Restoration of biological soil crust in a warming climate

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US Geological Survey, Northern Arizona University, Rim to Rim Restoration

"Late successional"   "Early successional"

mosses

lichens

dark cyanobacteria

light cyanobacteria
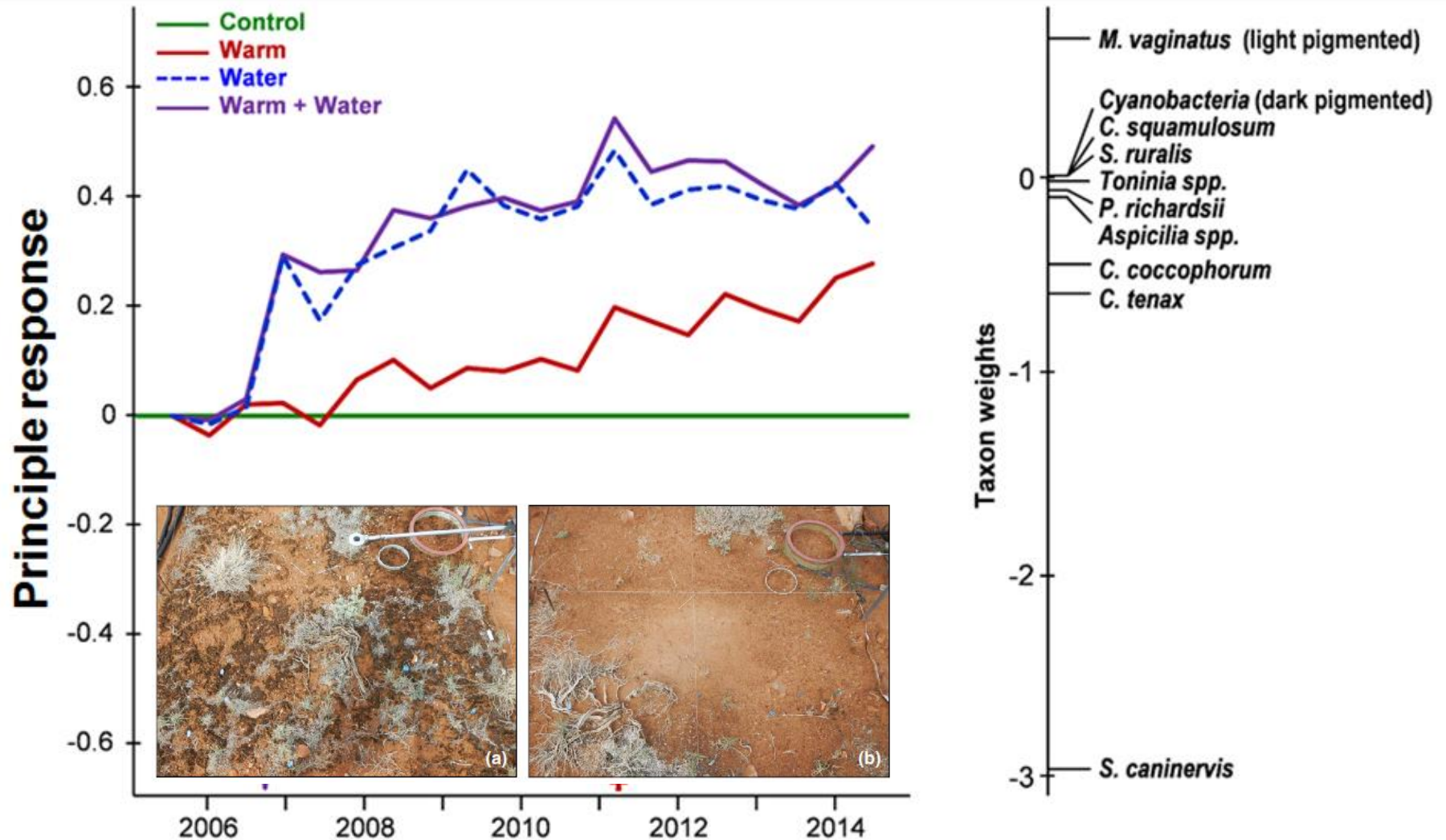
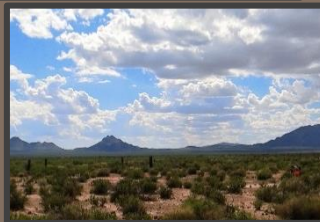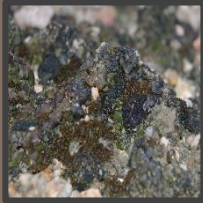# Climate change may complicate restoration efforts
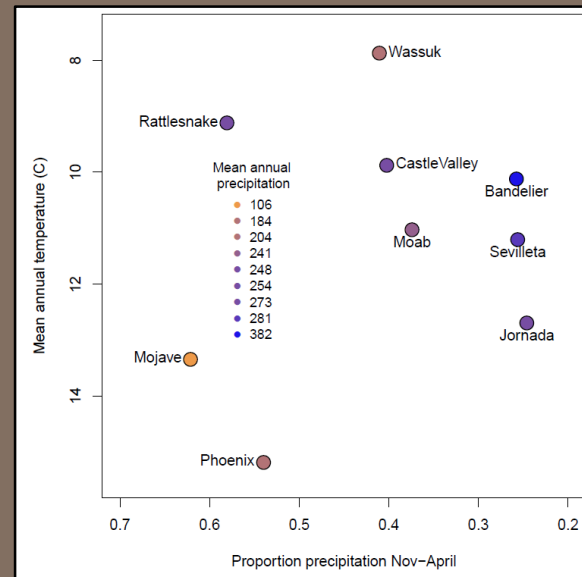
Climate change may complicate restoration efforts
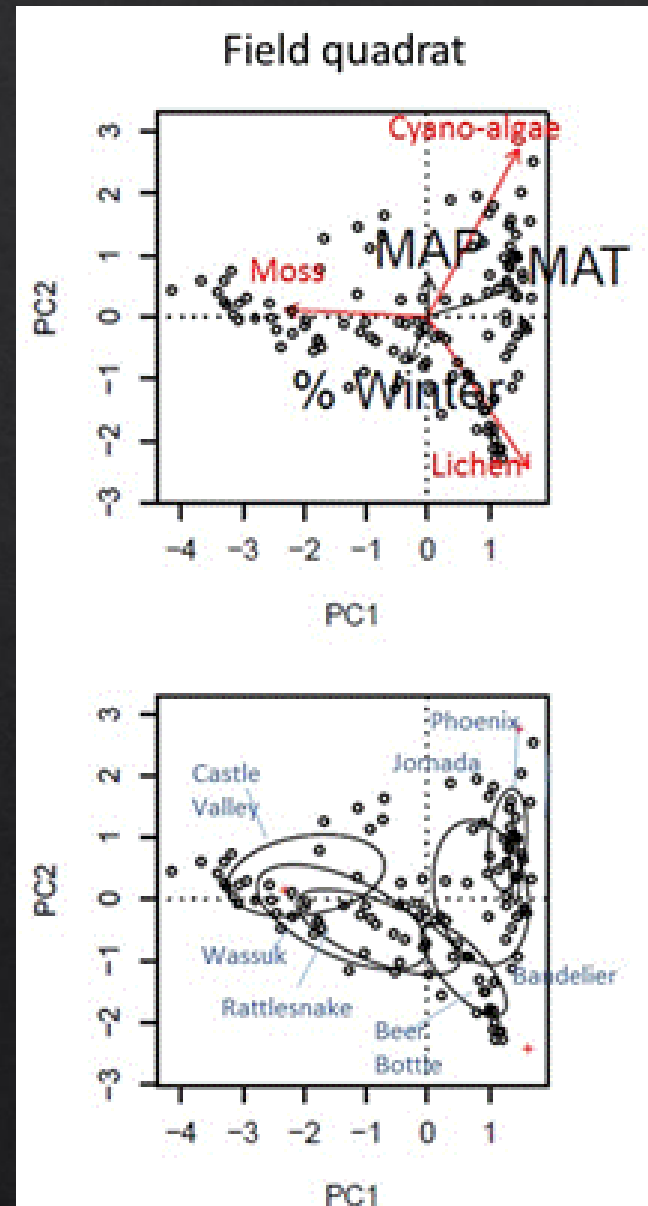
Is assisted migration a viable solution?

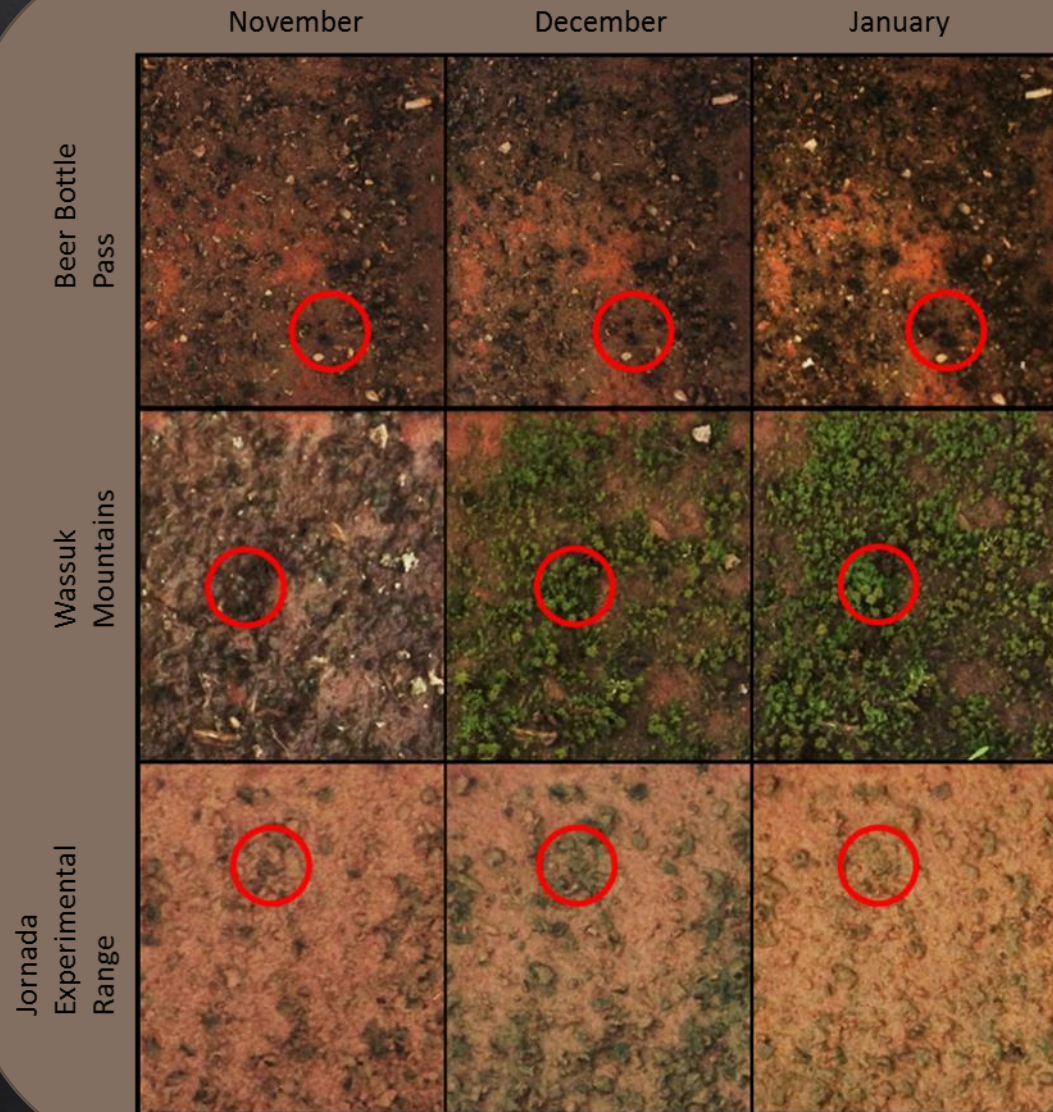# Is assisted migration a viable solution?

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Biocrust communities across the western US show strong climate-associated community functional composition.
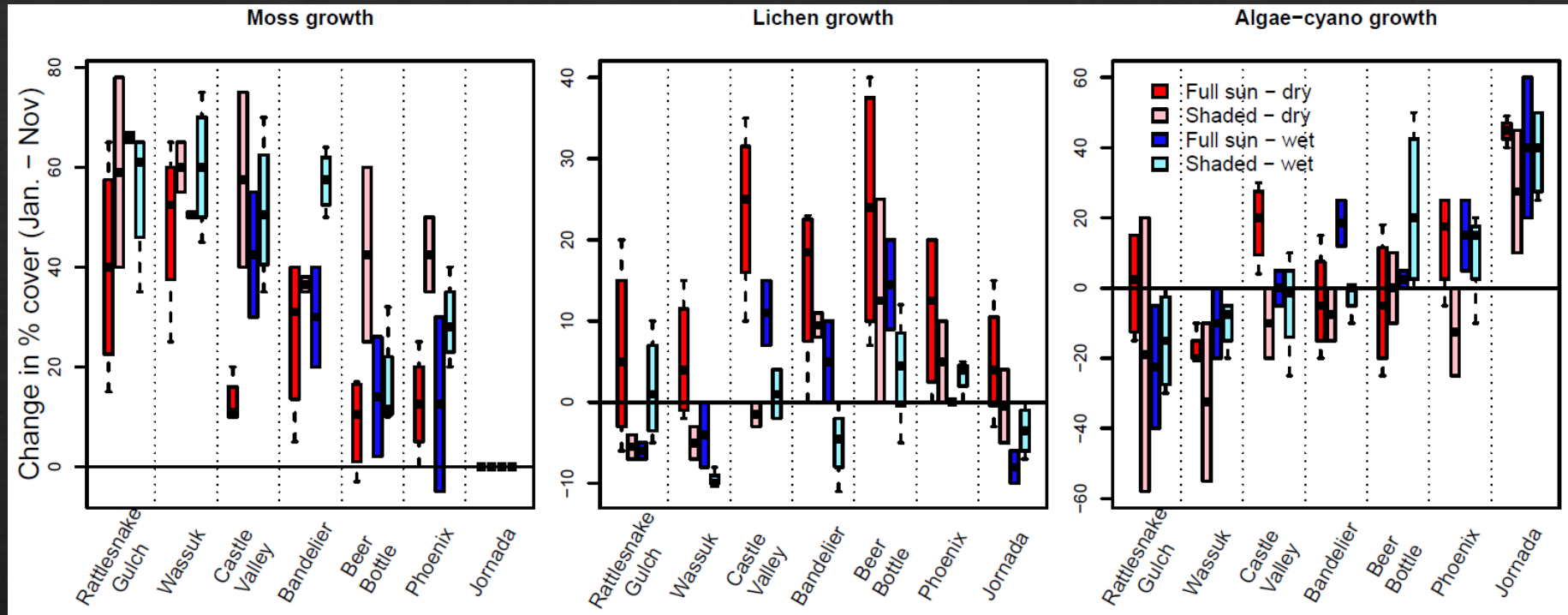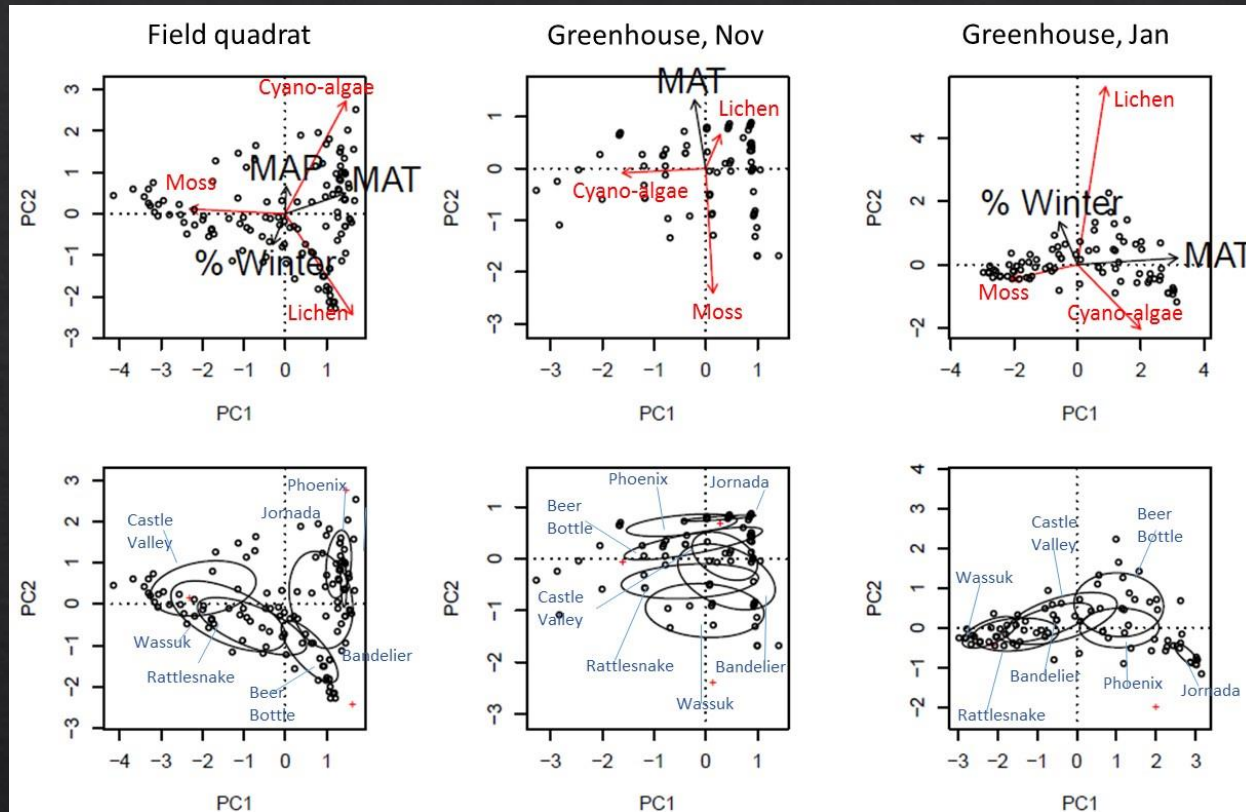
Is assisted migration a viable solution?

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Moss, lichen and cyanobacteria cultivated in the greenhouse show different growth patterns in response to water and shading.

Is assisted migration a viable solution?

After 2 months of bulking in the greenhouse, community functional composition and climate space mirrors that of the field harvest site.
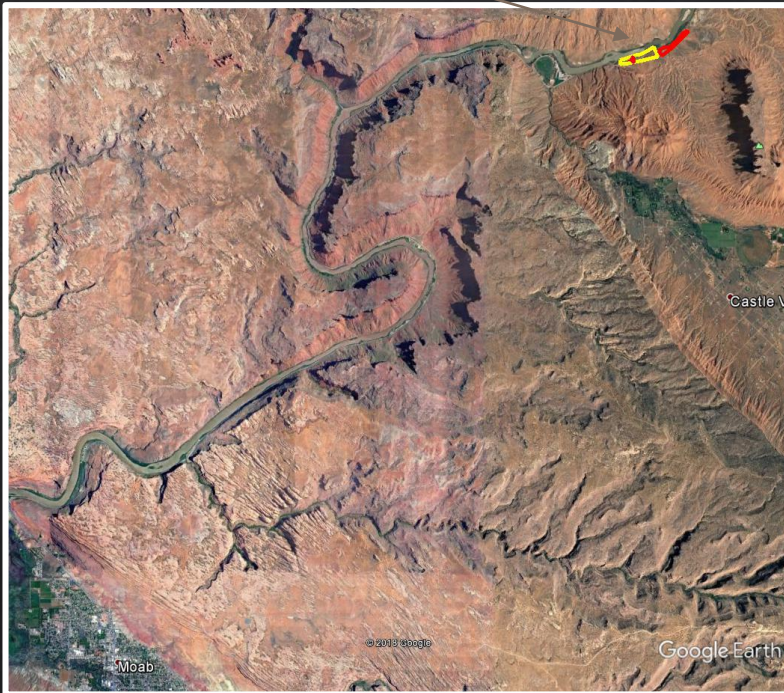
Is assisted migration a viable solution?

Warming and "softening" trial:

- Biocrust grown under heat lamps.
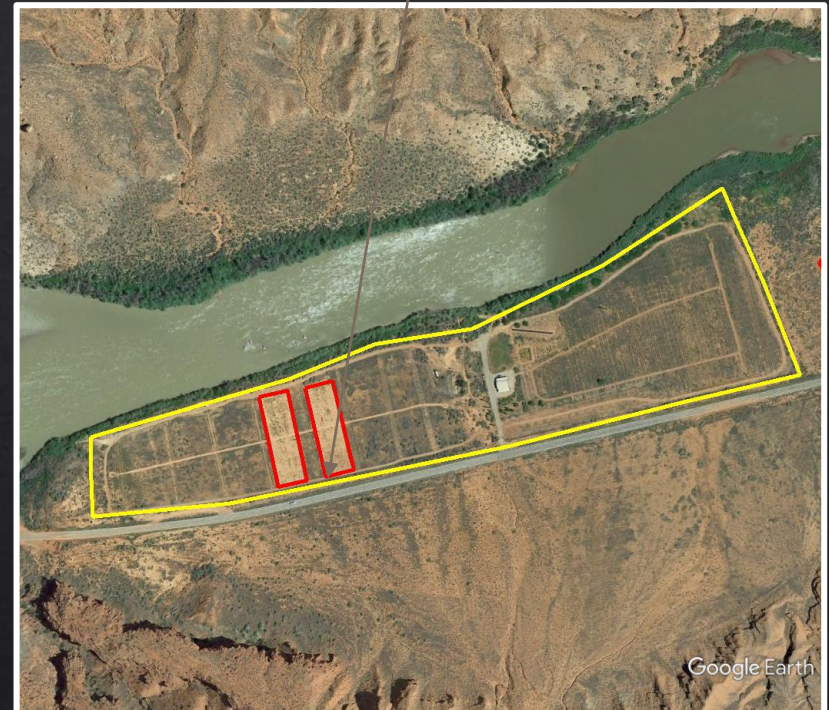- With shade and weed cloth

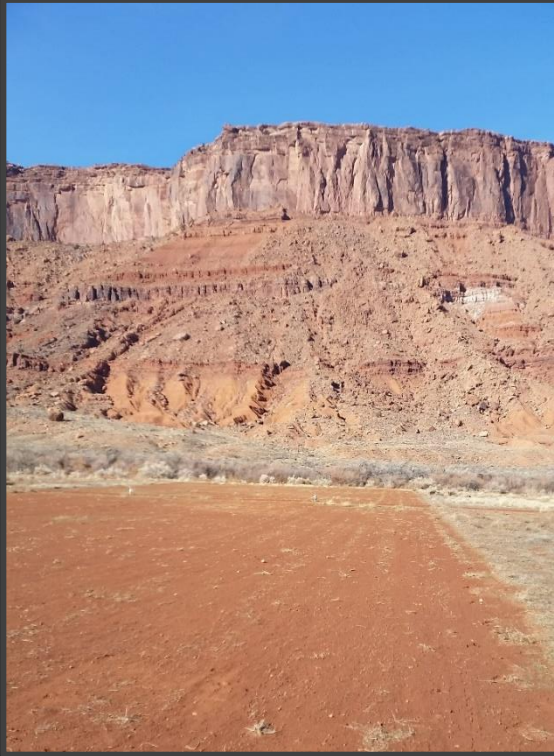# Biocrust nursery at Mayberry Native Plant Propagation Center

Mayberry is here

Two cleared, leveled 0.8 acre fields

Biocrust nursery at Mayberry Native Plant Propagation Center

1. Late successional biocrust on the Colorado Plateau are inhibited by warming.

2. Regional patterns of biocrust growth in relation to climate, and responses to greenhouse treatments suggest some suitability for assisted migration trials, we are still evaluating field warming-restoration for more a definitive answer

3. In the meantime we are beginning to upscale our cultivation approaches to provide suitable material sources for larger scale restoration efforts.
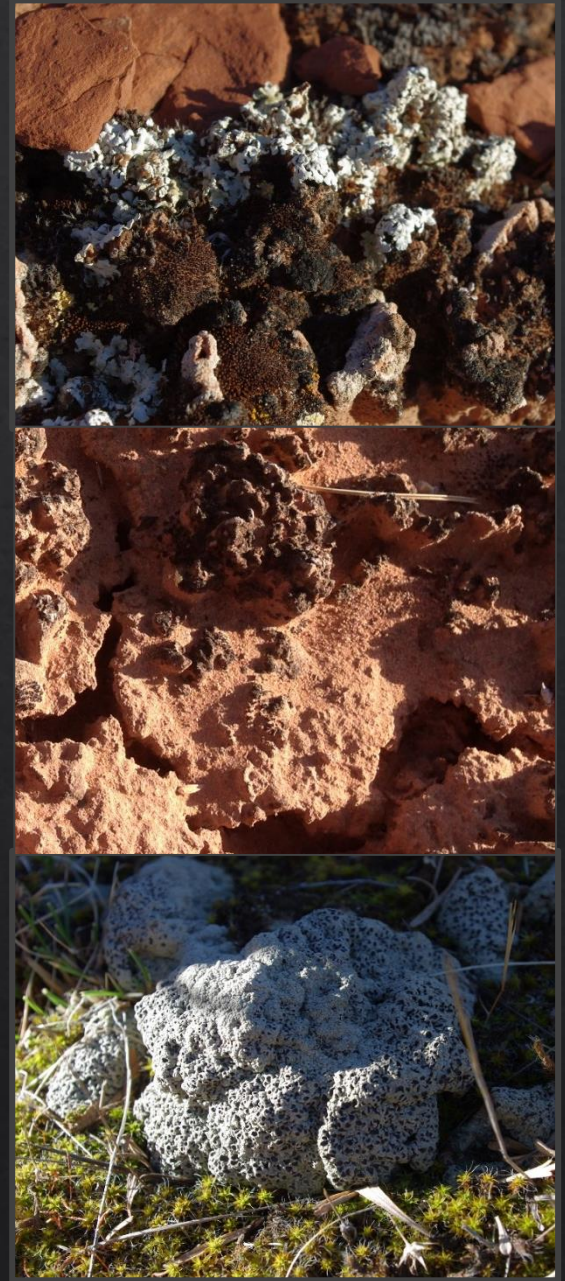
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