Seed bank and existing plant community mismatch: Potential impacts on climate change induced species range shifts

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Seed bank and existing plant community mismatch: Potential impacts on climate change induced species range shifts

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Results

Seedling Emergence (Figure 2, grey)
- 65% Annual Forbs
- 15% Annual Grass
- < 2% Sagebrush
- 10% Perennial Grass

Plant Community (Figure 2, white)
- < 2% Annual Forbs
- 5% Annual Grass
- 34% Sagebrush
- 47% Perennial Grass

How does the seed bank composition compare to the existing plant community composition in big sagebrush plant communities adjacent to the leading edge?

Methods

- Sampled at 3 field sites adjacent to the leading edge (Figure 1, yellow stars)

Seed bank
- Cores (6.5cm diameter, 5cm deep)
- 3 cores under shrub canopy & 3 cores in surrounding interspace (1 set) – 30 sets per site (A)
- Transferred to greenhouse for seedling emergence (B)
- Seedlings identified then removed (C)

Plant Community
- 3 – 100m² plots at each site
- 30 – 0.1m² quadrats (species composition and cover)

Figure 1. Map of big sagebrush leading and trailing edges. Leading edge is represented in blue, trailing edge is represented in red, and stable areas in grey. Yellow stars are site locations.

Figure 2. Relative seedling emergence vs. plant community cover across the sites (1, 2, 3).

Conclusions & Implications

- Over-representation of annual species in seed bank compared to plant community
- Under-representation of big sagebrush in seed bank compared to plant community
- Less than 30% similarity between seed bank and plant community composition
- The dominant species in these big sagebrush communities have a transient seed bank

Even though we expect an increase in habitat suitability for big sagebrush under future climate conditions at sampled locations, the current mismatch between plant community and the seed bank could impede big sagebrush range expansion into increasingly suitable habitat in the future.

References