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Assessment of Post-Fire Rehabilitation of Desert Tortoise Habitat in Clark County: Project 2009-USGS-808A

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U.S. Geological Survey

Overview

- **Historical background of project**
- **Project goals and approach**
- **Progress to date**

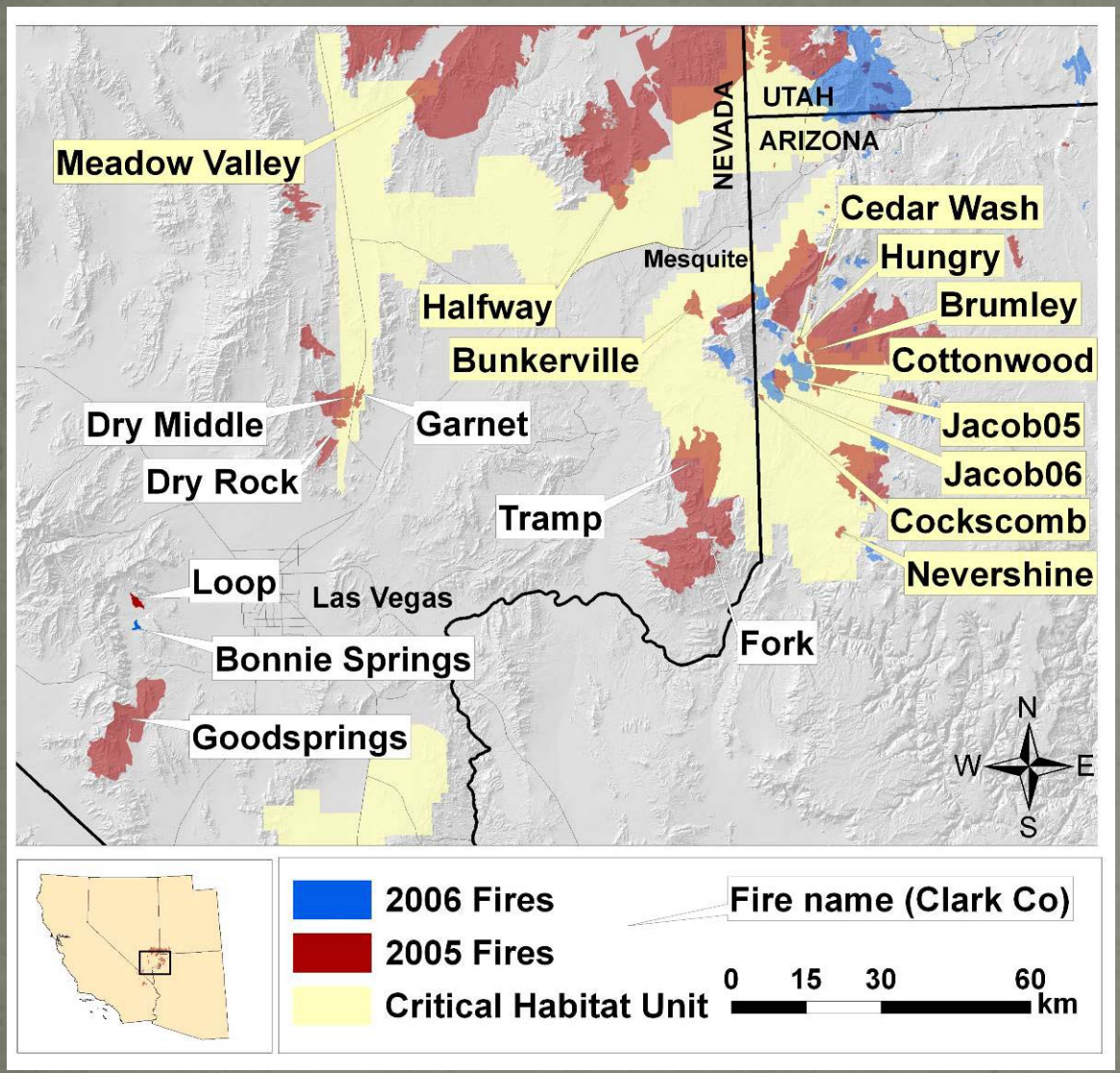
Background of Problem

- Mojave fires have increased in frequency and size (Brooks & Matchett 2006)
- Resprouting of native shrubs is limited (DeFalco et al. 2010)
- Little is known about recovery and rehabilitation of burned desert shrublands (Abella and Newton 2009)

- Fires alter habitat for sensitive wildlife species (Esque et al. 2003)

Photos: LA DeFalco, USGS

Wildfire Reduces Canopy Cover and Forage for Desert Tortoises



Nevada (11 fires)

- BLM ES&R (34%)
- CC DCP (21%)
- USGS (10%)

- Arizona (8 fires)
- BLM ES&R (20%)
- BLM, Arizona Strip (15%)

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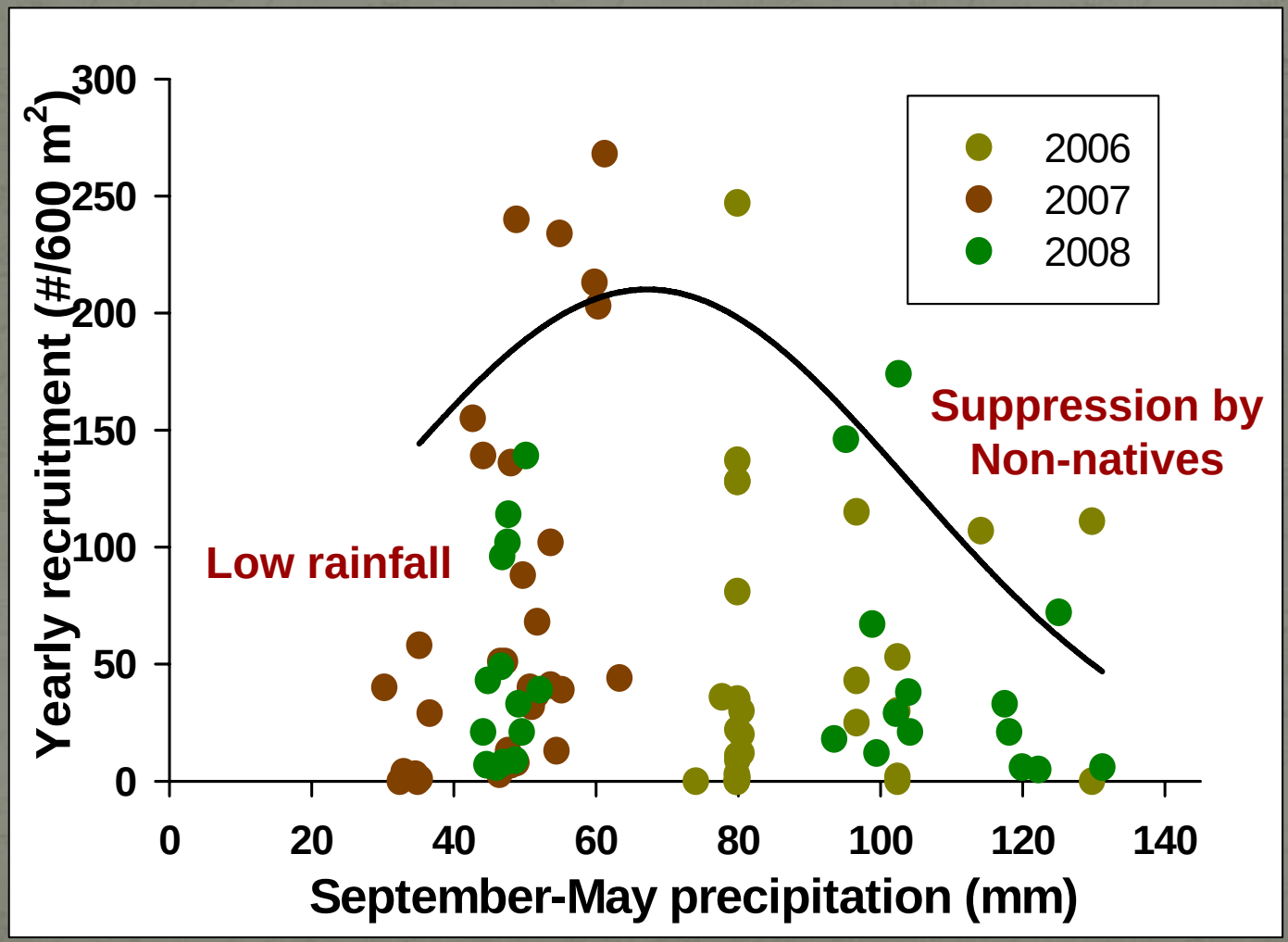
Potential Limitations to Perennial Plant Establishment



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Project Goals

- Goal 1: Predict areas with high fine fuel production in desert tortoise habitat
- Goal 2: Determine recommended rehabilitation treatments that are appropriate for burned tortoise habitat
- Goal 3: Identify appropriate native Mojave Desert species for rehabilitating burned tortoise habitat

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Project Progress

- Goal 1: Predict areas with high fine fuel production in desert tortoise habitat
  - Collect plot-level rainfall data to validate use of spatially-explicit precipitation models
  - Quantify fine fuels (peak production of exotic and native annuals) across plots
  - Correlate fine fuel production with model output of precipitation
  - Identify areas for fine fuels management based on model

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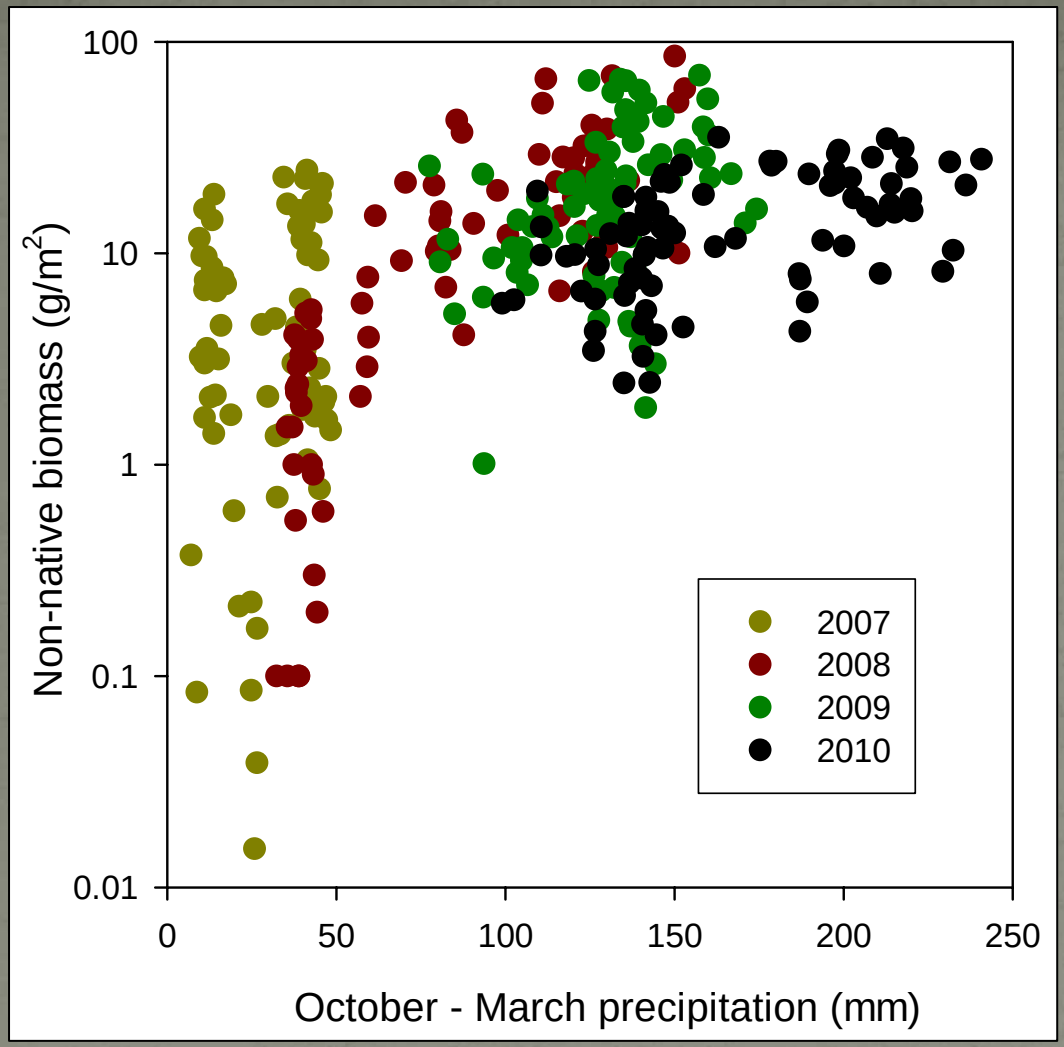

- 2010 biomass collected, and weighing completed
- 2011 biomass collected; weighing in progress

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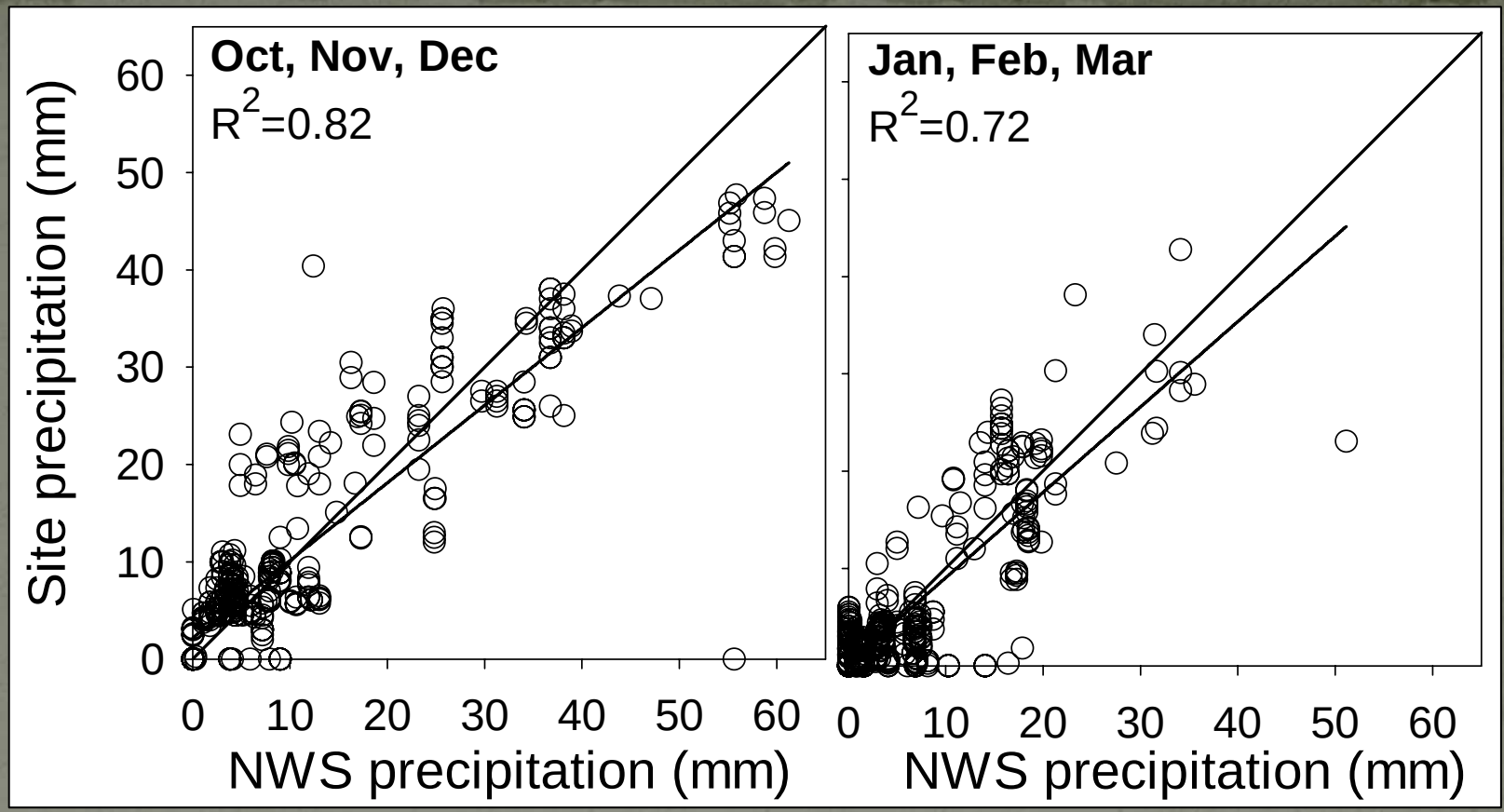

- QA/QC of recent plot-level precipitation in progress
- Initial validation with available spatial models (National Weather Service vs. PRISM) for identification of areas for fuel management

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Project Progress

- Goal 2: Determine recommended rehabilitation treatments that are appropriate for burned tortoise habitat
  - Monitor native and exotic plant establishment in areas treated after the wildfires
  - Evaluate the influence of climate on plant establishment in treatment areas
  - Evaluate appropriate rehabilitation treatments

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Rehabilitation Treatments

<u>Dec 2005/Nov 2006: Seeding</u>

- Seeding with native shrubs, perennial grasses and forbs

<u>Oct-Nov 2007: Outplanting</u>

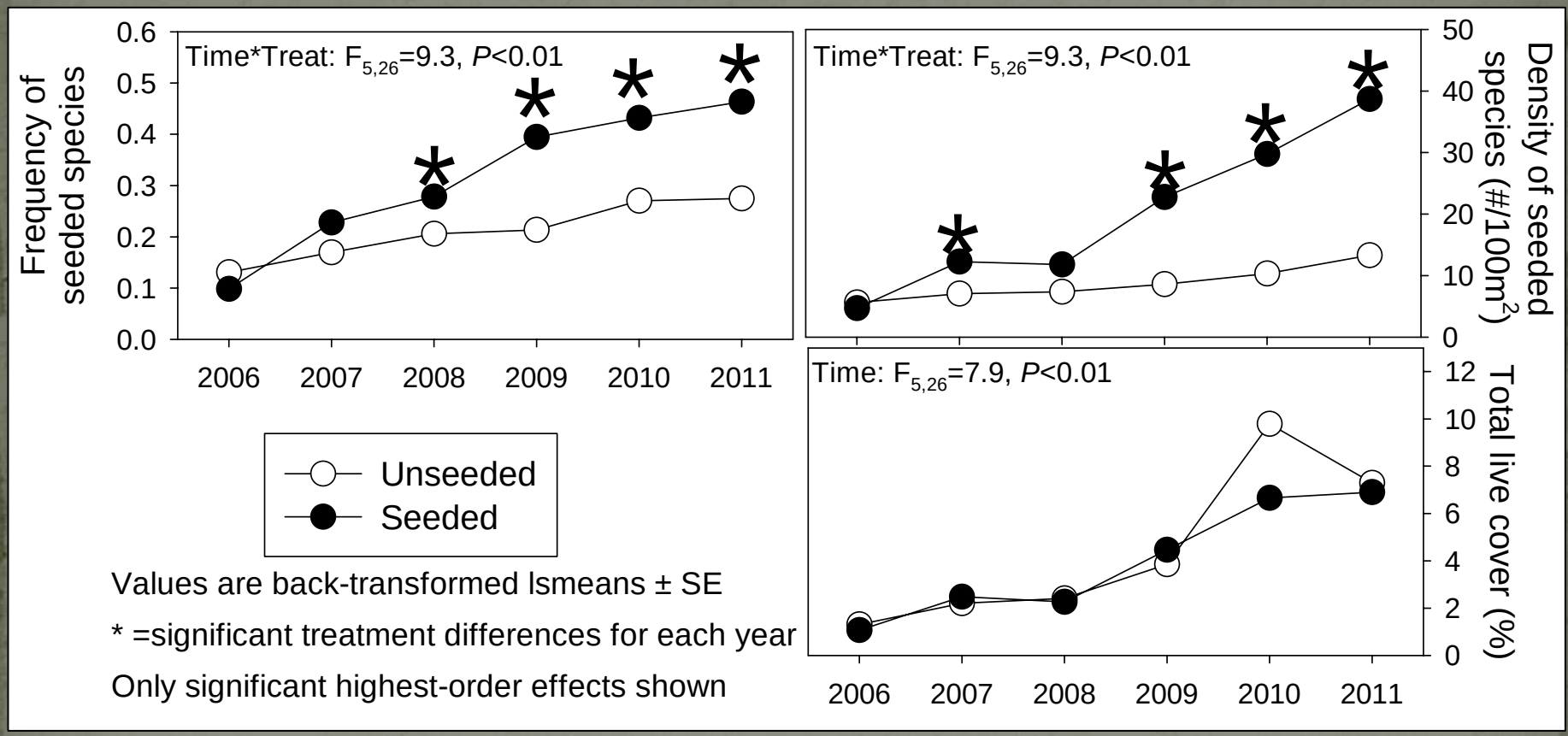
- Blackbrush/Mormon tea
- Soil moisture treatments

<u>Oct 2008: Herbicides</u>

- Pre- and post-emergent
- Hand-seeding with natives

Photos: LA DeFalco, USGS

Seeding Success



- QA/QC of plot-level precipitation in progress for evaluating climate influence on establishment and to determine suitability of seeding

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Outplanting of Seedlings With Soil Moisture Manipulations

Photos: LA DeFalco, USGS

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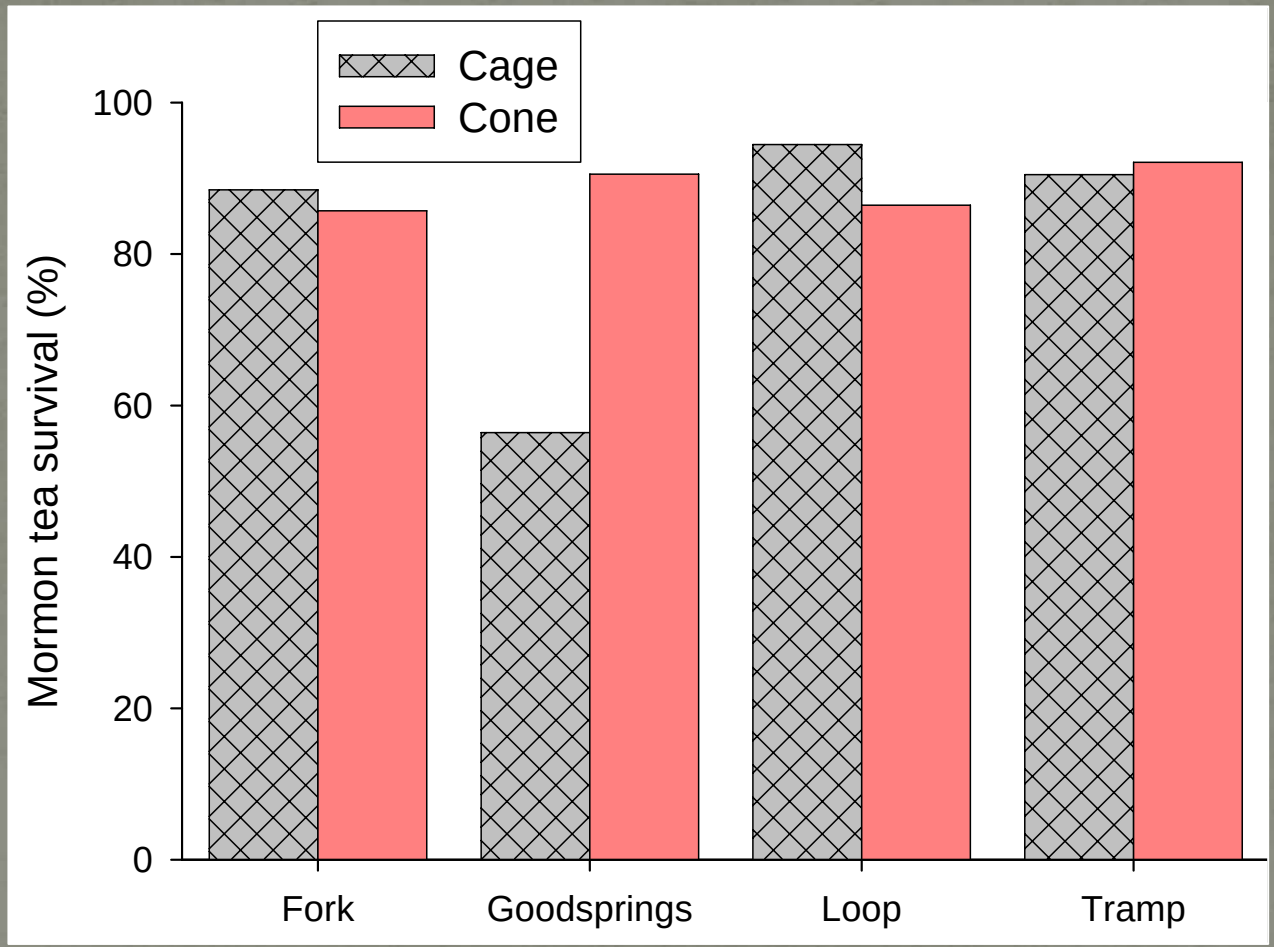
Mormon Tea (*Ephedra nevadensis*)



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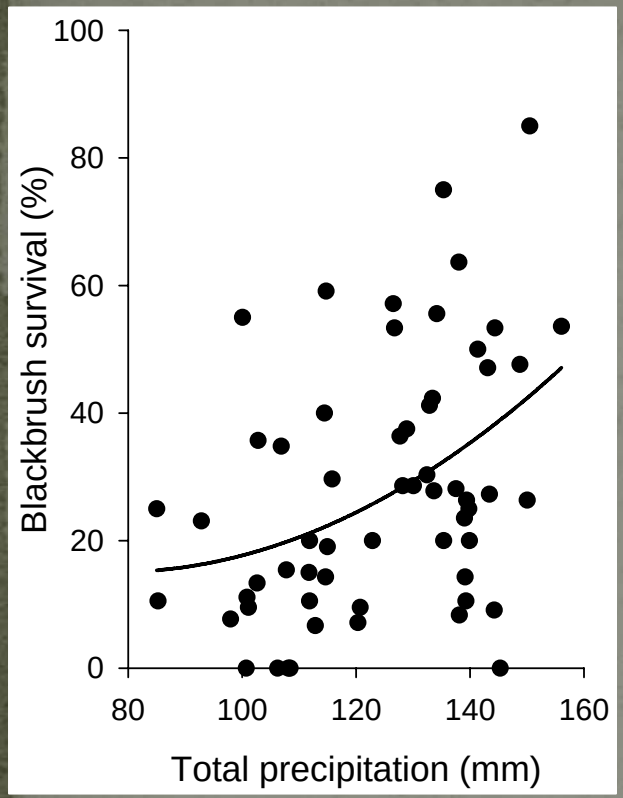
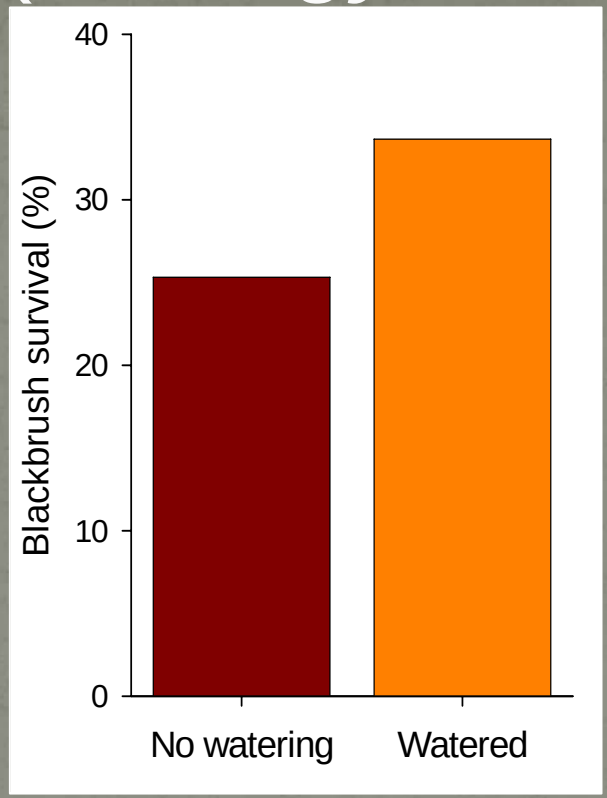
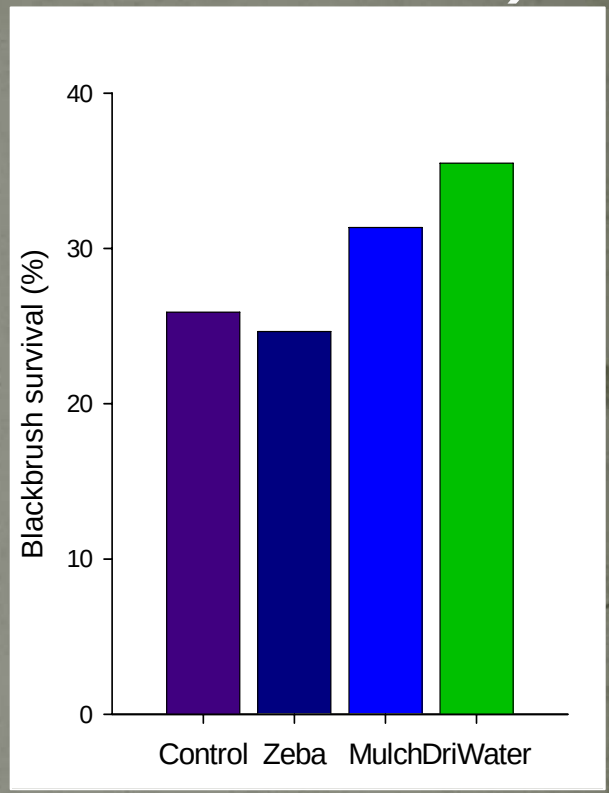
Blackbrush (*Coleogyne ramosissima*)







- QA/QC of recent plot-level precipitation in progress
- Updating 2011 census for final survivorship analysis and evaluation of climate influence for both species

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Herbicide Success

Herbicide plot in Dry Middle Fire, 2009

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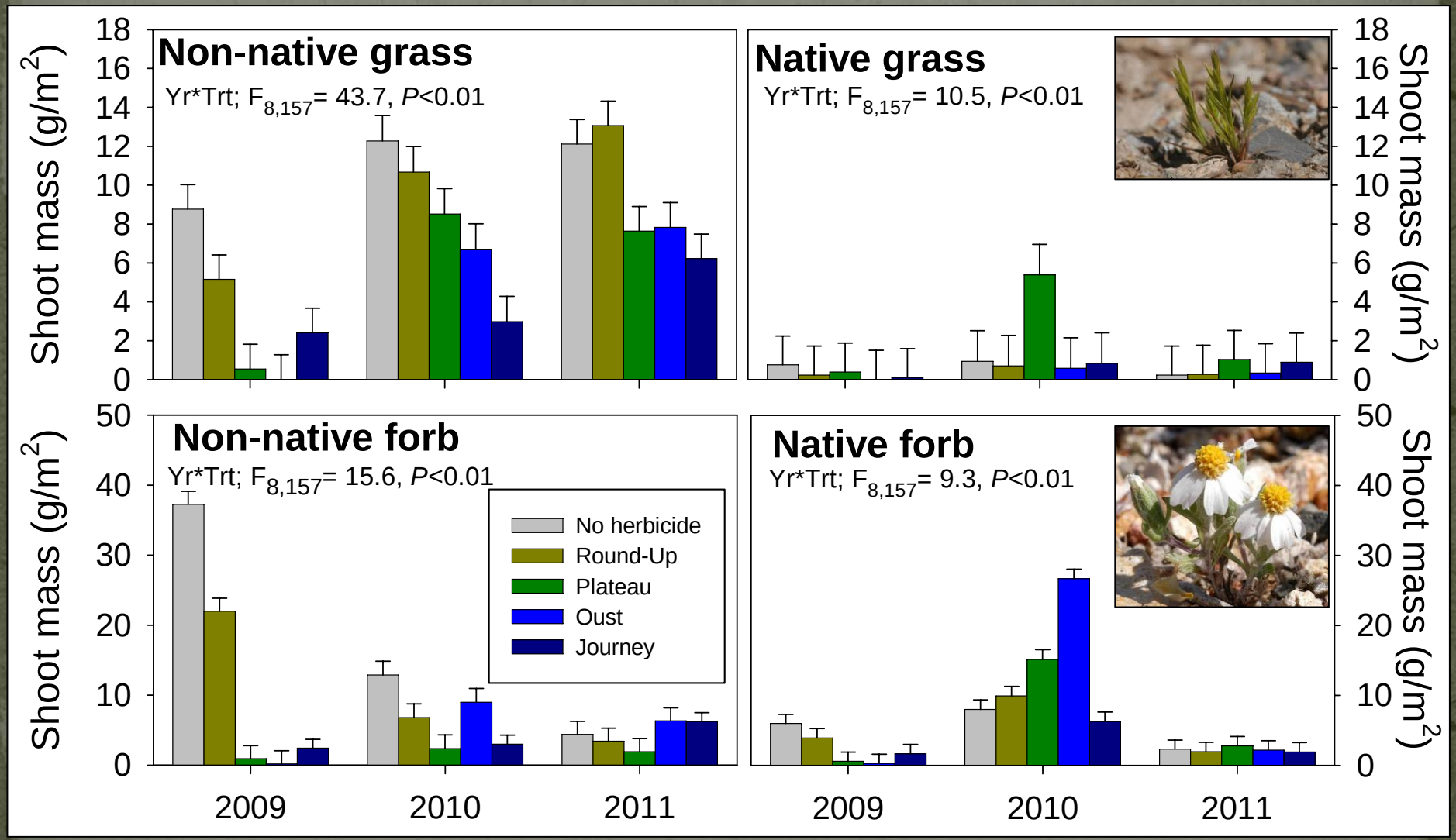
Annual Plant Production



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Project Progress

- Goal 3: Identify appropriate native Mojave Desert species for rehabilitating burned tortoise habitat
  - Establish seed bank
  - Evaluate adequacy of selected species and seeding rates on plant establishment
  - Estimate recovery times for plant cover and community composition

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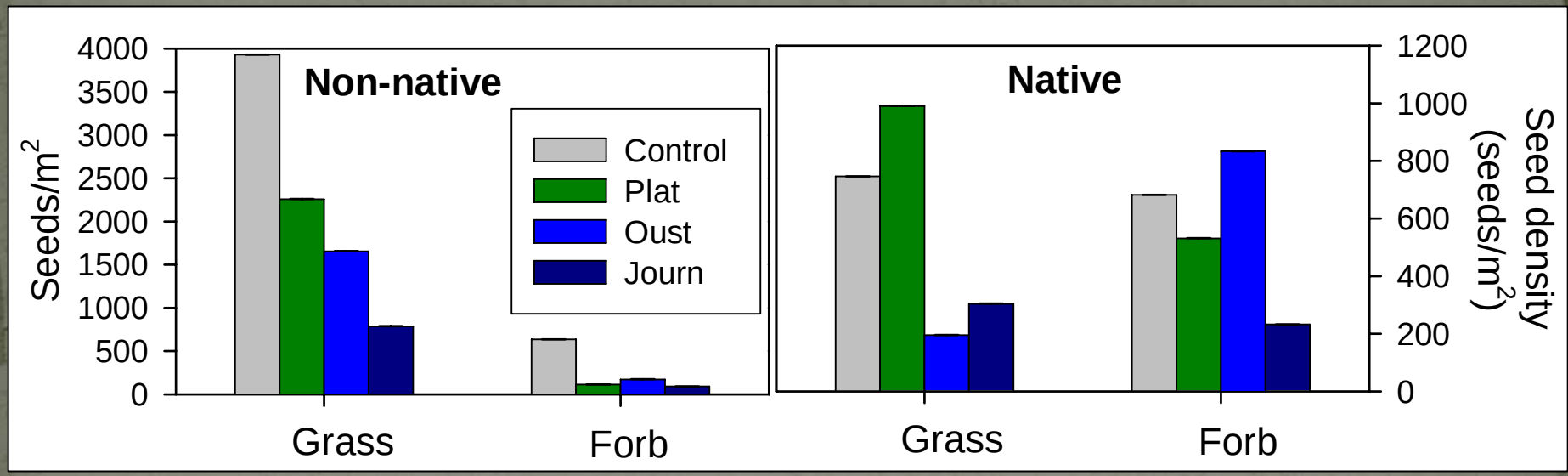
Seed Bank



- Seed bank assay for 2 years following herbicide treatment is complete; analyses initiated
- Seed bank assay for seeding treatments on-going (collect final samples in Sept-Oct 2011)

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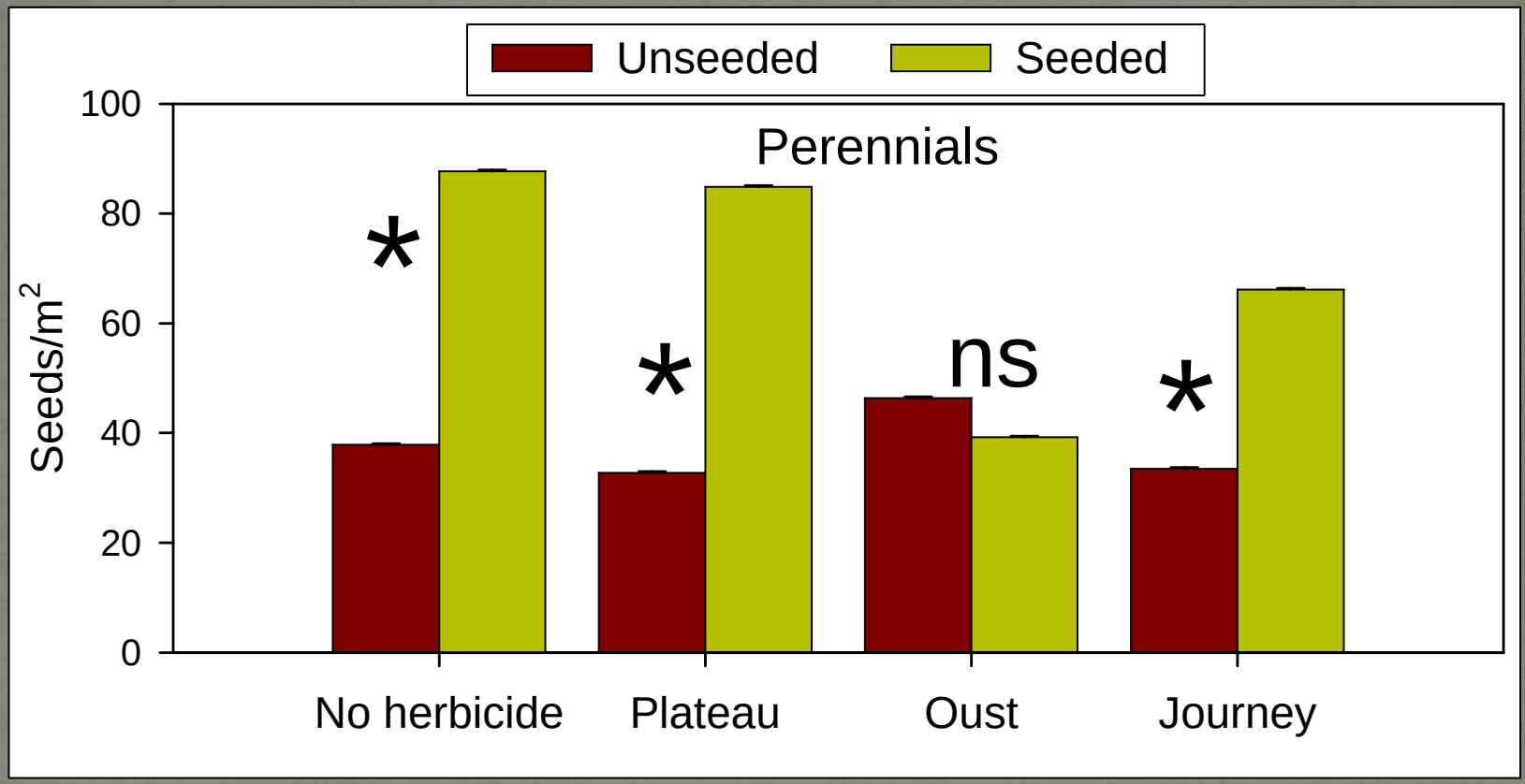
Unseeded
Seeded
Perennials
Seeds/m2
100
80
60
40
20
0
*
*
ns
*
No herbicide
Plateau
Oust
Journey

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Summary

- Majority of field data collection is complete (2010, 2011)
- Preliminary results are encouraging: seeding is effective based on seedling frequency and density as indicators; herbicides are effective, but may only provide narrow opportunity for reducing competition with non-natives
- Seeding treatment maintained higher seed densities in the seed bank two years after seeding and herbicide application
- In-depth analysis of data, particularly with available weather data, is expected to explain site-specific differences in rehabilitation success

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Acknowledgements

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- Student Conservation Association
- USGS staff

Photos: LA DeFalco, USGS

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