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

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Invasive Annual – Wildfire Cycle

Invasion

+

FIRE

Fire

Re-Invasion

Recovery

&

Rehabilitation

?

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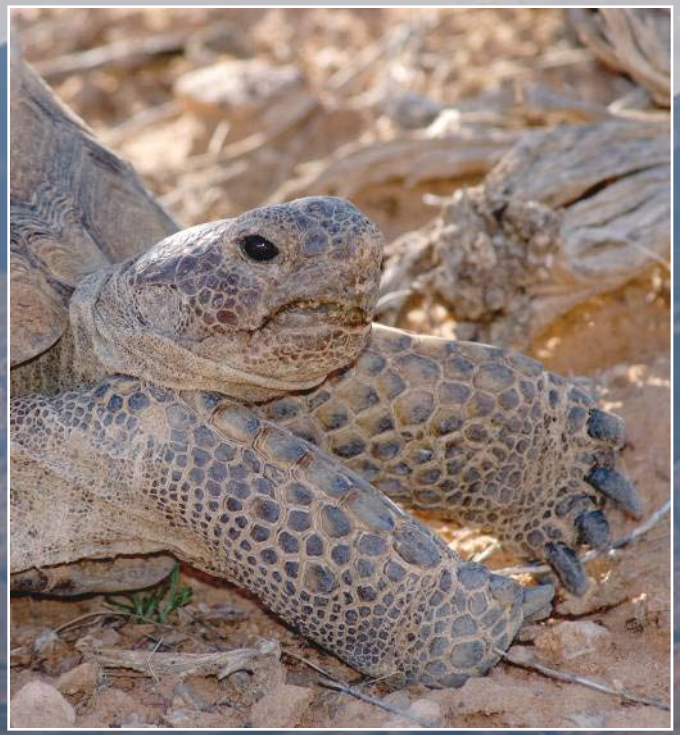
Negative Impacts of Wildfires



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Overview

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

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Historical Background of Project

- **June, 2005: Wildfires burn more than 500,000 acres of desert tortoise habitat in Nevada and Arizona**
- **December 2005: BLM implements restoration treatments as part of their Emergency Stabilization and Rehabilitation (ESR) Program**
- **Springs 2006 – 2009: USGS and UNLV monitor effectiveness of treatments following implementation**

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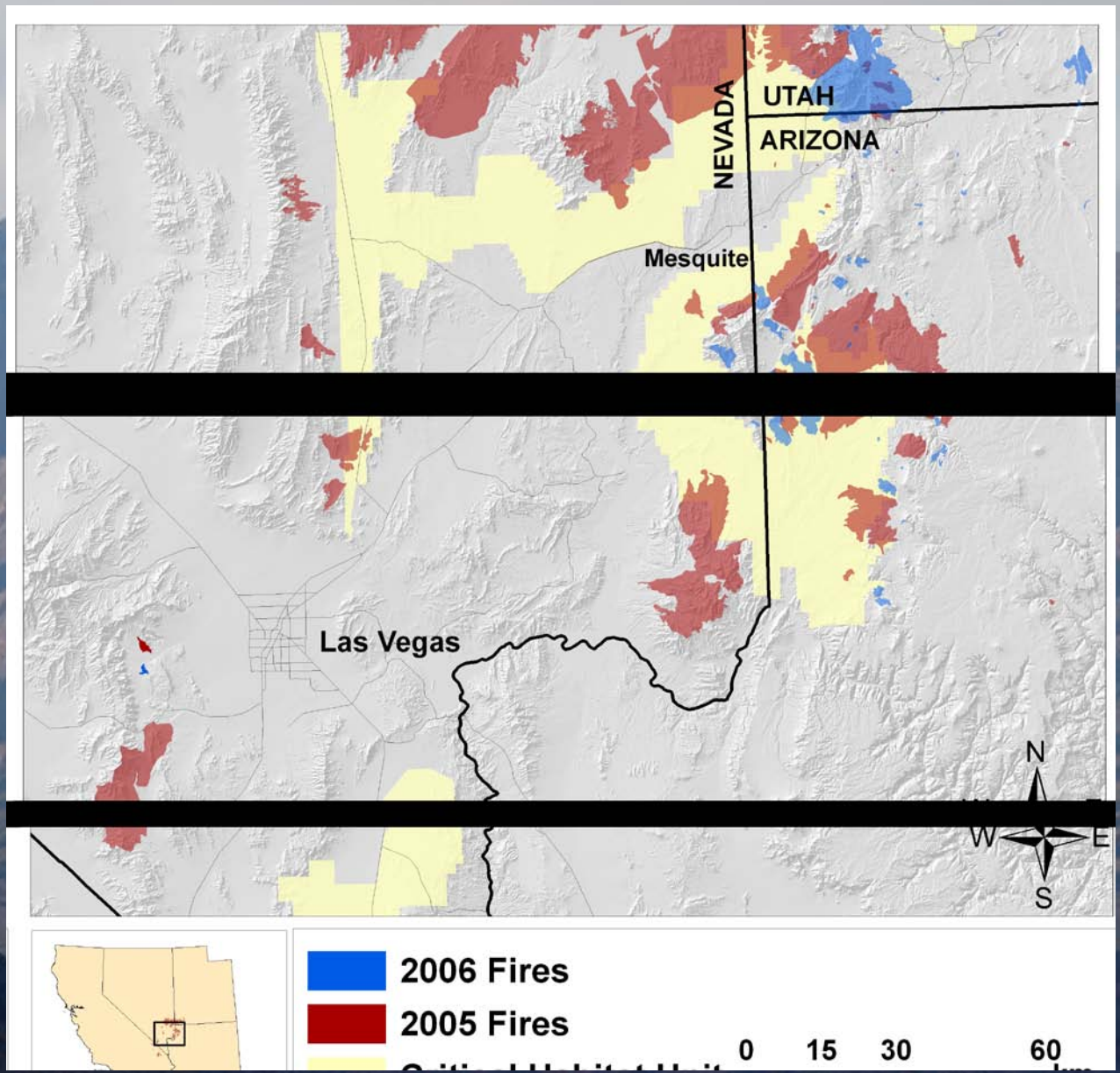
2005 & 2006 Wildfires



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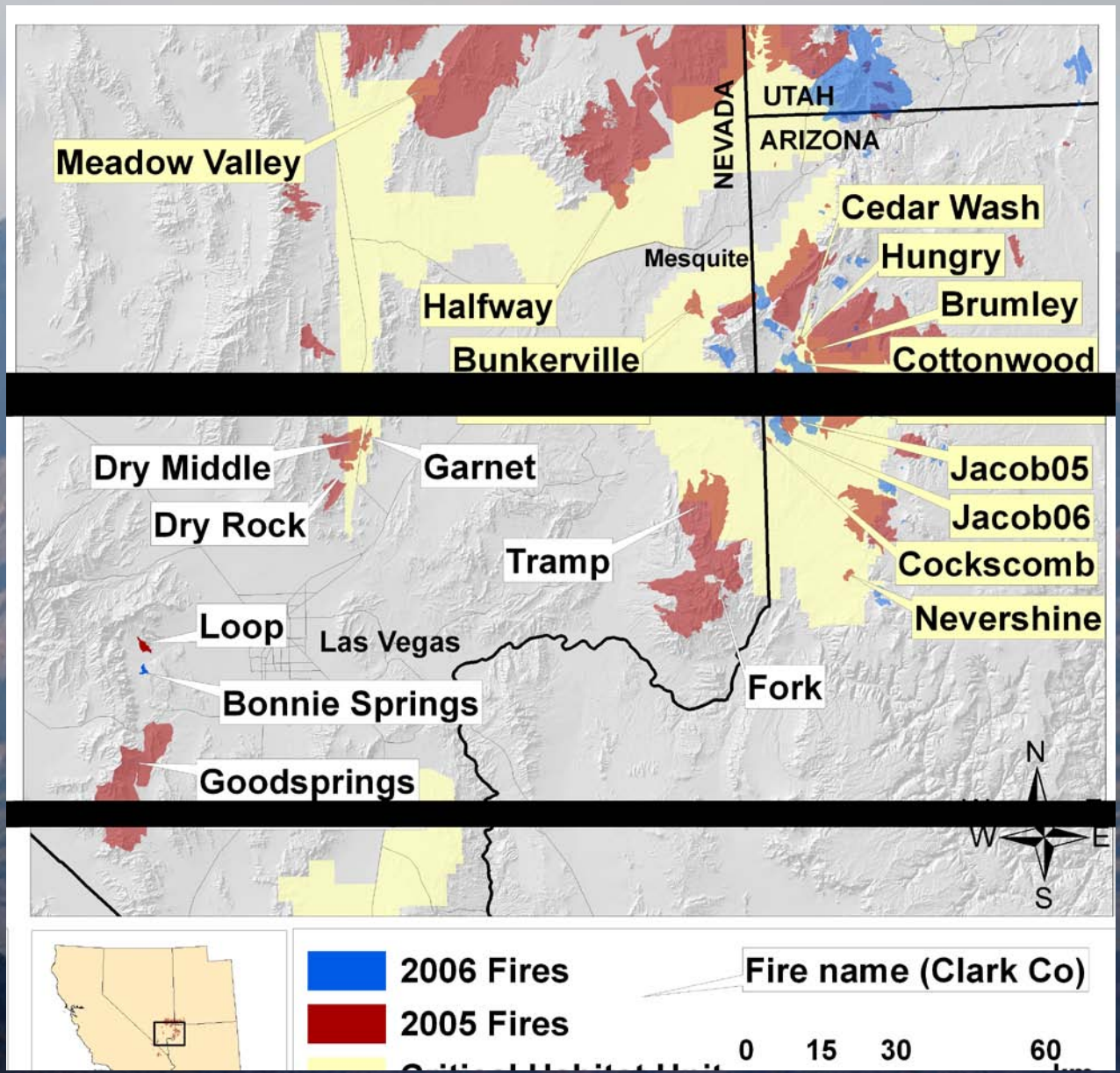
Regional Approach Using Network of Sites



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Seeding Treatments: Winter 2005 & 2006

- **Hand/aerial seeding in 6 fires (N=18 blocks)**
- **Native shrub/perennial grass (8-9 spp.) and annual grass/forb (5 spp.) seed mixes applied**

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- **<u>2006 – 2009 Monitoring</u>**
  - **Density of seedlings (ind/m^2)**
  - **Canopy cover (%)**
  - **Native and exotic annual plant abundance (%, g/m^2)**
  - **Seed bank (seeds/m^2)**

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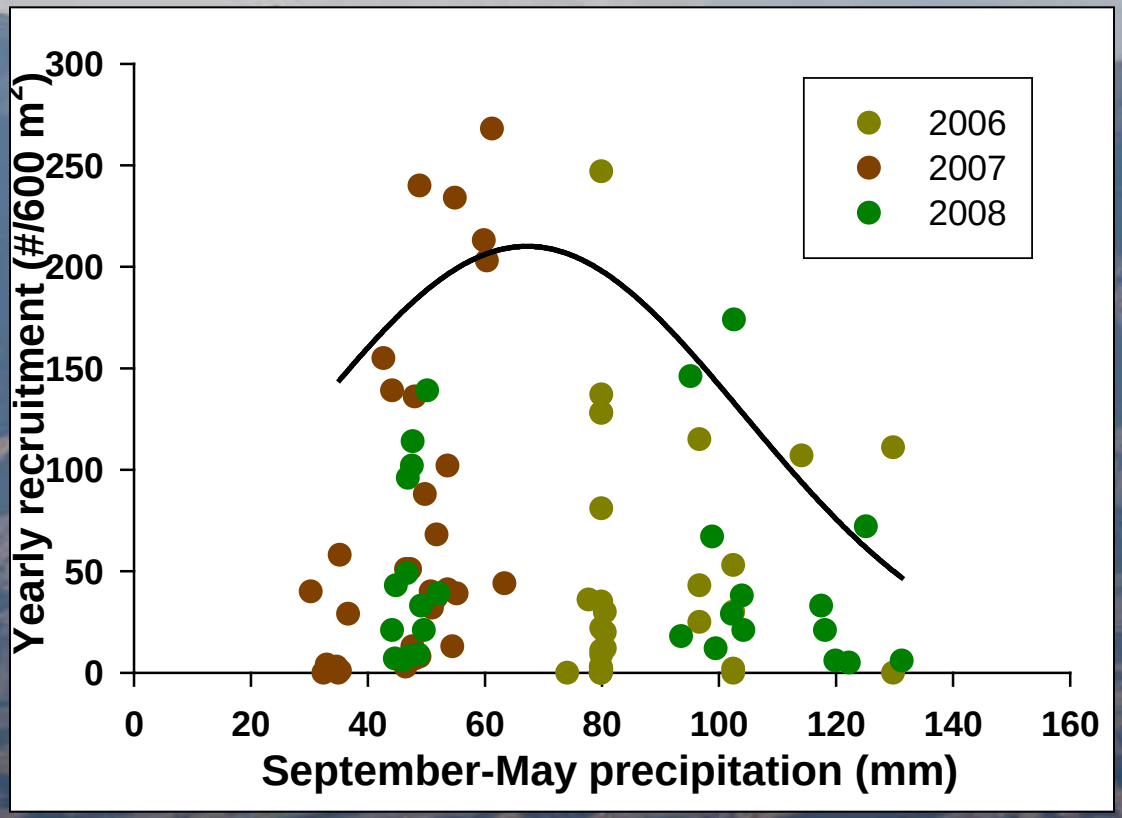
Understanding Limitations to Recruitment



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Transplanting Treatments: Winter 2007

- **3,591 blackbrush and Mormon tea seedlings transplanted in 60 “islands” across 4 fires**

- **Soil moisture amendments: DriWater, Zeba, mulch**
- **Monthly volunteer watering**

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- **<u>2008 – 2009 Monitoring</u>**
  - **Survival (%)**
  - **Phenology**
  - **Height (cm)**

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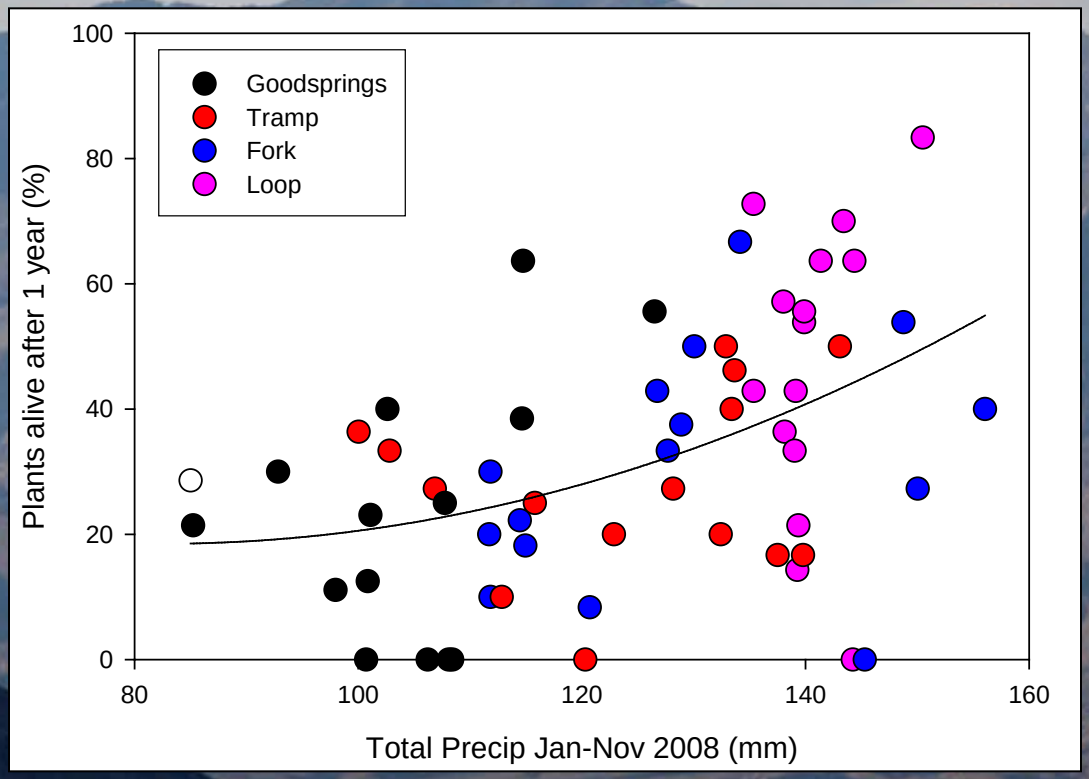
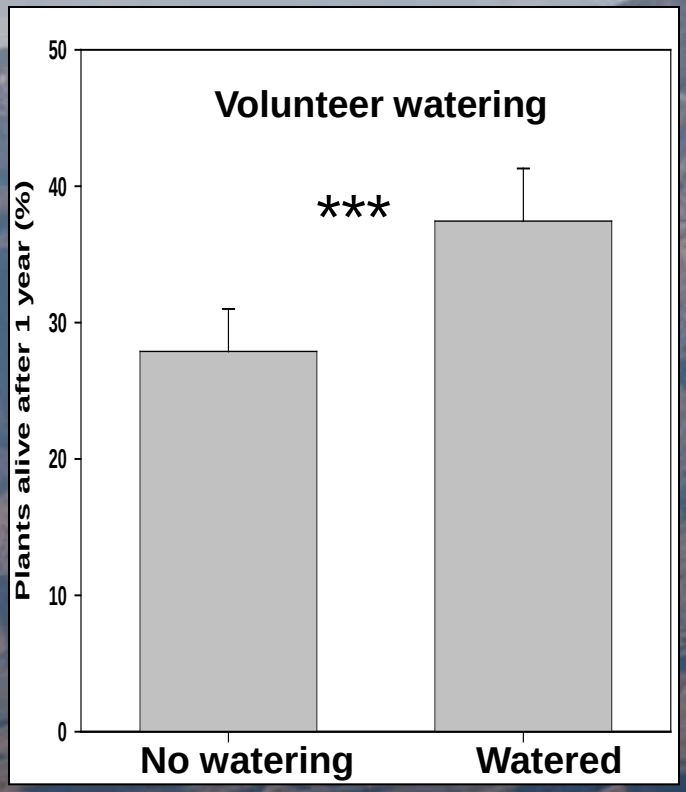
Short-term Transplant Success of Blackbrush Driven by Soil Moisture





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Herbicide Treatments: Fall/Spr 2008/09

- **Pre-emergent (Plateau, Oust) and post-emergent (RoundUp, Journey) herbicides at 4 fires (N=12 blocks)**
- **Native shrub and forb seed mix**

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- **<u>2009 Monitoring</u>**
  - **Density of seedlings (#/m^2)**
  - **Native shrub cover (%)**
  - **Native and exotic annual plant abundance (%, height)**

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Project Goals of 2009-USGS-808A

- **Goal 1: Predict areas with high fine fuel production in desert tortoise habitat**
- **Goal 2: Determine 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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2010 Project Progress (April – July)

- **Goal 1: Predict areas with high fine fuel production in desert tortoise habitat**
  - **Monthly rainfall at monitoring plots for validating use of spatially-explicit precipitation models**
  - **Quantified fine fuels across fires (peak production of exotic and native annuals)**

All raw data are in process of QA/QC

Annual plant samples are being weighed

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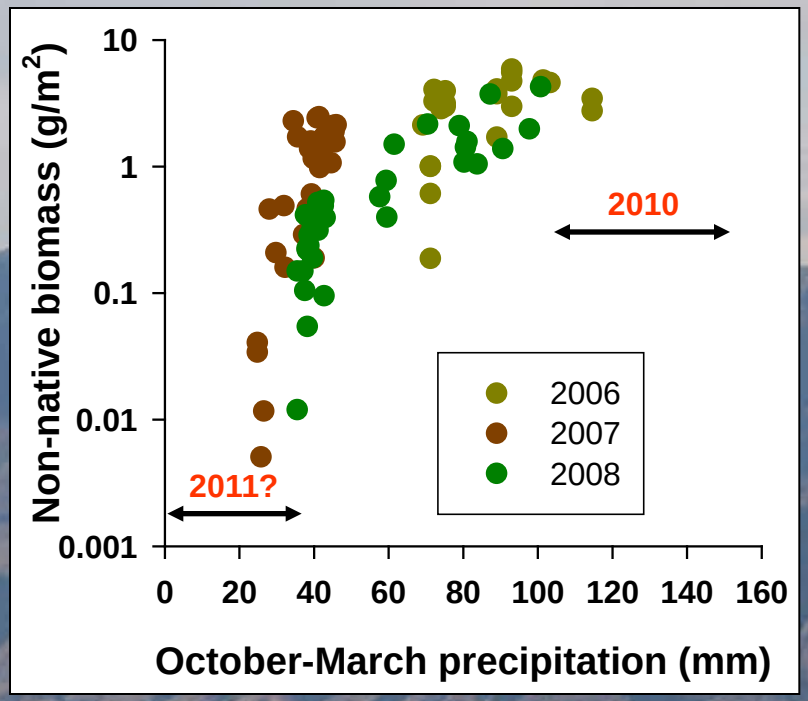
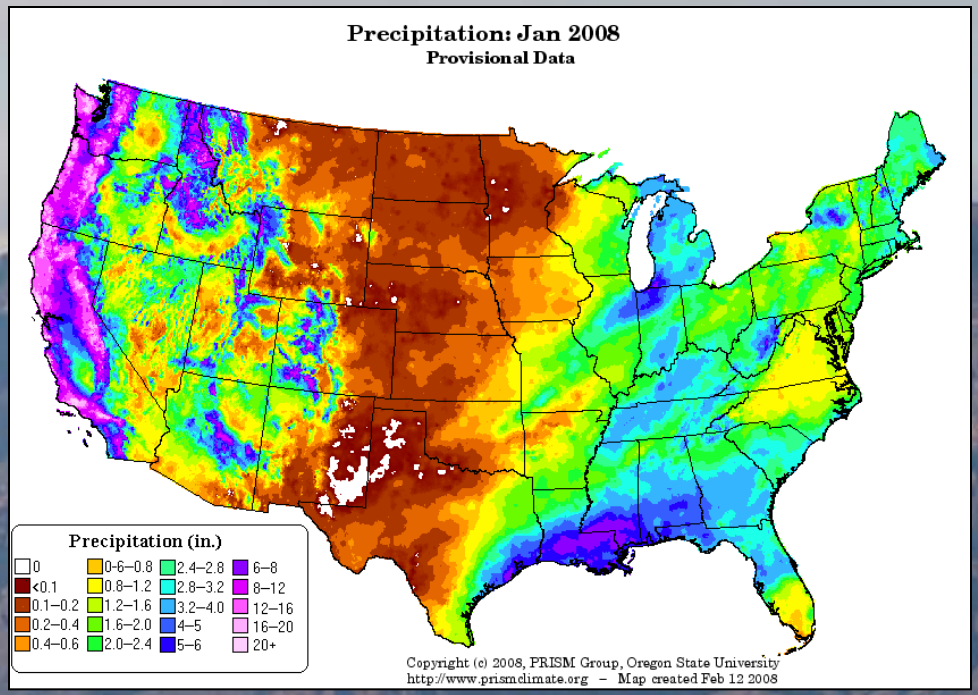
2010 Project Progress (April – July)





- Forthcoming: Spatially correlate fine fuel production with model output of precipitation (soils, if available)

- Forthcoming: Identify areas for fine fuels management

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2010 Project Progress (April – July)

- **Goal 2: Determine rehabilitation treatments that are appropriate for burned tortoise habitat**
  - **Measured native perennials and exotic annual plant establishment in treatment areas:**
    - **» Areas seeded in 2005/2006**
    - **» Seedling "islands" transplanted in 2007**
    - **» Herbicide plots sprayed in 2008**

All raw data are in process of QA/QC

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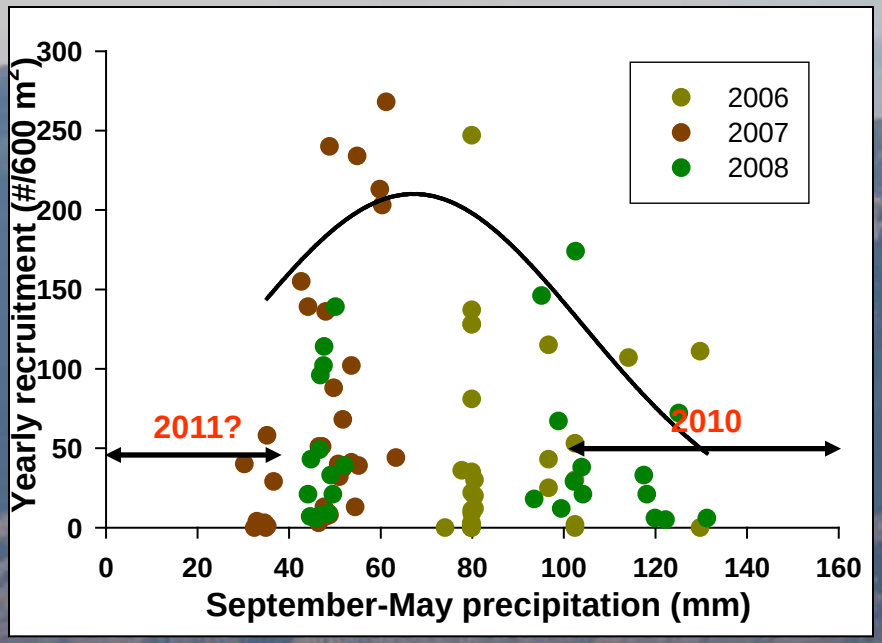
2010 Project Progress (April – July)

- **Goal 2: Determine recommended rehabilitation treatments that are appropriate for burned tortoise habitat**



  - **Forthcoming: Evaluate influence of climate (and soils) on plant establishment in treated areas**
  - **Forthcoming: Recommend appropriate rehabilitation treatments**

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2010 Project Progress (April – July)

- **Goal 3: Identify appropriate native Mojave Desert species for rehabilitating burned tortoise habitat**
  - **Fall: Collect seed bank samples to determine persistence of species in the seed bank**
  - **Forthcoming: Evaluate adequacy of selected species and seeding rates on plant establishment**
  - **Forthcoming: Estimate recovery times for plant cover and community composition**

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Acknowledgement of Support

- **Clark Co DCP**

- **Nevada BLM, Las Vegas and Ely Offices**
- **Arizona BLM, Arizona Strip Office**
- **US Fish and Wildlife**
- **NPS, Lake Mead NRA**
- **College of So Nevada**
- **Student Conservation Association resource interns**
- **USGS**
- **BLM Emergency Stabilization & Rehabilitation Program, USGS Invasive Species and USGS Priority Ecosystem Science Programs**

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