HEALTHY ENVIRONMENTS

University of California
Agriculture and Natural Resources

Making a Difference
for California

HEALTH

University *of* California
Agriculture and Natural Resources

Making a Difference for California

Large scale, low cost restoration of *Stipa pulchra* grasslands using herbicides.

Carl Bell, Marti Witter, and John Eckhoff

University of California Cooperative Extension, University of California Riverside, US National Park Service, CA Department of Fish and Game

HEALTHY ENVIRONMENTS

University of California
Agriculture and Natural Resources

Invasive Plants

Making a Difference for California

Why Herbicides?

- Low cost
- Effective
- Can be used early in the rainy season
  - Kill the weeds
  - Let the natives have the water
- Environmental pros and cons equivalent to other methods such as burning or grazing

San Diego Sites – CA DFG Rancho Jamul Ecological Reserve

Los Angeles Co. sites -US NPS Santa Monica Mountains National Recreation Area, Cheeseboro Canyon

- In an area with an existing, but sparse native stand of purple needlegrass;
  - Can we find post-emergence herbicides that are safe to apply **broadcast** over the native grass?
  - Will these herbicide treatments increase the cover and vigor of the needlegrass?

Imagery Date: 8/23/2010 1994 32°39'42.36" N 116°51'39.32" W elev 266 m Eye alt 371 m

HEALTH

University of California
Agriculture and Natural Resources

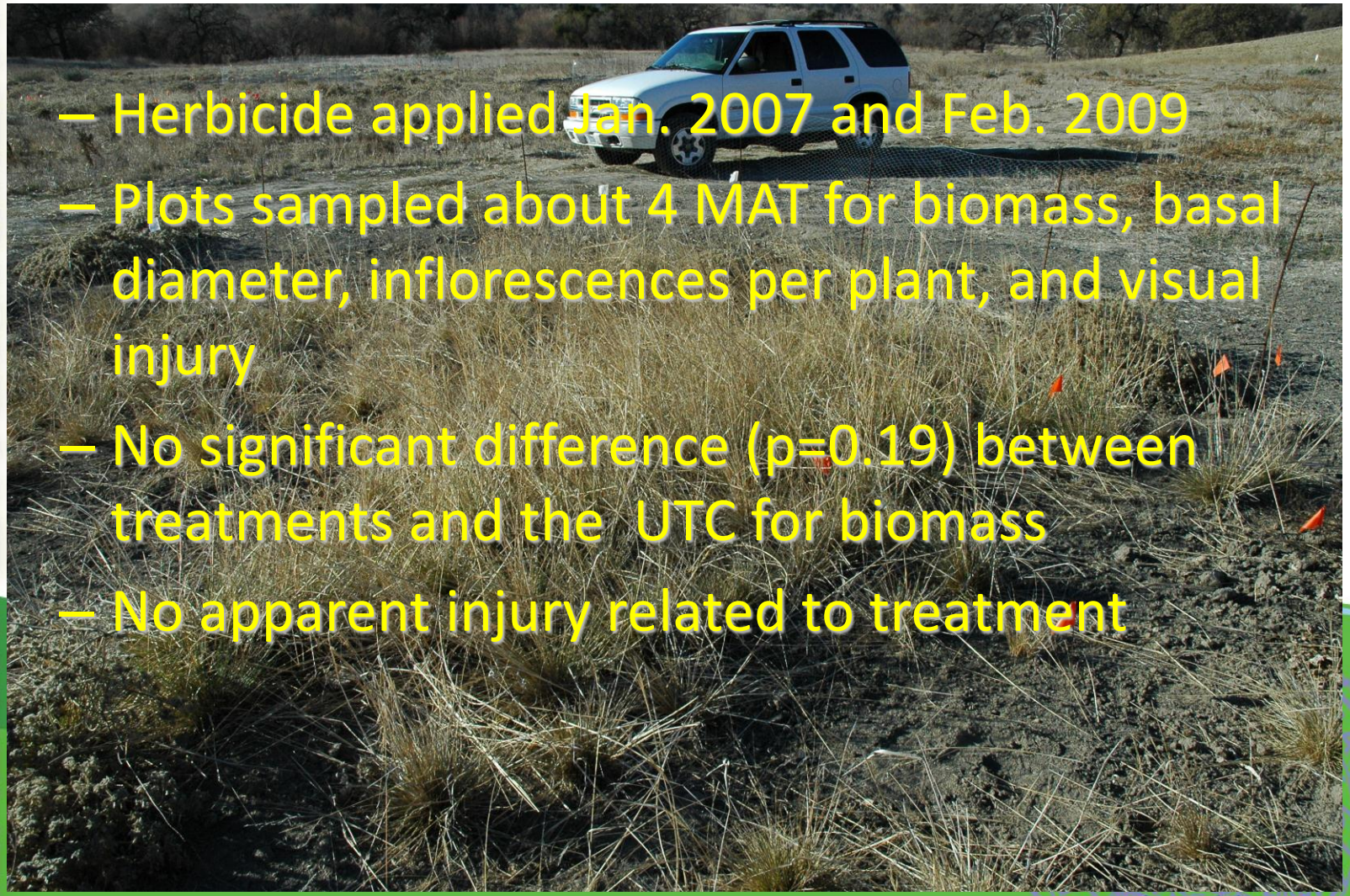
Making a Difference for California

Herbicide Selectivity can be based upon:

- Genetically different susceptibility
  - At the Class to Species level
  - Life history (annual vs perennial)
  - Or unique physiology
- Rate = amount of herbicide applied
- Plant phenology
- Season

- Herbicides applied in spring to established purple needlegrass, annually for 3 years.
- Herbicide treatments include:
  - **Fluazifop-butyl (Fusilade)**
  - **Clethodim (Envoy)**
  - **Glyphosate (Roundup)**
  - **Pelargonic acid (Scythe)**
  - **Imazapic (Plateau)**
  - **Trifluralin (Preen granules)**
  - **Aminopyralid (Milestone)**
  - **Triclopyr (Garlon)**

SMMNRA Research



- Herbicide applied Jan. 2007 and Feb. 2009
- Plots sampled about 4 MAT for biomass, basal diameter, inflorescences per plant, and visual injury
- No significant difference ($p=0.19$) between treatments and the UTC for biomass
- No apparent injury related to treatment

RJER Results

Treatment	Cover		Grams/plant		Basal diameter (cms)	
	site 1	site 2	site 1	site 2	Site 1	Site 2
Fusilade + Garlon LR	23.3	10.5	48.0	19.8	89	94
Fusilade + Garlon HR	30.0	18.8	56.0	21.8	72	106
Glyphosate LR	6.3	15	12.5	17.5	37	76
Glyphosate HR	0.3	9.5	0.8	12.5	7	80
UTC	0.5	6.3	9.0	8.5	23	67

HEALTHY ENVIRONMENTS

University *of* California
Agriculture and Natural Resources

Making a Difference for California

- There are no silver bullets
  - Fusilade alone was not sufficient
    - Vulpia myuros is resistant to Fusilade and all other grass herbicides
  - Glyphosate was safe and effective in some cases but not all
  - Fusilade plus Garlon or Milestone worked well, but;
    - Milestone and Garlon damage geophytes
- Regardless, some treatments increased needlegrass cover and vigor significantly
  - Eliminating weeds early in spring benefits natives
  - Treatments are low cost and effective
  - Integrated weed management systems can be developed

HEALTHY ENVIRONMENTS

Making a Difference for California