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Agriculture and Natural Resources



*Making a Difference
for California*



HEALTH

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for California*

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

Carl Bell, Marti Witter, and John Eckhoff

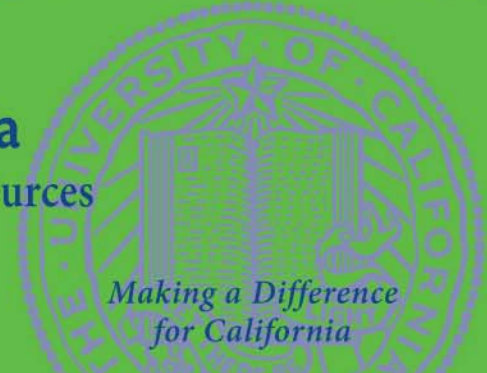
**University of California
Cooperative Extension, University
of California Riverside, US
National Park Service, CA
Department of Fish and Game**



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

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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?

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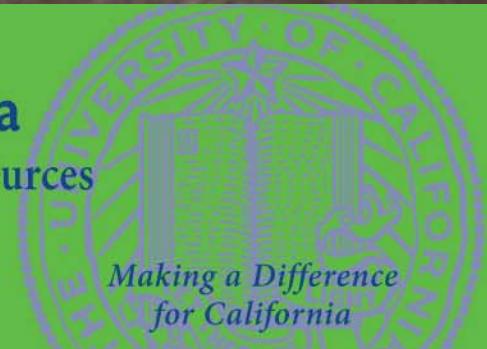
Imagery Date: 8/23/2010 1994

32°39'42.36" N 116°51'39.32" W elev. 266 m

Eye alt 371 m

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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

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- 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)

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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

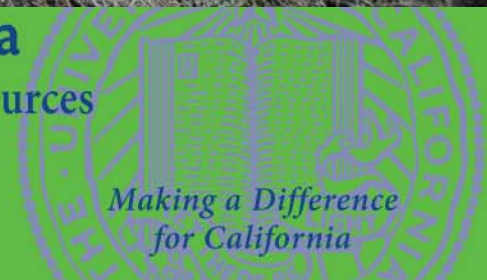
Treatment	Cover		Grams/plant		Basal diameter (cms)	
	site 1	site 2	site 1	site 2	Site 1	Site 2
Fusilade + Garlon LR	23.3	10.5	48.0	19.8	89	94
Fusilade + Garlon HR	30.0	18.8	56.0	21.8	72	106
Glyphosate LR	6.3	15	12.5	17.5	37	76
Glyphosate HR	0.3	9.5	0.8	12.5	7	80
UTC	0.5	6.3	9.0	8.5	23	67

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- ❖ 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

