



UC Berkeley
Richmond Field Station
Remediation and
Restoration Project

RFS Natural Areas
Restoration

Western Stege Marsh

Coastal Terrace Prairie



RFS Cleanup and Restoration Project

- 1999 Regional Water Quality Control Board oversight
- October 2001 RWQCB Site Cleanup Requirements
- 2002- 2004: Principal source areas cleaned up
- 2005- 2011 Department of Toxic Substances Control (DTSC) Order



Former Zeneca Site

RFS

Western Stege Marsh cleanup 2002-2004

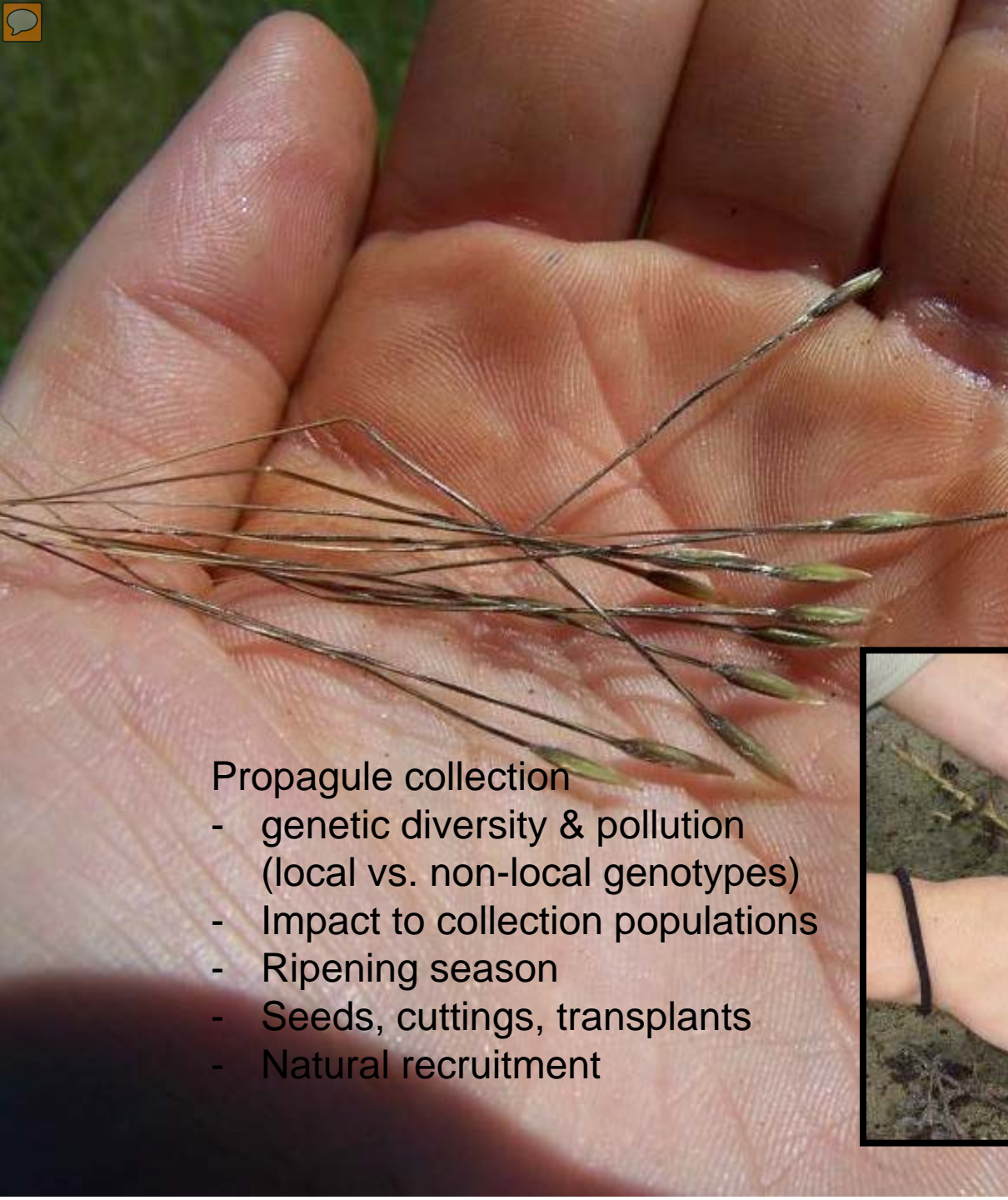


July 2004



The first outplantings occurred on a blank canvas.





Propagule collection

- genetic diversity & pollution (local vs. non-local genotypes)
- Impact to collection populations
- Ripening season
- Seeds, cuttings, transplants
- Natural recruitment





12/07/2004

~40,000 plants propagated











Tidal Marsh Species





Invasive Weed Management



Western Stege Marsh 2009

Marsh Restoration and Monitoring Program

US Army Corps of Engineers NW38 Permit 28135S September 3, 2003

5 Year Mitigation Monitoring Program-

Annual reports submitted 8/05, 11/07, 3/09, 8/09, 9/10.

Final (Y5) report 9/30/2010

Targets

1. Restore hydrologic complexity
2. Improve water quality
3. Restore low, middle, and high marshes
4. Create quality Clapper Rail habitat (compositionally and structurally complex ecosystem)

USFWS Section 7 B.O. incidental take requirements for Clapper Rail

1. Invasive species control (in particular pepperweed and invasive spartina)
2. Feral animal management

Marsh Monitoring Program

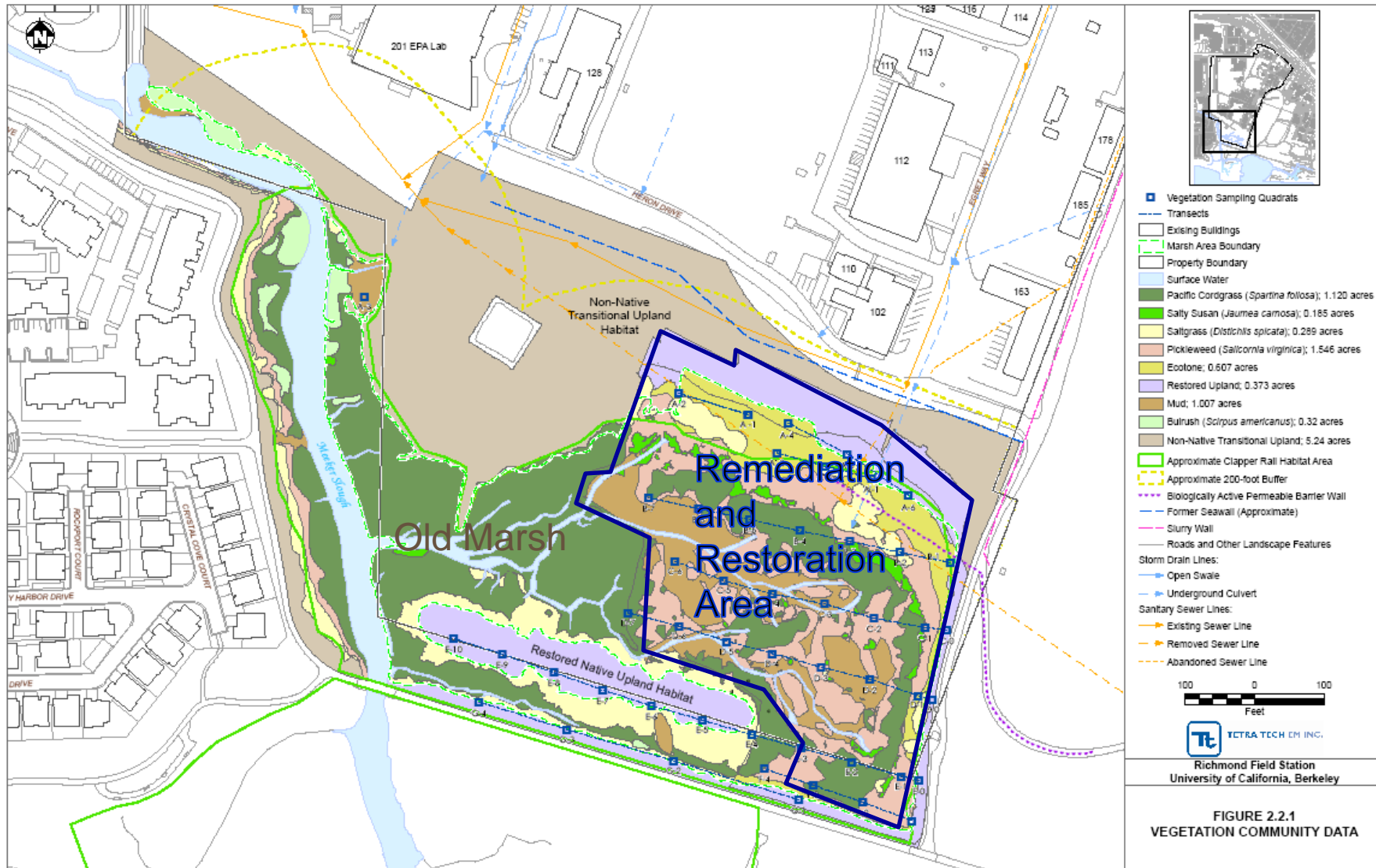


FIGURE 2.2.1
VEGETATION COMMUNITY DATA

Target 1: Restore hydrologic complexity

- Daily inundations support vegetative design
- Channel geometry shows healthy marsh evolution



September 28, 2011 6.9 ft high tide

Target 2: Improve water quality

- WQ results consistent with SF Bay ambient
- No indication of continued impact from former contaminants of concern

Figure 3.2.2 Vegetation Mapping, 2009



- Plant vigor excellent



Tidal Salt Marsh

Target 4: Establish a compositionally and structurally complex ecosystem with attributes important to wildlife focused on increasing habitat functions for the California Clapper Rail.



Clapper Rail Surveys



An adult rail and two chicks near Meeker Slough



Photo courtesy of Denise White

Other Special Status species also use the marsh and surrounding uplands



Saltmarsh Common Yellowthroat



Alameda Song Sparrow



Peregrine Falcon



t:

55 cats

UC Berkeley Richmond Field Station

Environmental Website



University of California, Berkeley

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Search the RFS Web Site

Welcome

The RFS Environmental Website serves as a principal and current source for environmental news, monitoring data and resources for the UC Richmond Field Station community (UC staff, faculty and students, non-UC tenants, and visitors). This website allows for convenient access to information.



If you have questions, concerns or suggestions related to the environmental remediation project, we're here for you.

If you have any questions - from human resources issues to environmental health inquiries - please [contact us](#). A list of names, phone numbers and other resources are available for you.

News

Current News

July 21, 2009 [Meade Street Bypass Soil Sampling to be Completed Thursday July 23, 2009](#)

July 6, 2009 [New CAG Meeting Location](#)

June 24, 2009 [Zeneca Work Notice for Soil Gas Sampling](#)

June 10, 2009 [UC Berkeley Helps Fund Richmond Jobs Program as Part of Settlement With State Environmental Agency](#)

June 5, 2009 [RFS Clapper Rail Caught on Video](#)

June 5, 2009 [New Reports Available: WTA TCRA Completion and March Stormwater Sampling](#)

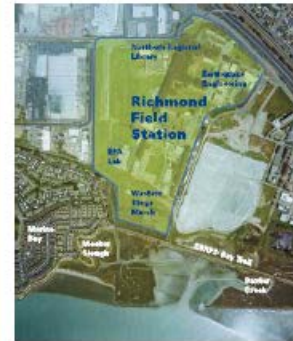
June 3, 2009 [New Zeneca Site Public Health Assessment Released by OHR and CDPH](#)

April 3, 2009 [Year 3 Marsh Monitoring Report Available](#)

RFS Environmental Website
<http://rfs-env.berkeley.edu>

Community Outreach

Western Stege Marsh Restoration UC Berkeley Richmond Field Station



Background

The University of California's (UC) Richmond Field Station (RFS) is an academic teaching and research facility that has been used primarily for large-scale engineering research. Prior to UC's purchase in 1956, the property was home to manufacturing companies, including the California Cap Company, which produced blasting caps for mining uses.

Cleanup and Restoration

Since 2002, UC Berkeley has been working to clean up legacy pollution at the RFS left from industrial activities that occurred prior to UC ownership of the land. UC's goal is the restoration of Western Stege Marsh, a tidal salt marsh. Cleanup and habitat restoration activities have included removing contaminated material, replacing it with clean soils, planting marsh plants and removing invasive weeds.

Western Stege Marsh is home to an endangered species, the California clapper rail (*Rallus longirostris obscura*). This large-sized bird, once abundant in the San Francisco Bay area, was described in 1918 by visionary UC biologist Joseph Grinnell as "truly a native of the Golden State that deserves protection on esthetic grounds, if not economic ones."



Clapper rails feed on crabs and other invertebrates and depend on pacific cordgrass, *Spartina foliosa*, and pickleweed, *Salsola vermiculata*, (pictured at left) for cover, all of which are returning with restoration of the marsh.



The 1913 Federal Migratory Bird Law offered some protection, but the continued destruction of Bay salt marsh habitats and predation by feral cats, red foxes and rats have resulted in only around 1,000 individual clapper rails remaining today.

Other natural resources at the RFS include trees used by monarch butterflies during their winter migration, and coastal prairie grassland that is home to many native plants and animals.

In the 1950s, clapper rails were slaughtered in great numbers as a game bird and sold in markets and restaurants.

RFS cleanup and restoration activities are being performed under the oversight and approval of the State Department of Toxic Substances Control in coordination with the US Army Corps of Engineers, Bay Conservation and Development Commission, East Bay Regional Park District, and the City of Richmond.

FOR MORE INFORMATION ABOUT THE RFS RESTORATION CALL THE UC BERKELEY OFFICE OF ENVIRONMENT, HEALTH & SAFETY AT 510-642-3073 OR GO TO: [HTTP://RFS-ENV.BERKELEY.EDU](http://rfs-env.berkeley.edu)



Renewing the Foundations of Excellence



Figure 3.4.2 San Francisco Estuary Project Invasive Spartina Project - Genetic Testing Results





Conclusions

Western Stege Marsh is progressing toward providing the functions of a typical SF Bay tidal salt marsh.

- Hydrologic complexity is established.
- Previous water quality problems eliminated.
- Diverse native salt marsh and marsh edge habitats have been created.
- Clapper rails and other marsh species present in WSM.

Two Ecologically Valuable Habitats

Tidal Saltmarsh



Coastal Terrace Prairie





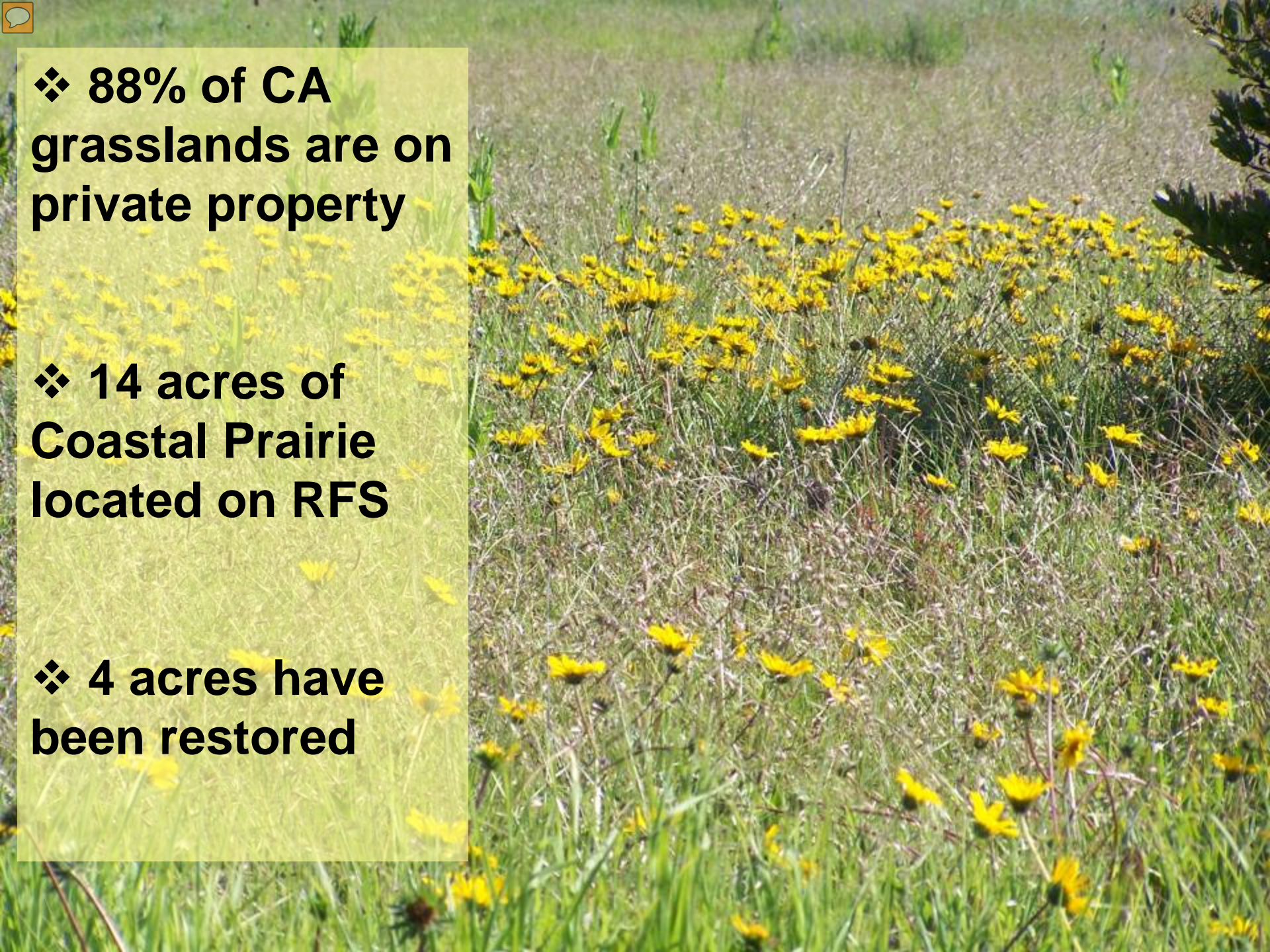
Coastal Terrace Prairie

A rare ecosystem...

8th rarest
ecosystem in
the US

99% of native
grasslands lost

Only 5 patches
remain in the
East Bay



❖ **88% of CA
grasslands are on
private property**

❖ **14 acres of
Coastal Prairie
located on RFS**

❖ **4 acres have
been restored**



Locally rare and significant grassland species

At least 12 locally rare species



sun cups



Hedge nettle



Big squirrel tail



Hill morning glory



Oregon timwort



Purple owls clover

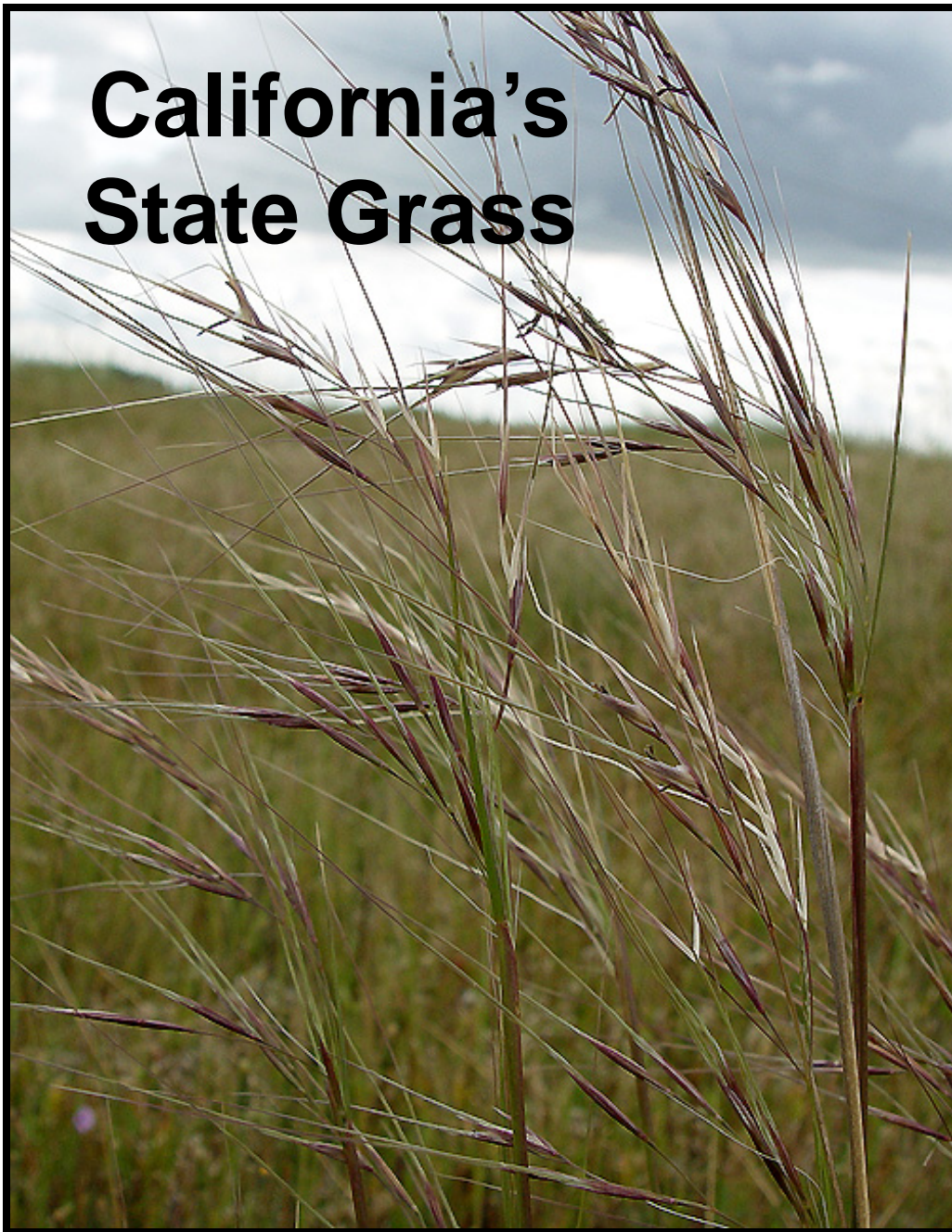


Hairy gumplant



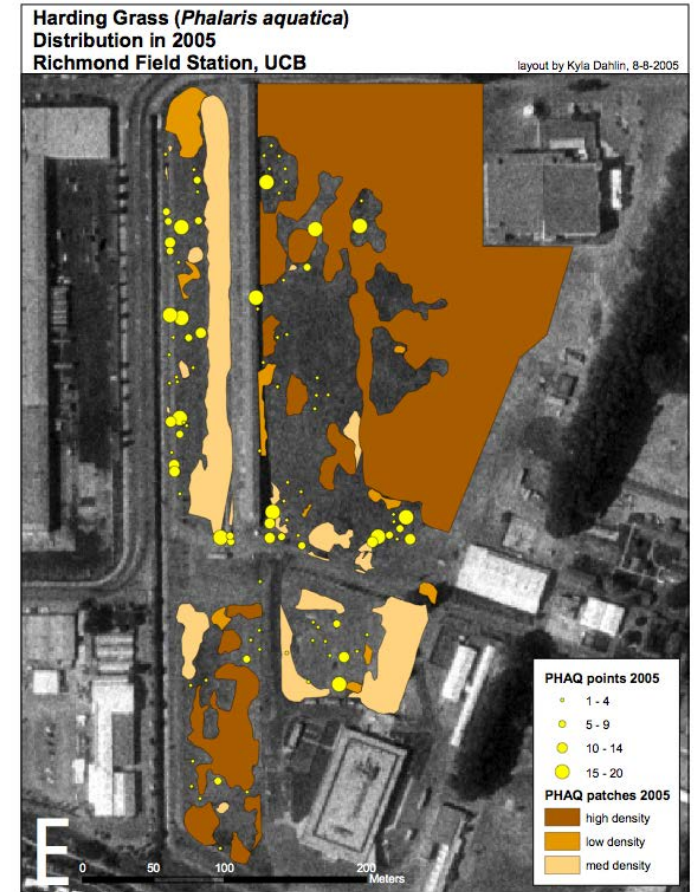
Meadow barley

California's State Grass



Harding grass in RFS grassland

- Association with cessation of mowing?
- Effect on soil topography
- Association with water table?





Prioritization and control of Harding grass

1. Prioritization: done through development of an innovative monitoring program
2. Control: experimentation with over 7 different methods



RFS Grassland Monitoring Data Sheets
Range and distribution of locally rare plant species

Date: _____ Reporter: _____

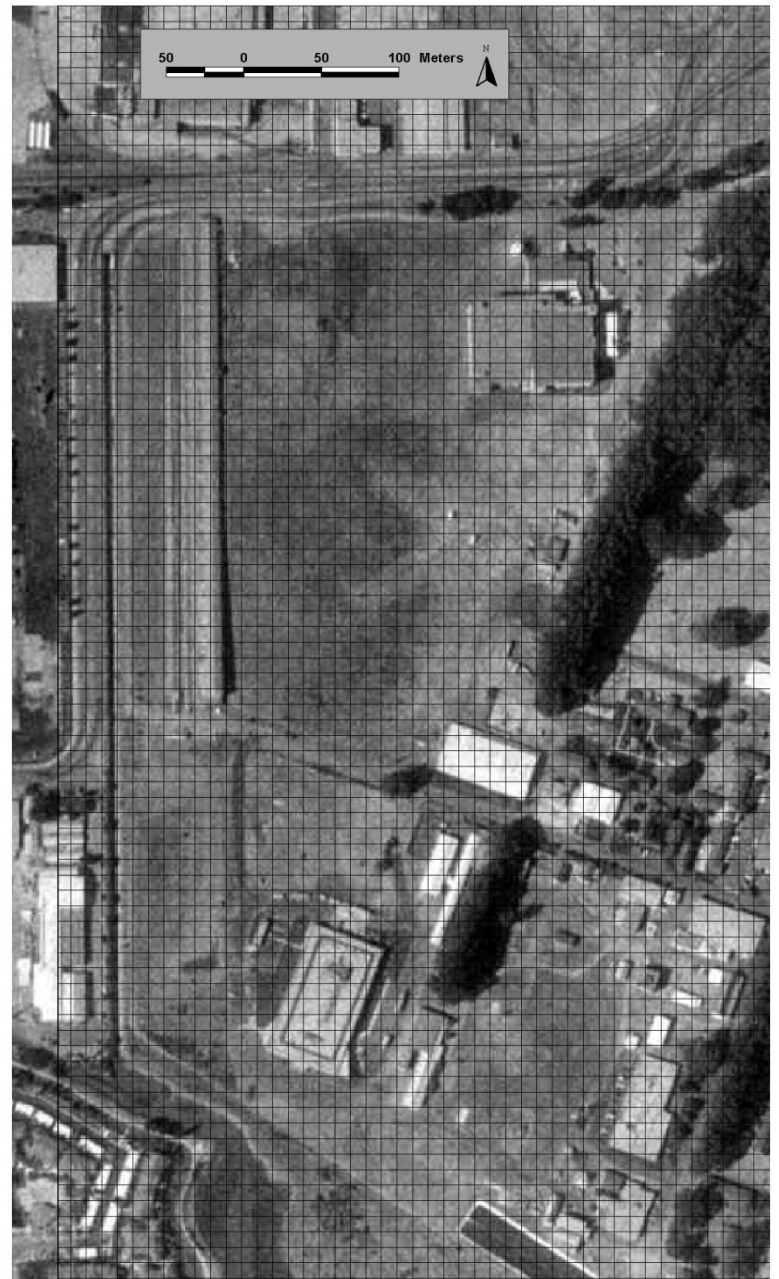
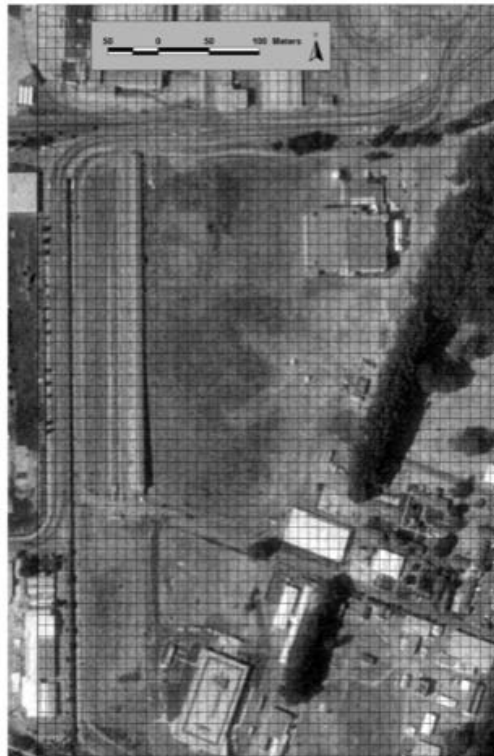
Plant Species Monitored: _____

Plant Phenology: (circle one) vegetative flower seed

Species abundance with 10-meter grid:

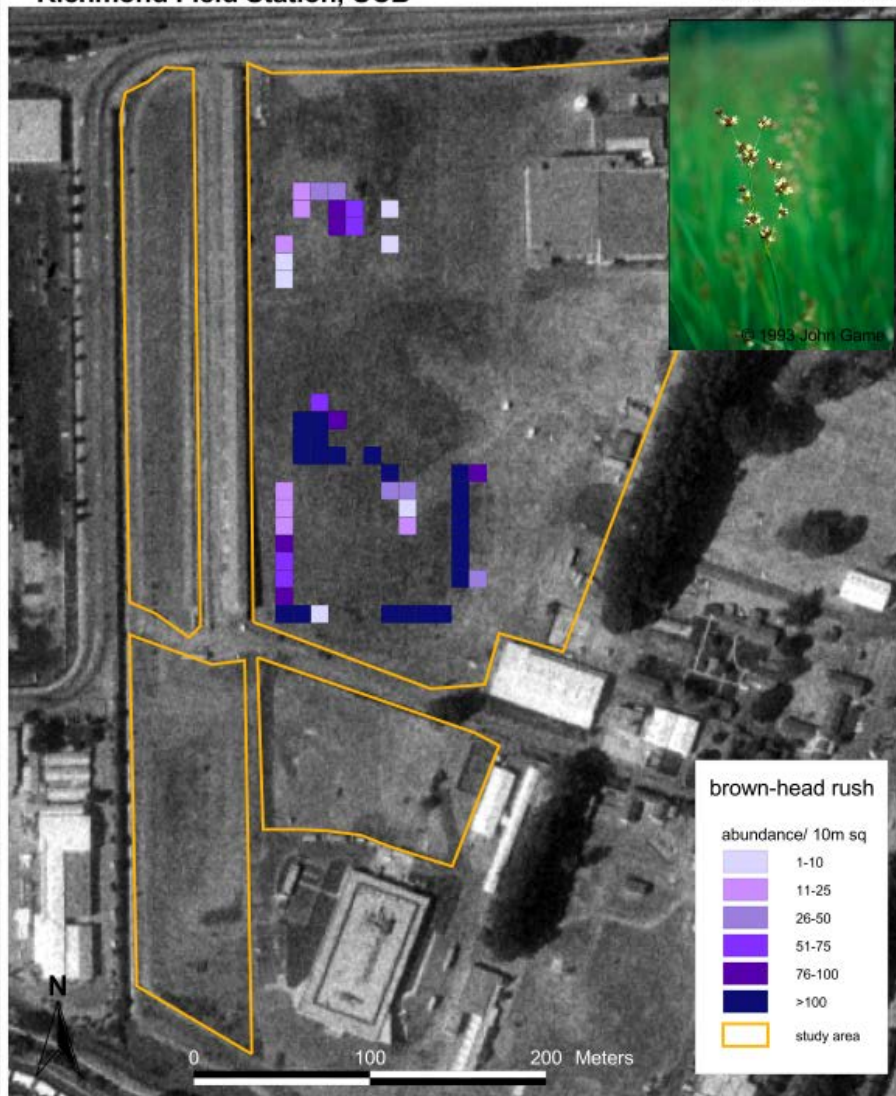
- 0 – 10 (red),
- 11 – 25 (blue),
- 26 – 50 (green),
- 51 – 100 (orange),
- greater than 100 (brown)

Comments: _____



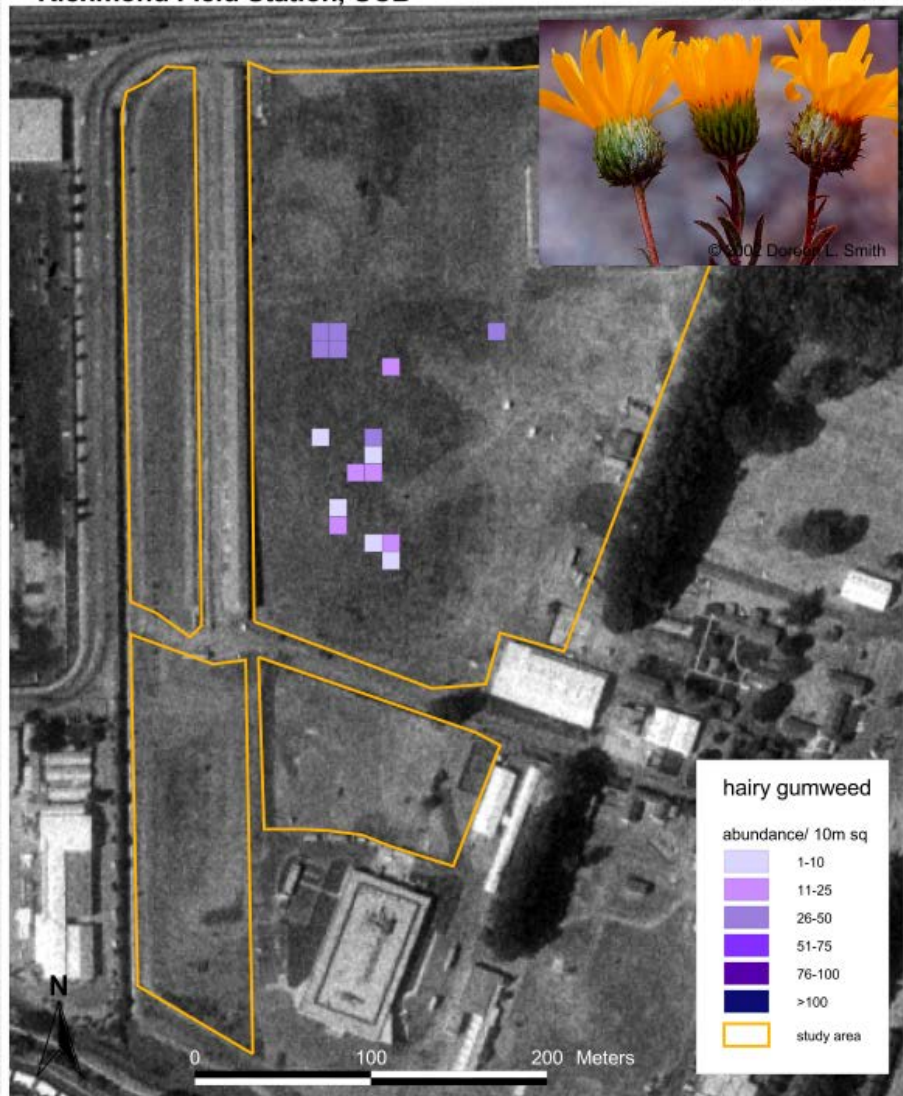
**Distribution and Abundance of Brown-head Rush
(*Juncus phaeocephalus*)
Richmond Field Station, UCB**

layout by Tom Elliott, 6-22-2005

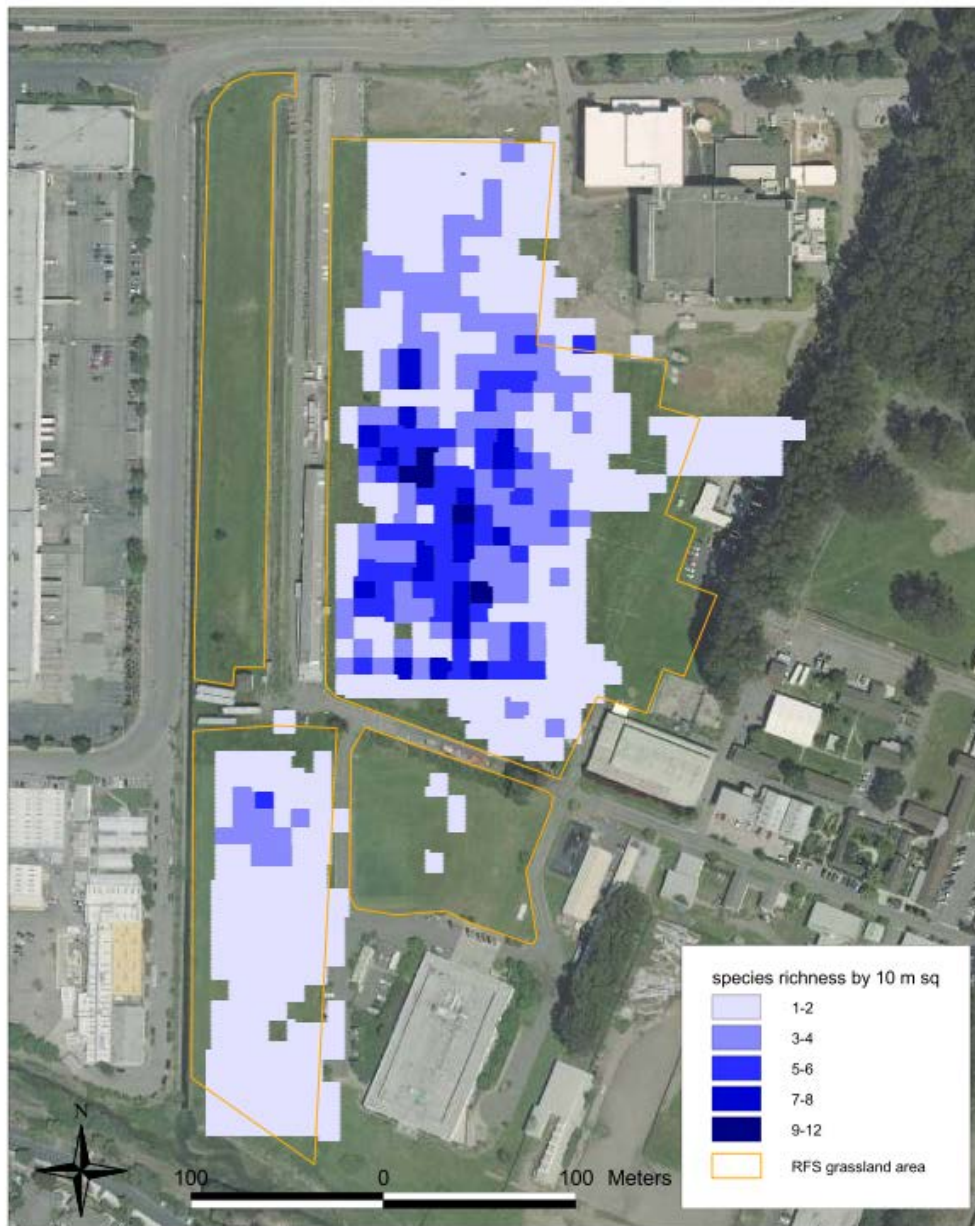


**Distribution and Abundance of Hairy Gumweed
(*Grindelia hirsutula* var. *hirsutula*)
Richmond Field Station, UCB**

layout by Tom Elliott, 6-22-2005



Grassland Species Richness Richmond Field Station, UCB

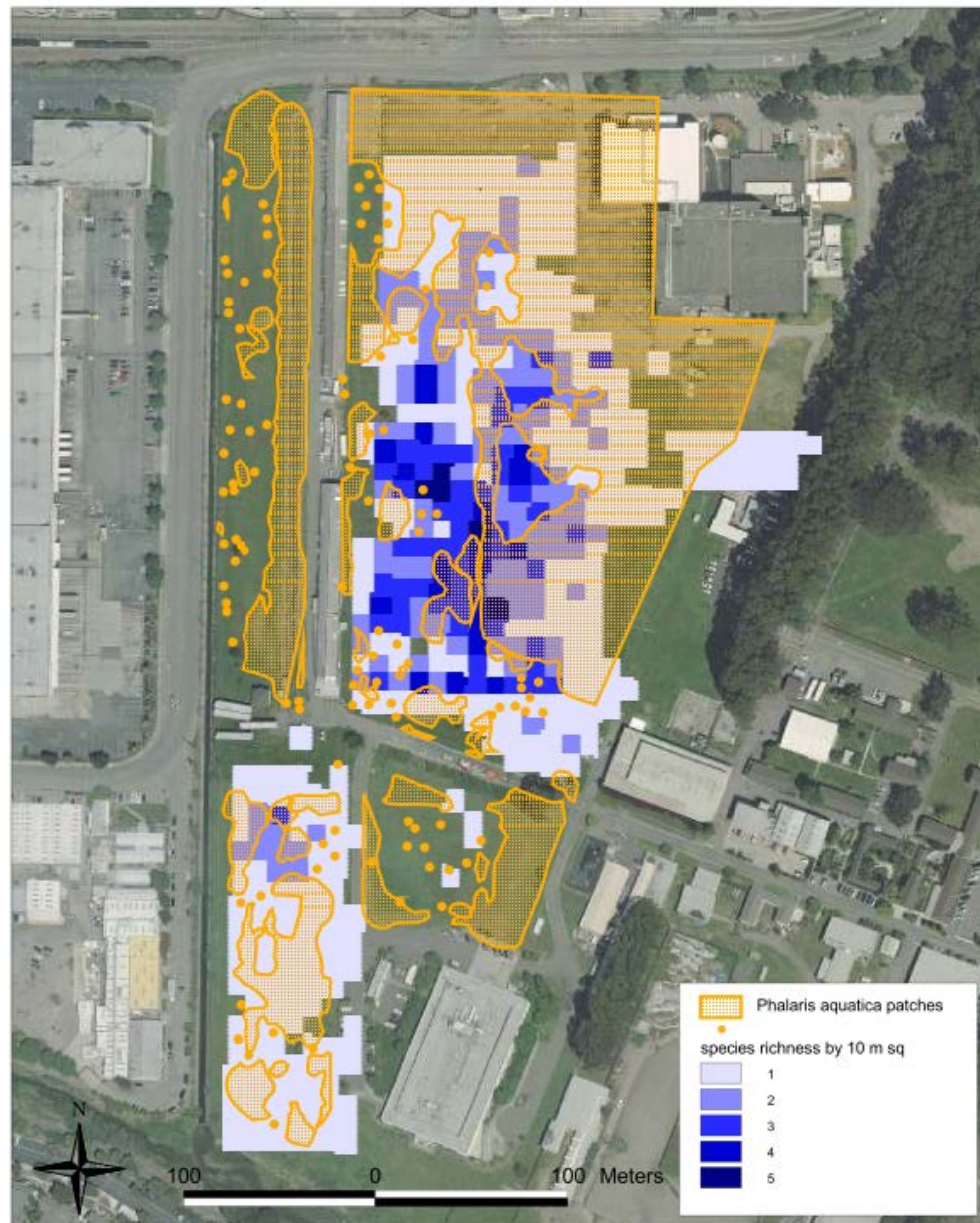


**Harding Grass (*Phalaris aquatica*)
Distribution in 2005
Richmond Field Station, UCB**

layout by Kyla Dahlin, 8-8-2005



Grassland Native Species Richness and Harding Grass Extent Richmond Field Station, UCB



**Harding Grass (*Phalaris aquatica*) pioneers
ranked by threat to rare species, RFS, UCB, 2005**



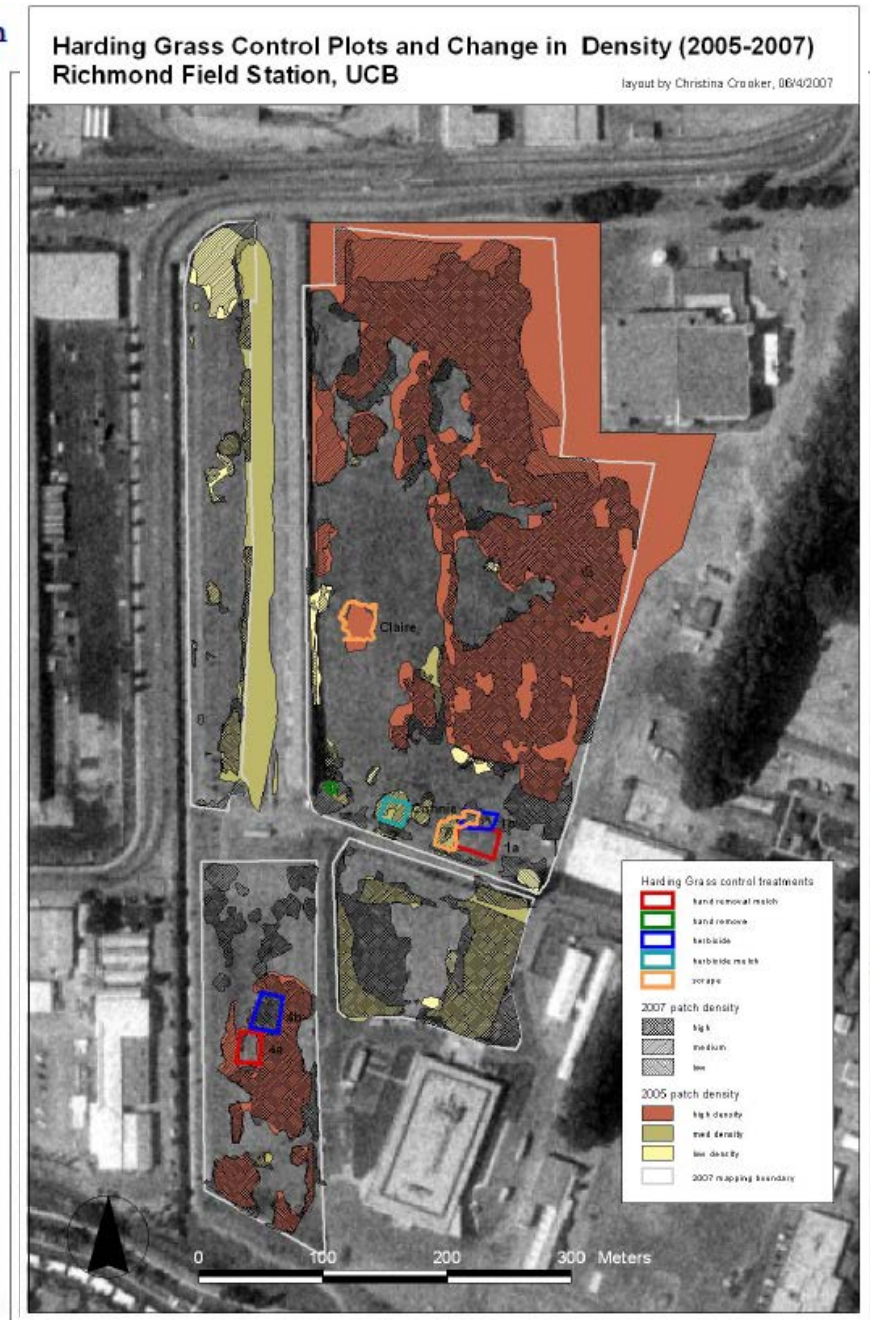
Figure 2.3c – Pioneer Patches of Harding Grass ranked By Threat to Rare Species. [Note this figure, and several others were used to help prioritize control activities in 4-acre plot].



Experimental control methods

- Hand Removal
- Herbicide: one application, May
- Straw mulch
- Mowing & brushcutting
- Scraping
- Limited experience: Hydro-mechanical obliteration, herbicide followed by sheet mulch, carpet cover

Figure 2.3a: Four-acre Restoration Project Location





Hand removal







Herbicide, one application



Straw mulch



Mowing and brushcutting





Scraping









Hydro-mechanical obliteration



THANK YOU

