



# South San Diego County Grasslands Project

## Project Background and Overview

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# Outline

- Purpose
- Objectives
- Beginnings
- Phase I: Grassland Assessments, Target Selection, Experimental Design
- Phase II: Experimental Design Implementation

# Project Purpose:

*“To develop landscape-scale, collaborative strategies for managing target grassland species in the South County MSCP”*

# Objectives

- Assess opportunities for enhancing habitat for target species across 3,000 acres of grasslands in the south county
  - Habitat Assessments
- Identify Desired Future Conditions for target grassland species across the South County MSCP
  - Assessment results, Conceptual Models
- Identify and test cost-effective measures of controlling invasive grasses and forbs to benefit target species
  - Best Management Practices

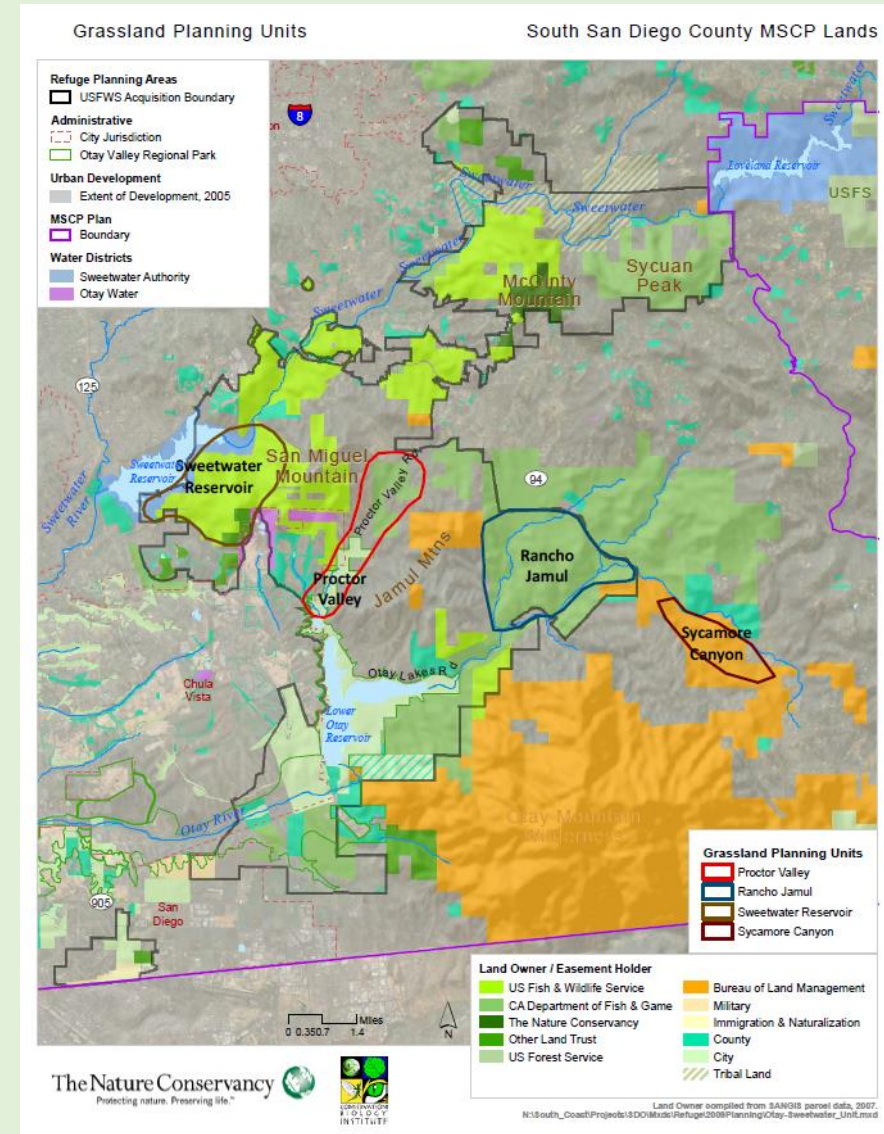
# Beginnings.....

# South San Diego County Species Matrix

	Species	THREATS (as identified by SDSU, 2006)														Current Management Actions		
		ALTERED FIRE REGIME	BORDER PATROL	ORV TRESPASS	INVASIVES	ALTERED HYDROLOGY	RECREATION/HUMAN DIST.	POLLUTION	PREDATION	HABITAT FRAGMENTAT	DISEASE	LOSS OF HOSTE /PREY	EROSION	ROADS				
Tier 1 Targets	<i>Acanthomintha ilicifolia</i> San Diego thornmint (NE)		L	L	H		L	L									NWR staff is restoring habitat for this species	
	<i>Ambrosia pumila</i> San Diego ambrosia (NE)	L		L	H		M										NWR is establishing a new population along the southeast side of the Sweetwater River	
	<i>Cupressus forbesii</i> Tecate cypress	H					L										Establishment of a nursery stand site at RJER; fuels removal at Little Cedar (Otay Mtn Eco Reserve) (DFG); SANDAG (AECOM) mapping Tecate cypress as part of vegetation mapping project.	
	<i>Deinandra conjugens</i> Otay tarplant (NE)		H	H	M		L			H							Active resoration and management on NWR lands.	
	<i>Dudleya variegata</i> Variegated dudleya (NE)		M	M	M		M											
	<i>Nolina interrata</i> <i>Dehesa bear-grass</i> (NE)	M		L	M													
	<i>Mitoura thornei</i> Thorne's hairstreak butterfly	H										H						BLM conducting post fire studies
	<i>Euphydras editha quino</i> Quino checkerspot butterfly																	BLM: planned habitat enhancement (weeding) for QCB at Sycamore Canyon along with outreach materials for recreational users. QCB restoration was done from 2007-2010 near the vernal pool habitat at Otay Lakes by AECOM through a SANDAG grant; POM: RECON developing QCB enhancement plan for Jamul Mtn
	<i>Athene cunicularia hypugaea</i> Burrowing owl					H				L					L			Habitat enhancement (NWR, CalTrans, City of SD): Otay Mesa northeast of Brown Field, Otay Ranch, and Otay River Valley, Johnson Canyon. DFG conducting 60 acres BUOW restoration at RJER, where 5 rehabilitated birds released in 2011. ICR and JEMM conducting field research into relationships between
	<i>Campylorhynchus brunneicapillus couesi</i> Coastal cactus wren	H				H					H	?						Habitat restoration (Prior To 2008: CalTrans; Post 2008 Funded Projects: POM, NWR, City CV Canyons, Salt Creek);

# Phase I: South County Grasslands Assessment

- TransNet EMP Grant: CBI
  - **Participants: BLM, CDFW/RJER, SDNWR, City SD, SWA**
  - Habitat Assessment of 192 grassland polygons (Spring 2011)
  - Conceptual Models
  - Restoration Vision
  - Experimental Design



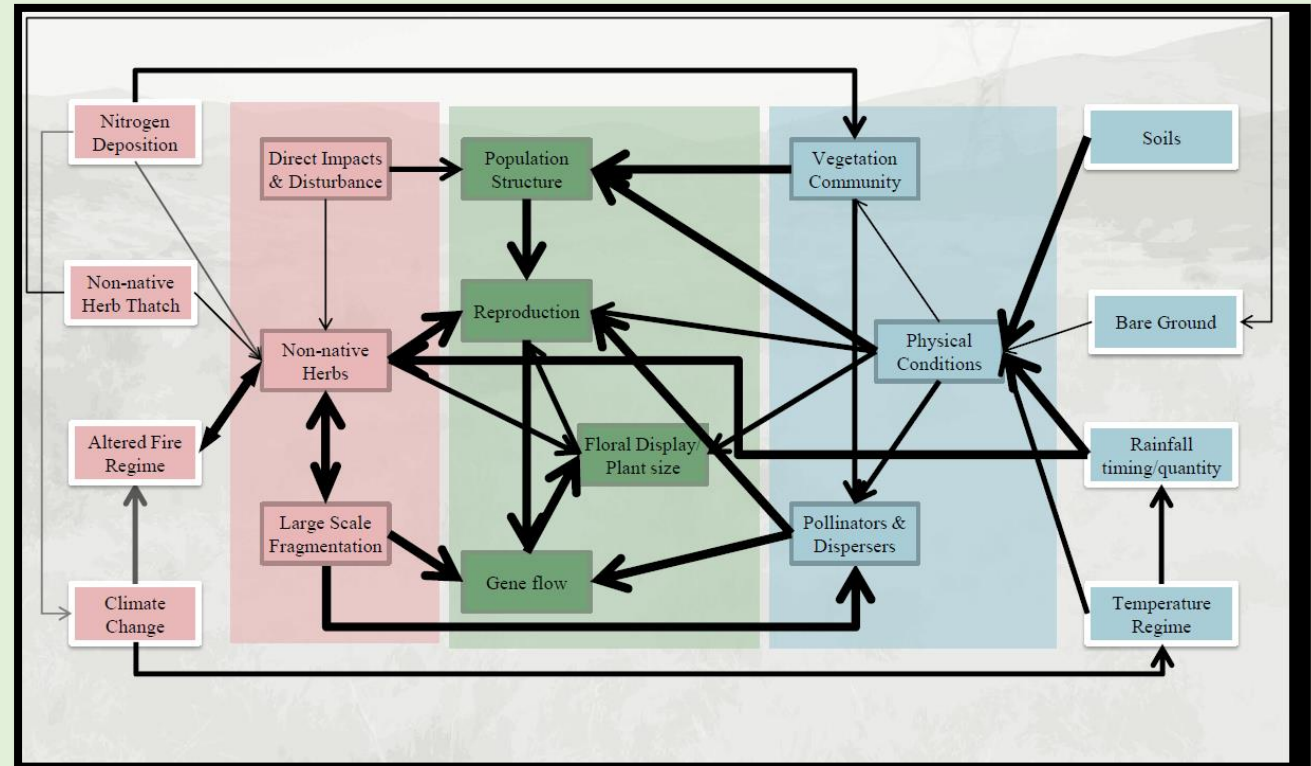
# Phase I: South County Grasslands Assessment

- TransNet EMP Grant: CBI
  - Participants: BLM, CDFW/RJER, SDNWR
  - **Habitat Assessment of 192 grassland polygons (Spring 2011) totaling 1,132 acres**
  - Conceptual Models
  - Restoration Vision
  - Experimental Design



# Phase I: South County Grasslands Assessment

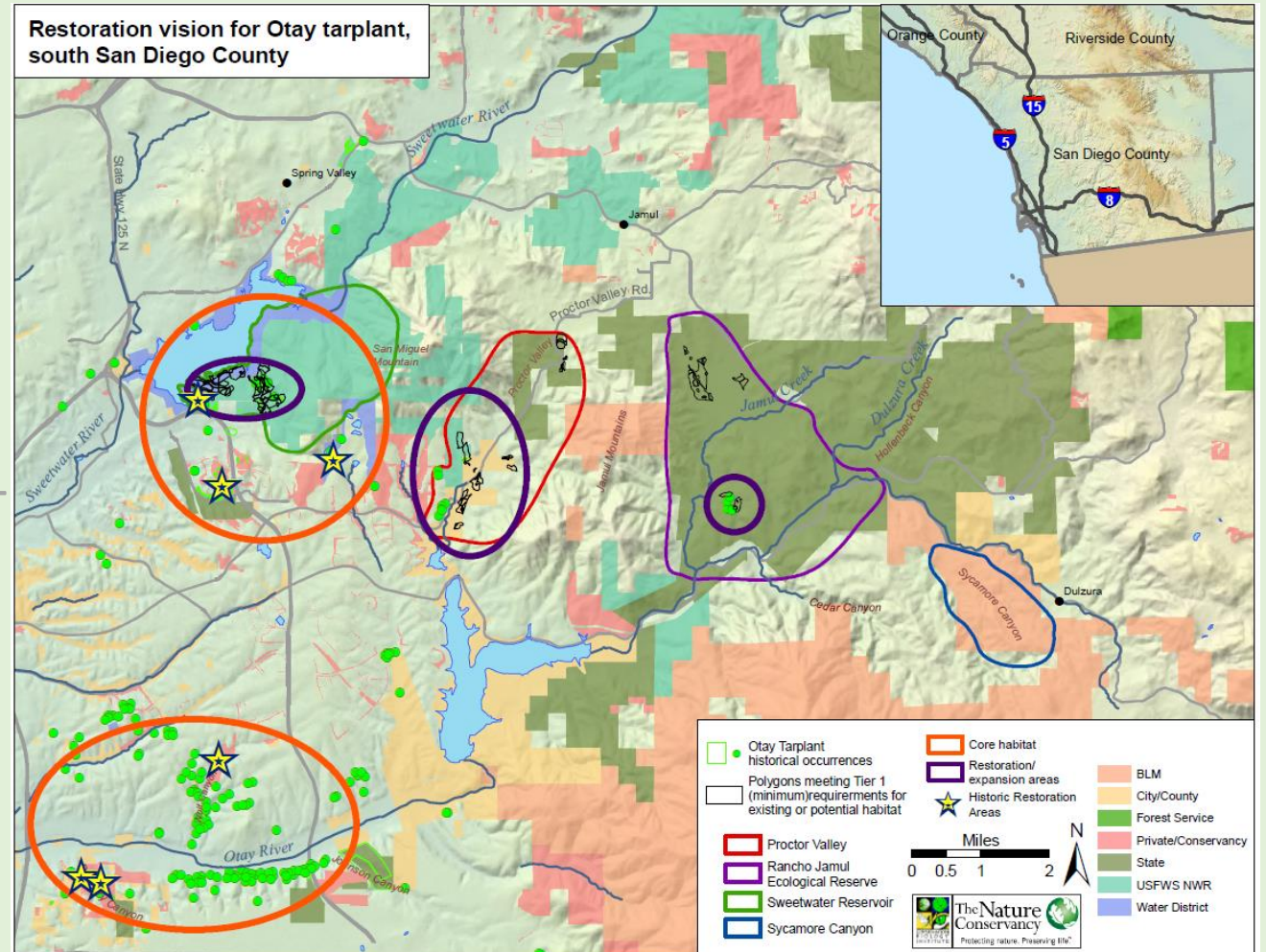
- TransNet EMP Grant: CBI
  - Participants: BLM, CDFW/RJER, SDNWR
  - Targets
  - Habitat Assessment of 132 grassland polygons (Spring 2011)
  - **Conceptual Models**
  - Restoration Vision
  - Experimental Design





# Phase I: South County Grasslands Assessment

- TransNet EMP Grant: CBI
  - Participants: BLM, CDFW/RJER, SDNWR
  - Targets
  - Habitat Assessment of 132 grassland polygons (Spring 2011)
  - Conceptual Models
  - **Restoration Vision**
  - Experimental Design



# Phase I: South County Grasslands Assessment

- TransNet EMP Grant: CBI
  - Participants: BLM, CDFW/RJER, SDNWR
  - Targets
  - Habitat Assessment of XX grassland polygons (Spring 2011)
  - Conceptual Models
  - Restoration Vision
  - **Experimental Design: LAND IQ**

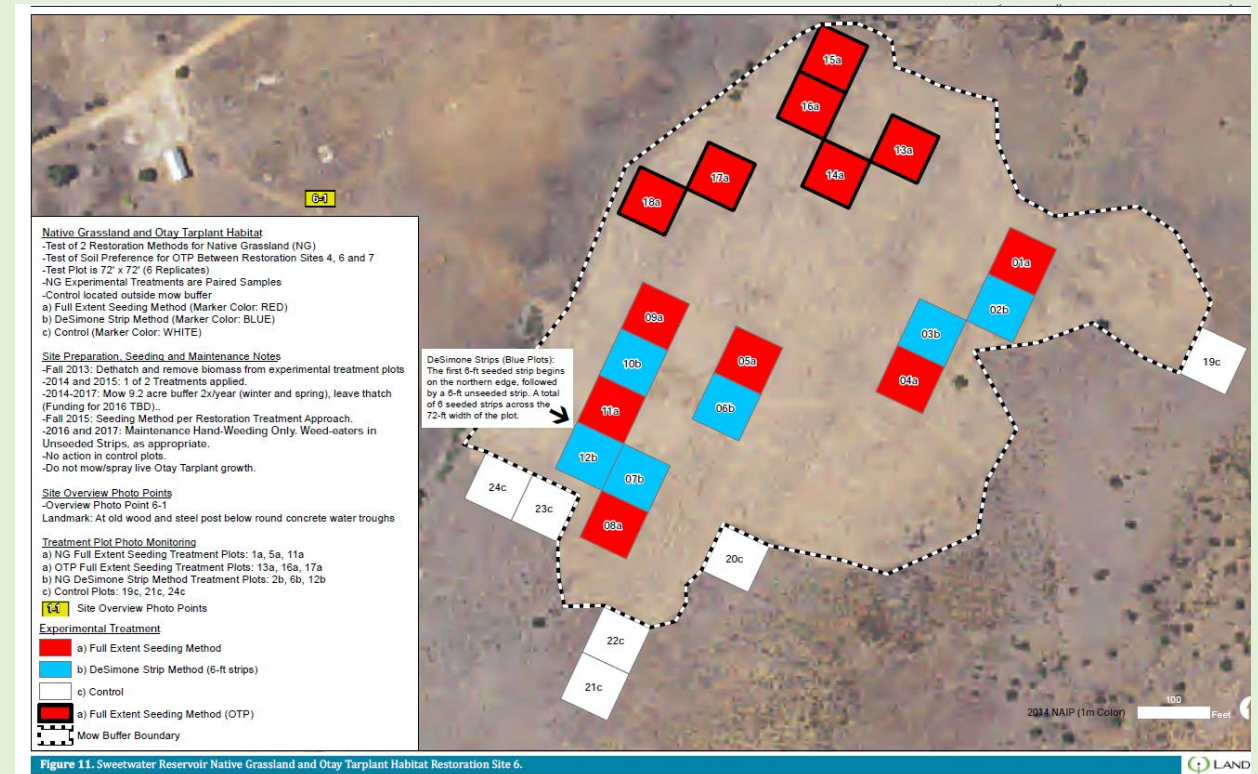


Figure 11. Sweetwater Reservoir Native Grassland and Otay Tarplant Habitat Restoration Site 6.

# Phase II: South County Grasslands Restoration Experiment Implementation

- Transnet EMP Grant : CBI
- Land Manager Collaboration
- Targets
  - QCB, Otoy Tarplant
  - Native Grassland, Forbland
- Volunteer Coordination (EDI)
- Seed bulking
- 8 Experimental Sites
  - 2 BLM
  - 3 DFW/RJER
  - 3 SDNWR



# Phase II: South County Grasslands Restoration Experiment Implementation

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- Seed bulking
- **8 Experimental Sites**
  - 2 BLM
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  - 3 SDNWR

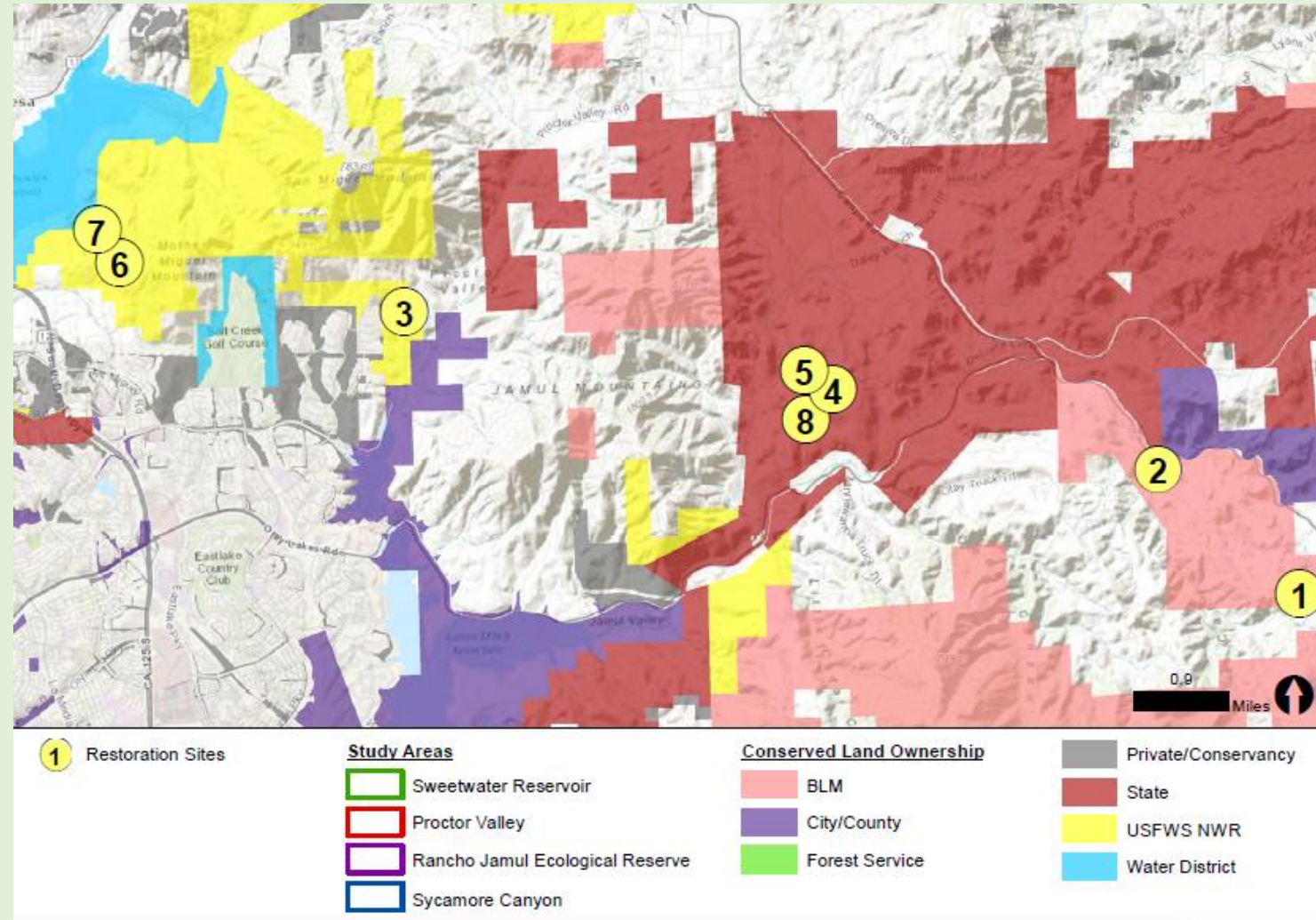
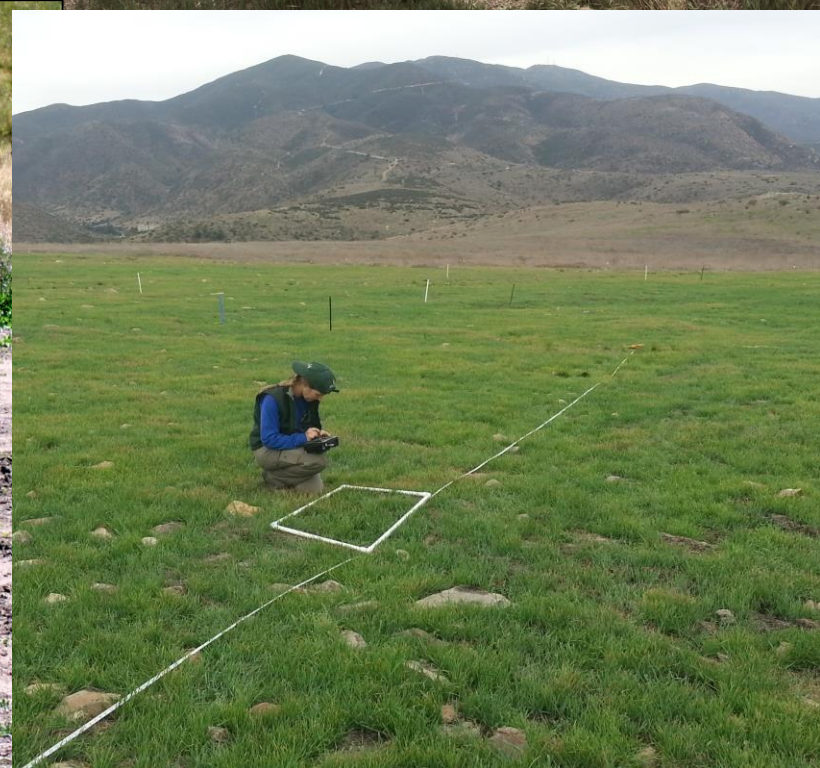










Figure 1. Phase 2 Habitat Restoration Experiment Site Locations.





Property	Sycamore Canyon		Proctor Valley	Rancho Jamul Ecological Reserve			Sweetwater Reservoir	
Site	1 - <i>Ridgelines</i>	2 - <i>Rolling Hills Along Power Line</i>	3 - <i>Ridgelines and Slopes</i>	4 - <i>Recently Burned Grassland</i>	5 - <i>Adjacent to Burned Grassland</i>	8 - <i>Recently Burned Grassland</i>	6 - <i>NW-Facing Slope</i>	7 - <i>N-Facing Slope</i>
Associated CBI HAP Polygon UIDs	12-2-33 12-2-34 12-2-36	NA	11-4-44	11-1-09	NA	NA	11-3a-04 11-3a-06 11-3a-02	11-3a-29
Land Owner	BLM	BLM	USFWS	CDFW	CDFW	CDFW	USFWS	USFWS
Representative Site Photo								
Restoration Target:								
Quino Checkerspot Butterfly (QCB)	☐ Treatments within open areas across 4.5-acres		☐ Treatments within open areas across 11.5-acres					
Forbland	☐ Treatments within 14-acres							
Otay Tarplant (OTP)				☐ Treatments for OTP within 3-4 acres of lower slope	☐ Treatments for OTP within ~2 acre historic OTP area (2004 observation) that was burned.		☐ Treatments for OTP at northeast end within 15-acres of NG restoration area.	☐ Treatments for OTP at lower slope within native grassland restoration area.
Native Grassland				☐ Treatments for NG restoration within 2012 Fall burn. ~9.5-acres of upper slope within 13.5-acres.	☐ Treatments for NG restoration in non-burned area within 5.5-acre site.	☐ Treatments in non-burned site for NG restoration within 15-acres.		☐ Treatments in non-burned site for NG restoration within 3.5-acres.

# Timeline

TASK	2013				2014				2015				2016				2017				
	W	Sp	Su	Fall	W	Sp	Su	Fall	W	Sp	Su	Fall	W	Sp	Su	Fall	W	Sp	Su	Fall	
Seed Collection and Bulking	Yellow				Yellow				Yellow												
Plot Set Up/Soil testing		Blue																			
Initial Clearing				Orange																	
Qualitative Monitoring					Red				Red				Red								
Weed Control					Orange				Orange				Orange					Orange			
Seeding												Green									
Quantitative Monitoring														Red							



# *Quino Checkerspot Butterfly Habitat Restoration Experiment*

## ***Research Goal:***

*Assess the effectiveness of two seeding techniques in establishing *Plantago erecta* and other QCB forb species on difficult to reach sites and sites with sensitive soil crusts*

# QCB Experiments: 2 Seeding Methods





# *Forbland Habitat Restoration Experiment*

## *Research Goal:*

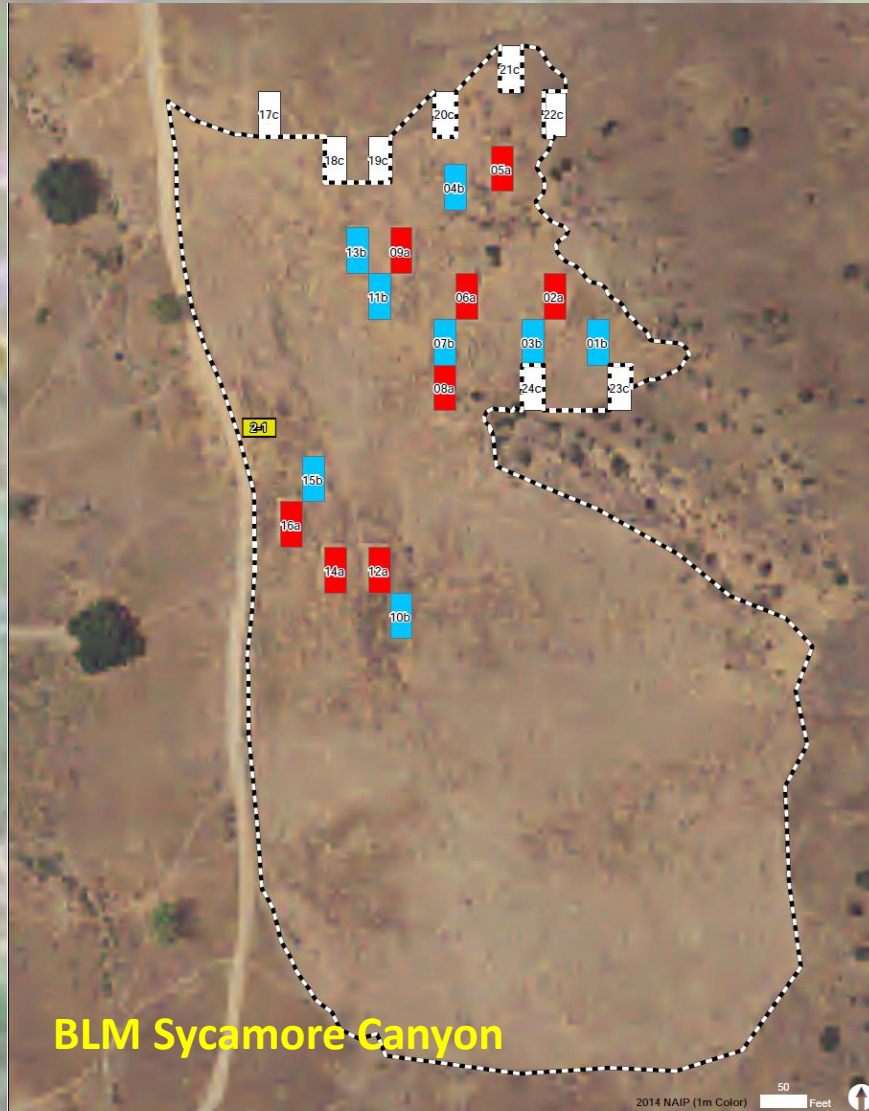
*Assess the effectiveness of two mechanized site preparation techniques that limit soil disturbance while reducing weed cover in sites with good access and low native forb cover*

# Forbland Experiment: Two Weed Control Methods





# Forbland Experiment: Site Layout and Treatments



## Forbland Habitat

- Test of 2 Site Preparation Methods
- Test Plot is 24' x 50' (8 Replicates)
- Plots randomly selected within identified area
- Treatments randomly assigned to test plots
- Control located outside mow buffer
- a) Full Extent Broadcast Seeding and Maintenance Hand Weeding (Site Prep was Mow and Leave Thatch in Winter and Spring) (Marker Color: RED)
- b) Full Extent Broadcast Seeding and Maintenance Hand Weeding (Site Prep was Glyphosate Application in Winter and Spring) (Marker Color: BLUE)

## Site Preparation, Seeding and Maintenance Notes

- Fall 2013: Dethatch and remove biomass from experimental treatment plots (total of 16 plots).
- 2014 and 2015: 1 of 2 Treatments applied.
- 2014-2017: Mow 10 acre buffer 2x/year (winter and spring), leave thatch (Funding for 2016 TBD).
- Fall 2015: Broadcast Seed Spreader with Pull-Behind Cultipacker.
- 2016 and 2017: Maintenance Hand-weeding only.
- No action in control plots.
- Avoid soil crusts.
- Site Overview Photo Points**
- Overview Photo Point 2-1
- Landmark: At edge of road, approx. in line with sycamore to the west across the drainage.

## Treatment Plot Photo Monitoring

- a) Mow 2x Plots: 2a, 8a, 12a
- b) Herbicide 2x Plots: 1b, 3b, 9b, 13b
- c) Control Plots: 17c, 19c, 22c, 23c

2-1 Site Overview Photo Points

## Treatment Type

- a) Mow 2x
- b) Herbicide 2x
- c) Control

Mow Buffer Boundary

# *Native Grassland Habitat Restoration Experiment*

## *Research Goals:*

- Compare effectiveness of seeding full extent vs. Desimone strip seeding method*
- Determine whether recent fall burn impacts success of two seeding approaches*
- Evaluate whether hand weed control and seeding methods as effective as mechanized methods*

# Native Grassland Experiment: Site Preparation and Seeding Treatments

<b>Desimone Strip Seeding Method</b>	<b>Full Extent Seeding Method</b>
Two Years Mowing Prior to Seeding	Two Years Herbicide Treatment Prior to Seeding
Hand Broadcast or Drill Seeding in Strips	Full Extent Hand Broadcast or 2-way Drill Seeding

\*SDNWR Site 7=Hand mowing and hand seeding due to inaccessibility

# *Otay Tarplant Habitat Restoration Experiment*

## ***Research Goals:***

- *Evaluate the effectiveness of establishing OTP populations using hand broadcast seeding or two-way drill seeding*
- *Determine if calcareous soils are limiting the establishment of OTP populations*

# Otay Tarplant Experiment: 2 Seeding Treatments



# Native Grassland and Otay Tarplant Experiments: Site Layout and Treatments: RJER

**Native Grassland and Otay Tarplant Habitat**  
 -Test of 2 Restoration Methods for Native Grassland (NG)  
 -Test of Soil Preference for OTP Between Restoration Sites 4, 6, 7  
 -Test Plot is 72' x 72' (6 Replicates)  
 -NG Experimental Treatments are Paired Samples  
 -Control located outside mow buffer

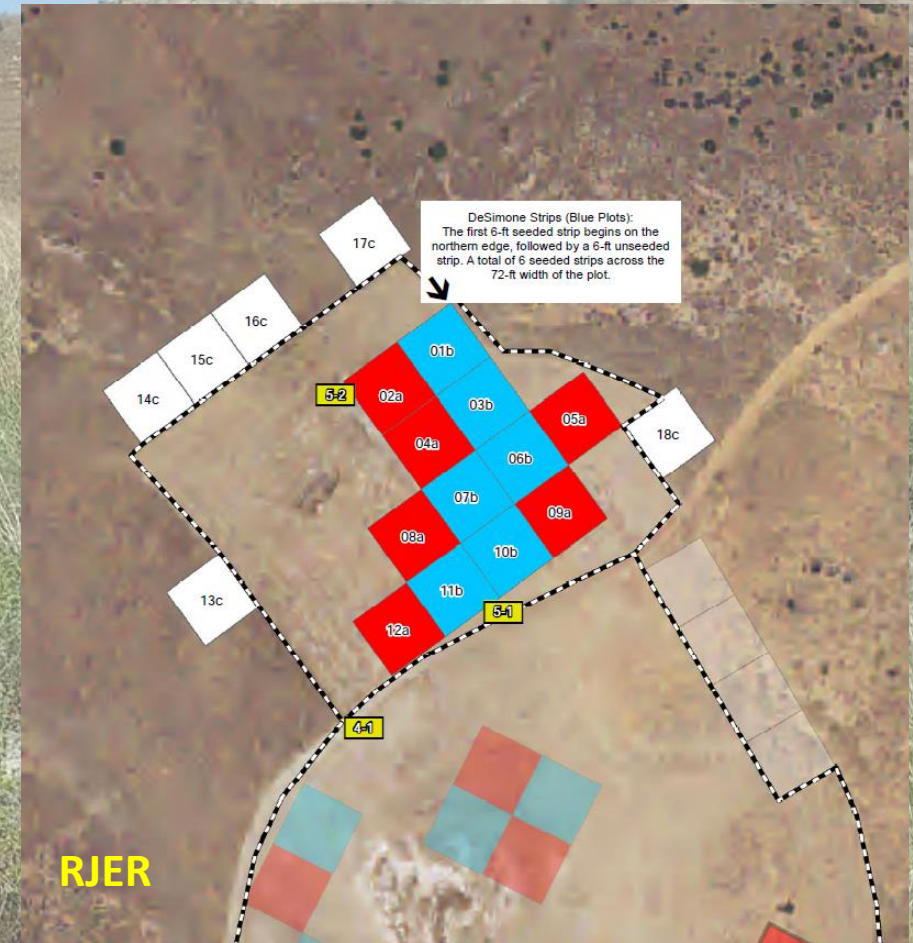
a) Full Extent Seeding Method (Marker Color: RED)  
 b) DeSimone Strip Method (Marker Color: BLUE)  
 c) Control (Marker Color: WHITE)

**Site Preparation, Seeding and Maintenance Notes**  
 -Fall 2013: Dethatch and remove biomass from experimental treatment plots  
 -2014 and 2015: 1 of 2 Treatments applied.  
 -2014-2017: Mow 9.9 acre buffer 2x/year (winter and spring), leave thatch (Funding for 2016 TBD)..  
 -Fall 2015: Seeding Method per Restoration Treatment Approach.  
 -2016 and 2017: Maintenance Hand-weeding only. Weed-eaters in Unseeded Strips, as appropriate.  
 -No action in control plots.  
 -Do not mow/spray live Otay Tarplant growth.

**Site Overview Photo Points**  
 -Overview Photo Point 4-1  
 Landmark: At rock adjacent to Road  
 -Overview Photo Point 4-2  
 Location: Rock-outcrop on edge of drainage.

**Treatment Plot Photo Monitoring**  
 a) NG Full Extent Seeding Treatment Plots: 4a, 9a, 11a  
 a) OTP Full Extent Seeding Treatment Plots: 13a, 15a, 17a  
 b) NG DeSimone Strip Method Treatment Plots: 3b, 10b, 12b  
 c) Control Plots: 20c, 22c, 23c

	Site Overview Photo Points
	2013 Otay Tarplant Population
<b>Experimental Treatment</b>	
	a) Full Extent Seeding Method
	b) DeSimone Strip Method (6-ft strips)
	c) Control
	a) Full Extent Seeding Method (OTP)
	Mow Buffer Boundary



# Native Grassland and Otay Tarplant Experiments: Site Layout and Treatments: SDNWR

## Native Grassland and Otay Tarplant Habitat

- Test of 2 Restoration Methods for Native Grassland (NG)
- Test of Soil Preference for OTP Between Restoration Sites 4, 6 and 7
- Test Plot is 72' x 72' (6 Replicates)
- NG Experimental Treatments are Paired Samples
- Control located outside mow buffer
- a) Full Extent Seeding Method (Marker Color: RED)
- b) DeSimone Strip Method (Marker Color: BLUE)
- c) Control (Marker Color: WHITE)

## Site Preparation, Seeding and Maintenance Notes

- Fall 2013: Dethatch and remove biomass from experimental treatment plots
- 2014 and 2015: 1 of 2 Treatments applied.
- 2014-2017: Mow 9.2 acre buffer 2x/year (winter and spring), leave thatch (Funding for 2016 TBD)..
- Fall 2015: Seeding Method per Restoration Treatment Approach.
- 2016 and 2017: Maintenance Hand-Weeding Only. Weed-eaters in Unseeded Strips, as appropriate.
- No action in control plots.
- Do not mow/spray live Otay Tarplant growth.

## Site Overview Photo Points

- Overview Photo Point 6-1
- Landmark: At old wood and steel post below round concrete water troughs

## Treatment Plot Photo Monitoring

- a) NG Full Extent Seeding Treatment Plots: 1a, 5a, 11a
- a) OTP Full Extent Seeding Treatment Plots: 13a, 16a, 17a
- b) NG DeSimone Strip Method Treatment Plots: 2b, 6b, 12b
- c) Control Plots: 19c, 21c, 24c

**1-1** Site Overview Photo Points

## Experimental Treatment

- a) Full Extent Seeding Method
- b) DeSimone Strip Method (6-ft strips)
- c) Control
- a) Full Extent Seeding Method (OTP)
- Mow Buffer Boundary

