

Revegetation Studies 2005

Pecos River Project

May 16, 2006

Principal Investigators:

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- Tom Davis
- Bill Berry
- Tracy McNeal



New Mexico Game & Fish (7 Rivers)

- Richard Artrip
- Fritz Hammer



Carlsbad Soil & Water Conservation District

- Bill See
- Aaron Curbello



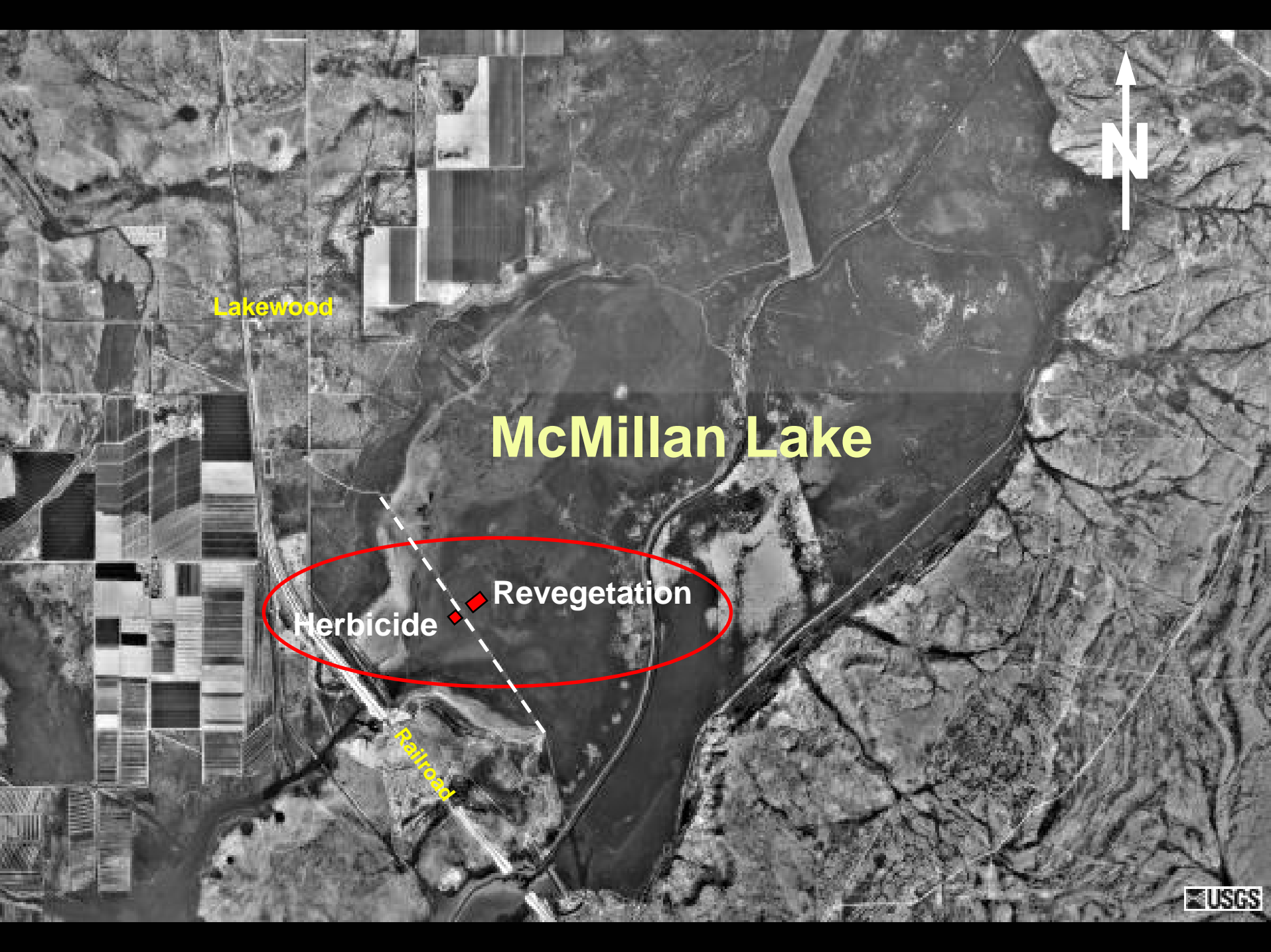
Bureau of Reclamation

- Wes Able
- Brent Tanzy
- Doc Lanford
- Ed Rodriguez
- Joe Alderete
- Marsha Carra
- Nancy Umbreit
- Art Coykendall
- Rob Doster
- Fred Nibling
- Debbie Eberts
- Scott O'Meara
- Vicky Johanson
- Sarah Wynn (now NPS)



Seasonal Technicians

- Phil Toutant (MSU)
- Nicole Schmidt (WSC)
- Michelle Cederborg (DU)



Lakewood

McMillan Lake

Herbicide

Revegetation

Railroad

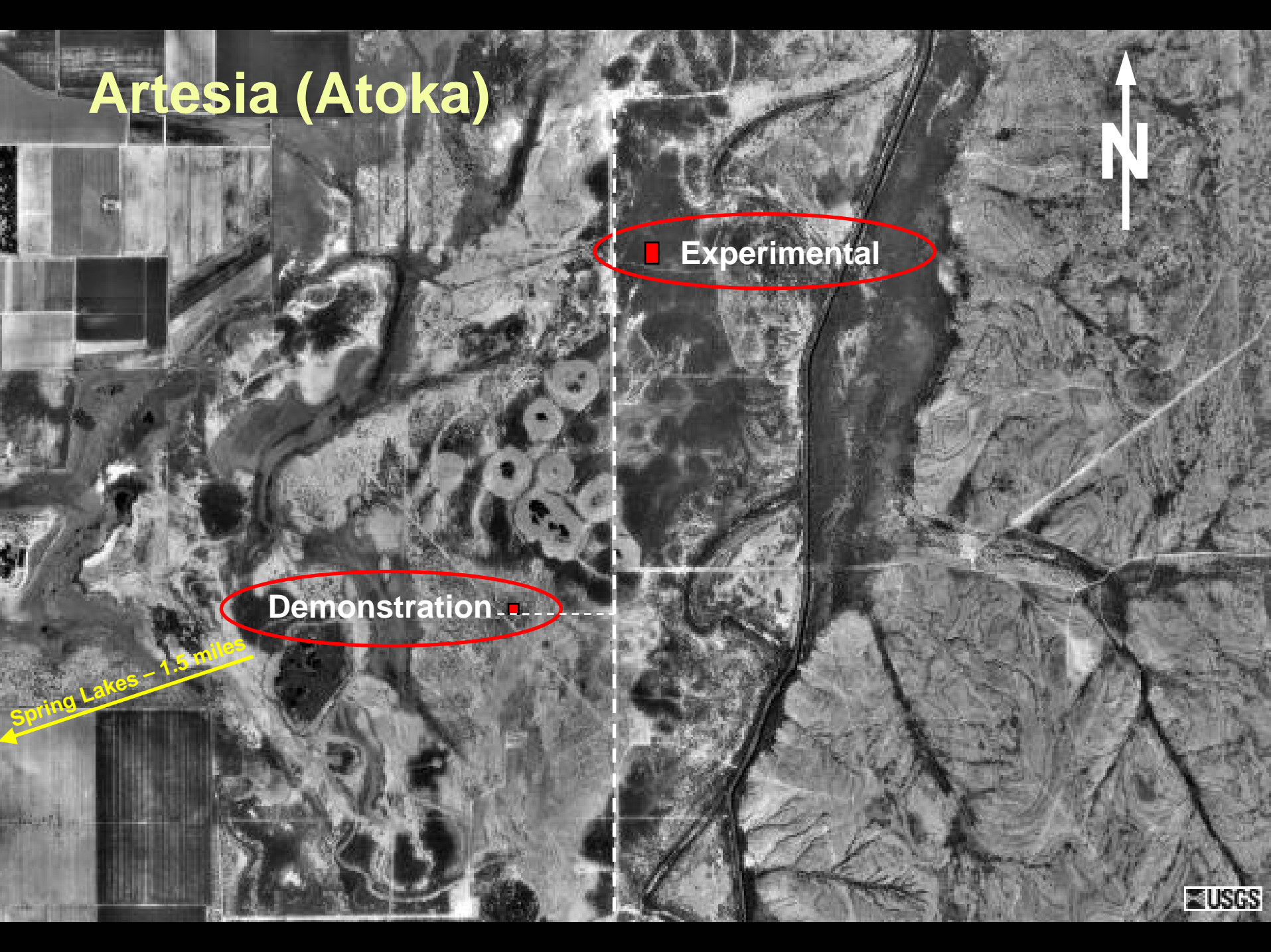
Artesia (Atoka)



■ Experimental

Demonstration ■

Spring Lakes - 1.5 miles



2005-06 Results

McMillan



NK 300



Sordan 79

August 5, 2005

Mycorrhizal inoculation



Inoculated

Non-inoculated



Cut to 12" – September 7, 2005



Soil texture

Seed predation



February, 2006

2006 ALTERNATIVE DESIGN – McMILLAN REVEGETATION STUDY SITE

SEEDING METHOD

		<u>ACRES</u>
TD	TRILLION DRILL	0.9
RD	FLEX II RANGE DRILL	0.9
BC	BROADCAST + CULTIPACKER	0.9
BI	BROADCAST + IMPRINTER	0.9
DF	DEEP FURROW DRILL + CULTIPACKER	0.9
NS	NO SEEDING	0.9
		5.4

SEED PRE-CONDITIONING

SS	STRATIFIED (CHILLED)	2.7
NS	NON-STRATIFIED	2.7
		5.4

POLYMER SUPPLEMENT

PP	POLYMER	2.7
NP	NO POLYMER	2.7
		5.4

McMILLAN HERBICIDE STUDY



Herbicide Treatments

9 - Vanquish + 2,4-D

8 - Plateau DF

4 - 2,4-D Amine 4

7 - Escort XP + 2,4-D
+ Vanquish

2 - Vista

10 - Vista + Overdrive

6 - Telar + 2,4-D +
Vanquish

1 - Escort XP

3 - Overdrive

5 - Telar + Vista

Preliminary Results

- All herbicides effective
- No indication of confirmed resistance
- Possible escapes with Plateau™
- Vista™ ineffective on Russian thistle



August 5, 2005

EXPERIMENTAL DESIGN – ARTESIA REVEGETATION STUDY SITE

<u>KOCHIA RESIDUE MANIPULATION / SEEDING METHOD</u>		<u>ACRES</u>
BR	MOW / BROADCAST SEED / ROLLER CHOP	1.0
BI	MOW / BROADCAST SEED / IMPRINT	1.0
ND	MOW / NO-TILL GRASS DRILL	1.0
TD	DISK / TRILLION DRILL	1.0
NS	MOW / NO SEED	1.0
		5.2

<u>HERBICIDE TREATMENT</u>		
VT	VISTA + TELAR	1.7
VO	VISTA + OVERDRIVE	1.7
NH	NO HERBICIDE	1.7
		5.2

<u>MYCORRHIZAL INOCULATION</u>		
M	RTI	2.6
N	NO MYC. INOCULUM	2.6
		5.2

Mowing (12" height)



Herbicide application

- Vista™ + Telar™
- Vista™ + Overdrive™







2005-06 Results

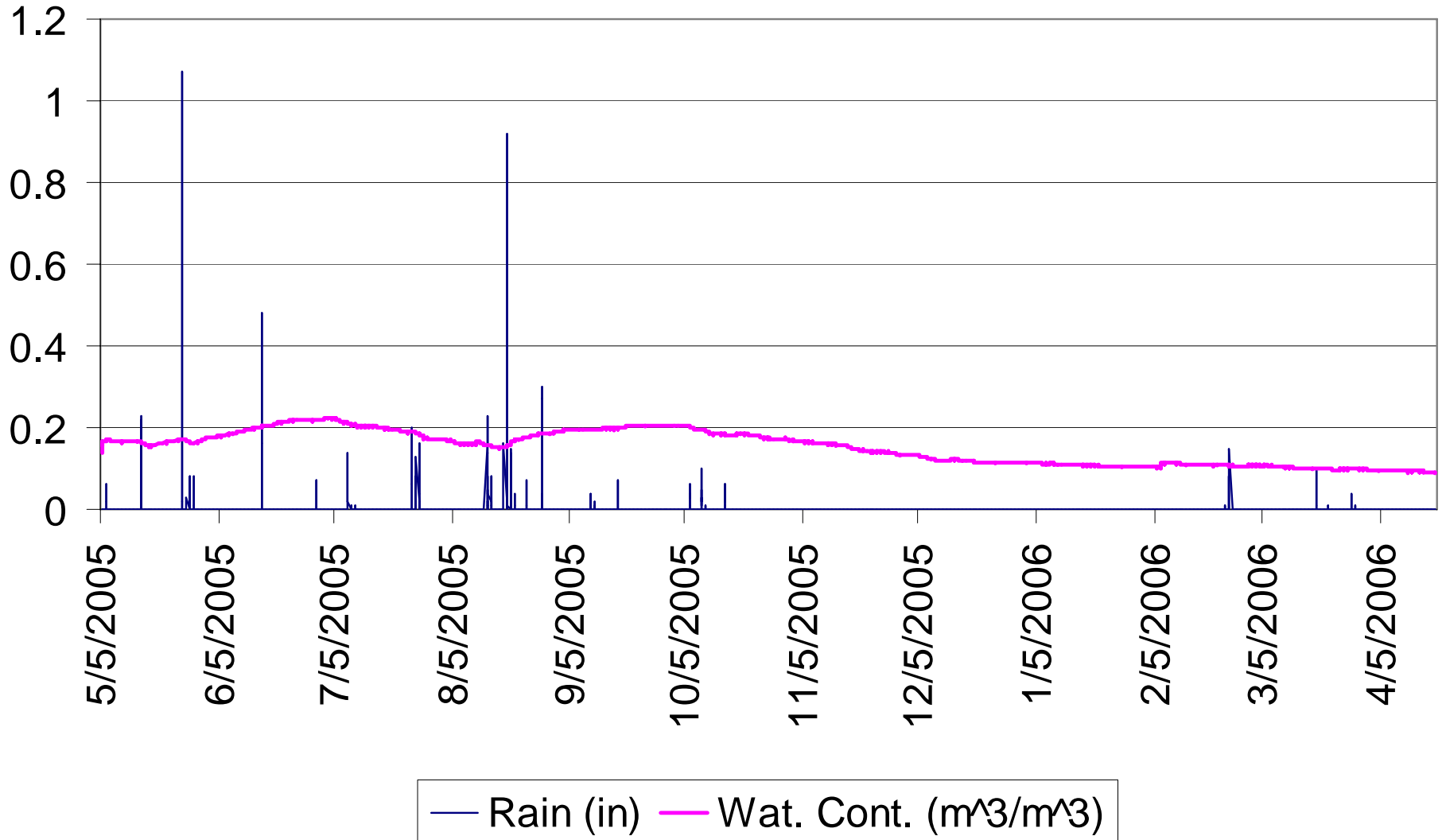
Artesia





~August 30, 2005

McMillan - Precip. & Soil Moisture



Date



Blue grama (*Bouteloua gracilis*)

Sideoats grama (*Bouteloua curtipendula*)



Blue grama



Sideoats grama



Switchgrass
Panicum virgatum



Alkali sacaton
Sporobolus airoides

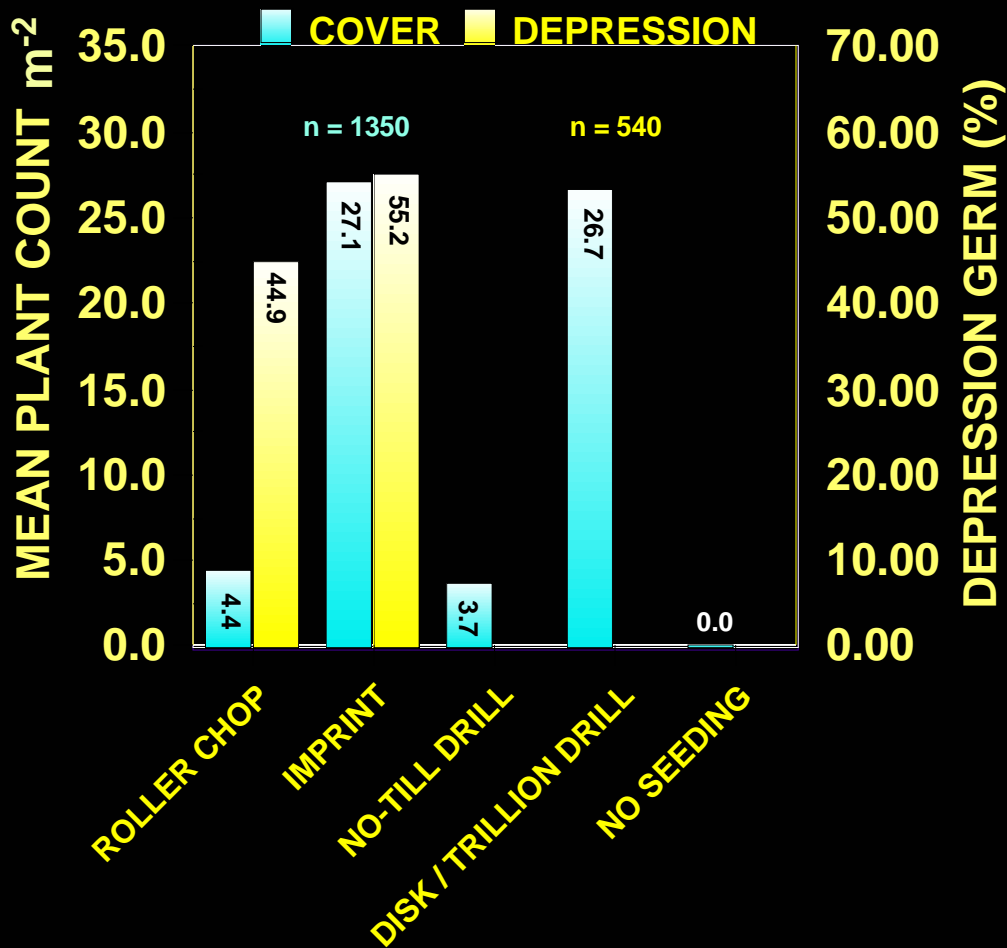


Cane bluestem
Bothriochloa
barbinodes



Bottlebrush Squirreltail
Elymus elymoides

Bouteloua gracilis *Bouteloua curtipendula*



**SEEDING METHOD RESPONSE
FEBRUARY, 2006**



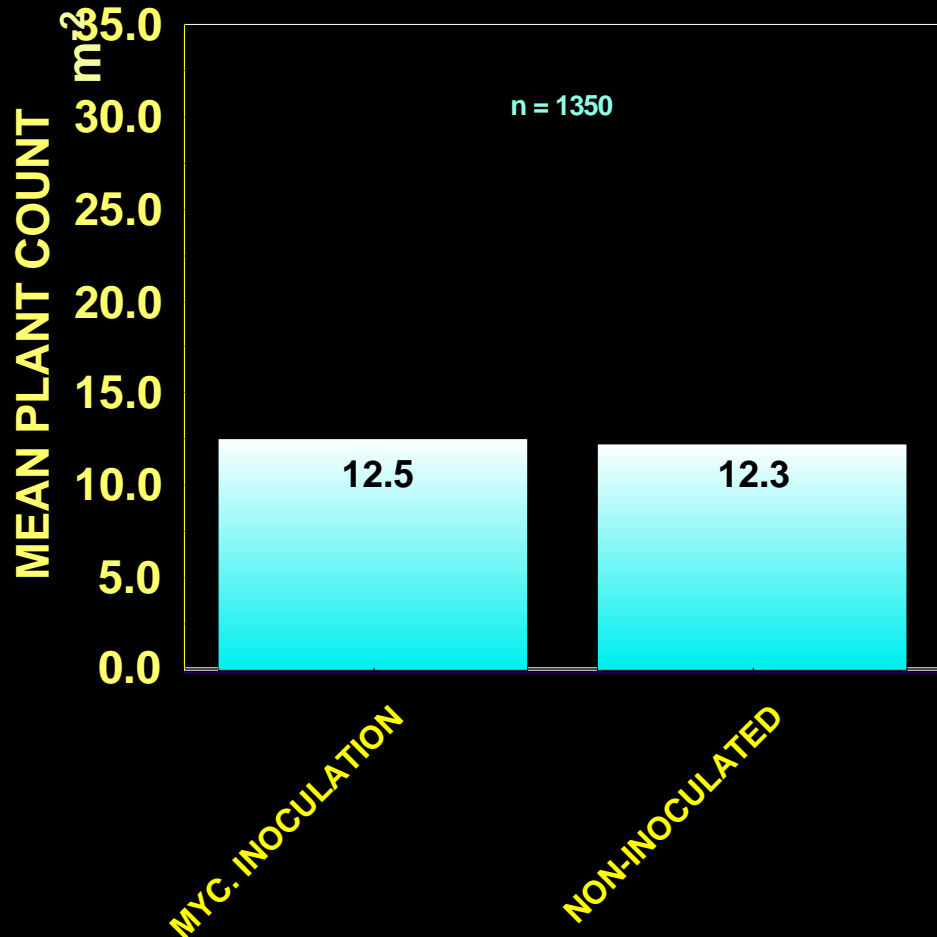
Blue grama



Sideoats grama

**Artesia Revegetation Study
Seeded: August 8, 2005**

Bouteloua gracilis
Bouteloua curtipendula



MYCORRHIZAL INOCULATION RESPONSE
FEBRUARY, 2006



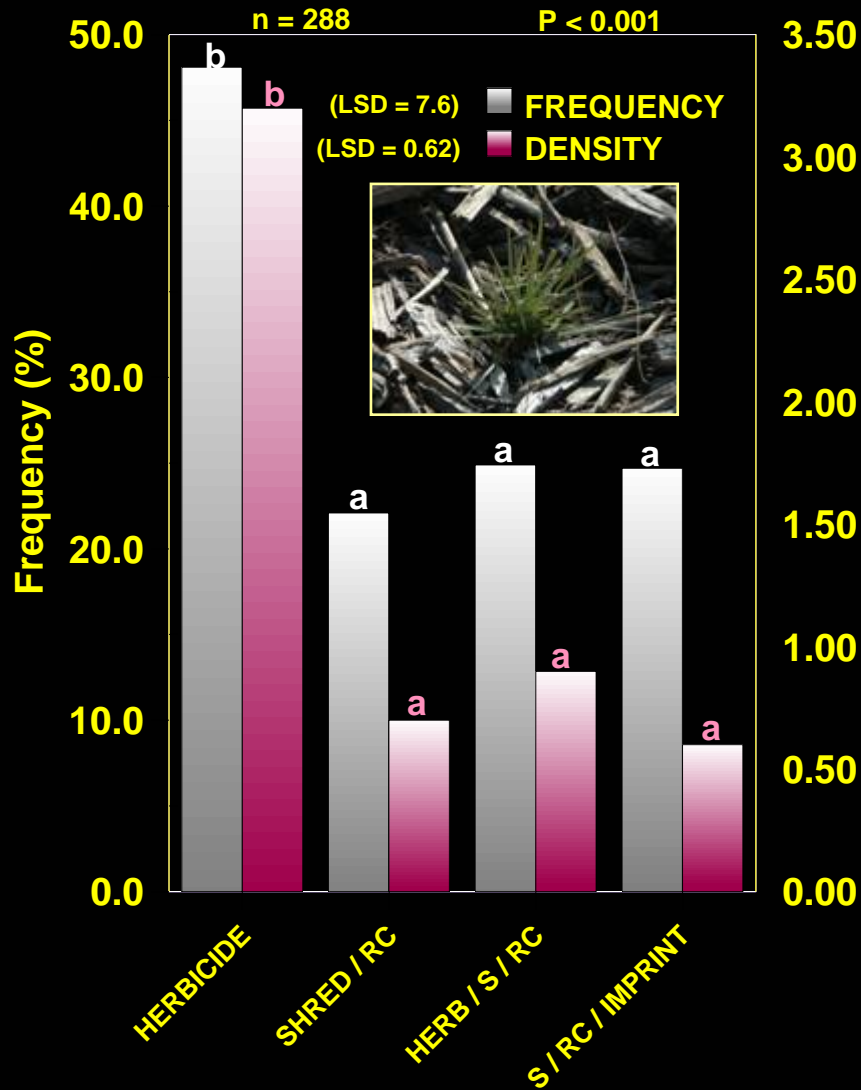
Blue grama



Sideoats grama

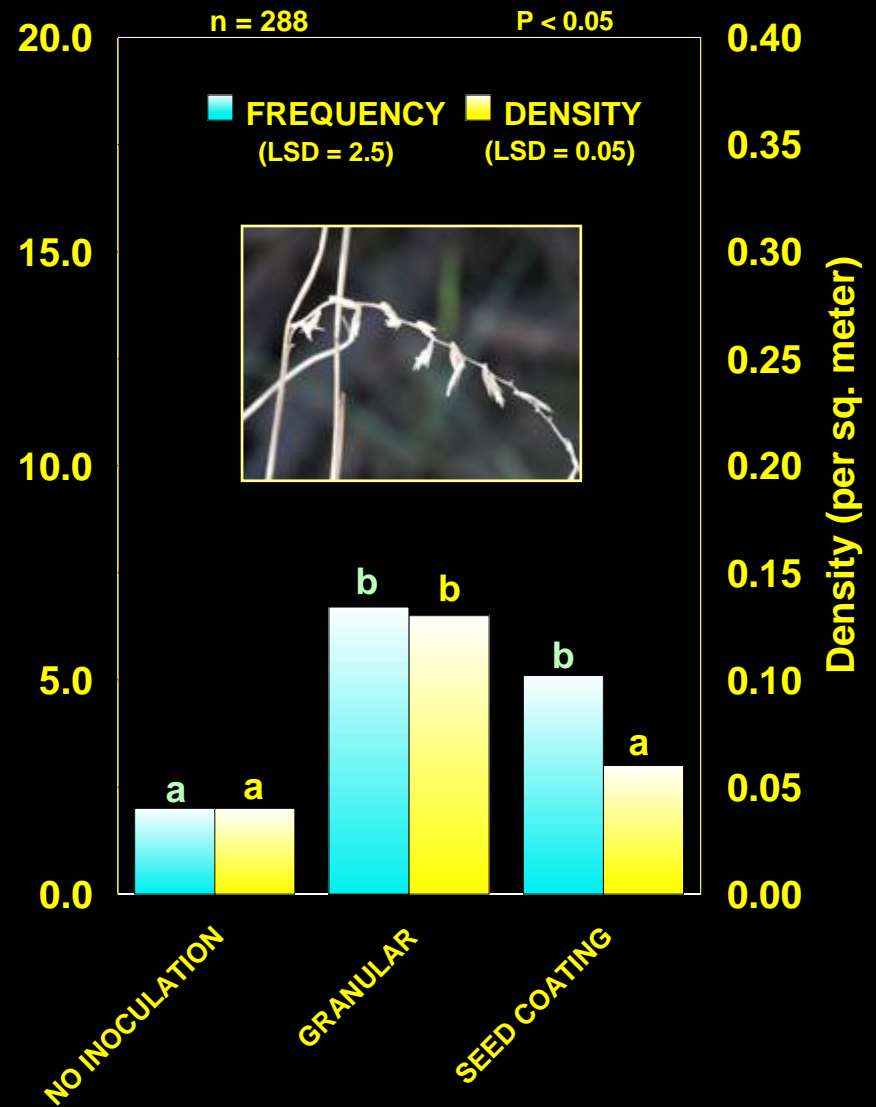
Artesia Revegetation Study
Seeded: August 8, 2005

Elymus trachycaulus



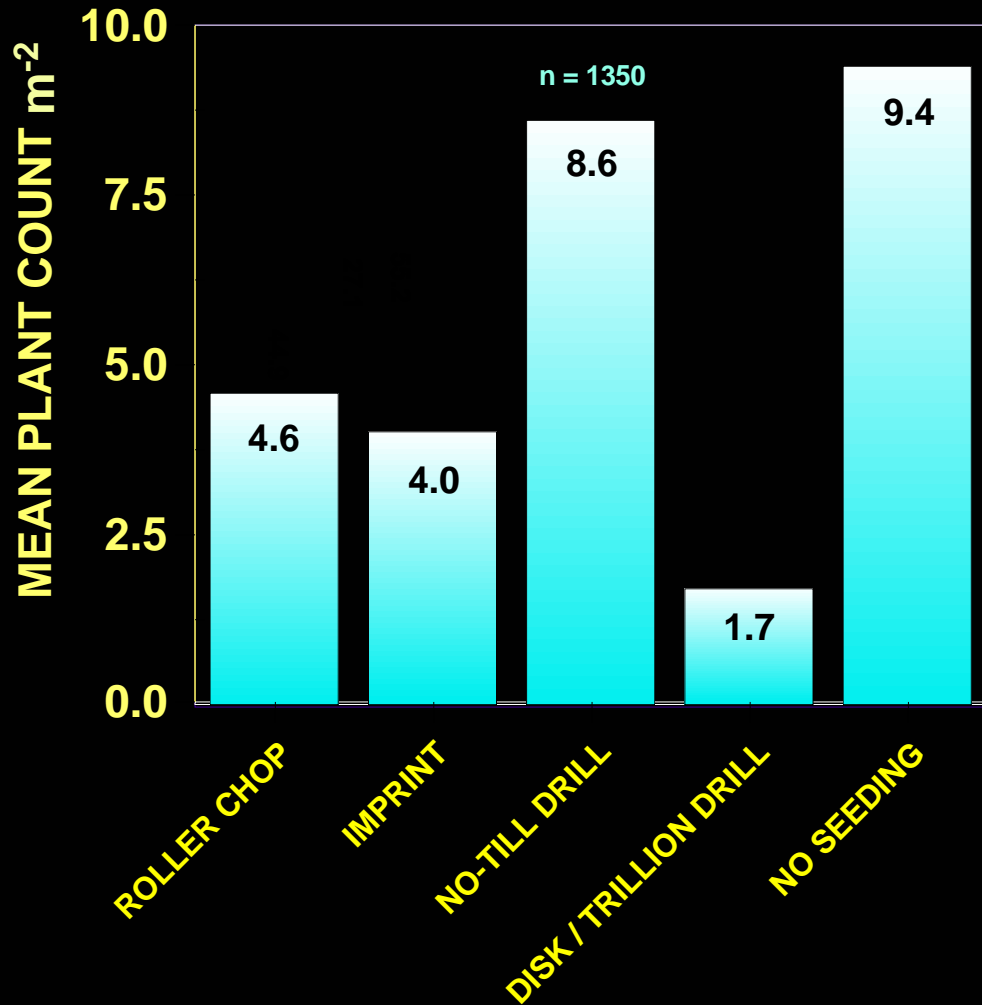
SALT CEDAR TREATMENT

Bouteloua curtipendula



MYCORRHIZAL INOCULATION

Kochia scoparia



**SEEDING METHOD RESPONSE
FEBRUARY, 2006**



Kochia



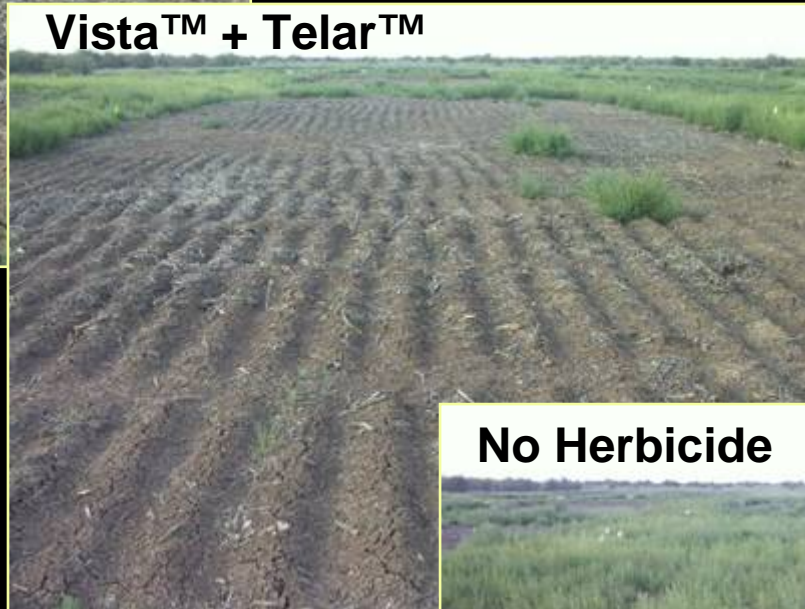
**Artesia Revegetation Study
Seeded: August 8, 2005**

Vista™ + Overdrive™

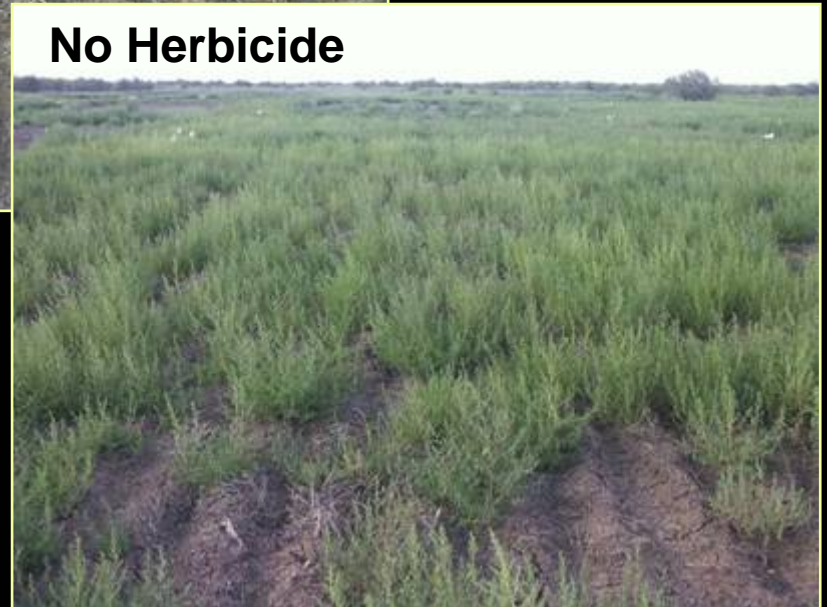


Herbicide Efficacy (2005-06)

Vista™ + Telar™

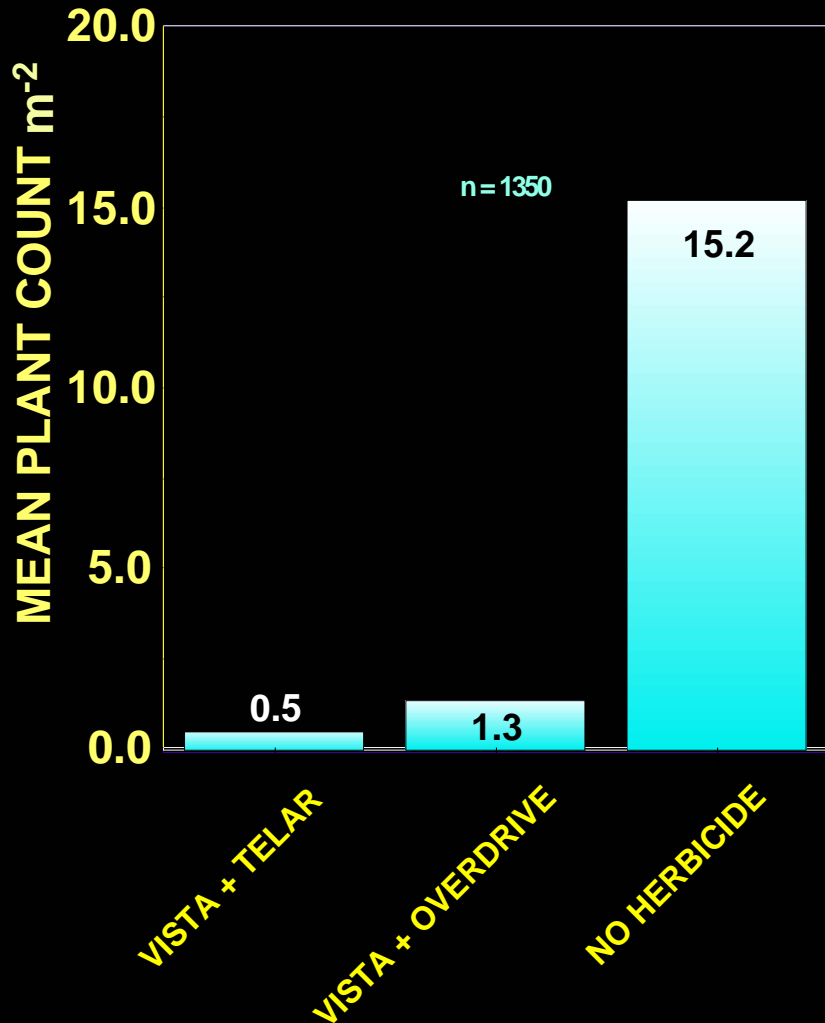


No Herbicide



Roller Chopped Plots

Kochia scoparia



HERBICIDE TREATMENT RESPONSE
FEBRUARY, 2006

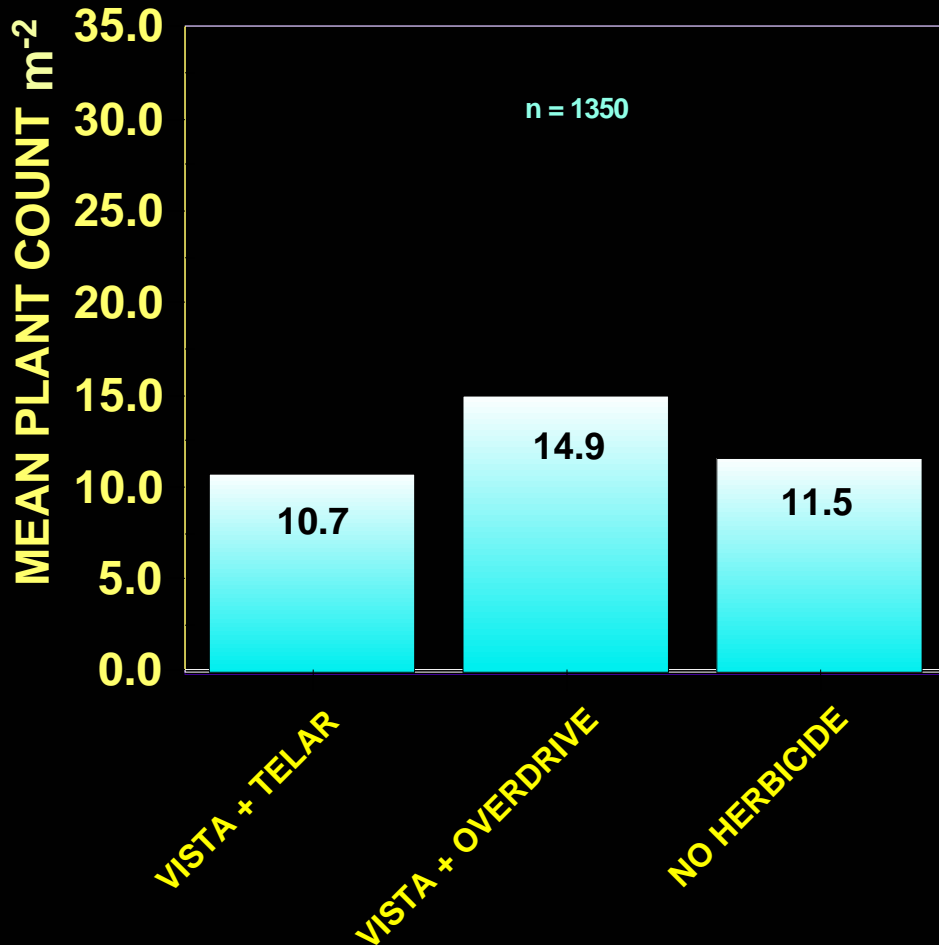


Kochia



Artesia Revegetation Study
Seeded: August 8, 2005

Bouteloua gracilis
Bouteloua curtipendula



HERBICIDE TREATMENT RESPONSE
FEBRUARY, 2006



Blue grama



Sideoats grama

Artesia Revegetation Study
Seeded: August 8, 2005

Demonstration Single-Species, Single-Row Trials



Artesia “Alkali Scald” Test Species

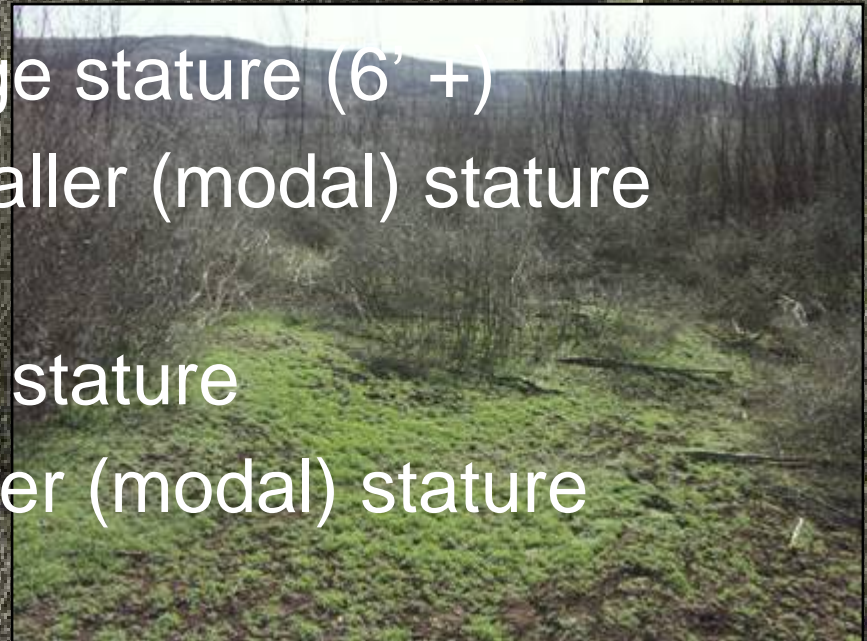
Common Name	Symbol	Scientific Name
Inland saltgrass	DISP	<i>Distichlis spicata</i>
Alkali muhly (Scratchgrass)	MUAS	<i>Muhlenbergia asperifolia</i>
Vine mesquite	PAOB	<i>Panicum obtusum</i>
Alkali sacaton	SPAI	<i>Sporobolus airoides</i>
Giant (big) sacaton	SPWR	<i>Sporobolus wrightii</i>
Salt heliotrope	HECU	<i>Heliotropium curassivicum</i>
Dwarf glasswort	SAVI	<i>Salicornia virginica</i>
Alkali goldenbush	ISAC	<i>Isocoma acradenius</i>
Frankenia	FRSA	<i>Frankenia salina</i>
Iodinebush; Pickleweed	ALOC	<i>Allenrolfia occidentalis</i>
Fourwing saltbush	ATCA	<i>Atriplex canescens</i>
Shadscale	ATCO	<i>Atriplex confertifolia</i>
Quailbush	ATLE	<i>Atriplex lentiformis</i>
Seep willow	BAGL	<i>Baccharis glutinosa</i>
Pale or Anderson wolfberry	LYAN	<i>Lycium andersonii</i>
Tornillo; screwbean mesquite	PRPU	<i>Prosopis pubescens</i>
Greasewood	SAVE	<i>Sarcobatus vermiculatus</i>
White bursage	AMDU	<i>Ambrosia dumosa</i>
Desert seepweed; iodineweed	SUMO	<i>Suaeda moquinii</i>

Apparent Kochia resistance

(secondary target species; Arsenal treatment)

- Kochia seed collected from two representative sites and two representative ecotypes:

- 1) McMillan locale / large stature (6' +)
- 2) McMillan locale / smaller (modal) stature (<6')
- 3) Artesia locale / large stature
- 4) Artesia locale / smaller (modal) stature



Kochia Herbicide Tolerance Testing

Colorado State University

BioAgricultural (Weed) Science Dep't.

Dr. Scott Nissen

Non-replicated demo trial

(n = 100 seed for collections 2, 3, 4)

(collected October 2005)

- **Vista (fluroxypyr) – 0% survival – all collections**
- **Aim (sulfentrazone) – 0% survival – all collections**
- **Telar (chlorsulfuron) – 5% survival – collections 3, 4**
- **Arsenal (imazapyr) – 92% survival!!! – collections 3, 4**

Further studies in 2006 using in-field bio-assay techniques (leaf disks) for determination of tolerance distribution along the Pecos floodplain.



**Bureau of
Reclamation**



Managing Water In The American West

REVEGETATION ECONOMICS

*(PRELIMINARY)*¹

	<u>LOW</u> (\$ / AC)	<u>HIGH</u> (\$ / AC)
Herbicide:		
Application	4.30	4.30
Product	3.00	27.00
Disking (x2)	16.00	16.00
Seeding:		
Application	11.00	11.00
Seed	79.15	106.30
Mowing	<u>8.00</u>	<u>8.00</u>
Totals:	\$121.45	\$172.60

¹ Application / operation values derived from 2004 CSREES Custom Rates reports – NM, CO, KS, TX