

# CHANGES IN SHRUB VEGETATION

THROUGH TIME AND SPACE

# COSO – Changes Thru Time

- During the original Coso MGS study, we sampled shrub vegetation twice on all 4 sites
- In 1989 after a series of pretty good rainfall years
- Again in 1994, after a long drought and then 3 good winters
- Then in June 2016, after a really severe drought we sampled Site 2 and 3

# COSO SHRUB SAMPLING

- Shrub sampling was done by line intercept method, using the 500 m N/S lines of trap stations. Ten of these lines were selected, beginning with Line B, then Line D, and so on. On each line, 10 alternating 25 m intervals between trap stations were sampled -- for example, Station B2 --> B3, then B4 --> B5. A total of 100 25 m intervals were sampled. Species and length of intercept (to nearest 10 cm) were recorded for each shrub intercepted, thus providing percent cover for each species, as well as the total number of individual plants per species. Plants with no live canopy were judged to be dead, but the number and intercept was recorded.

COSO SITE 2

CHANGES IN SHRUB COMMUNITY COMPOSITION

	PERCENT COVER			NUMBER OF PLANTS			AVERAGE CONDITION		
	1989	1994	2016	1989	1994	2016	1989	1994	2016
ACSP	3.53	4.73	1.87	322	350	142	2.5	3.4	1.9
AMDU	0.52	0.84	0.57	49	59	42	2.6	3.8	2.1
AMSA	2.1	3.24	1.54	97	127	72	2.1	3.5	2.2
ATCO	4.58	4.51	0.44	231	222	25	2.5	3.3	2.1
ATPO	1.87	1.06	1.62	63	30	44	1.2	3.8	3.2
EPNE	5.29	6.79	5.04	292	220	234	2.1	3.5	1.8
GRSP	0.18	0.28	0.33	11	11	12	2.1	3	2
KRLA	1.81	1.49	0.98	132	127	80	2.4	3.3	2.3
LYAN	2.1	2.31	1.28	118	117	88	2.4	2.6	1.7
PSAR	0.39	0.41	0.45	16	17	15	2.8	4	2.6
Total Live	22.37	25.66	14.12	1331	1280	754	Condition based on % estimate of live canopy		
Dead	1.32	2.96	10.55	84	187	717			
Live + Dead	23.69	28.62	24.67	1415	1467	1471			

Numbers in **bold** = species with  $\geq 10$  individuals in sample every year

Data with green fill = notable changes over time in cover, numbers, or condition

COSO SITE 3

CHANGES IN SHRUB COMMUNITY COMPOSITION

	PERCENT COVER			NUMBER OF PLANTS			AVERAGE CONDITION		
	1989	1994	2016	1989	1994	2016	1989	1994	2016
ACSP	0.41	0.60	0.48	33	44	30	2.2	3.5	2.1
AMSA	0.95	1.43	0.79	47	79	47	2.1	3.6	2.3
ATCA	4.96	3.52	2.22	147	120	84	2.1	3.6	2.5
ATCO	3.48	2.41	0.39	117	110	18	2.2	3.4	3.8
EPNE	0.19	0.32	0.26	11	16	16	2.5	3.8	1.9
ERCO	0.19	0.14	0.17	19	15	14	3.1	3.7	3
GRSP	7.27	3.66	3.21	264	150	133	2.3	3.3	2.8
KRLA	1.08	1.49	1.43	68	94	87	3.2	3.6	2.7
LYAN	0.42	0.58	0.17	21	31	14	2.7	3.1	1.9
LYCO	2.01	2.23	2.91	39	47	68	3.5	3.8	2.3
Total Live	21.09	16.48	12.07	766	706	511	Condition % estimate of live canopy 1 = 1-25% alive 2 = 25-50% alive 3 = 50-75% alive		
Dead	1.42	4.81	8.71	62	181	426			
Live + Dead	22.51	21.29	20.78	828	887	937			

Numbers in **bold** = species with  $\geq 10$  individuals in sample every year

Data with green fill = notable changes over time in cover, numbers, or condition





COSO SITE 2

May 29, 2011

U-21 -> U-01





R20 SITE 3  
May 29, 2011  
U-21-A26





COSO SITE 3  
May 29, 2011  
U-21 - U-01

# Changes through Space N & E of Kramer Junction

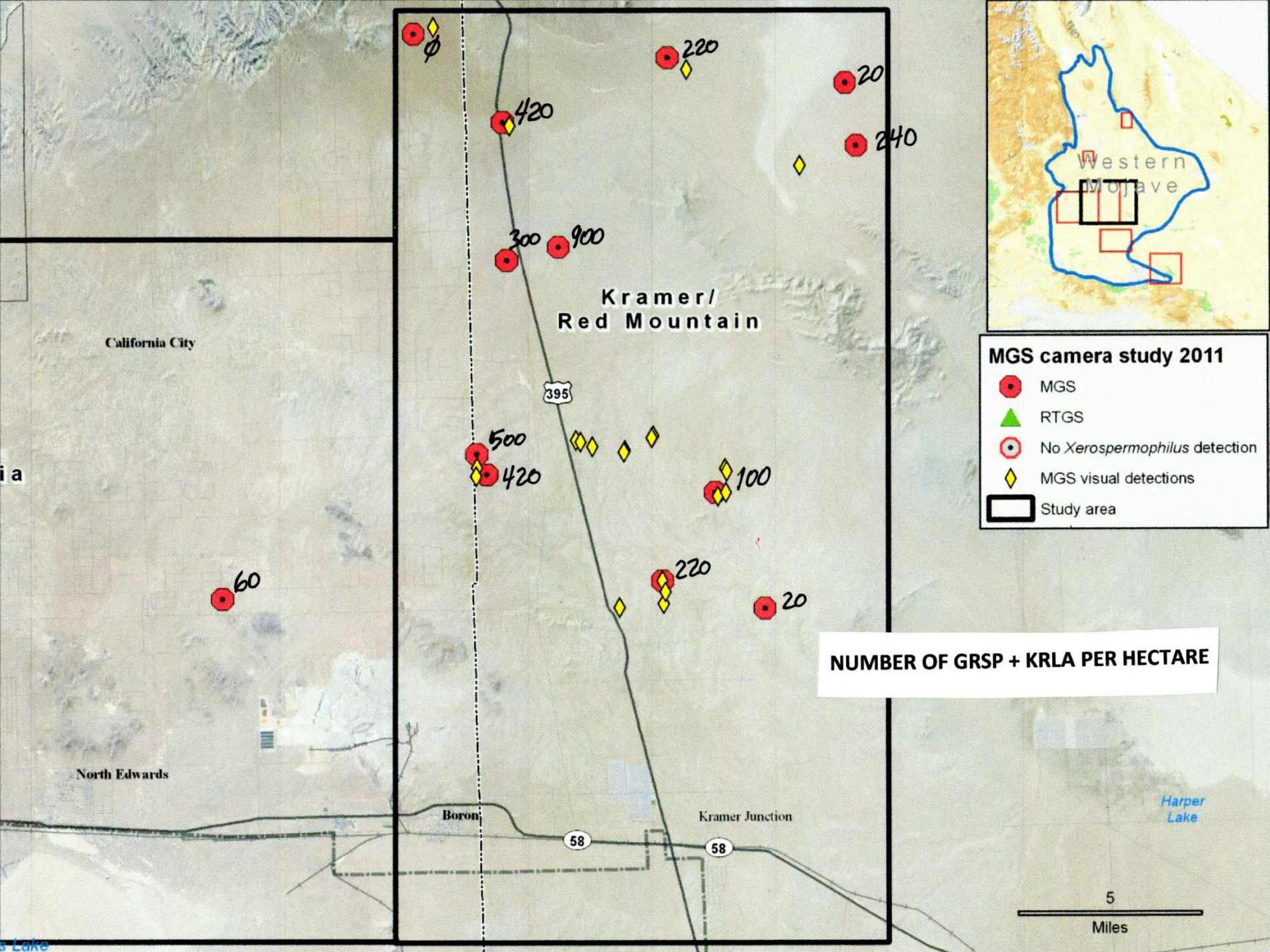
- In 2011 and 2012, shrub sampling was done at camera sites
- Data from 13 sites N of KJ and from 23 sites E of KJ
- Shrubs were counted and measured in 2 x 25 m belt transects adjacent to arrays of 10 camera stations at each site
- Small sample area – only 5% of a hectare

# Focus on Density of GRSP and KRLA

- Where were these 2 species found over this enormous area in the central part of the MGS range?
- How abundant were they?
- How does this fit with what we know about MGS diet?

# 8 Most Important Plants in MGS diet at Coso sites (1988-1996)

Food item	Percent mean relative density	Percent frequency
<i>Krascheninnikovia lanata</i> leaves	18.2	44.0
<i>Astragalus lentiginosus</i> leaves	12.6	35.2
<i>Grayia spinosa</i> leaves	11.9	28.0
<i>Atriplex</i> spp. leaves	7.4	47.1
<i>Gilia</i> sp./ <i>Linanthus</i> sp. leaves and seeds	7.4	34.3
<i>Lupinus odoratus</i> leaves, pods, and seeds	5.4	19.4
Asteraceae leaves, flowers, and seeds	4.5	20.7
<i>Eriogonum</i> spp. leaves	3.4	11.1
Total	70.8	





# Conclusions?

- West Mojave shrub communities are in bad shape
- If GRSP and KRLA provide dietary support for MGS when annuals don't come up
- Then certain areas with more GRSP and KRLA should have more stable MGS populations
- Maybe the lack of GRSP/KRLA has something to do with instability of MGS populations in the hybrid zone