



EDAPHIC COMPONENTS OF LAS VEGAS BEARPOPPY HABITAT

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Background

Arctomecon californica, Las Vegas Bear-poppy

- Perennial herbaceous evergreen species, flowers March-April, episodic recruitment life history
- Occurs in the Las Vegas Valley, Lake Mead NRA, Gold Butte NM, Mojave County, Arizona
- Gypsophile endemic, grows in various soil substrates
- Petitioned for listing under ESA in 2019

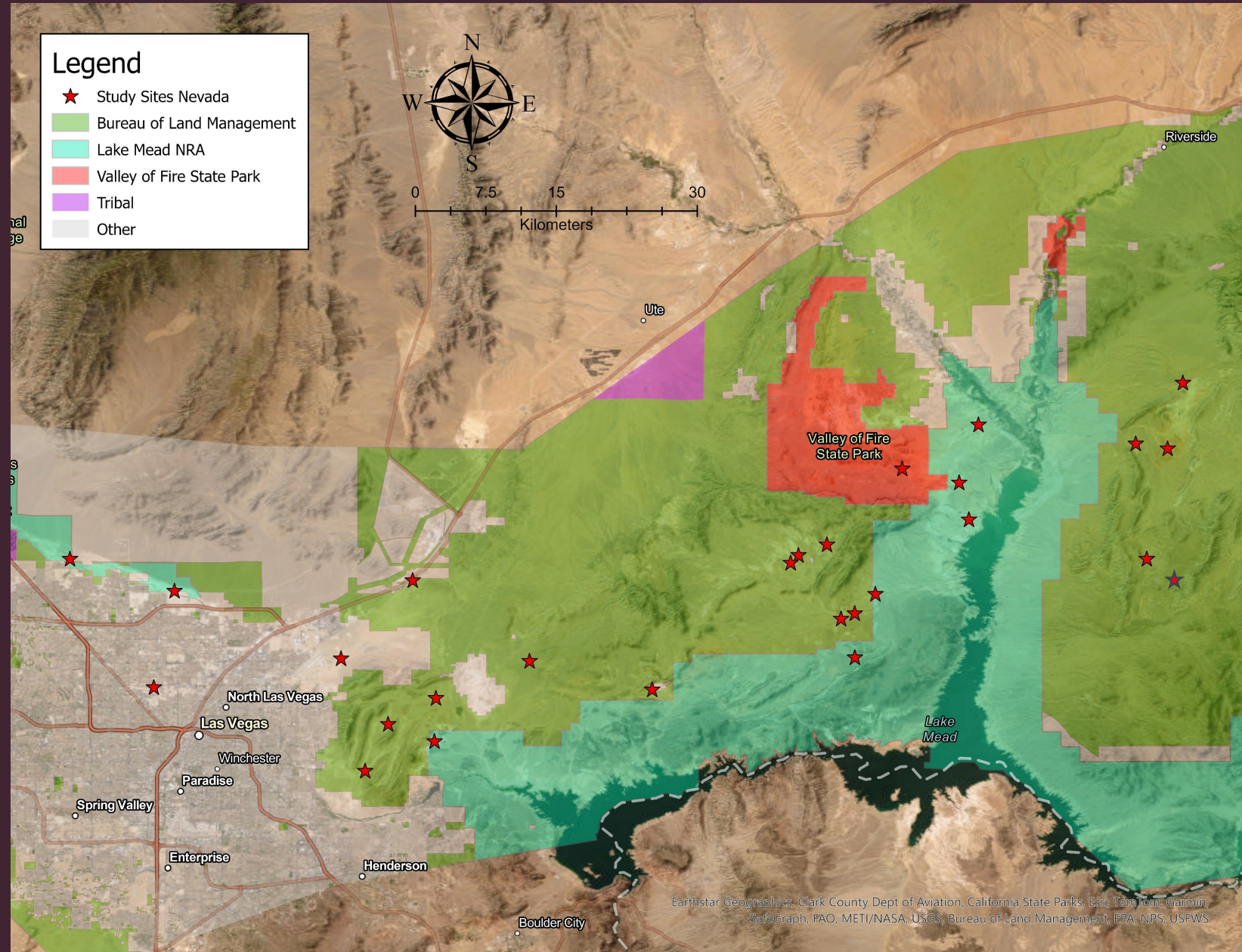
Research Objective:

Examine and quantify the full spectrum of edaphic conditions across *A. californica*'s range.

Study Components

1. Site Selection

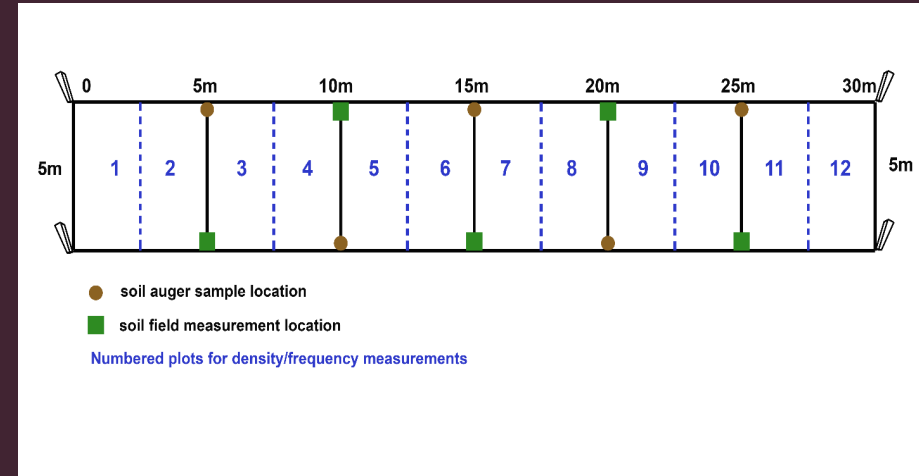
- 30 Study Sites across known range on various soil substrates
- Lake Mead NRA (6), Las Vegas Valley (6), Gold Butte (5), Rainbow Gardens (5), Bitter Springs Valley (5), Valley of Fire (1), Arizona (4)
- Study site soil all have some level of gypsum content
- Several study sites were placed in areas known to contain lithium, borate, or other unusual soil type for ARCA occurrences



Study Components

2. Sampling Methods

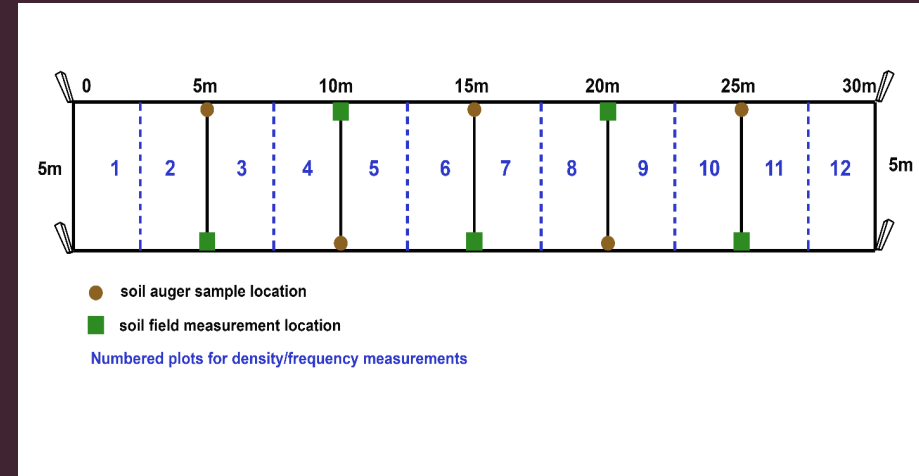
- Soil – 2 samples, seed zone (surface to 4cm), and root zone (6-30cm) at 5 points on each transect
- Soil Depth – steel rod
- Vegetation – perennial cover using belt transect (60m), frequency and density using 5 x 2.5m subplots
- Surface Cover – rock, crystalline gypsum, biological crust, plant litter, bare surface, using point intercept with a 25-point frame
- Tissue – 2-3 leaves from 5 plants for each site. Samples will be analyzed for unusual concentrations of microelements (i.e. lithium)



Study Components

3. Soil Analysis

- In-house: within transect variation, gypsum content (% dry weight), water content at saturation (% dry weight), pH, electrical conductivity (salinity).
- External Chemical Analysis: Utah State University Analytics Lab (USUAL) for bulked transect samples.
- USUAL also used for Tissue sample analysis.



Progress Report

Year 1 (Nov 1, 2023 – June 30, 2024)

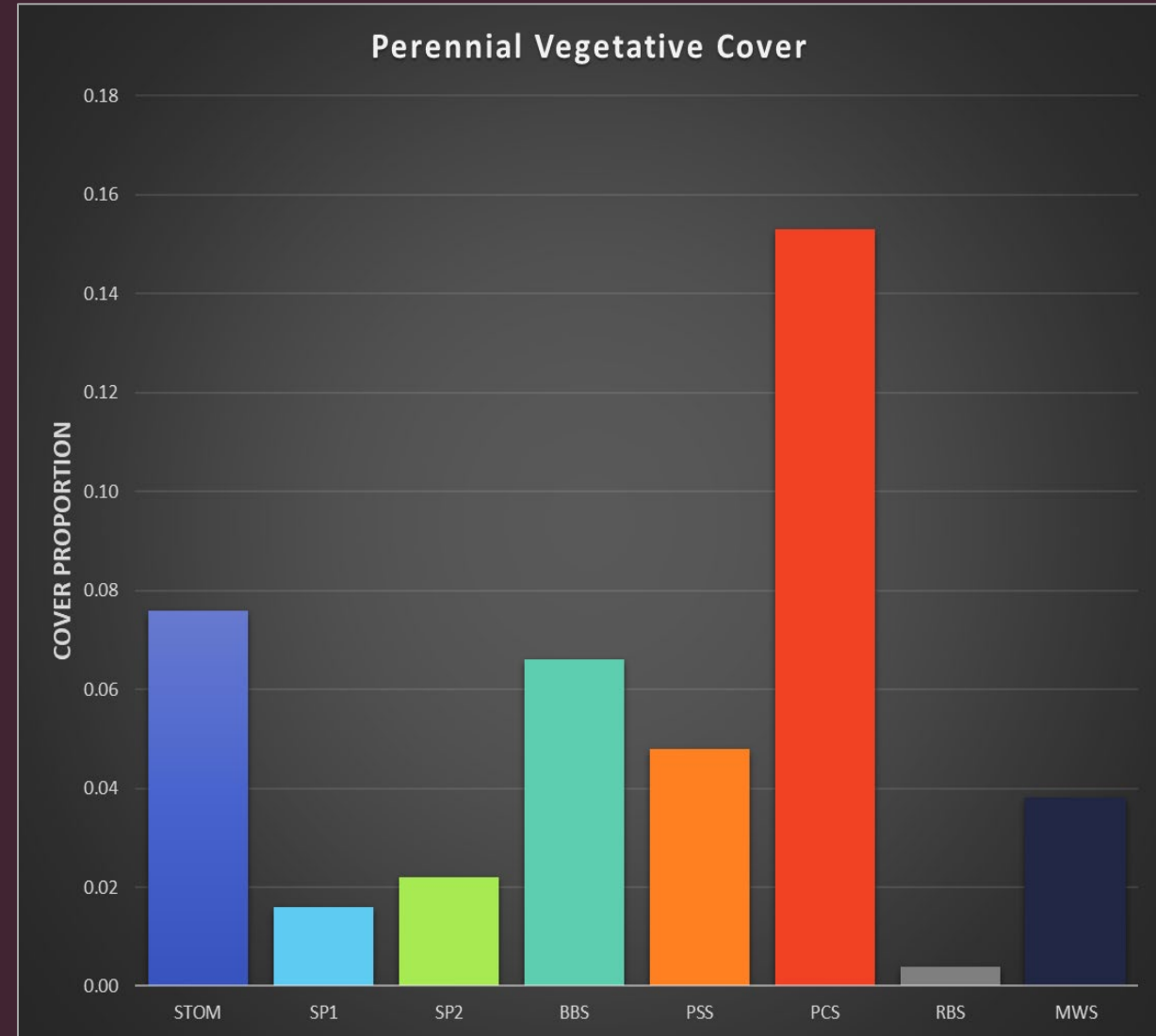
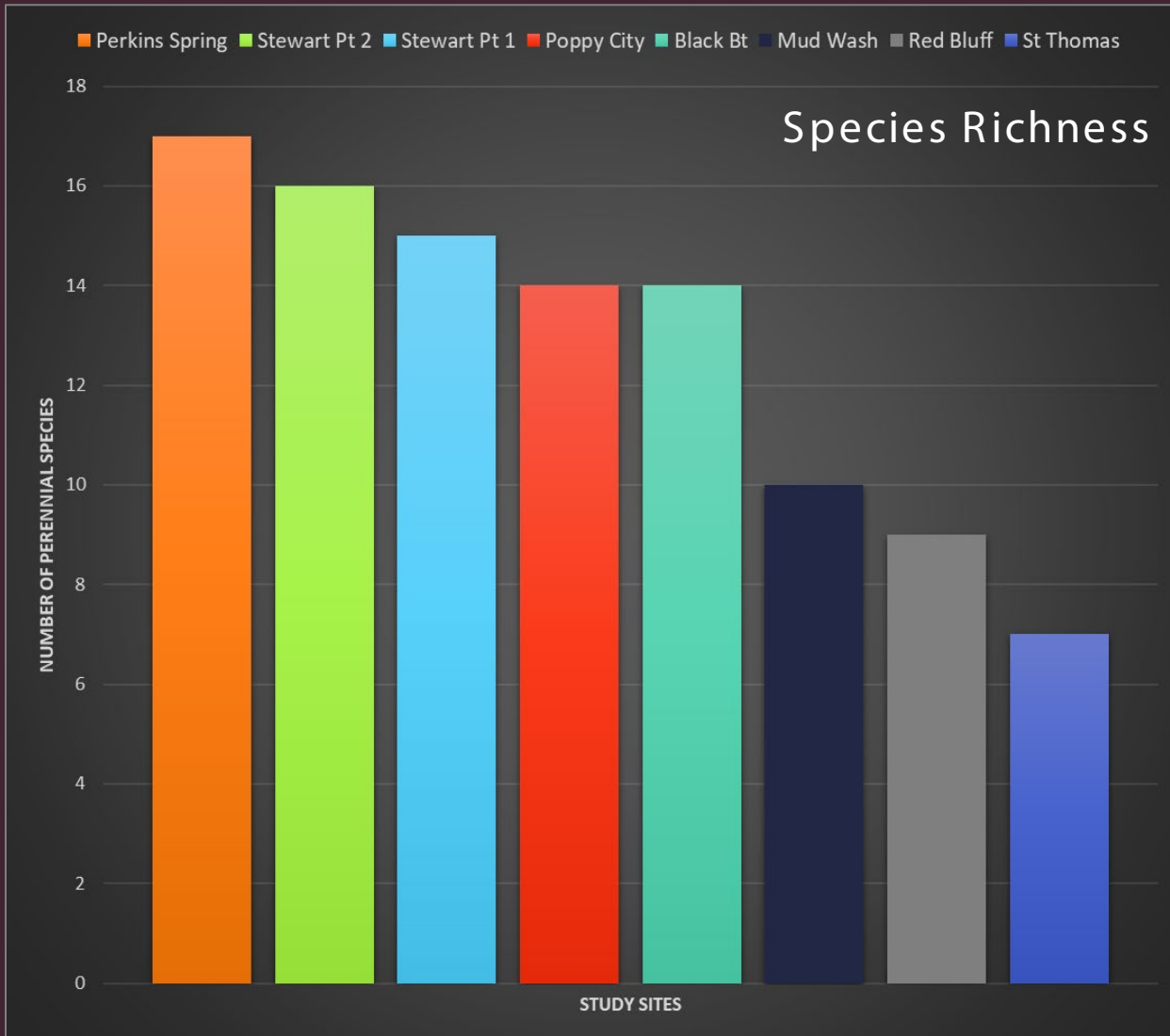
Completed:

- Work and data management plans
- Obtained all necessary permits (!!)
- Samples at Gold Butte Sites (5/5), Lake Mead Sites (3/6)
- Soil samples processed, data tabulated, and samples sent to USUAL for analysis
- Summarized all vegetation, cover, soil depth, and surface cover data



Preliminary Results

- Gold Butte Sites = Perkins Spring, Poppy City, Black Butte, Mud Wash, Red Bluff
- Lake Mead Sites = Stewart Point 1, Stewart Point 2, St. Thomas

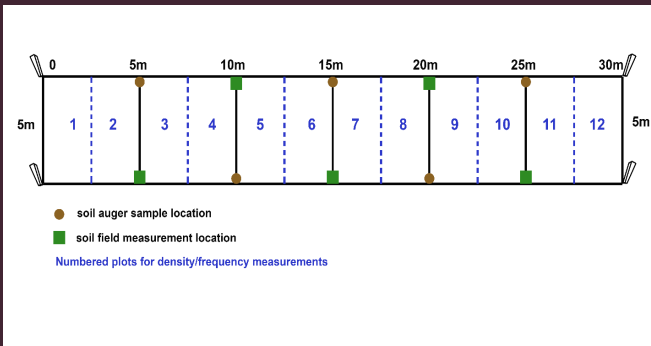


Preliminary Results

Gold Butte Sites = Perkins Spring (PSS), Poppy City (PCS), Black Butte (BBS), Mud Wash (MWS), Red Bluff (RBS)

Lake Mead Sites = Stewart Point 1 (SP1), Stewart Point 2 (SP2), St. Thomas (STOM)

- Frequency of perennial species presence within subplots, pooled by site (n=48 subplots per site)



CODE	Species	Common Name
AMDU	<i>Ambrosia dumosa</i>	Burrobush
ARCA	<i>Arctomecon californica</i>	Las Vegas Bear Poppy
ATCO	<i>Atriplex confertifolia</i>	Shadscale
BAMU	<i>Baileya multiradiata</i>	Desert Marigold
CAMU	<i>Camissonia multijuga</i>	Froststem Suncup
CORA	<i>Coleogyne ramosissima</i>	Blackbrush
ECJO	<i>Echinomastus johnsonii</i>	Johnson's Beehive Cactus
ENAR	<i>Enceliopsis argophylla</i>	Silverleaf Sunray
ENFA	<i>Encelia farinosa</i>	Brittlebush
EPTO	<i>Ephedra torreyana</i>	Torrey Mormon Tea
ERIN	<i>Eriogonum inflatum</i>	Desert Trumpet
HYSA	<i>Hymenoclea salsola</i>	Cheesebush
KRER	<i>Krameria erecta</i>	Littleleaf Range Ratany
LATR	<i>Larrea tridentata</i>	Creosote Bush
LEFR	<i>Lepidium fremontii</i>	Fremont Pepperbush
LYAN	<i>Lycium andersonii</i>	Anderson Wolfberry
MEPT	<i>Mentzelia pterosperma</i>	Wingseed Blazing Star
OPBA	<i>Opuntia basilaris</i>	Beavertail Cactus
PEPA	<i>Petalonyx parryi</i>	Parry Sandpaper Bush
PLRI	<i>Pleuraphis rigida</i>	Big Galleta Grass
PLSE	<i>Pluchea sericea</i>	Arrowweed
PRFA	<i>Prunus fasciculata</i>	Desert Almond
PSFR	<i>Psoralethamnus fremontii</i>	Fremont Indigobush
SADO	<i>Salvia dorrii</i>	Desert Purple Sage
SEGR	<i>Senegalia greggii</i>	Catclaw Acacia
SPAM	<i>Sphaeralcea ambigua</i>	Desert Globemallow
STPA	<i>Stephanomeria pauciflora</i>	Wirelettuce
STPI	<i>Stanleya pinnata</i>	Prince's Plume
SUNI	<i>Suaeda nigra</i>	Bush Seepweed
TIHI	<i>Tiquilia hispidissima</i>	Crinklemat
XYTO	<i>Xylorhiza tortifolia</i>	Mojave Aster
YUBR	<i>Yucca brevifolia</i>	Joshua Tree

Species list of perennial plants found in study site subplots, spring 2024

Frequency

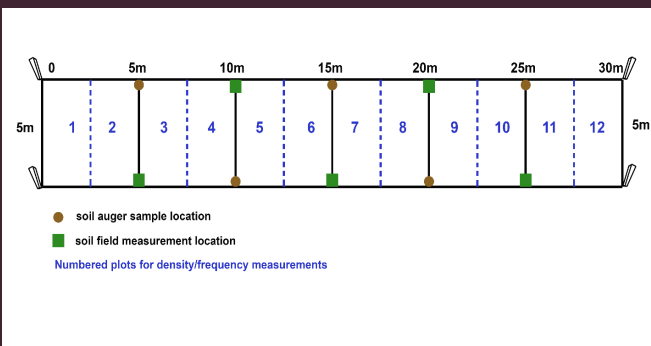
Species	STOM	SP1	SP2	BBS	PSS	PCS	RBS	MWS
AMDU	0.25	0.04	0.19		0.71	0.25	0.13	0.50
ARCA		0.13	0.06	0.27	0.31	0.35	0.21	0.10
ATCO		0.04	0.08	0.15		0.02	0.17	
BAMU					0.31			
CAMU			0.04					
CORA					0.02	0.27		
ECJO					0.06			
ENAR		0.06					0.23	0.17
ENFA					0.04			
EPTO	0.27	0.08	0.02	0.52	0.29	0.29	0.02	0.23
ERIN	0.02	0.02	0.17	0.02	0.06	0.23	0.52	0.15
HYSA				0.50	0.04	0.19	0.08	0.04
KRER		0.02	0.04		0.13	0.06		0.02
LATR	0.06	0.13	0.02			0.15		
LEFR		0.02	0.08					
LYAN				0.08		0.23		
MEPT		0.10	0.04				0.17	
OPBA		0.06	0.04					0.04
PEPA			0.02	0.19	0.10			
PLRI				0.06				
PLSE					0.08			
PRFA				0.02				
PSFR	0.75	0.21	0.19	0.40		0.17		0.29
SADO					0.02			
SEGR	0.02		0.02					
SPAM	0.08	0.04	0.04	0.08	0.04	0.27		0.08
STPA		0.13	0.06	0.02			0.02	
STPI				0.02				
SUNI		0.10						
TIHI				0.42	0.21			
XYTO					0.23	0.08		
YUBR					0.19	0.02		

Preliminary Results

Gold Butte Sites = Perkins Spring (PSS), Poppy City (PCS), Black Butte (BBS), Mud Wash (MWS), Red Bluff (RBS)

Lake Mead Sites = Stewart Point 1 (SP1), Stewart Point 2 (SP2), St. Thomas (STOM)

- Frequency of perennial species presence within subplots, pooled by site (n=48 subplots per site)
- Density (quantity of individuals) of perennial species pooled by site (600m²)



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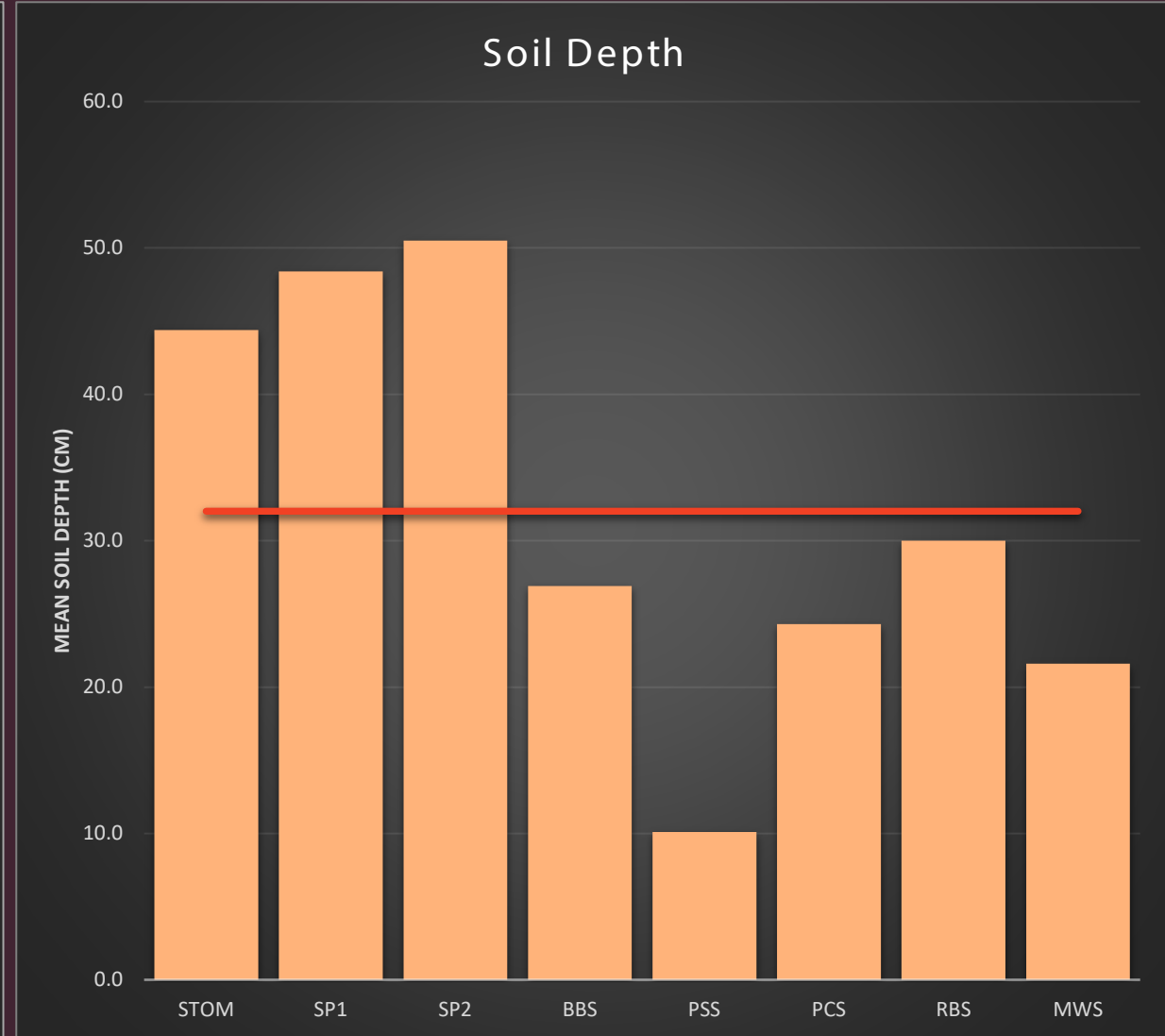
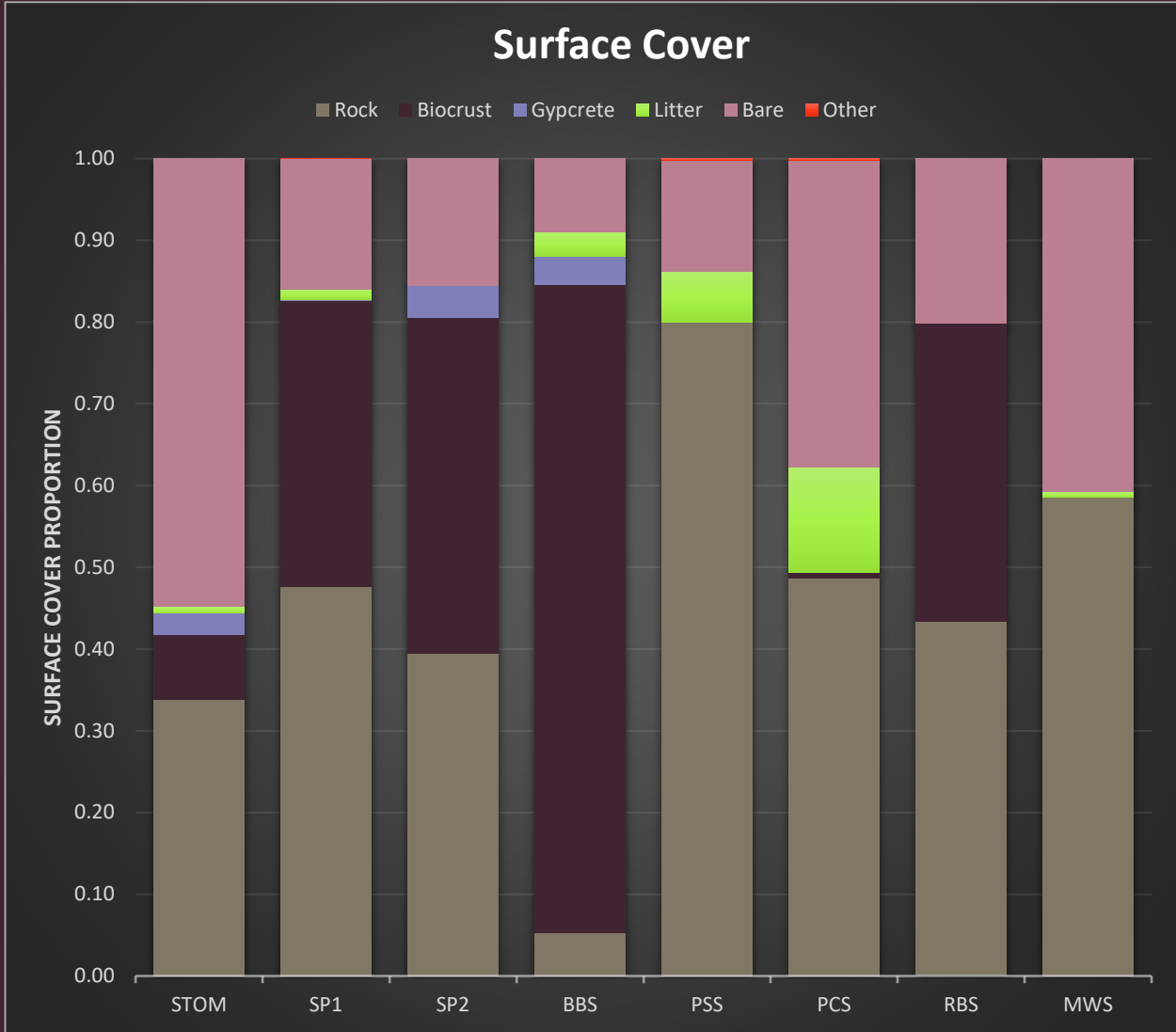
Density

Species	STOM	SP1	SP2	BBS	PSS	PCS	RBS	MWS
AMDU	16	2	13	-	91	22	10	36
ARCA	-	6	4	26	35	46	17	11
ATCO	-	2	6	8	-	1	11	-
BAMU	-	-	-	-	25	-	-	-
CAMU	-	-	2	-	-	-	-	-
CORA	-	-	-	-	3	18	-	-
ECJO	-	-	-	-	3	-	-	-
ENAR	-	3	-	-	-	-	28	14
ENFA	-	-	-	-	3	-	-	-
EPTO	14	4	1	32	22	18	1	11
ERINTR	2	1	11	1	4	26	47	11
HYSA	-	-	-	35	4	15	4	2
KRER	-	1	2	-	8	3	-	1
LATR	3	6	1	-	-	8	-	-
LEFR	-	2	5	-	-	-	-	-
LYAN	-	-	-	4	-	18	-	-
MEPT	-	6	2	-	-	-	13	-
OPBA	-	3	3	-	-	-	-	2
PEPA	-	-	1	12	8	-	-	-
PLRI	-	-	-	6	-	-	-	-
PLSE	-	-	-	-	25	-	-	-
PRFA	-	-	-	2	-	-	-	-
PSFR	69	11	17	28	-	12	-	17
SADO	-	-	-	-	2	-	-	-
SEGR	1	-	1	-	-	-	-	-
SPAM	5	2	3	8	3	26	-	5
STPA	-	6	4	1	-	-	1	-
STPI	-	-	-	1	-	-	-	-
SUNI	-	8	-	-	-	-	-	-
TIHI	-	-	-	78	29	-	-	-
XYTO	-	-	-	-	15	5	-	-
YUBR	-	-	-	-	10	1	-	-
MEAN	15.7	4.2	4.8	17.3	17.1	15.6	14.7	11.0

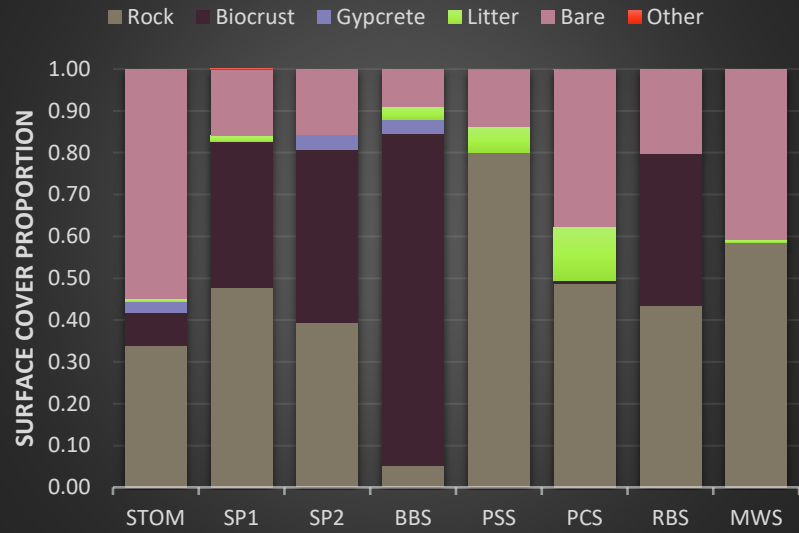
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Surface Cover



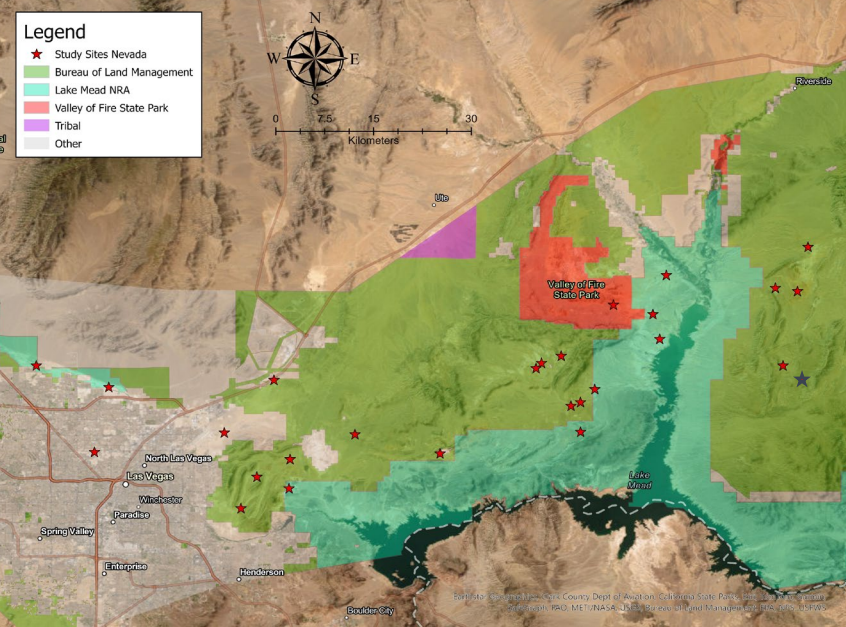
St Thomas
STOM



Stewart Pt 1
SP1



- Legend**
- ★ Study Sites Nevada
 - Bureau of Land Management
 - Lake Mead NRA
 - Valley of Fire State Park
 - Tribal
 - Other



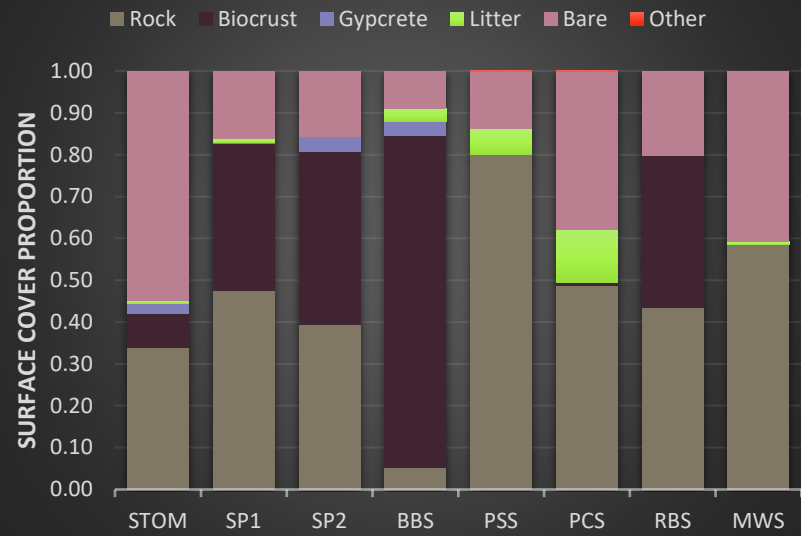
Stewart Pt 2
SP2



Black Butte
BBS



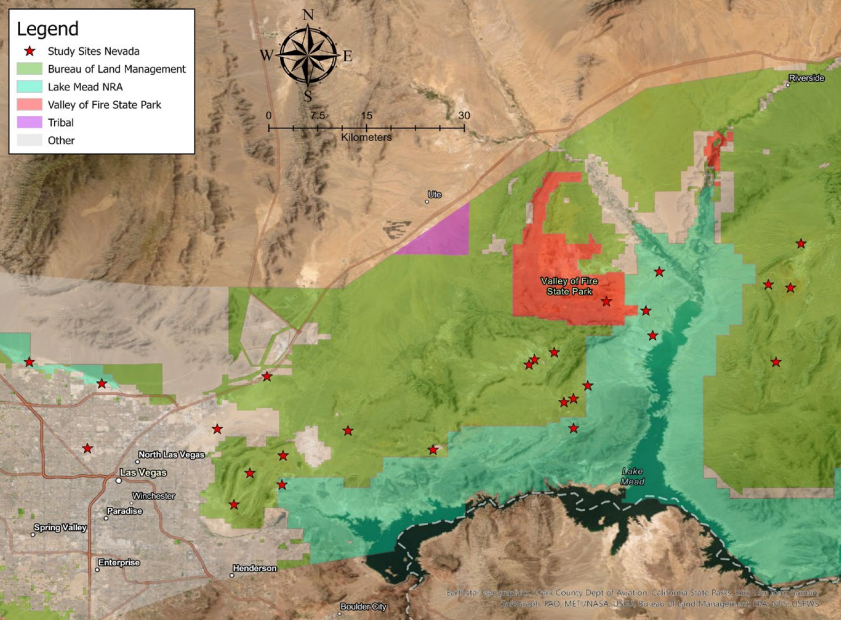
Surface Cover



Perkins Spring
PSS



Poppy City
PCS



Red Bluff
RBS



Mud Wash
MWS



Ongoing and Coming Soon

- Soil chemical analysis results expected back from lab any day
- In-house soil analysis beginning early September
- Fall 2024 field season begins October 15
 - Lake Mead western sites, Bitter Springs all sites, Valley of Fire site



Thank you!

SUU Team

Barry Ives

Hannah Kaczmerak

Mia Swagerty

Mason Freeman

Micah Olson

Susan Meyer

Kody Rominger

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