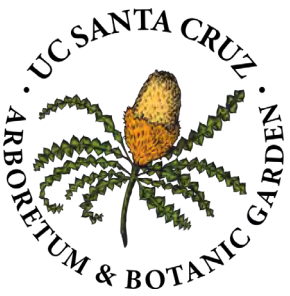




HERBACEOUS PLANT COMMUNITIES OF THE SAN JOAQUIN DESERT REGION OF THE CENTRAL INTERIOR COAST RANGES.

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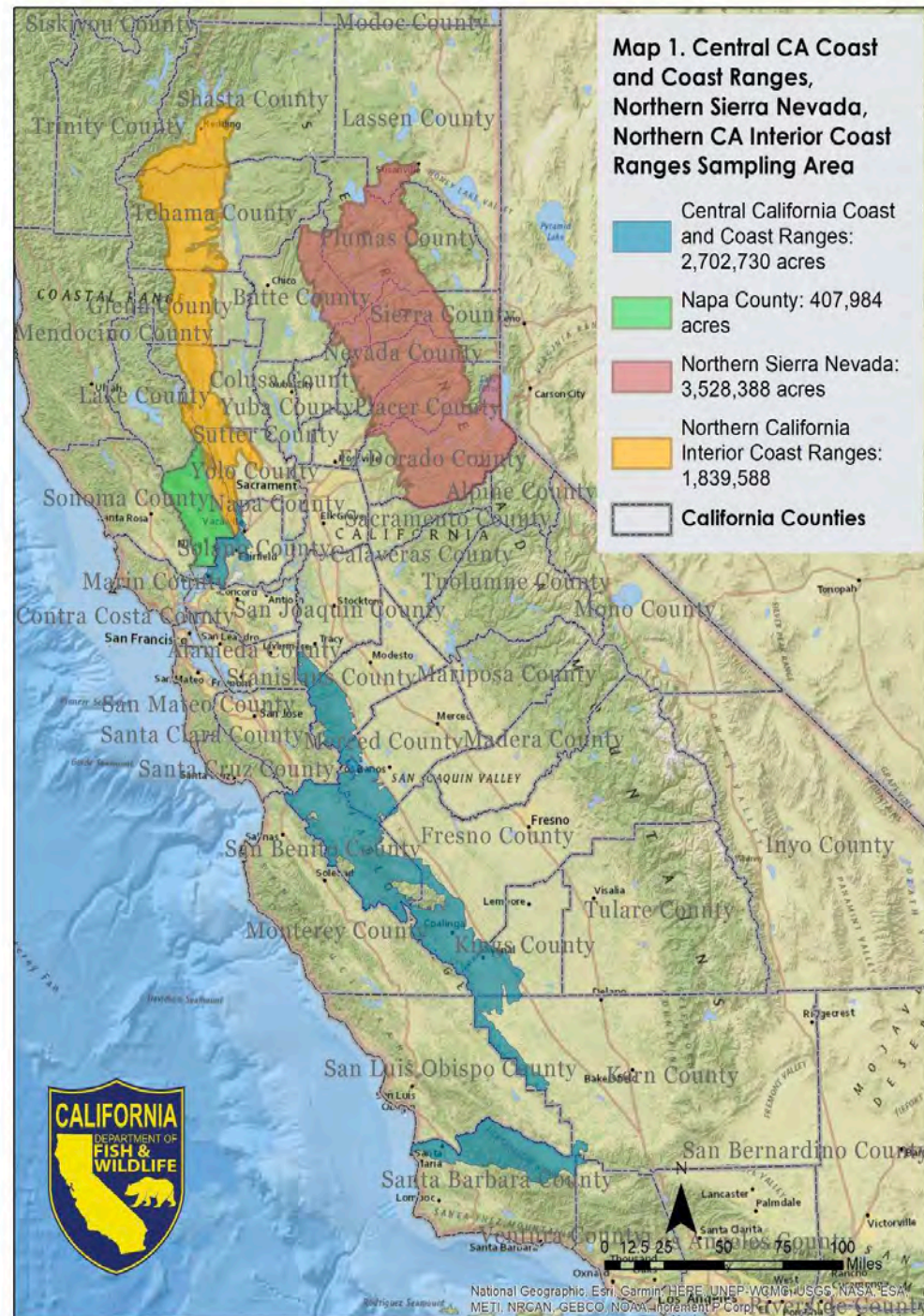


UC SANTA CRUZ ARBORETUM AND BOTANIC GARDEN



THE NATIVE PLANT PROGRAM

CONTRACTED REGIONS....



(MOST OF)
THE TEAM





THE AREA IN QUESTION...



Rain makes all the difference...



2022



2023

RYAN ODELL

Natural Resource
Specialist for the Central
Coast Field Office of the
BLM



Sandy Soil - Sand Dunes Allied Associations

NATIVE	Landform	Aspect	Parent Material	National Geologic Map Geologic Formations
ALLIANCE - <i>Oenothera deltoides</i> - <i>Abronia pogonantha</i> Herbaceous Alliance (sandstone ridge - <u>active sand</u> - sand dunes, sand sheets)				
Rumex hymenosepalus - <i>Abronia pogonantha</i> Association	Hillslope, ridge top	South or none	Sandstone	Panoche Formation - K
<i>Oenothera deltoides</i> subsp. <i>deltoides</i> - <i>Abronia pogonantha</i> Association	Ridge top	South or none	Sandstone	Panoche Formation - K
<i>Abronia pogonantha</i> - <i>Caulanthus inflatus</i> Association	Hillslope, ridge top	South	Sandstone	Panoche Formation - K
<i>Abronia pogonantha</i> - <i>Eriogonum angulosum</i> Association	Hillslope, ridge top	South	Sandstone	Panoche Formation - K
<i>Dicoria canescens</i> - <i>Stipa hymenoides</i> Association	Ridge top	South or none	Sandstone	Panoche Formation - K
Rumex hymenosepalus - <i>Stipa hymenoides</i> Association	Ridge top	South or none	Sandstone	Panoche Formation - K
<i>Stillingia linearifolia</i> - <i>Oenothera deltoides</i> Association	Ridge top	South or none	Sandstone	Panoche Formation - K
<i>Stipa hymenoides</i> - <i>Malacothrix glabrata</i> Association	Ridge top	South or none	Sandstone	Panoche Formation - K
<i>Eriastrum pluriflorum</i> subsp. <i>pluriflorum</i> - <i>Lessingia pectinata</i> var. <i>tenuipes</i> Association	Ridge top	South or none	Sandstone	Panoche Formation - K
ALLIANCE - <i>Chaenactis fremontii</i> - <i>Malacothrix glabrata</i> Herbaceous Alliance (sandstone ridge - sandy soils - <u>inactive sand</u> - south slopes, steep)				
<i>Plantago ovata</i> var. <i>fastigiata</i> - <i>Caulanthus inflatus</i> Association	Hillslope	South	Sandstone	Panoche Formation - K
<i>Phacelia ciliata</i> - <i>Caulanthus inflatus</i> Association	Hillslope	South	Sandstone	Panoche Formation - K
<i>Chaenactis fremontii</i> - <i>Mentzelia affinis</i> Association	Hillslope	South	Sandstone	Panoche Formation - K
<i>Malacothrix glabrata</i> - <i>Mentzelia affinis</i> Association	Hillslope	South	Sandstone	Panoche Formation - K
<i>Chaenactis fremontii</i> - <i>Malacothrix glabrata</i> Association	Hillslope	South	Sandstone	Panoche Formation - K
<i>Malacothrix glabrata</i> - <i>Salvia columbariae</i> Association	Hillslope	South	Sandstone	Panoche Formation - K
<i>Salvia carduacea</i> - <i>Chaenactis fremontii</i> Association	Hillslope	South	Sandstone	Panoche Formation - K
<i>Salvia carduacea</i> - <i>Eriogonum viridescens</i> Association	Hillslope	South	Sandstone	Panoche Formation - K
<i>Mentzelia affinis</i> - <i>Eremothera boothii</i> subsp. <i>decorticans</i> Association	Hillslope	South	Sandstone	
<i>Chaenactis fremontii</i> - <i>Mentzelia affinis</i> - <i>Eremalche parryi</i> subsp. <i>parryi</i>	Hillslope	South	Sandstone	
<i>Mentzelia affinis</i> - <i>Eschscholzia lemmoni</i> subsp. <i>lemmoni</i> Association	Hillslope	South	Sandstone	
ALLIANCE - <i>Pectocarya penicillata</i> Herbaceous Alliance (sandy soils - <u>inactive sand</u> - low slopes or flats)				
<i>Pectocarya penicillata</i> - <i>Eriogonum gracillimum</i> - <i>Hollisteria lanata</i> Association	Toeslopes	South	Sandstone	Panoche Formation - K
<i>Pectocarya penicillata</i> - <i>Lasthenia gracilis</i> - <i>Eriastrum hooveri</i> Association	Creek terraces	South or none	Sandstone alluvium	Panoche Formation - K
<i>Pectocarya penicillata</i> - <i>Deinandra kelloggii</i> - <i>Amsinckia tessellata</i> Association	Ridge tops, or flats	South or none	Sandstone	Panoche Formation - K
<i>Pectocarya penicillata</i> - <i>Phacelia douglasii</i> - <i>Linanthus dichotomus</i> Association	Ridge tops, or flats	South or none	Sandstone	Panoche Formation - K
<i>Pectocarya penicillata</i> - <i>Monolopia congdonii</i> - - -	Creek terraces	South or none	Sandstone alluvium	Panoche Formation - K
<i>Pectocarya penicillata</i> - <i>Lupinus nanus</i> - <i>Camissonia campestris</i> subsp. <i>campestris</i> Association	Spur ridges	South	Sandstone	
<i>Pectocarya penicillata</i> - <i>Lupinus nanus</i> - <i>Salvia carduacea</i> Association	Spur ridges, toeslopes	South	Sandstone	
<i>Pectocarya penicillata</i> - <i>Eschscholzia californica</i> - <i>Deinandra kelloggii</i> Association	Spur ridges, toeslopes	South	Sandstone	
ALLIANCE - <i>Lasthenia gracilis</i> Herbaceous Alliance	Ridge tops, or flats	South or none	Sandstone	
<i>Lasthenia gracilis</i> - <i>Plagiobothrys canescens</i> (<i>Plagiobothrys arizonicus</i>) Association	Ridge tops, or flats	South or none	Sandstone	
ALLIANCE - <i>Monolopia lanceolata</i> - <i>Phacelia</i> sp. Herbaceous Alliance (sandstone ridge - sandy soils - <u>inactive sand</u> - north slopes)				
<i>Phacelia distans</i> - <i>Monolopia lanceolata</i> - <i>Clarkia tembloriensis</i> subsp. <i>tembloriensis</i> Association	Hillslope	North	Sandstone	Panoche Formation - K
<i>Phacelia tanacetifolia</i> - <i>Monolopia lanceolata</i> Association	Hillslope	Top	Sandstone	Panoche Formation - K
<i>Phacelia distans</i> - <i>Monolopia lanceolata</i> Association	Hillslope	North	Sandstone	Panoche Formation - K
<i>Lavia glandulosa</i> - <i>Monolopia lanceolata</i> - <i>Amsinckia tessellata</i> Association	Hillslope	North	Sandstone	Panoche Formation - K

Vertic Clay Allied Associations - in turn, Allied with Acidic Marine Shale**NATIVE****ALLIANCE - *Lepidium jaredii* - *Deinandra halliana* Herbaceous Alliance (heavy vertic clay, extremely sodic, south slopes)***Lepidium jaredii* (subsp. album) - *Phacelia ciliata* Association (CNPS sampled - Cantua)*Lepidium jaredii* (subsp. album) - *Extriplex* sp. nov "succulenta" Association*Phacelia ciliata* Association*Deinandra halliana* - *Poa secunda* - *Phacelia ciliata* Association*Deinandra halliana* - *Phacelia ciliata* Association*Benitoa occidentalis* - *Deinandra halliana* Association*Plagiobothrys acanthocarpus* - *Lepidium nitidum* Association

Landform

Aspect

Parent Material

National Geologic Map Data

Geologic Formations

Hillslope

South

Marine clay shale

Panoche - Kp; Moreno Shale

Hillslope, toeslope

South, or none

Marine clay shale

Panoche - Kp; Moreno Shale

Hillslope

North

Marine clay shale

Panoche - Kp; Moreno Shale

Hillslope

South

Marine clay shale

Panoche - Kp; Moreno Shale

Hillslope

South

Marine clay shale

Panoche - Kp; Moreno Shale

Hillslope

South

Marine clay shale

Panoche - Kp; Moreno Shale

Toeslope

South, or none

Marine clay shale

Panoche - Kp; Moreno Shale

ALLIANCE - *Monolopia major* - *Phacelia ciliata* Herbaceous Alliance (heavy vertic clay, sodic, south slopes)*Monolopia major* - *Poa secunda* Association*Caulanthus anceps* - *Monolopia major* Association*Monolopia major* - *Phacelia ciliata* Association*Phacelia ciliata* Association

Hillslope

South

Marine clay shale

Panoche - Kp; Moreno Shale

Hillslope

South

Marine clay shale

Panoche - Kp; Moreno Shale

Hillslope

South

Marine clay shale

Panoche - Kp; Moreno Shale

Hillslope

North

Marine clay shale

Panoche - Kp; Moreno Shale

ALLIANCE - *Eriogonum clavatum* - *California macrophylla* Herbaceous Alliance (heavy vertic clay, sodic, steep slopes)*Eriogonum clavatum* - *California macrophylla* - *Benitoa occidentalis* Association*Eriogonum clavatum* - *Salvia columbariae* Association*Eriogonum ordii* - *Benitoa occidentalis* Association*Mentzelia lindleyi* (sp. nov.???) - *California macrophylla* Association

Hillslope

South

Marine clay shale

Panoche - Kp; Moreno Shale

Hillslope

South

Marine clay shale

Panoche - Kp; Moreno Shale

Hillslope, very steep (badlands)

Top

Marine clay shale

Panoche - Kp; Moreno Shale

Hillslope

South

Marine clay shale

Panoche - Kp; Moreno Shale

ALLIANCE - *Madia radiata* Herbaceous Alliance (heavy vertic clay, sodic, north slopes)*Madia radiata* - *Claytonia gypsophila* - *Calandrinia menziesii* Association (CNPS sampled - Cantua)*Madia radiata* - *Poa secunda* - *Phacelia ciliata* Association

Hillslope

North

Marine clay shale

Panoche - Kp; Moreno Shale

Hillslope

North

Marine clay shale

Panoche - Kp; Moreno Shale

ALLIANCE - *Monolopia stricta* Herbaceous Alliance (heavy vertic clay, sodic, gravelly, south slopes)*Monolopia stricta* - *Eriogonum ordii* - *Monolepis nuttalliana* Association*Monolopia stricta* - *Monolepis nuttalliana* - *Atriplex coronata* var. *vallicola* Association*Monolopia stricta* - *Phacelia ciliata* Association (CNPS sampled - Cantua)*Monolopia stricta* - *Amsinckia vernicosa* Association*Monolopia stricta* - *Phacelia tanacetifolia* Association*Monolopia stricta* - *Holocarpha obconica* - *Monolepis nuttalliana* Association*Chorizanthe spinosa* (sp. nov., in ed. "C. panochensis") - *Senecio aphanactis* Association

Hillslope

South

Marine sedimentary

Oro Loma - Tol; Tulare - QTt

Hillslope

South

Marine sedimentary

Oro Loma - Tol; Tulare - QTt

Hillslope

South

Marine clay shale

Panoche - Kp; Moreno Shale

Hillslope

South

Marine clay shale

Panoche - Kp; Moreno Shale

Hillslope

South

Marine clay shale

Panoche - Kp; Moreno Shale

Hillslope

North

Marine sedimentary

Tulare - QTt

Hillslope

South

Marine sedimentary

Tulare - QTt

ALLIANCE - *Leptosyne calliopsidea* - *Amsinckia vernicosa* Herbaceous Alliance (light clay, sodic, south slopes)

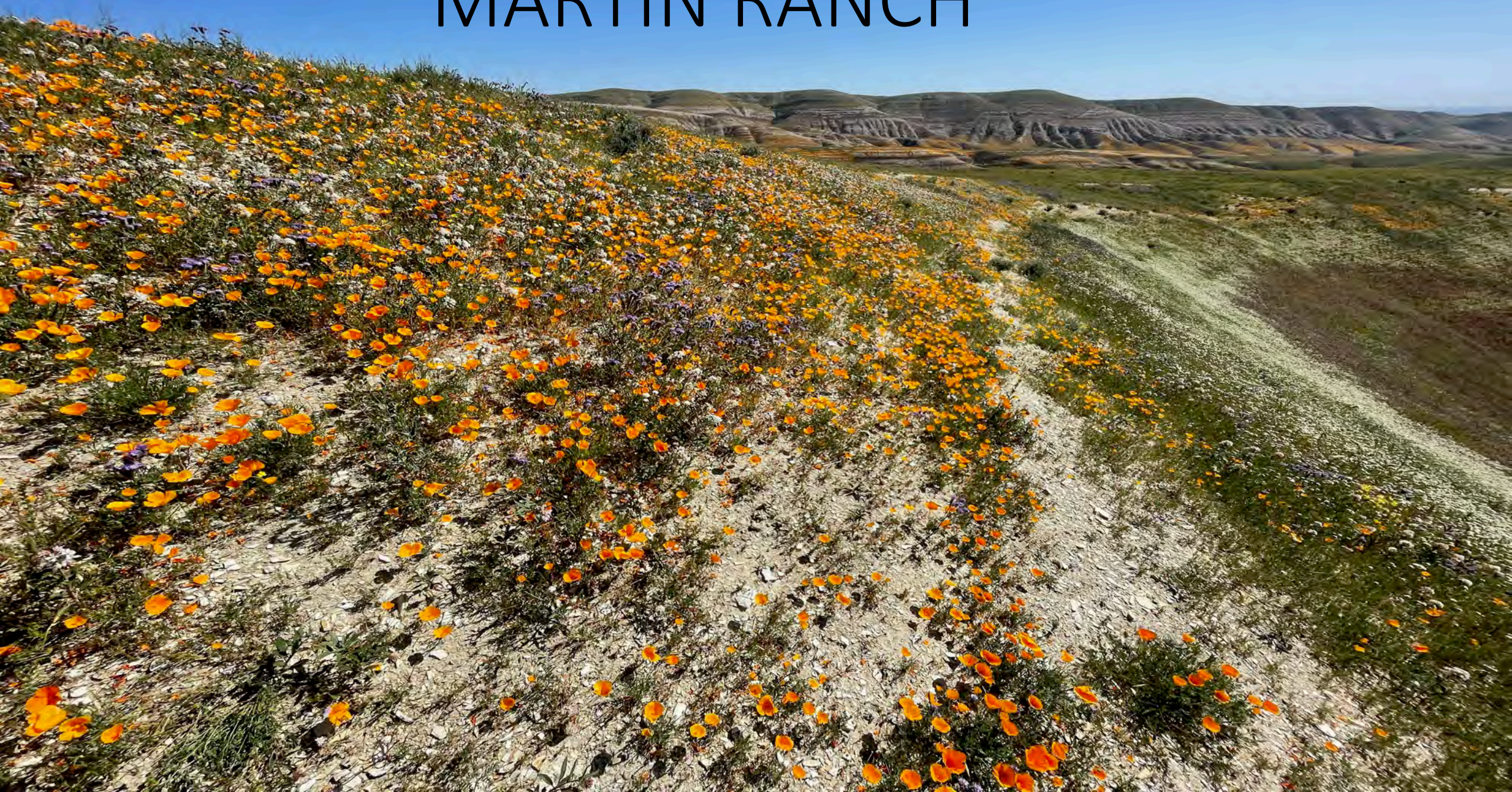
KETTLEMAN HILLS







MARTIN RANCH











ACTIVE SANDS















ACIDIC MARINE SHALE













VERTIC CLAY







NAVARRETIA
PANOCHENSIS
1B.3



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MADIA
RADIATA 1B.1



And some newbies....

EXTRIPLEX SP. NOV. “SUCCULENTA”

(née E. joaquinana)



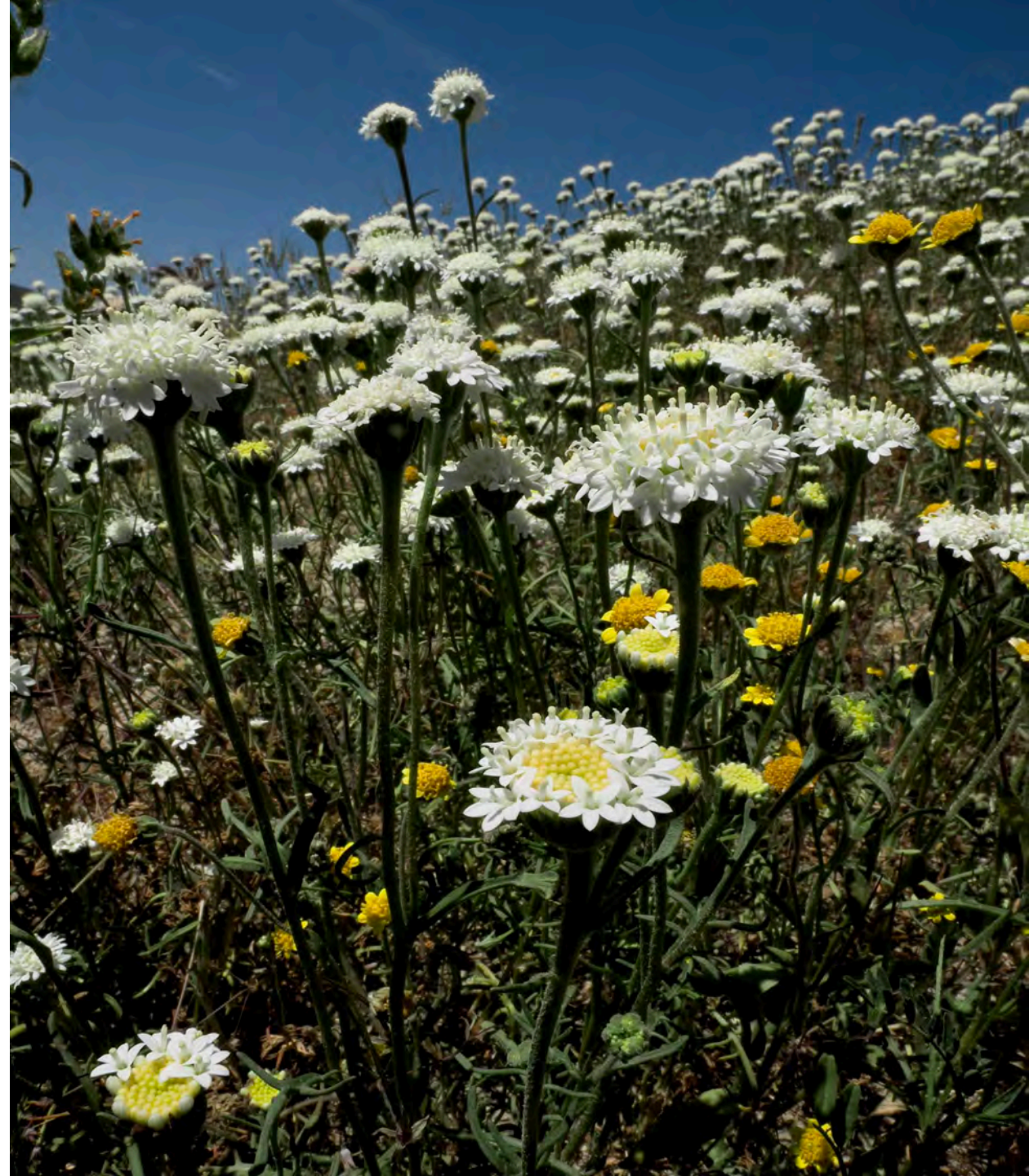
ATRIPLEX SP. NOV.
“GYPSOPHILA”

(*A. coronata* var. *vallicola*)



CHAENACTIS SP.
NOV. "JOAQUINENSIS"

(C. stevioides)



Thanks to our collaborators...



State of California



California State
Parks



Bureau of
Land
Management



California
Department of
Fish and
Wildlife

....And to the private landowners who support this work!!!