

SoCal Soils: Final Field Summary

Introduction:

In this course, aptly titled ‘Soils of California,’ our goal was to examine and classify the characteristics of various soils across a relatively wide breadth of locations from Goleta, down to the Mojave Desert. As a class, we’ve had the privilege of excavating and classifying 11 soil pits throughout the quarter with the goal of practicing field descriptions, classifications, and gaining experience working with soils in a real-world setting. The students in this class majored primarily in Environmental Studies, Geology, and Hydrology. It was a lot of fun getting to know so many wonderful people. For this final field summary report, I’ve organized the following descriptions by soil order.

Entisols

We encountered four Entisols across our soil expeditions. Entisols are soils that are the last order one would reach when determining their characteristics, in the order of classification via Keys to Soil Taxonomy. They lack the defining characteristics of any other soil order, implying that soil-forming processes are either absent or beginning to take place. These are very recent soils that typically exhibit an A over C horizon.

1. Bonus: Kelso Dunes

Classification: *Typic Torripsamment*

Parent Material: *Eolian transported material*

In our class trip to the Mojave Desert, we quickly visited the Kelso Dunes to see what kind of soil develops in this sandy, dune environment. Vegetation of the area is typical for a desert landscape, including desert psammophytic scrub (creosote) which are plants that have adapted to growing in sandy, unstable soils. As is typical with desert soils, the SMR is Aridic and the STR is Thermic with variations in overall temperature with the changes of the seasons. Not much was gathered in the short time we were there, however, we were able to determine that the horizons were typical of the Dalelake Series: an A horizon above two C horizons. The lack of a B horizon indicates the lack of soil-forming processes (clay). We determined the presence of an Ochric epipedon in the A horizon as it lacks the features of any other epipedon classification. We got to roll down the steep dunes and play in the sand as the sunset over the mountains. A very pleasant start to the Mojave trip.



2. Pedon #8: Carpinteria Salt Marsh (Ocean Side)

Classification: *Typic Hydroaquept*

Parent Material: *QEC quaternary estuary deposit*

At 6 feet above sea level, the Carpinteria Salt Marsh is a critically important estuary home to many sensitive flora and fauna. This includes salt bush, pickleweed, and alkali heath. This pedon's profile consists of two A horizons and two C horizons with subhorizon designations of 'g,' indicative of gleying. Gleying occurs in saturated soils like the ocean side of the salt marsh which experiences inundation for most parts of the year, hence the Aquic soil moisture regime. An Ochrich epipedon was observed in the first horizon with aquic, saturated conditions for the rest of the profile. Darker colors, 5YR and 2YR, were observed in the ocean side pedon than in pedon #7 (mountainside) which could indicate fewer redox features. The clay percentage throughout the profile was very low, ranging from 16% to 11% primarily due to the proximity to the beach (sand) and the constant saturated conditions which most likely move finer material, like clay, out of the profile. This slows down the development of any potential B horizon. We observed high electric conductivity with values upwards of 6000 uS/cm indicating saline soil conditions. This was pretty apparent due to its proximity to ocean water.



3. North Campus Open Space: Auger Location #1 (Mesa)

Classification: *Xerorthent*

Parent Material: *TSQ bottom, mixed with QMT and QE*

This location is an example of prime, human-altered soil material. The area was previously a wetland and was filled, converting the area into a golf course. Ironically, the soil comprising the golf course was graded and placed in the adjacent area (Mesa slope) creating a 10-foot layer of topsoil composed of differing materials. Our goal here was to provide insight into why plants weren't doing so well in the Mesa location than in the South Parcel so we augered two holes in each location. The vegetation in the area was chosen for native restoration, including coyote brush, giant rye, mule fat, California sunflower, Hazardia sacres. Redox features were present at the top of the slope where we augered first with very slight percentages of red colors indicating the reduction of iron, in conjunction with a high clay percentage, would indicate that the soil does not have ample drainage which would contribute to the reason why vegetation was not as healthy in the Mesa location. Additionally, higher levels of EC (salinity) were also observed as a result of the transfer of salty wetland soil to this sloped area. Due to the mass disturbance of the area, we classified the soil as a Xerorthent given its lack of developed features and human interference in soil-forming processes.

4. North Campus Open Space: Auger Location #2 (North Slope)

Classification: *Artesol/Entisol*

Parent Material: *Scraped QMT, possibly lower marine terrace*

The North Slope location is different from the Mesa area in that the soil here was scraped but not refilled, meaning a large section of the topsoil was completely removed. The vegetation in this area is similar to the Mesa area (californica, pearl everlasting, sticky monkey flower, CA codweed, moss, scarlett pumpernill) but is observed to be healthier and more abundant. When we augered, we noticed much of the soil material was sandy loam with very little to no clay present, with an average clay percentage of 9.5% across both auger holes. Compared to the Mesa slope, there were less redox features in the upper horizons of the soil but some were still present in the second auger hole with slightly reddish colors appearing after 12 inches (2.5YR 6/6). With ample drainage and less saline properties, the vegetation in this area is growing larger and in more abundance than the Mesa slope area. After we analyzed both sites in the North Campus Open Space, we determined that CCBER should focus on planting species able to tolerate the saturated, saline conditions of the Mesa slope and that perhaps translocation of material (human-altered material) should be reconsidered in its effectiveness for restoration purposes.



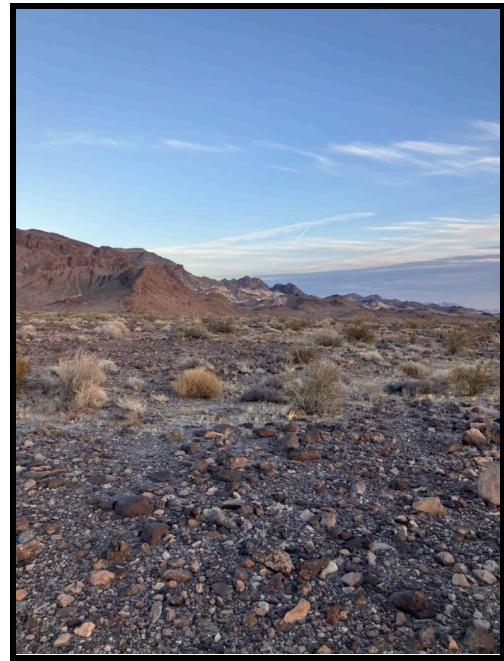
Aridisols

Our overnight soils trip to the Mojave Desert allowed us to examine and classify two types of Aridisols. The Aridisol soil order is defined by the following: an Aridic soil moisture regime (arid, desert-like climate), the presence of an ochric or anthropic epipedon with specific criteria regarding subsequent horizons, or the presence of a salic horizon. Vegetation in these soils, along with the soils themselves, are used to being without water for extended periods of time with extreme variations in temperature, typical of a desert climate. Aridisols are often found in dried ancient lake beds or at the bases of alluvial fans or bajada where sediment has accumulated over time from movement via water, wind, and many other elemental processes.

5. Pedon #4: Mojave Trails National Monument, Soil Pit #1

Classification: Loamy-skeletal, mixed, *Typic Haplargid*
Parent Material: Mixed alluvium (granitic surface, volcanic)

Pedon #4 was the first soil pit that we excavated while on our Mojave trip. Located at the base of a bajada (at 2449 feet elevation), this site is typical of a vast desert environment with sparse vegetation like creosote, burro bush, beaver tail, and prickly pear cactus. This pedon exhibited moderate erosion with a fairly complex epipedon diagnosis. The profile exhibited characteristics of an ochric horizon, above a cambic horizon, all on top an argillic horizon. In other words, ochric implies very little development within the top layer while the cambic designation indicates clay illuviation in the subsurface horizons (B horizons with subdesignation 'k'). A buried horizon, indicated by a subhorizon designation of 'b,' was found at 36 cm into the profile above where the Argillic horizon begins. This kind of lithic discontinuity is exhibited through an increase in rock fragments (25 → 40) and carbonate presence (slight effervescence), which means the parent material might have changed or past depositional processes have buried this horizon.



6. Pedon #5: Mojave Trails National Monument, Soil Pit #2

Classification: Loamy-skeletal, mixed, thermic *Typic Calciargid*
Parent Material: Mixed alluvium

Pedon #5 was the second soil pit we excavated in our single-day excursion to dig soil pits in the Mojave Trail NM. This pedon was located closer to the base of the surrounding mountains with a few unique characteristics. Other kinds of vegetation like longleaf ephedra, saliva comboria, and San Felipe dogweed were observed. With a different parent material than pedon #4, pedon #5 possesses an older land surface attributable to the presence of a V horizon and a greater development of a 'desert pavement.' Desert pavements are features typical of an alluvial fan (bajada) where the fine, sandy material surrounding the larger, rocky particles effectively filter through this layer leaving a closely packed, pavement-like layer of rocks and other granitic or volcanic material. The V horizon makes sense with the presence of desert pavement as this means that the top 6 cm has shown signs of water and other gases accumulating that were trapped by the surface layer, thus leaving behind small vesicular pores. Similar to pedon #4, an Ochric and Argillic horizon were observed. A Calcic horizon was observed in pedon #5 which helps reinforce the notion that this area has had more time to accumulate carbonates in the middle of the profile, thus being older in age. This contributes to the 'Calci-' portion of the classification.

Vertisols

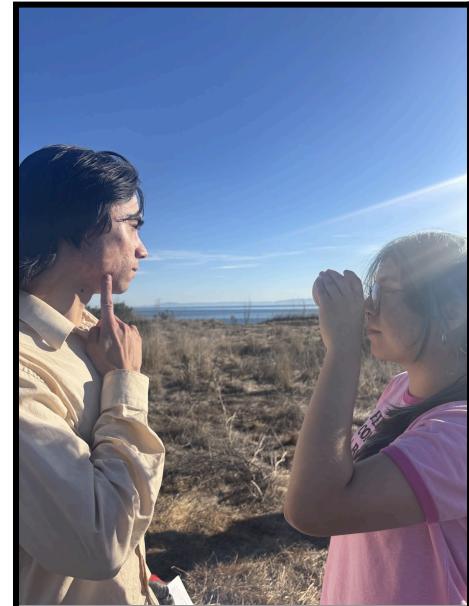
We only experienced one Vertisol in our soil adventures. Vertisols have three distinct characteristics: presence of slickensides or wedge-shaped peds, cracks that open and close periodically, and a whooooooole lot of clay.

7. Pedon #3: More Mesa Part 2

Classification: *Aridic Haploxerert*

Parent Material: Bedrock; sandstone from sub-marine canyon (lithified Pleistocene debris)

The More Mesa location is situated on a bluff, marine terrace, at 107 feet above sea level. Vegetation of the area includes coyote brush, mule fat, and invasive fennel and grasses. The climate of More Mesa is relatively tame as it possesses the common characteristics of a Mediterranean climate despite the Aridic subgroup designation. The Aridic designation pertains to the duration in which the cracks are open during the year. The profile of pedon #3 was fairly straightforward with a single A horizon above two B horizons with 'ss' subhorizon designations. These horizons exhibited a substantial amount of clay (30 - 50%) with a consistent structure of angular-blocky throughout. We classified the top 77 cm of pedon #3 as a Mollic epipedon which didn't exactly match the rest of the pedon. This is due to the lithological discontinuity that we found past 100 cm when we augered into the soil and made lithic contact at 150 cm. Substantial carbonate presence was observed in the augered material implying that everything above had been deposited either through alluvial (rivers) or aeolian (wind-blown from the sea) deposition. The horizon designations for the augered material were C horizons without subdesignations as the material had been classified out of situ.



Mollisols

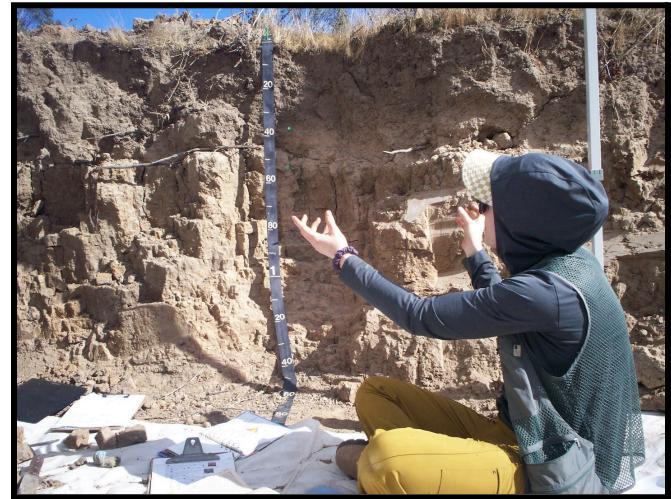
We observed three Mollisols across our soils journey. Key characteristics for defining a Mollisol include either the presence of a Mollic epipedon or at least the characteristics of one (5-3-3 color rule, organic content) in the surface horizontal, and a base saturation greater than 50% in all horizons.

8. Pedon #1: Campus Soil Pit (First Soil Pit Excursion)

Classification: *Argiaquic Xeric Argialboll*

Parent Material: *QMT marine terrace (~50cm) above sisquoc formation*

The campus soil pit is very close to the UCSB campus, situated on the same marine terrace landform as the More Mesa location. As such, pedon #1 exhibits the same soil temperature and moisture regimes (Thermic, Xeric). Surrounding vegetation includes coyote brush, California rose, coast live oak, mule fat, and even poison oak. This is the only soil that we've encountered that has an E horizon, a zone of leaching. The top 31 cm of the profile meets the criteria of a Mollie epipedon, followed by an Albic horizon, with an Argillic horizon throughout the rest. Clay was increasing with depth down the profile, going from 10% to 45% clay percentage. The bottom B horizons had subhorizon designations of 't' indicating silicate clay accumulation which follows as these are below the E horizon. A noteworthy observation was the soil experiences aquic conditions occasionally which might explain the accumulation of clay in the bottom horizons. The argillic horizon and lack of abrupt textural changes between the Argillic and Albic horizons imply the classification of the Argiaquic designation.



9. Pedon #2: More Mesa Part 1

Classification: *Oxyaquic Argixeroll*

Parent Material: *Marine terrace deposits (coastal aeolian sand) mudstone/shale*

We're back in More Mesa, except this time we're looking at the soil pit that we excavated before More Mesa Part 2. This location shares the same climate and vegetation but exhibits different horizon characteristics. This soil was formed from the tectonic uplift of the marine terrace but lacks the same deposited material that More Mesa Part 1 (pedon #3) possesses. Pedon #3 had a larger Mollie epipedon while pedon #2 exhibits a much smaller Mollie epipedon in addition to an Argillic horizon which extends past the lithological discontinuity present at 61 cm. This is apparent by the stark increase in clay from the fourth to the fifth horizon (30% → 50%). Additionally, the pH increases from 6.8 to 7.5 indicating more alkaline conditions. Concretions were present throughout all of the horizons with greater concentration towards the surface. The presence of an Argillic horizon, and saturated conditions in a majority of the horizons for 20 - 30 days in normal years, is why we classified it as an Oxyaquic Argixeroll.

10. Pedon #9: Fairview Gardens Farm

Classification: *Pachic Haploixeroll*

Parent Materials: *QIC, QAC - Alluvium*

We were lucky enough to visit Fairview Garden Farms, a small agricultural farm, located in the middle of a densely packed suburban neighborhood. Our goal here was to examine and classify agricultural soil that's been used and plowed for 125 years. Vegetation at this location included coyote brush, blue elder, lemonade berry, and cheeseweed. Our class concluded that the entirety of the soil profile of 70 cm met the description of a Mollic epipedon given its color, organic content, and base saturation. Two unique subhorizon designations, only found in this pedon, pertain to the top A horizon: 'p' and 'u' for plowing and human artifacts respectively. We found a shard of an indigenous arrowhead which was cool to see. The relatively low clay percentages in the top two horizons indicate an ideal growing environment for crops, in addition to the redox reactions present in the top layers. This is likely a result of nitrogen-fixing bacteria within the soil from cover crops and the tillage of organic material deeper into the soil profile. An additional explanation is that bioturbators (gophers) helped move material downwards creating a weak B horizon.



Inceptisols

Alas, we only observed one Inceptisol. Inceptisols, similar to Entisols, are very recent soils that lack developed features of older soils. The main difference between them is that Inceptisols show signs of an early B horizon in addition to other subsurface horizons such as a Salic horizon or a Cambic or Mollic epipedon. These are baby soils, just less baby than an Entisol. Toddler maybe?

11. Pedon #7: Carpinteria Salt Marsh (Mountain Side)

Classification: *Aeric Endoaquept*

Parent Material: *QE Estuarine deposit*

This is the other pedon that was classified in this location (the other pedon was pedon #8) except this soil was closer to the mountains than the ocean. The vegetation observed was the same across both sites. Pedon's #7 and #8 had aquic soil moisture regimes indicating a degree of saturation in their profiles,

heavily influencing their formation and composition. However, on the mountainside, the horizons look much different. We observed an A horizon above two B horizons and a C horizon at the bottom. Gleying was observed in the B horizons which we also saw in pedon #8 due to the aquic conditions. An Ochric epipedon was observed in the top A horizon with the remaining three profiles comprising a Cambic horizon due to the physical alterations and dynamic nature of the environment. I was not present on this excursion, but the proximity of pedon #7 from the ocean is potentially the reason why we observe a B horizon as the soil is less likely to be inundated by tidal inflow than pedon #8. This pedon is one of the few locations, other than pedon #8, where we hit groundwater. We observed redox reactions within the top two layers which is a difference between pedon #7 and pedon #8. This is most likely due to less inundation. Similar to pedon #8, we see very high salinity in the soil with the measuring tool maxing out at over 6000 uS/cm for the electric conductivity reading.

Conclusion:

This class allowed us to examine some Soils of California in a very personal way, literally digging soil pits. We were able to examine a variety of different soils typical of the Mediterranean and the aridic climate that California has. Observing soils by the beach and finding what is unique about these was very interesting as examining a marine terrace, let alone a once sub-marine canyon, is not something that everyone can do. The main soil-forming processes that we observed were related to the translocation of alluvial material forming desert soils as well as how geologic processes can change and alter previously established soils over millennia. We also observed first-hand, the impacts of humans on soils in the North Campus Open Space and how we go about fixing/adapting to the nature of the translocated soils, and what this means for restoration in the future.

I'm very grateful for the memories and friends I've made in this class. Even if I don't end up pursuing work related to soil, I will always remember the memories and experiences of working in the field with such a supportive and insightful team. Thank you Iris and Michelle for making this an unforgettable quarter. My heart is full and my hands are soiled.



Pedon #1: Campus Soils Pit (*Argiaquic Xeric Argialboll*):

FIELD SHEET FOR RECORDING SOIL CHARACTERISTICS												UNIVERSITY OF CALIFORNIA, SANTA BARBARA					
Date	1/17/2025			Classification	Order:	Mollisol	Suborder: Xeroll	Great group:	Argialboll			Subgroup: Argiaquic Xeric Argialboll			No.	1	
Series	Scrub Jay			Location	Campus Soil Pit			UTM							Quad		
Landform	Marine Terrace			Elevation	30 ft			Slope	-0.25 deg			Aspect	20 deg			Erosion	
Parent material	QMT Marine Terrace (~50cm). Below: Sisquoc formation			MAP	17 in.			MAAT	18 deg C			MAST	15 deg C				
Native vegetation	Coyote brush, California rose, coast live oak, mule fat, poison oak			STR	Thermic			SMR	Xeric (aqua)								
Present use	Restoration site managed by CCBER			Grndwr	> 1.4 m			Perm	Saline			Sodic					
Associated soils				Diagnost.	Mollis Epipedon (0-31cm), Albic horizon (31-44cm), Argillic horizon (44- >140cm)												
HORIZON	DEPTH CM	BDRY	COLOR			TEXTURE	CLAY %	ROCK FRAGS	STRUCTURE	CONSISTENCE	pH	CLAY FILMS	ROOTS	PORES	CONCRET MnO ₂	CO3 cmol+/-k ⁻¹	%BS
			H	V	C				D	M	W						
A1	0-18	GS	D 7.5 YR	5	2	Sandy loam	10	0	2 Vff Gr	MH	MS ND	7.0	N	3 VF t	3 M Tu	NE	
			M 7.5 YR	2.5	2											> 50%	
A2	18-31	AS	D 10 YR	5	3	Sandy loam	15	0	1 FIM Gr	VH	MS NP	7.0	N	2 VF t	3 Vff Tu	NE	> 50%
			M 10 YR	3	2											> 50%	
E	31-44	AW	D 10 YR	6	1	Sandy clay loam	23	0	1 CO GrABK	EH	MS NP	7.0	N	2 Vf t*Vct	3 Fine Tu	NE	> 50%
			M 10 YR	3	2											> 50%	
2B1	44-88	DS	D 10 YR	5	3	Silty clay loam	35	0	2 CO Pr	VH	MS MP	7.0	Y	1 Vf t	2 M Cracks	VS	> 50%
			M 10 YR	4	4											> 50%	
2B2	88-140	/	D 10 YR	6	3	Clay	45	0	3 M ABK	EH	SS VP	7.0	Y	1 VF t	1 Fine cracks	SL	> 50%
			M 10 YR	4	4												
		D															
		M															
		D															
		M															
		D															
		M															
		D															
		M															
Soil region	Profile group			NLD	Stone Index	A	B	C	D	E	X						
Soil grade	LCC unit	Irr	Nonirr	FFD	Interpretation for:												
Suitability: Irrig crops				Nonirrigated crops	Range						Timber						
Remarks:	Other vegetation includes non-native grasses and eucalyptus. Unusually dry year, seasonally high water table to be expected.																
described profile is adjacent to a Destructional Anthropogenic Microfeature (the soil pit) which is increasing the duration of seasonal saturation & aquic conditions																	

Pedon #2: More Mesa Part 1 (*Oxyaquic Argialboll*):

FIELD SHEET FOR RECORDING SOIL CHARACTERISTICS												UNIVERSITY OF CALIFORNIA, SANTA BARBARA					
Date	1/24/2025			Classification	Order:	Mollisol	Suborder: Xeroll	Great group:	Argixeroll			Subgroup: Oxyaquic Argixeroll			No.	2	
Series				Location	More Mesa, near the bluff edge (southeastern side)			UTM							Quad		
Landform	Marine terrace			Elevation	120			Slope	1.5 deg			Aspect	40 deg NW			Erosion	slight
Parent material	Marine terrace deposits (coastal aeolian sand) & mudstone/shale			MAP				MAAT				MAST					
Native vegetation	Mule fat, coyote brush, non-native fennel, non-native annual grasses			STR	Thermic			SMR	Xeric								
Present use	Open space			Grndwr	> 71 cm			Perm	Saline			no	Sodic			no	
Associated soils	Conception, Baywood, Diablo			Diagnost.	Mollis epipedon (0-48 cm), Argillic horizon (61-71 cm +), lithologic discontinuity at 61 cm												
HORIZON	DEPTH CM	BDRY	COLOR			TEXTURE	CLAY %	ROCK FRAGS	STRUCTURE	CONSISTENCE	pH	CLAY FILMS	ROOTS	PORES	CONCRET MnO ₂	CO3 cmol+/-k ⁻¹	%BS
			H	V	C				D	M	W						
A1	0-19	D	D 10 YR	5	1	Sandy Loam	9	0	2 Gr f	HA	-	6.9	N	2 vf t	2 vc dt	NE	assumed
			M 7.5 YR	3	3				so po							> 50% BS	
A2	19-27	G	D 10 YR	4	2	Sandy loam	15	0	2 Gr vf	MH	-	6.8	N	2 f t	2 vf dt	NE	assumed
			M 10 YR	3	2				ss po							> 50% BS	
BA	27-48	G	D 10 YR	5	2	Loam	23	0	2 Gr M	HA	-	6.5	N	1 vff t	3 vf dt	NE	assumed
			M 10 YR	2	2				ss po							> 50% BS	
Bw	46-61	C	D 10 YR	4/2	6/2	Sandy clay loam	30	2%	3 SBK f	HA	-	6.8	N	1 vff t	2 vf dt	NE	assumed
			M 10 YR	2	1				ss po							> 50% BS	
2Bt	61->71	C	D 10 YR	3	1	clay	55	0	3 SBK M	HA	-	7.5	Y	1 vf t	2 vf dt	NE	assumed
			M 10 YR	3	1				ms mp							> 50% BS	
		D															
		M															
		D															
		M															
		D															
		M															
Soil region	Profile group			NLD	Stone Index	A	B	C	D	E	X						
Soil grade	LCC unit	Irr	Nonirr	FFD	Interpretation for:												
Suitability: Irrig crops				Nonirrigated crops	Range						Timber						
Remarks:	Lithologic discontinuity from clay upwick. Underlying marine bedrock with marine terrace deposit on top. Accumulation of illuvial clay																
Dominant processes:	surface acidification from root respiration (carbon acid), organic matter accumulation, shrink-swell of 2:1 clays, secondary clay illuviation, contrasting parent material influences																
Note:	probably could find clay films in 4th horizon w/ added persistance / microscope / more time in the field, thus raising upper depth of our argillic horizon														UCSB-ENVS/EOG		

Pedon #3: More Mesa Part 2 (*Aridic Haploixerert*):

Bonus: Kelso Dunes (*Typic Torripsamment*):

FIELD SHEET FOR RECORDING SOIL CHARACTERISTICS											UNIVERSITY OF CALIFORNIA, SANTA BARBARA									
Date	2/7/25													No.	BONUS					
Series	Dalelake (iPhone SE)			Classification	Order:	Entisol	Suborder:	Psamment	Great group:	Torripsamment	Subgroup: Typic Torripsamment									
Location	Kelsa Dunes, Mojave National Preserve			UTM										Quad	Kelsa Dunes					
Landform	Sand Dunes			Elevation ~3000 ft										Slope	Aspect	Erosion				
Parent material	Eolian transported material										MAP									
Native vegetation	Desert Psammophytic Scrub incl. <i>Larrea tridentata</i> (creosote)										MAAT									
Present use	Recreation and wildlife habitat (NPS lands)										STR Thermic									
Associated soils	Diagnost										Ochric epipedon (0-6 cm)									
HORIZON	DEPTH CM	BDRY	COLOR			TEXTURE	PHONE %	ROCK FRAGS	STRUCTURE	CONSISTENCE			pH	CLAY FILMS	ROOTS	PORES	CONCRET MnO ₂	CO3	CEC cmol+/kg %BS	EC us/cm
			H	V	C					D	M	W								
A	0-6	D																		
		M																		
C1	6-45	D																		
		M																		
C2	45-150	D																		
		M																		
		D																		
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		M																		
Soil region	Profile group			NLD			Storie	Index	A	B	C	D	E		X					
Soil grade	LCC unit	Irr	Nonirr	FFD			Interpretation for:													
Suitability:				Nonirrigated crops			Poor	Range			Poor	Timber			Poor					
Remarks:	no soil pit dug; description based on field observations & type description for Dalelake series; organic matter 0-0.5%																			
Dominant processes:	aeolian transport & accumulation (ongoing reworking & new deposition), accumulation of organic matter (barely)																			

Pedon #4: Mojave NM Soil Pit #1 (*Typic Haploxerert*):

FIELD SHEET FOR RECORDING SOIL CHARACTERISTICS												UNIVERSITY OF CALIFORNIA, SANTA BARBARA							
Date	2/08/2025	Classification: Loamy-skeletal, mixed, thermic Typic Calciargid											No.	4					
Series	SE	Location: Mojave Tra UTM 11S 621265 E 3839525 N (Lat/long: 34°41'26.0"N 115°40'34.0"W)											Quad	Brown Buttes					
Landform	Bajada, granitic debris flow	Elevation: 2449 ft Slope: -0.75° Aspect: 160°											Erosion: moderate						
Parent material	Mixed alluvium (granite (on surface), volcanic)	MAP: 20 cm MAAT											MAST: 21.812 °C						
Native vegetation	Creosote, burro brush, beaver tail, prickly pear	STR: Thermic											SMR: Aridic						
Present use	camping, recreation, conservation, education (BLM management)	Grndwtr: >3.6 m depth											Perm: High	Saline: No	Sodic: No				
Associated soils	Soils seen in pedons 5, 6												Diagnost: Argillic horizon (52-86+); Calcic horizon (36-86+); Ochric epipedon (0-36)						
HORIZON	DEPTH CM	BDRY	COLOR			TEXTURE	Clay %	ROCK FRAGS	STRUCTURE	CONSISTENCE	pH	CLAY FILMS	ROOTS	PORES	CONCRET	CO3 MnO2	CEC cmol+kg %BS	EC us/cm	
A	0-6	AS	D	10 YR	7	3	GR S	2	19	PL	S	--	SO 2 m	N	1vf	2 vf	--	NE -- >50% (assumed)	700
			M	7.5 YR	5	3				SO PO					6.8	p	IR		
Bw1	6-22	CS	D	10 YR	6	4	S	3	10	SBK	S	--	SO 2 Co	N	2 vf	2 vf	--	NE -- >50% (assumed)	610
			M	7.5 YR	5	4				SO PO					6.9	p	IR		
Bw2	22-36	AW	D	10 YR	6	4	GR SL	18	16	SBK	S	--	SO 2 m	N	1 m	2 vf	--	NE -- >50% (assumed)	620
			M	7.5 YR	5	6				SO PO					6.9	p	IR		
2Bkb	36-52	CW	D	7.5 YR	5	4	GR LS	10	25	SBK	S	--	VS 2 m	N	2 vf	2 VF	--	VS <5% >50% (assumed)	630
			M	7.5 YR	4	3				SO PO					6.9	m	IR		
2Btkb1	52-70	AS	D	7.5 YR	6	4	VGR LS	15	45	SBK	SH	--	VS 3 m	Y	1vf	2 VF	--	VS <5% >50% (assumed)	620
			M	7.5 YR	5	6				SO PO					6.9	p	IR		
2Btkb2	70-86+	D	D	7.5 YR	7	3	VGR SCL	25	50	SBK	MH	--	VS 3 m	Y	1 f	1vf	--	VE/SL (10%) >50% (assumed)	350
			M	7.5 YR	5	6				SO PO					6.9	p	IR		
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Soil region	Profile group			NLD			Stone Index	A	B	C	D	E	X						
Soil grade	LCC unit	Irr	Nonirr	FFD			Interpretation for:												
Suitability:				Nonirrigated crops			Poor	Range			Moderate / Poor	Timber	Poor						
Remarks:																			
Dominant processes: Alluvial activity, Manganese oxidized at surface so no redox reaction, Bajada																UCSB-ENVS/GEOG			

Pedon #5: Mojave NM Soil Pit #2 (*Typic Calciargid*):

FIELD SHEET FOR RECORDING SOIL CHARACTERISTICS												UNIVERSITY OF CALIFORNIA, SANTA BARBARA							
Date	2/08/2025	Classification: Loamy-skeletal, mixed, thermic Typic Calciargid											No.	4					
Series	SE	Location: Mojave Tra UTM 11S 621265 E 3839525 N (Lat/long: 34°41'28.0"N 115°40'34.0"W)											Quad	Brown Buttes					
Landform	Bajada, granitic debris flow	Elevation: 2449 ft Slope: -0.75° Aspect: 160°											Erosion: moderate						
Parent material	Mixed alluvium (granite (on surface), volcanic)	MAP: 20 cm MAAT											MAST: 21.812 °C						
Native vegetation	Creosote, burro brush, beaver tail, prickly pear	STR: Thermic											SMR: Aridic						
Present use	camping, recreation, conservation, education (BLM management)	Grndwtr: >3.6 m depth											Perm: High	Saline: No	Sodic: No				
Associated soils	Soils seen in pedons 5, 6												Diagnost: Argillic horizon (52-86+); Cambic horizon (8-52 cm); Ochric epipedon (0-18 cm)						
HORIZON	DEPTH CM	BDRY	COLOR			TEXTURE	Clay %	ROCK FRAGS	STRUCTURE	CONSISTENCE	pH	CLAY FILMS	ROOTS	PORES	CONCRET	CO3 MnO2	CEC cmol+kg %BS	EC us/cm	
A	0-6	AS	D	10 YR	7	3	GR S	2	19	PL	S	--	SO 2 m	N	1vf	2 vf	--	NE -- >50% (assumed)	700
			M	7.5 YR	5	3				SO PO					6.8	p	IR		
Bw1	6-22	CS	D	10 YR	6	4	S	3	10	SBK	S	--	SO 2 Co	N	2 vf	2 vf	--	NE -- >50% (assumed)	610
			M	7.5 YR	5	4				SO PO					6.9	p	IR		
Bw2	22-36	AW	D	10 YR	6	4	GR SL	18	16	SBK	S	--	SO 2 m	N	1 m	2 vf	--	NE -- >50% (assumed)	620
			M	7.5 YR	5	6				SO PO					6.9	p	IR		
2Bkb	36-52	CW	D	7.5 YR	5	4	GR LS	10	25	SBK	S	--	VS 2 m	N	2 vf	2 VF	--	VS <5% >50% (assumed)	630
			M	7.5 YR	4	3				SO PO					6.9	m	IR		
2Btkb1	52-70	AS	D	7.5 YR	6	4	VGR LS	15	45	SBK	SH	--	VS 3 m	Y	1vf	2 VF	--	VS <5% >50% (assumed)	620
			M	7.5 YR	5	6				SO PO					6.9	p	IR		
2Btkb2	70-86+	D	D	7.5 YR	7	3	VGR SCL	25	50	SBK	MH	--	VS 3 m	Y	1 f	1vf	--	VE/SL (10%) >50% (assumed)	350
			M	7.5 YR	5	6				SO PO					6.9	p	IR		
		D																	
		M																	
		D																	
		M																	
Soil region	Profile group			NLD			Stone Index	A	B	C	D	E	X						
Soil grade	LCC unit	Irr	Nonirr	FFD			Interpretation for:												
Suitability:				Nonirrigated crops			Poor	Range			Moderate / Poor	Timber	Poor						
Remarks:																			
Dominant processes: Alluvial activity, Manganese oxidized at surface so no redox reaction, Bajada																UCSB-ENVS/GEOG			

Pedon #7: Carpinteria Salt Marsh (Ocean Side) (Aeric Endoaquept):

FIELD SHEET FOR RECORDING SOIL CHARACTERISTICS												UNIVERSITY OF CALIFORNIA, SANTA BARBARA												
Date	02/21/2022			Classification	Order:	Inceptis Suborder:	Aquept	Great group:	Endoaquept			Subgroup:			Aeric Endoaquept			No.	7					
Series																								
Location	Carpinteria Salt Marsh												UTM	34.402514, -119.533233										
Landform	Salt marsh												Elevation	10 ft	Slope	-0.125	Aspect	215 SW				Erosion		
Parent material	QEC Estuarine Deposit												MAP	38cm	MAAT	16.8	MAST	19.8						
Native vegetation	Salt bush, pickleweed, alkali heath												STR	Thermic	SMR	Aquic								
Present use	Preserve												Grndwtr	56 cm	Perm	Saline	Sodic							
Associated soils													Diagnostic: Ochric epipedon (0-20cm), cambic horizon (24-76 cm)											
HORIZON	DEPTH CM	BDRY	COLOR			TEXTURE	CLAY %	ROCK FRAGS	STRUCTURE	CONSISTENCE D	M	W	pH	CLAY FILMS	ROOTS	PORES	CONCRET MnO ₂	CO3	CEC cmol+kg %BS	EC us/cm				
A	0-24		H	V	C	Silty clay loam	33	0					SS	7.6	N									
		D											PO											
		M	10 YR	3	1								SS											
Bg1	24-50		D			Silty clay	55	0					SS	7.7	N									
		M	7.5 YR	3	2								SP											
Bg2	50-76		D			silty clay	43	0					SS	7.5	N									
		M	10 YR	3	2								SP											
2C	76-96+		D			silt -> sandy loam	27 -> 20	0					SS	7.4	N									
		M	10 YR	3	3								PO											
		D																						
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North Campus Open Space (Mesa Slope) (*Xerorthent*):

FIELD SHEET FOR RECORDING SOIL CHARACTERISTICS - MESA SITE																	
Date: 02/28/2			Landform: Mesa, slough			GPS: 34 25'12N, 119 52'44SW			Land use & amendment history:								
Location: NCOS MESA						Elevation: 20 ft			Past history of being used as a golf course (slough was filled in)								
Vegetation: Coyote brush, giant rye, mule fat, California sunflower, <i>Hazardia sacres</i>			Parent material: TSO bottom, mixed with QMT and QE			Slope: 1 2 (sec) Aspect: 330 334			Then was acquired by CCBER								
									Soil was scraped and later filled with material from surrounding area								
Present use: High pH which reflects in sodic soil									Amended with gypsum								
Additional site notes:																	
Auger #: 1		GPS Location:			Notes / location relative to other cores:												
HORIZON	DEPTH	Soil sample	Sample ID	COLOR			TEXTURE	CLAY %	ROCK FRAGS %	CONSISTENCE			pH	CONCRET MnO2	CO3	EC (uS/cm)	Redox Features % / Colors
				H	V	C				D	M	W					
IN	collection depth																
		M_1_6_250228	D					53			so	8.5					
	0-6	6 in	M	2.5Y	4	3			1		mp		370		15% black		
		M_1_18_250228	D								so	8.2			2% red		
	12-18	18 in	M	10 YR	4	4			55		vp		410		5% black		
		M_1_24_250228	D						0		so	8.2			8% red yellow		
	24-30	24 in (or depth to muck)	M	2.5Y	3	2			60		mp		780		1% red yellow		
			M	2.5Y	3	2			0		so				15% black		
Soil Notes:		Black (2.5Y3/1); Red (10YR/6/8). Too dry for moist, too wet for dry. Weird for rupture resistance															
Auger #: 2		GPS Location:			Notes / location relative to other cores:												
HORIZON	DEPTH	Soil sample	Sample ID	COLOR			TEXTURE	CLAY %	ROCK FRAGS %	CONSISTENCE			pH	CONCRET MnO2	CO3	EC (uS/cm)	Redox Features / Colors
				H	V	C				D	M	W					
IN	collection depth																
		M_2_6_250228	D					25			so	7.7			15% black		
	0-6	6 in	M	10 YR	4	3			1		vp		200		1% red		
		M_2_18_250228	D								so	8.6			15% red		
	12-18	18 in	M	10 YR	5	4					vp		420		10 YR 6/8		
		M_2_24_250228	D								so	7.8			80% black		
	24-30	24 in (or depth to muck)	M	2.5Y	3	2					vp		940				
			M	2.5Y	3	2					so		VS/ST	VS/ST			
Soil Notes:		Purple under 7.5R/2.5/2															

North Campus Open Space (North Parcel) (*Artesol/Entisol*):

FIELD SHEET FOR RECORDING SOIL CHARACTERISTICS - SOUTH PARCEL SITE																	
Date: 02/28/2			Landform: Mesa, slough			GPS: 34 25'11N 119 53'0" W			Land use & amendment history:								
Location: NCOS South Parcel						Elevation: 50			Past history of being a golf course								
Vegetation: californica, pearl everlasting, sticky monkey flower, CA codweed, moss, scarlet pimpernel			Parent material: Scraped QMT, possibly marine terrace lower			Slope: 1.5 1 Aspect: 35 33			Now an active restoration site managed by CCBER								
									Was scraped but NOT refilled								
Present use: Restoration site and trails						Saline: N			Sodic: N								
Additional site notes: Vegetation at much higher density, size and diversity compared to previous site																	
Auger #: 1		GPS Location:			Notes / location relative to other cores:												
HORIZON	DEPTH	Soil sample	Sample ID	COLOR			TEXTURE	CLAY %	ROCK FRAGS %	CONSISTENCE			pH	CONCRET MnO2	CO3	EC (uS/cm)	Redox Features / Colors
				H	V	C				D	M	W					
IN	collection depth																
		S_1_6_250228	D					11			so	7.1			2% BLACK		
	0-6	6 in	M	2.5Y	4	3			0		VFR	NE	170				
		S_1_18_250228	D								po	NE					
	12-18	18 in	M	10YR	5	4			15		so		180		Co3 nodules ~5%		
		S_1_24_250228	D						2		sp						
	24-30	24 in	M	10YR	6	4			7		so	7.1			170		
			M	10YR	6	4			0		L	NE					
Soil Notes:																	
Auger #: 2		GPS Location:			Notes / location relative to other cores: 15 feet from auger 1												
HORIZON	DEPTH	Soil sample	Sample ID	COLOR			TEXTURE	CLAY %	ROCK FRAGS %	CONSISTENCE			pH	CONCRET MnO2	CO3	EC (uS/cm)	Redox Features / Colors
				H	V	C				D	M	W					
IN	collection depth																
		S_2_6_250228	D					12			so	7.4			150		
	0-6	6 in	M	2.5Y	4	3			0		L	NE					
		S_2_18_250228	D								po	VS					
	12-18	18 in	M	2.5Y	5	4			8		so	7.7			130		
		S_2_24_250228	D						0		sp	NE			25% 2.5Y 6/6		
	24-30	24 in (or depth to muck)	M	2.5Y	6	4			4		so	7.6			120		
			M	2.5Y	6	4			0		L	NE			2.5 6/8		
Soil Notes:																	

Pedon #9: Fairview Garden Farms (*Pachic Haploxeroll*):

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V																					
1	FIELD SHEET FOR RECORDING SOIL CHARACTERISTICS																		UNIVERSITY OF CALIFORNIA, SANTA BARBARA																								
2	Date		3/7/25		Classification: Pacific Haplixerol (possibly Cumulic Haplixerol depending on C content & age at depth)														No.	9																							
3	Series		Soil description																Soil use																								
4	Location		Fairview Gardens Farm				UTM or Lat/Long				34.4482, -119.828				Quad				Soil use																								
5	Landform		Foothill/Valley				Elevation				60 ft		Slope		-0.25°		Aspect		80 E		Erosion		Slight																				
6	Parent material		Qia/Qac - Alluvium				Soil depth				MAP				17.2		MAAT		15.2°C		MAST		17.2°C																				
7	Native vegetation		Coyote brush, blue elder, lemonade berry, cheeseweed				Soil thickness				STR				Thermic		SMR		Xeric																								
8	Present use		Organic agriculture				Soil texture				Grndwr		>70 cm		Perm				Saline		No		Sodic		No																		
9	Associated soils						Diagnos		Mollie epipedon (0-70+)						pH		CLAY FILMS		ROOTS		PORES		CONCRET		CO3		CEC cmol+/kg %BS		EC us/cm														
10	HORIZON		DEPTH CM		BDRY		COLOR			TEXTURE		CLAY %		ROCK FRAGS %		STRUCTURE			CONSISTENCE			pH		CLAY FILMS		ROOTS		PORES		CONCRET		CO3		CEC cmol+/kg %BS		EC us/cm							
11	Apu		0-17		-		H V C			Sandy clay loam		20		0		0-10: 2 F GR 10-17: M- CO SBK			D M W			VFR		SS		7.0		N		2FT		1 VF TU		--		NE		-->50% (assumed)		110			
12	A		17-31		CW		D 10 YR 4 2			Sandy clay loam		26		1		3 M - CO SBK			--			VFR		SP		7.1		N		1FT		1 VF TU		--		NE		-->50% (assumed)		80			
13	Bw		31-58		AS		M 10 YR 3 3			clay loam		40		1		3 CO SBK			--			FR		SO		7.4		N		2 FT*		3 VF - F		--		NE		>50% (assumed)		80			
14	Bw2		58-70		VS		D 10 YR 4 2			sandy clay		33		0		3 CO SBK			--			VFR		MP		7.2		N		1 FT*		3 VF TU**		--		NE		>50% (assumed)		140			
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32	Soil region		Profile group				NLD				Storie Index		A		B				C		D		E		X																		
33	Soil grade		LCC unit		Irr		Nonirr		FFD		Interpretation for:																																
34	Suitability:		Nonirrigated crops				Range				Timber																																
35	Remarks: Significant bioturbation from gophers (at surface) and worms (throughout); *remnants of dead and old orchard roots at bottom (VC dead orchard roots in horizons 3 and 4);																																										
36	**tubular pores filled with worm castings																																										