

LOCATION ZAMORA

CA

Established Series

Rev. WFA/RCH/LCL

01/2003

ZAMORA SERIES

The Zamora series is a member of the fine-silty, mixed, thermic family of Mollic Haploxeralfs. Typically, Zamora soils have grayish brown, slightly acid loam A horizons; brown silty clay loam, neutral Bt horizons; and yellowish brown C horizons.

TAXONOMIC CLASS: Fine-silty, mixed, superactive, thermic Mollic Haploxeralfs

TYPICAL PEDON: Zamora silt loam - cultivated (Colors are for dry soil unless otherwise noted.)

Ap--0 to 10 inches; Grayish brown (2.5Y 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; massive; hard, friable, slightly sticky, slightly plastic; many fine roots; common very fine pores; slightly acid (pH 6.3); clear wavy boundary. (8 to 14 inches thick)

B21t--10 to 24 inches; Brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3) moist; weak coarse angular blocky structure; hard, friable, sticky, plastic; many fine roots; common very fine pores; few thin clay films on faces of peds and lining pores; neutral (pH 7.0); gradual wavy boundary. (12 to 15 inches thick)

B22t--24 to 40 inches; Brown (10YR 5/3) silty clay loam, dark brown (10YR 4/3) moist; weak coarse angular blocky structure; hard, friable, sticky, plastic; common fine roots; common very fine pores; continuous moderately thick clay films on faces of peds and lining pores; neutral (pH 7.0); gradual wavy boundary. (15 to 17 inches thick)

C1--40 to 51 inches; Yellowish brown (10YR 5/4) silt loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; common fine roots; common very fine pores; few thin clay films line pores; neutral (pH 7.0); clear wavy boundary. (10 to 15 inches thick)

C2--51 to 60 inches; Yellowish brown (10YR 5/4) gravelly loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; common very fine pores; slightly effervescent; lime segregated in concretions; slightly alkaline (pH 7.5).

TYPE LOCATION: Yolo County, California; about 3 miles north of Capay; 0.35 mile north of Road 16-A on Road 85, 45 feet east of Road 85, SW;4NW1/4NW1/4 sec. 1, T.10N., R.2W.

RANGE IN CHARACTERISTICS: The solum ranges in thickness from 35 to 46 inches. The mean annual soil temperature ranges from about 59 degrees to 64 degrees F. These soils are continually moist between 4 and 12 inches from some time in November until April or May and dry the remainder of the year.

The A horizon is dark grayish brown, grayish brown, dark brown or brown; hue is 10YR or 2.5Y. It is fine sandy loam, loam, silt loam or light

silty clay loam. The surface layer is both hard or very hard and massive when dry. The A horizon is about 2 to 4 percent organic matter. Reaction ranges from slightly acid to neutral.

The B2t horizon is dark grayish brown or brown, hue is 10YR or 7.5YR, and chroma is 2 or 3. It is clay loam or silty clay loam that contains less than 15 percent coarser than very fine sand. The upper boundary is diffuse, gradual or clear and some pedons have a transitional A3 horizon or B1 horizon. It has about 6 to 10 percent more clay absolute than the A horizon, but averages slightly less than 35 percent total clay. It is either massive or has blocky structure and ranges from neutral to slightly alkaline.

The C horizon is brown, grayish brown, yellowish brown, pale brown, light yellowish brown or light olive brown. Hue is 10YR or 2.5Y, value of 5 or 6, and chroma of 2, 3 or 4. Texture is clay loam, silt loam, loam, sandy loam or gravelly loam. In some pedons the lower part of the C horizon is stratified. The C horizon ranges from neutral to moderately alkaline and some pedons contain segregated lime and others lack it.

COMPETING SERIES: These are the [Azule](#), [Burchell](#), [Los Robles](#), [Modesto](#), [Perkins](#), [Pleasanton](#), [Rincon](#), and [Tehama](#) series. Azule and Rincon soils have 35 to 50 percent clay in the argillic horizon. Burchell, Modesto, Perkins, and Pleasanton soils are members of a fine-loamy family. In addition, Burchell soils are moderately to strongly alkaline in the argillic horizon. Modesto soils have an abrupt or clear boundary with 10 to 15 percent more clay in the argillic horizon than in the epipedon. Perkins soils have 5YR or 2.5YR hue in the argillic horizon. Pleasanton soils have less than 18 to 25 percent clay in the argillic horizon. Los Robles soils have a cambic horizon and lack a 20 percent increase in clay from A horizon to B2 horizon. Tehama soils have moist values of 4 or more in the A horizon.

GEOGRAPHIC SETTING: Zamora soils are on nearly level to strongly sloping fans and terraces usually 0 to 9 percent slopes at elevations of 30 to 1,300 feet. The soils formed in alluvium from material weathered from mixed sedimentary rocks. They have a dry subhumid mesothermal climate with hot dry summers and cool moist winters. Mean annual precipitation ranges from 14 to 30 inches. Average January temperature is 45 degrees F., average July temperature is 75 degrees F., and mean annual temperature is 58 degrees to 63 degrees F. Average freeze-free season is about 250 to 330 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing [Los Robles](#) and [Rincon](#) soils and the [Brentwood](#), [Salinas](#), [Sorrento](#), and [Yolo](#) soils. Brentwood soils lack argillic horizons and have 35 to 40 percent clay in the textural control section. Salinas and Sorrento soils have a mollic epipedon. Yolo soils lack an argillic horizon, but are otherwise very similar.

DRAINAGE AND PERMEABILITY: Well-drained; glow to medium runoff; moderately slow permeability.

USE AND VEGETATION: The soils are used for growing orchards, row, field, and truck crops. Native vegetation is annual grasses and forbs and widely spaced oaks.

DISTRIBUTION AND EXTENT: Along the west side of the Sacramento Valley in central California and other parts of California. The soil is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Solano County (Suisun Area), California, 1936.

REMARKS: Zamora soils were formerly classified as Noncalcic Brown soils.

The activity class was added to the classification in January of 2003. Competing series were not checked at that time. - ET

OSED scanned by SSQA. Last revised by state on 1/73.

National Cooperative Soil Survey
U.S.A.

LOCATION SAUGUS

CA

Established Series

Rev. GAW/RCH/LCL/ET

03/2003

SAUGUS SERIES

The Saugus series consists of deep, well drained soils that formed from weakly consolidated sediments. Saugus soils are on dissected terraces and foothills and have slopes of 9 to 50 percent. The mean annual precipitation is about 16 inches and the mean annual air temperature is about 63 degrees F.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, nonacid, thermic Typic Xerorthents

TYPICAL PEDON: Saugus loam, brush and grass. (Colors are for dry soil unless otherwise stated.)

A1--0 to 15 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine medium and coarse roots; common very fine, few fine tubular and common very fine interstitial pores; about 5 percent gravel by volume; neutral (pH 6.8); gradual smooth boundary. (8 to 17 inches thick)

C1--15 to 25 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine, common coarse roots; few very fine tubular, common very fine interstitial pores; about 15 percent gravel by volume; slightly acid (pH 6.5); gradual smooth boundary. (10 to 14 inches thick)

C2--25 to 42 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine, common fine and few coarse roots; few very fine tubular, common very fine interstitial pores; contains about 10 percent gravel by volume; slightly acid (pH 6.5); diffuse smooth boundary. (16 to 25 inches thick)

C3--42 to 50 inches; grayish brown (10YR 5/2) weakly consolidated sediments that crush to gravelly heavy sandy loam, dark grayish brown (10YR 4/2) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine interstitial pores; about 25 percent gravel and 5 percent cobbles; slightly acid (pH 6.3).

TYPE LOCATION: Los Angeles County, California; in Romero Canyon; NW1/4 NW1/4 section 27, T.5N., R.17W.

RANGE IN CHARACTERISTICS: Depth to a paralithic contact is 40 to 56 inches. Saugus soils are on complex slopes of 9 to 50 percent. The mean annual soil temperature at a depth of 20 inches is 60 degrees F. and the soil temperature is not below 47 degrees F. at any time. Soil between depths of about 5 and 15 inches is continuously dry in all parts from late April or May until late October to early December and is moist in some or all parts all the rest of the year. The soil profile is loam or sandy loam throughout and the 10 to 40 inch control section has less than 18 percent clay. Rock fragments range from 1 to 35 percent and are mostly gravel and a few cobbles. Usually the amount of rock fragments increases with depth, though in some pedons the immediate surface has a partial layer of fragments. The profile is slightly acid to slightly alkaline and in many pedons the lower part is less acid.

The A horizon is light brownish gray, grayish brown, yellowish brown, brown or pale brown in 10YR or 2.5Y hue when dry. The moist value is 4 or 5. In some pedons the upper 1 to 4 inches is gray, dark gray or dark grayish brown. The upper 7 inches of the A horizon has 0.4 to 1.0 percent organic matter.

The C horizon above the paralithic contact has a color similar to the A horizon or it has one unit higher value.

COMPETING SERIES: These are the [Escondido](#), [Hanford](#), [Honcut](#), [Pollasky](#), [Pfeiffer](#), [San Andreas](#), and [Vista](#) series. Escondido and Vista soils have a cambic horizon. Hanford and Honcut soils are on smooth slopes of less than 9 percent and they lack a paralithic contact. Pfeiffer and San Andreas soils have a mollic epipedon. Pollasky soils have a paralithic contact at depths of less than 40 inches.

GEOGRAPHIC SETTING: The Saugus soils are on slopes of dissected terraces and foothills at elevations of 600 to 2,500 feet. Slopes range from 9 to 50 percent. The soils formed in material weathered from weakly consolidated sediments mostly from granitic and closely related rocks. The climate is dry subhumid mesothermal with warm dry summers and cool moist winters. The mean annual precipitation is 14 to 20 inches all in the form of rain. Mean annual temperature is about 63 degrees F., average January temperature is about 54 degrees F., and average July temperature is about 73 degrees F. The freeze-free season is about 250 to 300 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the [Castaic](#), [Gaviota](#), [Metz](#), [San Andreas](#), and [Sorrento](#) soils. Castaic soils have more than 18 percent clay and have a fine-silty control section. Gaviota soils have a lithic contact less than 20 inches below the surface. Metz soils are sandy and are stratified with layers of finer texture.

DRAINAGE AND PERMEABILITY: Well drained; medium to rapid runoff; moderate permeability.

USE AND VEGETATION: Used for grazing, wildlife, watershed, and small amounts used for industry and urbanization. Native vegetation is chamise and other shrubs plus minor amounts of perennial grasses. Naturalized grasses and forbs make up a small to large portion of the vegetation.

DISTRIBUTION AND EXTENT: Foothills in the western part of southern California. The soils are of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: San Bernardino County (Southwestern Part), California, 1972.

REMARKS: The activity class was added to the classification in February of 2003. Competing series were not checked at that time. - ET

OSD scanned by SSQA. Last revised by state on 10/75.

National Cooperative Soil Survey
U.S.A.

LOCATION GAVIOTA

CA

Established Series
Rev. GWH/CAF/KP
10/2007

GAVIOTA SERIES

The Gaviota series consists of very shallow or shallow, well drained soils that formed in material weathered from hard sandstone or meta-sandstone. Gaviota soils are on hills and mountains and have slopes of 2 to 100 percent. The average annual precipitation is about 20 inches and the mean annual temperature is about 60 degrees F.

TAXONOMIC CLASS: Loamy, mixed, superactive, nonacid, thermic Lithic Xerorthents

TYPICAL PEDON: Gaviota gravelly loam, grass range. (Colors are for dry soil unless otherwise noted.)

A1--0 to 6 inches; brown (7.5YR 5/4) gravelly loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; common very fine tubular pores; neutral (pH 7.0); clear smooth boundary.

A2--6 to 10 inches; brown (7.5YR 5/4) gravelly loam, brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; neutral (pH 6.8); abrupt wavy boundary.

R--10 to 17 inches; pale brown (10YR 6/3) hard meta-sandstone.

TYPE LOCATION: Stanislaus County, California; nine miles west of the town of Westley, California; 1,700 feet north and 500 feet east of the southwest corner of section 6, T. 5 S., R. 6 E., MDB&M; USGS Solyo, California Quadrangle, NAD 27.

RANGE IN CHARACTERISTICS: Depth to a lithic contact of hard rock is 6 to 20 inches. The soils become moist below a depth of 6 inches some time between mid-October and mid-December and remain moist all the time in some parts below 6 inches until early April or late May. The mean annual soil temperature is 59 to 64 degrees F. and the soil temperature does not go as low as 41 degrees F. at any time. Texture throughout is sandy loam, fine sandy loam, loam, gravelly sandy loam, gravelly fine sandy loam, and gravelly loam. Clay content is 10 to 18 percent. Rock fragment content is less than 25 percent. Sand content is more than 40 percent of the fine earth fraction. Coarse and very coarse sand content is less than 20 percent.

The A horizon has color of 10YR 6/2, 6/3, 6/4, 5/2, 5/3, 5/4, 5/6, 5/8, 4/3; 2.5Y 6/2, 6/4, 5/2; 7.5YR 5/2, 5/4 or 6/4. Moist values are 4 throughout or if less than 4 they occur only in the upper part or have dry values of 6 or more. Reaction is moderately acid to neutral. Some pedons have a C horizon that differs from the A horizon principally by being one value unit lighter.

COMPETING SERIES: These are the [Daulton](#) , [Exchequer](#) (CA), [Ocroag](#) (CA), [Snook](#) (CA) and [Whiterock](#) (CA) series. Daulton soils have moist value of 3 and have a massive and hard epipedon. Exchequer soils have less than 50 percent sand in the fine earth fraction. Ocroag soils are neutral, have greater than 20 percent coarse and very coarse sand content. Snook soils are dry in all parts from early June to mid October. Whiterock soils

have 25 to 50 percent sand and a mean annual soil temperature of 63 to 67 degrees F.

GEOGRAPHIC SETTING: Gaviota soils are on hills and mountains. Slope is 2 to 100 percent. These soils formed in material weathered from sandstone and meta-sandstone. Elevation is 200 to 4,400 feet. Rock outcrops are commonly associated with this soil and occupy from less than 2 percent to 50 percent of the surface area. The climate is dry subhumid with hot dry summers and cool moist winters. Mean annual precipitation is 10 to 30 inches. Mean January temperature is about 42 degrees F. and about 56 degrees F. along the coast of California; mean July temperature is about 75 degrees F.; mean annual temperature is about 56 to 65 degrees F. The frost-free season is 175 to 350 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the [Altamont](#), [Los Gatos](#), [Los Osos](#), [Vallecitos](#) and [Wadesprings](#) soils. Altamont soils, on uplands, hills and mountains, have a fine particle-size control section. Los Gatos soils, on mountains, are moderately deep and have an argillic horizon. Los Osos soils, on uplands, have an argillic horizon and a paralithic contact at a depth of 20 to 40 inches. Vallecitos soils, on hills, have an argillic horizon and a clayey particle-size control section. Wadesprings soils, on uplands, have an argillic horizon and magnesian mineralogy.

DRAINAGE AND PERMEABILITY: Well and excessively well drained; very low to very high runoff; moderately rapid permeability.

USE AND VEGETATION: Used mostly for livestock grazing. Some of the less sloping areas are cropped to dryland grain. Natural vegetation is California sage, chamise, manzanita, purple needlegrass and annual grasses.

DISTRIBUTION AND EXTENT: Mostly in the California Coast Ranges. The soils are extensive. MLRA 15, 20.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Stanislaus County (Newman Area), California, 1941.

REMARKS: Soils in the Amargosa series as recognized in the Antelope Valley Area, California are not included in the Gaviota series. Soils formed in material weathered from granite are now excluded from the Gaviota series.

The revision made on 09/96 moves the type location to better represent the series as mapped for the Gaviota series.

CEC/Clay ratio estimated from similar soils with laboratory data in the W. Stanislaus Soil Survey Area.

Runoff terminology adjusted 4/96 to adjective criteria of the Soil Survey Manual, 10/93.

Competing series updated 01/2003.

Warmer January temperatures occur along the southern Coastal range. These were phased until a possible later decision to split these out as separate series.

National Cooperative Soil Survey
U.S.A.

LOCATION SOPER

CA

Established Series

Rev. JKW/LAB/RWY/ET

03/2003

SOPER SERIES

The Soper series consists of moderately deep, well drained soils that formed in material weathered from conglomerate and sandstone. Soper soils are on hills and uplands and have slopes of 15 to 50 percent. The mean annual precipitation is about 18 inches and the mean annual air temperature is about 60 degrees F.

TAXONOMIC CLASS: Fine-loamy, mixed, superactive, thermic Typic Argixerolls

TYPICAL PEDON: Soper gravelly loam, scattered brush and annual grass rangeland. (Colors are for dry soil unless otherwise noted.)

A1--O to 8 inches; brown (10YR 4/3) gravelly loam, dark brown (7.5YR 3/2) moist; weak medium and coarse subangular blocky structure; slightly hard, friable, sticky and plastic; few fine and common very fine roots; common very fine tubular pres; 12 percent gravel and cobbles (by volume); slightly acid (pH 6.5); abrupt smooth boundary. (7 to 12 inches thick)

B21t--8 to 11 inches; reddish brown (5YR 5/4) gravelly clay loam, reddish brown (5YR 4/4) moist; moderate fine and medium subangular blocky structure; hard, firm, sticky and plastic- few fine and common Very fine roots; common fine and very fine tubular pores; common moderately thick clay films lining pores and on faces of peds; 25 percent gravel and cobbles (by volume); neutral (pH 6.7); clear smooth boundary. (4 to 8 inches thick)

B22t--11 to 21 inches; reddish brown (5YR 5/4) gravelly clay loam, reddish brown (5YR 4/4) moist; moderate fine and medium subangular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; few very fine tubular pores; many moderately thick clay films lining pores and on faces of peds; 30 percent gravel and cobbles (by volume); neutral (pH 6.7); clear smooth boundary. (6 to 12 inches thick)

B3--21 to 29 inches; yellowish red (5YR 5/6) gravelly loam, yellowish red (5YR 4/6) moist- weak medium and coarse angular blocky structure; hard, firm, slightly sticky and plastic; few very fine roots; few very fine tubular pores; few moderately thick clay filmg lining pores and on faces of peds; 30 percent gravel and cobbles (by volume); neutral (pH 6.7); clear wavy boundary. (3 to 8 inches thick)

Cr--29 to 62 inches; weakly consolidated conglomerate; few thin clay films on rock faces in upper part; gravel and cobbles composed of mixed crystalline rocks some strongly weathered.

TYPE LOCATION: Orange County, California; about 4,500 feet north-northwest of the spillway for, Rattlesnake Reservoir and 300 feet north of the Highland Canal, Irvine Range; N 1/4 N 1/4 sec. 82 (sections by private survey), T.5S., R.1W., SBBM. Topside of sections by this private survey are towards the northwest.

RANGE IN CHARACTERISTICS: Depth to a paralithic contact is 24 to 40 inches. The mean annual soil temperature is 60 degrees to 65 degrees

F. at 20 inches depth and the soil temperature usually is not below 47 degrees F. at any time. The soil between depths of about 6 and 16 inches is continuously dry in all parts from late April or May until late October or November and usually is moist in some part all the rest of the year.

The A horizon is grayish brown, dark grayish brown, or brown in 10YR hue. It is loam or less commonly sandy loam and is commonly gravelly or cobbly with 0 to 20 percent rock fragments by volume. The horizon usually has weak or moderate granular or subangular blocky structure and is slightly hard or hard. In some pedons it is massive in some part and slightly hard. The A horizon is neutral to medium acid. It contains 1 to 4 percent organic matter to depth of about 10 inches and the amount decreases regularly to less than 1 percent at a depth of about 15 inches.

The B2t horizon is brown, dark brown or light yellowish brown in 10YR or 7.5YR hue or reddish brown in 5YR hue. It is gravelly or cobbly clay loam or gravelly or cobbly sandy clay loam and has 25 to 35 percent clay. This horizon is slightly acid to mildly alkaline. Some pedons have horizons transitional to the B2t horizon and have either or both B1 or B3 horizons. Some pedons have a C horizon above the paralithic contact that is gravelly or cobbly loam or gravelly or cobbly sandy loam.

COMPETING SERIES: These are the [Ballard](#), [Chualar](#), [Gilroy](#) and [Pinto](#) series. Dallard, Chualar and Pinto soils are deep and lack a paralithic contact. Gilroy soils have a lithic contact at depths of 20 to 40 inches.

GEOGRAPHIC SETTING: Soper soils are on hills and uplands with slopes of 15 to 50 percent and are at elevations of 100 to 2,500 feet. They formed in material weathered from conglomerate and sandstone. The climate is dry subhumid, mesothermal with warm to hot dry summers and cool moist winters. Mean annual precipitation is 12 to 25 inches. Mean annual temperature is 58 degrees to 65 degrees F. Average January temperature is about 45 degrees to 50 degrees F. and July temperature is about 70 degrees to 75 degrees F. The frost-free season is about 250 to 350 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the [Arnold](#), [Azule](#), [Balcom](#), [Cieneba](#), [Fontana](#), [Gaviota](#), [Los Gatos](#), [Los Osos](#), [Pleasanton](#), and [Vallecitos](#) soils. Arnold soils are sand or loamy sand and lack an argillic horizon. Azule and Los Osos soils have argillic horizons with more than 35 percent clay. Balcom soils lack an argillic horizon and are calcareous throughout. Cieneba soils have a paralithic contact at depths of less than 20 inches. Fontana soils lack an argillic horizon and have a Cca horizon. Gaviota soils have a lithic contact at depths of less than 20 inches. Los Gatos soils have a mean annual soil temperature of 54 degrees to 58 degrees F. Pleasanton soils lack a mollic epipedon and lack a paralithic contact above a depth of 40 inches. Vallecitos soils lack a mollic epipedon and have a lithic contact at depths of less than 20 inches in part of each pedon.

DRAINAGE AND PERMEABILITY: Well drained; rapid runoff; moderately slow permeability.

USE AND VEGETATION: Used for dryland pasture, rangeland, watershed, and homesites. Principal vegetation is annual and forbs, some native shrubs, and a few oak trees.

DISTRIBUTION AND EXTENT: Foothill areas in the western part of southern and central California. The soil is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: San Bernardino County (Santa Ana Watershed), California, 1940.

REMARKS: In past mapping, Soper soils were not restricted to pedons having a paralithic contact at a depth of less than 40 inches.

The activity class was added to the classification in February of 2003. Competing series were not checked at that time. - ET

OSED scanned by SSQA. Last revised by state on 6/76.

National Cooperative Soil Survey
U.S.A.

LOCATION LOS OSOS

CA

Established Series

Rev. DJE/LCL/RWK/AW

10/2001

LOS OSOS SERIES

The Los Osos series consists of moderately deep, well drained soils that formed in material weathered from sandstone and shale. Los Osos soils are on uplands and have slopes of 5 to 75 percent. The mean annual precipitation is about 25 inches and the mean annual air temperature is about 60 degrees F.

TAXONOMIC CLASS: Fine, smectitic, thermic Typic Argixerolls

TYPICAL PEDON: Los Osos loam - grazed range grass. (Colors are for dry soil unless otherwise noted.)

A--0 to 14 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; moderately acid (pH 6.0); clear smooth boundary. (10 to 16 inches thick)

Btss1--14 to 24 inches; yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; weak medium prismatic structure; very hard, very firm, sticky and plastic; few very fine roots; few very fine tubular pores; many moderately thick clay films on faces of peds and lining pores; few slickensides; moderately acid (pH 6.0); gradual wavy boundary. (6 to 12 inches thick)

Btss2--24 to 32 inches; light yellowish brown (10YR 6/4) clay loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, very firm, sticky and plastic; few very fine roots, common very fine tubular pores; many moderately thick clay films lining pores; few slickensides; few manganese concretions; slightly acid (pH 6.5); gradual wavy boundary. (4 to 8 inches thick)

C--32 to 39 inches; pale yellow (2.5Y 7/4) sandy loam, light olive brown (2.5Y 5/4) moist; massive; hard, friable, nonsticky and nonplastic; few manganese stains; neutral (pH 7.0); gradual wavy boundary. (0 to 7 inches thick)

Cr--39 to 43 inches; yellowish brown (10YR 5/4) sandstone, brown (10YR 4/3) moist; many moderately thick clay films and few manganese stains coat fracture faces that are less than 10cm apart and less than 1mm in width.

TYPE LOCATION: San Luis Obispo County, California; on the Cal-Poly University campus, approximately 2,000 feet west and 1,500 feet south of the northeast corner of section 23, T. 30 S., R. 12 E., MDB&M; Latitude 35 degrees, 18 minutes, 18 seconds north and Longitude 120 degrees, 39 minutes, 23 seconds west; San Luis Obispo Quadrangle.

RANGE IN CHARACTERISTICS: Depth to a paralithic contact of sandstone or shale is 20 to 40 inches. The mean annual soil temperature at a depth of 20 inches is 60 degrees to 67 degrees F. and the coldest temperature is warmer than 41 degrees F. All of the soil between depths of about 4 and 12 inches is continuously dry after some time in May until some time in October. Some or all of the soil between these depths is moist all the

rest of the time. There is 6 to 15 percent clay increase (absolute) from the A horizon to the B2t horizon and the soil lacks an abrupt A/B horizon boundary.

The A1 horizon is grayish brown, dark grayish brown, brown, or dark brown in 10YR or 7.5YR hue and has moist value of 3 or 2. It is loam, silt loam, clay loam, or silty clay loam and it has weak to strong structure. This horizon has 2 to 4 percent organic matter. It is medium acid to neutral.

The B2t horizon is brown, dark brown, grayish brown, dark grayish brown, light yellowish brown, yellowish brown, dark yellowish brown, brownish yellow, pale brown, light olive brown, light brown, or light brownish gray in 10YR, 7.5YR, or 2.5Y hue. In most pedons it has one unit higher value and one or two units brighter chroma than the A horizon. This horizon is heavy clay loam, clay, or silty clay and averages 35 to 50 percent clay. It has weak to strong angular or subangular blocky structure or is prismatic in the upper part and is massive in the lower part in some pedons. The B2t horizon is moderately acid to neutral. Some pedons have a C horizon consisting of a weathering front. The C horizon is sandy loam, loam, or clay loam.

COMPETING SERIES: These are the [Fagan](#), [Gabino](#), [Gridley](#), [Marcum](#), [Sespe](#), [Sween](#), and [Todos](#) series. Fagan and Todos are underlain by soft sandstone or shale at depths of 40 to 60 inches. Gabino soils have 5YR hue in the argillic horizon and have 10 to 30 percent pebbles and cobbles. Gridley soils are moderately well drained and are neutral to moderately alkaline. Marcum soils have paralithic horizons at 40 to 80 inches and are neutral to moderately alkaline. Sespe soils have hue of 5YR or 2.5YR in the argillic horizon. Sween soils have 10 to 15 percent (absolute) increase in clay from the A horizon to the B horizon, and have a lithic contact at a depth of 20 to 40 inches.

GEOGRAPHIC SETTING: Los Osos soils are at elevations of 100 to 3,500 feet. They formed in material weathered from firm to hard sandstone and shale. Slopes are 5 to 75 percent. The climate is dry subhumid mesothermal with warm, dry, somewhat foggy summers and cool, moist winters. Mean annual precipitation is 14 to 40 inches. Average annual temperature is 56 degrees to 63 degrees F., average January temperature is about 51 degrees F., and average July temperature is about 65 degrees F. The average freeze-free season is 200 to 320 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the [Altamont](#), [Arnold](#), [Diablo](#), [Gaviota](#), [Millsap](#), [San Benito](#), [Santa Lucia](#), and [Vallecitos](#) soils. Altamont and Diablo soils are of clay texture throughout. Gaviota, Millsap, and Vallecitos soils have a lithic contact at a depth of less than 20 inches. San Benito and Santa Lucia soils lack an argillic horizon.

DRAINAGE AND PERMEABILITY: Well drained; very high runoff; slow permeability.

USE AND VEGETATION: Used mostly for range, limited areas are cropped to grain and sudan grass pasture. Vegetation is mostly annual grasses and forbs with some perennial grasses, coastal sagebrush, and live oak.

DISTRIBUTION AND EXTENT: Central part of the Coast Range in California. The soils are of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: San Luis Obispo County (San Luis Obispo Area), California, 1928.

LOCATION CALLEGUAS CA

Established Series
Rev. GWH-RWK-MAV-KP
11/2001

CALLEGUAS SERIES

The Calleguas series consists of very shallow and shallow, well drained soils formed on uplands, hills and mountains in material weathered from sedimentary rocks. Calleguas soils have slopes of 9 to 75 percent. The mean annual precipitation is about 406 millimeters (16 inches) and the mean annual air temperature is about 16 degrees C (60 degrees F).

TAXONOMIC CLASS: Loamy, mixed, superactive, calcareous, thermic, shallow Typic Xerorthents

TYPICAL PEDON: Calleguas channery clay loam, rangeland. (Colors are for dry soil unless otherwise noted.)

A1--0 to 8 centimeters (0 to 3 inches); light brownish gray (10YR 6/2) channery clay loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; slightly hard, very friable, sticky and plastic; many very fine and fine roots; many very fine interstitial pores; about 20 percent shale fragments; strongly effervescent, lime disseminated; moderately alkaline (ph 8.0); abrupt smooth boundary. (5 to 10 centimeters (2 to 4 inches) thick)

A2--8 to 41 centimeters (3 to 16 inches); light brownish gray (10YR 6/2) channery clay loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; slightly hard, very friable, sticky and plastic; many very fine and fine roots; many very fine interstitial pores; about 34 percent shale fragments; strongly effervescent, lime disseminated; moderately alkaline (ph 8.0); gradual irregular boundary. (15 to 41 centimeters (6 to 16 inches) thick)

Cr--41 to 61 centimeters (16 to 24 inches); soft calcareous shale.

TYPE LOCATION: Los Angeles County, California; Las Virgenes Canyon; 1,500 feet north and 2,400 feet east of SW corner section 18, T.1N., R.17W. SBBM. USGS Malibu Beach, California, Quad; latitude 34 degrees, 06 minutes, 33 seconds N and long. 118 degrees, 43 minutes, 15 seconds W.

RANGE IN CHARACTERISTICS: Depth to a paralithic contact of shale and sandstone is 20 to 51 centimeters (8 to 20 inches). The mean annual soil temperature is about 16 to 18 degrees C (60 to 65 degrees F). and the soil temperature usually is not below 8 degrees C (47 degrees F). at any time. The soil below a depth of about 13 centimeters (5 inches) is usually dry all of the time from May 1 until December 15 and is moist in some or all parts all the rest of the year. Rock fragments are mainly angular and subangular pieces of shale 0.6 to 1 centimeters (0.25 to 0.5 inches) in diameter. Most fragments can be crushed by earthmoving machinery. Rock fragment average 5 to 35 percent of the soil volume and are usually most numerous just above the paralithic contact. Distinct horizon differentiation is lacking.

The soil is 10YR 6/2, 6/3, 5/2, 5/3; 2.5YR 6/2. Moist value is 4/2, 4/3, 4/4, and 2.5 4/2. It is loam, clay loam, silty clay loam, channery loam, channery clay loam, or channery silty clay loam. The soil is slightly to violently effervescent throughout except in some pedons deeper than 25 centimeters (10 inches) the upper few inches are noneffervescent. Reaction is slightly or moderately alkaline.

COMPETING SERIES: There are no other series in this family. Soil series of similiar families include [chumash](#), [Cieneba](#) and [Trigo](#) soils. Cieneba, chumash, and Trigo soils are noncalcareous in all parts.

GEOGRAPHIC SETTING: The Calleguas soils are on exposed and often eroded south-facing slopes. Slopes are 9 to 75 percent. Elevations are 30 to 853 meters (100 to 2,800 feet). The soils formed in material weathered from sandstone, shale, and mudstone. The climate is dry subhumid with warm dry summers and cool moist winters. Mean annual precipitation is 254 to 508 millimeters (10 to 20 inches). Average January temperature is 10 to 11 degrees C (50 to 52 degrees F); average July temperature is 19 to 23 degrees C (67 to 73 degrees F); mean annual temperature is 14 to 17 degrees C (58 to 62 degrees F). The frost-free season is 175 to 330 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing [Balcom](#), [Castaic](#), [Fontana](#), [Linne](#), [Saugus](#) and [Arnold](#) soils. Arnold soils are sandy and lack a paralithic contact within 100 centimeters (40 inches) of the surface. Balcom and Castaic soils have a cambic horizon. Fontana and Linne soils have a mollic epipedon. Saugus soils are deep and Arnold soils have sandy textures throughout

DRAINAGE AND PERMEABILITY: Well-drained; medium or high runoff; moderate permeability.

USE AND VEGETATION: Used for grazing and watershed. Vegetation is annual grasses and forbs with some shrubs of the coastal sagebrush group.

DISTRIBUTION AND EXTENT: Coast Range in the central and south-central part of California, MLRA 15 and 20. The soils are extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Los Angeles County, California, 1973.

National Cooperative Soil Survey
U.S.A.

LOCATION ARNOLD

CA

Established Series

Rev. GES/RCH/RWK/KJO/KP

7/98

ARNOLD SERIES

The Arnold series consists of deep, somewhat excessively drained soils that formed in material weathered from soft sandstone. Arnold soils are on hills and uplands and have slopes of 9 to 75 percent. The mean annual precipitation is about 16 inches. The mean annual air temperature is about 60 degrees F.

TAXONOMIC CLASS: Mixed, thermic Typic Xeropsamments

TYPICAL PEDON: Arnold loamy sand, rangeland. (Colors are for dry soil unless otherwise noted.)

O1--1/2 inch to 0; incomplete cover of twigs and leaves.

A1--0 to 2 inches; light brownish gray (10YR 6/2) loamy sand, dark gray (10YR 4/1) moist; weak fine granular structure; soft and very friable; common fine roots; many very fine and few fine interstitial pores; many fine flakes of organic matter; medium acid (pH 6.0); clear wavy boundary. (1 to 5 inches thick)

A2--2 to 12 inches; light brownish gray (10YR 6/2) loamy sand, dark grayish brown (10YR 4/2) moist; massive when moist, single grained and loose when dry; soft and very friable; few very fine and medium roots; many very fine interstitial pores; medium acid (pH 6.0); diffuse smooth boundary. (8 to 14 inches thick)

A3--12 to 23 inches; light brownish gray (10YR 6/2) sand, dark grayish brown (10YR 4/2) moist; slightly lighter color than horizon above; massive when moist, single grained and loose when dry; soft, very friable; few very fine and medium roots; many very fine interstitial pores; strongly acid (pH 5.5); few indistinct pockets filled with C horizon material; gradual wavy boundary. (6 to 14 inches thick)

C1--23 to 39 inches; very pale brown (10YR 8/3) sand, brown (10YR 5/3) moist; massive when moist, single grained and loose when dry; soft, very friable; few very fine roots; many very fine interstitial pores; 3 percent hard sandstone fragments; strongly acid (pH 5.1); few indistinct pockets filled with A horizon material; gradual smooth boundary. (10 to 18 inches thick)

C2--39 to 55 inches; very pale brown (10YR 8/3) sand, pale brown (10YR 6/3) moist; massive when moist, single grained and loose when dry; soft, very friable; few fine roots; many very fine interstitial pores; 3 percent hard sandstone fragments; strongly acid (pH 5.5); few indistinct pockets filled with A horizon material; gradual wavy boundary. (12 to 19 inches thick)

C3r--55 to 64 inches; very pale brown (10YR 7/3) soft sandstone, near reddish yellow (7.5YR 6/6) moist; very easily cut with hand tools, only slightly more firm than horizon above; contains 10 percent of subangular pieces, 2 to 8 inches in diameter of brown (7.5YR 5/4) hard sandstone, yellowish red (5YR 5/6) moist; continuous moderately thick clay films in bridges and lining pores of hard fragments; fragments are extremely firm

when moist in the upper portions to firm moist at depths over 60 inches; indistinct pockets filled with A horizon material.

TYPE LOCATION: Santa Barbara County, California; southeast of Orcutt, California; 2 1/4 miles SE from Clark Road on Bradley Road into oil field, 0.2 miles past cattle guard, 70 feet up 48 percent slopes; SW portion of NE 1/4 NE 1/4 sec. 24, T.9N., R.33W.

RANGE IN CHARACTERISTICS: Depth to a paralithic contact of soft sandstone that excludes roots is 40 to 60 inches or more. The mean annual soil temperature at a depth of 20 inches is 59 degrees to 63 degrees F., and the lowest temperature is about 47 degrees F. Soil between the depths of about 12 to 36 inches usually is moist in some or all parts from November until sometime in May and is dry all the rest of the year. In many pedons, the pH is near 6.0 throughout, but the range is from neutral to strongly acid with no large change from top to bottom. The profile is sand or loamy sand throughout. A few pedons have 1 to 15 percent gravel. Slopes are complex and range from 9 to 75 percent.

The A horizon is dark grayish brown to light brownish gray and pale brown (10YR 4/2, 5/2, 5/3, 6/2, 6/3). Where present, the darker colors are confined to the upper 3 to 8 inches. Organic matter content averages 0.5 to 1.0 percent in the upper 10 inches and decreases regularly with increasing depth.

Horizons immediately below the A horizons may be identified as B horizons or as C horizons. These horizons in some pedons are 10YR 8/1, 8/2, 8/3, 8/4, 7/1, 7/2, 7/3, 7/4, 6/2, or 6/3. In other pedons, they are 10YR 6/4, 5/3, 5/4, 5/6, 5/8, 4/4, 4/6, 3/4, 3/6; 7.5YR 6/4. In still other pedons, the ground mass has a pale color with high value and low chroma, but there are 5 to 30 percent lumps and small masses of higher chroma and redder hue. Boundaries between colors are clear to diffuse. Portions of horizons with stronger colors have a few thin clay bridges and are slightly more firm and harder when dry than the pale portions. On the average, clay increase to the brighter parts is less than 3 percent absolute. Some pedons, usually in the average, clay increase to the brighter parts is less than 3 percent absolute. Some pedons, usually in the lower part, contain a few hard dark reddish brown concretions or hard lumps suggestive of relic pieces of duripan. A small amount of cementation by silica is present, but most of the cementing material seems to be clay. These hard pieces do not slake in water and most do not soften appreciably.

COMPETING SERIES: These are the [Briones](#), [Calhi](#), [Corralitos](#), [Delhi](#), [Monoridge](#), [Monvero](#) and [Tujunga](#) series. Briones soils have a paralithic contact at a depth of 20 to 40 inches. Calhi and Delhi soils formed in wind deposited material and have a fairly uniform texture throughout the profile. Further, Calhi soils are calcareous throughout. Corralitos and Tujunga soils lack the slowly permeable paralithic contact below depth of 40 inches and are stratified with textures coarse than loamy fine sand. Monoridge soils are moderately deep to a paralithic contact. Monvero soils are very deep and effervescent throughout.

GEOGRAPHIC SETTING: Arnold soils are on hills and hilly uplands at elevations of 100 to 2,500 feet. Slopes are 9 to 75 percent. The soils formed in material weathered from soft sandstone. Some of the sandstone may be a relic of a cemented sandy soil. The climate is dry subhumid mesothermal with warm dry somewhat foggy summers and cool moist winters. Mean annual precipitation is 12 to 23 inches. Snow is very rare. Average annual temperature is 57 degrees to 62 degrees F.; average January temperature is about 51 degrees F.; average July temperature is about 63 degrees F. The frost-free season is about 175 to 330 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing [Corralitos](#) soils and the [Chamise](#), [Elkhorn](#), [Oceano](#), [San Andreas](#), [Santa Lucia](#), [Santa Ynez](#) and [Tierra](#) soils. Chamise, Elkhorn, Santa Ynez and Tierra soils have B2t horizons with more than 18 percent clay. Oceano soils have thin lamellae. San Andreas soils have sandy loam, fine sandy loam or loam textures with less than 18 percent clay, and dark colored A horizons with more than 1 percent organic matter. Santa Lucia soils average more than 35 percent clay and more than 35 percent rock fragments between depths of 10 to 40 inches.

DRAINAGE AND PERMEABILITY: Somewhat excessively drained; very low to medium runoff; rapid permeability above the sandstone and

slow in the sandstone.

USE AND VEGETATION: Used mostly for range, very limited areas used for growing truck crops, Christmas trees, and improved pasture. Vegetation is mostly chaparral, coastal sagebrush, coast live oak, shrubs, annual grasses, and forbs.

DISTRIBUTION AND EXTENT: South-central part of the Coast Range in California, usually within 30 miles of the coast. Moderately extensive. MLRA 15, 19, 20.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Davis, California

SERIES ESTABLISHED: Modesto-Turlock Area, California, 1908. (Redefined Santa Barbara County, 1927).

REMARKS: The Arnold series was redefined to include soils of the Moro Cojo series, which in part were the pedons with stronger chroma in the lower part.

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