SOIL SURVEY OF

Solano County, California

United States Department of Agriculture
Soil Conservation Service
In cooperation with
University of California
Agricultural Experiment Station

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in the period 1956–68. Soil names and descriptions were approved in 1969. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1969. This survey was made cooperatively by the Soil Conservation Service, the University of California Agricultural Experiment Station, and Solano County. It is part of the technical assistance furnished to the Dixon, Ulatis, and Suisun Resource Conservation Districts.

Soil maps in this survey may be copied without permission, but any enlargement of these maps could cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and ranches; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Solano County, California, are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

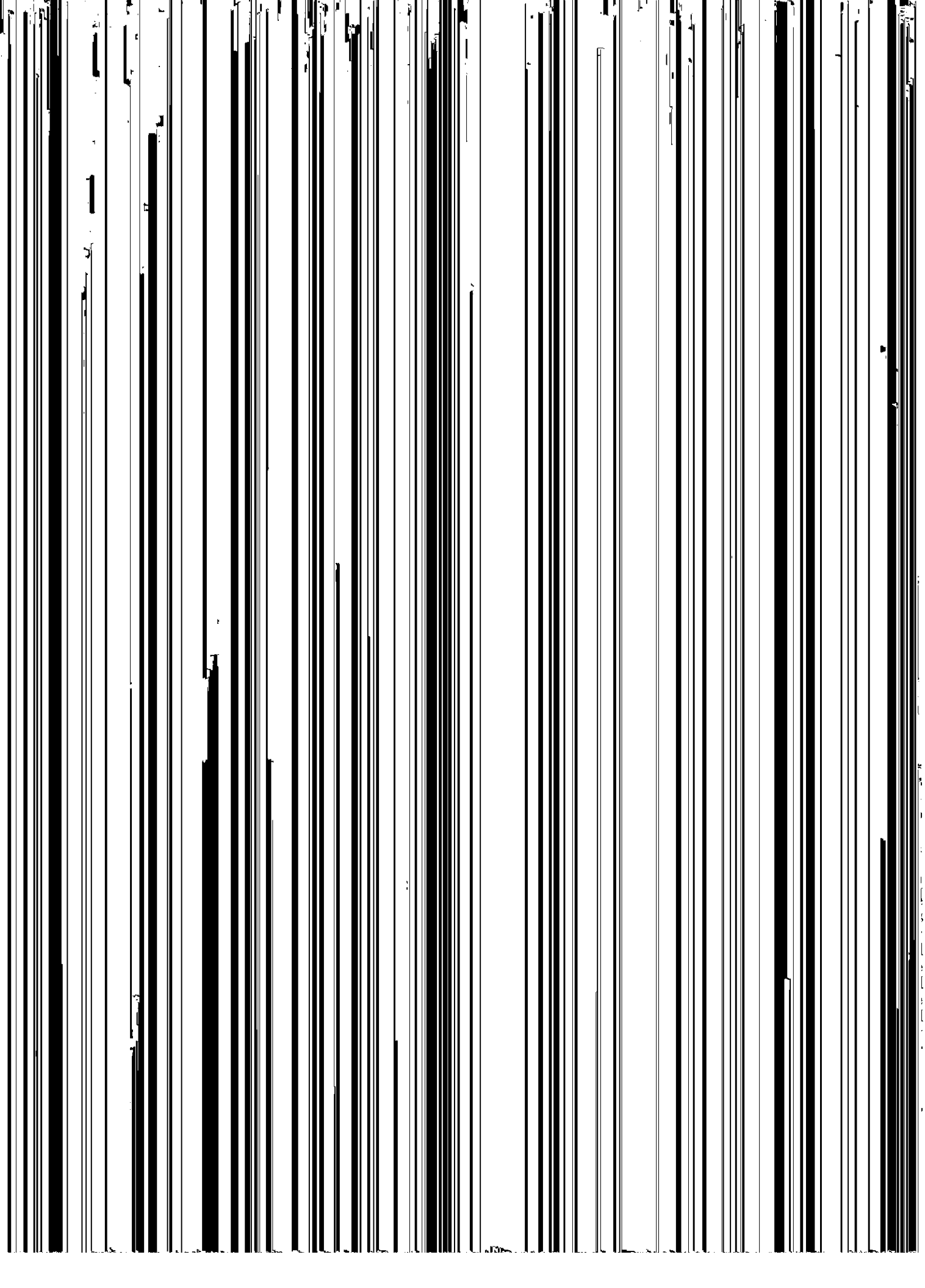
the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

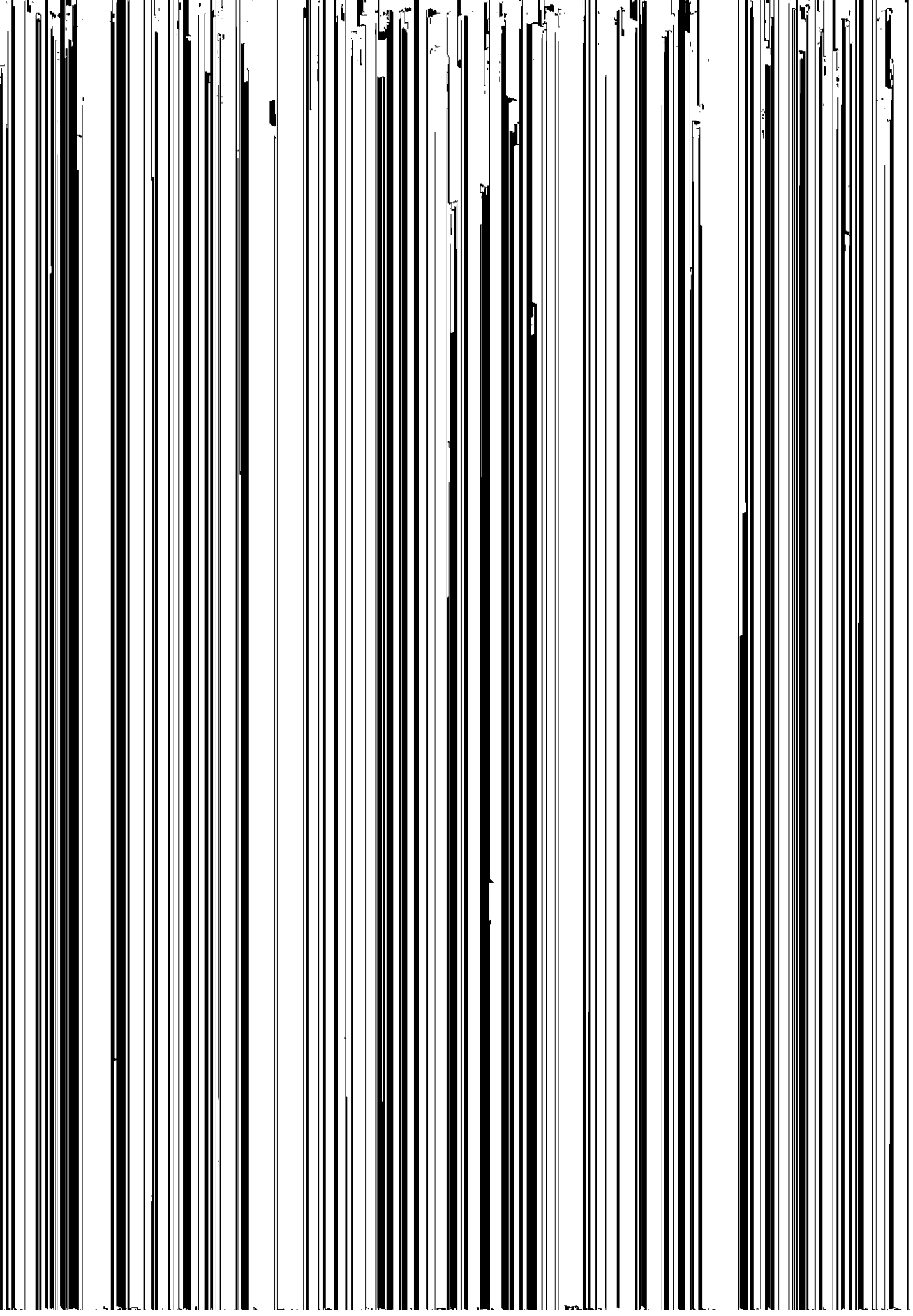
Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the range sites.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife."

Ranchers and others can find under "Range," groupings of the soils according to their suitability for range, and also the names of many of the plants that grow on each range site.

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, [redacted] affect engineering practices





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ssociation

p, well-drained loams and clay
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this association is Dibble soils,
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pale-brown loam or clay loam
bsoil is dark yellowish-brown
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brown loam or clay loam sur-
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ion

ery steep, well-drained loams
on mountainous uplands

ciation are shallow. The parent
lopes are 15 to 75 percent. Ele-
to 2,000 feet. The average an-
to 60° F., the average annual
es, and the frost-free season is
vegetation is mostly annual
few scattered oaks. This asso-
3 percent of the county.
f the association is Millsholm
s Dibble, Los Gatos, Los Osos,
d Millsholm soils, moderately

Millsholm soils are brown and dark yellowish-brown loam underlain by light yellowish-brown sandstone at a depth of 10 to 20 inches.

The soils in this association are used for range, wildlife habitat, and watershed.

Wildlife is mainly deer.

16. Maymen-Los Gatos association

Moderately steep to very steep, somewhat excessively drained and well-drained loams formed from sandstone; on mountainous uplands

The soils in this association are shallow or moderately deep. The parent material is sandstone (fig. 2). Slopes are 15 to 75 percent and are severely eroded. Elevation ranges from 1,500 to 3,000 feet. The average annual temperature is 54° to 56° F., the average annual rainfall is 30 to 40 inches, and the frost-free season is 220 to 240 days. The vegetation is a dense cover of brush, shrubs, and small trees. This association makes up about 3 percent of Solano County.

About 75 percent of the association is Maymen soils, and 15 percent is Los Gatos soils. The remaining 10 percent is Nibble, Los Osos, and Millsholm soils.

Maymen soils are somewhat excessively drained, brown to light yellowish-brown loam. Brownish-yellow sandstone is at a depth of 10 to 15 inches.

Los Gatos soils are well drained and have a brown loam surface layer and a yellowish-red clay loam subsoil. The parent material is yellowish-red sandstone at a depth of 20 to 25 inches.

The soils in this association are used for wildlife habitat and watershed.

Wildlife is mainly deer.

17. Hambright-Toomes association

Strongly sloping to very steep, well-drained and somewhat excessively drained loams and stony loams formed from basic igneous rocks; on mountainous uplands

The soils in this association are very shallow to shallow. The parent material is basic igneous rock (fig. 3).

***Figure 2.*—Typical landscape of the Maymen-Los Gatos association.**

***Figure 3.*—Typical view of the soils in the Hambright-Toomes association.**

Slopes are 9 to 75 percent. Elevation ranges from 300 to 2,300 feet. The average annual temperature is 59° to 62° F., the average annual rainfall is 20 to 25 inches, and the frost-free season is 240 to 260 days. The vegetation is annual grasses and forbs and some brush and scattered oaks. This association makes up about 4 percent of Solano County.

About 65 percent of the association is Hambright soils, and 15 percent is Toomes soils. The remaining 20 percent is Dibble, Gilroy, Los Osos, and Trimmer soils.

Hambright soils are well-drained brown loam, stony loam, or cobbly loam. They are underlain by hard basic igneous rock at a depth of 6 to 20 inches.

Toomes soils are somewhat excessively drained, light brownish-gray and light gray loam or stony loam. They are underlain by white tuff over rock at a depth of 5 to 17 inches.

The soils in this association are used for range, wildlife habitat, and watershed.

Wildlife is mainly deer.

Descriptions of the Soils

In this section the soils of Solano County are described in detail. The procedure is to describe first the soil series and then the mapping units, or kinds of soil, in that series. Thus, to get full information on any one mapping unit, it is necessary to read both the description of that unit and the description of the soil series to which the unit belongs.

rained soils
40 inches.
es are 2 to
ed, the veg-
verage an-
rage annual
ee season is
to 500 feet.
yer is dark
28 inches

es	Percent
435	.5
485	2.6
131	.2
416	.5
405	.5
667	2.2
251	(1)
780	.1
697	.1
070	.6
017	1.3
055	.2
940	.2
810	.3
586	2.8
473	.1
265	1.6
547	.7
985	.2
340	1.2
885	.7
745	.1
295	1.4
572	3.5
231	.4
781	.9
921	1.9
748	.3
405	.3
916	.9
885	.9
580	.5
295	.4
300	.4
729	2.8
405	.5
840	.7
845	.2
831	.2
520	.3
742	.9
400	1.0
680	.3
705	.3
130	.4
153	2.1
405	.8
225	5.0
720	100.0

d the frost-free season is 270 to
nges from sea level to 10 feet.
e profile, the surface layer is
silty clay loam 13 inches thick.
y silty clay loam 6 inches thick.
9 and 60 inches is dark-gray,
ay silty clay loam. The profile is

. Rooting depth is more than 60
er capacity is 8 to 9 inches, and
depth of 24 to 36 inches.
l for saltgrass pasture, irrigated
ed barley. Waterfowl are hunted

esentative profile of Alviso silty

dark-gray (N 4/0) silty clay loam,
) when moist; weak, medium, suban-
structure; hard, firm, sticky, plastic;
ine and medium roots; common very
pores; mildly alkaline; abrupt, smooth

gray (5Y 5/1) silty clay loam that
medium, distinct, light olive-brown
nottles; dark olive gray (5Y 3/2) and
wn (2.5Y 4/4) mottles when moist;
edium, prismatic structure parting to
edium, subangular blocky structure;
icky, plastic; many very fine and fine
very fine tubular pores; mildly alka-
nooth boundary.
ray (5Y 6/1) silty clay loam that has
n, prominent, light olive-brown (2.5Y
; olive gray (5Y 4/2) and has olive-
4/4) mottles when moist; massive;
sticky, plastic; few fine roots, many
many very fine tubular pores; mod-
ine; very slightly effervescent; dis-
ie; clear, wavy boundary.
, dark-gray (5Y 4/1) silty clay loam
mon, medium, distinct, olive-gray (5Y
; black (5Y 2/1) and has olive-gray
ttles when moist; massive; hard, firm,
c; few very fine and fine roots; com-
e tubular pores; moderately alkaline;
effervescent; disseminated lime; few
shells; clear, wavy boundary.
s, gray (5Y 5/1) silty clay loam that
nall, prominent, reddish-yellow (7.5YR
dark gray (5Y 4/1) and has strong-
R 5/6) mottles when moist; massive;
sticky, plastic; few very fine roots;
ne and fine tubular pores; moderately
y slightly effervescent; disseminated
all marine shells; clear, wavy bound-

s, greenish-gray (5GY 6/1) silty clay
s many, fine prominent, light yellow-
10YR 6/4) mottles; greenish gray
and has brown (7.5YR 4/4) mottles
massive; hard, firm, sticky, plastic;
ots; very few tubular pores; moder-
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ges from gray to dark gray in color,
to silty clay in texture, and from 12
ess. It is neutral to moderately alka-
aline to strongly saline. The C, IIAb,
nge from gray to greenish gray in
, from silty clay loam to silty clay,
rately alkaline, and from moderately
ne. Mottles occur throughout the pro-
11 horizon. The water table is at a
The Ab and Cb horizons are absent in

Alviso silty clay loam (An).—This soil is nearly level and is along the edges of marshes. Included with it in mapping are small areas of Reyes clay and Tamba mucky clay.

Surface runoff is very slow. Erosion is a slight hazard.

This soil is used mainly for dryland pasture. It is also used for irrigated pasture and dryfarmed barley. Waterfowl are hunted in most areas. Capability unit IVw–6 (17); not placed in a range site.

Antioch Series

The Antioch series consists of moderately well drained soils on terraces. These soils formed in alluvium from sedimentary sources. Slopes are 0 to 9 percent. Where these soils are not cultivated, the vegetation is annual grasses and forbs. The average annual temperature is 59° to 61° F., the average annual rainfall is 16 to 18 inches, and the frost-free season is 260 to 280 days. Elevation ranges from 10 to 50 feet.

In a representative profile (fig. 4), the surface layer is mottled, light brownish-gray, brown, and light-gray loam 19 inches thick. The subsoil is mottled, light yellowish-brown, yellowish-brown, and pale-brown clay 41 inches thick. The substratum is pale-brown loam that extends to a depth of more than 60 inches. The subsoil and substratum contain a small amount of sodium.

Permeability is very slow.

Antioch soils are used for sugar beets, pasture, grain sorghum, dryfarmed small grain, wildlife habitat, and recreation.

Following is a representative profile of an Antioch loam:

Ap—0 to 5 inches, light brownish-gray (10YR 6/2) loam that has common, fine, distinct yellowish-brown (10YR 5/6) mottles; dark grayish brown (10YR 4/2) and has common, fine, distinct, strong-brown (7.5YR 5/6) mottles when moist; massive; hard, friable, slightly sticky, slightly plastic; common very fine roots; many very fine and medium tubular pores; medium acid; clear, smooth boundary.

A1—5 to 14 inches, brown (10YR 5/3) loam that has few, fine, distinct yellowish-brown (10YR 5/6) mottles; dark brown (10YR 3/3) and has few, fine, distinct, strong-brown (7.5YR 5/6) mottles when moist; massive; hard, friable, slightly sticky, slightly plastic; few, very fine roots; many fine and medium tubular pores; medium acid; clear, wavy boundary.

A2—14 to 19 inches, light-gray (10YR 7/2) loam that has common, fine, distinct yellowish-brown (10YR 5/6) mottles; dark grayish brown (10YR 4/2) and has common, fine, distinct, strong-brown (7.5YR 5/6) mottles when moist; massive; hard, friable, slightly sticky, slightly plastic; very few very fine roots; many fine pores; slightly acid; manganese stains; abrupt, smooth boundary.

B21t—19 to 34 inches, light yellowish-brown (10YR 6/4) clay that has common, medium, faint, pale-brown (10YR 6/3) mottles; dark yellowish brown (10YR 4/4) and has common, medium, faint, brown (10YR 3/3) mottles when moist; moderate, very coarse, prismatic structure; extremely hard, very firm, sticky, very plastic; few very fine roots; common microtubular pores; many moderately thick clay films on ped faces and in pores; medium acid; few iron and manganese stains; clear, wavy boundary.

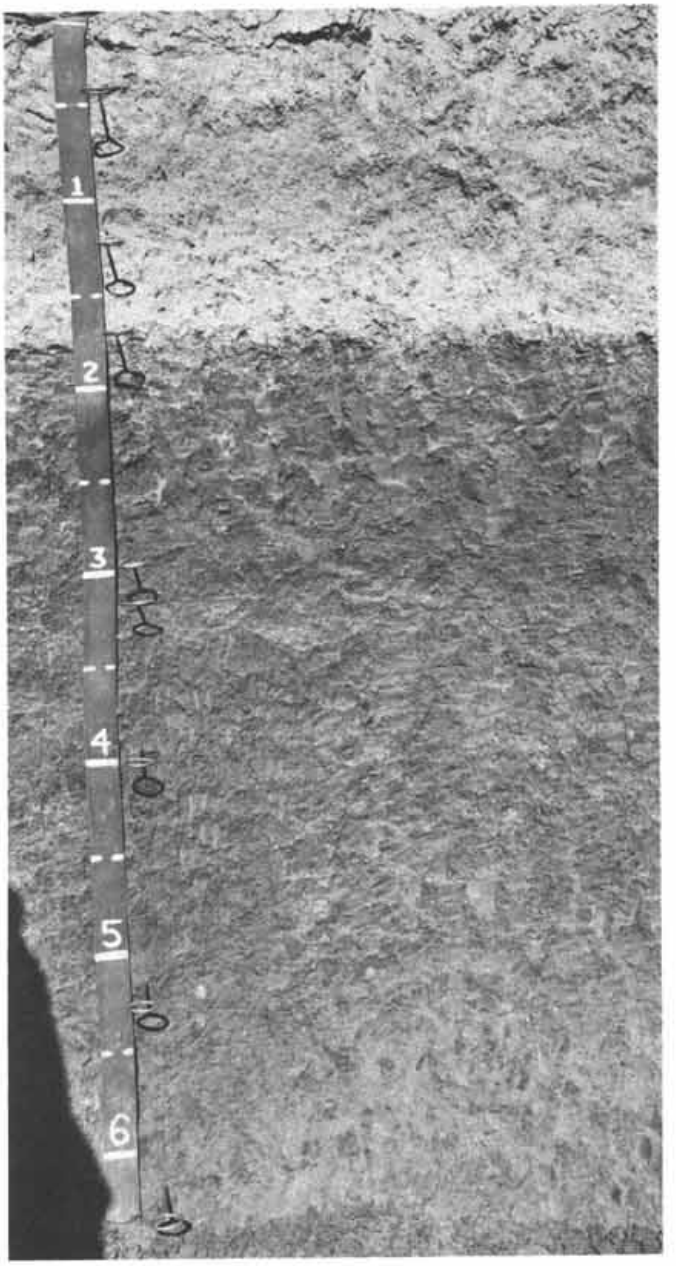


***Figure 4.*—Profile of an Antioch loam.**

B22t—34 to 37 inches, yellowish-brown (10YR 5/4) clay, dark brown (10YR 4/3) when moist; weak, medium, angular blocky structure; extremely hard, very firm, sticky, plastic; common very fine tubular pores; many moderately thick clay films on ped faces and in pores; moderately alkaline; many iron and manganese stains; clear, wavy boundary.

B23t—37 to 46 inches, pale-brown (10YR 6/3) clay, dark yellowish brown (10YR 4/4) and has dark-brown (7.5YR 3/2) and dark grayish-brown (2.5Y 4/2) ped faces when moist; weak, medium, angular blocky structure; hard, firm, sticky, plastic; common very fine tubular pores; continuous, moderately thick clay films on ped faces and in pores; moderately alkaline; common iron and manganese stains; diffuse boundary.

depth of 12 to 20 inches. Available
3.5 to 5.5 inches. Some roots get a
ater from the subsoil.
ch and San Ysidro soils have medium
a slight hazard.
is complex are used mostly for dry-
in and pasture. They are also used
ure, wildlife habitat, and recreation.
Ve–3 (17) ; not placed in a range site.

idro complex, thick surface, 0 to 2 sA).—This complex is about 55 per-
n and about 35 percent San Ysidro
remaining 10 percent is included
e the clayey subsoil is at a depth of
hes. The Antioch soil is mostly in
areas, and the San Ysidro soil is in
eas.
ve a profile similar to the one de-
entative for their respective series.
ing depth is 20 to 30 inches. Avail-
ity is 4 to 6 inches. Runoff is very
is a slight hazard.
e used mostly for irrigated grain
, sugar beets, beans, dryfarmed small
nd pasture. Capability unit IIIs–3
n a range site.

idro complex, thick surface, 2 to 9 sC).—This complex is about 45 per-
n and about 45 percent San Ysidro
remaining 10 percent is included
se soils that have a rooting depth of
es. The soils in this complex are un-
y rolling on terraces. Antioch loam
es, and San Ysidro sandy loam has

nd San Ysidro soils have a profile
described as representative for their
They have an effective rooting depth
s. Available water capacity is 4 to 6
mount of water is available to some
ubsoil. Runoff is medium, and erosion

is complex are used mostly for dry-
in and pasture. They are also used
ure, wildlife habitat, and recreation.
IIe–3 (15); not placed in a range

es consists of well-drained soils on
. These soils are underlain by weakly
ents at a depth of 40 inches to more
Slopes are 2 to 30 percent. Where
t cultivated, the vegetation is annual
. The average annual temperature is
average annual rainfall is 16 to 18
rost-free season is 260 to 280 days.
rom 25 to 300 feet.
tive profile, the surface layer is dark
lcareous clay 41 inches thick. When
racks form in the surface and extend
ubstratum is light yellowish-brown,

alkaline; strongly effervescent, fine soft masses of lime; prominent slickensides; clear, wavy boundary.

AC—32 to 40 inches, grayish-brown (10YR 5/2) clay, dark yellowish brown (10YR 4/4) and has very dark grayish-brown (10YR 3/2) ped faces when moist; moderate, medium, prismatic structure; hard, firm, sticky, very plastic; few very fine roots; many very fine tubular pores; moderately alkaline; slightly effervescent, fine soft masses of lime; distinct slickensides; gradual, smooth boundary.

C1—40 to 50 inches, pale-brown (10YR 6/3) heavy clay loam, dark yellowish brown (10YR 4/4) and has dark-brown (10YR 3/3) ped faces when moist; weak, coarse, angular blocky structure; hard, firm, sticky, and very plastic; very few very fine roots; many very fine tubular pores; moderately alkaline; very slightly effervescent, fine soft masses of lime; diffuse boundary.

C2—50 to 62 inches, yellowish-brown (10YR 5/6) heavy clay loam that has few, fine, distinct, strong-brown (7.5YR 5/6) mottles; dark yellowish brown (10YR 4/4) and has dark-brown (10YR 3/3) ped faces and few, fine, faint, yellowish-brown (10YR 5/6) mottles when moist; weak, fine and medium, angular blocky structure; hard, firm, sticky, very plastic; no roots; many very fine tubular pores; moderately alkaline; very slightly effervescent, fine soft masses of lime; diffuse boundary.

C3—62 to 80 inches, pale-brown (10YR 6/3) heavy clay loam that has few, fine, distinct, strong-brown (7.5YR 5/6) mottles; dark yellowish brown (10YR 4/4) and has brown (10YR 4/3) ped faces and few, fine, faint yellowish-brown (10YR 5/6) mottles when moist; massive; hard, firm, sticky, very plastic; no roots; many very fine tubular pores; moderately alkaline; very slightly effervescent, fine soft masses of lime; common iron and manganese concretions.

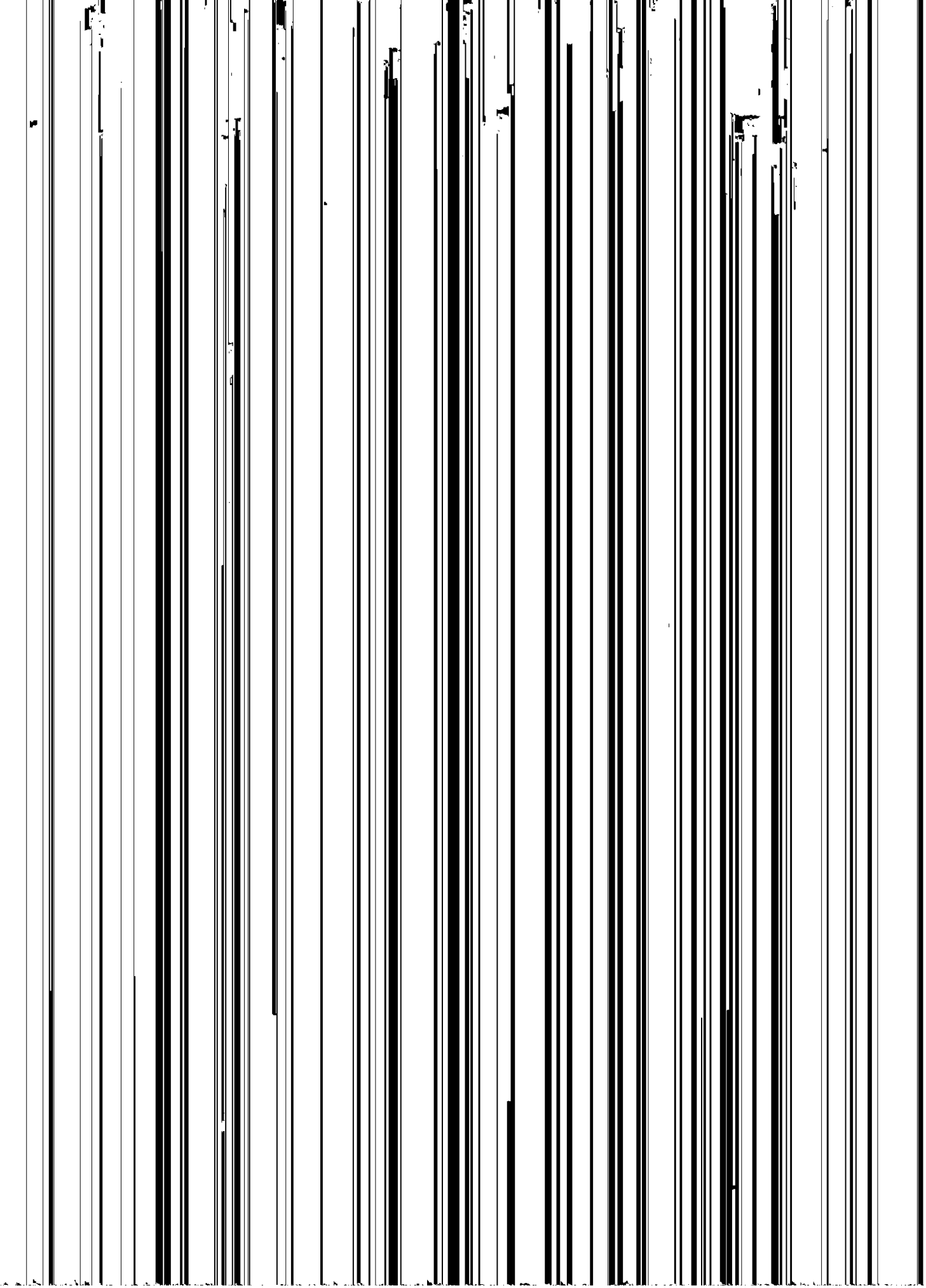
The A horizon ranges from grayish brown to dark grayish brown in hues of 10YR or 2.5Y; value is 4 or 5, and chroma is 2. It ranges from clay to silty clay loam in texture, from slightly acid to moderately alkaline in reaction, and from 29 to 40 inches in thickness. Intersecting slickensides are prominent to distinct in the lower part of the A horizon. The C horizon ranges from yellowish brown to pale brown in color and from clay to silty clay loam in texture. It is mildly alkaline to moderately alkaline in reaction. Depth to lime generally is 16 to 40 inches.

Capay silty clay loam [Ca].—This nearly level to level soil has a profile similar to the one described as representative for the series, except that it has a texture of a silty clay loam throughout the profile. Included with it in mapping are small areas of Rincon clay loam, Yolo silty clay loam, and Brentwood clay loam.

Surface runoff is very slow, and erosion is a slight hazard. Available water capacity is 9 to 11 inches.

This soil is used mainly for tomatoes, sugar beets, alfalfa, corn, grain sorghum, and beans (fig. 6). It is

Figure 6.—Irrigated beans on Capay silty clay loam.



derlying material is pale-brown and very pale brown, prominently mottled, stratified fine sandy loam, sand, and silt loam 22 inches thick. Below this is pale-brown and gray, distinctly mottled, stratified sand, loam, and silty clay loam that extends to a depth of more than 60 inches.

Permeability is moderately rapid. Effective rooting depth is more than 60 inches, and available water capacity is 7.5 to 9 inches. The water table is at a depth of 48 to 60 inches or more.

Columbia soils are used for irrigated row and field crops, dryfarmed grain, wildlife habitat, and recreation.

Following is a representative profile of Columbia find sandy loam:

Ap—0 to 11 inches, pale-brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) when moist; slightly hard, very friable, nonsticky, nonplastic; common very fine roots; few very fine tubular pores and many very fine interstitial pores; slightly acid; clear, smooth boundary.

A1—11 to 16 inches, pale-brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) when moist; weak, medium, subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; many very fine roots; common very fine tubular pores; slightly acid; clear, wavy boundary.

C1—16 to 23 inches, pale-brown (10YR 6/3) fine sandy loam that has common, fine, prominent, yellowish-brown (10YR 5/6) mottles; brown (10YR 4/3) and has common, fine, distinct, strong-brown (7.5YR 5/6) mottles when moist; massive; soft; very friable, nonsticky, nonplastic; common very fine roots; many very fine interstitial pores; slightly acid; clear, wavy boundary.

IIC2—23 to 26 inches, pale-brown (10YR 6/3) sand, dark brown (10YR 3/3) when moist; single grain; loose, nonsticky, nonplastic; many very fine roots; many very fine interstitial pores; slightly acid; clear, smooth boundary.

IIIC3—26 to 31 inches, mottled very pale brown (10YR 7/3) and reddish-yellow (7.5YR 6/6) fine sandy loam, mottled yellowish brown (10YR 5/4) and strong brown (7.5YR 5/6) when moist; massive; slightly hard, very friable, nonsticky, nonplastic; common very fine roots; many very fine tubular pores; neutral; clear, smooth boundary.

IIIC4—31 to 34 inches, very pale brown (10YR 7/3) silt loam that has many, medium, distinct, reddish-yellow (7.5YR 6/6) mottles; brown (10YR 5/3) and has many, medium, distinct, strong-brown (7.5YR 5/6) mottles when moist; moderate, medium, prismatic structure; hard, friable, slightly sticky, slightly plastic; very few very fine roots; many very fine and fine tubular pores; mildly alkaline; clear, smooth boundary.

IIIC5—34 to 38 inches, very pale brown (10YR 7/3) fine sandy loam that has many, medium, distinct, reddish-yellow (7.5YR 6/6) mottles; brown (10YR 5/3) and has many, medium, distinct, strong-brown (7.5YR 5/6) mottles when moist; massive; slightly hard, very friable, nonsticky, nonplastic; very few very fine roots; many very fine tubular pores and common very fine interstitial pores; mildly alkaline; clear, smooth boundary.

IVC6—38 to 41 inches, pale-brown (10YR 6/3) sand, dark brown (10YR 3/3) when moist; single grain; loose, nonsticky, nonplastic; common very fine roots; common very fine tubular pores and many very fine interstitial pores; neutral; very abrupt, smooth boundary.

VC7—41 to 55 inches, pale-brown (10YR 6/3) loam that has many, medium, distinct, reddish-yellow (7.5YR 6/6) mottles; brown (10YR 5/3) and has many, medium, distinct, strong-brown (7.5YR 5/6) mottles when moist; massive; slightly hard, very friable, slightly sticky, nonplastic; few very fine roots; many very fine, fine, medium, and coarse tubular pores; moderately alkaline; clear, smooth boundary.

VIA1b—55 to 60 inches, gray (10YR 6/1) silty clay loam that has common, fine, distinct, strong-brown (7.5YR 5/6) mottles; dark gray (10YR 4/1) and has common, fine, distinct, dark-brown (7.5YR 3/2) mottles when moist; massive; hard, friable, sticky, slightly plastic; very few very fine roots; many very fine, fine, and medium tubular pores; moderately alkaline.

The A horizon ranges from pale brown to brown in color, from fine sandy loam or loam to silt loam in texture, from slightly acid to mildly alkaline in reaction, and from 10 to 18 inches in thickness. The C horizon is highly stratified and ranges from grayish brown, brown, or pale brown to very pale brown in color and has distinct to prominent mottles in places. The C horizon ranges from silt loam to sand in texture and from neutral to moderately alkaline in reaction. Buried A horizons occur in places. Where they occur, they are below a depth of 40 inches.

Columbia fine sandy loam (Cm).—This nearly level soil formed on flood plains. Included with this soil in mapping are small areas of Valdez silt loam, Egbert silty clay loam, and Ryde clay loam.

Surface runoff is slow, and erosion is not a hazard.

This soil is used mostly for irrigated sugar beets, corn, pears, tomatoes, and alfalfa. It is also used for dryfarmed safflower, small grain, wildlife habitat, and recreation. Capability unit IIw–2 (17); not placed in a range site.

Conejo Series

The Conejo series consists of nearly level, well-drained soils. These soil formed in alluvium derived from basic igneous rocks. Where these soils are not cultivated, the vegetation is annual grasses and forbs. The average annual temperature is 59° to 60° F., the average annual rainfall is 20 to 25 inches, and the frost-free season is 260 to 290 days. Elevation ranges from 100 to 200 feet.

In a representative profile, the surface layer is grayish-brown and dark grayish-brown loam 25 inches thick. The substratum is brown loam that extends to a depth of more than 60 inches.

Effective rooting depth is 60 inches or more.

Conejo soils are used for orchards, vineyards, row crops, pasture, field crops, urban development, wildlife habitat, and recreation.

Following is a representative profile of Conejo loam:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) loam, very dark brown (10YR 2/2) when moist; moderate, medium, granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine roots; common very fine tubular pores and common fine and medium interstitial pores; slightly acid; clear, smooth boundary.

A11—6 to 19 inches, grayish-brown (10YR 5/2) loam, very dark brown (10YR 2/2) when moist; moderate, medium, granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine roots and few medium roots; common very fine tubular pores and many fine and medium interstitial pores; slightly acid; gradual, smooth boundary.

s, grayish-brown (10YR 5/2) loam, own (10YR 2/2) when moist; moder- granular structure; slightly hard, slightly sticky, slightly plastic; com- e roots and few medium roots; com- e tubular pores and many fine and rstitial pores; slightly acid; clear, ary.

rown (7.5YR 5/2) loam, dark brown when moist; massive; hard, friable, y, slightly plastic; few very fine mmon medium roots; common very pores and common fine and medium res; slightly acid.

es from grayish-brown to dark gray clay loam in texture, and from 20 to . Reaction is slightly acid to neutral. from brown to dark gray in color loam in texture. Reaction is slightly e. Content of gravel throughout the about 30 percent by volume.

This is a nearly level soil on al- he profile described as repre- es. Included with this soil in as of Trimmer loam and Conejo

erate. Runoff is slow, and ero- Available water capacity is 9 to

ostly for cherries, pears, and for urban development, wildlife . Capability unit I–1 (17); not

n (Co).—This soil has a profile ribed as representative for the vel makes up 20 to 30 percent, file. Included with this soil in as of Conejo loam and Conejo

ely permeable. Runoff is slow, hazard. Available water capac-

mostly for growing cherries, is also used for urban develop- and recreation. Capability unit n a range site.

).—This soil has a profile simi- d as representative for the se- clay loam texture throughout. in mapping are small areas of soils, wet.

rately slow. Runoff is slow, and rd. Available water capacity is

ly for growing cherries, pears, ed for wildlife habitat and rec- t I–1 (17); not placed in a

).—This mapping unit consists f Conejo loam and Conejo clay a profile similar to the one de- ve for the series, except that s clay loam texture throughout th these soils in mapping are loam.

These normally well-drained soils now have a fluctuating water table at a depth of 3 to 5 feet. Permeability is moderately slow to moderate. Runoff is slow, and erosion is a slight hazard. Available water capacity is 9 to 13 inches.

These soils are used mostly for growing pears and grapes. They are also used for wildlife habitat and recreation. Capability unit IIw–2 (17); not placed in a range site.

Corning Series

The Corning series consists of well-drained soils on dissected terraces of softly consolidated, mixed, gravelly alluvium. Slopes are 2 to 30 percent. The vegetation is chiefly annual grasses and forbs. The average annual rainfall is 20 to 25 inches, the average annual temperature is 60° to 62° F., and the frost-free season is 260 to 280 days. Elevation ranges from 25 to 250 feet.

In a representative profile, the surface layer is yellowish-red gravelly loam 17 inches thick. The subsoil is red clay that is 9 inches thick. The substratum is brownish-yellow, dense very gravelly sandy loam that extends to a depth of more than 60 inches.

Permeability is very slow in the subsoil. Effective rooting depth is 14 to 20 inches to the clay subsoil. Available water capacity is 2.5 to 3.5 inches. A small amount of water is available to some plants from the subsoil.

Corning soils are used for pasture, range, dry-farmed small grain, wildlife habitat, and recreation.

Following is a representative profile of Corning gravelly loam, 2 to 15 percent slopes, eroded:

Ap—0 to 6 inches, yellowish-red (5YR 5/6) gravelly loam, dark yellowish red (5YR 3/6) when moist; massive; hard, friable, slightly sticky, nonplastic; few fine roots; common fine, medium, and coarse pores; medium acid; clear, wavy boundary.

A11—6 to 14 inches, yellowish-red (5YR 4/6) gravelly loam, dark red (2.5YR 3/6) when moist; massive; hard, friable, slightly sticky, nonplastic; few fine roots; common fine, medium, and coarse pores; medium acid; gradual, wavy boundary.

A12—14 to 17 inches, yellowish-red (5YR 4/6) gravelly loam, dark yellowish red (5YR 3/6) when moist; massive; hard, friable, slightly sticky, nonplastic; few fine roots; common fine, medium, and coarse pores; medium acid; abrupt, wavy boundary.

B2t—17 to 26 inches, red (2.5YR 4/6) clay, red (2.5YR 4/6) when moist; columnar, top of columns coated with thin reddish-yellow (5YR 6/8) layer; extremely hard, very firm, very sticky, very plastic; many, thick, continuous clay films on ped faces and in pores; slightly acid; abrupt, wavy boundary.

C1—26 to 36 inches, brownish-yellow (10YR 6/6) very gravelly sandy loam, yellowish brown (10YR 5/6) when moist; massive; dense, partially cemented; very hard, very firm, nonsticky, nonplastic; clay films on sand grains; neutral; diffuse, wavy boundary.

C2—36 to 60 inches, brownish-yellow (10YR 6/6) very gravelly sandy loam, yellowish brown (10YR 5/6) when moist; massive, dense; very hard, very firm, nonsticky, nonplastic; clay films on surface of some gravel; moderately alkaline.

The A horizon ranges from brown or reddish brown to yellowish red in color. It is gravelly loam to gravelly sandy loam that is 20 to 30 percent gravel, and it is 14 to 20

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esentative profile of Gaviota
cent slopes, eroded:

own (10YR 5/3) sandy loam, dark
(10YR 4/2) when moist; massive;
very friable, slightly sticky, slightly
fine and very fine roots; many fine
pores; neutral; diffuse, smooth

own (10YR 5/3) sandy loam, dark
(10YR 4/2) when moist; massive;
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n fine and very fine roots; common
fine pores; slightly acid; abrupt,

ottled pale-brown (10YR 8/3) and
7/6) sandstone and interbedded
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es from brown to dark brown in
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Shallow Loamy range site.

sists of well-drained soils on
These soils are underlain by
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es from 500 to 1,500 feet.

ofile, the soil is brown loam to
hes thick. The substratum is
eous rock.

ate. Effective rooting depth is
le water capacity is 3.5 to 7.0

for pasture, range, wildlife

ntative profile of Gilroy loam,

vn (10YR 5/3) loam, dark brown
hen moist; moderate, fine and me-
structure; hard, friable, nonsticky,
many very fine roots; common
itial pores and few very fine tubu-
m acid; clear, smooth boundary.
own (7.5YR 5/2) heavy loam, dark
5YR 3/3) when moist; weak, fine
and medium, granular structure; hard, very friable, slightly sticky, slightly plastic; common very fine roots and few coarse roots; many very fine and fine interstitial pores and common very fine and fine tubular pores; slightly acid; 10 percent, by volume, is cobblestones; clear, wavy boundary.

R—38 to 45 inches, hard, fractured basic igneous rock.

The A horizon is brown in hues of 10YR and 7.5 YR, and is 8 to 14 inches thick. The texture is loam that is as much as 10 percent cobblestones, by volume. Reaction is slightly acid to medium acid. The B2t horizon ranges from brown to reddish brown in color in hues of 7.5YR and 5YR. Texture is heavy loam to light clay loam that is as much as 15 percent cobblestones. Reaction is slightly acid to medium acid, and thickness is 12 to 26 inches. Depth to bedrock is 20 to 40 inches.

Gilroy loam, 9 to 30 percent slopes (GlE).—This soil is on mountainous uplands. Included with this soil in mapping are small areas of Hambright loam and Trimmer loam.

Runoff is medium, and erosion is a moderate hazard.

This soil is used mostly for range. It is also used for pasture, wildlife habitat, and recreation. Capability unit IVe–1 (15); Fine Loamy range site.

Hambright Series

The Hambright series consists of well-drained soils on mountainous uplands. These soils are underlain by basic igneous rock at a depth of 6 to 20 inches. Slopes are 9 to 40 percent. The vegetation is annual grasses, forbs, and scattered oaks. The average annual temperature is 59° to 61° F., the average annual rainfall is 20 to 25 inches, and the frost-free season is 240 to 260 days. Elevation ranges from 300 to 2,300 feet.

In a representative profile, the soil is brown loam and cobbly loam about 14 inches thick. The substratum is hard, fractured basic igneous rock.

Permeability is moderate.

Hambright soils are used for range, wildlife habitat, recreation, and watershed.

Following is a representative profile of Hambright loam, 15 to 40 percent slopes:

A11—0 to 5 inches, brown (7.5YR 5/4) loam, dark brown (7.5YR 3/2) when moist; weak, fine, granular structure; slightly hard, friable, nonsticky, slightly plastic; many very fine roots; common very fine interstitial pores and few very fine tubular pores; medium acid; clear, smooth boundary.

A12—5 to 19 inches, brown (7.5YR 5/4) cobbly loam, dark reddish brown (5YR 3/3) when moist; moderate, fine granular structure; slightly hard, friable nonsticky, slightly plastic; many very fine roots; many very fine and fine interstitial pores and common fine and medium tubular pores; slightly acid; abrupt, irregular boundary.

R—19 to 22 inches, hard, fractured basic igneous rock.

The A horizon ranges from brown to dark brown in color. It is loam to cobbly loam in texture and is 5 to 50 percent cobblestones. It is 6 to 20 inches thick.

Hambright loam, 15 to 40 percent slopes (HaF).—This soil is on mountainous uplands. It has the profile described as representative for the series. Included with this soil in mapping are small areas of Gilroy loam and of a soil that does not have cobblestones in the profile.

layey muck; 35 percent organic
nt fibers, 50 percent of which are
millimeter; dark-brown (7.5YR
ers; very dark gray (10YR 3/1)
k gray (10YR 3/1) when pressed
brown (10YR 2/2) when rubbed
gray (N 6/0) and black (N 2/0)
fine, prominent, yellowish-brown
tles when dry; massive; extremely
icky, slightly plastic; 75 percent
ty; very strongly acid.
yey muck; 35 percent organic mat-
ers, 60 percent of which are greater
r; dark-brown (7.5YR 3/2) natu-
dark gray (10YR 3/1) matrix,
own (7.5YR 3/2) and very dark
2) when pressed firmly, very dark
2) when rubbed gently, black (N
many, fine, prominent, yellowish-
8) mottles when dry; massive; ex-
onsticky, slightly plastic; 60 per-
; dusty; moderately alkaline.

ons range from very dark gray or
in color. They are clayey muck to
ture and are 8 to 20 inches thick.
to very strongly acid. The subsur-
very dark gray or black to very
that is 30 to 50 percent organic
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levees and tide gates alters the
nerally less than 30 inches below
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is soil is nearly level. Included
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oil Variant

subsoil variant, consists of
ly level organic soils that are
lay at a depth of 25 to 35
in salt water marshes. They
ic plant remains mixed with
The vegetation is dominantly
es. The average annual tem-
., the average annual rainfall
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es from 3 feet above sea level

profile, the surface layer is
inches thick. The next layers
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ately rapid in the upper part
slow in the clay substratum.
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30 inches, restricts the effec-
e plants.
or wildlife habitat, recreation,

presentative profile of Joice muck,

, clayey muck; 30 percent organic mat-
ercent fibers, 10 percent of which are
n 1 millimeter; brown (7.5YR 5/4) natu-
dark olive-gray (5Y 3/2) matrix, dark
own (10YR 4/2) when pressed firmly,
grayish brown (10YR 3/2) when rubbed
rk gray (N 4/0) when dry; massive;
nonsticky, slightly plastic; 10 percent
id; dusty; neutral; clear, wavy bound-

s, clayey muck; 40 percent organic mat-
ercent fibers, 10 percent of which are
n 1 millimeter; brown (7.5YR 5/4) natu-
very dark brown (10YR 2/2) matrix,
gray (10YR 3/1) when pressed firmly,
brown (10YR 2/2) when rubbed gently,
R 2/1) when dry; massive; very hard,
nonplastic; 15 percent ooze, turbid;
htly acid; clear, wavy boundary.
hes, clayey muck; 50 percent organic
percent fibers, 10 percent of which are
n 1 millimeter; brown (7.5YR 5/4) natu-
very dark brown (10YR 2/2) matrix,
brown (10YR 2/2) when rubbed gently,
R 2/1) when dry; very hard, nonsticky,
; 15 percent ooze, turbid; dusty; slightly
pt, smooth boundary.
gray (N 6/0) clay, very dark gray (N
moist; massive; very hard, very firm,
icky, plastic; moderately alkaline; dis-
lime, very slight effervescent.

anges from dark gray to black in color
uck to mucky clay loam in texture. It is
. Reaction is strongly acid to neutral.
layers range from black to very dark
ey are 23 to 28 inches thick. Reaction is
derately alkaline. The C horizon ranges
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subsoil variant (Jb).—This soil is
ed with this soil in mapping are
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eries consists of well-drained soils
ands. These soils are underlain by
h of 20 to 25 inches. Slopes are 15
vegetation is a dense cover of
ees, mostly bay and several species
annual temperature is 54° to 56°
ual rainfall is 30 to 40 inches, and
on is 220 to 240 days. Elevation
3,000 feet.
ive profile, the surface layer is
2 inches thick. The subsoil is yel-
about 10 inches thick. Yellowish-
k is at a depth of 22 inches.
noderately slow. Effective rooting
nches. Available water capacity is

e used for wildlife habitat, recrea-

Following is a representative profile of Los Gatos loam:

A11—0 to 4 inches, brown (7.5YR 5/4) loam, dark brown (7.5YR 3/2) when moist; moderate, medium, crumb structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and medium roots; many fine and very fine pores; slightly acid; clear, wavy boundary.

A12—4 to 12 inches, brown (7.5YR 5/4) loam, dark reddish brown (5YR 3/3) when moist; weak, fine, subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and medium roots; many fine and very fine pores; slightly acid; clear, wavy boundary.

B21t—12 to 16 inches, yellowish-red (5YR 5/6) clay loam, yellowish red (5YR 4/6) when moist; moderate, fine, subangular blocky structure; hard, firm, sticky, plastic; few medium and very few fine roots; many very fine pores and few coarse pores; thin clay films bridging sand grains; medium acid; diffuse, wavy boundary.

B22t—16 to 22 inches, yellowish-red (5YR 5/6) clay loam, yellowish red (5YR 4/6) when moist; moderate, fine, subangular blocky structure; hard, firm, sticky, plastic; very few medium and fine roots; many very fine pores and few coarse pores; moderately thick discontinuous clay films on ped faces; medium; clear, wavy boundary.

R—22 to 26 inches, yellowish-red (5YR 5/8), hard, fractured sandstone; thick, dark reddish-brown (2.5YR 3/4) clay films along fracture planes.

Texture of the A horizon ranges from loam to fine sandy loam, reaction is slightly acid to medium acid, and thickness is 10 to 15 inches. The B horizon ranges from yellowish red to dark brown in color and from clay loam to heavy loam in texture. It is 10 to 18 inches thick. Reaction is medium acid to slightly acid. The R horizon is sandstone and is at a depth of 20 to 25 inches.

Los Gatos soils are mapped only in a complex with Maymen soils.

Los Osos Series

The Los Osos series consists of well-drained soils on mountainous uplands. These soils are underlain by sandstone at a depth of 20 to 40 inches. Slopes are 2 to 50 percent. The vegetation is mostly annual grasses, forbs, and scattered oaks. The average annual temperature is 58° to 60° F., the average annual rainfall is 20 to 30 inches, and the frost-free season is 240 to 260 days. Elevation ranges from 100 to 2,000 feet.

In a representative profile, the surface layer is brown clay loam about 7 inches thick. The subsoil is brown heavy clay loam and light clay about 18 inches thick. The substratum is light olive-brown sandstone at a depth of 25 inches.

Permeability in the subsoil is slow.

Los Osos soils are used for dryfarmed small grain, range pasture, wildlife habitat, recreation, and watershed.

Following is a representative profile of a Los Osos clay loam:

A1—0 to 7 inches, brown (10YR 5/3) clay loam, dark brown (10YR 3/3) when moist; weak, moderate, prismatic structure parting to weak, medium and coarse, subangular blocky structure; hard, friable, sticky, plastic; common very fine and fine roots; common fine and very fine pores; medium acid; clear, smooth boundary.

B21t—7 to 10 inches, brown (10YR 5/3) heavy clay loam, brown (10YR 4/3) when moist; weak, prismatic

structure parting to weak, medium, subangular blocky structure; very hard, friable, sticky, plastic; common fine roots, very few coarse roots; common fine and very fine pores and very few medium and coarse pores; common moderately thick clay films on ped faces and in pores; slightly acid; clear, smooth boundary.

B2t—10 to 25 inches, brown (10YR 4/3) light clay, dark yellowish brown (10YR 3/4) when moist; weak, prismatic structure parting to moderate, medium, angular blocky structure; very hard, firm, sticky, plastic; common fine and medium roots, very few coarse roots; common fine and very fine pores and very few medium and coarse pores; many moderately thick clay films on ped faces and in pores; slightly acid; clear, wavy boundary.

C—25 to 28 inches, light olive-brown (2.5YR 5/4) weathered sandstone, olive brown (2.5Y 4/4) when moist; very few coarse roots.

The A horizon ranges from brown to dark brown in color, from loam to silty clay loam in texture, and from 7 to 18 inches in thickness. Reaction is slightly acid to medium acid. The B horizon ranges from brown to yellowish brown in color, from heavy clay loam to light clay in texture, and from 13 to 22 inches in thickness. Reaction is slightly acid to neutral. The C horizon is yellowish-brown to light olive-brown sandstone and is at a depth of 20 to 40 inches.

Los Osos soils are mapped only in complexes with Dibble or Millsap soils.

Made Land

Made land (Ma) consists of areas that have been filled in with mixed materials (fig. 7). Sandstone, shale, concrete, and blacktop fragments make up as much as 80 percent of the mass. The soil material in the mixture ranges in texture from sandy loam to clay. The size and kinds of material present vary within short distances. The fill material is well drained, but it is commonly underlain by poorly drained tidal marsh or saline sediments that are at a depth of more than 3 feet to as much as 7 feet. Included in mapping are small areas of Valdez silty clay loam, wet.

Figure 7.—**Made land developed from material hauled in by truck.**

This land type is used mostly for urban development. Not placed in a capability unit or range site.

Maymen Series

The Maymen series consists of somewhat excessively drained soils on mountainous uplands. These soils are underlain by sandstone at a depth of 10 to 15 inches. Slopes are 15 to 75 percent. The vegetation is chaparral. The average annual temperature is 54° to 56° F., the average annual rainfall is 30 to 40 inches, and the frost-free season is 220 to 240 days. Elevation ranges from 1,500 to 3,000 feet.

In a representative profile, the soil is brown to light yellowish-brown loam about 10 inches thick. This is underlain by brownish-yellow sandstone bedrock.

Permeability is moderate. Effective rooting depth is 10 to 15 inches. Available water capacity is 1.5 to 2.5 inches.

Maymen soils are used for wildlife habitat, recreation, and watershed.

Following is a representative profile of Maymen loam:

O1—½ inch to 0, undecomposed leaves and plant remains.

A11—0 to 3 inches, brown (10YR 5/3) loam, dark brown (10YR 3/3) when moist; moderate, fine, crumb structure; sticky; slightly hard, friable, slightly plastic, many fine roots; slightly acid; clear, wavy boundary.

A12—3 to 10 inches, light yellowish-brown (10YR 6/4) loam, dark yellowish brown (10YR 4/4) when moist; weak, fine, subangular blocky structure; hard, firm, slightly sticky, plastic; many fine roots, decreasing with depth to few; very few, thin, patchy clay films; slightly acid; clear, wavy boundary.

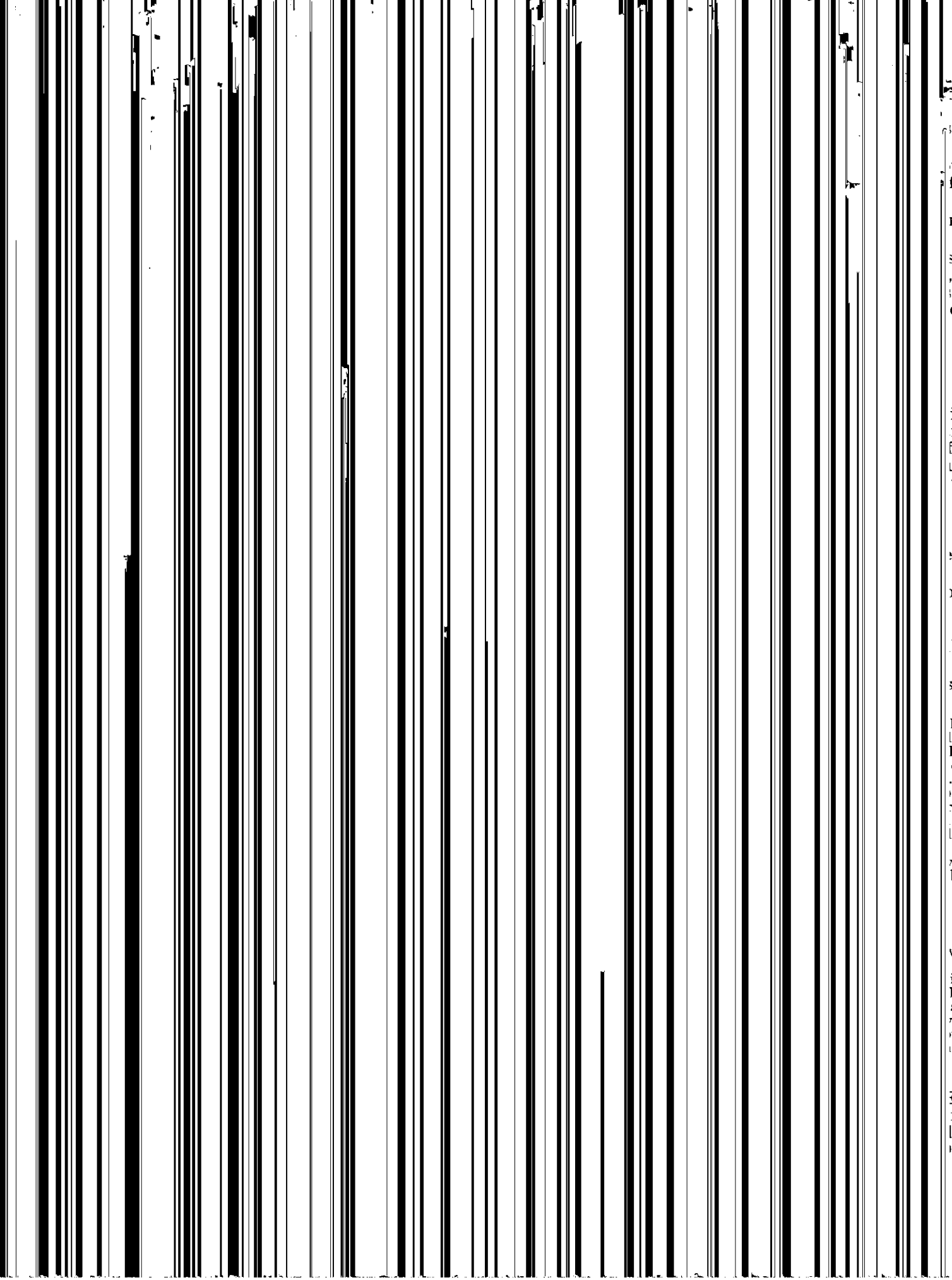
R—10 to 14 inches, brownish-yellow (10YR 6/6) fractured sandstone; thick, dark-red, somewhat continuous clay films along fracture planes.

The A horizon ranges from brown or light brown to light yellowish brown in color, from loam to fine sandy loam in texture, from slightly acid to medium acid in reaction, and from 10 to 15 inches in thickness.

Maymen-Los Gatos loams, 15 to 75 percent slopes, severely eroded (MeG3).—This complex is about 70 percent Maymen loam and about 20 percent Los Gatos loam. The remaining 10 percent is included areas of Millsholm loam. The Maymen soil is on the tops of ridges and hills and on south-facing slopes, and the Los Gatos soil is on north-facing slopes. These soils have the profile described as representative for their respective series. They have many gullies, and much of their surface layer has been removed through erosion.

Surface runoff is rapid to very rapid, and erosion is a high to very high hazard.

The soils in this complex are used for wildlife habitat, recreation, and watershed. Capability unit VIIIs–1 (15) ; not placed in a range site.



loam and Dibble clay loam, and some areas where bedrock is at a depth of more than 20 inches.

Runoff is medium, and erosion is a moderate hazard.

This soil is used mostly for range. It is also used for wildlife habitat and recreation. Capability unit VIe–1 (15) ; Shallow Loamy range site.

Millsholm loam, 30 to 75 percent slopes, eroded (MmG2).—This soil has a profile similar to the profile described as representative for the series, except that erosion has made the surface layer a few inches thinner. Included with this soil in mapping are areas of Dibble loam, Dibble clay loam, Maymen loam, and Los Gatos loam.

Runoff is rapid to very rapid, and erosion is a high to very high hazard.

This soil is used mostly for range. It is also used for wildlife habitat, recreation, and watershed. Capability unit VIIe–1 (15) ; Shallow Loamy range site.

Millsholm Series, Moderately Deep Variant

The Millsholm series, moderately deep variant, consists of well-drained soils on mountainous uplands. These soils are underlain by sandstone at a depth of 20 to 36 inches. Slopes are 2 to 30 percent. Where these soils are not cultivated, the vegetation is annual grasses and forbs. The average annual temperature is 58° to 60° F., the average annual rainfall is 20 to 25 inches, and the frost-free season is 230 to 250 days. Elevations range from 200 to 500 feet.

In a representative profile, the soil is pale-brown and yellowish-brown loam about 28 inches thick. The substratum is very pale brown sandstone.

Permeability is moderate. Available water capacity is 3.5 to 5.5 inches. Effective rooting depth is 20 to 36 inches.

These soils are used for orchards, pasture, dryfarmed small grain, wildlife habitat, and recreation.

Following is a representative profile of Millsholm loam, moderately deep variant, 9 to 30 percent slopes:

Ap—0 to 8 inches, pale-brown (10YR 6/3) loam, dark brown (10YR 3/3) when moist; weak, subangular blocky structure; hard, friable, slightly sticky, slightly plastic; slightly acid; clear, smooth boundary.

B1—8 to 20 inches, yellowish-brown (10YR 5/4) loam, dark yellowish-brown (10YR 4/4) when moist; weak subangular blocky structure; hard, friable, slightly sticky, slightly plastic; neutral; gradual, smooth boundary.

B2—20 to 28 inches, yellowish-brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) when moist; weak, blocky structure; hard, friable, sticky, slightly plastic; slightly acid; abrupt, smooth boundary.

C—28 to 34 inches, very pale brown (10YR 8/3) weathered sandstone.

The A horizon ranges from pale brown to brown in color, from loam to sandy loam in texture, from slightly acid to neutral in reaction, and from 6 to 10 inches in thickness. The B horizon ranges from yellowish brown to light yellowish brown in color, from loam to sandy loam in texture, from slightly acid to neutral in reaction, and from 16 to 26 inches in thickness. The C horizon is very pale brown sandstone at a depth of 20 to 36 inches.

Millsholm loam, moderately deep variant, 2 to 9 percent slopes (MnC).—This soil is on mountainous uplands. Included with this soil in mapping are small areas of Dibble loam and Millsholm loam.

Runoff is medium, and erosion is a slight hazard.

This soil is used mostly for pasture and hay. It is also used for orchards, dryfarmed small grain, wildlife habitat, and recreation. Capability unit IIIe–1 (15); not placed in a range site.

Millsholm loam, moderately deep variant, 9 to 30 percent slopes (MnE).—This soil is rolling to hilly on uplands. It has the profile described as representative for the series. Included with this soil in mapping are small areas of Dibble loam and Millsholm loam.

Runoff is medium, and erosion is a moderate hazard.

This soil is used mostly for pasture. It is also used for dryfarmed small grain, wildlife habitat, and recreation. Capability unit IVe–1 (15); not placed in a range site.

Omni Series

The Omni series consists of poorly drained, calcareous soils. These soils are nearly level in basins. They formed in mixed alluvium. Where these soils are not cultivated, the vegetation is annual grasses and forbs. The average annual temperature is 58° to 60° F., the average annual rainfall is 16 to 18 inches, and the frost-free season is 260 to 280 days. Elevation ranges from sea level to 10 feet.

In a representative profile, the surface layer is calcareous, grayish-brown silty clay about 8 inches thick. The subsoil is mottled, calcareous, gray silty clay 25 inches thick. The substratum is stratified, mottled, dark-gray to yellowish-brown or olive-gray silty clay that extends to a depth of more than 60 inches.

Permeability is slow. The water table is at a depth of 20 to 48 inches.

Omni soils are used for irrigated row crops, forage crops, dryfarmed field crops, wildlife habitat, and recreation.

Following is a representative profile of Omni silty clay:

Ap—0 to 8 inches, grayish-brown (2.5Y 5/2) silty clay, very dark grayish-brown (2.5Y 3/2) when moist; moderate, medium and coarse, subangular blocky structure; very hard, firm, sticky, plastic; few very fine and fine roots; common very fine and fine tubular pores and many very fine interstitial pores; moderately alkaline; very slightly effervescent; common light reddish-brown (5YR 6/4) concretions 1 to 5 millimeters in size; clear, smooth boundary.

B21g—8 to 18 inches, gray (5Y 5/1) silty clay, very dark gray (5Y 4/1) and has common, fine, prominent, dark-brown (7.5YR 4/4) mottles when moist; weak, coarse and very coarse, prismatic structure parting to medium and coarse, subangular blocky structure; very hard, firm, sticky, plastic; few very fine roots; common very fine and fine tubular pores; moderately alkaline; very slightly effervescent; abrupt, wavy boundary.

B22cag—18 to 33 inches, gray (5Y 6/1) silty clay, gray (5Y 5/1) and has many, fine, prominent, dark yellowish-brown (10YR 4/4) mottles when moist;

massive; very hard, very firm, sticky, plastic; few very fine roots; many very fine tubular pores; moderately alkaline; slightly effervescent; abrupt, smooth boundary.

A1bg—33 to 42 inches, mottled dark-gray (10YR 4/1), gray (10YR 6/1) and yellowish-brown (10YR 5/4) silty clay; mottled black (10YR 2/1), dark gray 10YR 4/1), and dark yellowish brown (10YR 4/4) when moist; massive; very hard, firm, sticky, plastic; no roots; common very fine tubular pores; moderately alkaline; very slightly effervescent; clear, wavy boundary.

Cbg—42 to 60 inches, olive-gray (5Y 5/2) silty clay; dark grayish brown (2.5Y 4/2) and has many, fine, prominent, dark yellowish-brown (10YR 4/4) mottles when moist; massive; very hard; very firm, sticky, plastic; no roots; few, very fine tubular pores; moderately alkaline; very slightly effervescent.

The A horizon ranges from grayish brown to gray or olive gray in color. It is silty clay or clay in texture, neutral to strongly alkaline in reaction, and 8 to 24 inches in thickness: In places the A horizon is clay loam 10 to 20 inches thick. Lime is common to a depth of 10 inches. The B2 horizon ranges from dark gray to light gray in color and has common to many, distinct to prominent mottles. Texture is silty clay or clay, reaction is moderately alkaline to strongly alkaline, and thickness is 6 to 25 inches.

Omni clay loam (Om).—This soil has a profile similar to the one described as representative for the series, except that it is strongly alkaline and has a dark clay loam surface layer 10 to 20 inches thick. This soil is slightly saline in places. Included with this soil in mapping are small areas of Solano loam, Clear Lake clay, and Rincon clay loam.

Runoff is slow, and erosion is a slight hazard. Available water capacity is 8 to 10 inches where this soil is drained.

This soil is used mostly for pasture and dryfarmed small grain. It is also used for wildlife habitat and recreation. Capability unit IVw–6 (17); not placed in a range site.

Omni silty clay (On).—This soil has the profile described as representative for the series. Included with this soil in mapping are small areas of Sacramento clay, Egbert silty clay loam, and Willows clay.

Runoff is very slow, and erosion is a slight hazard. Available water capacity is 7 to 9 inches.

This soil is used mostly for sugar beets, corn, and tomatoes. It is also used for dryfarmed barley, safflower, wildlife habitat, and recreation. Capability unit IIIw–5 (17); not placed in a range site.

Figure 8.—**Profile of Pescadero Series**

Pescadero Series

The Pescadero series consists of nearly level, somewhat poorly drained soils that have a saline-alkali subsoil. These soils are in basins. They formed in alluvium derived from sedimentary rocks. The vegetation is salt-tolerant plants. The average annual air temperature is 58° to 60° F., the average annual rainfall is 16 to 20 inches, and the frost-free season is 250 to 270 days. Elevation ranges from 25 to 100 feet.

In a representative profile (fig. 8), the surface layer is light brownish-gray clay loam 4 inches thick. The subsoil is gray, grayish-brown, and pale-brown clay and clay loam 43 inches thick. The substratum is light-gray and light brownish-gray clay loam to a depth of more than 60 inches.

Permeability is slow in the subsoil. Available water capacity is 7 to 8 inches. Effective rooting depth is more than 60 inches.

Pescadero soils are used for dryfarmed small grain, pasture, irrigated pasture, alkali-tolerant row crops, wildlife habitat, and recreation.

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nsticky,
common
lkaline;

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10YR 6/1, N 6/0)
silty clay; mottled
/4), yellowish-red
(10YR 5/2) when
blocky structure;
fine and very fine
ne tubular pores;
dary.
5Y 5/2) silty clay
n moist; few, fine,
4) mottles; strong,
cture; hard, firm,
very fine roots;
ular pores; very
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1/6) mottles when
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plastic; many fine
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id; diffuse, wavy

) silty clay, dark
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cky, plastic; many
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2 to 9 percent slopes (RnC).—This
e similar to the one described as repre-
e series, except that it has a loam sur-
t 15 to 25 inches thick. Slopes are dom-
percent. Included with this soil in
all areas of Brentwood clay loam.
w to medium, and erosion is a slight
le water capacity is 8 to 10 inches.
sed mostly for dryfarmed pasture, bar-
almonds. It is also used for alfalfa, ir-
wildlife habitat, and recreation. Capa-
(17); not placed in a range site.

loam, 0 to 2 percent slopes
soil has the profile described as repre-
he series. Included with this soil in
nall areas of Brentwood clay loam and
loam.
v, and erosion is a slight hazard. Avail-
city is 9 to 11 inches.
used mostly for irrigated sugar beets,
alfalfa. It is also used for almonds,
beans, dryfarmed barley, wildlife hab-
ation. Capability unit IIs–3 (17); not
e site.

loam, 2 to 9 percent slopes (RoC).—
profile similar to the one described as
for the series, except that slopes are
o 5 percent. Included with this soil in
nall areas of Brentwood clay loam.
w to medium, and erosion is a slight
le water capacity is 9 to 11 inches.
sed mostly for dryfarmed pasture, bar-
d almonds. It is also used for alfalfa,
re, wildlife habitat, and recreation. Ca-
–3 (17); not placed in a range site.

Rw) consists of excessively drained,
sandy, gravelly, cobbly, or stony
that are stratified throughout. It occu-
annels and is subject to flooding. The
attered cottonwoods, willows, and salt-
erage annual temperature is 58° to 60°
annual rainfall is 16 to 20 inches, and
season is 240 to 260 days. Elevation
o 150 feet.
mapping are small areas that have a
er of finer textured material.
is very rapid. Runoff is very slow in
not flooded. Deposition of material by
a hazard. Available water capacity is
h. Effective rooting depth is very shal-
ely deep.
aneous land type is used mainly for
nageways, but it is also used for wild-
d recreation. Capability unit VIIIw–1
d in a range site.

ries consists of poorly drained, nearly
elta areas. These soils are high in con-

tent of organic matter. They formed in mixed alluvial and organic materials. The average annual temperature is 58° to 60° F., the average annual rainfall is 16 to 18 inches, and the frost-free season is 250 to 270 days. Elevation ranges from 10 feet below sea level to sea level.

In a representative profile (fig. 9), the surface layer is gray and dark-gray, mottled clay loam about 15 inches thick. Below this is very dark gray, mottled mucky loam 16 inches thick. The substratum is stratified gray or black, gleyed, mucky loam to clay that extends to a depth of more than 60 inches.

Permeability is moderate. The available water capacity is 15 to 18 inches, and in places roots extend to a depth of 60 inches where these soils are drained. The water table, which has been lowered to a depth of 36 to 48 inches, limits root penetration for most plants.

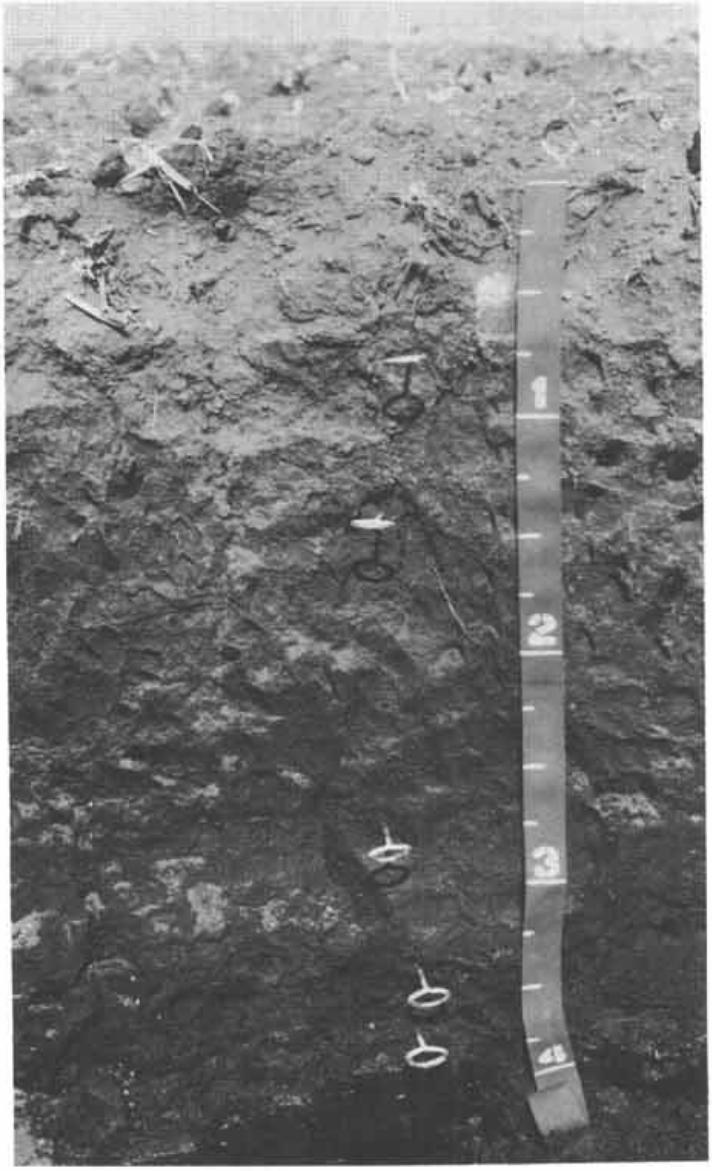

Figure 9.—**Profile of Ryde clay loam.**

Ryde soils are used for irrigated row crops, forage crops, dryfarmed small grain, wildlife, and recreation.

Following is a representative profile of Ryde clay loam:

Ap1—0 to 8 inches, gray (10YR 5/1) clay loam that has few, fine, prominent, pink (7.5YR 7/4) mottles, very dark gray (10YR 3/1) when moist; moderate, fine and medium, granular structure; hard, friable, sticky, plastic; common very fine and fine roots; many very fine interstitial pores; strongly acid; 5 to 10 percent organic matter; clear, smooth boundary.

Ap2—8 to 15 inches, dark-gray (10YR 4/1) clay loam that has few, fine, prominent, reddish-yellow (7.5YR 7/6) mottles, very dark gray (10YR 3/1) and has few, fine, prominent, reddish-yellow (7.5YR 6/6) mottles when moist; weak, coarse, prismatic structure; extremely hard, firm, sticky, plastic; common very fine roots; many very fine tubular and interstitial pores; strongly acid; 5 to 10 percent organic matter; abrupt, wavy boundary.

A1—15 to 31 inches, very dark gray (10YR 3/1) mucky loam that has few, fine, prominent, red (2.5YR 5/6) mottles, black (10YR 2/1) and has common, fine, prominent, dark-red (2.5YR 3/6) mottles when moist; moderate, coarse, prismatic structure parting to moderate, fine and medium, granular structure; slightly hard, friable, slightly sticky, nonplastic; few very fine roots; common very fine tubular pores and many very fine vesicular pores; slightly acid; 15 to 20 percent organic matter; abrupt, wavy boundary.

C1—31 to 38 inches, mottled dark-gray (10YR 4/1), yellow (10YR 7/6), and grayish-brown (2.5Y 5/2) clay, mottled very dark grayish brown (10YR 3/2 and 2.5Y 3/2) and light olive brown (2.5Y 5/4) when moist; moderate, coarse, prismatic structure (irreversible vertical cracking); extremely hard, firm sticky, plastic; very few very fine roots; common very fine tubular pores; slightly acid; 5 percent organic matter; abrupt, wavy boundary.

C2—38 to 41 inches, mottled very dark gray (10 YR 3/1) and very dark brown (10YR 2/2) mucky loam that has strong-brown (7.5YR 5/6) organic fibers, very dark brown (10YR 2/2) and has brown (7.5YR 4/4) organic fibers when moist; moderate, coarse, prismatic structure (irreversible vertical cracking); hard, firm, nonsticky, nonplastic; no roots; common very fine tubular pores; slightly acid; 15 to 30 percent organic matter; abrupt, wavy boundary.

C3—41 to 44 inches, gray (5Y 5/1) mucky loam, black (5Y 2/1) when moist; moderate, coarse, prismatic structure (irreversible vertical cracking); hard, firm, nonsticky, nonplastic; no roots; common very fine tubular pores; slightly acid; 10 to 15 percent (estimated) organic matter.

C4—44 to 72 inches, stratified gleyed material that is less than 5 to 40 percent organic matter; irreversible vertical cracking extends into this horizon.

The A horizon ranges from very dark gray or gray to grayish brown in color, from clay loam or silty clay loam to mucky loam in texture, from strongly acid to neutral in reaction, and from 15 to 31 inches in thickness. The C horizon ranges from black, very dark gray, dark gray, or gray to very dark brown in color; from mucky loam or mucky silty clay loam to clay in texture; and from slightly acid to mildly alkaline in reaction. Organic-matter content ranges from 10 to 30 percent by weight, and it can be as much as 40 percent in the lower part of the C horizon. This soil is slightly saline in places.

Ryde clay loam (Ry).—This soil has the profile described as representative for the series. Included with

5/6), reddish-brown (5YR 4/3), and
5/2) mottles when moist; mostly
and pores decrease gradually as
; moderately alkaline.

s from gray to dark gray or grayish
s are few, fine, faint to many, me-
ıre is clay or silty clay, reaction is
ıtely alkaline, and thickness is 10 to
are made up of as much as 20
overwash material. The C horizon
rk gray, or light gray to greenish
common to many, medium to large,
e texture is dominantly clay strati-
n that is high in content of organic
s calcareous in places.

loam (Sa).—This soil has a
ne described as representative
hat it has grayish-brown silty
terial on the surface. This ma-
inches thick. Included with this
nall areas of Sacramento clay
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s poorly drained soil has been
en drainage ditches and levees
e remains below a depth of 36
and erosion is a slight hazard.
acity is 9 to 11 inches.
stly for irrigated sugar beets,
grain sorghum. It is also used
ain and safflower, wildlife habi-
pability unit IIIw–3 (17); not

ay loam, occasionally flooded
profile similar to the one de-
ve for the series, except that it
y clay loam overwash material
aterial is as much as 20 inches
ct to flooding at least 1 year in
s more than 48 hours. Included
ing are small areas of Egbert

s poorly drained soil has been
en drainage ditches and levees
e remains below a depth of 36
slow, and erosion is a slight
vater capacity is 9 to 11 inches.
stly for irrigated beans, toma-
nd sugar beets. It is also used
r and small grain, wildlife habi-
pability unit IVw–3 (17); not

).—This soil has the profile de-
ve for the series. Included with
are small areas of Clear Lake
oam, and Ryde clay loam.
poorly drained soil has been im-
drainage ditches and levees so
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slow, and erosion is a slight
vater capacity is 8 to 10 inches.
nostly for irrigated tomatoes,
ı sorghum. It is also used for
and safflower, wildlife habitat,
bility unit IIIw–5 (17); not

San Benito Series

The San Benito series consists of well-drained soils on dissected terraces. These soils are underlain by weakly consolidated sediments at a depth of 25 to 40 inches. Slopes are 2 to 30 percent. Where these soils are not cultivated, the vegetation is annual grasses and forbs. The average annual temperature is 58° to 60° F., the average annual rainfall is 16 to 18 inches, and the frost-free season is 250 to 270 days. Elevation ranges from 25 to 250 feet.

In a representative profile (fig. 10) the surface layer is brown clay loam about 25 inches thick. The substratum is light yellowish-brown and white, calcareous, weakly consolidated sediments that crush to loam.

Permeability is moderately slow. The available water capacity is 4.5 to 8.5 inches. Roots penetrate to a depth of 25 to 40 inches.

San Benito soils are used for dryfarmed small grain, pasture, wildlife habitat, and recreation.

Following is a representative profile of a San Benito clay loam:

Ap—0 to 5 inches, brown (10YR 4/3) clay loam, dark brown (10YR 3/3) when moist; weak, fine and medium, subangular blocky structure; hard, friable, sticky, plastic; many very fine roots; many very fine and fine tubular pores; medium acid; abrupt, smooth boundary.

A11—5 to 17 inches, brown (10YR 4/3) clay loam, dark brown (10YR 3/3) when moist; moderate, medium and coarse, prismatic structure; hard, friable, sticky, plastic; common very fine roots; many very fine and fine tubular pores; slightly acid; few lime concretions; gradual, wavy boundary.

A12—17 to 25 inches, brown (10YR 5/3) clay loam, dark brown (10YR 3/3) when moist; weak, coarse, prismatic structure; hard, friable, sticky, plastic; common very fine roots; many very fine and medium tubular pores; neutral; few lime concretions; clear, wavy boundary.

Cca—25 to 34 inches, mottled light yellowish-brown (10YR 6/4) and white (10YR 8/2), weakly consolidated sediments that crush to loam, mottled dark yellowish brown (10YR 4/4) and light gray (10YR 7/2) when moist; massive; hard, friable, slightly sticky, slightly plastic; moderately alkaline; violently effervescent, lime disseminated and in soft masses; many large krotovinas.

The A horizon ranges from brown to dark grayish brown in color. It is clay loam or silty clay loam in texture and 25 to 40 inches in thickness. The C horizon ranges from light yellowish-brown to white in color. It is made up of consolidated calcareous sediments that crush to loam, clay loam, or silty clay loam. Depth to the C horizon is 25 to 40 inches.

San Benito soils are mapped only in complexes with Altamont and San Ysidro soils.

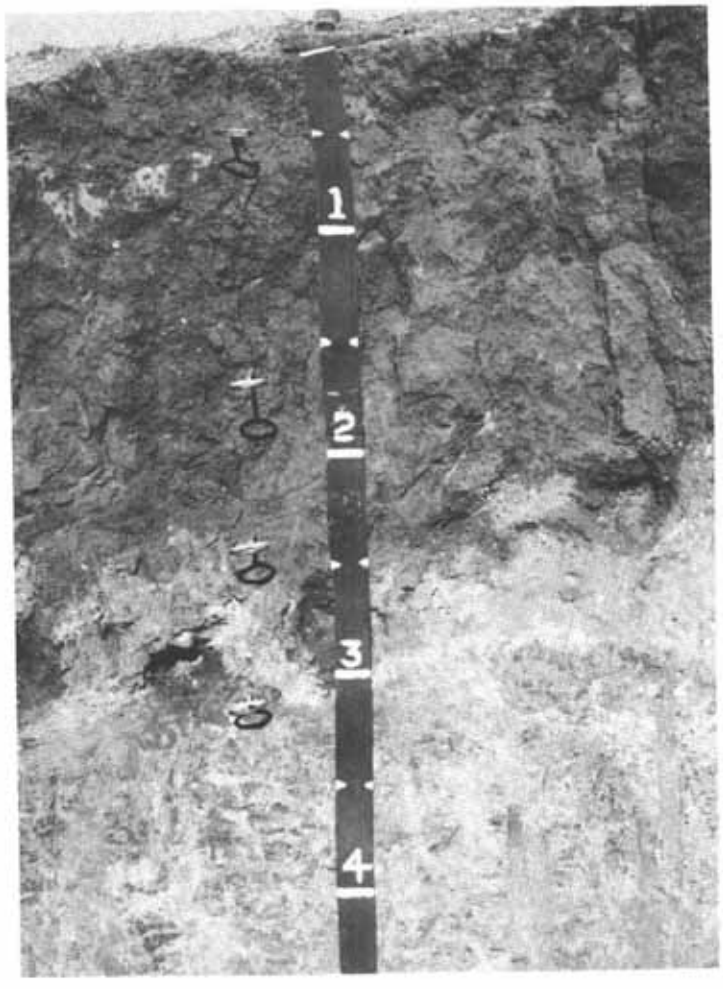


Figure 10.—**Profile of San Benito clay loam.**

San Ysidro Series

The San Ysidro series consists of moderately well drained soils on terraces. These soils formed in alluvium derived from sedimentary rocks. Slopes are 0 to 30 percent. Where these soils are not cultivated, the vegetation is annual grasses and forbs. The average annual temperature is 58° to 60° F., average annual rainfall is 16 to 22 inches, and the frost-free season is 250 to 270 days. Elevation ranges from 25 to 100 feet.

In a representative profile (fig. 11), the surface layer is light brownish-gray sandy loam and fine sandy loam 14 inches thick. The subsoil is dark yellowish-brown heavy clay loam and yellowish-brown sandy clay loam 26 inches thick. The substratum is yellowish-brown light sandy clay loam and light yellowish-brown light clay loam that extend to a depth of more than 60 inches.

Permeability is very slow.

San Ysidro soils are used for irrigated row crops and pasture, dryfarmed small grain, dryland pasture, wildlife habitat, and recreation.

Following is a representative profile of San Ysidro sandy loam, 0 to 2 percent slopes:

Ap—0 to 7 inches, light brownish-gray (10YR 6/2) sandy loam that has few, fine, distinct mottles of brownish yellow (10YR 6/6), brown (10YR 3/3) when moist; massive; hard, friable, nonsticky, slightly plastic; many very fine roots and common fine and medium roots; common very fine tubular and interstitial pores; slightly acid; clear, smooth boundary.

A1—7 to 14 inches, light brownish-gray (10YR 6/2) fine sandy loam that has few, fine, distinct mottles of brownish yellow (10YR 6/6), brown (10YR 3/3) when moist; massive; hard, friable, nonsticky, slightly plastic; many very fine roots, common fine

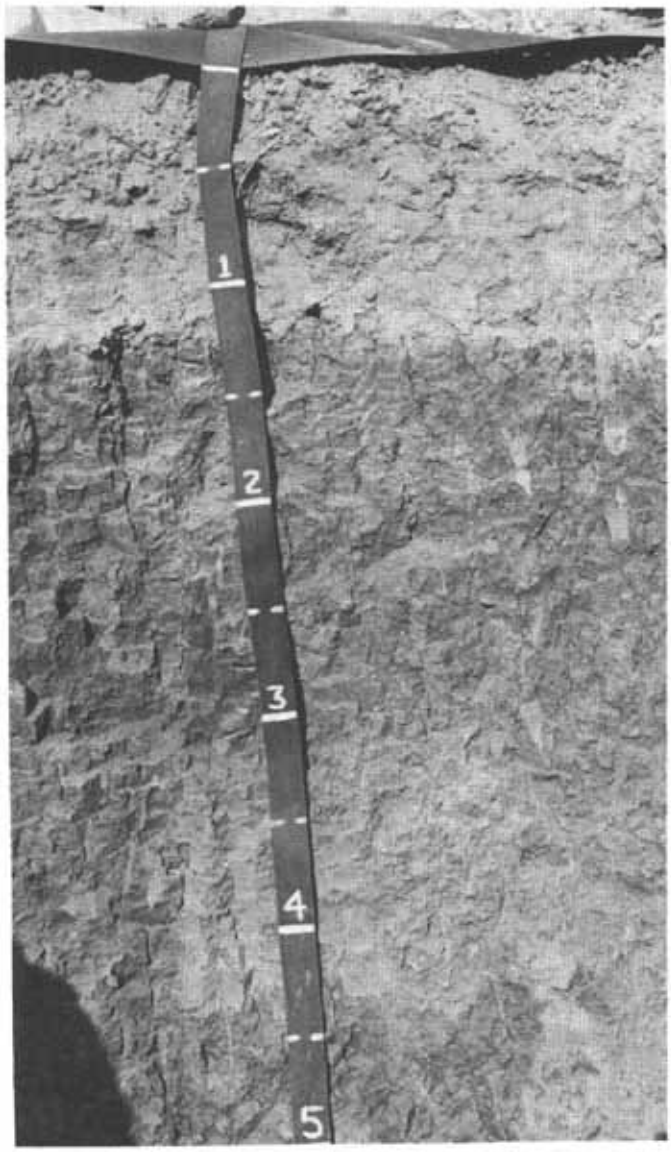


Figure 11.—**Profile of San Ysidro sandy loam, 0 to 2 percent slopes.**

and medium roots; common very fine tubular pores; medium acid; abrupt, smooth boundary.

B21t—14 to 28 inches, dark yellowish-brown (10YR 4/4) heavy clay loam, dark brown (7.5YR 4/4) when moist; strong, coarse, prismatic structure; a thin bleached layer immediately above the prisms is light gray (10YR 7/2), light brownish gray (10YR 6/2) when moist; extremely hard, very firm, sticky, plastic; few very fine and fine exped roots; common very fine tubular pores; many moderately thick clay films on ped surfaces and in pores; slightly acid; iron and manganese concretions; gradual, smooth boundary.

B22t—28 to 40 inches, yellowish-brown (10YR 5/6) sandy clay loam, dark yellowish brown (10YR 4/4) and has dark-brown (7.5YR 4/4) coatings when moist; strong, medium, prismatic structure; extremely hard, very firm, sticky, plastic; few very fine and fine exped roots; common very fine tubular pores; many moderately thick clay films on ped faces and in pores; neutral; iron and manganese concretions; gradual, smooth boundary.

C1—40 to 54 inches, yellowish-brown (10YR 5/4) light sandy clay loam, dark yellowish brown (10YR 4/4) when moist; moderate, medium, prismatic structure; extremely hard, very firm, sticky, plastic; few, very fine exped roots; common very fine tubular pores; many moderately thick clay films on ped faces and in pores; neutral; iron and manganese concretions; gradual, wavy boundary.

C2—54 to 68 inches, light yellowish-brown (10YR 6/4) light clay loam, dark yellowish brown (10YR 4/4) and has brown (7.5YR 4/4) coatings when moist; strong, medium, prismatic structure; hard, firm, sticky, plastic; few, very fine exped roots; common very fine tubular pores; continuous moderately thick clay films on ped faces and in pores; moderately alkaline.

The A1 horizon ranges from light brownish gray to pale brown in color, from very fine sandy loam to sandy loam in texture, and from 12 to 30 inches in thickness. Where present, the A2 horizon ranges from light gray to very pale brown in color, from very fine sandy loam to sandy loam in color, and from nearly 0 to 3 inches in thickness. It is slightly acid to medium acid. The B horizon is dark yellowish brown to light yellowish brown or brownish yellow. Texture ranges from heavy clay loam or sandy clay loam to clay. It is 12 to 30 inches thick and is slightly acid to mildly alkaline. The C horizon ranges from pale brown to yellowish brown. It is calcareous in some places.

San Ysidro sandy loam, 0 to 2 percent slopes (SeA).—This soil has the profile described as representative for the series. Included with this soil in mapping are small areas of Antioch loam and San Ysidro sandy loam, thick surface.

Runoff is slow. Erosion is a slight hazard. Available water capacity is 2 to 4 inches. Effective rooting depth is only 12 to 20 inches, but some water is slowly available to some plants from the subsoil.

This soil is used mainly for irrigated grain sorghum, sugar beets, and pasture; dryfarmed small grain; dryland pasture; wildlife habitat; and recreation. Capability unit IVs–3 (17); not placed in a range site.

San Ysidro sandy loam, 2 to 5 percent slopes (SeB).—This is an undulating soil on terraces. Included with this soil in mapping are small areas of Antioch loam and San Ysidro sandy loam, thick surface.

Runoff is medium. Erosion is a slight to moderate hazard. Available water capacity is 2 to 4 inches. Effective rooting depth is only 12 to 20 inches, but a small amount of water is available to some plants from the subsoil.

This soil is used for irrigated pasture, dryfarmed small grain, dryland pasture, wildlife habitat, and recreation. Capability unit IVe–3 (17); not placed in a range site.

San Ysidro sandy loam, thick surface, 0 to 2 percent slopes (SfA).—This soil has a profile similar to the one described as representative for the series, except that the subsoil is at a depth of 20 to 30 inches. Included with this soil in mapping are small areas of Antioch loam and San Ysidro sandy loam.

Runoff is slow. Erosion is a slight hazard. Available water capacity is 4 to 6 inches. Effective rooting depth is only 20 to 30 inches, but a small amount of water also is available to some plants from the subsoil.

This soil is used for irrigated grain sorghum, sugar beets, and pasture; dryfarmed small grain; dryland

pasture; wildlife habitat; and recreation. Capability unit IIIs–3 (17) not placed in a range site.

Solano Series

The Solano series consists of nearly level, somewhat poorly drained soils on terraces (fig. 12). These soils formed in alluvium derived from sedimentary rocks. The vegetation is alkali-tolerant annual grasses and forbs. The average annual temperature is 58° to 60° F., the average annual rainfall is 16 to 18 inches, and the frost-free season is 250 to 270 days. Elevation ranges from 5 to 40 feet.

In a representative profile (fig. 13) the surface layer is mottled, light brownish-gray and light-gray loam about 9 inches thick. The subsoil is brown and light yellowish-brown clay loam and silty clay loam that extends to a depth of more than 60 inches.

Permeability is very slow. Effective rooting depth is 6 to 12 inches. Available water capacity is only 1.5 to 2.5 inches, but some moisture also is slowly available to some plants from the subsoil.

Solano soils are used for dryland pasture, irrigated pasture, alkali-tolerant row crops, wildlife habitat, and recreation.

Following is a representative profile of Solano loam:

A21—0 to 4 inches, light brownish-gray (10YR 6/2) loam that has few, fine, distinct yellowish-brown (10YR 5/8) mottles, dark grayish brown (10YR 4/2) and has few, fine, distinct, yellowish-red (5YR 4/8) mottles when moist; massive; hard, friable, non-sticky, slightly plastic; many very fine and fine roots; many very fine tubular pores and common fine tubular pores; very strongly acid; clear, wavy boundary.

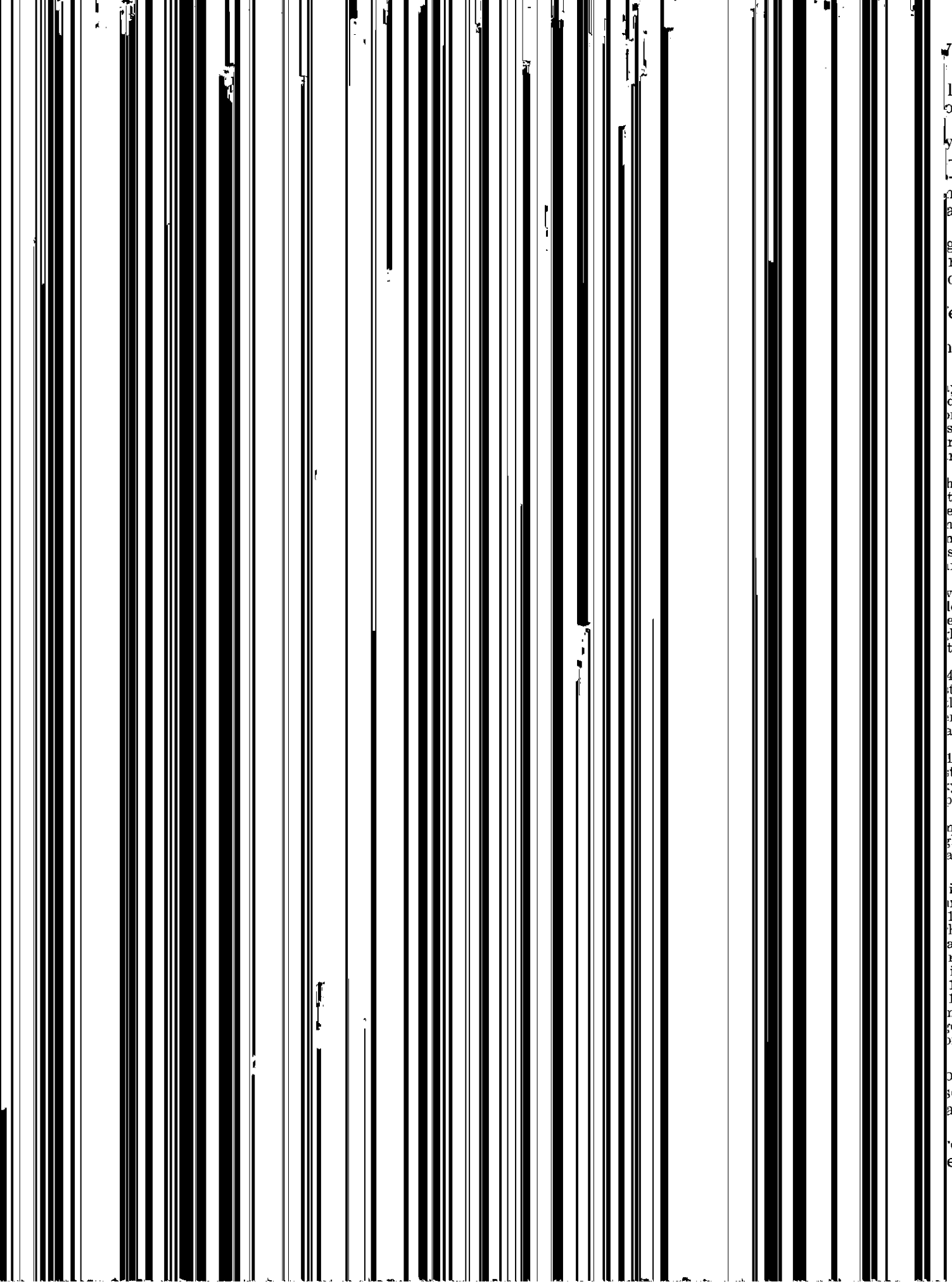
Figure 12.—Typical area of Solano loam.

***Figure 13.*—Profile of Solano loam.**

A22—4 to 9 inches, light-gray (10YR 7/2) loam that has few, fine, distinct, yellowish-brown (10YR 5/6) mottles, dark grayish brown (10YR 4/2) and has few, fine, distinct, dark reddish-brown (5YR 3/4) mottles when moist; massive; hard, friable, sticky, slightly plastic; many very fine roots; many very fine tubular pores; strongly acid; abrupt, wavy boundary.

B21t—9 to 21 inches, brown (10YR 5/3) clay loam, brown (10YR 4/3) matrix and dark grayish-brown (10YR 4/2) ped faces when moist; strong, coarse, columnar structure; extremely hard, firm, sticky, plastic; common very fine exped roots; many very fine tubular pores; many thin clay films on ped faces and in pores; neutral; gradual, wavy boundary.

B22t—21 to 32 inches, light yellowish-brown (2.5Y 6/4) clay loam, olive brown (2.5Y 4/4) and has dark reddish-brown (5YR 2/2) stains when moist; weak, medium and coarse, prismatic structure and weak, medium, angular blocky structure; extremely hard, firm, sticky, plastic; few very fine exped roots; common very fine tubular pores; many moderately thick clay films on ped faces;



(10YR 3/1) when rubbed gently, black R 2/1) and light gray (10YR 6/1) when dry; ive; hard, slightly sticky, slightly plastic; d; dusty; strongly alkaline, becoming medium when exposed to air for a few weeks.

inches, peaty muck, 50 percent organic mat- 40 percent fibers, 85 percent of which are r than 1 millimeter; dark reddish-brown 3/3) natural fibers; very dark gray (10YR matrix; black (10YR 2/1), very dark gray R 2/1), and dark reddish brown (5YR 3/3) pressed firmly, black (10YR 2/1) and very gray (10YR 3/1) when rubbed gently, black ight gray (10YR 2/1, 6/1) when dry; mas- hard, nonplastic, slightly sticky; turbid; ; strongly alkaline, becoming less alkaline exposed to air.

rizon ranges from black or very dark gray to wn in color, from muck to peaty muck in tex- edium acid to very strongly acid in reaction, to 18 inches in thickness. The next layer black or very dark gray to very dark brown ure is peaty muck that is 50 to 70 percent or- . Reaction ranges from mildly alkaline to ine. Thickness is 42 inches to more than 45 ater table varies with management of levees s, but it is generally at a depth of less than midsummer and near the surface in winter. strongly saline, and the electrical conduct- rom 15 to 50 millimhos per centimeter at 25° ately alkaline layers become acidic if exposed wed to dry.

muck (Sp).—This soil has the profile epresentative for the series. Included ping are small areas of Joice muck and lay.

ded, and erosion is not a hazard.

sed mostly for wildlife habitat and rec- so used for limited pasture. Capability) ; not placed in a range site.

ies

e series consists of nearly level, some- ained soils on alluvial fans. These soils uvium washed from mixed sources. ls are not cultivated, the vegetation is and forbs. The average annual temper- 60° F., the average annual rainfall is and the frost-free season is 250 to 270 ranges ranges from 25 to 150 feet.

ntative profile, the surface layer is silty clay loam about 9 inches thick. The led, grayish-brown silty clay loam 22 he substratum is distinctly mottled, gray silty clay loam that extends to a an 60 inches.

ls are used for irrigated orchards and farmed small grain; dryland pasture; and recreation.

a representative profile of Sycamore

nches, grayish-brown (10YR 5/2) silty clay very dark grayish brown (10YR 3/2) when ; massive; hard, friable, slightly sticky, plas- ew very fine roots; common very fine and pores; slightly acid; clear, smooth boundary. inches, grayish-brown (2.5Y 5/2) silty clay that has many, medium, distinct, light olive- (2.5Y 5/4) mottles, very dark grayish

brown (2.5Y 3/2) and has many, medium, distinct, olive-brown (2.5Y 4/4) mottles when moist; massive; hard, friable, slightly sticky, plastic; few very fine roots; many very fine, fine, and medium pores; neutral; clear, smooth boundary.

B22—25 to 31 inches, grayish-brown (2.5Y 5/2) silty clay loam that has common, fine, distinct, light olive-brown (2.5Y 5/4) mottles, very dark grayish brown (2.5Y 3/2) and has common, fine, distinct, olive-brown (2.5 4/4) mottles when moist; massive; hard, friable, slightly sticky, plastic; very few very fine roots; very fine, fine, and medium pores; mildly alkaline; clear, smooth boundary.

C—31 to 60 inches, light brownish-gray (2.5Y 6/2) silty clay loam that has many, fine, distinct, light olive-brown (2.5Y 5/4) mottles, dark grayish brown (2.5Y 4/2), and has many, fine, distinct, olive-brown (2.5Y 4/4) mottles when moist; massive; hard, friable, slightly sticky, plastic; very few very fine roots; many very fine pores; very slightly effervescent; moderately alkaline.

The A horizon ranges from grayish brown to gray in color, from loam to silty clay loam in texture, from slightly acid to mildly alkaline in reaction, and from 7 to 16 inches in thickness. The B horizon ranges from grayish brown to light brownish gray in color and has distinct to prominent mottles. Texture is silty clay loam to silt loam, reaction is neutral to moderately alkaline, and thickness is 15 to 30 inches. The C horizon ranges from light brownish gray to pale olive in color and has distinct to prominent mottles. It is silty clay loam to loam in texture and neutral to moderately alkaline in reaction. A fluctuating water table is at a depth of less than 5 feet in some years.

Sycamore silty clay loam (Ss).—This soil is the profile described as representative for the series. Included with this soil in mapping are small areas of Yolo silty clay loam and Sycamore silty clay loam, drained.

Permeability is moderately slow. Runoff is slow, and erosion is a slight hazard. The available water capacity is 10 to 12 inches. The effective rooting depth is 60 inches or more. The water table is at a depth of 36 to 60 inches.

This soil is used mostly for pears (fig. 14). It is also used for tomatoes, alfalfa, prunes, dryfarmed barley,

Figure 14.—Pear orchard on Sycamore silty clay loam.

tic plant remains. The vegetation is sedges and herbs. The average an- is 58° to 60° F., the average annual 20 inches, and the frost-free season is Elevation ranges from 3 feet below vel.

ative profile, the surface layer is light grayish-brown, and yellowish-brown, lay about 10 inches thick. The subsoil and black mucky clay about 42 inches atum is gray mucky clay that extends e than 60 inches.

f the subsoil is moderate. The effec- h is 60 inches or more and the avail- ity is 9 to 11 inches where these soils water table is at a depth of 12 to 36 ts most plant roots.

re used for pasture, wildlife habitat,

a representative profile of Tamba

hes, light brownish-gray (10YR 6/2) mucky at has common, medium, distinct, light yel- brown (10YR 6/4) mottles, very dark gray- wn (10YR 3/2) when moist; weak, fine and n, crumb structure; slightly hard, friable, plastic; many very fine roots; many very res; strongly acid; clear, smooth boundary.

inches, mottled grayish-brown (10YR 5/2) llowish-brown (10YR 5/4) mucky clay, mot- ry dark brown and dark yellowish brown 2/2, 3/4) when moist; weak, fine, granular re and weak, crumb structure; slightly riable, slightly sticky, slightly plastic; com- ry fine roots; common very fine pores; very y acid; abrupt, smooth boundary.

inches, gray (N 6/0) and black (10YR 2/1) clay that has few, fine prominent, yellow- (10YR 5/8) mottles, black (10YR 2/1) and w, fine, prominent, dark-red (2.5YR 3/6) ; when moist; massive; slightly hard, fria- cky, plastic; common very fine roots; com- ry fine pores; very strongly acid; diffuse, oundary.

inches, gray (N 6/0) and black (10YR 2/1) clay that has few, fine, prominent, brown 3/2) mottles, very dark brown (10YR 2/2) as few, fine, distinct, dark-brown (7.5YR ottles when moist; massive; slightly hard, , sticky, plastic; few very fine roots; com- ry fine pores; very strongly acid; gradual, oundary.

ches, gray (N 6/0) mucky clay, dark green- y (5BG 4/1) when moist; massive; slightly irm, very sticky, plastic; many fine tubular moderately alkaline, strong odor of hydro- lfide, becomes acid when exposed to air for veeks.

on ranges from gray, light gray, or light to grayish brown in color, from clay to texture, from medium acid to very strongly , and from 8 to 15 inches in thickness. The ay to mucky clay in texture and is 15 to 30 ic matter. Reaction ranges from very moderately alkaline, and thickness ranges inches. The C horizon ranges from gray to n color and from clay to mucky clay in tex- is moderately alkaline but becomes acid if posed to air and allowed to dry. Thickness inches to more than 27 inches. The water h management of levees and tide gates, but of about 3 feet in midsummer and near the

variant, 15 to 50
soil is on moun-
apping are small

sion is a moder-

ut it is also used
Capability unit
te.

arly level, exces-
reas. These soils
he vegetation is
The average an-
average annual
ost-free season is
5 to 40 feet.
s light brownish-
nd sand that ex-
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rooting depth is

ed orchards, pas-

e of Tujunga fine

y (10YR 6/2) fine
R 4/2) when moist;
, nonplastic; many
ots; many very fine
upt, smooth bound-

(10YR 5/4) sand,
moist; single grain;
common very fine
tial pores; slightly

y (10YR 6/2) fine
R 4/2) when moist;
nonplastic; common,
e interstitial pores;

soil consists of
th it in mapping
am and areas of
ne profile.
ight to moderate

rigated walnuts,
for melons, wild-
tion fill material.
aced in a range

rly level, poorly
in dredge spoil
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etation is annual
al temperature is
infall is 16 to 19

h brown (2.5Y 5/2) and has
rominent, white (10YR 8/2)
moderate, very coarse, pris-
emely hard, very firm, sticky,
ery fine roots; common very
strongly alkaline; slightly ef-
d lime in medium-sized soft
ides; gradual, smooth bound-

ray (10YR 6/1) clay, grayish
ıen moist; massive; extremely
y, plastic; very few very fine
common very fine tubular
alkaline; very slightly effer-
ime in medium-sized soft mas-
ecting slickensides; gradual,

light olive-gray (5Y 6/2) and
n (10YR 6/4) clay, mottled
and yellowish brown (10YR
assive; extremely hard, very
; common very fine tubular
ine; slightly effervescent, seg-
ım-sized soft masses; common
des; gradual, smooth bound-

greenish-gray (5GY 6/1) and
YR 6/6) heavy sandy clay
sh gray (5GY 6/1) and yel-
5/6) when moist; massive;
sticky, plastic; common very
ongly alkaline.

h light gray or dark gray to
clay or silty clay in texture
ess. The exchangeable sodium
25 percent within a depth of
on ranges from mottled light
sh gray in color, from sandy
and from strongly alkaline to
l.

s soil is in basins. It is
and is slightly saline in
oil in mapping are small
m, Omni silty clay, and

rosion is a slight hazard.
for sugar beets and dry-
sed for pasture, wildlife
ability unit IVw–6 (17);

nearly level, well-drained
soils formed in mixed al-
ıtary rocks. Where these
ıe vegetation is annual
ge annual temperature is
nnual rainfall is 18 to 25
ason is 240 to 260 days.
50 feet.
the surface layer is dark
m about 28 inches thick.
ay loam about 8 inches
vn loam that extends to a

ı is more than 60 inches.
orchards, irrigated row
crops, dryfarmed small
creation.

Following is a representative profile of Yolo silty clay loam:

Ap—0 to 9 inches, dark grayish-brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) when moist; massive; hard, friable, sticky, plastic; many very fine roots, few fine roots; common very fine pores; mildly alkaline; abrupt, wavy boundary.

A11—9 to 18 inches, dark grayish-brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) when moist; weak, medium, subangular blocky structure; hard, friable, sticky, plastic; few fine and very fine roots; few fine pores and common very fine pores; mildly alkaline; thin films on ped faces and in pores; gradual, wavy boundary.

A12—18 to 28 inches, dark grayish-brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) when moist; weak, medium, angular blocky structure; hard, friable, sticky, plastic; few fine and coarse roots; common fine pores; neutral; increase in films (may be organic staining) on ped faces; clear, wavy boundary.

AC—28 to 36 inches, brown (10YR 4/3) light clay loam, dark brown (10YR 3/3) when moist; weak, medium, subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few very fine and medium roots; many very fine and fine pores; mildly alkaline; thin very dark grayish-brown (10YR 3/2) films on ped faces; gradual, wavy boundary.

C1—36 to 44 inches, brown (10YR 5/3) loam, brown (10YR 4/3) when moist; weak, medium, subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few fine and coarse roots; common fine and very fine pores; mildly alkaline; thin films on ped faces; gradual, wavy boundary.

C2—44 to 60 inches, brown (10YR 5/3) loam, brown (10YR 4/3) when moist; weak, medium, subangular blocky stucture; slightly hard, very friable, slightly sticky, slightly plastic; few fine and coarse roots; common fine and very fine pores; mildly alkaline; thin films (may be organic staining) on ped faces.

The A horizon ranges from dark grayish brown to grayish brown in color, from silty clay loam to loam in texture, from slightly acid to moderately alkaline in reaction, and from 18 to 36 inches in thickness. The C horizon ranges from brown to yellowish brown in color. It is loam or silt loam in texture and neutral to moderately alkaline in reaction.

Yolo loam (Yo).—This soil has a profile similar to the profile described as representative for the series, except that it has a loam texture throughout. Included with this soil in mapping are small areas of Reiff fine sandy loam, Brentwood clay loam, Yolo silty clay loam, and Sycamore silty clay loam.

Permeability is moderate. Runoff is slow, and erosion is a slight hazard. The available water capacity is 9 to 11 inches.

The soil is used mostly for almonds, peaches, apricots, walnuts, sugar beets, corn, tomatoes, and alfalfa (fig.15). It is also used for dryfarmed barley, urban development, wildlife habitat, and recreation. Capability unit I–1 (17); not placed in a range site.

Yolo loam, clay substratum (Yr).—This soil has a profile similar to the one described as representative for the series, except that the surface layer is loam and a buried clay subtratum is at a depth of 40 to 60 inches. Included with this soil in mapping are small areas of Reiff fine sandy loam, Yolo loam, Sycamore silty clay loam, Brentwood clay loam, and a soil that has a clay substratum at a depth of 20 to 40 inches.

Figure 15.—**Irrigated field corn on Yolo loam.**

Permeability is slow. Runoff is slow, and erosion is a slight hazard. The available water capacity is 9 to 11 inches.

This soil is used for irrigated sugar beets, tomatoes, grain sorghum, and alfalfa. It is also used for dryfarmed barley, wildlife habitat, and recreation. Capability unit IIs–3 (17); not placed in a range site.

Yolo silty clay loam (Ys).—This soil has the profile described as representative for the series. Included with it in mapping are small areas of Reiff fine sandy loam, Brentwood clay loam, and Sycamore silty clay loam.

Permeability is moderately slow. Runoff is slow, and erosion is a slight hazard. The available water capacity is 10 to 12 inches.

This soil is used mostly for almonds, peaches, sugar beets, tomatoes, alfalfa, walnuts, and dryfarmed barley. It is also used for urban development, wildlife habitat, and recreation. Capability unit I–1 (17); not placed in a range site.

Use and Management of the Soils

The system of capability classification commonly used by the Soil Conservation Service is described in this section. Modifications based on climatic differences of the three land resource areas in the county are also listed. The capability units are explained, and suggestions for managing the soils in each capability unit are given. Following this, predicted yields of the principal crops are given and the management required to obtain those yields is described. Then the Storie index and the vegetative soil groups are explained. Finally, management of the soils of the range

aat water in or on the soil interferes
th or cultivation (in some soils the
partly corrected by artificial drain-
at the soil is limited mainly because it
hty, saline, or stony; and *c*, used only
the United States but not in Solano
at the chief limitation is climate that
dry.

lass I there are no subclasses, because
lass have few or no limitations. Class
t the most, only the subclasses indi-
d c, because the soils in this class are
r no erosion, though they have other
restrict their use largely to pasture,
wildlife, or recreation.

NITS are soil groups within the sub-
s in one capability unit are enough
ed to the same crops and pasture
e similar management, and to have
ity and other responses to manage-
capability unit is a convenient group-
many statements about management

ts in classes I through IV in Califor-
mbers to indicate the chief kind of
sible for placement of the soils in the
nd subclass. For this reason, some of
subclasses are not numbered consecu-
symbols are a partial indication of
California the numerals used to desig-
the classes and subclasses are these:

tion caused by very gravelly material
bstratum.
al or potential erosion hazard.
ss limitation caused by poor drainage
ng.
tion caused by slow permeability or
v permeability in the subsoil.
tion caused by coarse soil texture or
e gravel.
tion caused by fine soil texture.
tion caused by salt or alkali.
tion caused by stones or cobblestones.
tion caused by shallow depth of soil
rock or hardpan.
tion caused by low fertility.
tion caused by high content of or-
atter.

VI through VIII are given the non-
ral 1.

as

ty, capability classification is further
ting the land resource area in which
it occur. A land resource area is a
area that has a distinct combination
nanagement needs, and cropping sys-
terminous States in the nation have
156 land resource areas. Parts of
as are in Solano County. These areas
tionally as 15, 16, and 17 (*4*). Land
is made up of the Central California

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/III for range,

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alluvium from
are 0 to 2 per-
8 to 25 inches,
days. Permea-
y slow. Runoff
hazard. Avail-
s. The effective

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yfarmed small
almonds, apri-
n crops grown

ystem includes
amount of res-
ue soil helps to
es soil compac-
intake can be
green-manure
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age. Leveling is
water, and this
od management
nd reduces the

l for good crop
erally sufficient

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rained soil that
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fall is 18 to 25
30 to 280 days.
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ater capacity is
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system includes
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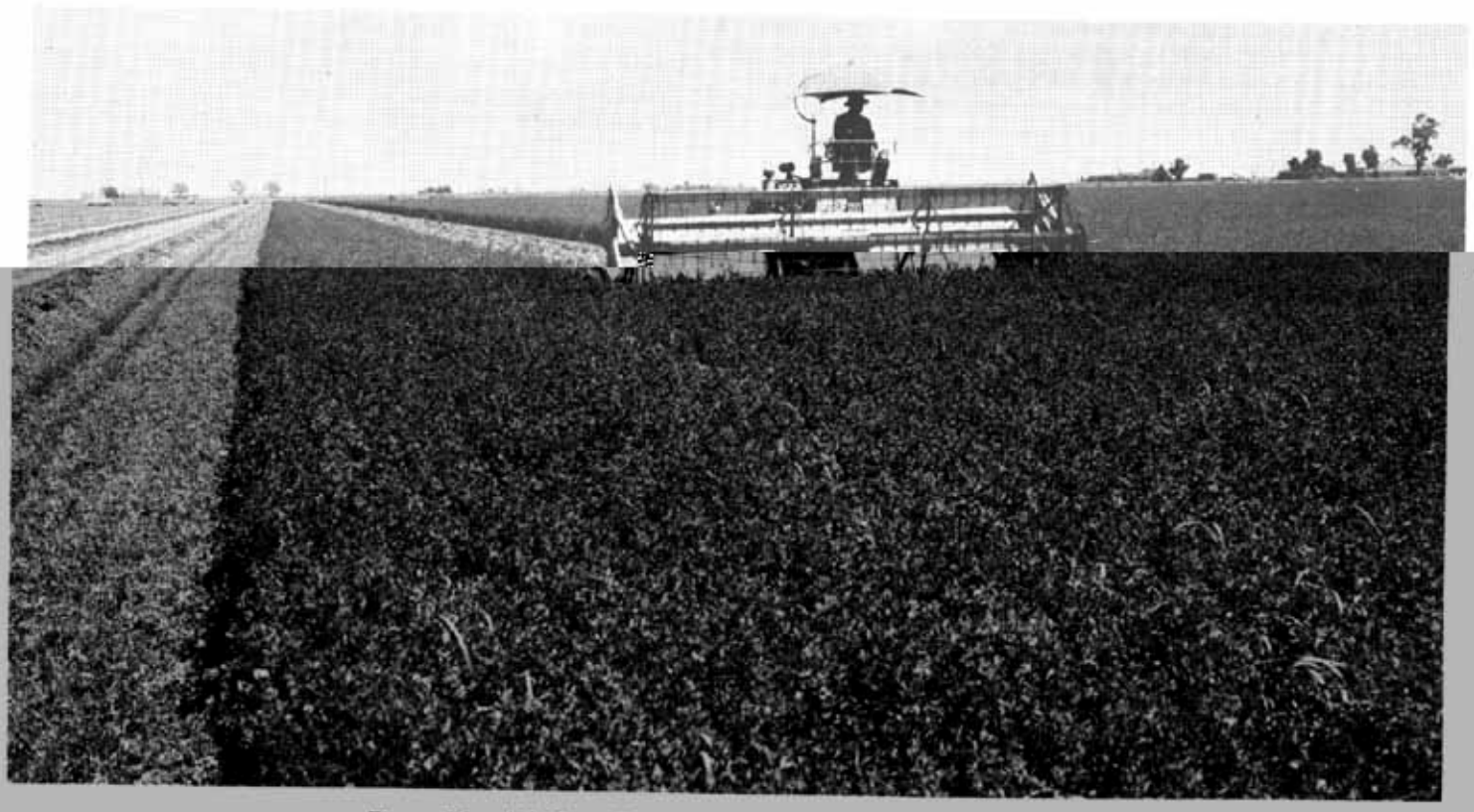

Figure 16.—Alfalfa on Brentwood clay loam, 0 to 2 percent slopes.

proved by growing cover crops and green-manure crops, and mulching, or by using a program for controlling weeds that does not include tillage. Leveling for irrigation or for smoothing out irregularities of slope can be done without permanently damaging the soil. Good management of irrigation water conserves water and helps to control erosion. Sprinkler irrigation should be used on the steeper slopes.

Nitrogen and phosphorus are needed for good crop growth.

CAPABILITY UNIT IIe-3(17)

This unit consists of well-drained loams and clay loams that have a heavy clay loam subsoil. These soils formed in alluvium washed from soils derived from sedimentary rocks. They are on alluvial fans. Slopes are 2 to 9 percent. The average annual rainfall is 20 to 25 inches, and the frost-free season is 240 to 260 days. Permeability is slow. Runoff is slow to medium. Erosion is a slight hazard. Available water capacity is 9 to 12 inches. The effective rooting depth is more than 60 inches.

Soils in this unit are suited to irrigated field crops, orchards, and pasture, and to dryfarmed grain. Prunes, alfalfa, and barley are the main crops grown.

A suitable conservation cropping system includes legumes and crops that produce a large amount of residue. Returning all crop residue to the soil helps to maintain tilth, reduces runoff and erosion, and improves water intake. Cross-slope cultivation is needed to reduce erosion. Proper tillage minimizes soil compaction and reduces runoff and erosion. In orchards, soil tilth, control of erosion, and water intake can be improved by growing cover crops and green-manure crops, and mulching, or by using a program for controlling weeds that does not include tillage. Leveling should be done cautiously to avoid excessive exposure of the slowly permeable subsoil. Good management of irrigation water conserves water and helps to control erosion.

Nitrogen and phosphorus are needed for good crop growth.

CAPABILITY UNIT IIs-3(17)

This unit consists of well-drained to moderately well drained loams to silty clay loams. These soils have a heavy clay loam to clay subsoil or a buried clay substratum. They formed in alluvium from mixed sources on alluvial fans and in basins. Slopes are 0 to 2 percent. The average annual rainfall is 16 to 25 inches, and the frost-free season is 240 to 290 days. Permeability is slow. Runoff is slow to very slow, and erosion is a slight hazard. Available water capacity is 9 to 12 inches. The effective rooting depth is more than 60 inches.

Soils in this unit are suited to irrigated row crops, field crops, and some orchard crops, and to dryfarmed small grain. Sugar beets, tomatoes, alfalfa, almonds, prunes, and barley are the main crops grown.

A suitable conservation cropping system includes legumes and crops that produce a large amount of residue. Returning all crop residue to the soil helps to

maintain tilth and improves water intake. Proper tillage minimizes soil compaction. In orchards, soil tilth and water intake can be improved by growing cover crops and green-manure crops, and mulching, or by using a program for controlling weeds that does not include tillage. Leveling for irrigation can be done without permanently damaging the soil. Good management of irrigation water is essential to prevent waterlogging of the soils and to prevent the formation of a perched water table.

Nitrogen and phosphorus are needed for good crop growth.

CAPABILITY UNIT IIs-4(17)

Conejo gravelly loam is the only soil in this unit. This is a well-drained soil that formed in alluvium from basic igneous rock and is on alluvial fans. Slopes are 0 to 1 percent. Average annual rainfall is 20 to 25 inches, and the frost-free season is 260 to 290 days. Permeability is moderate, runoff is slow, and erosion is a slight hazard. The available water capacity is 7 to 9 inches. The effective rooting depth is more than 60 inches.

This soil is used for orchards. The main crops grown are cherries, peaches, and grapes.

A suitable conservation cropping system includes legumes and crops that produce a large amount of residue. Proper tillage minimizes soil compaction. Returning all crop residue to the soil helps to maintain tilth. In orchards, soil tilth and water intake can be improved by growing cover crops and green-manure crops, and mulching, or by using a program for controlling weeds that does not include tillage. Leveling can be done without damaging the soil. Good management of irrigation water conserves water and reduces the leaching of nutrients.

Nitrogen and phosphorus are needed for good crop growth.

CAPABILITY UNIT IIs-5(17)

This unit consists of moderately well drained soils. These soils formed in alluvium from mixed sources and are on basin rims and in basins. Slopes are 0 to 2 percent. Average annual rainfall is 16 to 22 inches, and the frost-free season is 260 to 290 days. Permeability is slow. Runoff is very slow, and there is no hazard of erosion. The available water capacity is 8 to 10 inches. The effective rooting depth is more than 60 inches.

These soils are used for irrigated row crops and field crops, and for dryfarmed field crops. Sugar beets, tomatoes, grain sorghum, alfalfa, and barley are the main crops (fig. 17).

A suitable conservation cropping system consists of legumes and crops that produce a large amount of residue. Proper tillage minimizes soil compaction. Returning all crop residue to the soil helps to maintain tilth and to improve water intake. These soils can be tilled only when moist. If worked when too dry, the soils form large, hard clods, and if worked when too wet, the soils seal over. Leveling is needed for management of irrigation water, and surface drainage should be provided. Careful management of irrigation water is necessary to prevent waterlogging and the formation of a perched water table.

Figure 17.—**Irrigated sugar beets on Capay clay.**

Crops respond to nitrogen and phosphorus fertilizers.

CAPABILITY UNIT IIw-2(17)

This unit consists of somewhat poorly drained to poorly drained fine sandy loams to silty clay loams and of normally well-drained clay loams and loams that now have a fluctuating water table. All the soils formed in alluvium from mixed sources and are on alluvial fans. Slopes are 0 to 2 percent. Average annual rainfall is 16 to 25 inches, and the frost-free season is 250 to 290 days. Permeability is moderately rapid to moderately slow. Runoff is slow to very slow. Erosion is a slight hazard. Available water capacity is 7.5 to 12.0 inches. The water table is at a depth of 36 to 60 inches.

The soils in this unit are suited to irrigated row crops, hay crops, and orchards, and to dryfarmed small grain. Sugar beets, tomatoes, alfalfa, pears, prunes, and barley are the main crops grown. Long-lived, deep-rooted, deciduous fruit and nut trees are not well suited to the soils in this unit.

A suitable conservation cropping system includes legumes and crops that produce a large amount of residue. Returning crop residue to the soil helps to maintain tilth. Proper tillage minimizes soil compaction (fig. 18). In orchards, soil tilth and water intake can be improved by growing cover crops and green-manure crops, and mulching, or by using a program for controlling weeds that does not include tillage. Leveling is easily accomplished and is essential for good irrigation water management. Excess surface water must be removed. Good management of irrigation

Figure 18.—Management of crop residue on Sycamore silty clay loam.

water prevents waterlogging of the soil and keeps the high water table from rising higher. Open drains and tile drains help to maintain the water table at a fairly uniform depth.

Crops respond to nitrogen and phosphorus fertilizers.

CAPABILITY UNIT IIIe-1(15)

Millsholm loam, moderately deep variant, 2 to 9 percent slopes, is the only soil in this unit. This is a well drained soil that is underlain by sandstone at a depth of 20 to 36 inches. Slopes are 2 to 9 percent. Average annual rainfall is 20 to 25 inches, and the frost-free season is 230 to 250 days. Permeability is moderate, runoff is medium, and erosion is a slight hazard. The available water capacity is 3.5 to 5.5 inches. The effective rooting depth is 20 to 36 inches.

This soil is used for dryfarmed small grain, pasture, hay, and some orchard crops. The main dryfarmed grain is barley. Lana vetch and Hardinggrass are excellent for dry-farmed pasture. Excess pasture can be cut for hay.

A suitable conservation cropping system includes legumes and crops that produce a large amount of residue. Proper tillage minimizes soil compaction and reduces runoff and erosion. Cross-slope tillage should be practiced. Leaving crop residue and stubble on or near the surface helps to control erosion, to maintain soil tilth, and to improve water intake. Grazing should be controlled to maintain ground cover and to protect the soil from erosion.

Plants respond to nitrogen and phosphorus fertilizers.

CAPABILITY UNIT IIIe-3(15)

This unit consists of moderately well drained and well-drained soils that have a fine sandy loam to clay loam surface layer and a heavy clay loam to clay subsoil. These soils formed on terraces in mixed alluvium washed from soils derived from sedimentary rocks or on uplands from sandstone. Slopes are 2 to 9 percent. Average annual rainfall is 16 to 30 inches, and the frost-free season 225 to 280 days. Permeability is slow to very slow, runoff is medium, and erosion is a slight to moderate hazard. Available water capacity is 4 to 7 inches. The effective rooting depth is 20 to 30 inches to a clay subsoil or 30 to 40 inches to sandstone.

These soils are used for dryfarmed small grain, pasture, and hay, and for irrigated pasture. The main small grain is barley. Lana vetch and Hardinggrass are excellent for dryfarmed pasture. Shallow-rooted grasses and legumes grow well under irrigation. Excess pasture can be used for hay.

A suitable conservation cropping system includes legumes and crops that produce a large amount of residue. Proper tillage minimizes soil compaction and reduces runoff and erosion. Cross-slope tillage should be practiced. Leaving crop residue and stubble on or near the surface helps to control erosion, to maintain soil tilth, and to improve water intake. Careful management of irrigation water is necessary to avoid saturating the soil above the clay subsoil. Saturation could cause root rot, erosion, and leaching of plant nutrients. Leveling operations should be carefully planned to avoid deep cuts that would expose the clayey subsoil or sandstone. All outlets and waterways should be protected to prevent gullying.

Crops respond to a complete fertilizer containing nitrogen and phosphorus.

CAPABILITY UNIT IIIe-5(15 and 17)

This unit consists of well-drained clays or of poorly drained clays that are now drained. These soils formed on dissected terraces in weakly consolidated sediments or on alluvial fans in alluvium washed from soils derived from sedimentary rocks. Slopes are 2 to 9 percent. Average annual rainfall is 15 to 23 inches, and the frost-free season is 250 to 290 days. Permeability is slow, runoff is slow to medium, and erosion is a slight hazard. The available water capacity is 4 to 10 inches. The effective rooting depth is 28 inches to more than 60 inches.

These soils are used for dryfarmed small grain, pasture, and hay. The main dryfarmed grains are barley and wheat. Lana vetch and Hardinggrass are excellent for dryfarmed pasture. Excess pasture can be cut for hay.

A suitable conservation cropping system includes legumes and crops that produce a large amount of residue. Proper tillage minimizes soil compaction and reduces runoff and erosion. Crossslope tillage should be practiced. Leaving crop residue on or near the surface helps to maintain soil tilth, improves water intake, and aids in controlling erosion. Permanent vegetation protects waterways from erosion. Cover is needed in winter and in spring to control erosion. These soils form large cracks when dry, but the cracks close when the soils are thoroughly wetted. If these soils are tilled when too dry, they form large, hard clods, and if they are tilled when too wet, they seal over.

Crops respond to a complete fertilizer containing nitrogen and phosphorus.

CAPABILITY UNIT IIIs-3(17)

This unit consists of moderately well drained loams and fine sandy loams that have a clay or heavy clay loam subsoil. These soils formed on low terraces in alluvium washed from soils derived from sedimentary rocks. Slopes are 0 to 2 percent. Average annual rainfall is 16 to 22 inches, and the frost-free season is 250 to 280 days. Permeability is very slow, runoff is very slow, and erosion is not a hazard. The available water capacity is 4 to 6 inches. The effective rooting depth is 20 to 30 inches.

These soils are used for shallow-rooted, irrigated row crops, irrigated pasture, and dryfarmed grain. The main crops are sugar beets, grain sorghum, and barley.

A suitable conservation cropping system includes legumes and crops that produce a large amount of residue. Proper tillage minimizes soil compaction. Returning crop residue to the soil helps to maintain tilth and improves water intake. Leveling should be done carefully to avoid exposure of the clayey subsoil. Good management of irrigation water is essential to prevent temporary waterlogging of the soil and to prevent the formation of a perched water table.

Crops respond to nitrogen and phosphorus fertilizers.

CAPABILITY UNIT IIIs-4(17)

Tujunga fine sand is the only soil in this unit. This is an excessively drained soil that formed from mixed deposits dredged from the Sacramento River. Slopes are 0 to 3 percent. Average annual rainfall is 16 to 18 inches, and the frost-free season is 250 to 270 days. Permeability is rapid, runoff is very slow, and erosion is a slight hazard. The available water capacity is 3.5 to 4.5 inches. The effective rooting depth is more than 60 inches.

This soil is used for limited dryland pasture and irrigated orchard.

A suitable conservation system includes legumes and crops that produce a large amount of residue. Returning crop residue to the surface layer helps to control soil blowing, improves tilth, and maintains fertility. In orchards, soil tilth and water intake can be improved by growing cover crops and green-manure crops, and mulching, or by using a program for controlling weeds that does not include tillage. Proper management of irrigation water requires careful planning to prevent the leaching of nutrients and the wasting of water. Sprinkler irrigation is suitable for this soil.

Crops respond to a complete fertilizer containing nitrogen, phosphorus, and potassium.

CAPABILITY UNIT IIIw-2(16)

Ryde clay loam is the only soil in this unit. This is a poorly drained soil that contains 10 to 30 percent organic matter. It formed from mixed alluvium and hydrophytic plant remains in delta areas. Slopes are 0 to 1 percent. The average annual rainfall is 16 to 18 inches, and the frost-free season is 250 to 270 days. Permeability is moderate, runoff is very slow, and erosion is a slight hazard. Where this soil is drained, the available water capacity is 10 to 12 inches and the effective rooting depth is more than 60 inches. The water table is at a depth of 36 to 48 inches.

This soil is used for irrigated row crops and field crops and for dryfarmed grain. Corn, tomatoes, grain sorghum, small grain, safflower, and sugar beets are the main crops grown.

A suitable conservation cropping system includes legumes and crops that produce a large amount of residue. Proper tillage minimizes soil compaction. Returning all crop residue to the soil helps to maintain tilth and to improve water intake. Proper management of irrigation water requires careful planning to prevent the leaching of nutrients, waterlogging the soil, and raising the water table. Sprinkler irrigation is suitable for this soil. Open drains or tile drains are needed to keep the water table below the root zone for most crops (fig. 19).

Crops respond to lime and to nitrogen and phosphorus fertilizers.

CAPABILITY UNIT IIIw-3(17)

Sacramento silty clay loam is the only soil in this unit. This is a poorly drained soil that formed in alluvium from mixed sources and was deposited over buried clay in basins. Slopes are 0 to 1 percent. Average annual rainfall is 16 to 18 inches, and the frost-free season is 250 to 270 days. Permeability is slow, runoff is slow, and erosion is a slight hazard. Where this soil is drained, the available water capacity is 9 to 11 inches and the effective rooting depth is 60 inches. The water table is at a depth of 36 to 48 inches.

This soil is used for irrigated row crops and field crops and for dryfarmed grain. Tomatoes, sugar beets, corn, and barley are the main crops.

A suitable conservation cropping system includes legumes and crops that produce a large amount of residue. Proper tillage minimizes soil compaction. Returning crop residue to the soil helps to maintain tilth and improves water intake. Open drains and tile drains are needed to control the water table and

Figure 19.—Drainage ditch on Ryde clay loam.

thereby maintain a favorable condition in the rooting zone. Drainage is needed to remove excess surface water. Leveling is easily accomplished and aids in good management of irrigation water. Careful management of irrigation water is necessary to conserve water, to prevent waterlogging, and to keep the water table from rising.

Crops respond to nitrogen and phosphorus fertilizers.

CAPABILITY UNIT IIIw-5(17)

This unit consists of poorly drained clays and silty clays. These soils formed in basins in alluvium from mixed sources. Slopes are 0 to 1 percent. Average annual rainfall is 16 to 22 inches, and the frost-free season is 250 to 290 days. Permeability is slow, runoff is very slow, and erosion is a slight hazard. Where these soils are drained, the available water capacity is 7 to 10 inches and the effective rooting depth is more than 60 inches. The water table is at a depth of 20 to 60 inches.

These soils are used for irrigated row crops and field crops and for dryfarmed grain. The main crops are sugar beets, tomatoes, corn, grain sorghum, and barley.

A suitable conservation cropping system includes legumes and crops that produce a large amount of residue. Proper tillage minimizes soil compaction (fig. 20). Returning crop residue to the soil helps to maintain tilth and improves water intake. Drainage is needed to keep the water table at a suitable depth and to remove excess surface water. Leveling for irrigation and for surface drainage is not difficult, and it aids in good management of irrigation water. Management of irrigation water should be carefully planned to prevent waterlogging and to keep the water table from rising. These soils form large, hard clods if worked when too dry, and they seal over if worked when too wet.

Figure 20.—Sacramento clay fall plowed and left rough during winter has a favorable water-intake rate.

Crops respond to nitrogen and phosphorus fertilizers.

CAPABILITY UNIT IIIw-6(16, 17)

This unit consists of somewhat poorly drained silty clay loams that are affected by soluble salts. These soils formed on alluvial fans in alluvium from mixed sources. Slopes are 0 to 1 percent. Average annual rainfall is 16 to 25 inches, and the frost-free season is 250 to 270 days. Permeability is slow to moderately slow, runoff is slow, and erosion is a slight hazard. The available water capacity is 4 to 8 inches. The effective rooting depth, where these soils are drained, is more than 60 inches. The water table is at a depth of 36 to 60 inches.

These soils are used for irrigated pasture and row crops, dryfarmed field crops, and dryland pasture. The main crops are barley, grain sorghum, and hay.

A suitable conservation cropping system includes legumes and crops that produce a large amount of residue. Proper tillage minimizes soil compaction. Returning crop residue to the soil helps to maintain soil tilth and improves water intake. Open drains should be used to keep the water table at a fairly uniform depth. Salts should be leached to lower levels. Leveling of these soils is not difficult and is needed for good management of irrigation water and for land reclamation. Management of irrigation water prevents waterlogging and keeps the water table from rising.

Crops respond to fertilizers containing nitrogen and phosphorus.

CAPABILITY UNIT IVe-1(15)

This unit consists of well-drained loams. These soils formed from sandstone or basic igneous rock. Slopes are 9 to 30 percent. Average annual rainfall is 20 to 25 inches, and the frost-free season is 230 to 260 days. Permeability is moderate to moderately slow, runoff is medium, and erosion is a moderate hazard. The available water capacity is 3.5 to 7.0 inches. The effective rooting depth is 20 to 40 inches.

These soils are used for range, pasture, dryfarmed grain, and grass hay. Lana vetch or Hardinggrass is well suited to dryland pasture. Barley is the main grain grown

A suitable conservation cropping system includes legumes and crops that produce a large amount of residue. Proper tillage minimizes soil compaction and reduces runoff and erosion. Cross-slope tillage or plowing on the contour should be practiced. Returning crop residue to the soil and stubble-mulching on or near the surface help to reduce runoff, help to maintain tilth, and improve water intake. Grazing should be controlled to maintain ground cover and to protect the soil from erosion.

Plants respond to nitrogen and phosphorus fertilizers.

CAPABILITY UNIT IVe-3(15,17)

This unit consists of well drained to moderately well drained fine sandy loams, loams, gravelly loams, or clay loams. These soils formed on terraces in mixed alluvium derived from sedimentary rocks or formed in

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ITY UNIT IVw-9(16)

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Y UNIT VIe-1(15, 17)

well-drained loams, clay loams,
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The available water capacity is
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for range, dryland pasture, and
vetch is suitable for dryland

of these soils increases produc-
to the soils helps to prevent

erosion. These soils must be protected against overgrazing, which increases erosion. Leaving stubble after grazing helps to control erosion.

The vegetation generally responds to nitrogen and phosphorus fertilizers, which increase the amount of usable forage and extend the grazing period.

CAPABILITY UNIT VIw-1(16)

This unit consists of somewhat poorly drained to very poorly drained soils. These are saline soils that formed in mixed alluvium and hydrophytic plant remains or from materials dredged from bodies of saline water. They are commonly very high in organic-matter content or are mostly peats and mucks. The average annual rainfall is 15 to 20 inches, and the frost-free season is 240 to 280 days. Permeability is rapid to slow. The available water capacity is 6 to 19 inches. The effective rooting depth is 10 inches or more. The rooting depth is affected by the water table.

These soils are used for wildlife habitat and limited dryland and irrigated pasture (fig. 21).

A suitable system of conservation management includes drainage and leaching of salt. Levees and tide gates are needed to control the water. Pastures are irrigated at high tide by opening the tide gates. As the salt content of the soils is lowered, the quantity of the desirable vegetative species increases. Only salt- and water-tolerant grasses and forbs are suitable for pasture improvement.

The vegetation responds to nitrogen and phosphorus fertilizers.

Figure 21.—Pampasgrass used for wildlife habitat on Tamba mucky clay.

CAPABILITY UNIT VIIe-1(15)

This unit consists of well-drained sandy loams or loams that are cobbly in places. These soils formed on uplands in materials derived from sandstone or basalt. Slopes are 15 to 75 percent. The average annual rainfall is 20 to 30 inches, and the frost-free season is 220 to 260 days. Permeability is rapid to moderately slow, runoff is medium to rapid, and erosion is a moderate to high hazard. The available water capacity is 1.0 to 3.5 inches. The effective rooting depth is 10 to 20 inches.

These soils are used for range, wildlife habitat, watershed, and recreation.

Fire prevention and suppression are the major measures to be taken in the management of these soils and for the protection of areas downstream. Proper use of the soils increases the quality and quantity or forage. Cover must be maintained to help control erosion.

CAPABILITY UNIT VIIs-1(15)

This unit consists of well-drained and somewhat excessively drained, very shallow and shallow stony loams. These strongly sloping to moderately steep soils formed on uplands in materials derived from tuff or basic igneous rock. Slopes are 9 to 30 percent. The average annual rainfall is 20 to 25 inches, and the frost-free season is 240 to 260 days. Permeability is moderate, runoff is medium, and erosion is a high hazard. The available water capacity is 1 to 2 inches. The effective rooting depth is 6 to 17 inches.

These soils are used for range and wildlife habitat.

Proper use of the vegetation increases the quantity of desirable plants and the usable forage. Care must be taken to prevent overgrazing, because adequate cover is needed to control erosion. During years of light rainfall, it may be necessary to avoid grazing to maintain enough residue for erosion control and to insure that the annual plants will reseed themselves. Emergency seeding may be necessary to control erosion.

CAPABILITY UNIT VIIIs-1(15)

This unit consists of well-drained and somewhat excessively drained, very shallow loams and stony loams. These soils are on uplands. Slopes are 15 to 75 percent. The average annual rainfall is 20 to 40 inches, and the frost-free season is 220 to 260 days. Permeability is moderate, runoff is rapid, and erosion is a very high hazard. The available water capacity is less than 1 to 2.5 inches. The effective rooting depth is 5 to 15 inches.

These soils are used for wildlife habitat, watershed, and recreation.

Fire prevention and suppression are the major measures to be taken in the management of these soils and for the protection of areas downstream.

CAPABILITY UNIT VIIIw-1(16, 17)

This unit consists of Riverwash and Tidal marsh. Riverwash consists of excessively drained sandy and gravelly stream deposits that are subject to flooding and deposition. Tidal marsh is very poorly drained, strongly saline, stratified mineral and organic sedi-

(17), and IIs–5 (17). About 4.5 acre-feet of water per acre is applied annually. The water is applied about every 15 days, or twice between cuttings. Border irrigation is used where slopes are 0 to 1 percent, and sprinkler irrigation is used where slopes are 0 to 9 percent.

Group 2.—Soils in this group are in capability units IIw–2 (17), IIIw–3 (17), and IIIw–5 (17). About 4 acre-feet of water per acre is applied annually by border or sprinkler irrigation. The water is applied about every 14 days. Open-ditch or tile drains are used to keep the water table below the root zone.

IRRIGATED ALMONDS

Each year almond trees are selectively pruned, and 40 to 60 pounds of nitrogen per acre is applied. A cover crop of 20 pounds per acre of purple vetch, or 40 pounds of horse beans, or 8 pounds of Cucamonga brome, or 4 pounds of Blando brome, or 8 pounds of Wimmera 62 ryegrass, or 30 pounds of cereal grains per acre is grown. Frost is controlled by use of wind machines or smudge pots. Almonds are harvested in August and September by mechanical windrow and pickup.

The soil is not worked when too wet. Tillage operations are combined wherever possible. As needed, the soil is chiseled to break the plowpan, and the trees are sprayed to control diseases and insects.

Specific management practices by capability units follow:

Group 1.—Soils in this group are in capability units I–1 (17), IIe–1 (17), IIe–3 (17), IIs–3 (17), IIs–4 (17), IIIe–1 (15), and IIIe–3 (15). About 1.7 acre-feet of water per acre is used annually for irrigation. Water is applied about every 42 days. Basin, border, or furrow irrigation is used where slopes are 0 to 2 percent, and sprinkler irrigation is used where slopes are 0 to 9 percent. In preparation for harvest, the soil is disked twice, spring toothed three times, and landplaned or the cover crop is mowed and the residue left on the soil.

Group 2.—Soils in this group are in capability unit IIIs–4 (17). These soils are irrigated about every 10 days and receive about 4 acre-feet of water per acre annually. The cover crop is mowed and left as a mulch.

IRRIGATED APRICOTS

Apricots are selectively pruned each year. About 40 to 60 pounds of nitrogen per acre is applied annually. A cover crop of 20 pounds per acre of purple vetch, or 40 pounds of horse beans, or 8 pounds of Cucamonga brome, or 4 pounds of Blando brome, or 8 pounds of Wimmera 62 ryegrass, or 30 pounds of cereal grains for acre is grown. Frost is controlled by use of wind machines or smudge pots. Apricots are handpicked between May 20 and June 20.

The soil is not worked when too wet, and as many tillage practices as practicable are combined. As needed, plowpans are chiseled, and the trees are sprayed to help control insects and diseases.

TABLE 2.—*Predicted average acre yields of*

[No estimates are given for soils on which a particular

	Irrigated crops				
	Alfalfa	Almonds	Apricots	Lima beans	Corn
	Tons	*Pounds*	*Tons*	*Hundredweight*	*Hundredweight*
s					
es, eroded					
nplex, 2 to 9 percent					
nplex, 9 to 30 percent					
t slopes					
nt slopes, eroded					
percent slopes				15	
percent slopes					
rface, 0 to 2 percent					
rface, 2 to 9 percent					
slopes	8.5	2,200	8.0	30	100
slopes	8.5	2,200	8.0		
	7.5			25	60
	7.0				
s	7.0				
s					
nt slopes					
	8.0				110
	8.5	2,100	7.0	30	95
	8.5	1,500	5.0		
	8.5	2,100	7.0	30	95
	7.5			30	90
nt slopes, eroded					
pes					
opes, eroded					
t slope		1,200	4.0		
nt slopes					
ercent slopes		1,200	4.0		
percent slopes					
	8.0				110
flooded				30	100
lopes					
rcent slopes					
riant, 2 to 9 percent		1,200	4.0		
iant, 9 to 30 percent					
	7.0				100
	8.5	2,250	8.0	30	100
	7.0	1,800	6.0		
pes	7.5	1,800	6.0	25	60
pes	7.0	1,800	6.0		
					110
	7.5			30	100
ally flooded				30	90
	7.0				100
nt slopes					
pt slopes					
face, 0 to 2 percent					

principal crops under optimum management

crop is not grown or for soils to which a crop is not suited]

Irrigated crops—Continued					Dryfarmed crops		Pasture	
Grain sorghum	Pears	Prunes, dry	Sugar beets	Tomatoes	Barley	Wheat	Irrigated	Dryfarmed
Hundredweight	*Tons*	*Tons*	*Tons*	*Tons*	*Hundredweight*	*Hundredweight*	*Animal-unit-months* [1]	*Animal-unit-months* [1]
					35	25		5.0
					32	23		5.0
					20			4.0
					18			4.0
					35	25		5.0
					33	23		5.0
					12		8	[2] 1.0
45			10		14		12	3.0
					14		12	3.0
55			12		18		12	3.5
					18		12	3.5
65		1.8	26	30	36		20	
		1.7			35		20	
60			25	27	30		16	
60			25	25	30		16	
60			25	25	30		16	
					25		16	5.0
					15		12	[2] 2.0
65	12		25	30	35	25		
65	12	1.8	30	30	35		20	
		1.0						
65	12	1.8	30	30	35		20	
65	10		24	25	28		18	
					13			2.5
					35	25		5.0
					30	23		5.0
					20		12	4.5
					18			4.5
					20		12	4.5
					18			4.5
65			30	30	35	25	20	
65			30	27				
								4.0
							[3] 6	
							[3] 6	
					10		10	2.5
								2.0
					20			4.0
					18			4.0
					12		10	[2] 1.5
60			24	30	35		18	
					15		10	[2] 1.0
					12		9	[2] 1.0
65			27	20	30		18	
								[2] 2.0
							[3] 6	
		1.7			30		18	3.0
65			25	27	30		18	
		1.8			30		18	3.0
65			25	25	30	45		
60			25	30	35		18	
60			23	27	35		18	
60			24	30	35		18	
45			10		15		12	3.0
45			10		15		12	3.0
55			12		20		14	3.5
			10		15		12	[2] 1.5
			8		15		12	[2] 1.5
					15		12	[2] 1.5

rage acre yields of

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30	90
30	100
30	100
30	90
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percent for factor X.
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	Index rating
.....	80 to 100
.....	60 to 80
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.....	20 to 40
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ized in Solano County.

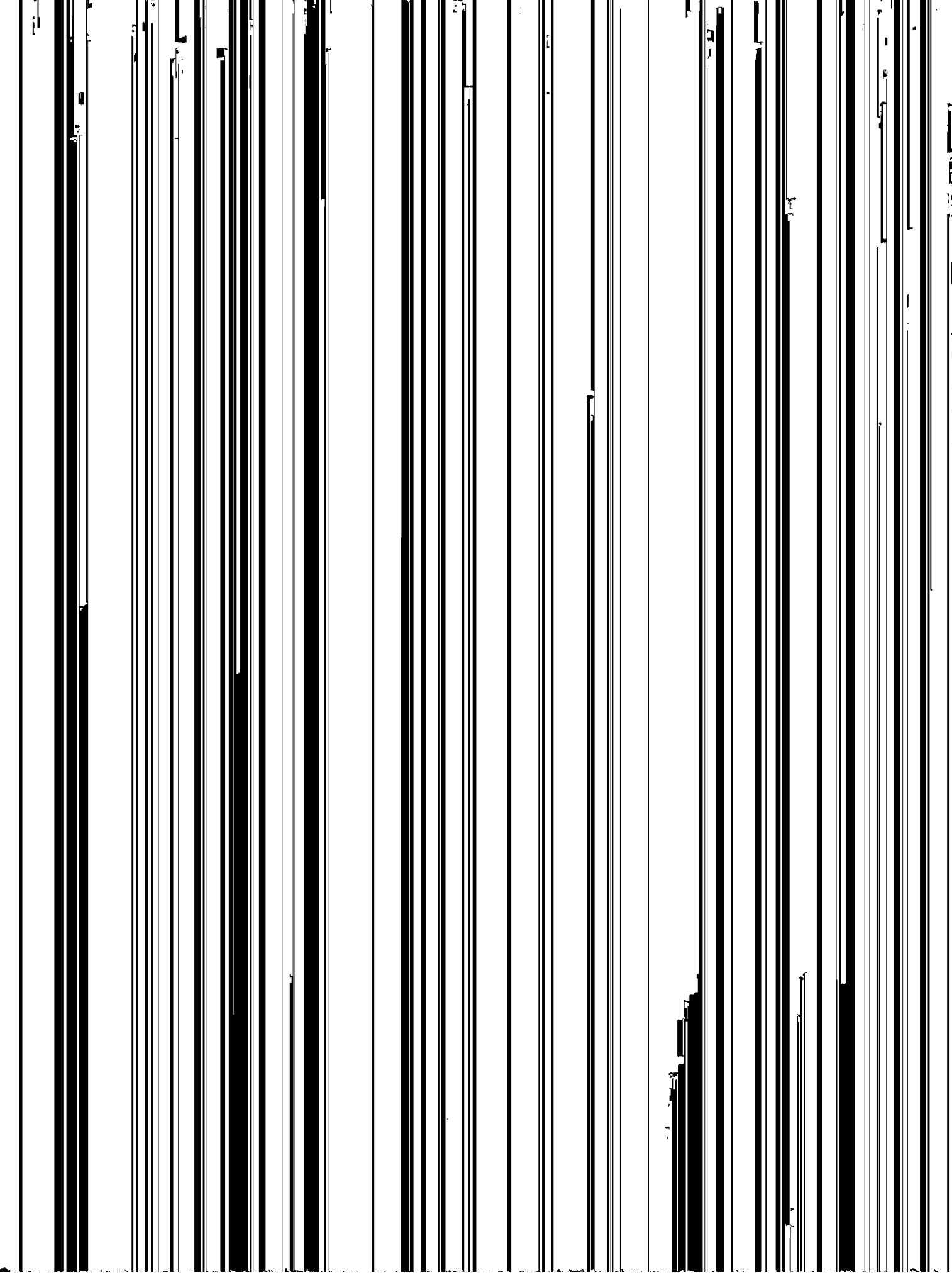

Figure 22.—**Farm pond on Dibble-Los Osos clay loams, 9 to 30 percent slopes.**

some desirable and less desirable plants, but it contains mostly undesirable plants. In places there are thick stands of buckbrush, manzanita, and oak, especially where the exposure is northerly.

Where an adequate seedbed can be prepared, the soils in this site can be seeded to Hardinggrass or reseeded to annual grases and legumes. Plants on these soils respond well to applications of nitrogen, phosphorus, and sulfur. On slopes where equipment can be used safely, clearing brush increases forage production.

The estimated total annual air-dry production on this site is 3,300 pounds per acre in favorable years and 1,600 pounds per acre in less favorable years. About 85 percent of this production is from plants that furnish forage for cattle, sheep, or deer.

CLAYEY RANGE SITE

This site consists of clay loams and clays that are generally 25 to 35 inches deep over softly consolidated material or sandstone. Slopes are 30 to 50 percent. Elevation ranges from 50 to 500 feet. The average annual precipitation is 15 to 23 inches. This site occupies about 3,000 acres in the county. It includes areas of clay soils that are used for range and have slopes of less than 30 percent.

Available water capacity is 4 to 6 inches. Permeability is moderately slow to slow. Reaction is generally slightly acid to moderately alkaline in the surface layer and moderately alkaline and calcareous in the substratum. These soils are subject to erosion if the plant cover is not maintained.

The plant cover on this site typically is open grass or grass and scattered oak trees. Small areas, especially where the exposure is northerly, have dense stands of blue oak, live oak, manzanita, and buckbrush. The vegetation on this site is mostly annual grasses and forbs. If production is at its potential, about 70 percent of the herbage is a mixture of desirable plants, including

soft chess, ryegrass, filaree, annual clovers, remnants of perennial grasses, and an excellent stand of burclover and wild oats. About 20 percent of the vegetation is less desirable plants, including ripgut brome, red brome, wild barley, squirreltail, and annual lupine. The remaining 10 percent consists of undesirable plants, including annual fescues, medusahead, nitgrass, dogtail, tarweed, fiddleneck, popcorn flower, vinegarweed, turkeymullein, thistles, and mustard. In poor condition this site contains some desirable and less desirable plants, but the undesirable plants are dominant. Woody plants commonly increase and replace herbaceous plants as the condition of the site declines.

Where an adequate seedbed can be prepared, the soils in this site can be seeded to Hardinggrass or reseeded to annual grasses and legumes. These soils respond well to applications of nitrogen, phosphorus, and sulfur.

The estimated total annual air-dry production on this site is 3,600 pounds per acre in favorable years and 2,000 pounds per acre during less favorable years. About 90 percent of this production is from plants that furnish forage for cattle, sheep, and deer.

CLAYPAN RANGE SITE

This site consists of gravelly loams and sandy loams that are 14 to 30 inches deep to a dense clay subsoil. Slopes are 2 to 30 percent. Elevation rages from 25 to 250 feet. The average annual precipitation is 16 to 25 inches. This site occupies about 3,100 acres in the county. It includes a sizable acreage of soils that have a claypan and are arable but are being used for range.

The available water capacity is 2.0 to 4.5 inches, but some additional moisture is slowly available to some plant roots in the clay subsoil. Reaction is strongly acid to slightly acid in the surface layer and neutral to strongly acid in the subsoil.

The plant cover on this site typically is open grass or grass and oak trees. The vegetation is mostly annual grasses and forbs, but a limited amount of brush grows on some north-facing slopes. Among the woody plants are live oak, blue oak, buckrush, and manzanita. These woody plants normally are in open, scattered stands or in small patches where the exposure is northerly.

If production is at its potential, about 70 percent of the herbage on this site is a mixture of desirable plants, including soft chess, wild oats, filaree, Spanish clover, annual clovers, a small amount of burclover, and remnants of perennial grasses. About 20 percent of the vegetation is less desirable plants, including ripgut brome, red brome, wild barley, wild carrot, and annual lupine. The remaining 10 percent consists of annual fescues, medusahead, dogtail, silver hairgrass, nitgrass, plantain, fiddleneck, tarweed, popcorn flower, and other undesirable plants. In poor condition this site contains some desirable and less desirable plants, but undesirable plants are dominant. Woody plants commonly increase as the condition of the site declines.

The soils in this site can be reseeded to annual grasses and legumes. Plants on these soils respond well to applications of nitrogen, phosphorus, and sulfur.

The estimated total annual air-dry production on this site is 2,000 pounds per acre in favorable years and 1,000 pounds per acre in less favorable years. About 70 percent of this production is from plants that furnish forage for cattle. Almost 90 percent is forage that is useful to sheep and deer.

SHALLOW LOAMY RANGE SITE

This site consists of loams and cobbly clay loams that are 10 to 20 inches deep over sandstone or basic igneous rock. Slopes are 15 to 75 percent, but only about 10 per cent of the area has slopes that are less than 30 percent. Elevation ranges from 300 to 2,300 feet. The average annual precipitation is 20 to 30 inches. This site occupies about 25,000 acres in the county.

The available water capacity is 1.5 to 3.5 inches. Reaction is slightly acid to medium acid.

The plant cover on this site typically is open grass or grass and oak trees (fig. 23). Some areas, especially where the exposure is northerly, are covered by dense brush. Except for scattered oak trees and occasional dense patches of oak, buckbrush, and manzanita, the vegetation is mostly annual grasses and forbs.

If production is at its potential, about 70 percent of the herbage on this site is a mixture of desirable plants, including soft chess, wild oats, remnant perennials, filaree, burclover, annual clovers, Spanish clover, and annual lupine. About 20 percent of the vegetation is less desirable plants, including ripgut brome, wild barley, wild carrot, yarrow, and lupine. As much as 10 percent of the vegetation is undesirable plants, including annual fescues, nitgrass, silver hairgrass, dogtail, popcorn flower, fiddleneck, tarweed, and thistle. In poor condition this site contains some desirable and less desirable plants, but undesirable plants are dominant. Woody plants commonly increase as the condition of the site declines.

Figure 23.—**Shallow Loamy range site on Millsholm loam, 15 to 30 percent slopes.**

doves are hunted through-
several commercial hunting
,000 pheasant annually for
ly managed areas. Califor-
vestern part of the county.
mportant, and most areas
ting are used by more than
and are in a State wildlife
ed deer, the only big-game
abundant in the western

ut. Bass, bluegill, and some
stocked in local ponds and
ack bass, and some species
ngame fish are plentiful in
in the southern part of the
and sturgeon are in the
wildlife, including jackrab-
otes, meadowlarks, white-
ther birds, also is in the

County occupies a wide va-
rticular habitat chosen de-
and character of the land-
e of farm development and
ristics of the soils have dif-
ality of the habitat for any
ily through the food and
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are grouped into nine wild-
rding to their characteris-
t the growth of plants that
gement of wildlife habitat.
oup for each soil in indi-
pping Units" at the back of
n of relative value of the
specific wildlife species re-
s of food, water, and cover
ment.
in each of the wildlife suit-
itability of these plants to
indicated in table 3. Plants
wildlife in the county are
oil group if they are natu-
xpected to grow well under
gation, or both. Plants are
to a soil group if they are
moderate to high degree of
establish them in quantities
e to wildlife, or both. Plants
unknown if they are not
heir suitability is not known.
er game and nongame wild-
rated as well suited for use
rticular kind of wildlife if
or excellent cover, or both.
ately suited if they provide
h. Plants are rated as un-
provide little or no food or
of wildlife or if their value

e wildlife are defined in the

TABLE 3.—*Suitability of specified plants for wildlife groups of soils and for specified kinds of wildlife*

[An Arabic number 1 means the plant named is suited to the wildlife group or has high value for the kind of wildlife; 2 means suitability of the plant is fair to marginal for the wildlife group or kind of wildlife; dashes in the columns mean the plant is not suited to soils of the wildlife group or its suitability is not known, or that the plant seldom is used by the particular kind of wildlife or its use is not known]

Plant	Wildlife group and rating									Kind of wildlife and rating								
	1	2	3	4	5	6	7	8	9	Deer	Pheasant	California quail	Mourning dove	Ducks	Geese	Other game and nongame wildlife		
																Open-land	Brush-land	Wet-land
Acacia, dwarf	1	2	2	1	2	2	2	1	2	–	2	1	2	–	–	2	1	–
Alfalfa	1	–	2	2	–	–	–	2	–	–	1	2	–	2	2	2	–	–
Alkali bulrush	1	–	1	1	1	1	–	–	1	1	2	–	2	1	1	–	–	1
Arizona cypress	1	2	2	1	2	–	2	1	–	–	2	1	2	–	–	2	1	–
Athel tree	1	2	–	1	2	1	–	1	2	–	2	2	2	–	–	2	2	–
Barley	1	1	1	1	1	2	2	1	–	2	1	1	2	1	1	1	1	2
Birchleaf mountain-mahogany	1	2	2	2	–	–	1	1	–	1	–	2	–	–	–	–	1	–
Blackberry	1	2	1	2	1	2	–	1	1	2	1	1	2	–	–	1	1	–
Bluegum, dwarf	1	2	2	1	2	2	–	1	2	–	2	1	2	–	–	2	1	–
Bottlebrush	1	2	1	1	2	2	2	1	2	–	2	2	2	–	–	2	2	–
Buckbrush	1	2	2	2	–	–	1	1	–	1	–	2	–	–	–	–	2	–
Chamise	–	2	–	1	–	–	1	1	–	1	–	–	–	–	–	–	–	–
Clovers, annual	1	1	1	1	1	2	1	1	–	1	2	1	2	–	–	2	2	–
Clover, bur	1	2	1	1	1	2	2	1	–	1	2	1	2	–	–	2	2	–
Corn, ear	1	–	1	1	1	–	–	2	–	1	1	2	2	1	1	2	2	2
Fat hen	1	–	1	2	1	2	–	–	1	–	1	1	1	1	1	1	1	1
Filaree	1	1	1	1	–	2	1	1	–	2	2	1	2	–	–	1	1	–
Grain sorghum	1	2	1	1	1	2	–	1	–	2	1	1	1	2	2	1	1	2
Hollyleaf cherry	1	2	–	–	–	–	2	2	–	1	2	1	1	–	–	2	1	–
Lupine, annual	1	1	2	1	–	2	2	1	–	2	2	1	1	–	–	1	1	–
Manzanita	1	–	–	1	–	–	1	1	–	2	–	2	–	–	–	–	2	–
Multiflora rose	1	–	1	2	1	–	–	2	–	–	1	1	2	–	–	1	1	–
Oaks	1	–	2	2	2	–	2	1	–	1	–	1	2	1	–	1	1	–
Oleander	1	–	1	1	1	2	2	1	–	–	2	2	2	–	–	1	1	–
Pampasgrass	1	1	1	1	1	1	2	1	2	–	2	2	2	–	–	1	2	–
Poison-oak	1	2	–	1	–	–	1	1	–	1	–	2	–	–	–	–	2	–
Pyracantha	1	–	1	2	2	–	–	1	–	1	1	1	1	–	–	1	1	–
Quailbush	1	1	1	1	1	1	2	1	2	2	1	1	1	–	–	1	1	–
Redmaids	1	1	1	1	2	2	2	1	–	–	2	1	1	–	–	1	1	–
Russian-olive	1	–	2	1	2	2	–	1	–	–	1	1	1	–	–	1	1	–
Ryegrass	1	1	1	1	1	2	1	1	–	2	1	2	–	–	2	2	2	–
Safflower	1	2	1	1	1	2	2	1	2	–	1	1	1	2	–	1	1	–
Saltcedar	1	1	1	1	1	1	–	1	1	–	2	2	2	–	–	2	2	–
Soft chess	1	1	1	1	2	2	1	1	–	2	–	2	–	–	–	2	2	–
Sunflower	1	2	1	1	1	–	–	1	–	–	1	1	1	–	–	1	1	–
Tarweed	1	1	1	1	2	1	1	1	–	–	2	1	2	–	–	1	1	–
Toyon	1	2	–	1	–	–	2	1	–	2	2	1	–	–	–	2	1	–
Trefoil	1	–	1	1	1	2	–	–	–	1	1	2	1	2	1	1	1	2
Turkeymullein	1	1	1	1	2	1	1	1	2	–	2	1	1	–	–	2	2	–
Vetch	1	2	1	1	2	2	1	1	–	1	1	1	1	–	–	1	1	–
Watergrass	1	–	1	1	1	–	–	2	–	–	1	1	1	1	1	1	1	1
Wheat	1	2	1	1	–	2	2	1	–	2	1	1	1	1	1	1	2	1
Wild oats	1	1	1	1	1	2	1	1	2	2	1	2	2	2	–	2	2	–

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These soils are used mainly for irrigated pasture or row crops, but they are well suited to ponding of water and management for waterfowl, fish, and wetland nongame wildlife. The soils are well suited to the management of habitat for pheasants and moderately suited to the management of habitat for doves, quails, and open-land nongame wildlife. Development of duck clubs and management of areas for pheasant hunting have good potential for economic return, as does development of commercial fishponds.

WILDLIFE SUITABILITY GROUP 6

This group consists of somewhat poorly drained to poorly drained, nearly level soils that are affected by salts or alkali, or both. These soils are in basins and on basin rims, in narrow drainageways, along marsh rims, on old terraces, and on alluvial fans. The soils have a rooting depth of more than 6 inches and have a loam to clay surface layer.

Permeability is slow to very slow. The available water capacity is 2 to 10 inches.

These soils are well suited to the ponding of water for waterfowl, fish, and wetland nongame wildlife. The soils are moderately suited to management of habitat for upland game, such as pheasants, quails, and doves, and for open-land nongame wildlife. The salt and alkali content of these soils limits the kinds of plants that can be used for wildlife habitat management, especially where irrigation water is not available. Development and management of these soils as habitat for waterfowl and for commercial fish production have good potential for economic return where adequate water is available.

WILDLIFE SUITABILITY GROUP 7

This group consists of well-drained to somewhat excessively drained, shallow, strongly sloping to very steep soils on mountainous uplands along the western side of the county. These soils are less than 20 inches deep and have a sandy loam to clay loam surface layer that is stony or cobbly in places. Irrigation water is not generally available. Soils of this group occupy about 45,000 acres.

Permeability is rapid to moderately slow. The available water capacity ranges from less than 1 inch to 3.5 inches.

These soils, which are mostly in chaparral, are suited mainly to the management of existing habitat for deer, quails, and brushland nongame wildlife. There is a shortage of water for wildlife in the area, and the potential for development of small ponds for wildlife drinking water, for fish, and for fire protection is very limited. Leasing of hunting rights for deer and quails has good potential for economic return.

WILDLIFE SUITABILITY GROUP 8

This group consists of well-drained to poorly drained, moderately deep to deep, gently sloping to steep soils. These soils are mainly in the Montezuma and Potrero Hills and on the lower foothills in the western part of the county. They are more than 20 inches deep and have a loam to clay surface layer. Irrigation water generally is not available. Soils of this group occupy about 122,000 acres.

Permeability is moderate to moderately slow. Available water capacity is 3 to 10 inches.

These soils are generally used for annual grain and pasture. They are well suited to management for quails and doves and moderately suited to management for pheasants if adequate water and cover are available or are provided. They are well suited to brushland and open-land nongame wildlife and to management for deer in the lower foothills. The soils are well suited to impoundment of water for fish and for general recreational uses where there are adequate sites. These soils are moderately suited to impoundment of water for waterfowl habitat. The development and use of these soils as habitat for deer, quail, dove, and pheasant hunting preserves have good potential for economic return.

WILDLIFE SUITABILITY GROUP 9

This group consists of poorly drained to very poorly drained, saline-acid soils that are mainly in the Suisun and Sears Point marshes near sea level. These soils are more than 60 inches deep and range from clay mineral soils to organic soils. Irrigation water is available in some areas. Soils of the group occupy 56,000 acres.

These soils are strongly saline and strongly acid to extremely acid. Permeability is slow to rapid. The available water capacity generally is more than 3.0 inches.

Soils in this group are used mainly for waterfowl habitat and are well suited to this use, as well as to use by wetland nongame wildlife (fig. 24). The mineral soils are moderately suitable for pheasant habitat where fresh water is available. The development and management of these soils for use as waterfowl habitat and pheasant preserves has good potential for economic return, but the kinds of plants suitable for use in habitat management are limited by the high salt content of the soils. These soils are well suited to the permanent impoundment of water for fish, though the salt content of the water limits the number of species that can be produced.

Figure 24.—**Duckpond on Joice muck.**

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TABLE 4.—*Engineering*

[Tests performed by California

	California report No.	Depth	Moisture density [1]	
			Maximum dry density	Optimum moisture
		Inches	*Lb. per cu. ft.*	*Pct.*
rocks.	65–0075	0–5	115	13
	65–0076	19–34	112	16
	65–0077	60–76	118	12
rocks.	65–0064	5–21	109	13
	65–0065	62–81	116	14
	65–0043	0–4	109	15
	65–0044	13–23	114	15
rocks.	67–4231	0–6	94	23
	67–4225	31–45	82	25
	67–4222	45–60	86	27
	67–4227	0–12	110	15
	67–4226	12–38	108	17
	67–4224	0–5	110	17
	67–4229	5–19	116	14
	65–0045	0–8	120	12
	65–0046	8–17	123	14
rocks.	65–0066	0–4	104	15
	65–0067	14–22	116	12
	65–0068	47–58	117	9
mains.	67–4228	0–8	71	38
	67–4223	41–44	53	65
rocks.	65–0061	0–7	122	13
	65–0062	14–28	114	13
	65–0063	40–54	115	12
rocks.	65–0072	0–4	108	16
	65–0073	9–21	118	11
	65–0074	48–62	114	14
	67–4230	0–13	103	11

oils and aggregates, test method No. Calif. 216E.

esults by this procedure frequently may differ somewhat Conservation Service (SCS). In the AASHO procedure, ractions are calculated on the basis of all the material, tre, the fine material is analyzed by the pipette method of grain-size fractions. The mechanical analyses used in

ways]

Mechanical analysis [2]								Liquid limit	Plasticity index	Classification	
ntage passing sieve—				Percentage smaller than—							
4 7 a.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO [3]	Unified [4]
----	100	96	65	60	46	25	17	23	3	A–4(4)	ML
----	----	100	84	79	67	50	42	43	25	A–7–6(22)	CL
----	100	98	67	62	51	33	24	26	9	A–4(5)	CL
----	----	100	97	90	75	63	44	49	21	A–7–6(24)	CL
----	100	97	83	80	69	51	40	45	31	A–7–6(25)	CL
----	100	97	89	84	69	48	34	36	13	A–6(12)	CL
----	100	97	88	83	69	50	36	51	32	A–7–6(22)	CH
----	100	98	94	93	83	63	42	61	27	A–7–5(31)	OH
----	100	97	93	92	85	71	53	79	30	A–7–5(39)	MH
----	100	98	96	96	90	74	59	80	39	A–7–5(48)	MH
94	83	73	58	55	44	29	15	33	5	A–4(4)	ML
98	80	71	58	55	45	29	19	35	9	A–4(4)	ML
100	96	87	69	66	49	22	16	31	([6])	A–4(6)	ML
100	94	84	68	65	54	29	15	29	8	A–4(5)	CL
----	100	94	41	38	21	20	15	22	([6])	A–4(1)	SM
----	100	93	42	40	23	21	17	22	([6])	A–4(1)	SM
----	100	98	91	84	68	45	33	44	15	A–7–6(17)	ML
----	100	98	87	82	70	53	43	54	40	A–7–6(36)	CH
100	98	96	79	73	61	45	37	40	22	A–6(16)	CL
100	97	87	71	69	59	42	25	75	8	A–5(11)	OH
100	97	92	84	83	72	59	44	101	29	A–7–5(32)	OH
100	98	94	50	48	37	21	15	18	([6])	A–4(2)	ML–SM
----	100	97	65	62	54	42	38	40	25	A–6(14)	CL
----	100	98	50	46	40	30	23	33	27	A–6(8)	CL–SC
----	100	97	77	70	53	27	19	30	([6])	A–4(7)	ML
----	100	98	81	77	64	44	37	33	16	A–6(12)	CL
100	95	92	83	78	64	43	34	56	36	A–7–5(32)	CH
91	76	57	38	35	29	16	8	([7])	([7])	A–4(6)	SM

ASHO Designation M 145–49(*1*).
he Unified soil classification system (*18*). SCS and Bureau of Public Roads have agreed to consider that all soils having plas-
hin two points from A-line are to be given a borderline classification. Examples of borderline classifications obtained by this
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mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for referring of this table. The symbol < means less than]

Percentage passing sieve—				Atterberg values		Permeability	Available water capacity	Reaction	Salinity	Shrink-swell potential	Corrosivity (uncoated steel)
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	Liquid limit	Plastic index						
						In. per hr.	*In. per in. of soil*	*pH*	*Mmhos./ cm. at 25°C.*		
100	100	90–100	75–95	50–60	30–40	0.06–0.2	0.14–0.16	6.1–8.4	0–2	High	High.
100	100	95–100	85–95	30–40	15–25	0.06–0.2	0.19–0.21	7.4–8.4	0–2	Moderate	High.
100	100	95–100	90–95	30–40	15–25	0.06–0.2	0.07–0.10	6.6–8.4	8–30	High	High.
100	100	90–100	60–70	20–30	0–10	0.63–2.0	0.15–0.17	5.6–6.5	0–1	Low	Low.
100	100	95–100	80–90	40–50	20–30	<0.06	0.04–0.06	5.6–9.0	0–2	High	High.
100	100	90–100	75–95	50–60	30–40	0.06–0.2	0.14–0.16	7.9–8.4	0–2	High	High.
100	100	90–100	70–80	30–40	10–20	0.06–0.2	0.18–0.20	7.9–8.4	0–2	Moderate	Moderate.
100	100	95–100	90–100	40–50	15–25	0.2–0.63	0.19–0.21	6.1–8.4	0–2	High	High.
100	100	95–100	90–95	30–45	15–25	0.06–0.2	0.16–0.18	6.1–8.4	0–2	High	High.
100	100	95–100	80–100	40–55	20–35	0.06–0.2	0.14–0.16	6.1–8.4	0–2	High	High.
100	95–100	90–100	80–95	50–70	35–55	0.06–0.20	0.14–0.16 (0.10–0.12 in CIA)	6.1–8.4	0–15	High	High.
100	100	70–85	40–50	0–20	0–10	2.0–6.3	0.13–0.15	6.1–8.4	0–1	Low	Moderate.
100	100	85–95	60–75	20–30	0–10	0.20–2.0	0.16–0.18	6.1–7.8	0–1	Moderate	Moderate.
65–75	55–70	50–65	40–50	20–30	0–10	0.63–2.0	0.12–0.14	6.1–7.8	0–1	Low	Low.
100	100	90–100	70–80	30–40	20–30	0.2–0.63	0.19–0.21	6.1–7.8	0–1	Moderate	Moderate.
65–75	55–70	50–65	40–50	20–30	0–10	0.63–2.0	0.13–0.15	5.1–6.0	0–1	Low	Low.
70–95	65–95	60–95	50–90	40–50	25–35	<0.06	0.03–0.05	5.6–6.5	0–2	High	High.
50–90	45–90	30–55	15–30	(2)	(2)	<0.06	0.03–0.05	6.6–8.4	0–1	Low	Moderate.
100	100	90–100	75–95	60–70	40–50	0.06–0.20	0.14–0.16	6.1–8.4	0–2	High	High.
100	100	85–95	60–70	20–30	0–10	0.63–2.0	0.16–0.18	5.6–6.5	0–1	Moderate	Low.
100	100	95–100	85–95	50–60	30–40	0.06–0.20	0.15–0.17	6.1–7.3	0–2	High	High.
100	100	95–100	80–90	30–40	10–20	0.2–0.63	0.18–0.20	5.6–6.5	0–1	Moderate	Moderate.
100	100	95–100	85–95	50–60	30–40	0.06–0.2	0.15–0.17	6.1–7.3	0–2	High	High.
100	100	95–100	90–100	60–80	25–40	0.2–0.63	0.19–0.21	5.6–6.5	0–1	High	High.

TABLE 5.—*Estimated soil properties*

Soil series and map symbols	Depth to—		Depth from surface of typical profile	Classification			Percentage greater than 3 inches
	Bedrock	Seasonal high water table		USDA texture	Unified	AASHO	
	Ft.	*Ft.*	*In.*				
Gaviota: GaG2	½–1	(1)	0–12 12	Sandy loam Sandstone and shale.	SM	A–2	0
Gilroy: GlE	1½–3½	(1)	0–38 38	Loam Igneous rock.	ML or CL	A–4 or A–6	0–20
*Hambright: HaF, HtE For Toomes part of HtE, see Toomes series.	½–1½	(1)	0–19 19	Loam and cobbly loam. Basic igneous rock.	ML or CL	A–4	5–65
Joice: Ja	5+	1–2½	0–60	Clayey muck (organic and mineral mixture).	Pt	A–8	
Joice, clay subsoil variant: Jb	5+	1–2½	0–29 29–60	Muck (organic and mineral mixture). Clay	Pt CH	A–8 A–7	 0
Los Gatos Mapped only with Maymen soils.	1½–2	(1)	0–12 12–22 22	Loam Clay loam Sandstone.	ML or CL CL	A–4 A–6	0 0
Los Osos Mapped only with Dibble and Millsap soils.	1½–3½	(1)	0–7 7–25 25	Clay loam Light clay Sandstone.	CL CH or CL	A–6 A–7	0 0
Made land: Ma. Too variable to rate.							
*Maymen: MeG3 For Los Gatos part, see Los Gatos series.	1–1½	(1)	0–10 10	Loam Sandstone.	ML or CL	A–4	0
*Millsap: MkA, MlC For Los Osos part of MlC, see Los Osos series.	1½–2½	(1)	0–16 16–28 28	Sandy loam Clay Sandstone.	SM CL	A–2 A–6	0 0
Millsholm and Millsholm variant: MmE, MmG2, MnC, MnE.	1–3	(1)	0–17 17	Loam Sandstone.	SM or ML	A–4	0
Omni: Om, On	5+	1½–4	0–60	Silty clay (clay loam surface layer in places.)	MH or CH	A–7	0
Pescadero: Pc, Pe	5+	(1)	0–34 34–69	Clay Clay loam	CH CL	A–7 A–6 or A–7	0 0
Reiff: Ra	5+	(1)	0–60	Fine sandy loam	SM or ML	A–4	0
Reyes: Rd, Re	5+	4–5+ (2–4 in Re)	0–60	Silty clay loam or silty clay.	MH or OH	A–7	0
Rincon: RnC, RoA, RoC	5+	(1)	0–60	Clay loam and heavy clay loam (loam surface layer in places).	CL	A–6	0

See footnotes at end of table.

nificant to engineering—Continued

Percentage passing sieve—				Atterberg values		Permeability	Available water capacity	Reaction	Salinity	Shrink-swell potential	Corrosivity (uncoated steel)
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	Liquid limit	Plastic index						
						In. per hr.	*In. per in. of soil*	*pH*	*Mmhos./ cm. at 25°C.*		
5–100	90–100	60–70	25–35	(2)	(2)	2.0–6.3	0.10–0.12	6.1–7.3	0–1	Low	Low.
0–100	80–90	70–80	55–65	30–40	5–15	0.63–2.0	0.16–0.18	5.6–6.5	0–1	Moderate	Low.
0–100	90–100	80–90	65–75	25–35	0–15	0.63–2.0	0.08–0.16	5.6–7.3	0–1	Low to moderate.	Low.
						2.0–6.3	0.23–0.25	4.5–8.4	15–50	High shrink, low swell.	High.
						2.0–6.3	0.23–0.25	4.5–8.4	15–50	High shrink, low swell.	High.
100	95–100	90–100	80–95	50–70	35–55	<0.06	0.03–0.05	7.4–8.4	15–50	High	High.
100	100	85–95	60–75	20–30	0–10	0.63–2.0	0.14–0.16	5.6–6.5	0–1	Moderate	Low.
100	100	90–100	70–80	30–40	15–25	0.2–0.63	0.19–0.21	5.6–6.5	0–1	Moderate	Moderate.
100	100	90–100	80–90	30–40	10–20	0.2–0.63	0.18–0.20	5.6–6.5	0–1	Moderate	Moderate.
100	100	95–100	85–95	40–60	30–40	0.06–0.20	0.15–0.17	6.1–7.3	0–2	High	High.
100	100	85–95	60–75	20–30	0–10	0.63–2.0	0.14–0.16	5.6–6.5	0–1	Moderate	Low.
100	100	60–70	25–35	(2)	(2)	2.0–6.3	0.11–0.13	5.1–6.0	0–1	Low	Low.
100	100	90–100	80–90	30–40	20–30	<0.06	0.05–0.07	6.1–7.3	0–1	High	High.
100	100	90–100	40–60	15–25	0–15	0.63–2.0	0.16–0.18	6.1–7.3	0–1	Low to moderate.	Low.
100	100	95–100	90–95	50–60	20–35	0.06–0.2	0.12–0.14	6.6–8.4	0–8	High	High.
100	100	95–100	85–95	50–60	35–45	0.06–0.2	0.17–0.19	7.9–9.0+	4–8	High	High.
100	95–100	90–100	75–85	35–45	20–30	0.06–0.2	0.03–0.05	7.9–9.0+	4–8	Moderate	High.
100	100	90–100	45–55	20–30	0–15	2.0–6.3	0.13–0.15	6.1–8.4	0–1	Low	Low.
100	90–100	85–95	70–80	50–60	15–25	0.06–0.20	0.12–0.14	<4.5–8.4	15–40	High	High.
100	100	90–100	70–90	25–40	10–30	0.06–0.2	0.15–0.17	6.1–7.8	0–2	High	High.

TABLE 5.—*Estimated soil properties*

Soil series and map symbols	Depth to—		Depth from surface of typical profile	Classification			Percentage greater than 3 inches
	Bedrock	Seasonal high water table		USDA texture	Unified	AASHO	
	Ft.	*Ft.*	*In.*				
Riverwash: Rw. Too variable to rate.							
Ryde: Ry	5+	3–4	0–72	Clay loam and loam high in organic matter.	MH or OH	A–5 or A–7	0
Sacramento: Sa, Sc, Sd	5+	3–4	0–61	Clay (silty clay loam surface layer in places.)	CH or MH	A–7	0
San Benito. Mapped only with Altamont and San Ysidro soils.	2–3½	(1)	0–25 25	Clay loam Weakly consolidated sediments.	CL	A–6 or A–7	0
San Ysidro: SeA, SeB, SfA	5+	(1)	0–14 14–68	Sandy loam Clay loam	SM or ML CL or ML	A–4 A–6 or A–7	0 0
*Solano: Sh, Sk. For Pescadero part of Sk, see Pescadero series.	5+	(1)	0–9 9–62	Loam Clay loam	ML or CL CL or CH	A–4 A–6 or A–7	0 0
Solano, dark surface variant: Sm	5+	(1)	0–7 7–13 13–55 55–63	Loam Clay loam Loam Loamy sand	ML or CL CL or CH ML or CL SM	A–4 A–6 or A–7 A–4 A–2	0 0 0 0
Suisun: Sp	5+	1–1½	0–60	Muck	Pt	A–8	
Sycamore: Sr, Ss, St, Su	5+	3–5+	0–60	Silty clay loam	CL	A–6 or A–7	0
Tamba: Ta	5+	1–3	0–72	Mucky clay	OH	A–7 or A–8	0
Tidal marsh: Td. Too variable to rate.							
Toomes: ToG2	½–1½	(1)	0–17 17	Loam Tuff.	SM	A–4	20–65
Trimmer: TrE	2–3½	(1)	0–20 20–40 40	Loam Clay loam Basic igneous rock.	ML or CL CL	A–4 A–6	0–30 0–30
Trimmer, shallow variant: TsF2	1–1½	(1)	0–13 13	Cobbly clay loam and cobbly clay. Basalt.	CL	A–6	30–65
Tujunga: Tu	5+	(1)	0–60	Sand and fine sand	SP–SM or SM.	A–1	0
Valdez:							
Va	5+	4–5	0–60	Silt loam	ML or CL	A–4	0
Vc, Vd	5+	3–5 in Vc, 1–1½ in Vd	0–60	Silty clay loam	CL	A–6	0
Ve	5+	3–5	0–40 40–60	Silty clay loam Clay	CL CH	A–6 A–7	0 0
Willows: Wc	5+	(1)	0–46 46–61	Clay Heavy sandy clay loam.	CH CL	A–7 A–6	0 0

See footnotes at end of table.

ngineering—Continued

passing sieve—		Atterberg values		Perme-ability	Available water capacity	Reaction	Salinity	Shrink-swell potential	Corrosivity (uncoated steel)
No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	Liquid limit	Plastic index						
				In. per hr.	*In. per in. of soil*	*pH*	*Mmhos./ cm. at 25°C.*		
85–95	70–85	75–105	5–30	0.63–2.0	0.25–0.30	5.1–7.8	0–8	High shrink, low swell.	High.
90–100	90–100	60–70	30–40	0.06–0.2	0.14–0.16	6.1–8.4	0–2	High	High.
90–100	85–95	35–50	25–35	0.2–0.63	0.19–0.21	5.6–8.4	0–2	Moderate	Moderate.
85–95	40–60	10–20	0–15	2.0–6.3	0.13–0.15	5.6–6.5	0–1	Low	Low.
95–100	50–65	30–45	15–30	<0.06	0.03–0.05	6.1–8.4	0–4	High	High.
90–100	65–80	20–30	0–10	0.63–2.0	0.14–0.16	5.1–6.5	2–10	Moderate	High.
90–100	75–85	30–55	15–35	<0.06	0.04–0.06	6.6–9.0	2–10	Moderate	High.
90–100	65–80	20–30	0–10	0.63–2.0	0.14–0.16	5.6–9.0	4–15	Low	High.
90–100	75–85	30–55	15–35	<0.06	0.04–0.06	7.9–9.0+	4–15	Moderate	High.
90–100	65–80	20–30	0–10	0.06–0.20	0.08–0.10	7.9–9.0	4–10	Low	High.
50–60	15–25	(2)	(2)	0.2–6.3	0.06–0.08	7.9–9.0	4–10	Low	High.
				6.3–20.0	0.25–0.27	4.5–9.0	15–50	High shrink, low swell.	High.
85–100	80–90	35–45	15–25	[3] 0.2–0.63	0.19–0.21	6.1–8.4	[4] 0–2	Moderate	High.
90–100	75–95	60–70	20–30	0.63–2.0	0.15–0.17	4.5–8.4	15–40	High shrink, low swell.	High.
55–65	35–45	(2)	(2)	0.63–2.0	0.10–0.12	5.6–6.5	0–1	Low	Low.
70–80	55–65	20–30	0–10	0.63–2.0	0.16–0.18	5.6–6.5	0–1	Moderate	Low.
75–85	60–70	30–40	15–25	0.2–0.63	0–19–0.21	6.1–7.3	0–1	Moderate	Moderate.
70–80	55–65	30–40	15–25	0.06–0.20	0.14–0.16	5.6–8.4	0–1	Moderate	Moderate.
40–50	5–15	(2)	(2)	6.3–20.0	0.06–0.08	6.1–7.3	0–1	Low	Low.
90–100	60–70	20–30	0–10	0.2–0.63	0.18–0.20	5.6–8.4	0–1	Moderate	Moderate.
95–100	85–95	30–40	15–25	0.2–0.63 in Vc, 0.06–0.2 in Vd	0.11–0.13	5.6–8.4	4–30	Moderate	High.
95–100	85–95	30–40	15–25	0.2–0.63	0.11–0.13	5.6–8.4	8–15	Moderate	High.
90–100	85–95	50–70	35–50	0.06–0.20	0.09–0.11	5.6–8.4	8–30	High	High.
95–100	85–95	60–70	30–50	0.06–0.20	0.12–0.14	7.9–9.0+	0–8	High	High.
80–90	50–60	30–40	10–20	0.20–0.63	0.10–0.12	7.9–9.0+	0–8	Moderate	High.

TABLE 5.—*Estimated soil properties*

Classification			Percentage greater than 3 inches
USDA texture	Unified	AASHO	
oam	ML or CL	A–4	0
oam	ML or CL	A–4	0
lay	CH	A–7	0
ilty clay loam	CL	A–6 or A–7	0
oam	ML or CL	A–4	0

about 5 feet, unless limited by bedrock or hardpan.

meability, expressed in inches per hour, relates o the movement of water downward through un- bed and uncompacted soil. It was estimated by arison with soils of known permeability as de- d in the section "Descriptions of the Soils."

ailable water capacity, expressed in inches per f soil depth, is the approximate amount of capil- water in the soil if wet to field capacity. When il is air-dry, this amount of water will wet the aterial described to a depth of 1 inch without r percolation.

ction is the degree of acidity or alkalinity of the xpressed as pH value. A range of pH 6.6 to 7.3 utral; lower values indicate acidity and higher indicate alkalinity. The pH value and relative used to describe soil reaction are explained in ossary.

nity of the soil is based on the electrical conduc- of the saturated soil extract, as expressed in mil- s per centimeter (mmhos./cm.) at 25° C. Salin- ay affect the stability of a soil when used as uction material, and it influences corrosivity.

ink-swell potential indicates the expected volume e in the soil that accompanies a change in mois- ontent. The volume change of soils is influenced amount of moisture change and the amount and f clay in the soil. The ratings provide an indica- f the hazard to structures resulting from this e change. The potential is rated low, moderate, h.

rosivity, as used here, indicates the potential r to uncoated steel structures through electro- cal action. Corrosivity correlates with the physi- emical, and biological characteristics of the soil The soil is evaluated in its undisturbed state. structures intersect different soil boundaries, otential for corrosion is greater than in a uni- soil. Corrosivity is rated as low, moderate, or and is based on the soil properties of drainage texture, total acidity, and conductivity of the tion extract.

orrosivity uncoated steel)	
	Low.
	Low.
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	Moderate.
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TABLE 6.—*Interpretations of the*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in such to other series that appear in

Soil series and map symbols	Suitability as source of—		Soil features affecting—	
	Topsoil	Road fill	Road location	Water retention structures: Embankments
*Altamont: AcC, AcE, AcF2, AlC, AlE, AmC, AmE2. For San Ysidro and San Benito parts of AlC and AlE and for Diablo part of AmC and AmE2, see their respective series.	Poor: clay	Poor: A-7 or A-6; high shrink-swell potential.	Siltstone at a depth of 2 to 3½ feet; slopes of 2 to 50 percent; high shrink-swell potential.	Low shear strength; high compressibility; low piping hazard; low permeability when compacted.
Alviso: An	Poor: silty clay loam; moderately saline.	Poor: A-6; high shrink-swell potential.	High shrink-swell potential.	Low to medium shear strength; medium compressibility; low to medium piping hazard; low permeability when compacted.
*Antioch: AoA, AoC, AsA, AsC. For San Ysidro part, see San Ysidro series.	Poor: loam over clay at a depth of 15 to 30 inches.	Fair to poor: A-4 or A-7; high shrink-swell potential.	Slopes of 0 to 9 percent; high shrink-swell potential.	Low shear strength; high compressibility; low piping hazard; low permeability when compacted.
Ayar. Mapped only with Diablo soils.	Poor: clay	Poor: A-7 or A-6; high shrink-swell potential.	Weakly consolidated sediments at a depth of 3½ to 5 feet; slopes of 2 to 30 percent; high shrink-swell potential.	Low shear strength; high compressibility; low piping hazard; low permeability when compacted.
Brentwood: BrA, BrC	Fair: clay loam	Poor: A-7; high shrink-swell potential.	Slopes of 0 to 9 percent; high shrink-swell potential.	Low to medium shear strength; medium compressibility; low to medium piping hazard; low permeability when compacted.
Capay: Ca, Cc	Poor: silty clay loam or clay.	Poor: A-6 or A-7; high shrink-swell potential.	High shrink-swell potential.	Low to medium shear strength; medium compressibility; low to medium piping hazard; low permeability when compacted.
Clear Lake: CeA, CeB, ClA	Poor: clay	Poor: A-7; high shrink-swell potential.	Water table at a depth of 4 feet to more than 5 feet; high shrink-swell potential.	Low shear strength; high compressibility; low piping hazard; low permeability when compacted.
Columbia: Cm	Good	Fair: A-4; low shrink-swell potential.	Water table at a depth of 4 feet to more than 5 feet; low shrink-swell potential.	Medium shear strength; low to medium compressibility; medium to high piping hazard; low to medium permeability when compacted.

See footnote at end of table.

nstructions for referring

for septic fields	Hydrologic soil groups
neability; pth of 2 to of 2 to 50	D
ble at a feet; slow	D
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ely slow	B
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meability	D
what poorly table at a to more	C

TABLE 6.—*Interpretations of the*

Soil series and map symbols	Suitability as source of—		Soil features affecting—	
	Topsoil	Road fill	Road location	Water retention structures: Embankments
Conejo: Cn, Cs	Good	Fair: A-4; moderate shrink-swell potential.	Water table at a depth of 3 to 5 feet in Cs; moderate shrink-swell potential.	Low to medium shear strength; medium compressibility; medium to high piping hazard; medium to low permeability when compacted.
Co	Fair: gravelly loam.	Fair: A-4; low shrink-swell potential.	Low shrink-swell potential.	Medium shear strength; low to medium compressibility; medium to high piping hazard; medium to low permeability when compacted.
Cr	Fair: clay loam	Poor: A-6; moderate shrink-swell potential.	Moderate shrink-swell potential.	Medium to low shear strength; medium compressibility; low to medium piping hazard; low permeability when compacted.
Corning: CvD2, CvE2	Poor: gravelly loam over clay at a depth of 14 to 20 inches.	Good to poor: A-4, A-7, or A-2; high shrink-swell potential.	Slopes of 2 to 30 percent; high shrink-swell potential in subsoil.	Medium to high shear strength; low to medium compressibility; medium piping hazard; medium to low permeability when compacted.
*Diablo: DaC, DaE2. For Ayar part, see Ayar series.	Poor: clay	Poor: A-7; high shrink-swell potential.	2½ to 4 feet to consolidated sediments; slopes of 2 to 30 percent; high shrink-swell potential.	Low shear strength; high compressibility; low piping hazard; low permeability when compacted.
*Dibble: DbC, DbE, DbF2. For Los Osos part, see Los Osos series.	Poor: loam over clay at a depth of 10 to 18 inches.	Fair to poor: A-4 or A-7; high shrink-swell potential.	Sandstone at a depth of 1½ to 3½ feet; slopes of 2 to 50 percent.	Low to medium shear strength; medium to high compressibility; low to medium piping hazard; low permeability when compacted.
DIC, DIE, DIF2. For Los Osos part, see Los Osos series.	Poor: clay loam over clay at a depth of 10 to 18 inches.	Poor: A-6 or A-7; high shrink-swell potential.	Sandstone at a depth of 2 to 3½ feet; slopes of 2 to 50 percent; high shrink-swell potential.	Low to medium shear strength; medium to high compressibility; low to medium piping hazard; low permeability when compacted.
Egbert: Eb, Ec	Fair: silty clay loam.	Poor: A-7; high shrink-swell potential.	Water table at a depth of 4 feet to more than 5 feet; high shrink-swell potential.	Low shear strength; high compressibility; low to medium piping hazard; low to medium permeability when compacted.

ic	Hydrologic soil groups
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TABLE 6.—*Interpretations of the*

	Soil features affecting—	
	Road location	Water retention structures
		Embankments
-------	Sandstone at a depth of 8 to 15 inches; slopes of 30 to 75 percent; low shrink-swell potential.	Medium shear strength; low to medium compressibility; medium to high piping hazard; medium to low permeability when compacted.
A-4 derate	Igneous rock at a depth of 1½ to 3½ feet; slopes of 9 to 30 percent; moderate shrink-swell potential.	Medium to low shear strength; medium compressibility; medium to high piping hazard; medium to low permeability when compacted.
w to rink- ial; 5 it s.	Igneous rock at a depth of 6 to 20 inches; slopes of 9 to 40 percent; low to moderate shrink-swell potential; 5 to 65 percent cobblestones.	Medium to low shear strength; medium compressibility; medium to high piping hazard; medium to low permeability when compacted.
igh swell.	Water table at a depth of 1 to 2½ feet; highly organic; high shrink, low swell.	Highly organic materials; not suited to embankments.
er rink, er swell.	Water table at a depth of 1 to 2½ feet; highly organic over clay; high shrink, low swell over high shrink-swell.	Highly organic materials over clay; not suited to embankments.
A-4 erate po-	Sandstone at a depth of 1½ to 2 feet; slopes of 15 to 75 percent; moderate shrink-swell potential.	Medium to low shear strength; medium compressibility; low to medium piping hazard; low to medium permeability when compacted.
A-7; swell	Sandstone at a depth of 1½ to 3½ feet; slopes of 2 to 50 percent; high shrink-swell potential.	Low shear strength high compressibility; low piping hazard; low permeability when compacted.
derate	Sandstone at a depth of 1 to 1½ feet; slopes of 15 to 75 percent; moderate shrink-swell potential.	Medium to low shear strength; medium compressibility; medium to high piping hazard; low to medium permeability when compacted.

ued

	Irrigation	Soil limitations for septic tank filter fields	Hydrologic soil groups
	Low available water capacity; rapid water intake; slopes of 30 to 75 percent; sandstone at a depth of 8 to 15 inches.	Severe: slopes of 30 to 75 percent; sandstone at a depth of 8 to 15 inches.	D
f	Medium available water capacity; moderate water intake; slopes of 9 to 30 percent; igneous rock at a depth of 1½ to 3½ feet.	Severe: slopes of 9 to 30 percent; igneous rock at a depth of 1½ to 3½ feet.	C
f	Low available water capacity; moderate water intake; slopes of 9 to 40 percent; igneous rock at a depth of 6 to 20 inches.	Severe: slopes of 9 to 40 percent; igneous rock at a depth of 6 to 20 inches.	D
ry il.	Very high available water capacity; rapid water intake; slopes of 0 to 2 percent; water table at a depth of 1 to 2½ feet; organic soil.	Severe: water table at a depth of 1 to 2½ feet; very poorly drained.	D
	Medium to high available water capacity; rapid water intake; slopes of 0 to 2 percent; water table at a depth of 1 to 2½ feet; organic soil.	Severe: water table at a depth of 1 to 2½ feet; very slow permeability; very poorly drained.	D
ll	Low available water capacity; moderate water intake; slopes of 15 to 75 percent; sandstone at a depth of 1½ to 2 feet; severely eroded.	Severe: moderately slow permeability; sandstone at a depth of 1½ to 2 feet; slopes of 15 to 75 percent.	C
le	Low to medium available water capacity; moderate water intake; slopes of 2 to 50 percent; sandstone at a depth of 1½ to 3½ feet.	Severe: slow permeability; sandstone at a depth of 1½ to 3½ feet; slopes of 2 to 50 percent.	C
d-	Low available water capacity; moderate water intake; slopes of 15 to 75 percent; sandstone at a depth of 1 to 1½ feet.	Severe: sandstone at a depth of 1 to 1½ feet; slopes of 15 to 75 prcent.	D

TABLE 6.—*Interpretations of the*

Soil series and map symbols	Suitability as source of—		Soil features affecting—	
	Topsoil	Road fill	Road location	Water retention structures: Embankments
*Millsap: MkA, MlC For Los Osos part of MlC, see Los Osos series.	Poor: sandy loam over clay at a depth of 20 to 30 inches.	Good to poor: A-2 or A-6.	Sandstone at a depth of 1½ to 2½ feet; slopes of 0 to 9 percent; high shrink-swell-potential.	Medium shear strength; medium compressibility; medium to low piping hazard; low permeability when compacted.
Millsholm and Millsholm variant: MmE, MmG2, MnC, MnE.	Poor: sandstone at a depth of 1 to 3 feet.	Fair: A-4; low to moderate shrink-swell potential.	Sandstone at a depth of 1 to 3 feet; slopes of 2 to 75 percent; low to moderate shrink-swell potential.	Medium to low shear strength; medium to low compressibility; medium to high piping hazard; medium to low permeability when compacted.
Omni: Om	Poor: clay loam over clay at a depth of 10 to 20 inches; saline.	Poor: A-7; high shrink-swell potential.	Water table at a depth of 1½ to 4 feet; high shrink-swell potential.	Low shear strength; high compressibility; low to medium piping hazard; low to medium permeability when compacted.
On	Poor: silty clay; saline.	Poor: A-7; high shrink-swell potential.	Water table at a depth of 1½ to 4 feet; high shrink-swell potential.	Fair to poor stability; high to very high compressibility; low to medium shear strength; poor to good resistance to piping and cracking.
Pescadero: Pc, Pe	Poor: clay over clay loam; saline.	Poor: A-6 or A-7; high shrink-swell potential.	High shrink-swell potential.	Low shear strength; high compressibility; low piping hazard; low permeability when compacted.
Reiff: Ra	Good	Fair: A-4; low shrink-swell potential.	Low shrink-swell potential.	Medium to low shear strength; medium to low compressibility; medium to high piping hazard; low to medium permeability when compacted.
Reyes: Rd, Re	Poor: silty clay loam or silty clay; strongly saline.	Poor: A-7; high shrink-swell potential.	Water table at a depth of 2 to more than 5 feet; high shrink-swell potential.	High organic-matter content necessitates onsite evaluation.
Rincon: RnC, RoA, RoC	Fair: clay or clay loam over heavy clay loam at a depth of 12 to 30 inches.	Poor: A-6; high shrink-swell potential.	Slopes of 0 to 9 percent; high shrink-swell potential.	Medium shear strength; medium compressibility; low to medium piping hazard; low permeability when compacted.
Riverwash: Rw. Too variable to rate.				
Ryde: Ry	Poor: loam and clay loam; high organic-matter content; saline in places.	Poor: A-5 or A-7; high shrink, low swell.	Water table at a depth of 3 to 4 feet; high shrink, low swell.	High organic-matter content necessitates onsite evaluation.

soils for engineering uses—Continued

Soil features affecting—Continued			Soil limitations for septic tank filter fields	Hydrologic soil groups
Water retention structures—Continued	Agricultural drainage	Irrigation		
Reservoir areas				
Very slow permeability; slopes of 0 to 9 percent; sandstone at a depth of 1½ to 2½ feet.	Very slow permeability; slopes of 0 to 9 percent; sandstone at a depth of 1½ to 2½ feet; moderately well drained.	Low available water capacity; moderate water intake; slopes of 0 to 9 percent; sandstone at a depth of 1½ to 2½ feet.	Severe: very slow permeability; sandstone at a depth of 1½ to 2½ feet.	D
Moderate permeability; slopes of 2 to 75 percent; sandstone at a depth of 1 to 3 feet.	Moderate permeability; sandstone at a depth of 1 to 3 feet; well drained.	Low available water capacity; moderate water intake; slopes of 2 to 75 percent; sandstone at a depth of 1 to 3 feet.	Severe: sandstone at a depth of 1 to 1½ feet; slopes of 2 to 75 percent.	D
Slow permeability; slopes of 0 to 2 percent; water table at a depth of 1½ to 4 feet.	Slow permeability; water table at a depth of 1½ to 4 feet; poorly drained.	High available water capacity; moderately slow water intake; slopes of 0 to 2 percent; water table at a depth of 1½ to 4 feet.	Severe: slow permeability; poorly drained; water table at a depth of 1½ to 4 feet.	D
Slow permeability; slopes of 0 to 2 percent; water table at a depth of 1½ to 4 feet.	Slow permeability; water table at a depth of 1½ to 4 feet; poorly drained.	High available water capacity; slow water intake; slopes of 0 to 2 percent; water table at a depth of 1½ to 4 feet.	Severe: slow permeability; poorly drained; water table at depth of 1½ to 4 feet.	D
Slow permeability; slopes of 0 to 2 percent.	Slow permeability; somewhat poorly drained.	High available water capacity; slow water intake; slopes of 0 to 2 percent.	Severe: slow permeability	C
Moderately rapid permeability; slopes of 0 to 2 percent.	Moderately rapid permeability; well drained.	High available water capacity; moderately rapid water intake; slopes of 0 to 2 percent.	Slight	B
Slow permeability; slopes of 0 to 2 percent; water table at a depth of 2 feet to more than 5 feet.	Slow permeability; water table at a depth of 2 feet to more than 5 feet; poorly drained.	Medium to high available water capacity; slow water intake; slopes of 0 to 2 percent.	Severe: slow permeability; water table at a depth of 2 feet to more than 5 feet.	D
Slow permeability; slopes of 0 to 9 percent.	Slow permeability; well drained.	High available water capacity; moderately slow water intake; slopes of 0 to 9 percent.	Severe: slow permeability	C
Moderate permeability; slopes of 0 to 2 percent; water table at a depth of 3 to 4 feet.	Moderate permeability; water table at a depth of 3 to 4 feet; poorly drained.	High available water capacity; moderate water intake; slopes of 0 to 2 percent; water table at a depth of 3 to 4 feet.	Severe: water table at a depth of 3 to 4 feet; poorly drained.	D

TABLE 6.—*Interpretations of the*

of—	Soil features affecting—	
Road fill	Road location	Water retention structures
		Embankments
A-7; high k-swell ntial.	Water table at a depth of 3 to 4 feet; high shrink-swell potential.	Low shear strength; high compressibility; low piping hazard and low permeability when compacted.
A-6 or A-7; erate shrink- potential.	Weakly consolidated sediments at a depth of 2 to 3½ feet; slopes of 2 to 30 percent; moderate shrink-swell potential.	Medium shear strength; medium compressibility; low to medium piping hazard; low permeability when compacted.
to poor: A-4; or A-7; high k-swell ntial.	Slopes of 0 to 30 percent; high shrink-swell potential.	Medium to low shear strength; medium compressibility; medium piping hazard; low to medium permeability when compacted.
poor: A-4, or A-7; mod- shrink-swell ntial.	Moderate shrink-swell potential.	Medium shear strength; medium compressibility; low to medium piping hazard; low permeability when compacted.
o poor: A-4, A-7, or A-2; erate shrink- potential.	Moderate shrink-swell potential.	Medium to low shear strength; medium compressibility; medium to high piping hazard; medium to low permeability when compacted.
A-8; high k, low swell.	Water table at a depth of 1 to 1½ feet; highly organic; high shrink, low swell.	Highly organic; not suited to embankments.
A-6 or A-7; erate shrink- potential.	Water table at a depth of 3 feet to more than 5 feet; moderate shrink-swell potential.	Medium shear strength; medium compressibility; low to medium piping hazard; low permeability when compacted.
A-7 or A-8; shrink, low .	Water table at a depth of 1 to 3 feet; high shrink, low swell.	High organic-matter content necessitates onsite evaluation.

ons for septic er fields	Hydrologic soil groups
permeability; at a depth of 3 orly drained.	D
erately slow ; weakly con-liments at a o 3½ feet.	C
slow perme-es of 0 to 30	D
slow perme-	D
slow perme-w permeability.	D
r table at a o 1½ feet; very ned.	D
erately slow to ability; water epth of 3 feet n 5 feet.	C
r table at a o 3 feet; very ned.	D

TABLE 6.—*Interpretations of the*

Soil features affecting—	
oad location	Water retention structures
	Embankments
a depth of 5 to ches; slopes of 9 percent; low k-swell potential; 65 percent lestones.	Medium shear strength; medium compressibility; medium to high piping hazard; medium to low permeability when compacted.
gneous rock at a h of 2 to 3½ feet; s of 9 to 30 per- moderate shrink- potential; 0 to ercent cobble- es.	Medium shear strength; medium compressibility; low to medium piping hazard; low permeability when compacted.
at a depth of 1 ½ feet; slopes of 15 percent; mod- shrink-swell ıtial; 30 to 65 ent cobblestones.	Medium shear strength; medium compressibility; low to medium piping hazard; low permeability when compacted.
rink-swell ıtial.	Medium shear strength; low compressibility; medium to high piping hazard; medium to high permeability when compacted.
table at a depth to 5 feet; moder- hrink-swell ıtial.	Medium to low shear strength; medium compressibility; medium to high piping hazard; medium to low permeability when compacted.
table at a depth to 5 feet; mod- shrink-swell ıtial.	Medium shear strength; medium compressibility; low to medium piping hazard; low permeability when compacted.
table at a depth to 5 feet; high k-swell potential.	Low shear strength; high compressibility; low piping hazard; low permeability when compacted.
ırink-swell ıtial.	Low shear strength; high compressibility; low piping hazard; low permeability when compacted.

for septic fields	Hydrologic soil groups
a depth of 5 opes of 9 to	D
tely slow basic igneous h of 2 to 3½ 9 to 30	C
rmeability; pth of 1 to s of 15 to 50	D
----------	A
ately slow water table 4 to 5 feet; rly drained.	C
ately slow neability; a depth of	C(Vc), D(Vd)
ermeability; a depth of	C
ermeability; d.	D

TABLE 6.—*Interpretations of the*

Soil series and map symbols	Suitability as source of—		Soil features affecting—	
	Topsoil	Road fill	Road location	Water retention structures: Embankments
Yolo:				
Yo	Good	Fair: A-4; moderate shrink-swell potential.	Moderate shrink-swell potential.	Medium to low shear strength; medium compressibility; high piping hazard; medium to low permeability when compacted.
Yr	Fair: loam over clay at a depth of 40 to 60 inches.	Fair to poor: A-4 or A-7; high shrink-swell potential.	High shrink-swell potential.	Medium shear strength; medium to high compressibility; medium to low piping hazard; low permeability when compacted.
Ys	Fair: silty clay loam over loam.	Poor to fair: A-6, A-7, or A-4.	Moderate shrink-swell potential.	Medium shear strength; medium compressibility; low to medium piping hazard; low permeability when compacted.

[1] May contaminate ground water.

Formation and Classification of the Soils

In this section the factors that affect the formation and composition of the soils in Solano County are discussed, and the morphology of the soils is described. Then, the classification of the soils by higher categories is given.

Factors of Soil Formation

Soil is a natural formation on the earth's surface that contains living matter and supports or is capable of supporting plants. Soils differ in different localities and even within short distances. The differences are the result of the interaction of five soil-forming factors: parent material, relief, climate, living organisms, and time. The relative effect of each of these factors varies from one soil to another.

The processes of soil formation are complex. Their influence and relationship are more easily described by relating soils within areas of similar landform, or geomorphic units. In the following discussion, the climate is described separately and then the factors of parent material, relief, time, and biological activity are considered in the relationship of the soils within geomorphic units.

Climate

The climate is fairly uniform throughout the county. The effect of climate on different soils varies because there is a complex interaction among factors, but some properties are common to many soils because of the similarity in climate.

Solano County is warm to hot and dry in summer and moderately cool and moist in winter. The average air temperature at Vacaville is 46.8° F. in January and 74° in July. The average annual rainfall in the county ranges from 16 to 40 inches, and 90 percent of it falls during the months of November through April. The rainfall is heavy at times during some winter storms.

During the rainy period, the soils become saturated and lose moisture through runoff or deep percolation. The soils rarely, if ever, freeze. In most years, soil moisture in the uppermost 20 inches falls below the wilting point late in May or in June. The soils become dry unless irrigated, and they remain dry until the fall rains.

Data from soil moisture calculations at Vacaville and Sacramento (2) show that about 3 to 5 inches of the precipitation is not lost by evapotranspiration during the winter months. Some soils in the county store 4 inches of moisture available to plants. Soils that have greater available water capacity are common in the county, but they have less surplus moisture for percolation.

The small amount of surplus moisture prevents active leaching of the soils. The rate of redistribution of carbonates and translocation of clays by this process is therefore slow. Most of the soils have a good supply of bases, and many of the soils lack prominent argillic horizons. The alternate wet and dry periods cause soils that are high in montmorillonitic clays to shrink

l limitations for septic tank filter fields	Hydrologic soil groups
: to moderate: moderate permeability.	B
e: slow permeability	C
t to moderate: moderate permeability in ostratum.	B

m a network of waterways stem of artificial levees en- Water is regulated by a sys- canals, drainage ditches, and with the distance from the al dilution by runoff from the an Joaquin River, and tribu-

in the delta are mostly mix- at remains and mineral sedi- d delta areas support a dense plants. The organic remains ulate over a long period of ter content increases, the un- wly subsides and the organic he quite thick. Mineral sedi- ganic deposits by tidal action turbid water during floods. from organic soils that con- nineral matter, commonly as to mineral soils that are low . The higher mineral content ith soils adjacent to sloughs

is mostly aquatic plants such es.

unit includes Egbert, Joice, d Tamba soils. Egbert and ils that have a high content remains. They formed far en little affected by brackish under poorer drainage than

prominent morphological features, and they are nguished mainly by differences in the texture of control section. Columbia soils are stratified but mostly fine sandy loam. Valdez soils are stratified clay loam, silt loam, and fine sandy loam. Colum- and Valdez soils are recent, and the surface layer the pale color of the parent alluvium. A fluctuat- water table has formed mottles of high chroma in lower horizons. Valdez soils have a substratum has a pronounced platy structure.

FLOOD BASINS

ne large flood basins of Solano County lie west of er Slough and are between the natural levees and low alluvial plains further to the west. Several ller isolated basins are on the alluvial plains where surface was slightly depressed or where drainage blocked by small ridges. The principal basin, Yolo n, is in the east-central part of the county. One of smaller basins on the alluvial plains is southeast of on, and it is represented by the Capay-Clear Lake ciation on the general soil map. Tributary streams flow from the Coast Ranges eastward empty into basins. The basins are nearly level but have small essions and low ridges formed by tributaries tying into them. Along their western edge, the ns gradually merge with the alluvial plains. This r perimeter is the basin rim, where the elevation ightly higher or the natural drainage was some- t better than in the basin itself.

riginally, the Sacramento River and its tributaries flowed and filled the basins. As the flooding sub- d, the water drained slowly back into the main nels. Today, artificial levees prevent some areas 1 flooding. Parts of the natural basins are diked form channels to convey floodwater. These are vn as bypasses, through which part of the river- is diverted from its natural channel during flood-

efore reclamation the basins were swampy and in es had a cover of marsh grasses and tules. Along basin rims, the vegetation was similar to the prai- vegetation and consisted mostly of perennial ses. The smaller isolated basins on the alluvial is had vegetation, mostly perennial grasses, similar at on basin rims.

ne parent material of the basin soils is rather re- in geologic time. It consists mostly of clay and that settled out of suspension from slack water after floods. In the bypass areas, fresh sediments still being deposited in layers of pale-colored silts clays. These form an overwash that contrasts the darker underlying soils of the original basin ace.

ne soils in the basins were poorly drained to some- poorly drained. These poorly drained conditions favorable for the reduction of iron compounds, icularly in the swampy areas. Drainage has been ed by reclamation works and structures and, in cases, by natural processes.

apay, Clear Lake, Omni, Pescadero, Sacramento, Willows soils are in the flood basins. The Capay are at the somewhat higher elevations of the

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—*Classification of soil series*

	Subgroup	Order
hermic	Typic Chromoxererts	Vertisols.
nesic	Tropic Fluvaquents	Entisols.
hermic	Typic Natrixeralfs	Alfisols.
hermic	Typic Chromoxererts	Vertisols.
hermic	Typic Xerochrepts	Inceptisols.
hermic	Typic Chromoxererts	Vertisols.
hermic	Typic Pelloxererts	Vertisols.
nacid, thermic	Aquic Xerofluvents	Entisols.
ic	Pachic Haploxerolls	Mollisols.
hermic	Typic Palexeralfs	Alfisols.
hermic	Chromic Pelloxererts	Vertisols.
hermic	Typic Haploxeralfs	Alfisols.
	Fluvaquentic Haplaquolls	Mollisols.
thermic	Lithic Xerorthents	Entisols.
ic	Typic Argixerolls	Mollisols.
hermic	Lithic Haploxerolls	Mollisols.
	Typic Medisaprists	Histosols.
mic	Terric Medisaprists	Histosols.
	Typic Argixerolls	Mollisols.
hermic	Typic Argixerolls	Mollisols.
	Dystric Lithic Xerochrepts	Inceptisols.
	Typic Palexeralfs	Alfisols.
	Lithic Xerochrepts	Inceptisols.
rmic	Typic Xerochrepts	Inceptisols.
lcareous, thermic	Fluvaquentic Haplaquolls	Mollisols.
hermic	Aquic Natrixeralfs	Alfisols.
nacid, thermic	Typic Xerofluvents	Entisols.
ic	Sulfic Haplaquepts	Inceptisols.
hermic	Mollic Haploxeralfs	Alfisols.
nic	Cumulic Haplaquolls	Mollisols.
hermic	Vertic Haplaquolls	Mollisols.
nic	Calcic Pachic Haploxerolls	Mollisols.
hermic	Typic Palexeralfs	Alfisols.
nic	Typic Natrixeralfs	Alfisols.
nic	Typic Natrixerolls	Mollisols.
	Typic Medihemists	Histosols.
d, thermic	Aeric Haplaquepts	Inceptisols.
ic	Typic Haplaquepts	Inceptisols.
	Lithic Ruptic-Xerorthentic Xerochrepts	Inceptisols.
nic	Mollic Haploxeralfs	Alfisols.
thermic	Lithic Argixerolls	Mollisols.
	Typic Xeropsamments	Entisols.
d, thermic	Aeric Haplaquepts	Inceptisols.
hermic	Typic Pelloxererts	Vertisols.
ic	Typic Xerochrepts	Inceptisols.

id and grayer than the defined range for the Millsap series; however, they are like

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The Xerorthents are simple soils that are fairly uniform in composition and appearance. The only subgroup in the county is a Lithic Xerorthents. Hard rock is at a depth of less than 20 inches. Except for some darkening of the surface soil from a small accumulation of organic matter, there is no evidence of soil horizon development. These soils have fairly steep slopes, and soil is removed about as fast as new soil material is weathered from the parent rock. The Gaviota series is in this subgroup.

The Xerofluvents are young, loamy soils on flood plains. Differences in the depositional material or accumulations near the surface that are subsequently buried by floods causes a slight variation in the organic-matter content from layer to layer. Insufficient time has elapsed for the mixing of the fine layers by roots and for other biological activities to take place in the

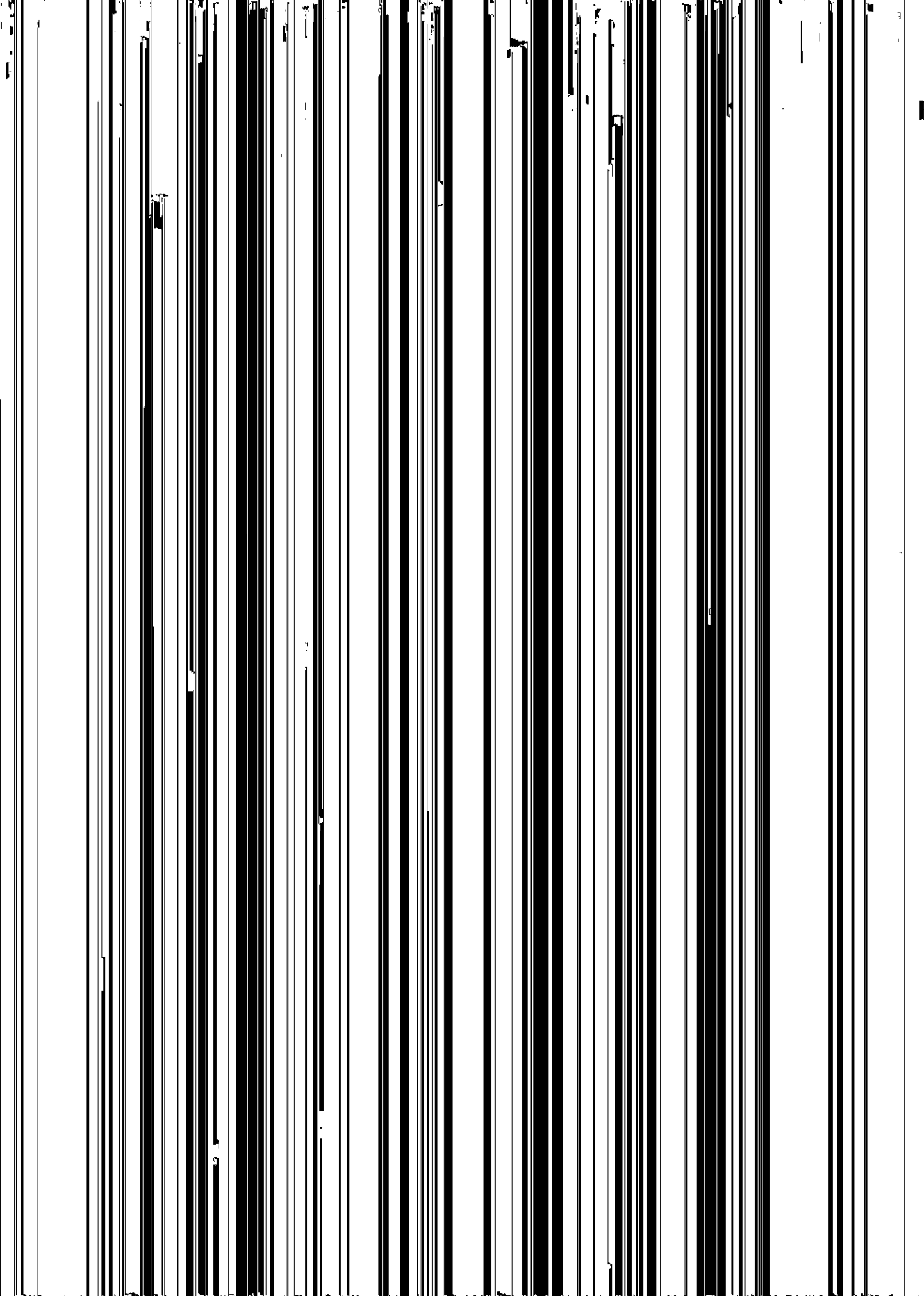

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TABLE 8.—*Particle-size distribution*

[Analyses by Soil Survey Laboratory, Riverside, California.

Soil name and sample number	Depth from surface	Size class and particle diameter							
		Total			Sand				
		Sand (2.0–0.05 mm.)	Silt (0.05–0.002 mm.)	Clay (0.002 mm.)	Very coarse (2.0–1.0 mm.)	Coarse (1.0–0.5 mm.)	Medium (0.5–0.25 mm.)	Fine (0.25–0.1 mm.)	Very fine (0.1–0.05 mm.)
	Inches	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Antioch loam:									
S64 Calif. 48–8–1 through 11.	0–5	39.2	45.4	15.4	0.3	1.8	4.9	19.6	12.6
	5–14	39.8	43.1	17.1	.2	1.9	5.0	20.1	12.6
	14–19	41.8	42.5	15.7	.4	2.3	5.2	20.4	13.5
	19–34	20.2	39.5	40.3	(1)	.3	1.4	6.8	11.7
	34–37	19.1	44.7	36.2	(1)	.2	.8	4.9	13.2
	37–46	19.6	47.5	32.9	(1)	.2	.5	3.6	15.3
	46–60	11.7	54.4	33.9	.8	.6	.8	3.7	5.8
	60–72	43.9	34.5	21.6	.4	1.7	4.9	19.5	17.4
Capay clay:									
S64 Calif. 48–2–1 through 9.	0–5	4.3	42.0	53.7	.1	.2	.4	1.2	2.4
	5–21	3.2	42.0	54.8	.1	.1	.2	.9	1.9
	21–32	3.8	45.5	50.7	.3	.3	.3	.9	2.1
	32–40	3.5	51.3	45.2	(1)	.1	.1	1.0	2.3
	40–50	7.0	55.1	37.9	(1)	.1	.1	3.2	3.6
	50–62	7.8	54.0	38.2	(1)	(1)	.2	2.8	4.8
	62–80	25.9	38.1	36.0	.3	2.1	6.1	11.1	6.3
Pescadero clay loam:									
S64 Calif. 48–3–1 through 9.	0–4	9.2	58.4	32.4	.3	.5	.9	2.8	4.7
	4–14	19.3	41.5	39.2	.1	.3	1.0	7.3	10.6
	14–22	18.1	40.9	41.0	(1)	.2	.7	6.9	10.3
	22–34	20.0	40.4	39.6	.2	.4	.9	7.5	11.0
	34–47	23.0	42.1	34.9	.5	.8	1.0	8.0	12.7
	47–58	31.2	39.4	29.4	1.3	1.6	1.5	11.4	15.4
	58–69	29.4	39.9	30.7	1.9	1.8	1.8	10.8	13.1
S64 Calif. 48–5–1 through 9.	0–4								
	4–14								
	14–21								
	21–30								
	30–34								
	34–49								
	49–62								
	62–72								
	86–102								
San Ysidro sandy loam:									
S64 Calif. 48–1–1 through 9.	0–7	55.8	33.8	10.4	.6	3.7	8.5	26.1	16.9
	7–14	56.1	32.4	11.5	.4	3.3	8.6	26.0	17.8
	14–28	38.6	24.2	37.2	.3	1.5	5.2	19.3	12.3
	28–40	47.1	22.3	30.6	(1)	.8	3.9	27.0	15.4
	40–54	55.1	21.5	23.4	.2	1.3	5.2	30.0	18.4
	54–68	28.7	43.2	28.1	(1)	.5	1.9	10.6	15.7
Solano loam:									
S24 Calif. 48–7–1 through 8.	0–4	31.8	53.3	14.9	.2	1.1	3.0	12.8	14.7
	4–9	31.4	52.7	15.9	.2	1.0	2.5	12.2	15.5
	9–21	26.0	43.3	30.7	.1	.8	2.4	10.7	12.0
	21–32	36.4	32.6	31.0	(1)	1.0	4.0	15.8	15.6
	32–48	23.7	44.1	32.5	2.8	2.3	1.5	7.0	10.1
	48–62	17.4	50.4	32.2	2.5	2.9	1.3	3.7	7.0

[1] Trace.

and moisture data for selected soils

Dashes indicate that determinations were not made]

Size class and particle diameter—Continued				Bulk density		Water content	
Silt							
0.05–0.02 mm.)	0.02–0.002 mm.)	0.2–0.02 mm.	2.0–0.1 mm.	1/3 bar	Ovendry	1/3 bar	15 bars
Percent	*Percent*	*Percent*	*Percent*	*Gm./cc.*	*Gm./cc.*	*Percent*	*Percent*
22.5	22.9	45.7	26.6	1.59	1.63	17.8	6.6
21.1	22.0	44.9	27.0	1.60	1.64	16.3	6.5
20.5	22.0	45.0	28.3	1.68	1.72	14.3	6.5
19.0	20.5	35.1	8.5	1.56	1.87	24.1	19.5
23.6	21.1	40.2	5.9	1.52	1.84	28.5	20.3
24.9	22.6	42.9	4.3	1.61	1.78	21.9	18.3
21.5	32.9	29.7	5.9	1.62	1.78	22.0	19.7
18.2	16.3	47.8	26.5	1.76	1.83	14.8	9.7
11.7	30.3	14.9	1.9				19.5
10.2	31.8	12.7	1.3	1.51	1.95	26.0	19.7
11.5	34.0	14.2	1.7	1.49	1.89	25.9	20.4
11.9	39.4	14.9	1.2				19.0
15.5	39.6	21.3	3.4	1.52	1.78	24.9	19.1
14.7	39.3	21.4	3.0				18.3
12.0	26.1	23.7	19.6	1.62	1.81	21.5	16.6
17.2	41.2	23.5	4.5	1.44	1.56	23.9	11.0
18.3	23.2	34.1	8.7	1.47	1.87	24.7	14.4
17.5	23.4	32.8	7.8	1.44	1.82	27.3	16.3
16.7	23.7	33.2	9.0	1.49	1.84	23.6	17.2
17.0	25.1	35.7	10.3	1.63	1.93	19.7	17.8
19.7	19.7	43.6	15.8	1.73	1.95	18.1	18.1
19.8	20.1	40.6	16.3	1.71	1.87	18.0	15.1
							15.9
							19.9
							18.5
							15.9
				1.70	1.87	18.6	14.5
							12.8
18.6	15.2	50.6	38.9	1.59	1.70	13.6	4.3
17.5	14.9	50.5	38.3	1.66	1.71	12.3	4.6
13.0	11.2	37.0	26.3	1.54	1.88	22.8	15.2
12.4	9.9	45.0	31.7	1.62	1.90	21.0	13.9
12.4	9.1	49.8	36.7	1.69	1.83	17.7	10.9
19.5	23.7	42.6	13.0	1.65	1.83	20.1	14.8
24.0	29.3	46.9	17.1				6.7
22.7	30.0	46.1	15.9				6.2
19.6	23.7	38.5	14.0				17.5
15.3	17.3	40.3	20.8				16.6
19.3	24.8	34.4	13.6				17.8
18.0	32.4	27.5	10.3				17.6

TABLE 9.—*Chemical data and clay*

yses by Soil Survey Laboratory, Riverside, California. One dash indicates that determination was made but

th	Organic carbon	Nitrogen	Carbonate as $CaCO_3$	Extensibility (COLE)	Reaction		Extractable bases (Meq./100 grams of soil)				Sum of bases	Cation-exchange capacity (sodium acetate)
					1:1	1:10	Ca	Mg	Na	K		
s	*Percent*	*Percent*	*Percent*	*In. per in.*	*pH*	*pH*					*Meq. per 100 grams of soil*	*Meq. per 100 grams of soil*
	1.35	0.127	—	0.010	5.8	6.2	7.7	2.0	0.3	0.4	10.4	14.1
4	.54	.064	—	.008	6.2	6.4	6.8	2.3	.4	.2	9.7	13.7
9	.28	.042	—	.006	6.5	6.8	6.1	2.7	.8	.1	9.7	12.4
4	.28	.047	—	.062	6.2	7.1	13.8	7.3	7.0	.3	28.4	34.3
7	.10	-----	—	.066	7.5	8.4	15.6	8.4	8.8	.3	33.1	34.7
3	.09	-----	—	.035	8.1	8.9	15.5	8.1	8.4	.2	32.2	33.4
0	.07	-----	—	.033	8.4	9.2	17.7	8.7	8.8	.2	35.4	35.3
2	.04	-----	—	.013	8.6	9.3	10.8	4.5	4.1	.1	19.5	18.0
	1.09	.103	—	-----	7.1	7.7	19.7	19.8	1.2	.7	41.4	43.0
1	.79	.078	(2)	.090	7.9	8.6	25.4	17.3	1.6	.5	44.8	42.4
2	.52	.057	1	.083	8.4	9.1	25.6	18.2	3.6	.4	47.8	42.5
0	.30	-----	(2)	-----	8.3	9.1	23.3	14.8	4.4	.4	42.9	40.1
0	.24	-----	(2)	.054	8.3	9.0	19.8	13.4	5.1	.3	38.6	37.6
2	.23	-----	—	-----	8.2	8.9	18.8	13.0	5.9	.3	38.0	36.9
0	.11	-----	1	.038	8.2	9.2	18.5	11.2	5.2	.3	35.2	33.3
	2.13	.184	—	.032	5.9	6.7	8.2	10.8	3.0	.5	22.5	32.3
1	.54	.052	1	.083	8.5	9.7	11.3	12.3	18.3	.6	42.5	28.6
2	.24	.029	1	.080	8.6	9.7	9.9	13.7	22.1	.5	46.2	29.3
1	.12	-----	1	.073	8.5	9.5	3.6	13.2	22.5	.3	39.6	27.5
7	.07	-----	3	.058	8.5	9.6	3.9	13.8	20.2	.2	38.1	26.4
3	.06	-----	5	.042	8.7	9.8	6.5	12.0	16.5	.2	35.2	23.7
0	.04	-----	5	.032	8.5	9.8	7.2	12.9	14.2	.2	34.5	25.8
	-----	-----	—	-----	-----	-----	6.6	9.5	.9	.5	17.5	23.5
1	-----	-----	—	-----	-----	-----	5.7	25.1	3.5	.4	34.7	41.4
1	-----	-----	—	-----	-----	-----	5.1	24.4	7.2	.4	37.1	37.2
0	-----	-----	—	-----	-----	-----	4.7	24.6	11.0	.4	40.7	36.7
1	-----	-----	—	-----	-----	-----	45.0	23.7	13.1	.4	82.2	31.2
0	-----	-----	—	-----	-----	-----	4.8	23.2	12.3	.4	40.7	30.9
2	-----	-----	—	-----	-----	-----	13.4	19.8	10.5	.4	41.1	27.7
2	-----	-----	—	-----	-----	-----	12.4	17.8	7.8	.3	38.3	27.0
02	-----	-----	—	-----	-----	-----	11.7	16.6	4.6	.3	33.2	22.3
	.69	.064	—	.022	6.4	6.6	4.0	2.5	.2	.5	7.2	9.8
5	.36	.045	—	.010	5.7	6.3	4.7	1.8	.2	.2	6.9	9.5
5	.32	.052	—	.064	6.6	7.2	13.9	9.5	1.0	.4	24.8	25.3
0	.14	-----	—	.053	7.0	7.7	12.8	8.8	1.4	.3	23.3	23.8
4	.07	-----	—	.027	7.2	7.8	10.6	7.9	1.8	.2	20.5	26.7
3	.07	-----	—	.036	7.4	5.1	16.5	11.8	2.9	.2	31.4	32.4
	2.25	.177	—	-----	5.6	6.0	5.2	2.1	.7	.2	8.2	15.7
	.90	.080	—	-----	5.7	6.4	4.5	2.8	1.1	.1	8.5	14.9
	.39	.050	—	-----	6.8	7.6	6.0	7.6	7.5	.2	21.3	22.8
2	.14	-----	—	-----	8.3	8.9	5.2	9.6	14.1	.3	29.2	28.0
3	.07	-----	9	-----	8.7	9.8	13.6	11.6	15.6	.3	41.1	33.3
2	.05	-----	11	-----	8.8	9.9	16.9	12.3	11.9	.3	41.4	34.1

ll amount was found; xx means that a moderate amount was found; xxx means an abundant amount was nt was dominant.

mineralogy of selected soils

reportable amount was not found. More than one dash in a column indicates that determination was not made]

Water extract from saturated paste (Meq./liter)								Electrical conductivity	Water at saturation	Sodium absorption ratio	Exchangeable sodium	Exchangeable sodium	Clay mineralogy [1]			
Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO_4						Montmorillonite	Vermiculite	Mica	Kaolinite
								Mmhos. per cm. at 25°C.	*Percent*		*Percent*	*Meq. per 100 grams of soil*				
2.0	0.8	2.8	0.4	—	0.2	2.9	—	0.67	40.1	2	1	0.2				
.8	.6	2.4	.2	—	.2	1.8	—	.42	33.1	3	2	.3		xx	x	x
.7	.6	4.4	.1	—	.2	3.5	—	.64	31.2	5	5	.6				
.4	.7	10.8	.2	—	.4	7.9	—	1.31	63.8	15	18	6.3				
.6	.3	14.4	.3	—	.6	11.1	—	1.61	66.0	21	23	7.9				
.7	.3	12.4	.2	—	1.9	8.9	—	1.38	59.0	18	23	7.7				
.6	.2	11.7	(2)	—	2.6	7.6	—	1.31	58.7	18	23	8.1	xxxx			x
.4	.4	8.5	.3	—	4.4	2.8	—	.80	38.4	13	21	3.7				
1.1	1.0	2.6	.1	—	1.8	.8	—	.48	53.9	3	3	1.1				
.8	.8	3.6	.1	—	3.2	.2	—	.50	53.7	4	3	1.4				
.5	.6	9.3	.1	—	3.4	.6	—	.78	55.0	11	7	3.1				
2.8	.6	8.5	.2	—	3.4	.6	5.9	1.08	54.7	7	10	4.0				
1.1	1.1	11.0	.2	—	3.6	.6	7.6	1.22	59.8	10	12	4.4				
1.9	2.1	15.2	.3	—	2.7	.4	15.6	1.79	56.4	11	14	5.0				
3.0	2.0	17.9	.3	—	2.2	.6	19.8	2.18	52.3	11	13	4.3				
.3	.2	6.6	.1	—	.5	5.6	1.8	.91	51.0	13	8	2.6	xxxx			xx
.5	1.9	91.2	.2	—	4.2	15.4	30.2	5.33	107.1	83	30	8.5				
1.0	2.9	68.5	.3	—	2.9	30.0	49.0	7.80	116.0	49	48	14.2	xxxx			x
.8	2.0	71.5	.3	—	2.4	27.5	44.6	7.10	135.6	60	46	12.8				
.6	2.0	57.2	.3	—	3.0	24.8	37.9	6.30	123.6	50	50	13.1				
.5	1.2	40.5	.3	—	3.2	18.2	24.6	4.58	114.1	44	50	11.9	xxxx			xx
.6	1.5	40.0	.3	—	3.1	19.6	20.6	4.30	99.4	39	40	10.2				
1.0	2.0	3.7	.2	—	.3	3.2	2.3	.79	41.3	3	3	.8				
5.9	31.8	31.0	.2	—	.9	22.3	52.8	5.88	64.2	7	4	1.5				
1.0	5.2	24.5	.2	—	.8	19.2	11.2	3.29	67.0	14	15	5.5				
6.9	43.0	75.8	.2	—	2.4	58.3	77.8	10.90	65.0	15	17	6.1				
32.4	62.5	74.8	.2	—	1.9	43.6	136.0	13.00	60.0	11	28	8.6				
8.4	58.5	105.0	.2	—	2.4	89.3	89.1	14.60	60.7	18	47	14.6				
4.2	26.1	70.0	.1	—	2.9	64.2	37.4	9.80	61.5	18	22	6.2				
2.3	11.3	45.0	.1	—	3.1	45.4	13.5	6.00	55.5	17	20	5.3				
.8	3.6	15.7	.1	—	2.7	14.7	2.2	2.18	53.8	11	17	3.7				
1.0	.8	1.3	.3	—	.4	1.2	------	.35	32.6	1	1	.1				
.3	.4	9.5	(2)	—	.2	.8	------	1.52	29.5	2	—	—	—	xx	xx	x
11.4	12.4	21.9	1.1	—	.5	10.1	36.9	4.02	49.8	6	—	—				
.7	.6	3.9	.1	—	.6	3.0	------	.59	50.5	5	5	1.2	xxxx	—	—	x
.5	.5	4.3	(2)	—	.5	3.1	------	.59	48.3	6	7	1.6				
2.0	1.6	8.8	.1	—	.6	10.5	------	1.41	55.1	7	9	4.5	xxxx	—	—	x
.8	.5	3.7	.1	—	.2	2.5	1.2	.68	46.8	5	4	.6	xx	—	—	x
.5	.1	4.0	.1	—	.2	3.1	.8	.57	36.4	7	6	.9				
.5	.9	17.5	.1	—	.5	15.1	3.0	2.13	60.9	21	28	6.4				
.7	1.3	36.6	.5	—	1.4	26.1	5.8	3.57	101.6	36	37	10.4	xxxx	—	—	x
.5	.6	25.6	.5	—	3.3	19.7	2.8	2.86	101.4	34	39	13.0	xxxx			x
.5	.3	12.6	(2)	—	4.3	8.3	.9	1.49	84.6	20	32	10.8				

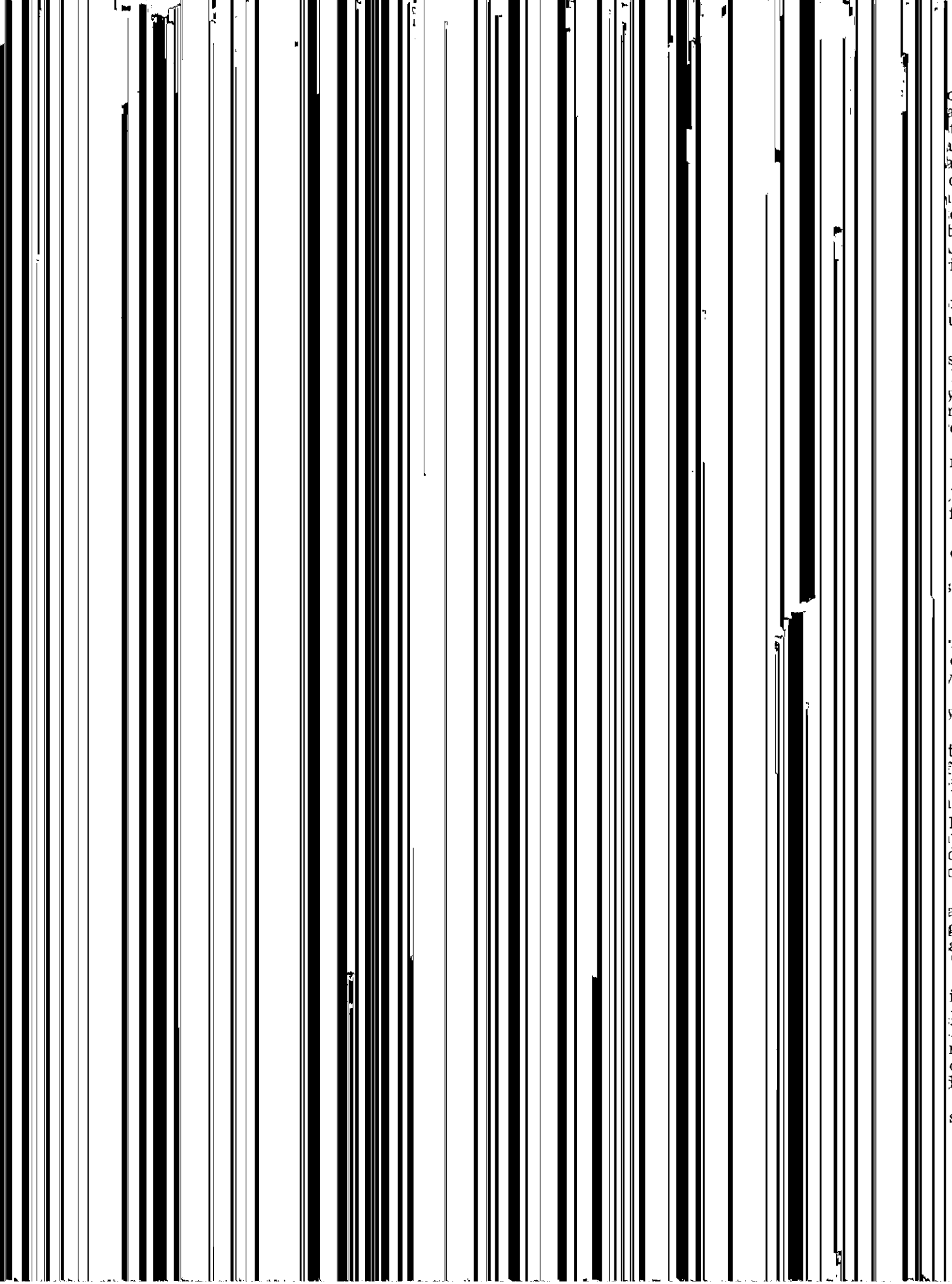

TABLE 10.—*Temperature and precipitation data, Vacaville, Calif.*[1]

Temperature				Precipitation		
Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average monthly total	One year in 10 will have—	
		Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—
°F.	°F.	°F.	°F.	*Inches*	*Inches*	*Inches*
55	36	65	26	5.3	1.4	10.6
60	38	70	28	5.1	1.0	11.5
66	41	79	31	3.1	.6	6.9
73	43	87	35	1.8	(2)	5.0
81	48	95	39	.6	0	1.6
89	53	103	45	.1	0	.5
96	56	107	50	(2)	0	(2)
95	54	106	47	(2)	0	(2)
91	52	105	45	.2	0	.9
80	46	94	36	1.2	(2)	3.7
67	39	81	29	2.2	(2)	4.9
56	37	67	26	5.5	.8	14.2
76	45	[3] 110	[4] 23	25.2	11.5	35.9

1931–60.

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three main sources of fresh wa-
ground water, and the several
o the Sacramento River.

hich was formed by the Monti-
Creek, has a potential to supply
) acre-feet of water to Solano
f this, 219,800 acre-feet is used
70,000 acres of farmland. Irriga-
naining 74,200 acres in irrigated

farms comes from wells and the sloughs that empty into the Sacramento River.

The ground water supply is replenished by Putah Creek in the northern part of the county and by Suisun and Green Valley Creeks west and north of Fairfield.

Population and History

Solano County was occupied by the Patwin Indians at the time the Spanish arrived (*10*). The Patwins

.—*Probabilities of last freezing temperatures in spring and first in fall, Vacaville, Calif.*[1]

ty	Dates for given probabilities and temperatures				
	16° F. or lower	20° F. or lower	24° F. or lower	28° F. or lower	32° F. or lower
	(2)	January 1	February 15	March 19	April 23
n	(2)	(2)	February 1	March 3	April 11
n	(2)	(2)	(2)	February 8	March 21
n	(3)	(3)	November 16	November 7	October 18
an	(3)	(3)	November 26	November 15	October 25
an	(3)	(3)	(3)	November 30	November 7

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of a soil, ex-
pH 7.0 is pre-
r acid nor al-
gives an acid
alkalinity are

	pH
..	Below 4.5
..	4.5 to 5.0
..	5.1 to 5.5
..	5.6 to 6.0
..	6.1 to 6.5
..	6.6 to 7.3
..	7.4 to 7.8
..	7.9 to 8.4
..	8.5 to 9.0
9.1	and higher

ation upon a
rea in stream
rface without

sinking in is called surface runoff; that which enter the ground before reaching surface streams is called groundwater runoff or seepage flow from ground water.

Saline-alkali soil. A soil that contains a harmful concentration of salts and exchangeable sodium; or contains harmful salts and has a highly alkaline reaction; or contains harmful salts and exchangeable sodium and is strongly alkaline in reaction. The salts, exchangeable sodium, and alkaline reaction occur in the soil in such location that growth of most crops is less than normal.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeters) to the lower limit of very fine sand (0.05 millimeters). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Structure, soil. The combination or arrangement of primary soil particles into secondary particles, units, or peds. These secondary units may be, but generally are not, arranged in the profile in such a manner as to give a distinctive characteristic pattern. The secondary units are characterized and classified on the basis of size, shape, and degree of distinctness into classes, types, and grades, respectively.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. That part of the soil below the solum. The parent material or other layers unlike the parent material that lie below the B horizon.

Surface soil. The uppermost part of the soil, ordinarily moved in tillage, or its equivalent in uncultivated soils, about 5 to 8 inches thick. The plowed layer.

Terrace. An old alluvial plain, ordinarily nearly level or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportions of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Variant soil. A soil having properties sufficiently different from other known soils to justify a new series, but comprising such a limited geographic area that creation of a new series is not justified.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. Dashes in a column mean that the particular mapping unit is not suitable for that use. For information on vegetative soil groups and Storie index ratings, see page 63. For information on wildlife, see section beginning or page 67. Other information is given in tables as follows:

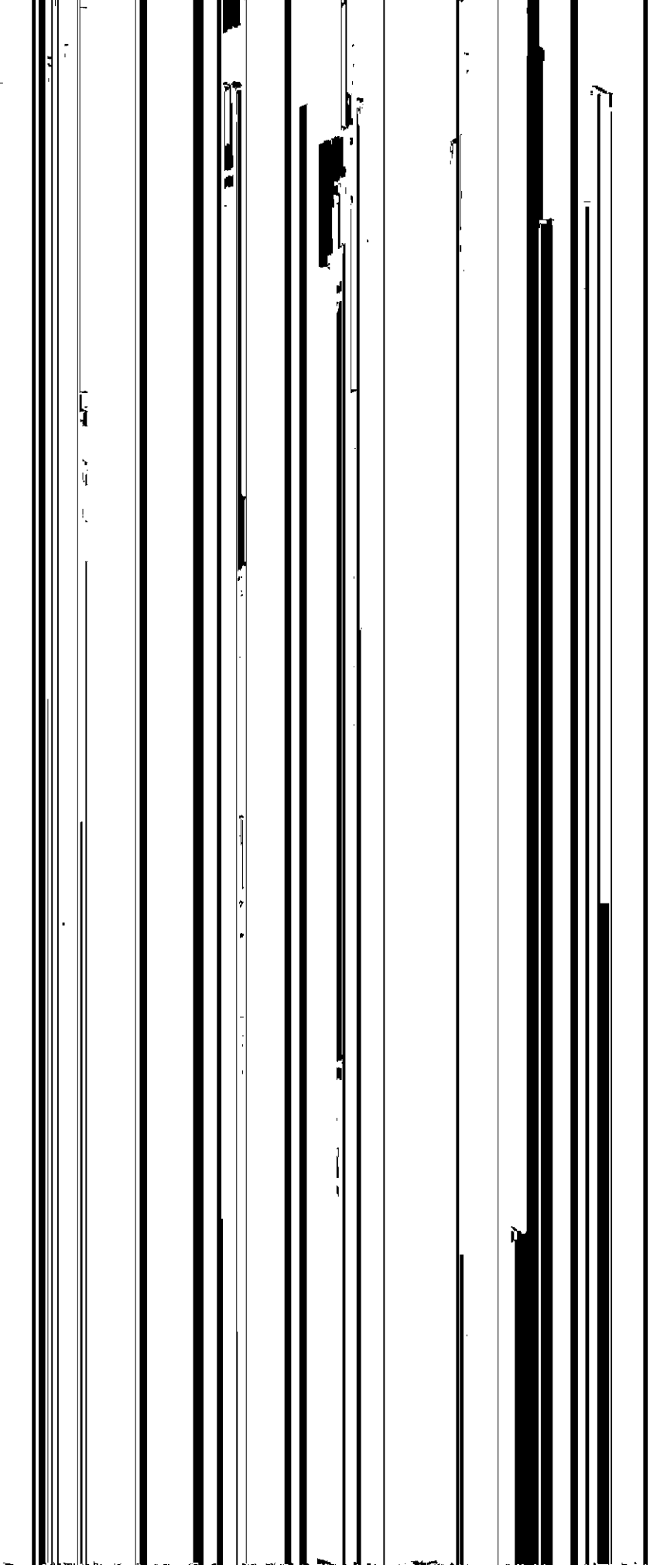
Acreage and extent, table 1, page 8.
Predicted yields, table 2, page 58.
Engineering, tables 4, 5, and 6, pages 72 to 95.

Map symbol	Mapping unit	Page	Capability unit		Vegetative soil group	Wildlife group	Range site		Storie index rating
			Symbol	Page	Symbol	Number	Name	Page	Number
AcC	Altamont clay, 2 to 9 percent slopes	9	IIIe-5 (15)	50	C	8		--	38
AcE	Altamont clay, 9 to 30 percent slopes	9	IVe-5 (15)	53	C	8		--	30
AcF2	Altamont clay, 30 to 50 percent slopes, eroded	9	VIe-1 (15)	54	C	8	Clayey	65	14
AlC	Altamont-San Ysidro-San Benito complex, 2 to 9 percent slopes	9	IIIe-5 (15)	50	--	--		--	36
	Altamont part	--		--	C	8		--	--
	San Ysidro part	--		--	D	4		--	--
	San Benito part	--		--	G	8		--	--
AlE	Altamont-San Ysidro-San Benito complex, 9 to 30 percent slopes	9	IVe-5 (15)	53	--	--		--	30
	Altamont part	--		--	C	8		--	--
	San Ysidro part	--		--	D	4		--	--
	San Benito part	--		--	G	8		--	--
AmC	Altamont-Diablo clays, 2 to 9 percent slopes	10	IIIe-5 (15)	50	C	8		--	38
AmE2	Altamont-Diablo clays, 9 to 30 percent slopes, eroded	10	IVe-5 (15)	53	C	8		--	30
An	Alviso silty clay loam	11	IVw-6 (17)	54	F	6		--	37
AoA	Antioch-San Ysidro complex, 0 to 2 percent slopes	12	IVs-3 (17)	53	D	4		--	38
AoC	Antioch-San Ysidro complex, 2 to 9 percent slopes	12	IVe-3 (17)	52	D	4		--	35
AsA	Anitoch-San Ysidro complex, thick surface, 0 to 2 percent slopes	12	IIIs-3 (17)	51	D	4		--	42
AsC	Antioch-San Ysidro complex, thick surface, 2 to 9 percent slopes	12	IIIe-3 (15)	50	D	4		--	37
BrA	Brentwood clay loam, 0 to 2 percent slopes	13	I-1 (17)	47	A	1		--	81
BrC	Brentwood clay loam, 2 to 9 percent slopes	14	IIe-1 (17)	47	A	1		--	73
Ca	Capay silty clay loam	15	IIs-3 (17)	48	A	1		--	69
Cc	Capay clay	16	IIs-5 (17)	49	C	3		--	46
CeA	Clear Lake clay, 0 to 2 percent slopes	16	IIs-5 (17)	49	C	3		--	49
CeB	Clear Lake clay, 2 to 5 percent slopes	16	IIIe-5 (17)	50	C	8		--	41
ClA	Clear Lake clay, saline, 0 to 2 percent slopes	16	IVw-6 (17)	54	F	6		--	32
Cm	Columbia fine sandy loam	17	IIw-2 (17)	49	E	1		--	90

GUIDE TO MAPPING UNITS--Continued

		Capability unit		Vegetative soil group	Wildlife group	Range site		Storie index rating
	Page	Symbol	Page	Symbol	Number	Name	Page	Number
----	18	I-1 (17)	47	A	1	----------	--	100
----	18	IIs-4 (17)	49	A	1	----------	--	75
----	18	I-1 (17)	47	A	1	----------	--	85
----	18	IIw-2 (17)	49	E	1	----------	--	77
---	19	IVe-3 (17)	52	D	2	----------	--	21
---	19	VIe-1 (17)	54	D	2	Claypan	66	18
---	19	IIIe-5 (15)	50	C	8	----------	--	43
---	19	IVe-5 (15)	53	C	8	----------	--	35
---	20	IIIe-3 (15)	50	G	8	Fine Loamy	64	65
---	20	IVe-3 (15)	52	G	8	Fine Loamy	64	51
---	20	VIe-1 (15)	54	G	8	Fine Loamy	64	14
---	20	IIIe-3 (15)	50	G	8	Fine Loamy	64	55
---	20	IVe-3 (15)	52	G	8	Fine Loamy	64	44
---	21	VIe-1 (15)	54	G	8	Fine Loamy	64	20
---	21	IIw-2 (17)	49	E	1	----------	--	63
---	21	IVw-2 (17)	53	E	5	----------	--	54
---	22	VIIe-1 (15)	55	J	7	Very Shallow Loamy	67	8
---	22	IVe-1 (15)	52	G	8	Fine Loamy	64	50
---	22	VIe-1 (15)	54	G	7	Shallow Loamy	66	24
---	23	VIIs-1 (15)	55	J	7	Very Shallow Loamy	67	18
---	23	VIw-1 (16)	55	J	9	----------	--	18
---	24	VIw-1 (16)	55	J	9	----------	--	16
---	25	Variable	--	--	--	----------	--	Variable

Map symbol	Mapping unit	Page	Capability unit	Page	Vegetative soil group	Wildlife group	Range site	Page	Storie index rating
			Symbol		Symbol	Number	Name		Number
MeG3	Maymen-Los Gatos loams, 15 to 75 percent slopes, severely eroded	25	VIIIs-1 (15)	55	J	--	----------	--	6
	Maymen part	--	--------	--	--	7	----------	--	--
	Los Gatos part	--	--------	--	--	8	----------	--	--
MkA	Millsap sandy loam, 0 to 2 percent slopes	26	IVs-3 (15)	53	D	4	----------	--	38
MlC	Millsap-Los Osos complex, 2 to 9 percent slopes	26	IVe-3 (15)	52	--	--	----------	--	41
	Millsap part	--	--------	--	D	2	Claypan	66	--
	Los Osos part	--	--------	--	G	8	Fine Loamy	64	--
MmE	Millsholm loam, 15 to 30 percent slopes	26	VIe-1 (15)	54	G	7	Shallow Loamy	66	27
MmG2	Millsholm loam, 30 to 75 percent slopes, eroded	27	VIIe-1 (15)	55	J	7	Shallow Loamy	66	8
MnC	Millsholm loam, moderately deep variant, 2 to 9 percent slopes	27	IIIe-1 (15)	50	G	8	----------	--	51
MnE	Millsholm loam, moderately deep variant, 9 to 30 percent slopes	27	IVe-1 (15)	52	G	8	----------	--	38
Om	Omni clay loam	28	IVw-6 (17)	54	F	6	----------	--	47
On	Omni silty clay	28	IIIw-5 (17)	52	E	5	----------	--	36
Pc	Pescadero clay loam	29	IVw-6 (17)	54	F	6	----------	--	35
Pe	Pescadero clay	29	IVw-6 (17)	54	F	6	----------	--	24
Ra	Reiff fine sandy loam	30	I-1 (17)	47	A	1	----------	--	100
Rd	Reyes silty clay loam, drained	30	IVw-9 (16)	54	H	9	----------	--	37
Re	Reyes silty clay	30	VIw-1 (16)	55	H	9	----------	--	25
RnC	Rincon loam, 2 to 9 percent slopes	31	IIe-3 (17)	48	A	1	----------	--	77
RoA	Rincon clay loam, 0 to 2 percent slopes	31	IIs-3 (17)	48	A	1	----------	--	72
RoC	Rincon clay loam, 2 to 9 percent slopes	31	IIe-3 (17)	48	A	1	----------	--	65
Rw	Riverwash	31	VIIIw-1 (17)	55	J	2	----------	--	<5
Ry	Ryde clay loam	32	IIIw-2 (16)	51	E	5	----------	--	61
Sa	Sacramento silty clay loam	33	IIIw-3 (17)	51	E	5	----------	--	65
Sc	Sacramento silty clay loam, occasionally flooded	33	IVw-3 (17)	54	E	5	----------	--	34
Sd	Sacramento clay	33	IIIw-5 (17)	52	E	5	----------	--	43
SeA	San Ysidro sandy loam, 0 to 2 percent slopes	35	IVs-3 (17)	53	D	4	----------	--	46
SeB	San Ysidro sandy loam, 2 to 5 percent slopes	35	IVe-3 (17)	52	D	4	----------	--	43
SfA	San Ysidro sandy loam, thick surface, 0 to 2 percent slopes	35	IIIs-3 (17)	51	D	4	----------	--	49
Sh	Solano loam	37	IVs-6 (17)	53	F	6	----------	--	38
Sk	Solano-Pescadero complex-	37	IVw-6 (17)	54	F	6	----------	--	34



G UNITS--Continued

y	Vegetative soil group	Wildlife group	Range site		Storie index rating
age	Symbol	Number	Name	Page	Number
53	F	6	----------	--	38
55	J	9	----------	--	27
49	E	1	----------	--	68
47	A	1	----------	--	85
52	F	6	----------	--	45
54	E	5	----------	--	39
55	J	9	----------	--	30
55	J	9	----------	--	5
55	J	7	----------	--	6
52	G	8	Fine Loamy	64	48
55	J	7	Shallow Loamy	66	12
51	B	2	----------	--	41
49	E	1	----------	--	77
52	F	6	----------	--	62
55	F	6	----------	--	34
54	F	6	----------	--	39
54	F	6	----------	--	39
47	A	1	----------	--	100
48	A	1	----------	--	85
47	A	1	----------	--	90

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