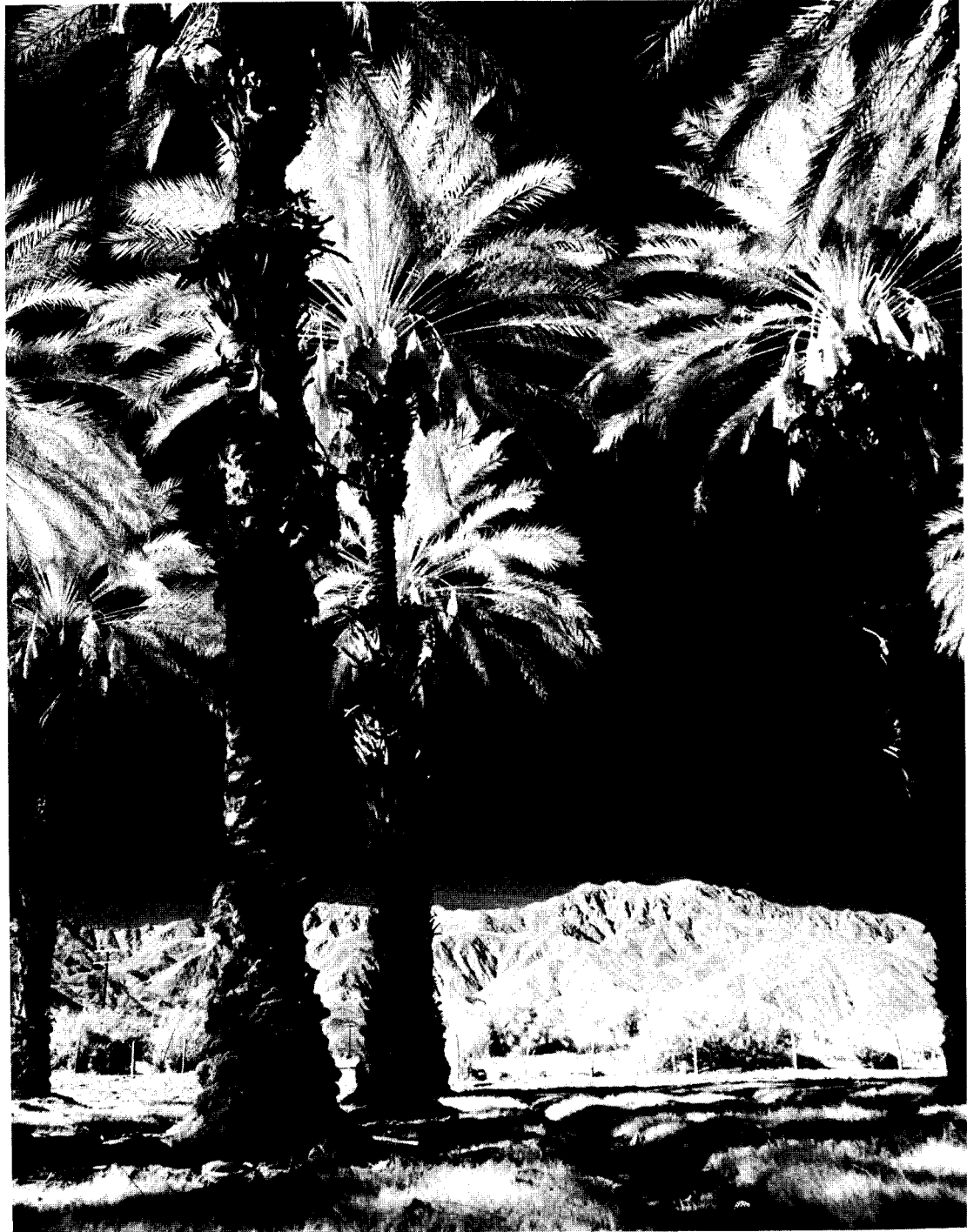


SOIL SURVEY OF  
**Riverside County, California**  
**Coachella Valley Area**



**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. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1958-73. Soil names and descriptions were approved in 1974. Unless otherwise indicated, statements in the publication refer to conditions in the Area in 1974. This survey was made cooperatively by the Soil Conservation Service and the University of California Agricultural Experiment Station. The Coachella Valley Resource Conservation District and the Coachella Valley County Water District assisted by providing equipment and services. It is part of the technical assistance furnished to the Coachella Valley Resource Conservation District and the Coachella Valley County Water District.

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

**T**HIS SOIL SURVEY contains information that can be applied in managing farms; 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 Riverside County, California, Coachella Valley Area, 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 "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the Area in alphabetic order by map symbol and gives the capability classification of each. It also shows the page where each soil is described and the page for the capability unit in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in 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 descriptions of the soils, the capability grouping, and the discussion of management practices and estimated yields.

*Engineers and builders* can find, under "Engineering," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

*Community planners and others* can find information that affects the choice of sites for dwellings, industrial buildings, and recreational areas in the engineering tables.

*Scientists and others* can read how the soils formed and how they are classified in the section "Formation, Morphology, and Classification of the Soils."

*Newcomers in the Coachella Valley Area* may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "Climate."

Cover: Date garden on Coachella fine sand, 0 to 2 percent slopes. Date clusters covered for protection against birds and rain.

# Contents *Some Crop Information*

	Page		Page
Index to map units -----	ii		20
Summary of tables -----	iii		21
<b>How this survey was made</b> -----	<b>1</b>		<b>22</b>
<b>General soil map</b> -----	<b>2</b>		<b>24</b>
Excessively drained to somewhat poorly drained, nearly level to moderately steep soils on alluvial fans and valley fill and in lacustrine basins in the Coachella Valley -----	2		25
1. Niland-Imperial-Carsitas association -----	2		26
2. Carsitas-Myoma-Carrizo association -----	2		26
3. Myoma-Indio-Gilman association -----	3	<i>Some Crop Info</i>	26
4. Gilman-Coachella-Indio association -----	4		26
5. Salton-Indio-Gilman association -----	4		26
Excessively drained to well drained, nearly level to very steep soils on alluvial fans, terraces, and mountains rimming the Coachella Valley -----	5		27
6. Rock outcrop-Omstott-Cajon variant association -----	5		27
7. Chuckawalla-Badland association -----	5		27
8. Tujunga-Soboba-Riverwash association -----	6		27
9. Rock outcrop-Lithic Torripsamments association -----	6		27
10. Badland-Carsitas association -----	6		27
<b>Descriptions of the soils</b> -----	<b>7</b>		<b>28</b>
Badland -----	7		28
Borrow pits -----	7		28
Bull Trail series -----	7		28
Cajon series -----	9		28
Cajon variant -----	10		28
Carrizo series -----	10		28
Carsitas series -----	11		28
Carsitas variant -----	12		28
Chuckawalla series -----	13		28
Coachella series -----	15		28
Fluvaquents -----	16		28
Fluvents -----	16		28
Gilman series -----	17		28
Gravel pits and dumps -----	19		28
Imperial series -----	19		28
Indio series -----			29
Lithic Torripsamments-Rock outcrop -----			29
Myoma series -----			29
Niland series -----			29
Omstott series -----			29
Riverwash -----			29
Rock outcrop -----			29
Rock outcrop-Lithic Torripsamments -----			29
Rubble land -----			29
Salton series -----			29
Soboba series -----			29
Torriorthents-Rock outcrop -----			29
Tujunga series -----			29
<b>Use and management of the soils</b> -----			<b>30</b>
Capability grouping -----			30
Major land resource areas -----			31
Management by capability units -----			34
<b>Crop management and estimated yields</b> -----			<b>38</b>
Engineering -----			44
Building site development -----			44
Sanitary facilities -----			47
Water management -----			53
Construction materials -----			56
Recreation -----			57
Wildlife habitat -----			57
Windbreaks -----			64
Soil properties -----			64
Engineering properties -----			65
Engineering test data -----			65
Physical and chemical properties -----			70
Soil and water features -----			76
<b>Formation, morphology, and classification of the soils</b> -----			<b>78</b>
Factors of soil formation -----			79
Parent material -----			79
Relief -----			79
Climate -----			79
Living organisms -----			80
Time -----			80
Morphology of the soils -----			81
Classification of the soils -----			81
<b>Additional facts about the area</b> -----			<b>82</b>
Water supply -----			83
Climate -----			83
<b>Literature cited</b> -----			<b>86</b>
<b>Glossary</b> -----			<b>87</b>
<b>Guide to mapping units</b> -----		Following	<b>89</b>

Issued September 1980

## Index to Map Units

		Page			Page
BA	Badland -----	7		fine substratum, 0 to 2 percent slopes -----	18
BP	Borrow pits -----	7			
BHE	Bull Trail stony sandy loam, 9 to 30 percent slopes -----	9	GeA	Gilman silt loam, 0 to 2 percent slopes -----	19
CaD	Cajon loamy sand, 5 to 15 percent slopes -----	10	GfA	Gilman silt loam, wet, 0 to 2 percent slopes -----	19
CbD	Cajon variant, 2 to 15 percent slopes -----	10	GP	Gravel pits and dumps -----	19
CcC	Carrizo stony sand, 2 to 9 percent slopes -----	11	leA	Imperial silty clay, 0 to 2 percent slopes -----	20
CdC	Carsitas gravelly sand, 0 to 9 percent slopes -----	11	lfA	Imperial silty clay, wet, 0 to 2 percent slopes -----	20
CdE	Carsitas gravelly sand, 9 to 30 percent slopes -----	12	lmC	Imperial-Gullied land complex, 2 to 9 percent slopes -----	20
CfB	Carsitas sand, wet, 0 to 5 percent slopes -----	12	loC	Imperial-Gullied land complex, wet, 2 to 9 percent slopes -----	20
ChC	Carsitas cobbly sand, 2 to 9 percent slopes -----	12	lp	Indio fine sandy loam -----	21
CkB	Carsitas fine sand, 0 to 5 percent slopes -----	12	lr	Indio fine sandy loam, wet -----	21
CmB	Carsitas variant, 2 to 5 percent slopes -----	13	ls	Indio very fine sandy loam -----	21
CmE	Carsitas variant, 5 to 30 percent slopes -----	13	lt	Indio very fine sandy loam, wet -----	21
CnC	Chuckawalla cobbly fine sandy loam, 2 to 9 percent slopes -----	14	LR	Lithic Torripsamments-Rock outcrop complex -----	21
CnE	Chuckawalla cobbly fine sandy loam, 9 to 30 percent slopes -----	14	MaB	Myoma fine sand, 0 to 5 percent slopes -----	23
CoB	Chuckawalla very gravelly sandy clay loam, 2 to 5 percent slopes -----	15	MaD	Myoma fine sand, 5 to 15 percent slopes -----	23
CoD	Chuckawalla very gravelly sandy clay loam, 5 to 15 percent slopes -----	15	McB	Myoma fine sand, wet, 0 to 5 percent slopes -----	23
CpA	Coachella fine sand, 0 to 2 percent slopes -----	16	NaB	Niland sand, 2 to 5 percent slopes -----	25
CpB	Coachella fine sand, hummocky, 2 to 5 percent slopes -----	16	NbB	Niland sand, wet, 2 to 5 percent slopes -----	25
CrA	Coachella fine sand, wet, 0 to 2 percent slopes -----	16	OmD	Omstott coarse sandy loam, 5 to 15 percent slopes -----	26
CsA	Coachella fine sandy loam, 0 to 2 percent slopes -----	16	Or	Omstott-Rock outcrop complex -----	26
Fa	Fluvaquents -----	16	RA	Riverwash -----	26
Fe	Fluvents -----	16	RO	Rock outcrop -----	26
GeB	Gilman loamy fine sand, 0 to 5 percent slopes -----	17	RT	Rock outcrop-Lithic Torripsamments complex -----	26
GbA	Gilman fine sandy loam, 0 to 2 percent slopes -----	17	RU	Rubble land -----	26
GbB	Gilman fine sandy loam, 2 to 5 percent slopes -----	18	Sa	Salton fine sandy loam -----	27
GcA	Gilman fine sandy loam, wet, 0 to 2 percent slopes -----	18	Sb	Salton silty clay loam -----	27
GdA	Gilman fine sandy loam, moderately fine substratum, 0 to 2 percent slopes -----	18	SoD	Soboba cobbly sand, 2 to 15 percent slopes -----	28
			SpE	Soboba stony sand, 5 to 30 percent slopes -----	28
			TO	Torriorthents-Rock outcrop complex -----	28
			TpE	Tujunga fine sand, 5 to 30 percent slopes -----	29
			TrC	Tujunga gravelly loamy sand, 0 to 9 percent slopes -----	29
			TsB	Tujunga loamy fine sand, 0 to 5 percent slopes -----	29

## Summary of Tables

	Page
Acreage and Proportionate Extent of the Soils (Table 1) -----	8
Acres. Percent.	
Building Site Development (Table 3) -----	45
Shallow excavations. Dwellings without basements. Small commercial buildings. Local roads and streets.	
Classification of the Soils (Table 14) -----	82
Soil name. Family or higher taxonomic class.	
Construction Materials (Table 6) -----	54
Roadfill. Sand. Gravel. Topsoil.	
Engineering Properties and Classifications (Table 9) -----	66
Depth. USDA texture. Classification—Unified, AASHTO.	
Fragments > 3 inches. Percentage passing sieve—Number—4, 10, 40, 200. Liquid limit. Plasticity index.	
Engineering Test Data (Table 10) -----	72
Soil name and location. Calif. Report No. Depth. Horizon. Moisture density—Maximum, Optimum. Percentage passing sieve—Number—4, 10, 40, 200. Percentage smaller than—0.005 mm., 0.002 mm. Liquid limit. Plasticity index. Classification—AASHTO, Unified.	
Mean Monthly Precipitation and Temperatures (Table 16) -----	85
Month. Indio Date Garden. Mecca SE. Palm Springs.	
Physical and Chemical Properties of Soils (Table 11) -----	74
Depth. Permeability. Available water capacity. Soil reaction. Salinity. Shrink-swell potential. Risk of corrosion—Uncoated steel, Concrete. Erosion factors. Wind erodibility group.	
Precipitation, Temperatures, Probabilities, and Growing Season (Table 15) -----	84
Recreational Development (Table 7) -----	58
Camp areas. Picnic areas. Playgrounds. Paths and trails.	
Sanitary Facilities (Table 4) -----	48
Septic tank absorption fields. Sewage lagoon areas. Trench sanitary landfill. Area sanitary landfill. Daily cover for landfill.	
Soil and Water Features (Table 12) -----	77
Hydrologic group. Flooding—Frequency, Duration, Months. High water table—Depth, Kind, Months, Bedrock—Depth, Hardness.	
Soil Temperature Readings at 20-inch Depth at Specified Sites (Table 13) -----	80
Site. Elevation. Aspect. Average annual temperature.	
Water Management (Table 5) -----	51
Pond reservoir areas. Embankments, dikes, and levees. Drainage. Irrigation. Terraces and diversions. Grassed waterways.	
Wildlife Habitat Potentials (Table 8) -----	60
Potential for habitat elements—Grain and seed crops, Grasses and legumes, Wild herbaceous plants, Hardwood trees, Coniferous plants, Shrubs, Wetland plants, Shallow water areas. Potential as habitat for—Openland wildlife, Woodland wildlife, Wetland wildlife, Rangeland wildlife.	
Yields Per Acre of Irrigated Crops (Table 2) -----	30
Soil name and map symbol. Alfalfa. Carrots. Lint cotton. Dates. Thompson seedless grapes. Marsh grapefruit. Wheat. Oat hay.	