

3.3 CLIMATE, GEOLOGY, TOPOGRAPHY, AND SOILS



This section describes the climate, geology, topography, and soil resource characteristics of the Yolo Bypass Wildlife Area (Wildlife Area). Agricultural soil resources (e.g., Prime Farmland) are described in Section 3.2, “Agricultural Resources and Land Uses.” Geomorphology, hydrology, and water quality are described in Section 3.4.

The following text was developed through a review of existing scientific literature and Yolo Bypass Wildlife Area staff information. These sources provided information on climate, geology, topography, and soils characteristics throughout the Yolo Bypass Wildlife Area.

3.3.1 CLIMATE

Yolo County has a Mediterranean climate characterized by hot, dry summers and temperate, wet winters. However, the county receives a marine air influence from the Delta regions to the south that moderates the temperature extremes of the Central Valley. During the summer months (June–August), average daily high temperatures are in the mid-90s Fahrenheit (°F) and average daily low temperatures are in the mid-50s. During the winter months (December–February), average high temperatures are in the 50s°F and average lows are 38–40°F. Virtually all precipitation falls as rain, between November and April in most years. Annual rainfall typically ranges from 16 to 22 inches, and the average annual air temperature is 60–62°F. The frost-free season is 230–280 days throughout the year (Yolo County Planning Department 2005).

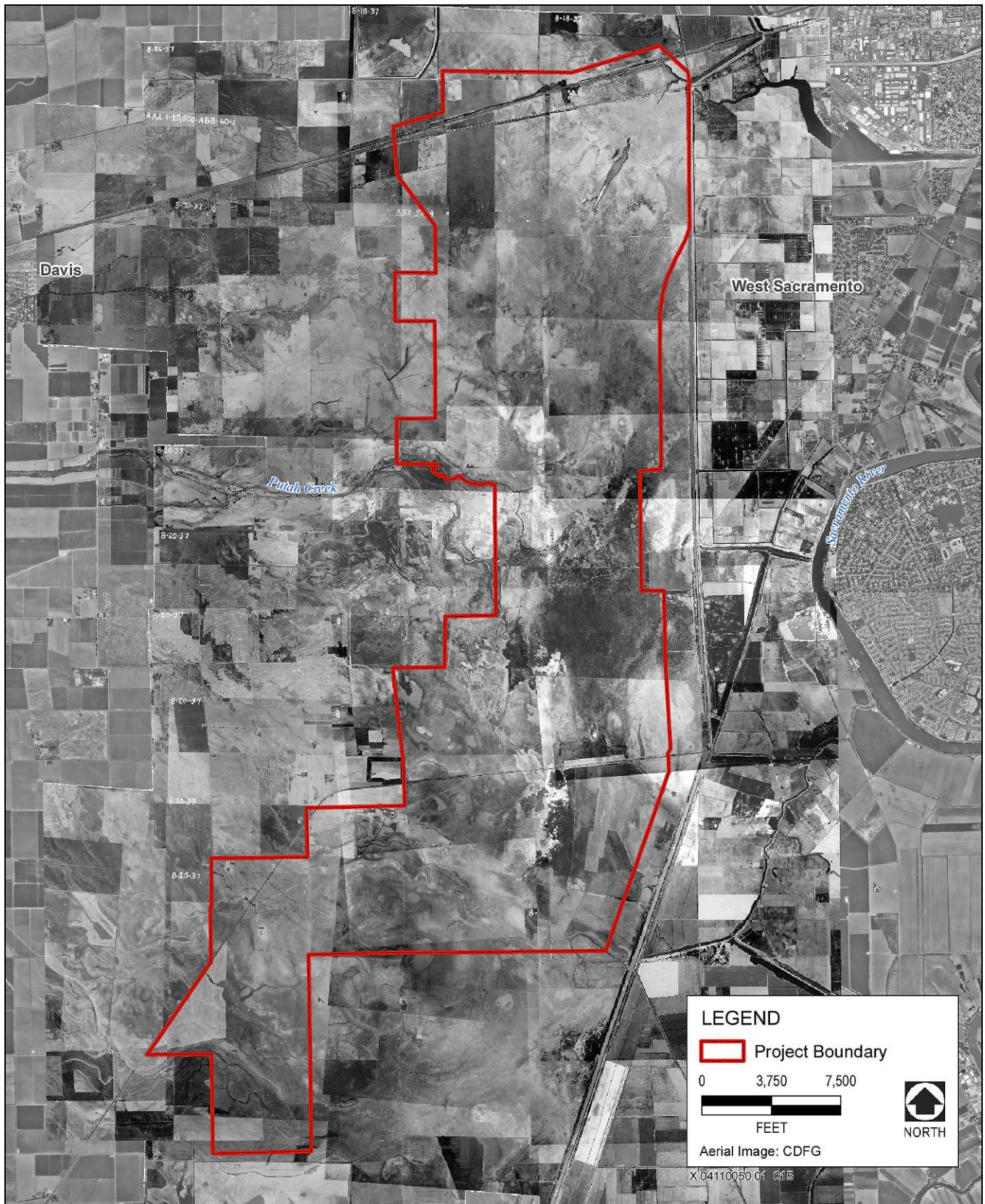
3.3.2 GEOLOGY

The Yolo Bypass Wildlife Area is located in the Yolo Basin on the west side of the Sacramento Valley, in the Great Valley geomorphic province of California. The Sacramento Valley forms the northern half of the Great Valley, which fills a northwest-trending structural depression bounded on the west by the Great Valley Fault Zone and the southern Coast Ranges, and to the east by the Sierra Nevada and the Foothills Fault Zone. Most of the surface of the Great Valley is covered with alluvium of Holocene and Pleistocene age, composed primarily of sediments from the Sierra Nevada and the Coast Ranges that were carried by rivers and deposited on the valley floor.

The Wildlife Area is underlain by Holocene-age (i.e., the last 10,000 years) Basin deposits, composed of fine-grained silt and clay, which overlie older Pleistocene-age alluvial fan deposits (Riverbank Formation) of the Sacramento River (Helley and Harwood 1985, Wagner et al. 1987). These periods of deposition correlate with periods of glaciation in the Sierra Nevada, the rise and fall in sea level, and climatic change. Additional information regarding the geomorphology and hydrology of the Yolo Wildlife Area is provided in Section 3.4.

3.3.3 TOPOGRAPHY

Historic landforms in the Yolo Wildlife Area include the floodplains and natural levees along the Sacramento River; the historic delta and distributary channels of Putah Creek (as depicted in Exhibit 3.3-1); the closed depression formations of the Putah Creek Sinks; the edge of the alluvial fan of Putah Creek extending into the Basin; and the Yolo Basin rims within and around its borders. Green’s Lake in the northern portion of the present-day Wildlife Area appears that it could be an oxbow lake that may have been formed over time as erosion and deposits of soil changed the course of the Sacramento River and perhaps Putah Creek. Historic maps seem to depict a connection between the north fork of Putah Creek, Green’s Lake, Lake Washington, and perhaps the Sacramento River.



Source: Department of Fish and Game

Yolo Bypass Wildlife Area Aerial Photo (1937)

Exhibit 3.3-1

The alluvial fans, natural levees, and floodplains including the sinks of Putah Creek are composed of coarse sediment deposited by the flowing water of periodic overbank flooding of the Sacramento River and Putah Creek. The basins and basin rims are composed of fine sediment deposited by the ponded water of rainfall and flood overflows.

The current topographic features and landforms within the Wildlife Area are largely a product of anthropogenic alterations to the natural system. The construction of dams (upstream in the Sacramento River watershed and in Putah Creek) and levees, management of water releases, and grading of topography for purposes of conversion to agricultural lands has resulted in substantial changes to the current topography. Currently elevations range from approximately 5 feet above sea level at the bank of the East Toe Drain to 15 feet above sea level at the western edge of the Tule Ranch Unit. Primary topographic features now include human-made levees, trestles, and berms. Remaining natural topographic features include closed landform depressions, (e.g., Putah Creek Sinks, natural seasonal wetlands, vernal pools), remnant alluvial fan features that drain the western portion of the Tule Ranch to the East Toe Drain, and Green’s Lake (i.e., remnant oxbow lake). Additional information regarding physical processes that formed the topographic features and landforms throughout the Yolo Bypass Wildlife Area is provided in Section 3.4, Geomorphology, Hydrology, and Water Quality.”

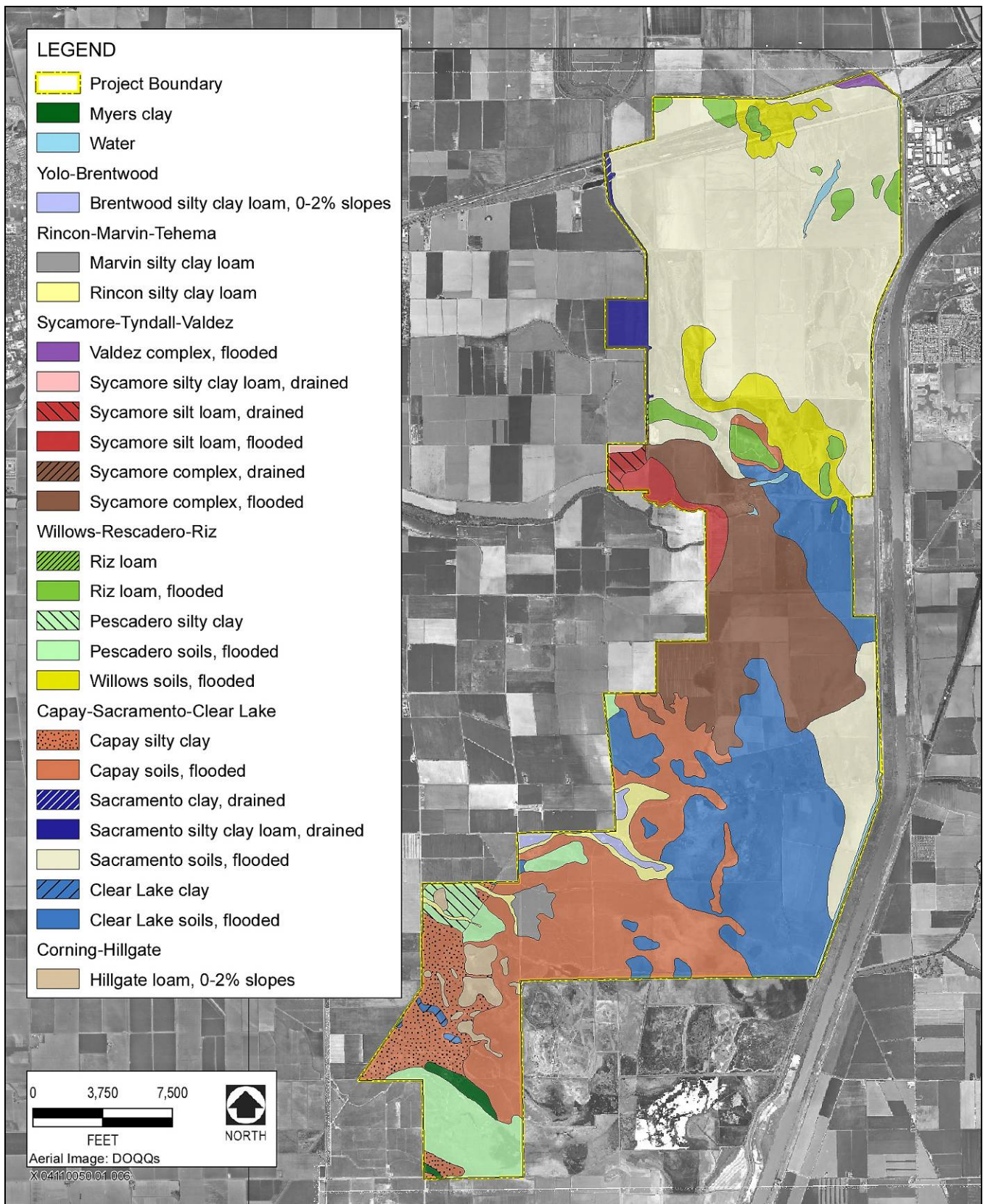
3.3.4 SOILS

Six general soil associations have been identified in the Wildlife Area (Natural Resources Conservation Service 1972) (Exhibit 3.3-2). A soil association is a landscape that has a distinctive proportional pattern of soil types. It normally consists of one or more major soils and at least one minor soil; it is named for the major soils. The soils in one association may occur in another, but in a different pattern. Table 3.3-1 summarizes the natural vegetation and agricultural/land use characteristics of the soil associations identified in the Wildlife Area (Andrews 1972; Yolo County Planning Department 2005). A brief description of each soil association is provided below. In the NRCS characterization of each association described below, the terms for texture apply to the surface layer.

**Table 3.3-1
Soil Association Characteristics of the Yolo Bypass Wildlife Area**

Soil Association	Natural Vegetation Characteristics ^{1,2}	Agricultural and Other Land Use Characteristics ³
Yolo-Brentwood	Annual grasses and forbs	Wide range of irrigated and nonirrigated crops
Rincon-Marvin-Tehema	Annual grasses and forbs with scattered oaks	Wide range of irrigated and nonirrigated crops
Sycamore-Tyndall-Valdez	Annual grasses and forbs	Irrigated crops and pasture and dry-farmed grain
Willows-Pescadero-Riz	Annual grasses, forbs, salt-tolerant plants	Alkali-tolerant irrigated crops and pasture and dry-farmed grain; wildlife habitat
Capay-Sacramento-Clear Lake	Annual grasses and forbs	Irrigated crops and pasture and dry-farmed grain
Corning-Hillgate	Annual grasses and forbs with scattered oaks and brush in places	Dry-farmed grain, pasture, rangeland, recreation, wildlife habitat

¹ Current vegetation of uncultivated and otherwise undisturbed soils; historic vegetation (prior to 1800s) characteristics would have been different, likely including native grasses and forbs, wetland plants and riparian trees and shrubs.
² Many of these soils have wetland soil characteristics (e.g., hydric).
³ Primary uses may have changed in some of the associations as a result of reclamation and development of the irrigation system.
Sources: Andrews 1972; Yolo County Planning Department 2005



Source: SSURGO 2005, EDAW 2005

Soils Associations in the Yolo Bypass Wildlife Area

Exhibit 3.3-2

YOLO-BRENTWOOD ASSOCIATION

NRCS characterizes the Yolo-Brentwood Association as a “well-drained soil with nearly level topography, characterized by silt loams to silty clay loams, on alluvial fans.” These soils formed in alluvium derived from sedimentary rock. In uncultivated areas the vegetation is typically annual grasses and forbs. Minor soils of this association are the Myers, Reiff, Sycamore, and Zamora. The soils of this association are used chiefly for irrigated orchards, row crops, and field crops. The soils are also used for truck crops, irrigated pasture, dry-farmed grain, recreation areas, and wildlife habitat.

RINCON-MARVIN-TEHAMA ASSOCIATION

NRCS characterizes the Rincon-Marvin-Tehama Association as “well-drained and somewhat poorly drained soil with nearly level topography, characterized by silty clay loams to loams, and found on alluvial fans and basin rims.” These soils formed in alluvium derived from sedimentary rock. They have a subsoil of clay loam, silty clay loam, or silty clay. In areas not cultivated, the vegetation is mainly annual grasses and forbs, but Valley oaks may grow in scattered areas. Marvin soils are somewhat poorly drained and Tehama soils are well drained. Minor soils of this association are the Capay, Clear Lake, and Hillgate. The soils of this association are used chiefly for irrigated orchards, row crops, and field crops. The soils are also used for dry-farmed grain, for recreation areas, and as wildlife habitat.

SYCAMORE-TYNDALL-VALDEZ ASSOCIATION

This soil association occurs within the alluvial zone of Putah Creek. Most of the productive agricultural fields on the Wildlife Area contain these soils. NRCS characterizes the Sycamore-Tyndall-Valdez Association as “somewhat poorly drained soil with nearly level topography, characterized by very fine sandy loams to silty clay loams, on alluvial fans.” These soils formed in alluvium derived from mixed sources. In some areas drainage has been improved and the water table has been lowered. In uncultivated areas the vegetation is annual grasses and forbs. Lang is a minor soil in this association. Also included in this association are small, alkali-affected areas and a few small areas that have a silty clay substratum. The soils of this association are used chiefly for row crops, hay crops, orchards, irrigated pasture, and dry-farmed grain. The soils are also used for recreation areas and as wildlife habitat.

WILLOWS-PESCADERO-RIZ ASSOCIATION

NRCS characterizes the Willows-Pescadero-Riz Association as “poorly drained soil on nearly level topography, characterized by saline-alkali silty clay loams to clays, and located in basins.” These soils formed in alluvium derived from mixed and sedimentary rocks. In uncultivated areas the vegetation is annual grasses, forbs, salt grass, pickleweed, and other salt-tolerant plants. Minor soils of this association are the Lang, Laugenour, and Sacramento. The soils of this association are used chiefly for alkali-tolerant, irrigated row crops, field crops, and pasture plants, and as wildlife habitat. The soils are also used for dry-farmed grain and field crops, dryland pasture, and recreation areas.

CAPAY-SACRAMENTO-CLEAR LAKE ASSOCIATION

NRCS characterizes the Capay-Sacramento-Clear Lake Association as “moderately well drained to poorly drained soil located on nearly level topography, characterized by silty clays and clays, and located on basin rims and in basins.” These soils formed in alluvium derived from sedimentary rock under moderately good to poor drainage. In uncultivated areas the vegetation is annual grasses and forbs. Capay soils are moderately well drained, and Sacramento and Clear Lake soils are poorly drained. Minor soils of this association are the Lang, Laugenour, and Sacramento. Soils may be subject to ponding. The soils of this association are used chiefly for irrigated row crops, truck crops, field crops, dry-farmed field crops, and pasture. The soils are also used for recreation areas and as wildlife habitat.

CORNING-HILLGATE ASSOCIATION

NRCS characterizes the Corning-Hillgate Association as “well-drained soil on gently sloping to moderately steep topography, characterized by gravelly loams or loams, and located on terraces.” These soils formed in alluvium derived from sedimentary rock and mixed sources. They have a very slowly permeable subsoil at a depth between 10 and 30 inches. The vegetation is chiefly annual grasses and forbs, although a few oaks can grow and patches of brush can also occur. The depth to the clay subsoil in both the Corning and Hillgate soils ranges from 10 to 30 inches. Minor soils of this association are the Positas, San Ysidro, and Sehorn. Also found in this association are a few areas of soil that are moderately deep over clay subsoil, and a few severely eroded areas where the clay subsoil is exposed. The soils of this association are used chiefly for dry-farmed grain, pasture, range, and recreation areas, and as wildlife habitat.

The suitability of the soils for particular agricultural uses and their farmland classification (e.g., Prime Farmland) is described in more detail in Section 3.2, “Agricultural Resources.”