



Attachment B

Biological Resources

- ❖ The following are all rare, threatened, endangered, and Species of Special Concern known to occur within the 9-quads queried. Information was taken from up to date CNDDDB and CNPS listings.

Birds

Tricolored Blackbird (*Agelaius tricolor*)

Status: SSC and California Threatened

Habitat Requirements: The tricolored blackbird is a breeding resident in most of California, primarily in the Central Valley, and coastal areas from southern Sonoma County along the coast to San Diego County. They breed and forage in a variety of habitats, including salt marshes, moist grasslands, freshwater marshes, bay-shore habitats, riparian forests, and oak savannahs. This species commonly builds nests just above ground or water and up to several meters high in trees. Usually, nests are close to water or near spiny vegetation to inhibit access by predators.

Potential for Occurrence: There is a moderate to low potential for habitat within the project area. No individuals or nests were observed during reconnaissance.

Great Blue Heron (*Ardea herodias*)

Status: SSC

Habitat Requirements: Great blue herons are common in shallow estuaries, and fresh and saline emergent wetlands. Foraging areas include river and creek banks, ponds, lakes, and watercourses in mountainous areas. Nest trees are called “rookery” trees; *A. herodias* is a colonial nester. This species requires lakes, ponds, streams, rivers, marshes, or wet meadows for foraging on aquatic invertebrates, frogs, snakes, and fish (Cogswell 1977).

Potential for Occurrence: There is moderate potential for this species to occur; mainly along the Russian river. No individuals or their nest trees were observed during field reconnaissance.

Burrowing owl (*Athene cunicularia*)

Status: BFS

Habitat Requirements: Burrowing owls are yearlong residents of Napa County. They occur in open, dry grassland and desert habitats, and in grassland, forb and open shrub stages of pinyon-juniper and ponderosa pine habitats. They use rodent or other burrows for roosting and nesting cover.

Potential for Occurrence: There is no habitat potential for this species within the project areas.

White-Tailed Kite (*Elanus leucurus*)

Status: SSC, BFS

Habitat Requirements: White-tailed kites are yearlong residents in coastal and valley lowlands and are rarely found away from agricultural areas. White-tailed kites inhabit herbaceous and open stages of most habitats mostly in cismontane California. White-tailed kites forage for voles and other rodents in undisturbed, open grasslands, meadows, farmlands, and emergent wetlands (Waian and Stendall 1970). Nests are made of loosely piled sticks and twigs and lined with grass or straw. Nests are placed near the top of dense broadleaved deciduous trees, approximately 6-20 meters above ground.



Potential for Occurrence: There is habitat potential for this species. A nest tree was observed in a Blue gum Eucalyptus according to the CNDDDB. The RPF relocated the potential nest, but no individuals were observed. The nest tree is greater than .5 miles of the project area.

Osprey (*Pandion haliaetus*)

Status: SSC, BFS

Habitat Requirements: Some osprey are year-round residents in Mendocino County, while the majority overwinter in Mexico and South America. Ospreys are strictly associated with large, fish-bearing waters, primarily in ponderosa pine through mixed conifer habitat types. Osprey are only able to dive up to three feet in depth, hence are typically associated with shallow fishing areas. These birds require open, clear water for foraging, such as rivers, lakes, reservoirs, estuaries, lagoons, swamps, marshes, and bays. Large trees, snags, and blown-out tree tops in open forest habitats are used for cover and nesting. Tall, open-branched “pilot trees” are required nearby for landing before approaching the nest and for practice by the young (Zeiner et al. 1990a). Nests are a platform of sticks near or on the top of large snags, blown-out trees, cliffs, or on human-made structures. Nests are usually next to fish-bearing water, however may be up to twelve miles away. Nests may be used year after year thus producing a large nest. Nest trees in California range from 30 to 81 inches dbh with nest heights averaging 135 feet (Airola and Shubert 1981). The osprey breeds in northern California from the Cascade Ranges south to Lake Tahoe, and along the coast to Marin County.

Potential for Occurrence: There is potential habitat within the Fitch Mountain Open Space Preserve. There was also an observation of two individuals foraging recorded in the 1985. In 1978-79 there was an observation along the Russian River and presumed nest in a woodland there. In 1972 at least one young was observed and there was a record of a nest in a dead redwood. The location of the redwood was not described. No nest tree or observations were made during the reconnaissance survey.

Purple Martin (*Progne subis*)

Status: SSC

Habitat Requirements: Purple martins often nest in tall old-growth trees or snags in coniferous forests with multilayered canopy. They are second cavity nesters, using old woodpecker cavities and crevices in rocks, trees, and cactus (Baicich and Harrison 2005). Nests are typically found in open areas near water. Purple martins typically nest in colonies. The purple martin diet consists of beetles, flies, dragonflies, damselflies, leafhoppers, grasshoppers, crickets, butterflies, moths, wasps, bees, caddisflies, spiders, cicadas, termites, and mayflies.

Potential for Occurrence: There is a moderate potential for habitat within the project area. No individuals were observed during reconnaissance surveys.

Mammals

Pallid Bat (*Antrozous pallidus*)

Status: SSC

Habitat Requirements: Pallid bats occupy a wide variety of habitats, such as grasslands, shrublands, and forested areas of oak and pine, but prefer rocky outcrops with desert scrub (Zeiner et al. 1990b). The pallid bat roosts in caves, mines, crevices, buildings, under bridges, and occasionally in hollow trees. Day roosts are located at sites that provide protection from the heat of the day; Night roosts are in more open areas such as porches or open buildings (Zeiner et al. 1990b). They roost in small groups of 20 or more. They do need water, but have a good urine-concentrating ability, so they don't have to roost within close vicinity of a water source (Geluso 1978). In California, pallid bats do not migrate, but make local movements to hibernacula and during post-breeding. Pallid bats feed on a wide variety of relatively large ground dwelling or slow flying insects and arachnids (Zeiner et al. 1990b). Colonies of *A. pallidus* will typically emerge about 1 hour after sunset, return to roost, and then forage again before dawn. Specializes



in foraging on insects on the ground, versus in the air, by listening for the insect footsteps. The pallid bat is found throughout most of the western U. S. and Mexico. In California, the bat is widespread in low elevations with the exception of the high Sierra Nevadas from Shasta to Kern counties and in the northwestern corner of the state from Del Norte and western Siskiyou counties to northern Mendocino County (Zeiner et al. 1990b).

Potential for Occurrence: There is a moderate potential for occurrence within the treatment area. No individuals were located during field reconnaissance.

Townsend's Big-Eared Bat (*Corynorhinus townsendii*)

Status: SSC

Habitat Requirements: *C. townsendii* inhabits southwestern British Columbia, Canada and most of the western U.S., east to the Great Plains, and south from western Texas into central Mexico. Isolated populations of central and eastern U.S. Townsend's big-eared bats are most common in mesic sites but are found in a variety of habitats including coastal conifer and broad-leaf forests, oak and conifer woodlands, arid grasslands and deserts, and high-elevation forests and meadows. Roosting, maternity and hibernacula sites in California include limestone caves, lava tubes, mine tunnels, buildings, and other man-made structures.

Roost structures that could be classified as cave analogues and that function as maternity roosts or hibernacula include large trees (minimum dbh of 8 ft.; adapted from maternity roosts in large redwood trees) with large basal hollows and an internal roost area large enough for flying forays (larger than the entrance). The roost ceiling must be dome-like (allowing for multiple bats to roost in clusters) and occur at least 1 ft. above the top of the entrance (allows for better protection from predators and changing microclimates). The only light penetrating the roost area must originate from the roost entrances so that the internal roost area remains semi-dark to dark. Suitable habitat is described as basal hollows in trees 42" dbh and greater having all of the following characteristics:

- An opening equal to or greater than 2 square feet.
- An internal cavity extending above the entrance equal to or greater than 12 inches.
- An internal cavity equal to or greater than 3 feet above the ground.

Potential for Occurrence: There is a moderate potential to locate this species or suitable roost trees. There are no known Townsend's big-eared bat colonies and no known mine shafts, caves or large trees with basal hollows in or near the project area. No potential trees within or adjacent to the plan area that meet the criteria for this species roosting habitat were observed.

Hoary Bat (*Lasiurus cinereus*)

Status: SSC

Habitat Requirements: This bat is one of the few bats known to both migrate south for winter and to hibernate locally. *L. cinereus* prefers a diet of moths, yet will also consume beetles, wasps, flies, grasshoppers, dragonflies, and termites. Hoary bat daytime roosts are typically dense foliage of medium to large sized trees. This bat occupies a variety of habitats including dense forest, forest edges, coniferous forests, deserts, and broadleaf forests.

Potential for Occurrence: There is moderate potential for this species to occur within the treatment units. No individuals nor suitable nest sites were observed during field reconnaissance.



Fringed myotis (*Myotis thysanodes*)

Status: BFS

Habitat Requirements: Optimal habitats for the Fringed myotis are pinyon-juniper, valley and foothill grassland and hardwood-conifer habitats. They roost in caves, mines, buildings, and crevices. They forage around streams, lakes, and ponds. The plan area is quite hot during the late summer months and there are no natural caves or mines within the assessment area.

Potential for Occurrence: There is a moderate potential for this species to occur within the treatment units. No individuals nor suitable nest sites were observed during field reconnaissance.

Sonoma Tree Vole (*Arborimus pomo*)

Status: SSC

Habitat Requirements: This species occurs along the North Coast of California. Red Tree Voles are entirely arboreal. This species lives, nests and feeds in the forest canopy and have been found in various stand size classes of Douglas-fir, bishop pine and grand fir. This species feeds on the vascular cambium of Douglas-fir, grand fir and bishop pine needles while the unconsumed resin ducts (from the needles) are used for nest lining. Over-time resin ducts accumulate in the nest and the surplus is discarded from the nest by the animal. A visual search of the forest canopy for active Red Tree Vole nests is usually complimented by an inspection of the forest floor, upon which, matted clusters of resin ducts can usually be observed.

Potential for Occurrence: The THP does contain potential habitat for the Sonoma Tree Vole. A visual search of the canopy for stick nests and the forest floor for discarded resin ducts, which accumulate below vole nests was conducted. Resin ducts or nests were not observed above in the trees; however, they could be hidden up in the canopy.

North American Porcupine (*Erethizon dorsatum*)

Status: SSC

Habitat Requirements: North American porcupines range from Canada, Alaska, and into northern Mexico, and primarily west of the Rocky Mountains. They are commonly found in coniferous and mixed forested areas, but have adapted to harsh environments such as shrublands, tundra, and deserts. They make their dens in hollow trees, decaying logs, and caves in rocky areas.

Potential for Occurrence: There is a moderate potential for this species to occur within the treatment units. No individuals were observed during field reconnaissance.

Fisher (*Pekania pennanti*) [West Coast Distinct Population Segment (DPS)]

Status: SSC, ST

Habitat Requirements: *P. pennanti* is a stocky, dark brown weasel with a long brushy tail. Fishers are primarily nocturnal and known to be solitary except during the breeding season in late February through April. This fur-bearing mammal travels along fallen logs and move among branches from tree to tree and often den in hollow downed wood or large snags. Habitat components for the West Coast DPS fishers includes forest stands with late-successional characteristics such as high canopy closure, large trees and snags, and large woody debris (USFWS 2004). If these characteristics exist in earlier aged stands, fishers may still be present as den site and prey availability were found to be related to these habitat attributes (USFWS 2004).

Potential for Occurrence: There is no potential for this species to occur within the treatment units. The project areas lack the mature forest component required by this species. No individuals were observed during field reconnaissance.



American Badger (*Taxidea taxus*)

Status: SSC

Habitat Requirements: A small carnivore, with a distinctive white badge-like mark on its forehead. This species is most abundant in drier open stages of most shrub, forest and herbaceous habitats, with friable soils (Zeiner et al. 1990b). They dig burrows in the friable soils and frequently reuse old burrows. They prey on burrowing rodents, especially ground squirrels and pocket gophers, also on birds, insects, reptiles and carrion. Their diet shifts seasonally depending on the availability of prey. American badgers are non-migratory and are found throughout most of California, except the northern North Coast area (Grinnell et al. 1937).

Potential for Occurrence: There is a very low potential for this species to occur within the treatment units. No individuals were observed during field reconnaissance.

Amphibians and Reptiles

Western Pond Turtle (*Emys marmorata*)

Status: SP, SSC

Habitat Requirements: The pond turtle is associated with permanent ponds, lakes, streams, or permanent pools along intermittent streams in a wide variety of habitats. It requires basking sites in the aquatic environment, grassy openings for nest sites, and nests are typically within 100 meters of a water source, although nests up to 500 meters have been recorded (Thomas et al. 2016).

Potential for Occurrence: There is a high potential for occurrence along the Russian river, and near fox pond in the Healdsburg Ridge Open Space Preserve. There are many observations recorded from 1995 to 2004 of many individuals basking on logs along the Russian river within the proposed Russian river treatment unit. No individuals were observed during field reconnaissance.

Red-Bellied Newt (*Taricha rivularis*)

Status: SSC

Habitat Requirements: The red-bellied newt ranges within Mendocino, Sonoma, Humboldt, and Lake Counties. They are predominantly found in redwood forests, along the coast, however have also been detected in Douglas-fir, tan oak, mixed conifer, valley-foothill woodland, montane woodland, hardwood-conifer and madrone forest types, particularly when near streams. The preferred aquatic breeding habitats are moderate to fast-flowing streams with rocky substrates. Breeding coincides with the receding of streams after heavy winter rains. Adults are terrestrial and the aquatic breeding phase lasts from February to May. After breeding, adults leave streams but usually stay in the same drainage; however, they are also known to travel several kilometers between breeding years. Underground retreats are used from May to October, and adults forage on the surface before and as they migrate to streams. (Thomas et al. 2016).

Potential for Occurrence: There is a moderate potential for individuals to occur within the treatment areas near ponds and class II or greater watercourses. No individuals were encountered during field reconnaissance.

California tiger salamander (*Ambystoma californiense*)

Status: FT, SSC

Habitat Requirements: The California tiger salamander is associated with annual grassland with seasonal rainwater ponds or vernal pools for breeding. They also use California ground squirrel burrows when migrating upland.



Potential for Occurrence: There is a low potential for this species to occur within the treatment areas around water sources.

California Giant Salamander (*Dicamptodon ensatus*)

Status: SSC

Habitation Requirements: California *Dicamptodon* salamanders are year round residents of California. In 1989, these salamanders were split into two species – California giant salamander (*Dicamptodon ensatus*) occurring south of the Mendocino County line and the coastal giant salamander (*Dicamptodon tenebrosus*) occurring in the north (Thomas et al. 2016). A hybrid zone exists approximately 6 miles north of Gualala; however outside of this area, the two species are known to be distinct (Thomas et al. 2016).

This species occurs in wet coastal forests in or near clear, cold permanent and semi-permanent streams and seepages.

Potential for Occurrence: There is a moderate to high potential for this species to exist within the project area. No individuals were observed.

Foothill Yellow-Legged Frog (*Rana boylei*)

Status: California Endangered; SSC

Habitation Requirements: Foothill Yellow-Legged Frogs (FYLF) are associated with lower elevation streams draining the Pacific slope from west-central Oregon to northwestern Baja California. Foothill yellow-legged frogs occupy a diverse range of ephemeral and permanent streams, rivers, and adjacent moist terrestrial habitats over the course of their complex life history. Small streams often have dense canopies that limit the light needed by algae, the food resource of tadpoles. Adults can migrate down the drainage network to channels that are broad and more sunlit. Occupied streams are often partly shaded, low gradient, and dominated by coarse, unconsolidated rocky substrates. Seasonal variation in streamflow has a strong influence on life history and movement. To avoid disturbance and optimize feeding by tadpoles, adults breed and tadpoles develop in slow water velocity habitats. Reproduction occurs in synchrony with the transition from winter and spring snowmelt freshets to summer drought.

Potential for Occurrence: There is a high potential for this species and habitat to exist within the treatment areas. No individuals were encountered during field reconnaissance.

California Red-Legged Frog (*Rana draytonii*)

Status: FT, SP, SSC

Habitation Requirements: California red-legged frogs (CRLF) primarily inhabit permanent or nearly permanent water sources (quiet streams, marshes, and ponds). Breeding tends to occur primarily in ponds, less likely in streams, and happens from November to April. This frog will also use upland habitats outside of the breeding season and may be discovered under logs, rocks, and other debris during wet conditions. CRLF were historically believed to prefer only habitats and shorelines with extensive vegetation.

Potential for Occurrence: There is a high potential for individuals to occur within the treatment areas near ponds and class II or greater watercourses. No individuals were encountered during field reconnaissance.



Fish

Navarro roach (*Lavinia symmetricus navarroensis*)

Status: SSC

Habitation Requirements: California roach are generally found in small, warm intermittent streams, and dense populations are frequently found in isolated pools. They are most abundant in mid-elevation streams in the Sierra foothills and in the lower reaches of some coastal streams. Roach are tolerant of relatively high temperatures (30-35 C) and low oxygen levels (1-2 ppm). However, they are habitat generalists, also being found in cold, well-aerated clear "trout" streams (Taylor et al. 1982), in human-modified habitats and in the main channels of rivers, such as the Russian and Tuolumne.

Potential for Occurrence: High. There were two documented collections of adults from just under the Russian River bridge in the 1990's. No individuals were observed during field reconnaissance.

Hardhead (*Mylopharodon conocephalus*)

Status: SSC

Habitation Requirements: Hardheads are typically found in small to large streams in low to mid elevation environment. They may also inhabit lakes or reservoirs. Within a stream, hardheads tend to prefer warmer temperatures than salmonids and they are often found associated with pikeminnows and suckers. The hardhead minnow is usually found in clear deep streams with a slow but present flow.

Potential for Occurrence: There is a low potential for this species to occur within the project area. The highest probability for occurrence would be at fox pond or the associated class II watercourse.

Russian River tule perch (*Hysterothorax traskii pomo*)

Status: SSC

Habitation Requirements: The Russian River tule perch inhabits streams and rivers, generally, in areas with beds of vegetation or overhangs. This species is one of three subspecies of tule perch and is endemic to the Russian River and the lower parts of its tributaries.

Potential for occurrence: There is a high potential within the Russian River. There are no known occurrences near or within the project area.

Coho salmon (*Oncorhynchus kisutch*) Central California Coast ESU

Status: State and Federally Endangered.

Habitat: Class I watercourses.

Life history: Adults return to their natal Watercourses to spawn in the winter. Juveniles spend one year rearing in the freshwater environment before migrating towards the ocean. At age 3 most coho salmon return to their natal Watercourses again to spawn.

Potential for Occurrence: There is a high potential for occurrence within the Russian River.

Steelhead (*Oncorhynchus mykiss*) Central California Coast DPS

Status: Federally Threatened/Species of Special Concern.

Habitat: Class I watercourses.

Life history: Adults return to their natal Watercourses in the winter and spring to spawn. Juveniles spend from 1 year to their entire lives rearing in freshwater environments before migrating to the ocean.

Potential for Occurrence: High potential within the Russian River. A fairly large school of steelhead (approximately 20-30) was observed within a pool during field reconnaissance.

Insects

Obscure bumblebee (*Bombus califinosus*)

Status: SSC

Habitat Requirements: The obscure bumble bee is a species of bumblebee native to the west coast of the United States, where its distribution extends from Washington through to Southern California. The workers are most often seen on Fabaceae, the legume family, while queens are most often seen on Ericaceae, the heath family, and males have been observed most often on Asteraceae, the aster family. Common plants visited by the workers include ceanothus, thistles, sweet peas, lupines, rhododendrons, Rubus, willows, and clovers.

Potential for Occurrence: There is moderate potential for habitat. No sightings occurred during field reconnaissance.

Western bumblebee (*Bombus occidentalis*)

Status: SSC

Habitat Requirements: The western bumble bee was once very common in the western United States and western Canada. This species will visit a range of different plant species and are considered generalist pollinators of a wide variety of flowering plants and crops (Goulsen 2003a; Heinrich 2004). This genus is most commonly encountered along stream banks, in meadows, recently burned or logged areas, or on flowers by roadsides.

Potential for Occurrence: There is moderate potential for habitat. No sightings occurred during field reconnaissance.

Blennosperma vernal pool andrenid bee (*Andrena blennospermatis*)

Status: SSC

Habitat Requirements: Blennosperma vernal pool andrenid bees are associated with the early spring bloom of Common stickyseed (*Blennosperma nanum*) and Baker's stickyseed (*Blennosperma bakeri*). The blooming period for Common stickyseed is commonly from February through April, whereas the blooming period for Baker's stickyseed is from March through May. *A. blennospermatis* is a solitary, ground-nesting bee. Adults emerge early in the spring, with males emerging slightly earlier and dying off sooner than females. After emergence, the females of this species mate, and then begin excavating nests in the upland areas around vernal pools. The flight period for females ranges from late February to late April (Thorp and Leong, 1995). *A. blennospermatis* spatially restricts its foraging activities to near-neighbor flowers. Thus, bees may have difficulty colonizing areas around artificially-constructed vernal pools, because of their limited flight ability and low dispersal tendencies (Leong 1994, Thorp and Leong 1995, Leong, Randolph, and Thorp 1995).

Potential for Occurrence: There is no potential for occurrence due to the lack of vernal pools within the project areas.



Serpentine cypress wood-boring beetle (*Trachykele hartmani*)

Status: SSC

Habitation Requirements: The serpentine cypress wood-boring beetle is associated with Sargent and McNab cypress trees. Larvae develop in Sargent cypress. This species is restricted to Napa, Colusa, and Lake counties.

Potential for Occurrence: None. The McNab cypress trees are not known to exist within the treatment areas.

Communities

Northern Hardpan Vernal Pool

This system includes shallow ephemeral waterbodies found in depressions among grasslands and open woodlands. They are found from British Columbia through California. There is a cemented layer of clay or bedrock that forms the hardpan, enabling the pools to retain water through most of the spring. By late summer, these pool are usually dry. They are usually up to several acres in size and contain endemic and federally listed species.

Potential for occurrence: None. The closest occurrence is over 5 miles from the treatment areas.



Botanical Report

Special Status Plants Within the CNDDB 9 Quad Search:

Scientific Name	Common Name	Taxon Group	Listing Status	Rare Plant Rank
<i>Lasthenia californica</i> ssp. <i>Bakeri</i>	Baker's goldfields	Dicots		1B.2
<i>Navarretia leucocephala</i> ssp. <i>Bakeri</i>	Baker's navarretia	Dicots		1B.1
<i>Gratiola heterosepala</i>	Boggs Lake hedge-hyssop	Dicots	SE	1B.2
<i>Eriastrum brandegeae</i>	Brandegee's eriastrum	Dicots		1B.1
<i>Carex comosa</i>	bristly sedge	Monocots		2B.1
<i>Rhynchospora capitellata</i>	brownish beaked-rush	Monocots		2B.2
<i>Lasthenia burkei</i>	Burke's goldfields	Dicots	FE, SE	1B.1
<i>Rhynchospora californica</i>	California beaked-rush	Monocots		1B.1
<i>Ceanothus divergens</i>	Calistoga ceanothus	Dicots		1B.2
<i>Astragalus claranus</i>	Clara Hunt's milk-vetch	Dicots	FE, ST	1B.1
<i>Lupinus sericatus</i>	Cobb Mountain lupine	Dicots		1B.2
<i>Layia septentrionalis</i>	Colusa layia	Dicots		1B.2
<i>Hemizonia congesta</i> ssp. <i>Congesta</i>	congested-headed hayfield tarplant	Dicots		1B.2
<i>Downingia pusilla</i>	dwarf downingia	Dicots		2B.2
<i>Navarretia leucocephala</i> ssp. <i>Pauciflora</i>	few-flowered navarretia	Dicots	FE, ST	1B.1
<i>Fritillaria liliacea</i>	fragrant fritillary	Monocots		1B.2
<i>Streptanthus brachiatus</i> ssp. <i>Hoffmanii</i>	Freed's jewelflower	Dicots		1B.2
<i>Panicum acuminatum</i> var. <i>thermale</i>	Geysers panicum	Monocots	SE	1B.2
<i>Hesperolinon adenophyllum</i>	glandular western flax	Dicots		1B.2
<i>Delphinium luteum</i>	golden larkspur	Dicots	FE, SR	1B.1
<i>Erigeron greenei</i>	Greene's narrow-leaved daisy	Dicots		1B.2
<i>Harmonia hallii</i>	Hall's harmonia	Dicots		1B.2
<i>Streptanthus glandulosus</i> ssp. <i>Hoffmanii</i>	Hoffman's bristly jewelflower	Dicots		1B.3
<i>Ceanothus purpureus</i>	holly-leaved ceanothus	Dicots		1B.2
<i>Leptosiphon jepsonii</i>	Jepson's leptosiphon	Dicots		1B.2
<i>Astragalus rattanii</i> var. <i>jepsonianus</i>	Jepson's milk-vetch	Dicots		1B.2
<i>Sidalcea oregana</i> ssp. <i>Valida</i>	Kenwood Marsh checkerbloom	Dicots	FE, SE	1B.1
<i>Arctostaphylos manzanita</i> ssp. <i>Elegans</i>	Konocti manzanita	Dicots		1B.3
<i>Legenere limosa</i>	legenere	Dicots		1B.1
<i>Navarretia leucocephala</i> ssp. <i>Plieantha</i>	many-flowered navarretia	Dicots	FE, SE	1B.2



Attachment B

<i>Sidalcea oregana</i> ssp. <i>Hydrophila</i>	marsh checkerbloom	Dicots		1B.2
<i>Microseris paludosa</i>	marsh microseris	Dicots		1B.2
<i>Streptanthus morrisonii</i> ssp. <i>Morrisonii</i>	Morrison's jewelflower	Dicots		1B.2
<i>Calystegia collina</i> ssp. <i>Oxyphylla</i>	Mt. Saint Helena morning-glory	Dicots		4.2
<i>Amorpha californica</i> var. <i>napensis</i>	Napa false indigo	Dicots		1B.2
<i>Brodiaea leptandra</i>	narrow-anthered brodiaea	Monocots		1B.2
<i>Viburnum ellipticum</i>	oval-leaved viburnum	Dicots		2B.3
<i>Centromadia parryi</i> ssp. <i>Parryi</i>	pappose tarplant	Dicots		1B.2
<i>Cordylanthus tenuis</i> ssp. <i>Capillaris</i>	Pennell's bird's-beak	Dicots	FE, SR	1B.2
<i>Cuscuta obtusiflora</i> var. <i>glandulosa</i>	Peruvian dodder	Dicots		2B.2
<i>Lilium pardalinum</i> ssp. <i>Pitkinense</i>	Pitkin Marsh lily	Monocots	FE, SE	1B.1
<i>Castilleja uliginosa</i>	Pitkin Marsh paintbrush	Dicots	SE	1A
<i>Ceanothus confusus</i>	Rincon Ridge ceanothus	Dicots		1B.1
<i>Rhynchospora globularis</i>	round-headed beaked-rush	Monocots		2B.1
<i>Trifolium hydrophilum</i>	saline clover	Dicots		1B.2
<i>Limnanthes vinculans</i>	Sebastopol meadowfoam	Dicots	FE, SE	1B.1
<i>Cryptantha dissita</i>	serpentine cryptantha	Dicots		1B.2
<i>Erigeron serpentinus</i>	serpentine daisy	Dicots		1B.3
<i>Stuckenia filiformis</i> ssp. <i>Alpina</i>	slender-leaved pondweed	Monocots		2B.2
<i>Kopsiopsis hookeri</i>	small groundcone	Dicots		2B.3
<i>Eriogonum nervulosum</i>	Snow Mountain buckwheat	Dicots		1B.2
<i>Streptanthus brachiatus</i> ssp. <i>Brachiatus</i>	Socrates Mine jewelflower	Dicots		1B.2
<i>Alopecurus aequalis</i> var. <i>sonomensis</i>	Sonoma alopecurus	Monocots	FE	1B.1
<i>Penstemon newberryi</i> var. <i>sonomensis</i>	Sonoma beardtongue	Dicots		1B.3
<i>Chorizanthe valida</i>	Sonoma spineflower	Dicots	FE, SE	1B.1
<i>Blennosperma bakeri</i>	Sonoma sunshine	Dicots	FE, SE	1B.1
<i>Campanula californica</i>	swamp harebell	Dicots		1B.2
<i>Calochortus raichei</i>	The Cedars fairy-lantern	Monocots		1B.2
<i>Horkelia tenuiloba</i>	thin-lobed horkelia	Dicots		1B.2
<i>Calystegia collina</i> ssp. <i>Tridactylosa</i>	three-fingered morning-glory	Dicots		1B.2
<i>Calamagrostis crassiglumis</i>	Thurber's reed grass	Monocots		2B.1
<i>Hesperolinon bicarpellatum</i>	two-carpellate western flax	Dicots		1B.2
<i>Trifolium amoenum</i>	two-fork clover	Dicots	FE	1B.1
<i>Ceanothus foliosus</i> var. <i>vineatus</i>	Vine Hill ceanothus	Dicots		1B.1
<i>Clarkia imbricata</i>	Vine Hill clarkia	Dicots	FE, SE	1B.1
<i>Arctostaphylos densiflora</i>	Vine Hill manzanita	Dicots	SE	1B.1
<i>Rhynchospora alba</i>	white beaked-rush	Monocots		2B.2
<i>Piperia candida</i>	white-flowered rein orchid	Monocots		1B.2



Survey

In order to satisfy CEQA requirements, an initial survey of the City of Healdsburg and Surrounding Community Fuels Reduction Project was executed on the following dates: May 17th, 19th / 20th and July 7th, 9th and 16th of 2021. This covers the early, mid, and late season blooming periods for most target species. An additional survey shall be conducted in early spring to verify that a form of manzanita found within the serpentine soils of the Callahan property is not the Baker’s manzanita. See the results section below for more information. The outcome of the final survey shall be amended into this report.

The 68 species shown in the table above are a result of the 9-quad search of CNDDDB and CNPS inventory of listed plants. This list was narrowed down by eliminating species which lacked habitat within the survey area. The result is a list of 55 target species. The property was surveyed by hiking as shown on the survey route maps and recording all species encountered. See identified species section of this report. When an unknown species was encountered, pictures were taken, and identification was made from the office.

Target Species

Common Name	Habitat	Blooming Period
Baker’s navarretia	Meadows, vernal pools and wetlands.	Apr-Jul
Boggs Lake hedge-hyssop	Wetlands, lake margins, clay soils	Apr-Aug
bristly sedge	Wetlands, lake margins	May-Sep
brownish beaked-rush	Marsh, wetlands	Jul-Aug
Burke’s goldfields	Vernal wetlands and meadows	Apr-Jul
California beaked-rush	Wetlands, seeps, meadows	May-Jul
Calistoga ceanothus	Chaparral	Feb-Apr
Colusa layia	Chaparral	Apr-May
congested-headed hayfield tarplant	Northern coastal scrub, valley grasslands	Apr-Nov
dwarf downingia	Wetland, vernal pools, valley grasslands, woodlands	Mar-May
Few-flowered navarretia	Vernal pools and wetlands	May-Jun
fragrant fritillary	Northern coastal scrub, coastal prairie, valley grassland, riparian	Feb-Apr
Freed’s jewelflower	Foothill woodland, chaparral	May-July
Geysers panicum	Riparian, closed cone pine forests	Jun-Sep
glandular western flax	Foothil woodland, chaparral, valley grassland, serpentine soils	May-Aug
golden larkspur	Chaparral, Coastal Prairie	Mar-May
Greene’s narrow-leaved daisy	Chaparral	May-Sep
Hall’s harmonia	Chaparral	Apr-Jun
Hoffman’s bristly jewelflower	Serpentine soils	Mar-Jun
holly-leaved ceanothus	Chaparral	Mar-May
Jepson’s leptosiphon	Oak Woodland, grassland, serpentine soils	Mar-May
Konocti manzanita	Chaparral, foothill woodland	Mar-May
many-flowered navarretia	Venal pools and wetlands	Apr-Jun
marsh checkerbloom	Wetland, riparian, meadows	Jul-Apr



Morrison's jewelflower	Chaparral, foothill, woodland	Jun
Mt. Saint Helena morning-glory	Chaparral	Apr-Jun
Napa false indigo	Foothill woodland, coniferous forests	Apr-Jul
narrow-anthered brodiaea	Foothill woodland, valley grassland, chaparral.	May-Jul
oval-leaved viburnum	Chaparral	May-Jun
pappose tarplant	Wetlands and non-wetlands	May-Nov
Pennell's bird's-beak	Chaparral, Serpentine soils	Jun-Sep
Pitkin Marsh lily	Marsh, wetland, riparian	Jun-Jul
Pitkin Marsh paintbrush	Marsh, wetland, riparian	Jun-Jul
Rincon Ridge ceanothus	Chaparral, foothill woodland. Soils derived from sandstone like rock	Feb-Jun
round-headed beaked-rush	Marsh, wetlands, riparian	Jul-Apr
saline clover	Wetland, riparian	Apr-Jun
Sebastopol meadowfoam	Vernal pools, wet meadows, wetlands, riparian zones	Apr-May
serpentine cryptantha	Chaparral, serpentine soils	May-Aug
serpentine daisy	Chaparral, serpentine soils	May-Aug
small groundcone	Redwood forest	Apr-Aug
Snow Mountain buckwheat	Chaparral and serpentine soils	Jun-Sep
Socrates Mine jewelflower	Chaparral	May-Jun
Sonoma alopecurus	Wetlands, riparian	May-Jun
Sonoma beardtongue	Chaparral	Apr-Aug
Sonoma sunshine	Wetlands, vernal pools, valley grassland	Mar-May
swamp harebell	Wetlands, meadows, marsh, north coastal conifer forest	Jun-Oct
The Cedars fairy-lantern	Chaparral, closed cone pine forest	May-Aug
thin-lobed horkelia	Chaparral, openings	May-Jul
Baker's manzanita	Chaparral, closed cone pine	Feb-May
Thurber's reed grass	Marsh, wetlands, Northern coastal scrub, riparian	May-Jun
Vine Hill ceanothus	Chaparral	Mar-May
Vine Hill clarkia	Chaparral, valley grassland	Jun-Aug
Vine Hill manzanita	Chaparral	Feb-Apr
white beaked-rush	Wetlands, riparian	Jul-Aug
white-flowered rein orchid	North coastal coniferous forest, yellow pine forest	May-Sep

Results

Of the 55 target species listed in the table above, one species was located during surveys and one potential species was identified. Napa False Indigo was relocated throughout the Fitch Mountain Open Space Preserve. It is ubiquitous on the north facing slopes of the preserve. This species is not listed as state or federally threatened, rare, or endangered. It is however a species of special concern.

A form of manzanita was observed within the Callahan property along the ridge which had some phenotypic qualities of Bakers manzanita. It could not be fully identified due to its early blooming period. These individuals were flagged with orange flagging in the field and will be avoided during operations until a follow up survey can be carried out in the spring of 2022.

Other species which have a blooming period falling outside of the dates surveyed were ruled out due to the absence of phenotypic characteristics which would necessitate a floristic survey.



Identified Species

The following species were identified during the botanical survey:

Pacific madrone (*Arbutus menziesii*)
California bay (*Umbellularia californica*)
Toyon (*Heteromeles arbutifolia*)
California coffeeberry (*Frangula californica*)
Large leather-root (*Hoita macrostachya*)
Leather oak (*Quercus durata*)
Pointleaf manzanita (*Arctostaphylos pungens*)
Yerba santa (*Eriodictyon californicum*)
Sweetshrub (*Calycanthus occidentalis*)
Douglas-fir (*Pseudotsuga menziesii*)
Coast live oak (*Quercus angustifolia*)
Valley oak (*Quercus lobata*)
Ranger buttons (*Sphenosciadium capitellatum*)
Northern maidenhair (*Adiantum pedatum*)
Timothy grass (*Phleum pratense*)
Pinemat manzanita (*Arctostaphylos nevadensis*)
Spanish broom (*Spartium junceum*)
Coastal wood fern (*Dryopteris arguta*)
Yarrow (*Achillea millefolium*)
Deer brush (*Ceanothus integerrimus*)
Serviceberry (*Amelanchier alnifolia*)
California buckeye (*Aesculus californica*)
Jepson ceanothus (*Ceanothus jepsonii*)
Big berry manzanita (*Arctostaphylos glauca*)
Blackwood acacia (*Acacia melanoxylon*)
Knobcone pine (*Pinus attenuate*)
Eastwoods manzanita (*Arctostaphylos glandulosa*)
Yellow monkeyflower (*Mimulus guttatus*)
Coyote mint (*Monardella villosa*)



Hollyleaf redberry (*Rhamnus crocea* subsp. *Ilicifolia*)
Coralberry (*Symphoricarpos orbiculatus*)
French broom (*Genista monspessulana*)
European aspen (*Populus tremula*)
Beaked hazelnut (*Corylus cornuta*)
Coastal Woodfern (*Dryopteris arguta*)
Douglas iris (*Iris douglasiana*)
Bigleaf maple (*Acer macrophyllum*)
Drops of gold (*Prosartes hookeri*)
Napa false indigo (*Amorpha californica* Var. *napensis*)
Dwarf rose (*Rosa gymnocarpa*)
Redwood insideout flower (*Vancouveria planipetala*)
Creambush (*Holodiscus discolor*)
St john's wort (*Hypericum perforatum*)
Licorice bedstraw (*Galium circaezans*)
Solidstem burnet-saxifrage (*Pimpinella saxifrage*)
Stinkwort (*Dittrichia graveolens*)
Mugwort (*Artemisia Douglasii*)
White sweetclover (*Melilotus albus*)
Narrowleaf willow (*Salix exigua*)
Twiggy mullein (*Verbascum virgatum*)
Mule fat (*Baccharis salicifolia*)
White alder (*Alnus rhombifolia*)
Large-flower primrose-willow (*Ludwigia grandiflora*)
River bulrush (*Bolboschoenus fluviatilis*)
Water speedwell (*Veronica anagallis-aquatica*)
Blazing star (*Mentzelia laevicaulis*)
Common chicory (*Cichorium intybus*)
Southern catalpa (*Catalpa bignonioides*)
Pennyroyal (*Mentha pulegium*)
Wild carrot (*Daucus carota*)
Hayfield tarweed (*Hemizonia congesta*)

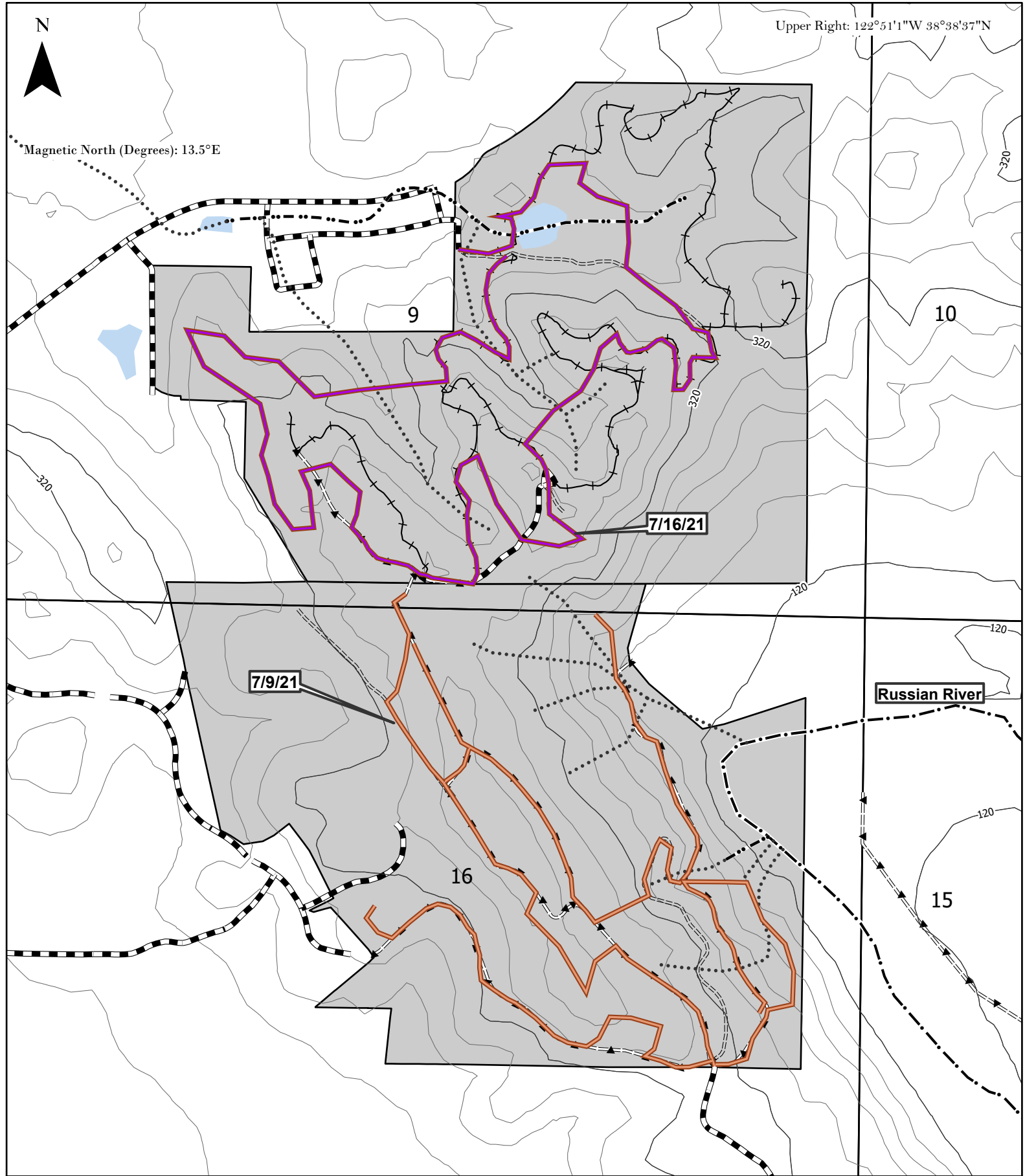


Crested wheatgrass (*Agropyron cristatum*)
California black oak (*Quercus kelloggii*)
Oregon white oak (*Quercus garryana*)
Blue oak (*Quercus douglasii*)
Poison hemlock (*Conium maculatum*)
Arundo (*Arundo donax*)
California buckwheat (*Eriogonum fasciculatum*)
Black cottonwood (*Populus balsamifera* ssp. *Trichocarpa*)
Knobcone pine (*Pinus attenuate*)
Black walnut (*Juglans nigra*)
English walnut (*Juglans regia*)

N

Upper Right: 122°51'1"W 38°38'37"N

Magnetic North (Degrees): 13.5°E



Botanical Survey: Callahan and Healdsburg Ridge Treatment Units

Sections 9, 14, 15, 16, 21, 22, 23, 28, T9N, R9W, MDBM
 Jimtown and Healdsburg USGS 7.5 Minute Quadrangle

JH 10/6/21

0 1,000 2,000 feet

Watercourses

- Class 2
- Class 3
- Class 1
- Unclassified

Survey

- Callahan
- Healdsburg Ridge

Roads

- Seasonal

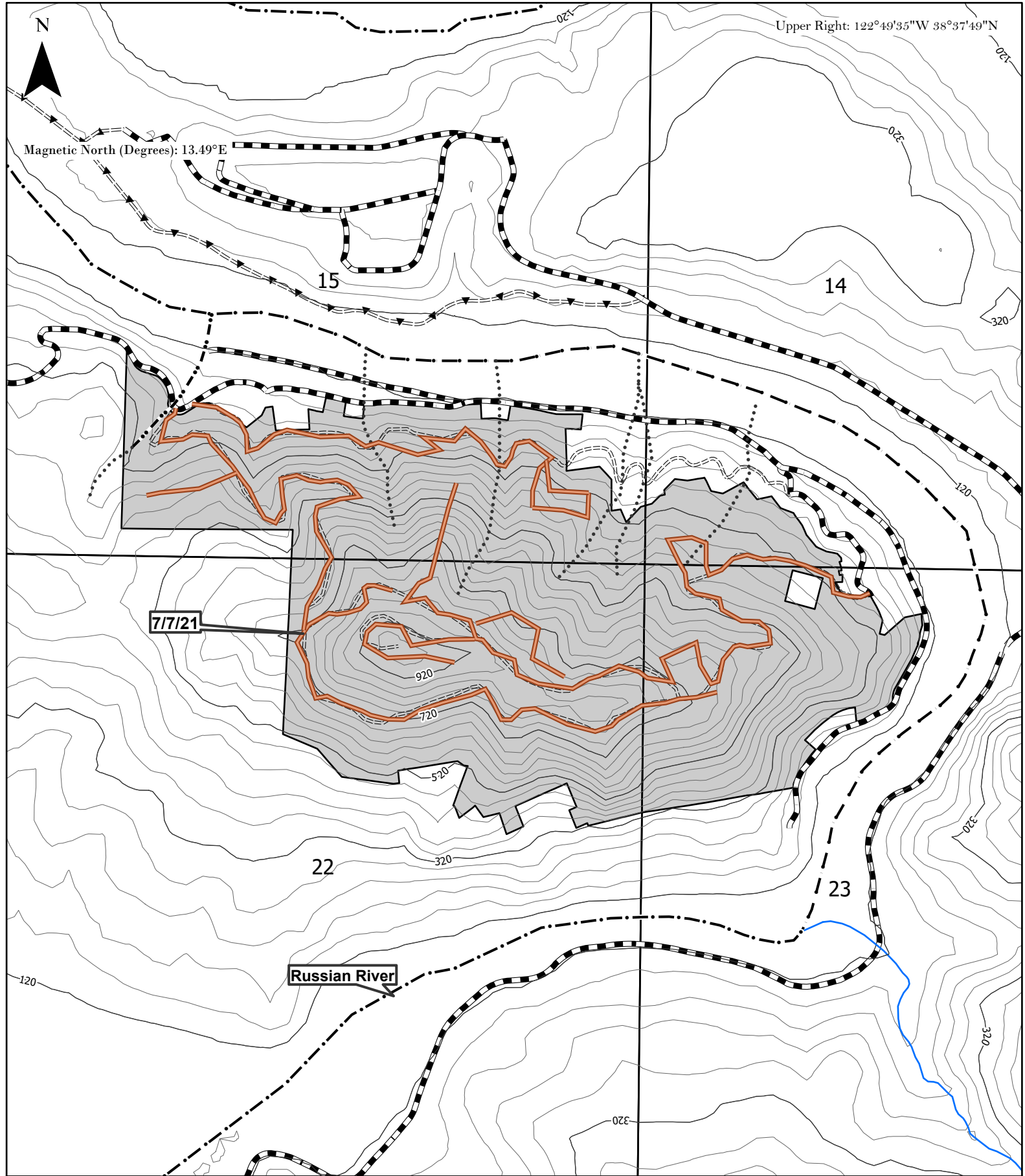
Survey

- Paved
- Trail
- Permanent
- Project Area

N

Upper Right: 122°49'35"W 38°37'49"N

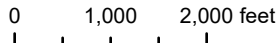
Magnetic North (Degrees): 13.49°E



JH 10/6/21

Botanical Survey: Fitch Mountain

Sections 9, 14, 15, 16, 21, 22, 23, 28, T9N, R9W, MDBM
Jimtown and Healdsburg USGS 7.5 Minute Quadrangle



Watercourses Survey

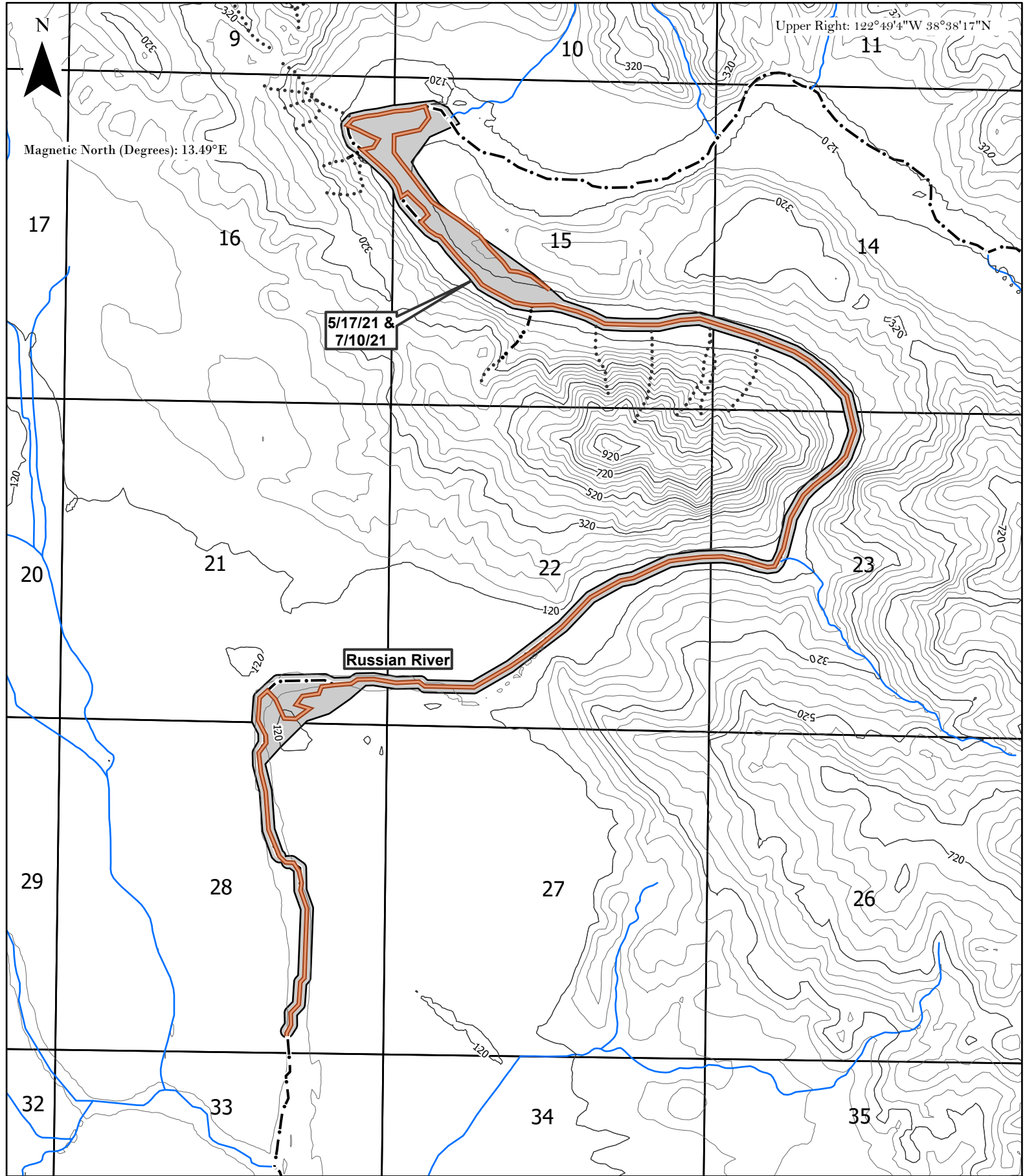
- Class 2
- Class 3
- Class 1
- Unclassified

Fitch Mountain

Roads

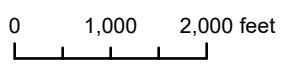
- ==== Seasonal

- ▬ Paved
- ⊕ Trail
- ▲ Permanent
- ▭ Project Area



Botanical Survey: Russian River Treatment Unit

Sections 9, 14, 15, 16, 21, 22, 23, 28, T9N, R9W, MDBM
 Jimtown and Healdsburg USGS 7.5 Minute Quadrangle



Watercourses

- Class 2
- Class 3
- Class 1
- Unclassified

- Survey Track
- River Treatment Unit

Custom Soil Resource Report for Sonoma County, California

The City of Healdsburg and Surrounding Community Fuels Reduction Project



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	12
Sonoma County, California.....	14
AdA—Alluvial land, sandy.....	14
BoE—Boomer loam, 7 to 50 percent slopes, moist, MLRA 15.....	14
CeB—Clear Lake clay, sandy substratum, 2 to 5 percent slopes.....	16
CgC—Clough gravelly loam, 2 to 9 percent slopes.....	17
CrA—Cortina very gravelly sandy loam, 0 to 2 percent slopes.....	18
DcD—Dibble clay loam, deep, 5 to 26 percent slopes, MLRA 15.....	20
DcE—Dibble clay loam, 4 to 30 percent slopes, MLRA 15.....	21
DcE2—Dibble clay loam, 15 to 30 percent slopes, eroded.....	22
DcF—Dibble clay loam, 15 to 46 percent slopes, MLRA 15.....	23
DcF2—Dibble clay loam, 9 to 41 percent slopes, moist, eroded, MLRA 15.....	25
GP—Gravel pits.....	26
GrE—Guenoc gravelly silt loam, 5 to 30 percent slopes.....	26
HbC—Haire gravelly loam, 0 to 9 percent slopes.....	28
HgE—Henneke gravelly loam, 4 to 46 percent slopes, MLRA 15.....	29
HgG2—Henneke gravelly loam, 30 to 75 percent slopes, eroded.....	30
JoF—Josephine loam, 30 to 50 percent slopes.....	31
LgE—Laughlin loam, 2 to 30 percent slopes.....	33
LmG—Los Gatos gravelly loam, 30 to 75 percent slopes.....	34
PeA—Pleasanton loam, 0 to 2 percent slopes, MLRA 14.....	35
PeC—Pleasanton loam, 2 to 9 percent slopes, MLRA 14.....	37
Pgb—Pleasanton gravelly loam, 2 to 5 percent slopes.....	38
RaD—Raynor clay, 9 to 15 percent slopes.....	40
RnA—Riverwash.....	41
RoG—Rock land.....	42
StF—Suther loam, 30 to 50 percent slopes.....	43
ToG—Toomes rocky loam, 30 to 75 percent slopes.....	44
W—Water.....	45
YIA—Yolo sandy loam, 0 to 2 percent slopes.....	45
YmB—Yolo sandy loam, overwash, 0 to 5 percent slopes.....	47
YsA—Yolo silt loam, 0 to 5 percent slopes, MLRA 14.....	48
References	50

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

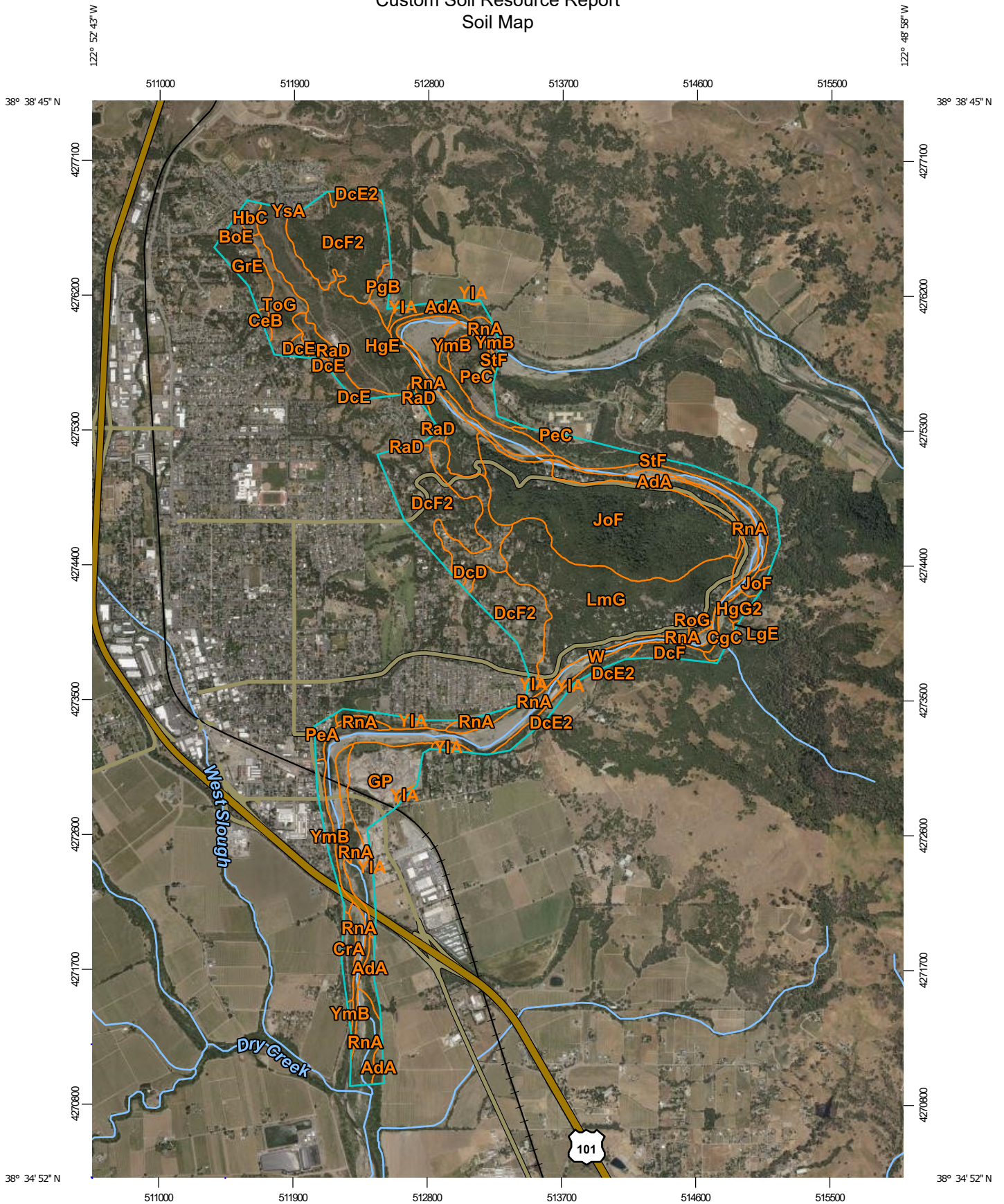
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

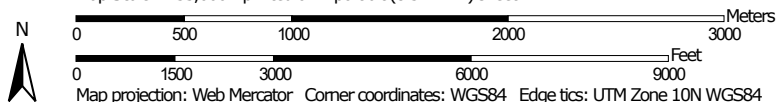
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:35,000 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sonoma County, California
 Survey Area Data: Version 15, Sep 10, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 1, 2020—Oct 30, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AdA	Alluvial land, sandy	51.2	3.5%
BoE	Boomer loam, 7 to 50 percent slopes, moist, MLRA 15	2.5	0.2%
CeB	Clear Lake clay, sandy substratum, 2 to 5 percent slopes	2.3	0.2%
CgC	Clough gravelly loam, 2 to 9 percent slopes	7.2	0.5%
CrA	Cortina very gravelly sandy loam, 0 to 2 percent slopes	10.3	0.7%
DcD	Dibble clay loam, deep, 5 to 26 percent slopes, MLRA 15	44.2	3.1%
DcE	Dibble clay loam, 4 to 30 percent slopes, MLRA 15	6.2	0.4%
DcE2	Dibble clay loam, 15 to 30 percent slopes, eroded	3.4	0.2%
DcF	Dibble clay loam, 15 to 46 percent slopes, MLRA 15	11.3	0.8%
DcF2	Dibble clay loam, 9 to 41 percent slopes, moist, eroded, MLRA 15	209.1	14.4%
GP	Gravel pits	55.8	3.8%
GrE	Guenoc gravelly silt loam, 5 to 30 percent slopes	23.5	1.6%
HbC	Haire gravelly loam, 0 to 9 percent slopes	6.0	0.4%
HgE	Henneke gravelly loam, 4 to 46 percent slopes, MLRA 15	135.4	9.3%
HgG2	Henneke gravelly loam, 30 to 75 percent slopes, eroded	6.0	0.4%
JoF	Josephine loam, 30 to 50 percent slopes	213.1	14.7%
LgE	Laughlin loam, 2 to 30 percent slopes	0.4	0.0%
LmG	Los Gatos gravelly loam, 30 to 75 percent slopes	182.4	12.6%
PeA	Pleasanton loam, 0 to 2 percent slopes, MLRA 14	6.1	0.4%
PeC	Pleasanton loam, 2 to 9 percent slopes, MLRA 14	32.0	2.2%
PgB	Pleasanton gravelly loam, 2 to 5 percent slopes	9.0	0.6%
RaD	Raynor clay, 9 to 15 percent slopes	20.9	1.4%

Custom Soil Resource Report

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
RnA	Riverwash	139.5	9.6%
RoG	Rock land	3.3	0.2%
StF	Suther loam, 30 to 50 percent slopes	49.5	3.4%
ToG	Toomes rocky loam, 30 to 75 percent slopes	27.1	1.9%
W	Water	136.6	9.4%
YIA	Yolo sandy loam, 0 to 2 percent slopes	34.1	2.4%
YmB	Yolo sandy loam, overwash, 0 to 5 percent slopes	20.8	1.4%
YsA	Yolo silt loam, 0 to 5 percent slopes, MLRA 14	0.3	0.0%
Totals for Area of Interest		1,449.7	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

Custom Soil Resource Report

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Sonoma County, California

AdA—Alluvial land, sandy

Map Unit Setting

National map unit symbol: hf9s
Elevation: 200 to 800 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Alluvial land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alluvial Land

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 10 inches: gravelly sand
H2 - 10 to 60 inches: stratified very gravelly coarse sand to sand

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydric soil rating: Yes

Minor Components

Unnamed

Percent of map unit: 15 percent
Hydric soil rating: No

BoE—Boomer loam, 7 to 50 percent slopes, moist, MLRA 15

Map Unit Setting

National map unit symbol: 2w8db
Elevation: 210 to 1,840 feet
Mean annual precipitation: 38 to 73 inches
Mean annual air temperature: 57 to 60 degrees F
Frost-free period: 300 to 345 days
Farmland classification: Not prime farmland

Map Unit Composition

Boomer and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Boomer

Setting

Landform: Hillslopes, ridges

Landform position (two-dimensional): Backslope, summit

Landform position (three-dimensional): Side slope, interfluvium

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from igneous, metamorphic and sedimentary rock

Typical profile

A - 0 to 11 inches: loam

AB - 11 to 19 inches: loam

Bt1 - 19 to 37 inches: clay loam

Bt2 - 37 to 47 inches: gravelly clay loam

Bt3 - 47 to 55 inches: gravelly clay loam

Crt - 55 to 65 inches: cemented bedrock

Properties and qualities

Slope: 7 to 50 percent

Depth to restrictive feature: 30 to 70 inches to paralithic bedrock

Drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.2 to 0.5 mmhos/cm)

Available water supply, 0 to 60 inches: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Hugo

Percent of map unit: 5 percent

Hydric soil rating: No

Josephine

Percent of map unit: 5 percent

Hydric soil rating: No

Red hill

Percent of map unit: 5 percent

Hydric soil rating: No

CeB—Clear Lake clay, sandy substratum, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2vbt8

Elevation: 30 to 350 feet

Mean annual precipitation: 27 to 44 inches

Mean annual air temperature: 57 to 59 degrees F

Frost-free period: 225 to 345 days

Farmland classification: Prime farmland if irrigated and drained

Map Unit Composition

Clear lake, sandy substratum, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Clear Lake, Sandy Substratum

Setting

Landform: Basin floors

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Basin alluvium derived from volcanic and sedimentary rock over fan alluvium derived from volcanic and sedimentary rock

Typical profile

Apg1 - 0 to 2 inches: clay

Apg2 - 2 to 8 inches: clay

Assg - 8 to 25 inches: clay

Bssg1 - 25 to 39 inches: clay

Bssg2 - 39 to 46 inches: clay

Bkssg - 46 to 52 inches: clay

2Bkg - 52 to 60 inches: clay loam

2Btg - 60 to 72 inches: fine sandy loam

2C - 72 to 84 inches: stratified loamy coarse sand to clay loam

Properties and qualities

Slope: 2 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 6 percent

Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)

Sodium adsorption ratio, maximum: 8.0

Custom Soil Resource Report

Available water supply, 0 to 60 inches: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): 2e

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C/D

Ecological site: R014XG905CA - Clayey Bottom

Hydric soil rating: Yes

Minor Components

Huichica

Percent of map unit: 5 percent

Landform: Flood plains

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Haire

Percent of map unit: 5 percent

Landform: Basin floors

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Wright

Percent of map unit: 5 percent

Landform: Stream terraces

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

CgC—Clough gravelly loam, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hfbn

Elevation: 200 to 1,000 feet

Mean annual precipitation: 35 inches

Mean annual air temperature: 61 degrees F

Frost-free period: 200 to 250 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Clough and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Clough

Setting

Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 10 inches: gravelly loam
H2 - 10 to 23 inches: very gravelly clay
H3 - 23 to 38 inches: indurated
H4 - 38 to 60 inches: stratified very gravelly loam to very cobbly loam

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches; 20 to 40 inches to duripan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R015XD129CA - SHALLOW LOAMY UPLANDS
Hydric soil rating: No

Minor Components

Positas

Percent of map unit: 8 percent
Hydric soil rating: No

Manzanita

Percent of map unit: 7 percent
Hydric soil rating: No

CrA—Cortina very gravelly sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hfc1
Elevation: 30 to 2,400 feet
Mean annual precipitation: 8 to 40 inches

Custom Soil Resource Report

Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 250 to 270 days
Farmland classification: Not prime farmland

Map Unit Composition

Cortina and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cortina

Setting

Landform: Flood plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 7 inches: very gravelly sandy loam
H2 - 7 to 60 inches: stratified very gravelly loamy sand to very gravelly loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: R014XG907CA - Loamy Bottom
Hydric soil rating: No

Minor Components

Yolo

Percent of map unit: 7 percent
Hydric soil rating: No

Cole

Percent of map unit: 7 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

DcD—Dibble clay loam, deep, 5 to 26 percent slopes, MLRA 15

Map Unit Setting

National map unit symbol: 2xc9r
Elevation: 240 to 750 feet
Mean annual precipitation: 38 to 47 inches
Mean annual air temperature: 58 to 59 degrees F
Frost-free period: 292 to 313 days
Farmland classification: Not prime farmland

Map Unit Composition

Dibble, deep, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dibble, Deep

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile

A1 - 0 to 6 inches: clay loam
A2 - 6 to 12 inches: clay loam
Bt1 - 12 to 22 inches: clay
Bt2 - 22 to 50 inches: clay
Bt3 - 50 to 56 inches: clay loam
Cr - 56 to 66 inches: bedrock

Properties and qualities

Slope: 5 to 26 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.2 to 0.5 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C

Custom Soil Resource Report

Ecological site: R015XD126CA - LOAMY UPLAND
Hydric soil rating: No

Minor Components

Montara

Percent of map unit: 5 percent
Hydric soil rating: No

Laughlin

Percent of map unit: 5 percent
Hydric soil rating: No

Spreckels

Percent of map unit: 5 percent
Hydric soil rating: No

DcE—Dibble clay loam, 4 to 30 percent slopes, MLRA 15

Map Unit Setting

National map unit symbol: 2xc9k
Elevation: 180 to 810 feet
Mean annual precipitation: 40 to 44 inches
Mean annual air temperature: 58 to 59 degrees F
Frost-free period: 304 to 314 days
Farmland classification: Not prime farmland

Map Unit Composition

Dibble and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dibble

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from sedimentary rock

Typical profile

A1 - 0 to 10 inches: clay loam
A2 - 10 to 16 inches: clay loam
Bt - 16 to 26 inches: clay
Cr - 26 to 36 inches: bedrock

Properties and qualities

Slope: 4 to 30 percent
Depth to restrictive feature: 22 to 30 inches to paralithic bedrock
Drainage class: Well drained

Custom Soil Resource Report

Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.2 to 0.5 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R015XD126CA - LOAMY UPLAND
Hydric soil rating: No

Minor Components

Spreckels

Percent of map unit: 5 percent
Hydric soil rating: No

Laughlin

Percent of map unit: 5 percent
Hydric soil rating: No

Guenoc

Percent of map unit: 5 percent
Hydric soil rating: No

DcE2—Dibble clay loam, 15 to 30 percent slopes, eroded

Map Unit Setting

National map unit symbol: hfch
Elevation: 100 to 2,000 feet
Mean annual precipitation: 12 to 40 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 150 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Dibble and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dibble

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

Custom Soil Resource Report

Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 10 inches: clay loam
H2 - 10 to 44 inches: clay
H3 - 44 to 50 inches: clay loam
H4 - 50 to 60 inches: weathered bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R015XD126CA - LOAMY UPLAND
Hydric soil rating: No

Minor Components

Laughlin

Percent of map unit: 5 percent
Hydric soil rating: No

Spreckels

Percent of map unit: 5 percent
Hydric soil rating: No

Guenoc

Percent of map unit: 5 percent
Hydric soil rating: No

DcF—Dibble clay loam, 15 to 46 percent slopes, MLRA 15

Map Unit Setting

National map unit symbol: 2xc9m
Elevation: 180 to 820 feet
Mean annual precipitation: 39 to 44 inches
Mean annual air temperature: 58 to 59 degrees F
Frost-free period: 305 to 317 days
Farmland classification: Not prime farmland

Map Unit Composition

Dibble and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dibble

Setting

Landform: Hillslopes

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Residuum weathered from sedimentary rock

Typical profile

A1 - 0 to 10 inches: clay loam

A2 - 10 to 16 inches: clay loam

Bt1 - 16 to 26 inches: clay

Bt2 - 26 to 36 inches: clay

Cr - 36 to 46 inches: bedrock

Properties and qualities

Slope: 15 to 46 percent

Depth to restrictive feature: 20 to 40 inches to paralithic bedrock

Drainage class: Well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.2 to 0.5 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C

Ecological site: R015XD116CA - STEEP LOAMY

Hydric soil rating: No

Minor Components

Laughlin

Percent of map unit: 4 percent

Hydric soil rating: No

Montara

Percent of map unit: 4 percent

Hydric soil rating: No

Spreckels

Percent of map unit: 4 percent

Hydric soil rating: No

Rock outcrop

Percent of map unit: 3 percent
Hydric soil rating: No

DcF2—Dibble clay loam, 9 to 41 percent slopes, moist, eroded, MLRA 15

Map Unit Setting

National map unit symbol: 2xc9p
Elevation: 180 to 760 feet
Mean annual precipitation: 40 to 44 inches
Mean annual air temperature: 58 to 59 degrees F
Frost-free period: 306 to 317 days
Farmland classification: Not prime farmland

Map Unit Composition

Dibble and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dibble

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile

A1 - 0 to 10 inches: clay loam
A2 - 10 to 16 inches: clay loam
Bt1 - 16 to 26 inches: clay
Bt2 - 26 to 30 inches: clay
Cr - 30 to 40 inches: bedrock

Properties and qualities

Slope: 9 to 41 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.2 to 0.5 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C

Ecological site: R015XD116CA - STEEP LOAMY

Hydric soil rating: No

Minor Components

Laughlin

Percent of map unit: 4 percent

Hydric soil rating: No

Spreckels

Percent of map unit: 4 percent

Hydric soil rating: No

Montara

Percent of map unit: 4 percent

Hydric soil rating: No

Rock outcrop

Percent of map unit: 3 percent

Hydric soil rating: No

GP—Gravel pits

Map Unit Composition

Gravel pits: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gravel Pits

Setting

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy and gravelly alluvium

GrE—Guenoc gravelly silt loam, 5 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfdj

Elevation: 400 to 3,000 feet

Mean annual precipitation: 25 to 50 inches

Mean annual air temperature: 57 to 63 degrees F

Frost-free period: 260 to 280 days

Custom Soil Resource Report

Farmland classification: Not prime farmland

Map Unit Composition

Guenoc and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Guenoc

Setting

Landform: Hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Concave

Across-slope shape: Convex

Parent material: Residuum weathered from igneous rock

Typical profile

H1 - 0 to 17 inches: gravelly silt loam

H2 - 17 to 38 inches: gravelly clay

H3 - 38 to 44 inches: unweathered bedrock

Properties and qualities

Slope: 5 to 30 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C

Ecological site: R015XD126CA - LOAMY UPLAND

Hydric soil rating: No

Minor Components

Boomer

Percent of map unit: 4 percent

Hydric soil rating: No

Rock outcrop

Percent of map unit: 4 percent

Hydric soil rating: No

Supan

Percent of map unit: 4 percent

Hydric soil rating: No

Spreckels

Percent of map unit: 3 percent

Hydric soil rating: No

HbC—Haire gravelly loam, 0 to 9 percent slopes

Map Unit Setting

National map unit symbol: hfdn

Elevation: 20 to 2,400 feet

Mean annual precipitation: 20 to 45 inches

Mean annual air temperature: 54 to 57 degrees F

Frost-free period: 200 to 300 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Haire and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Haire

Setting

Landform: Terraces

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 24 inches: gravelly loam

H2 - 24 to 36 inches: clay

H3 - 36 to 60 inches: very gravelly clay loam

Properties and qualities

Slope: 0 to 9 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: R014XC010CA - CLAYPAN

Hydric soil rating: No

Minor Components

Diablo

Percent of map unit: 7 percent
Hydric soil rating: No

Arbuckle

Percent of map unit: 6 percent
Hydric soil rating: No

Clear lake

Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

HgE—Henneke gravelly loam, 4 to 46 percent slopes, MLRA 15

Map Unit Setting

National map unit symbol: 2xc9z
Elevation: 290 to 2,320 feet
Mean annual precipitation: 32 to 48 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 258 to 335 days
Farmland classification: Not prime farmland

Map Unit Composition

Henneke and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Henneke

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope, base slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from serpentinite

Typical profile

A - 0 to 5 inches: gravelly loam
Bt - 5 to 16 inches: very gravelly clay
R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 4 to 46 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.2 to 0.5 mmhos/cm)

Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: D

Ecological site: R015XD133CA - SERPENTINE LAND

Hydric soil rating: No

Minor Components

Montara

Percent of map unit: 4 percent

Hydric soil rating: No

Huse

Percent of map unit: 4 percent

Hydric soil rating: No

Unnamed

Percent of map unit: 3 percent

Hydric soil rating: No

Boomer

Percent of map unit: 2 percent

Hydric soil rating: No

Hugo

Percent of map unit: 2 percent

Hydric soil rating: No

HgG2—Henneke gravelly loam, 30 to 75 percent slopes, eroded

Map Unit Setting

National map unit symbol: hff1

Elevation: 500 to 4,000 feet

Mean annual precipitation: 16 to 55 inches

Mean annual air temperature: 61 degrees F

Frost-free period: 125 to 260 days

Farmland classification: Not prime farmland

Map Unit Composition

Henneke and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Henneke

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from serpentinite

Typical profile

H1 - 0 to 5 inches: gravelly loam
H2 - 5 to 16 inches: very gravelly clay
H3 - 16 to 26 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 75 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high
(0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R015XD133CA - SERPENTINE LAND
Hydric soil rating: No

Minor Components

Huse

Percent of map unit: 10 percent
Hydric soil rating: No

Hugo

Percent of map unit: 5 percent
Hydric soil rating: No

JoF—Josephine loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hfft
Elevation: 1,200 to 5,000 feet
Mean annual precipitation: 50 inches

Custom Soil Resource Report

Mean annual air temperature: 55 degrees F
Frost-free period: 125 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Josephine and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Josephine

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 13 inches: gravelly loam
H2 - 13 to 35 inches: gravelly clay loam
H3 - 35 to 45 inches: gravelly fine sandy loam
H4 - 45 to 59 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R014XG924CA - Loamy Upland
Hydric soil rating: No

Minor Components

Boomer

Percent of map unit: 5 percent
Hydric soil rating: No

Laughlin

Percent of map unit: 5 percent
Hydric soil rating: No

Hugo

Percent of map unit: 5 percent
Hydric soil rating: No

LgE—Laughlin loam, 2 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfgl
Elevation: 800 to 3,500 feet
Mean annual precipitation: 35 to 70 inches
Mean annual air temperature: 54 to 57 degrees F
Frost-free period: 240 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Laughlin and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laughlin

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 4 inches: loam
H2 - 4 to 25 inches: sandy clay loam
H3 - 25 to 35 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 30 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R004BY065CA - SHALLOW LOAMY UPLANDS
Hydric soil rating: No

Minor Components

Suther

Percent of map unit: 5 percent
Hydric soil rating: No

Hugo

Percent of map unit: 5 percent
Hydric soil rating: No

Yorkville

Percent of map unit: 5 percent
Hydric soil rating: No

LmG—Los Gatos gravelly loam, 30 to 75 percent slopes

Map Unit Setting

National map unit symbol: hfgs
Elevation: 600 to 4,000 feet
Mean annual precipitation: 25 to 70 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Los gatos and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Los Gatos

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 7 inches: gravelly loam
H2 - 7 to 25 inches: gravelly clay loam
H3 - 25 to 35 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 75 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Custom Soil Resource Report

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: R015XD131CA - VERY SHALLOW
Hydric soil rating: No

Minor Components

Maymen

Percent of map unit: 5 percent
Hydric soil rating: No

Hugo

Percent of map unit: 5 percent
Hydric soil rating: No

Boomer

Percent of map unit: 5 percent
Hydric soil rating: No

PeA—Pleasanton loam, 0 to 2 percent slopes, MLRA 14

Map Unit Setting

National map unit symbol: 2x52s
Elevation: 60 to 2,070 feet
Mean annual precipitation: 19 to 44 inches
Mean annual air temperature: 58 to 60 degrees F
Frost-free period: 240 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pleasanton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pleasanton

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

Ap - 0 to 5 inches: loam

Custom Soil Resource Report

A - 5 to 18 inches: loam
Bt1 - 18 to 23 inches: clay loam
Bt2 - 23 to 44 inches: fine gravelly clay loam
Bt3 - 44 to 66 inches: fine gravelly sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Ecological site: R014XG918CA - Loamy Fan
Hydric soil rating: No

Minor Components

Hillgate

Percent of map unit: 3 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Arbuckle

Percent of map unit: 3 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

San ysidro

Percent of map unit: 3 percent
Landform: Valley floors, alluvial fans, terraces
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Cortina

Percent of map unit: 3 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear

Hydric soil rating: No

Yolo

Percent of map unit: 3 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

PeC—Pleasanton loam, 2 to 9 percent slopes, MLRA 14

Map Unit Setting

National map unit symbol: 2x52v

Elevation: 120 to 3,440 feet

Mean annual precipitation: 19 to 44 inches

Mean annual air temperature: 58 to 60 degrees F

Frost-free period: 240 to 340 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pleasanton and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pleasanton

Setting

Landform: Alluvial fans

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Typical profile

A - 0 to 21 inches: loam

Bt1 - 21 to 33 inches: clay loam

Bt2 - 33 to 45 inches: very gravelly clay loam

C - 45 to 55 inches: clay loam

2C - 55 to 79 inches: stratified very gravelly clay

Properties and qualities

Slope: 2 to 9 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R014XG918CA - Loamy Fan
Hydric soil rating: No

Minor Components

Arbuckle

Percent of map unit: 5 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Zamora

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Yolo

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

PgB—Pleasanton gravelly loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: hfhp
Elevation: 2,400 feet
Mean annual precipitation: 25 inches
Mean annual air temperature: 59 degrees F
Frost-free period: 260 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pleasanton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pleasanton

Setting

Landform: Terraces, alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear, convex
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 27 inches: gravelly loam
H2 - 27 to 72 inches: gravelly clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R014XG912CA - Loamy Terrace
Hydric soil rating: No

Minor Components

Arbuckle

Percent of map unit: 4 percent
Hydric soil rating: No

Zamora

Percent of map unit: 4 percent
Hydric soil rating: No

Yolo

Percent of map unit: 4 percent
Hydric soil rating: No

Cortina

Percent of map unit: 3 percent
Hydric soil rating: No

RaD—Raynor clay, 9 to 15 percent slopes

Map Unit Setting

National map unit symbol: hfhy

Elevation: 200 to 1,200 feet

Mean annual precipitation: 22 to 35 inches

Mean annual air temperature: 57 to 61 degrees F

Frost-free period: 260 to 290 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Raynor and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Raynor

Setting

Landform: Hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from igneous rock

Typical profile

H1 - 0 to 17 inches: clay

H2 - 17 to 35 inches: clay

H3 - 35 to 45 inches: very cobbly clay

H4 - 45 to 60 inches: fragmental material

Properties and qualities

Slope: 9 to 15 percent

Depth to restrictive feature: 20 to 47 inches to strongly contrasting textural stratification

Drainage class: Well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: R014XG922CA - Clayey Upland

Custom Soil Resource Report

Hydric soil rating: No

Minor Components

Diablo

Percent of map unit: 5 percent

Hydric soil rating: No

Goulding

Percent of map unit: 5 percent

Hydric soil rating: No

Cotati

Percent of map unit: 5 percent

Hydric soil rating: No

RnA—Riverwash

Map Unit Setting

National map unit symbol: hfj7

Elevation: 700 to 2,900 feet

Mean annual precipitation: 8 to 15 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 110 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Riverwash: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverwash

Setting

Landform: Flood plains

Parent material: Sandy and gravelly alluvium

Typical profile

H1 - 0 to 6 inches: very gravelly sand

H2 - 6 to 60 inches: stratified very gravelly coarse sand to very gravelly sand

Properties and qualities

Slope: 0 to 2 percent

Drainage class: Excessively drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: About 0 inches

Frequency of flooding: FrequentNone

Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: Yes

Minor Components

Unnamed

Percent of map unit: 15 percent

Hydric soil rating: No

RoG—Rock land

Map Unit Setting

National map unit symbol: hfj8

Elevation: 650 to 4,000 feet

Mean annual precipitation: 8 to 15 inches

Mean annual air temperature: 45 to 52 degrees F

Frost-free period: 110 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Rock land: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Land

Setting

Parent material: Residuum weathered from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 10 inches: unweathered bedrock

Properties and qualities

Slope: 50 to 75 percent

Depth to restrictive feature: 0 to 10 inches to lithic bedrock

Drainage class: Excessively drained

Runoff class: Very high

Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 15 percent

Hydric soil rating: No

StF—Suther loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hfk8
Elevation: 300 to 3,000 feet
Mean annual precipitation: 40 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Suther and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Suther

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone

Typical profile

H1 - 0 to 3 inches: loam
H2 - 3 to 14 inches: clay loam
H3 - 14 to 36 inches: gravelly clay
H4 - 36 to 59 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R015XD134CA - STEEP CLAYPAN
Hydric soil rating: No

Minor Components

Laughlin

Percent of map unit: 5 percent
Hydric soil rating: No

Hugo

Percent of map unit: 5 percent
Hydric soil rating: No

Josephine

Percent of map unit: 5 percent
Hydric soil rating: No

ToG—Toomes rocky loam, 30 to 75 percent slopes

Map Unit Setting

National map unit symbol: hfkq
Elevation: 150 to 4,000 feet
Mean annual precipitation: 8 to 25 inches
Mean annual air temperature: 45 to 61 degrees F
Frost-free period: 110 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Toomes and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Toomes

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from igneous rock

Typical profile

H1 - 0 to 4 inches: gravelly loam
H2 - 4 to 13 inches: gravelly clay loam
H3 - 13 to 23 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 75 percent
Depth to restrictive feature: 4 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Custom Soil Resource Report

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R015XD132CA - SHALLOW ROCKY
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent
Hydric soil rating: No

Guenoc

Percent of map unit: 5 percent
Hydric soil rating: No

Spreckels

Percent of map unit: 5 percent
Hydric soil rating: No

Goulding

Percent of map unit: 5 percent
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

YIA—Yolo sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hfkq
Elevation: 30 to 400 feet
Mean annual precipitation: 16 to 22 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 240 to 260 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Yolo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yolo

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 15 inches: sandy loam
H2 - 15 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Ecological site: R014XG917CA - Dry Loamy Fan
Hydric soil rating: No

Minor Components

Pajaro

Percent of map unit: 5 percent
Hydric soil rating: No

Zamora

Percent of map unit: 5 percent
Hydric soil rating: No

Cortina

Percent of map unit: 5 percent
Hydric soil rating: No

YmB—Yolo sandy loam, overwash, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hfr

Elevation: 0 to 3,500 feet

Mean annual precipitation: 12 to 30 inches

Mean annual air temperature: 59 degrees F

Frost-free period: 200 to 350 days

Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Yolo and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yolo

Setting

Landform: Alluvial fans

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 8 inches: sandy loam

H2 - 8 to 60 inches: loam

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.20 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: NoneOccasional

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): 2w

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: B

Ecological site: R014XG918CA - Loamy Fan

Hydric soil rating: No

Minor Components

Zamora

Percent of map unit: 5 percent
Hydric soil rating: No

Cortina

Percent of map unit: 5 percent
Hydric soil rating: No

Pleasanton

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

YsA—Yolo silt loam, 0 to 5 percent slopes, MLRA 14

Map Unit Setting

National map unit symbol: 2w8b0
Elevation: 30 to 790 feet
Mean annual precipitation: 31 to 54 inches
Mean annual air temperature: 56 to 60 degrees F
Frost-free period: 240 to 260 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Yolo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yolo

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from volcanic and sedimentary rock

Typical profile

Ap - 0 to 8 inches: silt loam
C - 8 to 60 inches: loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches

Custom Soil Resource Report

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: Rare

Frequency of ponding: None

Calcium carbonate, maximum content: 1 percent

Maximum salinity: Nonsaline (0.3 to 0.5 mmhos/cm)

Available water supply, 0 to 60 inches: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): 1

Land capability classification (nonirrigated): 3c

Hydrologic Soil Group: B

Ecological site: R014XG918CA - Loamy Fan

Hydric soil rating: No

Minor Components

Pleasanton

Percent of map unit: 5 percent

Cortina

Percent of map unit: 5 percent

Pajaro

Percent of map unit: 5 percent

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf