5.5 SPECIAL-STATUS SPECIES AND OTHER WILDLIFE

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Special-Status Species

Special-status species include those that are listed or proposed for listing as rare, threatened, or endangered by either the California Department of Fish and Game (CDFG) or the U.S. Fish and Wildlife Service, most species that are candidates for either state or federal listing, and species designated as "fully protected" or "species of special concern" by CDFG. Certain other categories of species are also sometimes regarded as special-status species, but none of those occur within the study area.

Consideration of special-status species will be an essential element in the final development of restoration recommendations and in the resources management plan and associated environmental review. Therefore, background information is included in this technical report. Consideration of special-status species is appropriate because these species usually require higher quality representations of the particular habitat type which they use, thereby providing a measure of the ideal goals, not necessarily the stated achievement objectives, of general habitat reclamation or restoration. In this way, consideration of the habitat needs of special-status species generally encompasses general habitat requirements of a wider variety of species.

Within the study area, only four special-status species are recorded in the Natural Diversity Data Base (NDDB) maintained by the California Department of Fish and Game: Swainson's hawk, bank swallow, and tricolored blackbird. Designated critical habitat for a fourth species, valley elderberry longhorn beetle (VELB), has been mapped within the study area, and evidence indicative of the presence of the species has been documented. The DFG stresses that, throughout the state, the NDDB records are a useful guide to known occurrences but are not represented as being complete. The NDDB records are likely to be particularly incomplete for Cache Creek, as the area is entirely in private ownership and has been studied by few biologists, and then only to a limited extent (usually focused surveys for occurrences of Swainson's hawk). As emphasized in Section 5.2, the constant change that is a major characteristic of riparian habitat, especially along Cache Creek, makes it likely that the number and sites of special-status species occurrences change from year to year. Anecdotal observations of special-status species during field work for this project and during public field workshops suggest that some species occur at sites not recorded in the NDDB.

Information on special-status species is presented in three categories: species that are known or reliably believed to occur presently or within the very recent past, species that are known from the region and for which suitable habitat presently occurs along lower Cache Creek, and species for which habitat is marginally suitable or unsuitable, but which could benefit from the habitats that might develop under likely management and/or reclamation and restoration scenarios.

Species Known to Occur Along Cache Creek

Swainson's hawk (*Buteo swainsoni*)

The Swainson's hawk has been a species of concern for many years to scientists and conservationists due to drastic declines in the California portion of its range. These declines have been documented since as early as the 1940s and the populations in California may have declined by as much as 90 percent.[1] These population declines led to the Swainson's hawk being listed as a threatened species by the California Department of Fish and Game in 1983.

The historical distribution of the Swainson's hawk covered much of western North America. In California, Swainson's hawk were common nesters from lowland California and the southern coastal valleys through the Central Valley and into the Great Basin of northeastern California. There were also smaller nesting populations in the southern Sierra Nevada/White Mountains and the Mojave Colorado desert region.[2] Information on the historical distribution of Swainson's hawks in Yolo County is lacking.

Currently, there are two current Swainson's hawk population centers in California. There is a population found primarily in Lassen, Modoc and Siskiyou counties in northeastern California which nests in the juniper, sagebrush steppe community, and also adjacent to agricultural areas there. The majority of the population (80 to 85 percent) resides in the Central Valley of California.[3] Within the Central Valley, 80 percent of the estimated 280 pairs of nesting Swainson's hawks are found between the southern Sacramento and northern San Joaquin Valleys.

In Yolo County, Swainson's hawks are primarily distributed along riparian areas during the nesting season. These areas include the Sacramento River, Cache Creek, Willow Slough, Putah Creek, and Dry Slough.[4] They also nest along major canals that border and traverse agricultural fields, as well as in lone trees and roadside trees within the county. Large native and ornamental trees within the city limits of Davis and Woodland are also utilized by nesting Swainson's hawks. Knowledge of Swainson's hawk distribution in Yolo County is very complete and is primarily based on recent studies (circa 1993) conducted by the University of California, Davis,[5] and through a ten-year study of Swainson's hawks in Yolo County conducted by J. Estep.[6]

Swainson's hawks require suitable nest trees adjacent to or in close proximity to large open agricultural fields, grasslands, and pastures which have an abundant prey base, and therefore constitute foraging habitat. Historically, native grasslands and open shrub habitat were the preferred foraging habitat for Swainson's hawks. Today in the Central Valley, they find suitable prey resources in alfalfa and other hay crops, certain grain and row crops, and in lightly grazed pastures and fallow fields. The lack of prey and/or the unavailability of prey due to the density of vegetative cover renders agricultural crops including corn, cotton, rice, orchards and vineyards unsuitable for Swainson's hawk foraging habitat. Suitable nest sites are located primarily in association with riparian systems that are adjacent to suitable foraging habitats and, in fact, over 85 percent of Swainson's hawks nest territories are associated with riparian systems. Other suitable nest sites include large lone oak trees in the middle of agricultural fields, and also groves of oaks, other large roadside trees, or ornamental trees within city limits which are adjacent to or in close proximity to suitable foraging habitat.[7]

Swainson's hawk foraging ranges fluctuate on a daily as well as a seasonal basis in response to the availability of prey and concomitantly with the maturity of vegetative cover of suitable fields for foraging habitat. For example, early in the season when crops are newly planted and there is minimal vegetative cover, Swainson's hawks may have a relatively small home range. Later in the season when crops mature and vegetative cover increases, this reduces the prey availability for Swainson's hawks, and they expand their foraging range. Late in the season when harvesting of various row crops commences, prey availability is increased for Swainson's hawks, prey populations are at a peak, and Swainson's hawks reduce their foraging range correspondingly.[8] In areas where nesting pairs are located in trees adjacent to alfalfa fields and pasture lands, home ranges remain relatively stable, as prey is available on a more or less consistent basis throughout the breeding season.[9] Several studies have estimated Swainson's hawk foraging ranges during the breeding season of 1,033 to 6,818 acres.[10] [11] [12]

Breeding density of Swainson's hawks is variable according to the spatial extent of the area examined[13] and the availability of suitable nest sites and foraging habitat within a particular area. Estep[14] found that the average breeding density for Swainson's hawks in his study areas was 0.417 pairs per square mile. In areas with a favorable combination of suitable foraging habitat adjacent to riparian nest sites, such as in the Woodland area, Swainson's hawk breeding densities were at their highest, and reached 0.556 pairs per square mile.[15] But densities at study sites are much higher than those across intervening landscapes.[16] In general the breeding distribution of Swainson's hawks in the Central Valley follows the distribution of suitable nest sites along riparian areas. However, there is suitable nesting habitat in Yolo County which is not currently occupied by Swainson's hawks, and a portion of this nesting habitat is within the vicinity of suitable foraging habitat.[17] These unused, but suitable, nesting habitats will likely be used in future years.

The primary prey of Swainson's hawks in the Central Valley are rodents, birds, snakes and insects. However, during migration and in the non-breeding season, Swainson's hawks are known to land on the ground in freshly disced fields and feed on insects such as grasshoppers and beetles that have been stirred up by the discing process.

Swainson's hawk foraging habitat usage in the Central Valley is based on a combination of abundance and availability of prey. Areas with land uses that include crop types with both adequate prey populations and available prey base, such as alfalfa, slightly grazed pastures, or fallow fields, are areas near which Swainson's hawks will tend to nest. They can also survive in areas where summer-harvested row crops, hay crops and grains are cropped in patterns that enable the Swainson's hawk to utilize the prey as they become available from harvesting operations.

Swainson's hawks nest predominantly in large riparian trees on or adjacent to suitable foraging habitat, and in the Central Valley most of these trees are valley oaks or cottonwoods.[18] [19] [20] Swainson's hawks also nest in isolated oak trees in shelter belts, in roadside rows of large mature trees such as walnuts and eucalyptus, and they will nest in ornamental trees around homesteads and even in small cities with surrounding suitable foraging habitats such as Davis and Woodland. The critical combination for Swainson's hawks seems to be suitable nesting areas on or adjacent

to suitable foraging habitat. If there is no suitable foraging habitat, then Swainson's hawks will not nest in the area, even with the presence of suitable nest trees.

Portions of the Cache Creek riparian corridor support numerous large, suitable nest trees, and all of it lies within foraging distance of substantial acreages of alfalfa and other suitable crops. Accordingly, it is not surprising that many occurrences of Swainson's hawks within the study area are recorded in the NDDB. These are primarily located in the eastern portion of the study area, although anecdotal observations of at least one pair were made in the Dunnigan Hills reach during the preparation of this report. It seems likely that additional pairs nest along forested reaches of lower Cache Creek.

Bank swallow (*Riparia riparia*)

Bank swallows have been eliminated from all but a very small portion of their historical range in California. Loss of habitat is the major contributing factor to a severe decline of bank swallows. Bank protection and stabilization projects sponsored and funded by state and federal agencies have been responsible for the riprapping of over 100 miles of naturally eroding river banks which provide critical nesting habitat for bank swallows. Due to the severe population declines in California's bank swallows, the California Fish and Game Commission listed the species as threatened in 1989.[21] Currently the bank swallow is not listed by the federal government.

Bank swallows breed in northern California, including Yolo County, from April through early August. The majority of bank swallows remaining in California nest along the Sacramento River, representing up to 70 percent of the population.[22] In Yolo County, bank swallows have been known to nest recently along Cache Creek at Fremont Weir and along the Sacramento River on the Yolo County side at Sacramento Slough.[23] [24] Several active colonies of bank swallows have been observed along lower Cache Creek as recently as 1987.[25]

Bank swallows nest in small to large colonies composed of burrows excavated from the steep sides of river banks, borrow pits, road cuts, or sea cliffs.[26] Bank swallows primarily nest in steep earthen riverbanks throughout their present range in California. These river banks are subject to frequent erosion, primarily during winter months.[27] The steepness of the bank, the quantity of suitable soil, and the soil type all affect the location and size of a bank swallow colony. Bank swallows prefer to nest in areas with fine loam or sandy loam soils, in which they can easily excavate their burrows. Banks with steep vertical cliffs are also preferred, with angles approaching 90 percent containing the most occupied burrows. Reclamation of off-channel aggregate mining pits could create preferred topography in suitable soils, in the expectation that bank swallows will adopt these created sites as suitable nesting sites.

Tricolored blackbird (*Agelaius tricolor*)

The tricolored blackbird is listed as a Category 2 candidate species by the United States Fish and Wildlife Service[28] and as a species of special concern by the California Department of Fish and Game.[29]

Historically, the distribution of the tricolored blackbird included northwestern Baja California, southcentral Oregon, and the lowlands of California. The California distribution included primarily the San Joaquin and Sacramento valleys but also included the foothills of the Sierra Nevada from Kern County north to Shasta County, and coastal valleys from Sonoma County south to the Mexican border. They also occurred sparingly and very locally east of the Sierra Nevada-Cascade crest on the Modoc Plateau in northeastern California.[30] [31] Currently, the breeding distribution of tricolored blackbirds in California mirrors that of historical times; however, the overall population size as well as the size of individual colonies has decreased by 50 percent or more over the last 50 to 60 years.[32]

From the 1920s to the 1970s the breeding distribution of tricolored blackbirds in Yolo County included several sites near Woodland, several sites near West Sacramento, and colonies located near Davis, south of Elkhorn, southwest of Verona, along Willow Slough, at Madison, in the Knight's Landing area, and at River Farms.[33] Between the years 1991 and 1993, tricolored blackbird nesting colonies were documented at two locations northwest of Davis along Dry Slough and along Union School Slough. The average colony size at these locations was 1,000 individuals.[34] There is another recent nesting colony originally discovered in 1992 which is still present along Cache Creek west of Woodland, and this nesting colony averages between 300 and 500 individuals.[35] The survey coverage of Yolo County, particularly in recent years, has been fair to moderate, including a 1994 county-wide survey for tricolored blackbirds.

Tricolored blackbirds inhabit fresh water marshes and crop lands. Nests are built near or over water, and occasionally in agricultural fields. Nesting colonies tend to be very large and densely concentrated. Recently, tricolored blackbirds have displayed tendencies toward increased nesting in patches of blackberry, willows, mustard, thistles, nettles, and even grasses.[36] Tricolored blackbirds forage away from their nesting colonies, usually in flooded fields, pond margins, or open farmland.[37]

Although tricolored blackbirds occur sparingly in northwestern Baja California and southcentral Oregon, they are primarily an endemic species to the Central Valley and coastal valleys of California. The tricolored blackbird is considered a casual or irregular nesting species in Yolo County; tricoloreds do not nest every year in the county.[38] During the winter months, tricolored blackbirds are often present Yolo County within large feeding flocks, which include European starlings, red-winged blackbirds, and occasionally yellow-headed blackbirds. These large feeding flocks wander between agricultural fields and the edges of marsh habitat in search of food. Specific habitat requirements of tricolored blackbirds include an abundant concentrated supply of insects in close proximity to nesting areas, and dense emergent marsh vegetation consisting primarily of cattail or tule marshes as nesting habitat.[39] As indicated earlier, there has been a shift between the 1930s and 1980s in nesting substrate from tule/cattail marshes to more non-marsh habitat such as blackberry thickets, but since tricolored populations are estimated to have declined by greater than 74 percent during that time interval, this indicates that the switch in nesting substrates has not been a successful one.[40] Most breeding colonies of tricolored blackbirds are located over or near water and it is known that tricolored blackbirds require at least some free water for bathing and drinking. In the absence of a traditional water source, tricolored blackbird colonies are sometimes abandoned.[41]

Tricolored blackbirds in Yolo County have undergone seriously population declines from the 1930s, when an estimated 3,000 to 170,000 breeding tricolored blackbirds nested here, through the 1970s, when an estimated 1,000 to 5,200 tricolored blackbirds nested in Yolo County, to a low today of approximately 300 to 500 breeding individuals in the county at one location along Cache Creek.[42] [43] Reasons for this decline include loss of favored wetland nesting habitat, loss of foraging habitat, food supplies, and water, disturbance by predators and humans, competition with red-winged blackbirds, and poisoning.[44]

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)

The valley elderberry longhorn beetle is listed by the U.S. Fish and Wildlife Service as a threatened species, with critical habitat designated in parts of Solano, Yolo (Putah Creek), and Sacramento counties.

This beetle is found in remnants of riparian and elderberry savanna habitats in the Central Valley from Tehama to Kern County, and in Sierra Nevada foothill locations from Placer to Fresno counties.[45] [46] [47]

The larvae are wood borers and feed internally in the roots and main stems of elderberry, specifically those with stems between one and four inches in diameter. Adults feed on the flowers and foliage of elderberry and are infrequently encountered.

Adult beetles have generally been observed in mature mixed riparian forest, and it is presumed that the species preferentially or exclusively uses more or less continuous riparian habitat corridors.[48] [49]

In Yolo County, VELB is presently known to occur in scattered riparian remnants along the Sacramento River, in the Cache Creek area from Yolo to Lake County, and along Putah Creek between Davis and Monticello Dam.

Along Cache Creek, emergence holes of the diameter and characteristics that are characteristic of VELB have been reported in the Dunnigan Hills subreach.[50]

Additional Species for Which Suitable Habitat Occurs Along Cache Creek

Cooper's hawk (*Accipiter cooperi*)

Cooper's hawks are protected by the federal Migratory Bird Treaty Act (1918) and are a fully protected species under the Fish and Game Code of California. Currently, Putah Creek, Cache Creek, Willow Slough, and the Sacramento River provide the best remaining potential nesting habitat for Cooper's hawks in Yolo County.

Due to the combined effects of shooting and trapping, pesticides and other contaminants, degradation of breeding and wintering habitat, and falconry, the Cooper's hawk is listed as extirpated, endangered, threatened, or of special concern status in 16 eastern states.[51] Western populations were not affected as much by pesticides and are now considered relatively stable

overall.[52] Due to the rapid destruction of lowland riparian nesting habitat in California, however, the Cooper's hawk is listed as a species of special concern by the state.[53] [54]

The historical breeding range of the Cooper's hawk included north-central and northwestern Mexico, the conterminous United States, and southern Canada. The current breeding range has contracted, with the reported disappearance of nesting populations in some parts of the prairie states and southern United States. Cooper's hawks winter throughout the breeding range, although the northernmost and some southwestern populations are migratory and the wintering range may extend as far south as Columbia.[55]

In California, the Cooper's hawk nested throughout most of the state, primarily in riparian zones, from valley river bottoms up to an elevation of 6,500 feet.[56] Few Cooper's hawks nested in the southeastern deserts or the northwestern coastal belt.[57] By the mid-1970s, the Cooper's hawk had disappeared as a breeding bird along the Colorado River, the Yosemite region, northern San Diego County, the Santa Barbara region, Santa Cruz and Santa Clara counties, and major declines were noted in the Sacramento Valley.[58] [59] The extent to which the California populations have recovered is unknown. During the winter months, Cooper's hawks inhabit primarily the bottomlands and foothills throughout California. There is an influx of migrant Cooper's hawks into the state during the winter and California has the second highest density of wintering Cooper's hawks in the United States.[60]

Little is known about the historical distribution of Cooper's hawks in Yolo County, although in the 1930s they were considered uncommon winter visitants within a 10-mile radius of Davis by an eminent local ornithologist.[61] The Cooper's hawk has been confirmed in the past as a nesting species in Yolo County, but the current breeding status of the species is uncertain.[62] [63] [64] No thorough county-wide censuses of Cooper's hawks have been conducted during the nesting season, but no recent nests have been discovered during periodic California Department of Fish and Game surveys for other raptor species in Yolo County.[65] Although the population trend of Cooper's hawks in Yolo County is unknown, sources of available occurrence data include the *Checklist of the Birds of Yolo County* (Beedy 1993), California Natural Diversity Data Base (1994), and the Sacramento Audubon Society files (1994).

Cooper's hawks in California demonstrate a preference for lowland riparian forests, which include scattered stands of live or blue oaks as nesting habitat.[66] Nest stands of Cooper's hawks are generally 30 to 70 years old and contain an average of 907 trees per hectare.[67] In California, 97 percent of documented nests (75 out of 77) were located in oaks.[68] The average percent canopy closure of nest tree stands is 64 to 95 percent, average diameter of nest tree at breast height is between one and four feet, and the average height of the nest is 25 to 50 feet.[69] However, unlike other accipiters, Cooper's hawks have been known to nest successfully in cities, isolated trees, and forest fragments.[70] The nest is usually placed in the dense canopy near a clearing and close to water.[71] During migration and winter, Cooper's hawks can occur in virtually any habitat type with adequate tree or shrub cover for roosting.

The Cooper's hawk is listed as uncommon from September through April and casual in May through August in Yolo County.[72] Cooper's hawks utilize a wide range of habitat types within Yolo County during the nonbreeding season[73] and potential breeding habitat exists along Cache

Creek, Putah Creek, Willow Slough, and the Sacramento River.[74] The Capay and Dunnigan Hills reaches of lower Cache Creek provide very suitable habitat for the Cooper's hawk, although no formally recorded occurrences are known.

California yellow warbler (*Dendroica petechia brewsteri*)

The yellow warbler is a strictly riparian bird whose populations in the southwestern U.S. are seriously threatened by loss of riparian nesting habitat and heavy brood parasitism by brown-headed cowbirds.[75] In California, the yellow warbler has virtually disappeared as a nesting species in the Sacramento and San Joaquin valleys, and has been extirpated from the lower Colorado River Valley.[76] [77] The California yellow warbler is listed as a Species of Special Concern in the State of California.[78] [79]

The historical breeding distribution of the California yellow warbler included riparian habitat throughout the western portion of the state, from Modoc west to Del Norte counties and south to San Diego County along the coast, and excluding the deserts of southeastern California.[80] Currently, the California yellow warbler nests throughout its historical range, but has been greatly reduced in the Sacramento and San Joaquin valleys, southern coastal area, and San Francisco, Marin, and Siskiyou counties.[81] The wintering range extends from the Bahamas and Mexico through Central and South America.[82]

Little is known about the historical distribution of yellow warblers in Yolo County, although they were confirmed nesting on the University Farm at the University of California, Davis campus in the mid-1930s and were then considered scarce summer visitants within a 10-mile radius of Davis by an eminent local ornithologist.[83] Currently, the breeding status of the yellow warbler is uncertain and it may no longer nest in Yolo County.[84] [85] No recent, thorough county-wide censuses of yellow warblers during the nesting season have not been conducted; however, no recent nests have been discovered during periodic California Department of Fish and Game surveys for other sensitive bird species.[86]

The preferred foraging and nesting habitat of the yellow warbler is streamside thickets of tangled, thick underbrush interspersed among alders, cottonwoods, and willows.[87] The riparian woodlands usually used during the breeding season are composed of a heterogenous layer of mature cottonwoods, willows, aspens, sycamores, and alders, with a dense understory.[88] Yellow warblers breed in riparian habitat from the mixed conifer zone down to the foothill woodlands and throughout the interior valleys of California.[89]

The yellow warbler is listed as an uncommon to common spring and fall migrant from mid-April through May and August through September in Yolo County.[90] Yellow warblers frequent riparian, woodland, chaparral, and even human habitations in their migration through the county.

Ringtail (*Bassariscus astutus*)

The ringtail, a member of the raccoon family, is a fully protected species in California, under section 4700 of the California Fish and Game Code. The species has no federal status.

The distribution of ringtails extends throughout most of California with the exception of the extreme northeast corner of the state and southern portions of the San Joaquin Valley. Observations of the species are relatively uncommon, probably primarily due to its secretive, nocturnal habits. Many of the recent sightings are reported from the Northern Sacramento Valley near Butte Creek and Sutter Buttes. This population, which is outside of the range described by Grinnel et al.,[91] has been previously documented in the literature.[92] [93] [94] Belluomini and Trapp (1984) documented the highest reported ringtail densities in the literature within the Sacramento Valley, along the lower Feather river and portions of the Sacramento River, especially in higher quality riparian habitats.

Zeiner et al.[95] reports that the ringtail occurs in various riparian habitat, and in brush stands of most forests and shrub habitat at low to middle elevations. For cover the ringtail prefers hollow trees, logs, snags, an dcavities in talus and other rocky areas. In a exhaustive search of recorded occurrences, museum specimens, and recent literature, S. Orloff[96] revealed one recorded occurrence in Yolo County. Licensed fur trapper take of ringtails in California (trapping records) from 1938-1966 revealed that one to thirteen ringtails were trapped in five trapping seasons in Yolo County. Potential habitat for the ringtail may be present in Yolo County in the riparian habitat along the Sacramento River, or possibly along Cache Creek or Putah Creek. However, the fact that suitable habitat along Cache Creek is disjunct; that is, separated from the inhabited reaches of the Sacramento River by areas where suitable habitat is absent, makes it seem unlikely that the species would naturally disperse to the lower Cache Creek study area.

Northwestern pond turtle (*Clemmys marmorata marmorata*)

The pond turtle is listed as a Category 2 candidate species by the U.S. Fish and Wildlife Service and as a Species of Special Concern in the State of California. The western pond turtle remains in the vast majority of its historical range, although populations may be adversely affected by a number of factors.

The northwestern pond turtle occurs from the Sacramento Valley and coastal drainages northward from San Francisco Bay to Puget Sound in Washington. It may co-occur in the South San Francisco Bay area and the San Joaquin Valley.[97] [98]

The western pond turtle inhabits fresh or brackish, permanent and intermittent water bodies from sea level to about 6,000 feet[99] [100]. The abundance of turtles have been positively correlated with the number of logs and boulders used for basking sites.[101] The turtle uses adjacent uplands for nesting. Hatchlings and juveniles require shallow water with abundant emergent vegetation. The western pond turtle feeds primarily on small aquatic invertebrates, but is omnivorous in its overall food habits.[102]

The western pond turtle is omnivorous, eating plants, insects, worms, fish and carrion, with an apparent preference for flesh over plant material.

Up until the 1930s, western pond turtles were exploited for food, resulting in depletion of some large populations in the Central Valley of California.[103] Some animals were taken for the pet trade also, but the primary cause of decline is alteration and destruction of habitat. Massive water

development projects have changed the flow, location and use of water in the Central Valley. Western pond turtles appear to fare poorly in reservoirs created by dams,[104] partly because water levels fluctuate and reservoirs maintain populations of introduced predators (i.e., bullfrogs and bass) that prey on young turtles.

The California Natural Diversity Data Base lists no recorded occurrences of northwestern pond turtle in Yolo County. The turtle is observed along Cache Creek, Putah Creek, and other waterways in the county, but local records have not been included in the NDDB.

Sacramento anthicid beetle (*Anthicus sacramento*)

This beetle, a category 2 candidate for federal listing, is a member of the family Anthicidae, the antlike flower beetles. It lives in sparsely vegetated fine-grained riverine sand deposits such as sand dunes, sand bars, and riverine shorelines, but has also been found associated with sandy dredge spoils.

This beetle is only known from California. At the time of its description, this beetle was believed to be restricted to the Sacramento-San Joaquin Delta area around Rio Vista.[105] Hagen[106] reported that in 1952, he collected specimens from sand bars in the dry creek bed of Putah Creek, near Davis. However, since construction of Monticello Dam, the hydrological regime of the creek has been changed and the beetle has not been seen at this location.

This species is presently known from; a) a few sites in the Sacramento-San Joaquin Delta in the vicinity of Rio Vista (Solano and Sacramento counties);[107] [108] [109] b) Feather River (Sutter County);[110] Sacramento River (Solano, Butte, Glenn, and Tehama counties),[111] [112] and San Joaquin River (San Joaquin County).[113] This species is not currently known from Yolo County. The only specimens of this species from Yolo county are from an apparently extinct population.

Current research has not revealed any survey efforts for this beetle in Yolo County outside of the Putah Creek drainage. The quality of the limited available data for Yolo County is good. The sources of available occurrence data is Hagen 1986.

<u>Restoration-Potential Species</u>

The species treated under this heading are not characteristically riparian species. However, some abandoned off-channel pits will be revegetated in ways that could provide habitat for these species, therefore it is appropriate for the species and their habitat uses to be included.

White-faced ibis (*Plegadis chihi*) - nesting

The white-faced ibis is considered a Category 2 candidate species by the U.S. Fish and Wildlife Service and is listed as a species of special concern by the California Department of Fish and Game.

White-faced ibis nest in 45 known colonies throughout the western U.S. In California, the species historically was found from the Salton Sea in San Diego County north through the Central

Valley to the Klamath Basin.[114] As of 1985, the breeding population of white-faced ibis in California had been reduced to three active colonies located at Mendota Wildlife Management Area in Fresno County, the south Wilbur Flood Area in Kings County, and at Woodland Sugar Ponds in Yolo County.[115] [116] More recently, a nesting colony of white-faced ibis was located at Colusa National Wildlife Refuge in Colusa County.[117]

The white-faced ibis is considered a rare, irregular nesting species in Yolo County between the months of March and September.[118] A total of approximately 30 pairs attempted nesting at Woodland Sugar Ponds in 1985, with only a total of three to four young fledging successfully. Ibis have continued to attempt nesting at the Sugar Ponds every year since that time.[119] Small to large flocks of white-faced ibis are regularly seen foraging within the county at Conaway Ranch, Woodland Sugar Ponds, and Yolo Bypass; usually between 1 to 200 individuals are observed.[120] Flocks as large as 850 individuals have been observed roosting at Woodland Sugar Ponds.[121] The white-faced ibis was observed on the Sacramento Audubon Society's Christmas Bird Count for the first time in 1990, with 50 individuals observed near the Davis Sewage Ponds.[122] They are also found during the non-breeding season in rice fields and also in spring and summer shallow-flooded wetlands and duck clubs in the south Yolo Bypass.[123] The breeding distribution of white-faced ibis within Yolo County is fairly well understood; however, distribution during the winter months is poorly understood.

The preferred nesting habitat of the white-faced ibis is dense, shallow, fresh emergent wetland habitat. Nests are composed of coarse, emergent vegetation in the form of a deep cup and are usually found on the ground or in low, aquatic vegetation such as cattails.[124] The white-faced ibis winters in habitats similar to those utilized during the breeding season.[125]

White-faced ibis generally nest close to one another in small colonies that are usually located in dense stands of bulrush and cattails. Ibis nests are usually constructed of broken pieces of dead bulrush, and the nests are placed on mats of broken stems from the previous year or attached to living stems.[126] Standing water is a habitat requirement both for nesting and for foraging.

White-faced ibis forage primarily for aquatic invertebrates, particularly insect larvae and earthworms, by probing the mud of swamps, rivers, ponds, and flooded rice and alfalfa fields. Crustaceans, small fish, and amphibians are also eaten.[127] Ibis feed in larger groups than other herons, feed in close proximity to one another, and commute in groups. Ibis are also found feeding in mixed species groups; snowy egrets sometimes follow feeding ibis, which make prey more available.[128] During the winter months, ibis utilize the same combination of natural marshes and irrigated fields as foraging habitat.

Double-crested cormorant (*Phalacrocorax auritus*)

The double-crested cormorant is listed as a Species of Special Concern in the State of California.[129] [130]

Historically, the double-crested cormorant nested along the southern and central coast of California and in the interior from San Diego County and the Salton Sea in Imperial County north to Clear Lake in Lake County, Eagle Lake in Lassen County, and Tule and Clear lakes in

Modoc County.[131] Double-crested cormorants have expanded their coastal breeding population, which now stretches north from Marin County to the Oregon border.[132] In contrast, marked declines have been noted in inland breeding populations, especially in the San Joaquin Valley, Salton Sea, and Sacramento Valley. The double-crested cormorant has disappeared as a nesting species from Buena Vista and Tulare lakes in San Joaquin County and from the Salton Sea, due to the unsuitability of former nesting habitat.[133]

Little is known about the historical distribution of double-crested cormorants in Yolo County, although they were considered uncommon permanent residents within a 10-mile radius of Davis by an eminent local ornithologist.[134] Currently, the double-crested cormorant is a confirmed irregular nester at Beaver Lake in Yolo County and winters at Lake Solano and Lake Washington within the county.[135] [136] [137] No recent, thorough county-wide censuses of double-crested cormorants have been conducted during the breeding or nonbreeding seasons; however, Beaver Lake was surveyed three years ago and no nesting cormorants were found that year.[138]

The double-crested cormorant is considered common during the winter months of October through March, uncommon during April through May and August through September, and casual during June and July in Yolo County.[139] Cormorants are found on open water, marshes, and riparian habitats in the county. Confirmed nesting has occurred at Beaver Lake[140] and a small nesting colony of undetermined size is located along Liberty Cut (an offshoot of Cache Slough) in Yolo County.[141] Nesting colonies were present along Cache Creek up until the 1950s, when persistent shooting led to their extirpation.[142] Major wintering areas include Lake Solano and the Lake Washington turning basin.[143] [144] Another nearby nesting colony is located at North Stone Lake, about 10 miles south of Sacramento. During a recent survey, this colony was found to consist of 17 nests in cottonwood trees.[145]

Double-crested cormorants nest either on the ground, in large trees (both live and dead), and on artificial structures such as bridges and transmission towers along lakes, reservoirs, rivers, or the ocean.[146] [147] Cormorants normally nest in large colonies where the older, more experienced nesters are usually the earliest breeders in the colony. Large bodies of water not only provide foraging and roosting habitat for the double-crested cormorant, but also accommodate their long, labored take-offs.[148] The species requires relatively secure nesting habitat and seems to be particularly vulnerable to human disturbance. Several vandalized colonies have been abandoned.[149] Successful reproduction is also dependent on a reliable food supply relatively close to the nesting colony. Maintaining water levels in reservoirs and leaving dead trees in place are essential for the success of inland-nesting double-crested cormorants.

Other Wildlife

A wide variety of common mammalian wildlife species, most of which are not limited to riparian habitats, have been reported from the study area. Quantitative information on game or other indicator species such as deer are not available for the private lands that comprise nearly all of the study area. The densely vegetated portions of the study area are neither of sufficient size nor connectedness to other similar habitat to support self-sustaining populations of any larger predators, although raccoons, bobcats, coyotes, and mountain lions would be expected to forage

within the study area occasionally. The most notable wildlife record of recent years was of a bear, treed by farm workers somewhere along lower Cache Creek in 1990 or 1991.[150]

From the perspective of overall wildlife habitat values, riparian systems in the west are most important for bird species diversity and abundance. Not including common species that utilize many different habitat types within Yolo County, approximately 80 species of birds utilize habitats that are found, or are likely to be reclaimed in connection with closure of ongoing mining operations, along lower Cache Creek.[151] For diversity of breeding species especially neotropical migrants, the most important single subtype of riparian habitat is mature mixed riparian forest, with a tall canopy and a mixture of tree species in the mid-canopy and understory. The importance of this habitat type is probably due both to its structural diversity and to the high diversity of different food sources, which, for riparian breeding species, are primarily insects and berries. However, riparian scrub and thickets are also important, especially during the non-breeding seasons. In a recent study in central California, the number of different species was similar between breeding and non-breeding seasons, the total number of individual birds observed was much higher during the fall and winter (by as much as three times), with the increase in numbers comprised mostly of seed-eating species that prefer thickets and scrub.[152] Although, in terms of area, mature riparian forests are under-represented within the riparian vegetation of lower Cache Creek, this pattern of bird distribution underscores the importance of maintaining substantial areas of contiguous riparian habitat of all vegetation subtypes.

Implications for Riparian Management

Consideration of the habitat requirements of special-status species that presently do or potentially could occur along lower Cache Creek does not support any single management prescription in preference to others. However, in light of the habitat needs summarized above and the scarcity of particular habitat types or elements within the study area and/or within the County, the following maintenance or restoration actions would benefit the species discussed above:

- Increase the area of mature riparian forest, which is used by most of the non-aquatic birds that nest within riparian systems and by the ringtail.
- Maintain a balance of agricultural land uses in the vicinity of lower Cache Creek, thereby maintaining foraging habitat for a variety of riparian species.
- Maintain and create tall vertical banks in loamy and sandy substrates, which provide the nesting sites for bank swallows.
- Maintain or enhance the present habitat conditions of the one existing tricolored blackbird colony site, which occurs within the study area; create additional suitable bulrush marsh habitat where appropriate in off-channel pit revegetation.
- Enhance the stability of the present creek channel/floodplain system, allowing for the development and maintenance of scrub and thicket habitat continuously over the length of the study area. This is an essential habitat type by itself and also provides continuous movement corridor for mammals and birds.

- Create wetland habitats of sufficient area and of a character that is conducive to adoption as rookeries by the cormorant and ibis in the context of reclamation of abandoned off-channel wet pits.

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