Section 3.8
Vegetation and Wildlife

Vegetation and wildlife resources within the area of analysis could be affected by any of the proposed water transfer types: groundwater substitution, reservoir release, cropland idling, crop shifting, and conservation transfers.

3.8.1 Affected Environment/Environmental Setting

This section describes the terrestrial natural communities, special-status species and their habitats occurring in the area of analysis with potential to be affected by water transfers.

3.8.1.1 Area of Analysis

Long-term transfers could affect portions of the Central Valley, the Sacramento-San Joaquin Delta (Delta), and portions of Contra Costa, Alameda, Santa Clara, and San Benito counties. Figure 3.8-1 shows the counties in the Seller Service Area and Buyer Service Area and the Sacramento Valley Groundwater Basin. Figure 3.8-2 shows major rivers and reservoirs in the Seller Service Area.

3.8.1.1.1 Seller Service Area

The Seller Service Area includes potential seller lands within the Sacramento River and San Joaquin watersheds. The Sacramento River watershed includes the Sacramento, Feather, Yuba, Bear, and American rivers, as well as numerous smaller tributaries to the Sacramento River including Deer, Mill, Butte, Putah, Cache, Stony, Stone Corral and other smaller creeks. The portion of the San Joaquin River watershed considered in this analysis includes the Merced and San Joaquin Rivers. Water transfer actions would not affect other tributaries in the Seller Service Area of the San Joaquin watershed.

The alternatives could affect watersheds within the Sacramento River Basin that include the following water bodies:

- Sacramento River from Shasta Reservoir to the Sacramento–San Joaquin Delta (Delta);

Figure 3.8-1. Vegetation and Wildlife Area of Analysis Counties and Sacramento Valley Groundwater Basin

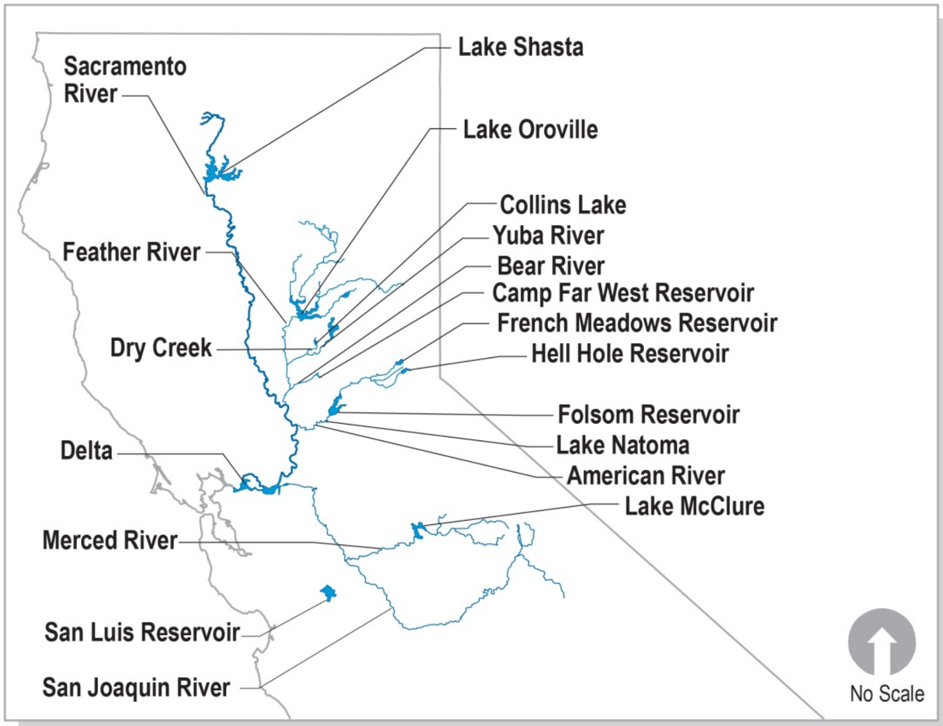

Figure 3.8-2. Vegetation and Wildlife Area of Analysis Major Rivers and Reservoirs

- Feather River and its tributaries, including and downstream of Lake Oroville, the Yuba River including and downstream of New Bullards Bar Reservoir, and the Bear River including and downstream of Camp Far West Reservoir;
- American River, including and downstream of Folsom Reservoir and Lake Natoma;
- Middle Fork American River downstream of Hell Hole and French Meadows Reservoirs; and
- Numerous small tributaries to the Sacramento River, Feather River, Yuba River, and Bear River.

Within the San Joaquin River watershed, potentially affected water bodies in the Seller Service Area include the:

- San Joaquin River from the Merced River to the Delta; and
- Merced River, including and downstream of Lake McClure.

Water transfers made under the alternatives would move through the legal Delta, roughly defined as the waterways within the "triangular area" demarcated by Freeport on the Sacramento River on the north, to Vernalis on the San Joaquin River on the south, and Antioch at the confluence of the two rivers on the west, and could affect vegetation and wildlife resources in the Delta.

3.8.1.1.2 Buyer Service Area

The Buyer Service Area includes portions of Contra Costa County, northwestern Alameda County, Santa Clara County, northwestern San Benito County, small portions of Merced, San Joaquin, and Stanislaus counties, and extends through western Fresno County into northwest Kings County.

Water transfers to the Buyer Service Area could potentially affect the San Luis Reservoir in Merced County.

3.8.1.2 Regulatory Setting

There are various federal, state and local regulations and policies that apply to vegetation and wildlife resources that occur within the area of analysis. Applicable requirements are itemized below and discussed in greater detail in Appendix H.

- Federal Endangered Species Act (ESA) of 1973;
- Fish and Wildlife Coordination Act of 1958;
- Federal Migratory Bird Treaty Act of 1972;
- Executive Order 11990 (Protection of Wetlands) (1977);
- California Endangered Species Act (CESA) of 1984;
- Fully Protected Species under the California Fish and Game Code;
- Protection of Birds and Raptors under the California Fish and Game Code;
- California Native Plant Protection Act (CNPPA) of 1977;
- California Natural Community Conservation Planning Act of 2003;
- California Water Code;
- Requirements stipulated in the various Central Valley Project (CVP), Sacramento River Settlement Contracts, and Water

Service Contracts between Reclamation and the various buyers and sellers, and their associated biological opinions (BOs) with U.S. Fish and Wildlife Service (USFWS) and National Oceanic Atmospheric Administration Fisheries Service;

- Requirements stipulated in previous Consultations and USFWS BOs regarding the CVP Improvement Act and the State Water Project (SWP); and
- Existing Natural Community Conservation Plans (NCCPs) and Habitat Conservation Plans (HCPs).

3.8.1.3 Existing Conditions

The following section describes the natural communities present in the different regions of the area of analysis, followed by a discussion of the special-status plant and wildlife species with potential to be affected by long-term water transfers. The descriptions of the natural communities are generally based on the California Wildlife Habitat Relationships (CWHR) System (California Department of Fish and Game [CDFG] 2008) and Terrestrial Vegetation of California (Barbour et al. 2007), as well as those previously developed for other water system Environmental Impact Reports (EIRs).

The list of special-status species considered for analysis was based on a search of the California Department of Fish and Wildlife [CDFW] California Natural Diversity Database (CNDDB), USFWS species lists for the counties within the area of analysis, and active HCPs in the vicinity of the area of analysis. The complete list of special-status species evaluated is provided in Tables I-1 (fish and wildlife) and I-2 (plants) contained within Appendix I. Figure 3.8-3 shows Federal national wildlife refuges (NWRs) and State wildlife management areas in the area of analysis.

3.8.1.3.1 Natural Communities and Agricultural Habitats in the Seller Service Area

This section describes the natural communities in the Seller Service Area that could be affected by long-term water transfers. The Seller Service Area includes the Sacramento and San Joaquin rivers watershed. Although the Central Valley is dominated by agricultural land, remnant grassland, oak woodlands, riparian and wetland habitats remain (Central Valley Joint Venture 2006; Point Reyes Bird Observatory 2005).

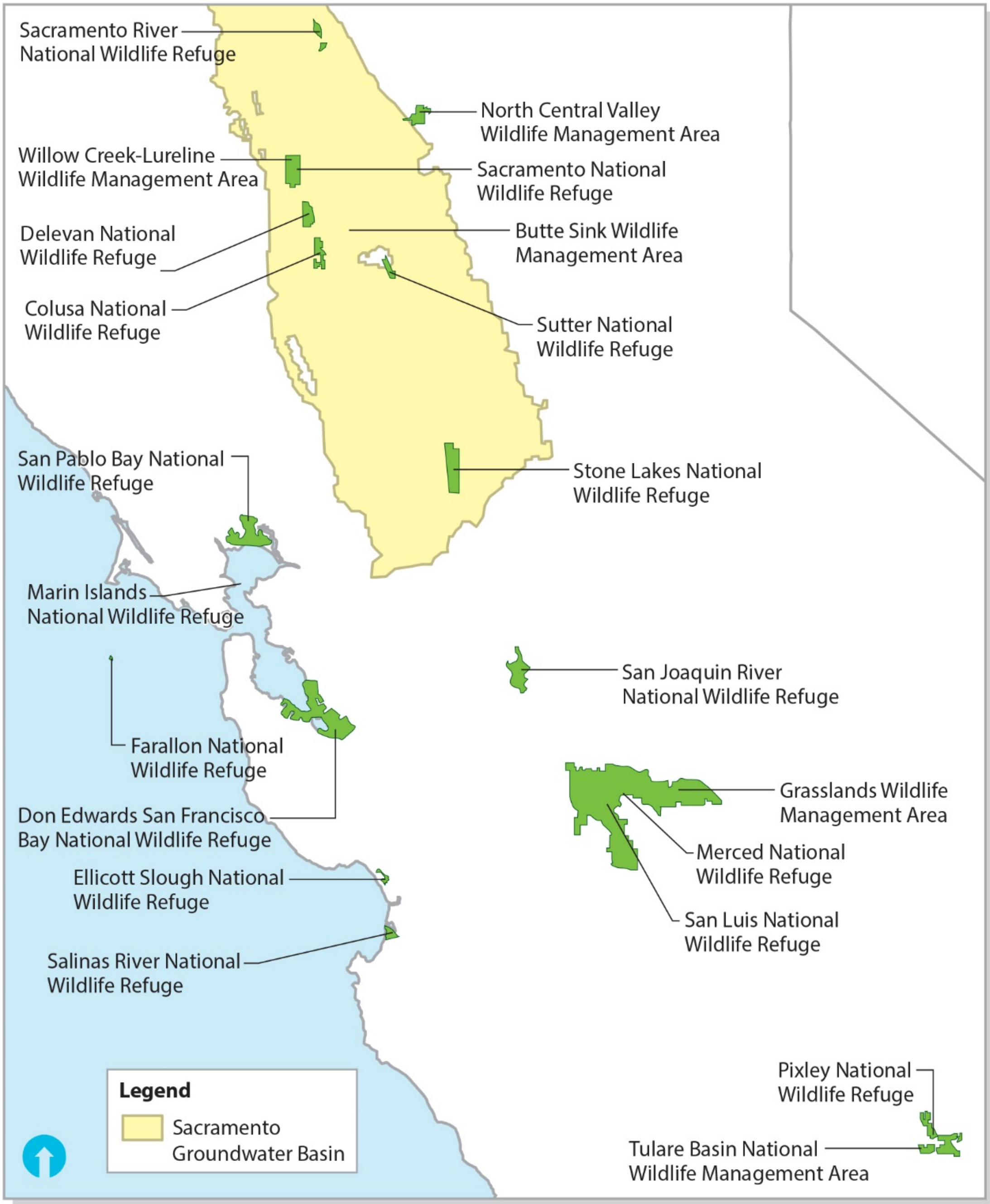

Figure 3.8-3. Federal NWRs and State Wildlife Management Areas

Tidal Perennial Aquatic Natural Community
The tidal perennial aquatic natural community is defined as deepwater aquatic (greater than ten feet deep from mean lower low water[1]), shallow aquatic (less than or equal to ten feet deep from mean lower low water), and unvegetated intertidal (tideflats) zones of estuarine bays, river channels, and sloughs.

Tidal perennial aquatic natural community occurs in open water including sloughs and channels in the Bay Delta and bays. Deep, open water areas are largely unvegetated; beds of aquatic plants occur in shallower open-water areas. Over 50 species of fish use tidal perennial aquatic habitat at some stage of their life cycle, and many spend their entire lives within this natural community. Shorebirds, wadingbirds, waterfowl, river otters (*Lutra canadensis*), and beavers (*Castor canadensis*) are some of the terrestrial species that use this natural community.

Saline Emergent Wetland Natural Community
Portions of San Francisco, San Pablo, and Suisun Bays and the Delta support emergent salt-tolerant or brackish-tolerant wetland plant species, collectively considered saline emergent wetland. This natural community is typically located within the intertidal zone or on lands such as diked wetlands that historically experienced tidal exchange (Reclamation and Department of Water Resources [DWR] 2004). Cordgrass (*Spartina* sp.), pickleweed (*Salicornia* sp.), bulrush (*Schoenoplectus* spp.), saltgrass *(Distichlis spicata*), arrowgrass (*Triglochin* sp.), seablite (*Suaeda* sp.), hairgrass (*Deschampsia* sp.), cattails (*Typha* spp.), common reed (*Phragmites australis*), and algae are common dominant plant species in this natural community.

Over 25 species of birds and mammals have been documented in saline emergent wetlands (CALFED 2000a). Over 220 species of birds, 45 species of mammals, 16 species of amphibians and reptiles, and over 40 fish species inhabit the Suisun Marsh environs (CDFG, USFWS, Reclamation 2011). Herons, egrets, ducks, hawks, and rodents are representative wildlife that occur in saline emergent wetlands.

[1] Mean lower low water is the average height of the lowest tide recorded at a tide station each day during the recording period.

Tidal Fresh Emergent Wetland Natural Community

The tidal fresh emergent wetland natural community includes portions of the intertidal zones of the Delta that support emergent wetland plant species that are not tolerant of saline or brackish conditions. Tidal fresh emergent wetlands and brackish-water emergent marsh natural communities occur on in-stream islands and along mostly unleveed, tidally influenced waterways. Tidal emergent marsh provides habitat for many special-status species. The dominant vegetation in the tidal freshwater emergent natural community includes California bulrush (*Schoenoplectus californicus*), river bulrush (*Bolboschoenus fluviatilis*), big bulrush (*S. mucronatus*), tules (*Schoenoplectus acutus* var. *occidentalis*), cattails, and common reed.

Freshwater emergent wetlands are among the most productive wildlife habitats in California. They provide food, cover, and water for more than 160 species of birds as well as numerous mammals, reptiles, and amphibians (CDFG 2008). Over 50 species of birds, mammals, reptiles, and amphibians use freshwater emergent wetlands in the Delta (CALFED 2000a).

Non-tidal Fresh Emergent Wetland Natural Community

Non-tidal fresh emergent wetlands are scattered along the Sacramento River, typically in areas with slow-moving backwaters. Substantial portions of this natural community occur at the Colusa, Sutter, and Tisdale Bypasses, the Butte Sink, and at the Fremont Weir. Non-tidal fresh emergent wetland also occurs on the landward side of levees in the Delta, often in constructed waterways and ponds within agricultural lands. This natural community often occurs where soils are inundated or saturated for all or most of the growing season, such as around backwater areas.

Non-tidal fresh emergent wetland consists of permanent wetlands comprised of vegetation that is not tolerant of salt or brackish water, such as meadows (Barbour et al. 2007). These areas may be natural or managed. The dominant vegetation for this natural community includes thingrass (*Agrostis pallens*), spikerush (*Eleocharis* sp.), big leaf sedge (*Carex amplifolia*), bulrush, redroot nutgrass (*Cyperus erythrorhizos*), tules, cattails, common reed, and water grass (*Echinochloa oryzoides*).

Many wildlife species depend on non-tidal fresh emergent wetland for the entirety of their life cycles. In addition this natural community is seasonally important to migratory species. Over 50 species of birds, mammals, reptiles, and amphibians use this natural community in the Delta (CALFED 2000a). Examples of amphibians that occur within this natural community type include bullfrogs (*Rana catesbeiana*), western toads (*Bufo boreas*), and Pacific tree frogs (*Pseudacris regilla*). Birds typically found in non-tidal fresh emergent wetlands include herons, egrets, bitterns, mergansers, wood ducks (*Aix sponsa*), and yellow warblers (*Dendroica petechia*) (CDFG 2008).

Natural Seasonal Wetland Natural Community

The natural seasonal wetland natural community can be found scattered along the Sacramento and American Rivers, typically in areas with slow-moving backwaters. Substantial portions of these natural communities occur at the Colusa, Sutter, and Tisdale Bypasses, the Butte Sink, and at the Fremont Weir. Seasonal wetlands, including vernal pools, are interspersed with other natural communities throughout Merced County.

Natural seasonal wetlands encompass non-managed systems with natural hydrologic connections. Typically, ponded water or saturated soils are present for an extended period of time in these natural communities, supporting obligate or facultative herbaceous wetland species (Reclamation and DWR 2004). Dominant vegetation in this natural community type includes big leaf sedge, bulrush, and redroot nutgrass.

Shorebirds and waterfowl such as killdeer (*Charadrius vociferus*), western sandpiper (*Calidris mauri*), greater yellow-legs (*Tringa melanoleuca*), American coot (*Fulica americana*), American widgeon (*Anas americana*), gadwall (*Anas strepera*), mallard (*Anas platyrhynchos*), canvasback (*Aythya valisineria*), and common moorhen (*Gallinula chloropus*) utilize natural seasonal wetlands. These birds prey extensively on invertebrates in the wetlands. This natural community also supports large mammals as well as several species of reptiles and amphibians. Many special-status wildlife species are associated with natural seasonal wetlands, including vernal pool species, which have substantially declined due to impacts of various land practices (e.g., development, invasion of non-native species, flood control activities restricting water movement, and lowered groundwater levels (Barbour et al. 2007). Special-status species are discussed in greater detail in Section 3.8.1.3.3.

Managed Seasonal Wetland Natural Community

The managed seasonal wetland natural community occurs west of the Sacramento Deep Water Ship Channel, on the west side of the Sacramento River, between Willows and Dunnigan along the Colusa Basin Drain. Substantial portions of this natural community also occur at the Colusa, Sutter (including the Sutter Bypass Wildlife Area), Tisdale, and Yolo (including the Yolo Bypass Wildlife Area) Bypasses, at the Fremont Weir, and as a part of the Sacramento NWR Complex (six refuges totaling 38,486 acres). Privately managed wetlands occur in the Suisun Bay area, with water supplies provided by landowners' riparian or appropriative rights distributed by diversion from Delta channels and tributaries. Managed seasonal wetland natural communities on the east side of the Sacramento River generally occur along Butte Creek (Upper Butte Basin Wildlife Area) and along Angel Slough north of Butte City (Llano Seco Rancho Wildlife Area).

Managed seasonal wetland includes wetland areas that are flooded and drained by land managers in order to enhance habitat for wildlife species. Wetlands dominated by native or non-native herbaceous plants, as well as associated ditches and drains, are encompassed by this natural community type, excluding farmed croplands (California Waterfowl Association 2011).

The dominant vegetation in managed seasonal wetlands is comparable to that found in natural seasonal wetlands. Managed seasonal wetland natural communities are often managed for waterfowl such as mallards, northern pintails (*Anas acuta*), American widgeon, and Canada goose (*Branta canadensis*) and other geese. These natural communities also support a variety of wading birds and shorebirds, such as herons, egrets, terns, and gulls. Managed seasonal wetlands are of great importance to migratory waterfowl and shorebird populations during fall, winter, and spring, when bird populations in the Delta increase dramatically (USFWS 2007, California Waterfowl Association 2011). Many special-status species also utilize this natural community (CDFG 2008).

Lacustrine Natural Community

The lacustrine natural community consist of permanent or intermittent lakes and ponds, and may also include dammed river channels and large reservoirs (Grenfell Jr. 1988a, 1988b, 1988c,1988d). Low-lying areas historically supported this natural community, and some additional areas have been created due to dam, dike and levee construction. Dead end sloughs, forebays, and flooded islands are other examples of the lacustrine natural community that can be found throughout the Delta. The lacustrine natural communities in the Seller Service Area that would be potentially impacted by the alternatives include the following reservoirs: Shasta, Oroville, New Bullards Bar, Camp Far West, Collins, Folsom, Hell Hole, French Meadows, and McClure. Unlike lakes and ponds, the reservoirs have been designed for water supply, flood control, and/or hydroelectric power production, although not all reservoirs serve all of these functions. Reservoirs are characterized by fluctuations in water surface elevation each year.

A wide variety of birds, mammals, reptiles and amphibians use the margins of reservoirs for reproduction, food, water, and cover resources. Fish-eating terns, grebes, cormorants, herons, waterfowl, beaver, river otter, and muskrat (*Ondatra zibethicus*) are some of the resident species (CALFED 2000a; CDFG 2008).

Valley/Foothill Riparian Natural Community

Valley/foothill riparian natural community generally occurs along river and stream corridors on the east side of the Sacramento Valley and is found in narrow bands within the upper reach of the San Joaquin River. Historically, the Merced River likely also supported this habitat type (Barbour et al. 2007). Riparian vegetation is also scattered throughout the Delta on islands, along levees, in backwater areas and sloughs, and in thin bands along river channels. This habitat type is associated with low-gradient reaches of non-tidal streams and rivers (generally below an elevation of 300 feet) and is comprised of the successional stages of woody vegetation within the active and historical floodplains and may be associated with gravel bars and bare cut banks, shady vegetated banks, and sheltered wetlands such as sloughs, side channels, and oxbow lakes (Sacramento River Advisory Council 2001). Trees typically associated with the valley/foothill riparian natural community include willows (*Salix* spp.), Fremont cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), and western sycamore (*Platanus racemosa*) (Barbour et al. 2007). Shaded riverine aquatic, pool, riffle, run, unvegetated channel, sloughs, backwaters, overflow channels, and flood bypasses with hydrologic connection to stream and river channels are the aquatic habitats associated with the valley/foothill riparian natural community type (Barbour et al. 2007).

In California, over 225 species of birds, mammals, reptiles, and amphibians depend on riparian habitats. Cottonwood-willow riparian areas support more breeding avian species than any other comparable broad California habitat type (Sacramento River Advisory Council 2001, Stillwater Sciences 2002). Riparian habitat supports a myriad of invertebrates, such as wood-boring larvae. Woodpeckers, warblers, flycatchers, and owls are common inhabitants of this natural community, as are wintering and breeding raptors and passerines (Reclamation and San Joaquin River Group Authority 1999). Other wildlife species that use riparian habitats include western fence lizard (*Sceloporus occidentalis*), Pacific tree frog, western toad, bullfrog, western skink (*Eumeces skiltonianus*), western whiptail (*Cnemidophorus tigris*), southern alligator lizard (*Elgaria multicarinata*), racer (*Coluber constrictor*), gopher snake (*Pituophis catenifer*), king snake (*Lampropeltis* sp.), garter snake (*Thamnophis* sp.), northern Pacific rattlesnake (*Crotalus oreganus oreganus*), opossum (*Didelphis virginiana*), black-tailed jackrabbit (*Lepus californicus*), western gray squirrel (*Sciurus griseus*), ringtail (*Bassariscus astutus*), river otter, striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), beaver, mule deer (*Odocoileus hemionus*), and a number of bat species. Riparian areas serve as significant corridors for wildlife movement (Sacramento River Advisory Council 2001).

Montane Riparian Natural Community

The montane riparian natural community occurs in the floodplain of streams and rivers at elevations above approximately 300 feet (Reclamation and DWR 2004). Within the area of analysis, montane riparian natural community is found on the Yuba River northward from the Timbuctoo Bend, just upstream of Highway 20, as well as on the segment of American River located northeast of Folsom Reservoir. Montane riparian vegetation is dominated by black cottonwood (*Populus trichocarpa*) and Fremont cottonwood (at lower altitudes), white alder (*Alnus rhombifolia*), bigleaf maple (*Acer macrophyllum*), dogwood (*Cornus* sp.), box elder (*Acer negundo*), quaking aspen (*P. tremuloides*), western azalea (*Rhododendron* sp.), water birch (*Betula occidentalis*), and buttonbush (*Cephalanthus occidentalis*). Montane riparian natural community supports a diversity of wildlife species comparable to that of the valley/foothill riparian natural community.

Grassland Natural Community

Grasslands are most prevalent at the eastern and western edges of the Central Valley. Areas downstream of Lake Oroville along the Feather River and portions of the American River (Folsom Reservoir Shoreline) also contain the grassland natural community (Barbour et al. 2007). The grassland natural community occurs in many outlying areas surrounding the Delta, as well as on islands within the Delta region (Reclamation and DWR 2004). The Delta historically supported perennial grasslands associated with wetland and riparian areas, as well as in association with vernal pools at higher elevations in drier locations. Grasslands in the Delta estuary continue to decline due to land conversion, as well as invasion by non-native annual species.

Grasslands are an upland natural community often dominated by non-native annual species including wild oats (*Avena* sp.), soft chess (*Bromus hordeaceus*), brome (*Bromus* sp.), Italian ryegrass (*Festuca perennis*), mustards (Brassicaceae), foxtail (*Alopecurus* sp.), and barley *(Hordeum* sp.). Many grassland areas within the area of analysis are in active use as rangelands. Forbs commonly observed in this natural community include filarees (*Erodium* spp.), clovers (*Trifolium* spp.), popcorn flower (*Plagiobothrys* sp.), and mullein (*Verbascum* sp.). Wildlife species of the grassland natural community include western fence lizard, garter snake, rattlesnake, black-tailed jackrabbit, California ground squirrel (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), harvest mouse (*Reithrodontomys megalotis*), California vole (*Microtus californicus*), badger (*Taxidea taxus*), and coyote (*Canis latrans*). Bird species include western meadowlark (*Sturnella neglecta*), turkey vulture (*Cathartes aura*), and American kestrel (*Falco sparverius*) (Barbour et al. 2007; CDFG 2008).

Inland Dune Scrub Natural Community
Inland dune scrub natural community consists of vegetated, stabilized sand dunes associated with river and estuarine systems, such as that at Antioch Dunes NWR and Brannan Island State Park. The Antioch-Oakley areas, Delta marshes, and small isolated dunes on the eastern edge of the Delta also historically supported inland dune scrub (Reclamation and DWR 2004).

This natural community is dominated by mostly sensitive species (see Appendix I), but also contains common plants such as primrose (*Camissonia* sp.), wallflower (*Erysimum* sp.), buckwheat (*Eriogonum* sp.), elegant clarkia (*Clarkia unguiculata*), California poppy (*Eschscholzia californica*), California croton (*Croton californicus*), gumplant (*Grindelia* sp.), deerweed (*Acmispon* sp.), telegraph weed (*Heterotheca grandiflora*), California matchweed (*Gutierrezia* sp.), and silver bush lupine (*Lupinus albifrons*). Common wildlife species known to occur within the inland dune scrub natural community include mink (*Mustela vison*), desert cottontail (*Sylvilagus audubonii*), beaver, muskrat, opossum, weasel (*Mustela* sp.), striped skunk, gopher (*Thomomys* sp.), gray fox (*Urocyon cinereoargenteus*), California ground squirrel, coyote, black-tailed jackrabbit, raccoon, Townsend's mole (*Scapanus townsendii*), weasel (*Mustela* sp.), red fox (*Vulpes vulpes*), California legless lizard (*Anniella pulchra*), sideblotched lizard (*Uta stansburiana*), coast horned lizard (*Phrynosoma coronatum*), San Joaquin whipsnake (*Masticophis flagellum ruddocki*), glossy snake (*Arizona elegans*), western whiptail lizard (*Cnemidophorus tigris*), and western fence lizard.

Upland Scrub Natural Communities
Upland scrub natural communities in the area of analysis include mixed chaparral, sage scrub, saltbush scrub, and valley sink scrub. Mixed chaparral natural community occurs on steep south-facing slopes along the Middle and Lower North Forks of the American River and portions of Folsom Reservoir also provide upland scrub natural community (Placer County Development Resources Agency 2011; California State Parks 2007). In Contra Costa County, the surroundings of Los Vaqueros Reservoir support Diablan sage scrub, chaparral, and remnants of valley sink scrub natural community (Contra Costa Water District [WD] 2005; East Contra Costa Habitat Conservancy 2006). Common plant species observed in these natural communities include buckbrush (*Ceanothus* spp.), manzanita (*Arctostaphylos* spp.), bitter cherry (*Prunus emarginata*), oaks, poison oak (*Toxicodendron diversilobum*), coffee berry (*Frangula* sp.), California buckeye (*Aesculus californica*), toyon (*Heteromeles arbutifolia*), sugar sumac (*Rhus ovata*), chamise (*Adenostoma fasciculatum*), California saltbush (*Atriplex californica*), sagebrush (*Artemisia* sp.), and creosote bush (*Larrea tridentata*) (Barbour et al. 2007).

Upland scrub natural communities support many common wildlife species. Spotted towhee (*Pipilo maculatus*), California quail (*Callipepla californica*), California thrasher (*Toxostoma redivivum*), and red-tailed hawk (*Buteo jamaicensis*) are frequently observed in upland scrub. Common mammals occurring within this habitat include brush rabbit (*Sylvilagus bachmani*), blacktailed jackrabbit, and mule deer (CDFG 2008).

Seasonally Flooded Agriculture Habitat

Seasonally flooded agriculture is concentrated in the Sacramento Valley portion of the area of analysis. The central Delta also supports small grains croplands. Lands that fall within this habitat require seasonal flooding for at least one week at a time for irrigation or pest control purposes, and may include grain, rice (*Oryza* sp.), and other crops. Grain crops are typically post-harvest flooded in the winter season, which provides habitat for waterfowl and other wildlife.

Rice fields provide particularly important foraging habitat for a variety of wildlife species. Many species forage on post-harvest waste grain and other food found within the fields (Pitkin 2011; Central Valley Joint Venture 2006). Small birds and rodents that consume rice waste grain are a food source for raptors that forage in the seasonally flooded fields. Duckweed (*Lemna* sp.) and other moist soil plants, which may grow in fields where water level manipulation allows their germination, can provide high-quality food for waterfowl (California Waterfowl Association 2011). Fish are often entrained in the irrigation canals that supply water to the rice fields. Crayfish are found in the canal banks and berms of the rice fields. Other invertebrates and their larvae may be found in very shallow water, particularly during an early to midseason drawdown. Invertebrates found in these areas (e.g., bloodworms) are particularly important to shorebirds (California Waterfowl Association 2011).

Rice fields also provide resting, nesting, and breeding habitat similar to that in natural wetlands. Irrigation ditches can contain wetland vegetation such as cattails, which provide cover habitat for rails, egrets, herons, bitterns, marsh wrens (*Cistothorus palustris*), sparrows, and common yellowthroats (*Geothlypis trichas*). Rice fields provide pair, brood, and nesting habitat for birds such as mallard duck, northern pintail, and terns (Central Valley Joint Venture 2006, CDFG 2008).

Upland Cropland Habitat

Upland cropland areas are found throughout the Sacramento and San Joaquin valleys, as well as adjacent to most leveed waterways. This habitat is considered to include agricultural lands that are not seasonally flooded. Sacramento Valley croplands are dominated by cereal rye (*Secale cereale*), barley (*Hordeum vulgare*), wheat (*Triticum aestivum*), milo (*Sorghum* sp.), corn (*Zea mays*), dry beans, safflower (*Carthamus tinctorius*), sunflower (*Helianthus annuus*), alfalfa (*Medicago sativa*), cotton (*Gossypium* sp.), tomatoes (*Lycopersicon* sp.), lettuce (*Lactuca sativa*), Bermuda grass (*Cynodon dactylon*), Italian ryegrass, tall fescue (*Festuca arundinacea*), almonds (*Prunus dulcis*), walnuts (*Juglans* sp.), peaches (*Prunus persica*), plums (*Prunus* sp.), and grapes (*Vitis* sp.) and other fruits and vegetables. Most of these crops are annuals, planted in the spring and harvested during summer or fall. Wheat and other dryland grains are planted in the fall and harvested in the late spring, early summer. Sugar beets (*Beta vulgaris*) can also be left over winter and harvested in the spring.

Wildlife use of upland crop areas varies throughout the growing season with crop type, level of disturbance, and available cover. Upland crop fields provide important foraging habitat for a variety of wildlife species. Many species forage on crops (waste and otherwise) and other food found within the fields, such as invertebrates. Typically, various birds and rodents consume the crops and invertebrates and serve as a food source for predators. Irrigation ditches associated with upland cropland can contain wetland vegetation such as cattails, which provide cover habitat for rails, egrets, herons, bitterns, marsh wrens, sparrows, and common yellowthroats.

3.8.1.3.2 Natural Communities and Agricultural Habitats in the Buyer Service Area

This section describes the natural communities, agricultural habitats and associated plant and wildlife species that are present in the Buyer Service Area. The Buyer Service Area includes portions of Contra Costa and Alameda Counties (Contra Costa WD, East Bay Municipal Utility District), Santa Clara County (Santa Clara Valley WD), and northern San Benito County (San Benito County WD). The Buyer Service Area also includes the area that extends south from San Joaquin County to northwestern Kings County, which contains potential buyers that are member agencies of San Luis & Delta-Mendota Water Authority.

Lacustrine Natural Community
The lacustrine natural community in the Buyer Service Area occurs within San Luis Reservoir on the western edge of the San Joaquin Valley.

Wildlife species that may be found within the lacustrine natural community in the Buyer Service Area include belted kingfisher (*Megaceryle alcyon*), Caspian tern (*Hydroprogne caspia*), ring-billed gull (*Larus delawarensis*), Clark's grebe (*Aechmophorus clarkii*), western grebe (*Aechmophorus occidentalis*), pied-billed grebe (*Podilymbus podiceps*), osprey (*Pandion haliaetus*), great egret (*Ardea alba*), spotted sandpiper (*Actitis macularius*), and killdeer.

Valley/Foothill Riparian Natural Community
This natural community occurs in the Buyer Service Area along many of the segments of the San Joaquin River from Friant Dam through the Central Valley into the Delta and is comprised primarily of mixed oak, cottonwood, and willow. Valley/foothill riparian natural community is present at San Luis Reservoir in the form of sparse mule fat and willow patches. In addition to the plant species previously mentioned in the other regions, riparian habitats south of the Delta may support Northern California black walnut, a species considered sensitive by CDFW.

Common species that may occur in this vegetation community and associated aquatic habitat within the Buyer Service Area include black phoebe (*Sayornis nigricans*), red-winged blackbird (*Agelaius phoeniceus*), Brewer's blackbird (*Euphagus cyanocephalus*), ash-throated flycatcher (*Myiarchus cinerascens*), northern rough-winged swallow (*Stelgidopteryx serripennis*), western scrub jay (*Aphelocoma californica*), black-headed grosbeak (*Pheucticus melanocephalus*), California quail, Nuttall's woodpecker (*Picoides nuttallii*), oak titmouse (*Baeolophus inornatus*), California towhee (*Pipilo crissalis*), Merriam's chipmunk (*Tamias merriami*), mule deer, coyote, black bear (*Ursus americanus*), mountain lion (*Puma concolor*), and raccoon.

Grassland Natural Community
Substantial areas of non-native grassland are present in Contra Costa, Santa Clara, and Merced Counties. This includes lands surrounding San Luis Reservoir. Non-native grasses in these locations intergrade with native species including purple needle grass (*Stipa pulchra*), beardless wild rye (*Elymus triticoides*), and onion grass (*Melica* sp.).

Killdeer, white-throated swift (*Aeronautes saxatalis*), ring-necked pheasant (*Phasianus colchicus*), American crow (*Corvus brachyrhynchos*), rufous-crown sparrow (*Aimophila ruficeps*), rock wren (*Salpinctes obsoletus*), western meadowlark, red-tailed hawk, American kestrel, common loon (*Gavia immer*), Barrow's goldeneye (*Bucephala* *islandica*), savannah sparrow (*Passerculus sandwichensis*), California vole, black-tailed jackrabbit, California ground squirrel, coyote, foxes, badgers, skunk, western rattlesnake, southern alligator lizard, two-striped garter snake (*Thamnophis hammondii*), California mountain kingsnake (*Lampropeltis zonata*), and western fence lizard are some of the species that would commonly be observed within grasslands in the Buyer Service Area.

Oak Woodland Natural Community

Scattered blue oak (*Quercus douglasii*) woodlands occur on the western shore of the San Luis Reservoir. Remnant patches are often found at the edges of agricultural lands that were converted from woodland to cultivation, and occur in larger stands leading up to the Sierra Nevada foothills. The oak woodland natural community varies with respect to the mix of hardwoods, conifers or shrubs present, and also demonstrates a range of canopy densities. Valley oak, blue oak, interior live oak (*Quercus wislizeni*), coast live oak (*Q. agrifolia*), and foothill pine (*Pinus sabiniana*) are common dominant species (Barbour et al. 2007).

Acorn woodpecker (*Melanerpes formicivorus*), northern flicker (*Colaptes auratus*), wild turkey (*Meleagris gallopavo*), oak titmouse, black-tailed jackrabbit, American crow, California quail, western fence lizard, coyote, mule deer, western bluebird (*Sialia mexicana*), white-breasted nuthatch (*Sitta carolinensis*), and American kestrel are commonly observed wildlife species in oak woodland within the Buyer Service Area (CDFG 2008).

Upland Cropland Habitat

Upland cropland areas are found throughout the San Joaquin Valley. Major crops in this area include alfalfa, almonds, corn, cotton, grapes, rice, and tomatoes (County of Fresno Department of Agriculture 2010; Merced County Department of Agriculture 2010; San Joaquin County 2010). These crops support common species, and may be important to common and sensitive wildlife, especially during irrigation periods. For example, cotton is known to harbor mourning doves (*Zenaida macroura*) and house mice (*Mus musculus*) and may also support species such as killdeer, American pipit (*Anthus rubescens*), and horned lark (*Eremophila alpestris*) (CDFG 2008). San Joaquin kit fox (*Vulpes macrotis mutica*), a federally endangered species, has been known to utilize croplands for forage as well (USFWS 1998). Ditches associated with intensive cropland are often chemically treated and therefore are less likely to serve as suitable habitat for wildlife species.

3.8.1.3.3 Special-Status Plant and Wildlife Species

Wildlife and plant species addressed in this section have been selected through the following process. First, all species identified in database records searches went through an evaluation to identify what are considered "special-status species" in relationship to the federal ESA and CESA compliance. For the purpose of this assessment, "special-status species" are those species that meet one or more of the following criteria:

- Species that are listed or proposed for listing as threatened or endangered under ESA (50 Code of Federal Regulations [CFR] 17.11 [listed animals]; 50 CFR 17.12 [listed plants]; and various notices in the Federal Register [FR]).
- Species that are candidates for possible future listing as threatened or endangered under ESA (75 FR 69222, November 10, 2010).
- Species that are listed or proposed for listing by the State of California as threatened or endangered under CESA (14 California Code of Regulations [CCR] 670.5).
- Species that meet the definitions of rare or endangered under the California Environmental Quality Act (CEQA) (State CEQA Guidelines Section 15380).
- Plants listed as rare under the CNPPA (CDFW Commission 1900 et seq.).
- Plants listed by California Native Plant Society (CNPS) as plants about which more information is needed to determine their status and plants of limited distribution, which may be included as special-status species on the basis of local significance or recent biological information.
- Animals listed as California Species of Special Concern (SSC) to the CDFW (Shuford and Gardali 2008 [birds]; Williams 1986 [mammals]; and Jennings and Hayes 1994 [amphibians and reptiles]).
- Animals that are fully protected in California (CDFW Commission 3511 [birds], 4700 [mammals], 5050 [amphibians and reptiles], and 5515 [fish]).
- Birds of Conservation Concern (USWFS 2008).

The selection process resulted in an initial list of 257 special-status plant and wildlife species. Tables I-1 and I-2 in Appendix I provide information on all 257 special-status species known from, or with potential to occur in the area of analysis, including common and scientific name, listing status (Federal, State, Global Rank, and/or State

Rank), suitable habitat characteristics, distribution in California, and potential for occurrence in the area of analysis.

Not all of these species have the potential to be affected by long-term water transfers. Many of the 257 species are not expected to occur in the natural communities and agricultural habitats that would be affected by the action alternatives (e.g., riverine, riparian, natural and managed wetlands, rice fields, and irrigation/drainage channels), or impacts to those species would be avoided because of the environmental commitments that are incorporated in the alternatives. Consequently, the action alternatives have the potential to affect only a limited number of these special-status species.

For each plant and wildlife species, the likelihood that water transfers would affect the species is assigned a category in the last column and the rationale for that categorization is provided. Those species in Tables I-1 and I-2 (Appendix I) which are known to occur in the area of analysis, but would not be affected by the action alternatives are not addressed further in this analysis. Based on these considerations, the initial list of species potentially present was reduced to 14 species that could be affected. These 14 species are listed in Table 3.8-1 along with HCP/NCCPs that are adopted or in preparation which cover the species and may have additional requirements for species conservation within their plan areas. Special-status plants and terrestrial wildlife species potentially affected by the action alternatives are discussed below. Potentially affected special-status fish species are discussed separately in Section 3.7.

Table 3.8-1. Potentially Affected Special-Status Plant and Wildlife Species in the Area of Analysis

				Conservation Plan Coverage[2]										
	Status	Species	Status[1]	BRCP	BDCP	ECCC HCP/NCCP	NB HCP	PCCP	SJMSCP	SCV HCP/NCCP	SMSHCP	SSHCP	YNHP	YS NCCP/HCP
Plants	California Rare Plant Rank	Ahart's dwarf rush	RPR 1B.2	X				X				X		X
		Sanford's arrowhead	RPR 1B.2						X					
		Red Bluff dwarf rush	RPR 1B.1	X				X	X					
		Saline clover	RPR 1B.2											
Wildlife	Listed	Giant garter snake	FT, ST	X	X	X	X	X	X		X	X	X	X
		San Joaquin kit fox	FE, ST		X	X			X	X				
		Greater sandhill crane	ST, FP	X	X				X			X		X
		Western pond turtle	SSC		X	X	X		X	X		X	X	X
	Species of Concern	Black tern	SSC/WL											
		Long-billed curlew	SSC						X					
		Purple martin	SSC										X	

	Status	Species	Status[1]	Conservation Plan Coverage[2]										
				BRCP	BDCP	ECCC HCP/NCCP	NB HCP	PCCP	SJMSCP	SCV HCP/NCCP	SMSHCP	SSHCP	YNHP	YS NCCP/HCP
		Tricolored blackbird	SSC	X	X	X	X	X	X	X	X	X	X	X
		White-faced ibis	WL				X		X					
		Yellow-headed blackbird	SSC											

[1]Status:
FE-federally listed endangered
FP-fully protected under California Fish and Game Code
FT-federally listed threatened
RPR 1B.1-California Rare Plant Rank 1B.1 = Plants rare, threatened, or endangered in California and elsewhere. Seriously threatened in California (over 80 percent of occurrences threatened / high degree and immediacy of threat)
RPR 1B.2-California Rare Plant Rank 1B.1 = Plants rare, threatened, or endangered in California and elsewhere. Fairly threatened in California (20 to 80 percent occurrences threatened / moderate degree and immediacy of threat)
ST-state-listed threatened
SSC-California Species of Special Concern
[2]Conservation plan
BDCP – Bay-Delta Conservation Plan (under development)
BRCP – Butte Regional Conservation Plan (under development)
ECCCHCP/NCCP – East Contra Costa County HCP/NCCP (adopted)
NBHCP – Natomas Basin HCP (adopted)
PCCP – Placer County Conservation Plan (under development)
SCVHCP/NCCP – Santa Clara Valley HCP/NCCP (adopted)
SJMSCP – San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (adopted)
SMSHCP-Solano Multispecies HCP (under development)
SSHCP – South Sacramento HCP (under development)
YNHP – Yolo Natural Heritage Program (under development)
YSNCCP/HCP – Yuba-Sutter NCCP/HCP (under development)

Ahart's Dwarf Rush
Ahart's dwarf rush (*Juncus leiospermus* var. *ahartii*) is a California Rare Plant Rank (RPR) 1B.2 species known from Butte, Calaveras, Placer, Sacramento, Tehama, and Yuba counties, and previous observations exist within the Seller Service Area. This species has generally been documented at mesic locations within valley and foothill grassland between 30 and 229 meters above mean sea level (amsl). It may also occur in disturbed areas including agricultural fields and locations with gopher digging activity. Ahart's dwarf rush typically blooms between March and May. Development is the major threat to this species.

Sanford's Arrowhead
Sanford's arrowhead (*Sagittaria sanfordii*) is a California RPR 1B.2 perennial rhizomatous herb found in the Central Valley in freshwater marsh, shallow stream areas, and ditches between zero and 650 meters amsl. Previous observations exist within the Seller Service Area. Sanford's arrowhead typically blooms between May and August.

Threats to Sanford's arrowhead include grazing, development, recreational activities, non-native plants, road widening, and alteration of channels.

Red Bluff Dwarf Rush
Red Bluff dwarf rush (*Juncus leiospermus* var. *leiospermus*) is a California RPR 1B.1 species that occurs within Butte, Placer, Shasta, and Tehama counties. Red Bluff dwarf rush is known from vernally mesic sites in chaparral, valley and foothill grassland, cismontane woodlands, and vernal pools from 30 to 1,020 meters amsl. It may also be found in intermittent drainages and areas of pocket gopher and ground squirrel activity (Butte County Association of Governments 2011). The typical bloom period for Red Bluff dwarf rush is March through May. Suitable habitat for this species occurs within the area of analysis and occurrences have been documented within the Seller Service Area.

Some of the recognized threats to Red Bluff dwarf rush include: development, grazing, vehicles, industrial forestry, and agricultural activities.

Saline Clover
Saline clover (*Trifolium hydrophilum*) is a California RPR 1B.2 species known from California's central coast and Bay Area. Previous observations exist within both the Buyer and Seller Service Areas. This species has generally been documented in marshes and swamps, valley and foothill grassland, and vernal pool habitats from zero to 300 meters

amsl. It is often found in mesic or alkaline areas. Saline clover blooms from April through June.

The status of many saline clover populations is not known. Development, trampling, road construction, and vehicles are considered some of the major threats to the species.

Giant Garter Snake

Giant garter snake (*Thamnophis gigas*) is listed as threatened under both the ESA and CESA (58 FR 54053). A Draft Recovery Plan for giant garter snake was completed in 1999, but no critical habitat has been designated for this species (USFWS 1999). One of the largest garter snakes, the giant garter snake reaches up to 64 inches in length, with females generally slightly longer and heavier than males (Hansen 1980).

Giant garter snake historically occupied wetlands throughout the Sacramento and San Joaquin Valleys, as far north as Chico, and as far south as Buena Vista Lake, near Bakersfield (Hansen and Brode 1980). The current known distribution of giant garter snakes is patchy, extending from near Chico, Butte County, south to Mendota Wildlife Area, Fresno County. Giant garter snakes are not known from the northern portion of the San Joaquin Valley north to the eastern fringe of the Sacramento-San Joaquin River Delta, where the floodplain of the San Joaquin River is limited to a relatively narrow trough (Hansen and Brode 1980, Federal Register 58:54053–-54066).

The giant garter snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, other waterways and agricultural wetlands such as irrigation and drainage canals and rice fields, and the adjacent uplands. Essential habitat components consist of (1) adequate water during the snake's active period (i.e., early spring through mid-fall) to provide a prey base and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat; (3) upland habitat for basking, cover, and retreat sites; and (4) higher elevation uplands for cover and refuge from flood waters (USFWS 1999). Another key requirement of the giant garter snake includes maintenance of connectivity between habitats. giant garter snake rely on canals and ditches as movement corridors. These corridors provide important habitat, and are used during daily movement within a home range. Recent work by the U.S. Geological Survey (Halstead et al. 2010) suggests that giant garter snake primarily occurs in areas with dense networks of canals among rice agriculture and wetlands. Giant garter snake are less likely to be found in areas with high stream density. More recent work suggests that giant garter snake are most likely to occur within areas of historic tule marsh, and the likelihood of encountering them drops substantially with distance from these areas of historic habitat (Halstead et al. 2014).

Giant garter snake typically forage and shelter within cattail, bulrush, or other emergent herbaceous wetland vegetation, using grassy banks and openings at the water's edge for basking. Rice fields in particular may be important nursery and feeding habitat, providing prey that are absent from other permanent aquatic areas (USFWS 1999). Wintering habitat consists of higher elevation upland areas with vegetation, burrows or other underground refugia (Hansen 1988). Studies of marked snakes indicated that individuals typically move about 0.25 to 0.5 miles per day. Individuals have been documented to move five to eight miles over the course of a few days. Giant garter snake home range size is highly variable, with an average size of about 0.1 square miles (USFWS 2010). During the winter months, when the snakes are inactive, small mammal burrows and other soil or rock crevices may be used for hibernation, and also provide refuge from hot conditions during the snake's active season (Hansen and Brode 1993; USFWS 1999). Giant garter snake have been documented using burrows as much as 165 feet from marsh edges to shelter from heat during the active season, and up to 820 feet away during the winter (Wylie et al. 2000).

Numerous observations of giant garter snake have been documented within the Sacramento Valley portion of the Seller Service Area. Records also exist within the Buyer Service Area, including near Mendota, in the Central Valley (CNDDB 2014; Halstead et al. 2014).

San Joaquin Kit Fox

San Joaquin kit fox is federally-listed as endangered under the ESA (USFWS 1967) and state-listed as threatened under CESA (Swick 1971). No critical habitat has yet been designated for the species.

San Joaquin kit foxes occur in some areas of suitable habitat on the floor of the San Joaquin Valley and in the surrounding foothills of the Coast Ranges, Sierra Nevada, and Tehachapi Mountains from Kern County north to Contra Costa, Alameda, and San Joaquin Counties (USFWS 1998). Since 1998, the population structure has become more fragmented, with some resident satellite populations having been locally extirpated, and frequented by dispersing kit foxes rather than resident animals (USFWS 2010:15). The largest extant populations of kit fox are in Kern County (Elk Hills and Buena Vista Valley) and San Luis Obispo County in the Carrizo Plain Natural Area (USFWS 1998). Natural habitats for San Joaquin kit fox include alkali sink, alkali flat, and grasslands. San Joaquin kit foxes may use agricultural lands such as row crops, orchards, and vineyards to a limited extent but kit foxes are unable to occupy farmland on a long-term basis (USFWS 2010:19–21.) San Joaquin kit foxes usually prefer areas with loose-textured soils suitable for den excavation (Orloff et al. 1986:62) but are found on virtually every soil type (USFWS 1998:129). Where soils make digging difficult, kit foxes may enlarge or modify burrows built by other animals, particularly those of California ground squirrels (Orloff et al. 1986:63; USFWS 1998:127). Structures such as culverts, abandoned pipelines, and well casings may also be used as den sites (USFWS 1998:127).

San Joaquin kit fox are active throughout the year, and are generally active during twilight. The kit fox's home range may vary from less than 2.6 square kilometers (km^2) to 31 km^2 (Morrell 1972; Zoellick et al. 2002, Spiegel and Bradbury 1992; White and Ralls 1993). The breeding season begins during September and October when adult females begin to clean and enlarge natal or pupping dens. Mating and conception occur between late December and March, and litters of two to six pups are born between late February and late March (USFWS 1998:126).

Growth of agricultural and urban areas is cited as the primarily threat to San Joaquin kitfox. Land conversion displaces populations, may reduce preferred prey abundance, prohibits movement throughout the landscape, and may also result in direct or indirect mortality of kit foxes (Constable et al. 2009; USFWS 1998). Intensive grazing, use of pesticides and rodenticides, and predation by coyote and red fox are other notable stressors on San Joaquin kit fox populations (Bell et al. 1994; USFWS 1998).

Greater Sandhill Crane

The Central Valley population of greater sandhill crane (*Grus canadensis tabida)* is a state-listed threatened and fully protected species. This species uses a variety of habitats including non-tidal fresh emergent wetland, natural seasonal wetland, and managed seasonal wetland. They will also utilize upland habitats such as grassland and upland crop areas. As a result of the loss of a large proportion of wetlands in the Sacramento Valley, greater sandhill cranes are increasingly associated with managed seasonal wetland environments and seasonally flooded agriculture, particularly rice fields.

Formerly a common breeder in California, the species now breeds only in Siskiyou, Modoc, Lassen, Sierra Valley, Plumas and Sierra counties (Zeiner et al. 1988); during the summer, the birds are found near wet meadows, shallow lacustrine and fresh emergent wetland habitats. Greater sandhill crane is known to winter in the Sacramento and San Joaquin valleys, within the Butte Sink (from Chico in the north to the Sutter Buttes in the south and from Sacramento River in the west to Highway 99 in the east), where birds forage in annual and perennial grassland habitats, moist croplands with rice and corn stubble, and emergent wetlands. Cranes migrate to the Central Valley between

September and November, and depart between March and May (Reclamation and DWR 2004); however the California breeding population winters chiefly in the Central Valley (Zeiner et al. 1988). Sandhill cranes mate for life and have high site fidelity; the pair will return to the same territory each year (USFWS 1987).

Food, cover, and nesting requirements for greater sandhill cranes are closely associated with water in the form of some type of wetland. The loss and degradation to riverine and wetland ecosystems is an important threat to sandhill crane populations. For the migratory populations, this is of greatest concern in foraging and wintering areas (USGS 2006). Additional threats include development pressures and human disturbance when nesting.

Black Tern

The black tern (*Chlidonias niger*) is designated as a California SCS. Within California, black terns typically occur as migrants and summer residents between mid-April and mid-October (Shuford and Gardali 2008) where they breed in flooded rice fields and freshwater marshes, including lakes and ponds with marsh edges (Shuford et al. 2001). In the Central Valley, black terns nest on small dirt mound-islands in rice fields (Shuford et al. 2001) and are known to build nests on masses of dead floating vegetation, or on mounds within marsh habitat (Shuford and Gardali 2008). The species may also nest on dikes or levees (Reclamation and DWR 2004). The remainder of the year, the terns migrate to bays, rivers, and pelagic waters (Reclamation and DWR 2004).

The black tern was once a common visitor to emergent wetlands of the Central Valley, but its numbers have declined due to habitat losses, especially the widespread loss of freshwater marshes. In California, the terns have been known to breed in the Central Valley, Klamath Basin, and the Modoc Plateau (Shuford et al. 2001). Due to lack of suitable freshwater habitat in most NWRs and State Wildlife Areas during the summer, black tern breeding sites in the Sacramento Valley are primarily flooded rice fields (Technology Associates 2009a). In 2001, Shuford et al. reported that rice fields supported 90 percent of the Central Valley breeding population. Surveys in the late 1990s found breeding black terns to be widespread in Sacramento Valley rice fields, with the largest concentration in the northern Colusa Basin. This species only has two known regular breeding locations in the San Joaquin Valley, in rice fields in Merced and Fresno counties (Shuford and Gardali 2008).

Black terns are considered to be an area-dependent species with specific breeding and foraging requirements. Because black terns have a limited distribution and are dependent upon flooded rice fields for breeding, conversion of rice fields to other crops, or to dry land rice, pose a threat to the migrant population (Technology Associates 2009a). Additional threats to the species include water management of rice fields (i.e. rapid lowering of water exposes nests to predators) and effects from exposure to pesticides (Technology Associates 2009a).

Pacific Pond Turtle

The Pacific pond turtle (*Actinemys marmorata*) is the only native box turtle widely distributed in the western United States, occurring from Baja California north into the State of Washington. Historically, the turtle once inhabited the vast permanent and seasonal wetlands of the Central Valley. Pacific pond turtle is considered a SSC by CDFW and its status is currently under review by USFWS.

Pacific pond turtle is associated with nontidal fresh emergent wetland, managed seasonal wetland, valley/foothill riparian, and lacustrine habitats. They may also utilize upland habitats including grassland and scrub (Holland 1994). Its preferred habitat is slow moving or quiet water, with emergent vegetation and undercuts for refuge. Protected, grassy uplands with a clay/silt soil are the preferred nesting sites. Irrigation ditches, drains, and rice fields provide suitable habitat for Pacific pond turtle foraging, with basking areas on adjacent levees. The turtles are active during the spring, summer, and fall when rice preparation, growing, and harvesting are performed, respectively.

The draining of wetlands for agriculture and urban development has greatly reduced this species' habitat. Other causes of population decline include increased predation and collecting by humans. Poor reproductive success due to predation and nest destruction also hamper the turtle's recovery. Reduced vegetative cover, such as in heavily maintained ditches, may increase predation on females and juveniles moving between aquatic habitats and nest sites between May and October (Holland 1988).

The CNDDB reports several occurrences spread throughout the area of analysis in Sacramento, San Joaquin, and Contra Costa counties.

Purple Martin

Purple martin (*Progne subis*) is a passerine bird species and is considered by the CDFW to be a SSC. Purple martin occur in eastern North America, west to the Pacific Coast and south into Central Mexico. In the arid west, its distribution is concentrated in the southern Rocky Mountains and the Sonoran Desert (Shuford and Gardali 2008). In California, purple martins are summer residents, typically observed between mid-March and mid-August (Shuford and Gardali 2008). They have been documented in forest and woodland areas, generally at lower elevations, and the most robust populations are known from conifer forests on the north coast and the foothills of the Sierra Nevada Mountains. Only a small breeding population occurs in the Central Valley.

Purple martins prefer breeding areas with numerous nesting cavities and locally sparse canopy cover. They require access to open foraging areas that support their insect prey, particularly wetlands or other water bodies. Purple martins may nest as single pairs or in larger groups.

Non-native European starlings (*Sturnus vulgaris*) compete with purple martins for nest sites. Additional threats include loss of suitable nesting sites due to habitat conversion by human activity or events such as stand-replacing fires (Shuford and Gardali 2008).

Long-Billed Curlew
The long-billed curlew (*Numenius americanus*) is designated as a CDFW Watch List species and a Bird of Conservation Concern by the USFWS (USFWS 2008). The long-billed curlew is a migratory bird that breeds east of the Cascade Mountains, including northeastern California, through the western Great Plains (Zeiner et al. 1988). It winters from Central and Imperial Valleys, coastal California to southwestern United States. and is found as a winter migrant in the San Joaquin Valley.

Long-billed curlews are found in grasslands, meadows, pastures, and fallow agricultural fields, as well as tidal flats, beaches, and salt marshes in winter. The most highly preferred habitat is natural marshes, grassland, irrigated pasture, and alfalfa fields (San Joaquin County Multi-Species Habitat Conservation and Open Space Plan 2000) and preferred winter habitat includes large coastal estuaries, upland herbaceous areas, and croplands (Zeiner et al. 1988). A small number of nonbreeders remain in coastal habitat in summer and a larger number of birds remain in some years in the Central Valley (Zeiner et al. 1988). In California, long-billed curlew nest on elevated interior grasslands and wet meadows, usually adjacent to bodies of water, such as lakes or marshes (Zeiner et al. 1988).

The conversion of natural lands to agriculture has greatly diminished available forage for wintering birds (Zeiner et al. 1988); wintering habitat in California wetlands has declined by 90 percent (Dugger and Dugger 2002). Continuing threats to long-billed curlews include habitat loss owing both to development and projected effects of climate change and effects of pesticide spraying indirectly reducing the birds' prey items (Dugger and Dugger 2002). The species has previously been proposed as a candidate for Federal Endangered status.

Tricolored Blackbird
The tricolored blackbird (*Agelaius tricolor*) is a medium-sized passerine bird, which is very similar in appearance to red-winged blackbird

(*Agelaius phoeniceus*). It is designated by the CDFW as an SSC and is designated as a Bird of Conservation Concern by the USFWS (USFWS 2008). The species forms the largest colonies of any North American passerine bird, often with tens of thousands of breeding pairs (Beedy and Hamilton 1999).

Nearly all tricolored blackbird populations occur within California. While no major changes in their overall geographic distribution have been noted, large gaps in the occupied range now exist due to loss of habitat (e.g., Kings, San Joaquin, Riverside, and San Bernardino counties) and populations have significantly declined (Kyle and Kelsey 2011). Most individuals are year-round residents in the Central Valley, although some birds overwinter elsewhere, including in the Sacramento-San Joaquin Delta (Beedy 2008).

This species typically breeds in areas with access to open water and protected nesting sites, often including flooded, thorny, or spiny vegetation. Historically, tricolored blackbirds nested in freshwater marsh habitat in vegetation including tules, cattails, willows, thistles or nettles. Nests may also be concentrated in grain fields, giant reed (*Arundo donax*), and riparian scrubland and forest areas (DeHaven et al. 1975; Kyle and Kelsey 2011). Birds may forage as much as eight miles from nest sites (Beedy and Hamilton 1999) in areas that support insect prey. Pasturelands, alfalfa and rice crops, dairies, grassland, and shrubland habitats may be used in lieu of natural flooded habitat (Beedy and Hamilton 1999).

Tricolored blackbird colonies are sensitive to habitat loss, predation, and human activities. When water is withdrawn from marshes, nests become more susceptible to predation, such as by coyotes (*Canis latrans*) (Technology Associates 2009b). Chemical application in agricultural areas may reduce survivorship and disturbance associated with urbanization, including noise, pet and human presence, may result in nest abandonment (Beedy and Hamilton 1999).

White-Faced Ibis

White-faced ibis (*Plegadis chihi*) is considered a Species of Concern by USFWS and an SCC by CDFW. Historically, the ibis was a locally common summer resident in California and its breeding distribution was centered in the San Joaquin Valley. Currently, the species occurs in California as an uncommon, localized breeder and summer resident. It is a mobile species and shifts in range usually coincide with changing water levels and water quality. The ibis is found in shallow, emergent wetlands with high quality fresh and brackish water. Muddy grounds of wet meadows, irrigated or flooded pastures, flooded pond edges and shallow lacustrine water, and wet cropland such as rice fields are suitable foraging habitat. Ibises typically prefer large emergent wetlands with islands of dense emergent vegetation for nesting (CDFG 2008).

White-faced ibis is a colonial breeder and builds shallow nests in thick emergent vegetation such as tule and cattail, in shrubs, or in low trees (Ryder and Manry 1994). It breeds in scattered locations in the San Joaquin Valley, and has established breeding colonies in the Sacramento Valley. Significant breeding colonies have been reported in the Mendota Wildlife Area and the Colusa NWR (Natomas Basin HCP 2003). The species winters primarily in the San Joaquin and Imperial Valleys with a concentrated wintering population near Los Banos in Merced County (Zeiner et al. 1990a).

Populations of white-faced ibis have declined in California and stopped breeding regularly as a result of loss or deterioration of extensive marshes in the Central Valley, which are required for nesting. Elsewhere in its range, pesticides have caused decline in numbers (Zenier 1988).

Yellow-Headed Blackbird

The yellow-headed blackbird (*Xanthocephalus xanthocephalus*) is a small to medium-sized passerine which is a California SSC. This species winters in the western United States; in California it has been documented east of the Cascade Range and Sierra Nevada Mountains, within the Imperial, Colorado River, and Central Valleys, as well as localized areas of the Coast Range west of the Central Valley (Twedt *et al*. 1991). It is fairly common in winter in the Imperial Valley, but its distribution is concentrated mainly in the western portion of the valley (CDFG 2008).

Yellow-headed blackbirds forage along emergent wetland and moist, open areas near croplands and grasslands, in addition to muddy shores of lacustrine habitat (CDFG 2008). They mainly feed on seeds and cultivated grains, although aquatic insects may make up a large part of their diet during the breeding season (Twedt et al. 1991; Twedt and Crawford 1995). Rice fields near freshwater marshes often support breeding colonies (Twedt and Crawford 1995).

In California, yellow-headed blackbirds are found year-round, but breed and winter in different locations and habitat. Water levels are a very important factor in reproduction success. This species breeds in fresh emergent wetland with dense vegetation (e.g. cattails and tules) and deep water, generally along lake and pond borders (Picman et al. 1993). They only breed where large insects are abundant and nesting is timed with maximum emergence of aquatic insect prey (Zeiner et al. 1990).

Throughout its range, the primary threat to the yellow-headed blackbird is the conversion of wetlands to croplands and urban land uses. The species' population has declined in California as a result of habitat loss and competitive exclusion from great-tailed grackles (*Quiscalus mexicanus*), as well as other mammalian and avian predators. Agricultural pesticides and herbicides have also negatively affected the species (Technology Associates 2009b).

3.8.2 Environmental Consequences/Environmental Impacts

Within each alternative, the analysis focuses on biological resources of concern: natural communities, vegetation and wildlife, and special-status wildlife and plant species. Terrestrial biological resources associated with streams and reservoirs upstream of the area of analysis are not discussed in this section because the long-term water transfers would not affect terrestrial biological resources in those areas.

3.8.2.1 Assessment/Evaluation Methods

The effects analysis assumes that if transfers affect the natural community, then transfers could affect any species associated with that community, unless the life history traits of a species indicate that the species would not be affected.

Development of the long-term water transfer impact analysis involved literature review, review of known occurrences of special-status species based on CNDDB, CNPS Inventory records, USFWS regional species list, CWHR, review of information obtained from species experts, and results of hydrologic modeling, as detailed below.

Each alternative, including the No Action/No Project Alternative, is discussed in terms of potential impacts on sensitive resources in the Seller Service Area (including the Delta Region) and Buyer Service Area.

The assessment methods specific to each transfer type are described briefly below. This is followed by the impact assessment for different natural communities and species.

3.8.2.1.1 Groundwater Substitution Transfers

As a part of the Full Range of Transfers Alternative (Proposed Action), there would be an increased use of groundwater to irrigate crops instead of diversion of water from rivers, creeks, and other streams. This would entail increased groundwater pumping compared to existing conditions to substitute water usually obtained from surface water supplies, which could result in a reduction in levels of groundwater in the vicinity of pumps.

Modeled changes in groundwater elevations over time were used to assess the potential impacts of groundwater depletion on stream flows in small tributaries and associated natural communities. Appendix D includes more information about SACFEM2013, which was used to model groundwater substitution-related changes to groundwater and surface water. The groundwater modeling results indicate that shallow groundwater is typically deeper than 15 feet in most locations under existing conditions, and often substantially deeper. This is substantially below the rooting depth of typical vegetation associated with upland communities (e.g., grassland and scrubland habitats). Some tree species, such as valley oak, can have root depths in excess of 20 feet and upward of 80 feet, and rely on groundwater at such a depth during months of low rainfall. However, these species have further adapted to California's Mediterranean climate of wet winters and hot, dry summers by diversifying their rooting structure to take advantage of multiple sources of water. Valley oak trees, for example, typically lose their long taproot by the time they are 40 years old, having developed a complex root system that often extends nearly twice as far as the tree's dripline within the first several meters of the ground surface (Bolsinger 1988).

Riparian habitats are structurally and compositionally diverse, providing a variety of food resources and shelter not found in adjacent upland habitat (Palmer and Bennett 2006, Kirkpatrick et al. 2007). Depth of groundwater has been shown to be an important driver of riparian tree species presence, abundance, and health (Merritt et al. 2010). Merritt et al. showed that riparian tree species are more common in areas with shallow groundwater (less than 4.5 feet below surface level). The maintenance of riparian forests that support complex habitat requires perennial streamflow to maintain elevated groundwater tables during the growing season (Stromberg et al. 2007; Merritt and Poff 2010). Because of the interaction of surface flows and groundwater flows in riparian systems, including associated wetlands, enables faster recharge of groundwater, these systems are less likely to be impacted by groundwater drawdown as a result of the action alternatives.

The frequency of occurrence of riparian forest cover vegetation decreases with the lowering of groundwater levels (Merritt et al. 2010) until the vegetation transitions into communities dominated by upland species less reliant on groundwater levels. In wetland and riparian habitats, groundwater could be much shallower than 15 feet below ground surface, ranging from eight feet to just below the ground surface (Faunt, ed. 2009).

In a few locations in the North Delta, groundwater elevations under existing conditions are less than 15 feet below ground surface and natural communities reliant on groundwater are more likely to be impacted.

The impact of groundwater substitution on natural communities is based on impacts to upland habitats, and those dependent on stream flows. The impact assessment method for stream flow dependent species is discussed in Section 3.8.2.1.4. This impact was evaluated based on the magnitude and frequency of groundwater depletion relative to existing conditions models.

The potential impacts of groundwater substitution on natural communities in upland areas was considered potentially significant if it resulted in a consistent, sustained depletion of water levels that were accessible to overlying communities (groundwater depth under existing conditions was 15 feet or less). A sustained depletion would be considered to have occurred if the groundwater basin did not recharge from one year to the next.

In addition to changing groundwater levels, groundwater substitution transfers could affect stream flows. As groundwater storage refills during and after a transfer, it could result in reduced availability of surface water in nearby streams and wetlands. Assessing the potential effects of these changes on terrestrial resources is discussed further in Section 3.8.2.1.4.

3.8.2.1.2 Cropland Idling/Crop Shifting Transfers

Cropland idling/crop shifting would make water available for transfer that would have been used for agricultural irrigation without the transfer. Cropland idling/crop shifting transfers would occur in the Sacramento River watershed area of analysis. The irrigation season for this area generally lasts from April through September. Rice has been the crop idled most frequently in previous transfer programs. For crop shifting transfers, water is made available when farmers shift from growing higher water use crop to a lower water use crop. Cropland idling/crop shifting would potentially affect some wildlife species that depend on cropland for foraging and/or depend on habitat associated with cropland and managed agricultural lands, including surrounding supply and return water canals. Crop shifting would potentially affect habitat value for various wildlife species. These farming practices may also have an effect on downstream habitat dependent upon agricultural flow returns.

Cropland idling/shifting transfers would be done in accordance with the environmental commitments described in Section 2.3.2.4.

Croplands (except cotton) generally provide forage, resting, and nesting habitat for a variety of wildlife. Many species rely on agro-ecosystems to meet their lifecycle requirements. Vegetable crops (e.g., tomatoes, onions, melons, and sugar beets), grain crops (e.g., corn, rice, etc.), and alfalfa generally provide forage for wildlife both pre- and post-harvest. The value of a crop to wildlife as habitat and for forage varies greatly between crops (from corn and wheat—highly beneficial to wildlife;

cotton—limited to no benefits to wildlife) and species to species. Seasonally flooded agriculture, specifically rice fields, and its associated uplands, drainage ditches, irrigation canals, and dikes, provide potentially suitable habitat for many species including giant garter snake, Pacific pond turtle, and a variety of water birds including, but not limited to egrets, herons, ducks, and geese. Upland crop habitat, such as wheat and corn, provide potentially suitable foraging habitat for many species, including migratory birds and San Joaquin kit fox.

Waste products (grain, fruits, or foliage) remaining in fields after harvest also serve as a food resource for wildlife species, including many special-status species associated with upland cropland (see Section 3.8.2.3.3 for further details). A reduction in the availability of waste products as forage to wildlife could result in significant effects to those species dependent upon waste grain for a large portion of their forage, primarily birds and rodents (primary consumers). These species may also provide a prey base for predators, such as hawks or foxes, and a reduction in the numbers primary consumers could affect predator condition and abundance.

Rice fields in particular provide important foraging habitat for many wildlife species found within the Seller Service Area; not only do the wildlife forage on post-harvest waste grain, but they will also forage on small fish, amphibians, small mammals, and invertebrates that live in the flooded fields. Invertebrates, such as crayfish, can be found on canal banks and berms that separate the rice patties. Shallow water also attracts aquatic insects and other invertebrates, which can provide a source of prey for many wildlife species, such as long-billed curlew. Rice fields also provide resting, nesting, and breeding habitat similar to natural wetlands.

Associated with seasonally flooded agriculture idling is the potential loss of water within adjacent agricultural irrigation and return ditches, when crops are idled/shifted. Agricultural canals and ditches can contain wetland vegetation such as cattails, which provide cover for animals, and these canals and ditches provide forage, resting, nesting habitat and movement corridors for a variety of species (e.g., Pacific pond turtle, giant garter snake, tricolored blackbird, waterfowl, and wading birds), and could serve as migration corridors for various species of wildlife. The potential reduction in flows resulting from idling or shifting of seasonally irrigated crops could reduce habitat for those species that rely on habitat dependent agricultural return flows, with potentially significant impacts on to those species.

Cropland idling would result in fallow fields, which do not provide the same type of habitat as farmed fields, nor the forage base for animals, but which do provide habitat for early successional plants and the species that depend upon them, as well as providing areas that are relatively undisturbed, providing space for nests and burrows. Studies show that fallow fields and inactive farmland may provide suitable foraging, nesting, and/or dispersal habitat for many species of birds (Woodbridge 1998; California Rice Commission 2011).

Cropland idling/shifting has the potential to contribute to fragmentation and isolation of suitable wildlife habitat. Habitat fragmentation can have a significant negative impact to wildlife, by preventing species from moving or dispersing between areas. In the case of animals, different areas may be used for different life history needs, such as trees for nesting and grain fields for foraging, which may or may not overlap in time. The ability to move between different types of habitat or from one area of habitat to another area of similar habitat, on a seasonal or daily basis, is critical to the species success.

Cropland idling/shifting under long-term water transfer would occur in addition to standard farming practices, which include rotation of crops and fallowing of fields in response to market conditions and water availability, and to maintain soils and reduce problems with pests and disease. Because crop rotation and idling are standard practices, species that reside in agricultural areas adjust to these types of activities.

The distribution of these water year types within the action period is unknown. Additionally, the exact locations of cropland idling/shifting actions would not be known until the spring of each year, when water acquisition decisions are made.

The effects of cropland idling/shifting are evaluated on a qualitative analysis based on the proportional of the total acreage idled/shifted, the frequency with which cropland idling/shifting is expected to occur, the value of that cropland to special-status species, and the degree of habitat fragmentation that would likely occur. This evaluation includes consideration of the environmental commitments which are intended to avoid or minimize the potential impacts of this activity.

The effects of idling/shifting of upland crops (those crops that do not require seasonal inundation) are evaluated based on the representative crops of corn, alfalfa and tomatoes, although other upland crops could also be idled. The effects of idling/shifting seasonally flooded crops is represented by rice, which has historically been the crop most idled, but may also include other field crops that require seasonal flooding for at least one week as a management practice, or those which are flooded seasonally to enhance habitat values for a specific wildlife species (e.g., waterfowl).

3.8.2.1.3 Reservoirs

Water would be made available for transfers from Camp Far West, Collins, Folsom, Hell Hole, French Meadows, and McClure reservoirs. These reservoirs would continue to operate in accordance with their existing regulatory requirements and other commitments. Water transfers from these reservoirs would result in decreasing their storage and associated elevation and surface area, during the period when transfers would be made (July through September), and the ongoing reduction in storage until the reservoirs are refilled. Shasta, Oroville, New Bullards Bar, and Folsom reservoirs would not provide water for transfer, but their release patterns may be affected, in that the project may modify flows at compliance points in the mainstem rivers downstream of these reservoirs or in the Delta. Additionally, they could store water made available early in the season (April through June) before capacity is available to move the water through the Delta. Transfers could result in more or less water being released from these reservoirs at different times of year. All reservoirs would continue to function under their existing operating requirements, including reservoir drawdown to targeted storage levels, and in meeting downstream flow, temperature, and other water quality requirements.

Reservoirs are distinct from lakes and ponds in that they are artificial environments designed for use for water supply, flood control, and/or hydroelectric power production, although not all reservoirs serve all of these functions. These reservoirs are generally filled during periods of high runoff during the winter and spring, and emptied during the drier times of year to provide water for human and environmental needs. Depending on hydrologic conditions and downstream water needs, these reservoirs may not reach either their maximum storage elevation or be drawn down to their lowest allowed operating elevation (minimum pool) every year. A large proportion of the reservoirs' volume is filled and drained each year, however, resulting in large changes in water surface elevation of tens to over a hundred feet between the spring and fall of a single year. Because the reservoir does not provide a reliable supply of water near their maximum elevations, natural communities around reservoirs typically consist of upland vegetation types that are not dependent on the reservoir for water. Species and natural communities requiring more substantial amounts of water may become established along riparian corridors tributary to the reservoirs or in areas along the margins of the reservoirs where water is retained when the reservoir water levels decline. Within the high water line of the reservoir, the annual cycle of inundation and desiccation prevents permanent vegetation from becoming established. This area may support ruderal species that can establish quickly when this habitat becomes available. This area is unlikely to support substantive cover or other habitat features suitable for wildlife immediately adjacent to the water. Wildlife that utilize reservoir habitats would typically use the nearshore areas on both the aquatic and terrestrial side of the water line. Open water areas are used infrequently and do not provide primary habitat.

The impacts of changes in reservoir storage in the Seller Service Area were evaluated based on the results of the transfer operations model which predicted changes in storage volume, elevation, and surface area on a monthly timestep. Substantial, systematic or prolonged changes in reservoir levels as a result of long-term water transfer storage and releases, particularly those that occur outside of the normal range of operation for that reservoir, could impact vegetation and wildlife species associated at or near water surface and within the drawdown zone, where water may be held longer or released sooner than it would have been under existing conditions. Changes in reservoir operations would also affect downstream riverine habitat, the effects of which are considered in Section 3.8.2.1.4.

These effects were evaluated against the existing conditions during the corresponding time period, considering the change in elevation and the value of the existing habitat to natural communities and special–status species associated with the reservoir.

3.8.2.1.4 Rivers and Creeks

As discussed in the preceding sections, water transfers would affect flows in the rivers and creeks within the Seller Service Area adjacent to and downstream of the areas where these activities would occur. There are no anticipated changes in conditions in the rivers and creeks in the Buyer Service Area. Changes in stream flows in the Seller Service Area could potentially affect natural communities, such as riverine, riparian, seasonal wetland, and managed wetland natural communities, which are reliant on groundwater for all or part of their water supply. These changes could propagate downstream and affect areas downstream of the location where pumping occurs, which may extend to the Sacramento River and Delta. To meet regulatory requirements, some minor modifications in the operation of the CVP and SWP may be required, which may affect storage and flow releases in some reservoirs within the area of analysis.

Groundwater substitution transfers were modeled using the SACFEM2013 groundwater model to assess potential changes to groundwater and surface water. Groundwater substitution pumping was simulated as an additional pumping stress on the system, above the baseline pumping volume. The annual volume of transfers was determined by comparing the supply in the seller service area to the demand in the buyer service area. The availability of supplies in the seller service area was determined based on data provided by the potential sellers. The demand was estimated using demand data provided by East Bay MUD and Contra Costa WD as well as the available capacity at the Delta export pumps to convey transfers. The available export capacity was determined from CalSim II model results. The CalSim II model currently only simulates conditions through WY 2003. The available capacity for south of delta exports was typically more limiting than the south of delta water supply demand. Because CalSim II results are only available through 2003, the SACFEM2013 model simulation was truncated at the end of WY 2003.

The analysis of supply and demand resulted in the potential to export groundwater substitution pumping transfers through the Delta during 12 of the years from 1970 through 2003 (33 years, SACFEM2013 simulation period). Each of the 12 annual transfer volumes was included in a single model simulation. Including each of the 12 years of transfer pumping in one simulation rather than 12 individual simulations allows for the potential compounding effects from pumping from prior years. Appendix D, Groundwater Model Documentation, includes more information about the use of SACFEM2013 in this analysis.

The results of the SACFEM2013 analysis estimated streamflow depletion from groundwater substitution throughout the Sacramento Valley. These estimates were included in Transfer Operations Model simulations of the action alternatives. The Transfer Operations Model results are the basis for the determination of potential effects to fish and their habitats. Appendix B, Water Operations Assessment, includes more details about the transfer operations model.

The analysis of potential impacts to stream flow in the Seller Service Area focused on the frequency and magnitude of changes in mean monthly flow rates by water year types (wet, above normal, below normal, dry, and critical), as compared to existing conditions, based on the modeling results. As discussed there, not every water body could be evaluated in the groundwater model; therefore, smaller water bodies adjacent to those modeled are assumed to respond in a similar way, with similar changes in flow magnitude and timing. Potential impacts to biological resources in these adjacent water bodies would be similar to those of the modeled streams.

For the Proposed Action and No Cropland Modifications Alternative, a screening analysis was conducted for smaller waterways for which groundwater modeling data were available to eliminate the need for biological analyses for streams in which substantial reductions in stream flow did not occur. If the flow reduction caused by implementing the transfer action would be less than one cubic feet per second (cfs) and less than ten percent change in mean flow by water year type, then no further analysis was required, because the effect was considered too small to have a substantial effect on terrestrial species.

The ten percent threshold was used to determine measurable flow changes based on several major legally certified environmental documents in the Central Valley (Trinity River Mainstem Fishery Restoration Record of Decision, December 19, 2000; San Joaquin River Agreement Record of Decision in March 1999; Freeport Regional Water Project Record of Decision, January 4, 2005; Lower Yuba Accord Final EIR/EIS). In these documents, there is consensus that differences in modeled flows of less than ten percent would be within the noise of the model outputs and beyond the ability to measure actual changes.

The one cfs minimum flow threshold was applied to each month during the entire modeled period, such that, if a change of greater than one cfs occurred in any one month during the modeled period, the waterway would be examined further for biological effects.

Combined, these two thresholds were used as an initial screening evaluation to determine whether further analyses were warranted to assess biological significant impacts because these two thresholds may not always translate into a significant biological effect on plant and wildlife species. Therefore, these further biological analyses included consideration of other physical and biological factors in addition to absolute and relative flow changes, including presence and timing of life stages of species, size of the waterway, timing of flow changes, and water year type.

Historical stream flow information from the USGS or the California Data Exchange Center for these streams were gathered where available and used as the measure of baseline flow. For locations for which historical flow data were limited or unavailable, a quantitative analysis was not possible; thus a qualitative discussion of potential impacts is included for these locations. No impacts would occur to groundwater in the No Action/No Project and No Groundwater Substitution alternatives and, therefore, this screening analysis did not apply.

For rivers and their major tributaries, including the Sacramento, American, Feather, Yuba, Bear, San Joaquin, and Merced rivers, transfer operations model outputs were used to assess impacts to surface water flows.

The evaluation of potential impacts to natural communities and special-status vegetation and wildlife considered the magnitude and frequency of streamflow depletion in small streams, both as depicted by the groundwater model. These changes are evaluated for small streams, as CVP and SWP operations could not be altered to offset any changes in these streams. The impacts of groundwater substitution on the larger rivers and CVP and SWP reservoirs are carried from the groundwater model to the transfer operations model, but this model also incorporates other changes in hydrology associated with cropland idling/shifting, reservoir releases, and water conservation, so the combined effect of all these activities are evaluated concurrently for these water bodies.

The impact analysis assumes that an action alternative would have an adverse effect on vegetation and associated wildlife within each river system if it resulted in: a substantially reduced source water for natural communities (e.g., loss of seasonal inundation of adjacent floodplain); flow changes impacting/affecting wildlife movement, foraging pattern, breeding, or predation risks; flow changes altering vegetation communities (e.g., increased in stream flow causing erosion of stream banks resulting in the loss of shaded riverine habitat); flow changes impacting/affecting vegetation recruitment or establishment, or changes in the timing of flows such that natural geomorphic processes do not occur.

3.8.2.1.5 Sacramento-San Joaquin Delta

The changes described above for rivers and streams would be also apply downstream into the Delta. Additionally, exports would vary in timing and magnitude with implementation of water transfers. These changes were modeled using the Transfers Operations Model. To assess the potential impacts of these changes on vegetation and wildlife resources in the Delta, the difference in Delta outflow and the location of X2, defined as the distance (in kilometers) up the axis of the estuary to the daily averaged near-bottom 2-practical salinity units (psu) isohaline (Jassby et al. 1995), were considered. Changes in these parameters were used to qualitatively assess the impacts of long-term water transfers on natural communities and special-status species. Modeled changes in Delta outflow or X2 relative to existing conditions were considered substantial and required further analysis if they were greater than ten percent.

3.8.2.1.6 Natural Community Impacts

The natural community impacts assessment included an analysis of impacts on wetlands and upland habitat types. Natural communities that qualify as wetlands are tidal perennial aquatic, saline emergent wetland, tidal freshwater emergent wetland, non-tidal fresh emergent wetland, natural seasonal wetland, managed seasonal wetland, natural seasonal wetland, valley/foothill riparian habitat, and montane riparian habitat. Natural upland communities include grassland, inland dune scrub, upland scrub, and upland cropland habitat.

The impacts of water transfer actions on natural communities were assessed qualitatively based on possible changes in the distribution and extent of the natural communities affected, either through conversion to other habitat types or through change in quality relative to existing conditions. This assessment was conducted by assessing the types of natural communities that would potentially occur in areas where various water transfer activities, as described above, would occur. The type, frequency, magnitude and duration of these transfer activities, as described in the preceding section, were assessed relative to the needs of those natural communities. This approach was used to assess whether these activities would be likely to fragment existing natural communities, disrupt important wildlife management areas, or reduce habitat patch size.

3.8.2.1.7 Species Impacts Assessment

The species impacts analysis includes an assessment of the direct and indirect impacts of implementing the long-term water transfer actions on terrestrial species. The assessment evaluated permanent and temporary impacts on terrestrial natural resources, including special-status species, and is based on impacts on natural communities that the species use within the area of analysis, the species' geographic distribution, and records for these species in the area of analysis maintained in the CNDDB, and from other sources. This analysis included consideration of the way in which the habitat is used by different species, e.g., breeding, foraging, or dispersal habitat. It is important to note that although wildlife species are associated with certain natural communities, it does not necessarily indicate that wildlife species are restricted to those areas. The analysis indicates that habitat areas have a higher probability of species occurrence compared with areas identified as non-habitat. The analysis does not incorporate microhabitat conditions and other site-specific variables that may further restrict a species use within a natural community.

Plant Species

For plant species, species-habitat associations were defined (Table I-2, Appendix I) and the extent of potential permanent and/or temporary impacts on individual special-status species was based upon the impacts on their associated natural community types. Plants are often associated with specific microhabitats within the natural community and generally have localized occurrences in the region and in their suitable habitat. The analysis does not analyze the impacts of long-term water transfers at the microhabitat level; any loss or alteration of a natural community associated with a plant species is assumed to be a loss of suitable habitat for the species.

Impacts to plant species were assessed qualitatively, based on predicted changes to land use or water availability that could affect species distribution. Direct and indirect impacts of implementing transfers could include the alteration of species composition, establishment of invasive species, and changes to natural communities that result in removal, conversion, or fragmentation of the community.

Wildlife Species

For wildlife species, species-habitat associations were developed and defined (Table I-1, Appendix I) based on literature and review of species databases, including CNDDB and CWHR. Wildlife species and natural communities' relationships are generally not as specific as for plant species. Wildlife species generally occur in several habitat types and move among them. Thus, where necessary, the analysis evaluates the impacts to wildlife species both on a natural community and species level. Hydrologic impacts on wildlife species were assessed qualitatively based on extrapolation of groundwater and surface water modeling results to the species habitat requirements.

Direct and indirect impacts on wildlife communities may include habitat degradation or removal, displacement of wildlife, project-related impacts on adjacent habitat (e.g., changes in hydrology in adjacent areas), and habitat fragmentation leading to disruption of breeding, dispersal, and/or foraging behaviors.

3.8.2.2 Significance Criteria

Consistent with CEQA and the CEQA Guidelines, an alternative would have a significant impact on terrestrial biological resources if it would:

- Cause a substantial reduction in the size or distribution of any natural community.
  - Have a substantial adverse effect, such as a reduction in area or geographic range, on any riparian natural community, other sensitive natural community, or significant natural areas identified in local or regional plans, policies, regulations, or by CDFW or USFWS;
  - Substantially adversely affect federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) either individually or in combination with the known or probable impacts of other activities through direct removal, filling, hydrological interruption, or other means;
  - Substantially decrease the size of important native upland wildlife habitats or wildlife use areas;
  - Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan.

- Cause a substantial adverse effect on any special-status species.
  - Cause a substantial adverse effect on, either directly or through habitat modifications, any endangered, rare, or threatened species, as listed in 14 CCR Sections 670.2 or 670.5; or in 50 CFR. A significant impact is one that affects the population of a species as a whole, not individual members;
  - Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS, including substantially reducing the number or restricting the range of an endangered, rare, or threatened species;
  - Cause a reduction in the area or habitat value of critical habitat areas designated under the federal ESA;
  - Conflict substantially with goals set forth in an approved recovery plan for a federally listed species, or with goals set forth in an approved State Recovery Strategy (California Fish and Game Code Section 2112) for a state listed species;
  - Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan;
  - Substantially fragment or isolate wildlife habitats or movement corridors, especially riparian and wetland habitats, or impede the use of wildlife nurseries.

The significance criteria described above apply to all natural communities and common and special-status plant and wildlife species that could be affected by the alternatives. Changes in habitat quality are determined relative to existing conditions (for CEQA) and the No Action/No Project Alternative (for NEPA).

3.8.2.3 Alternative 1: No Action/No Project

The assessment evaluates the No Action/No Project Alternative by including likely future conditions in the absence of long-term water transfers and identifies the impacts associated with the No Action/No Project Alternative.

3.8.2.3.1 Seller Service Area

Groundwater Levels
There would be no impacts to groundwater levels under the No Action/No Project Alternative and therefore there would be no impacts on natural communities that rely on groundwater.

Impacts on Natural Communities: Because there would be no increase in the amount of groundwater pumped for agricultural uses under the No Action/No Project Alternative, there would be no impacts to natural communities that rely on groundwater for all or part of their water supply.

Impacts on Special-Status Species: Because there would be no increase in the amount of groundwater pumped for agricultural uses under the No Action/No Project Alternative, there would be no impacts to special-status species.

Reservoirs
The No Action/No Project Alternative would not impact reservoir storage, elevation, and reservoir surface area.

Impacts on Natural Communities: The No Action/No Project Alternative would not result in changes to reservoir storage, elevation, or surface area relative to existing conditions. The No Action/No Project Alternative would have no impact on surrounding lacustrine communities along reservoirs within the area of analysis.

Impacts on Special-Status Wildlife: The No Action/No Project Alternative would have no impact on special-status wildlife species associated with lacustrine communities along these reservoirs, as there would be no impact to natural communities.

Rivers and Creeks
The No Action/No Project Alternative would not change flows of rivers and creeks in the Sacramento and San Joaquin river watersheds relative to existing conditions.

Impacts on Natural Communities: The No Action/No Project Alternative would have no impact on surrounding natural communities in rivers and creeks in the Sacramento and San Joaquin river watersheds, because flows would not be changed from existing conditions.

Impacts on Special-Status Wildlife: The No Action/No Project Alternative would have no impact on special-status species that are associated with the rivers and creeks in the Sacramento and San Joaquin river watersheds, because flows would not be changed from existing conditions.

Delta

The No Action/No Project Alternative would not alter flows through the Delta Region compared to existing conditions.

Impacts on Natural Communities: The No Action/No Project Alternative would have a no impact on surrounding Delta natural communities, as there would be no change in the volume or timing of inflows or exports relative to existing conditions.

Impacts on Special-Status Wildlife: The No Action/No Project Alternative would have no impact on special-status species that are associated with Delta habitat, as there would be no change in their habitat.

Cropland Idling/Crop Shifting

There would be no cropland idling/shifting under the No Action/No Project Alternative and no effects to suitable habitat relative to existing conditions.

Impacts on Natural Communities: The No Action/No Project Alternative would have no impact on natural communities as a result of cropland idling/crop shifting, as these practices would remain the same as under existing conditions.

Impacts on Special-Status Wildlife: The No Action/No Project Alternative would have no impact on special-status species that are associated with upland cropland habitat and seasonally flooded agriculture.

3.8.2.3.2 Buyer Service Area

Reservoirs

The No Action/No Project Alternative would not impact San Luis Reservoir storage and surface area. Storage levels in the reservoirs would be the same as under existing conditions.

Impacts on Natural Communities: The No Action/No Project Alternative would have no impact on surrounding lacustrine communities or wetland habitat around San Luis Reservoir, as it would not result in changes to reservoir storage, elevation, or surface area relative to existing conditions.

Impacts on Special-Status Wildlife: The No Action/No Project Alternative would have no impact on special-status wildlife species associated with lacustrine communities and wetland habitat, as it would have no impact on natural communities.

Effects of Water Use
Cropland idling/shifting under the No Action/No Project Alternative would not decrease suitable habitat relative to existing conditions.

Upland Cropland Habitat & Seasonally Flooded Agriculture
Agricultural land uses in the Buyer Service Area would be similar to those under existing conditions and land use practices would be similar to recent levels. Farmers would be expected to continue current practices of idling some land temporarily, depending on crop rotation patterns or soil maintenance purposes.

Impacts on Natural Communities: The No Action/No Project Alternative would have no impact on natural communities, relative to existing conditions, as land use practices would remain the same.

Impacts on Special-Status Plants and Wildlife: The No Action/No Project Alternative would have no impact on special-status species that are associated with upland cropland habitat in the Buyer Service Area.

3.8.2.3.3 Special-status Species Habitat

The No Action/No Project Alternative would not impact special-status species in the area of analysis through modification of suitable lacustrine, wetland, riverine, and upland habitat. Under the No Action/No Project Alternative, conditions would be the same as the existing conditions in terms of groundwater pumping, farming practices, reservoir operations, and river and stream flows. Special-status species, including Pacific pond turtle, giant garter snake, greater sand hill crane, black tern, long-billed curlew, purple martin, tricolor blackbird, white-faced ibis, yellow-headed blackbird, and San Joaquin kit fox would not be impacted as a result of the No Action/No Project Alternative.

Impacts on Special-Status Plants and Wildlife: The No Action/No Project Alternative would not result in changes to existing water transfer practices. Therefore, no impacts would occur to special-status plants and wildlife as a result of the No Action/No Project Alternative.

3.8.2.4 Alternative 2: Full Range of Transfers (Proposed Action)

3.8.2.4.1 Seller Service Area

Groundwater Levels
Groundwater substitution under the Proposed Action could decrease available groundwater for natural communities relative to the No Action/No Project Alternative. As a part of the Proposed Action, there would be an increased use of groundwater to irrigate crops. This would entail increased groundwater pumping compared to the No Action/No Project Alternative, which would result in a reduction in levels of groundwater in the vicinity of pumps.

As discussed in the Assessment Methods, if groundwater levels are more than 15 feet below ground surface, a change in groundwater levels would not likely affect overlying terrestrial resources. In a few locations in the North Delta associated with wetlands, groundwater elevations under existing conditions are less than 15 feet below ground surface and natural communities reliant on groundwater are more likely to be impacted. In these areas, the maximum reductions would be 0.3 to 0.8 feet, with full recharge. These increases in subsurface drawdown would be too small to affect natural communities such as riverine, riparian, seasonal wetland, and managed wetland habitats, which rely on groundwater for all or part of their water supply. Plants within these communities would be able to adjust to the small reductions in groundwater levels because the draw down is expected to occur slowly through the growing season, allowing plants to adjust their root growth to accommodate the change.

Impacts on Natural Communities: The Proposed Action would have a less than significant effect on natural communities, because increases in drawdown would be too small to cause a substantial effect on vegetation that relies on groundwater.

Impacts on Special-Status Plants: Because the natural communities where special-status plants occur would not be significantly affected, impacts to special-status plants would be less than significant. Impacts to special-status wildlife as a result of groundwater substitution transfers are discussed further under Rivers and Creeks.

Reservoirs

The Proposed Action could impact reservoir storage and reservoir surface area. Under the Proposed Action, model output predicts that there would be no substantial (more than ten percent) decrease in end-of-month storage volume, reservoir elevation, or surface area relative to existing conditions in Shasta, Oroville, and Folsom reservoirs.

Table 3.8-2 shows the modeled changes in average end-of-month storage for the non-Project reservoirs that could participate in reservoir release transfers. Storage changes in Merle Collins Reservoir and Lake McClure would be less than ten percent of the reservoir volume.

Table 3.8-2. Changes in Non-Project Reservoir Storage between the No Action/No Project Alternative and the Proposed Action (in 1,000 AF)

Year Type	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Camp Far West Reservoir												
W	-0.4	-0.4	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AN	-2.5	-2.5	-2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	-2.3	-2.5
C	-3.6	-3.6	-3.6	-3.6	-1.1	-0.7	-0.7	-0.7	-0.7	-4.3	-4.3	-4.3
Merle Collins Reservoir												
W	-0.4	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D	-0.8	-0.8	-0.8	-0.8	-0.2	0.0	0.0	0.0	0.0	-1.1	-1.7	-1.7
C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hell Hole and French Meadows Reservoirs												
W	-6.1	-6.1	-4.1	-1.8	-0.7	-0.6	-0.6	-1.2	-0.4	-0.4	-0.3	-0.1
AN	-22.3	-22.3	-22.3	-13.9	-1.8	0.2	0.2	0.2	0.2	0.2	0.1	0.1
BN	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D	-16.6	-16.7	-16.7	-13.4	-11.4	-7.9	-1.1	-4.9	-8.5	-12.5	-16.8	-20.4
C	-28.2	-28.5	-29.0	-29.0	-29.0	-29.0	-28.9	-34.5	-39.5	-44.5	-49.8	-55.2
Lake McClure												
W	-2.3	-2.3	-2.3	-2.3	0.0	0.0	-3.3	-4.8	-3.5	-2.0	-0.8	-0.2
AN	-15.0	-15.0	-15.0	-15.0	-15.0	-10.0	-17.7	-20.9	-12.8	-9.3	-6.4	-5.0
BN	0.0	0.0	0.0	0.0	0.0	0.0	-9.1	-15.0	-15.0	-15.0	-15.0	-15.0
D	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-15.7	-21.9	-19.9	-17.8	-16.1	-15.2
C	0.0	0.0	0.0	0.0	0.0	0.0	-6.7	-10.3	-8.6	-6.6	-5.1	-4.5

Note: Negative numbers indicate that the Proposed Action would decrease reservoir storage compared to the No Action/No Project Alternative; positive numbers indicate that the Proposed Action would increase reservoir storage.
Key: Year Type = Sacramento watershed year type, W = wet, AN = above normal, BN = below normal, D = dry, C = critical

At Camp Far West Reservoir, average end-of-month storage would be 4,300 acre-feet (AF) (10.8 to 21.9 percent) lower under the Proposed Action relative to existing conditions in critical water years during July through September. This change in storage would reduce reservoir elevations by up to 8.5 feet, or up to 3.8 percent relative to existing conditions, during September of critically dry years, but the reservoir would still be within the operating range experienced under existing conditions.

The reduction in storage would lead to reductions in the surface area of the reservoir during critical years during August and September (86.1 to 97.8 acres, or 12.4 to 18.2 percent). Surface area would change by less than ten percent during the remaining months and water year types.

Up to 47,000 AF of water could be made available for transfer from PCWA's Hell Hole and French Meadows reservoirs. The reservoirs are operated under license by the Federal Energy Regulatory Commission (FERC) and associated 401 Water Quality Certification conditions by the State Water Resources Control Board and 4(e) conditions from the U.S. Forest Service. Transfers would be made under the terms and conditions of this license, which includes measures to protect natural resources within the reservoirs and in the downstream rivers. Water elevations and storage levels during transfers would occur within the normal range of operations of these reservoirs under existing conditions.

Overall, under the Proposed Action, all reservoirs would continue to be operated according to their existing requirements and within their current range of operations.

Impacts on Natural Communities: Long-term water transfer actions under the Proposed Action would have a less than significant impact on natural communities associated with reservoirs because the changes caused would occur within the normal range of operations for the reservoirs.

Impacts on Special-Status Wildlife: Long-term water transfer actions under the Proposed Action would have a less than significant impact on special-status wildlife species associated with reservoirs because the changes caused would be within the normal range of operations for the reservoirs.

Rivers and Creeks

Sacramento River Watershed

The Proposed Action could cause flows in rivers and creeks in the Sacramento River watershed to be lower than under the No Action/No Project Alternative. The following section provides the impacts to natural communities and special-status species as a result of changes in timing and flow rate for rivers, streams, and associated tributaries under the Proposed Action.

Under the Proposed Action, transfers could directly impact natural communities by changing the timing and volume of flows within rivers.

Under the Proposed Action, mean monthly modeled flows would be reduced by less than ten percent on the Sacramento, Feather, Yuba, and American rivers. Based on the screening level criteria, these flow reductions are not considered substantial. Existing stream flow requirements (flow magnitude and timing, temperature, and other water quality parameters) would continue to be met. Among larger rivers, only the Bear River flows would be reduced by more than ten percent by the Proposed Action and, therefore the Bear River is discussed in detail below.

In addition, an initial screening evaluation of modeled flows in several smaller creeks was conducted (see Section 3.8.2.1 for details). The evaluation concluded that impacts to terrestrial species in the following waterways are less than significant: Deer Creek (in Tehama County), Antelope Creek, Paynes Creek, Seven Mile Creek, Elder Creek, Mill Creek (in Tehama County), Thomes Creek, Mill Creek (Thomes Creek tributary), Butte Creek, Auburn Ravine, Honcut Creek, Freshwater Creek, Colusa Basin Drain, Upper Sycamore Slough, Funks Creek, Putah Creek, Spring Valley Creek, Walker Creek, North Fork Walker Creek, Wilson Creek, Stone Corral Creek, Little Chico Creek, and the South Fork of Willow Creek (Table 3.8-3).

Table 3.8-3. Screening Evaluation Results for Smaller Streams in the Sacramento River Watershed for Detailed Vegetation and Wildlife Impact Analysis for the Proposed Action

Waterway	>1 cfs reduction?	>10% reduction?
Deer Creek (Tehama County)	N	-
Antelope Creek	N	-
Paynes Creek	N	-
Seven Mile Creek	N	-
Elder Creek	N	-
Mill Creek (Tehama County)	N	-
Thomes Creek	N	-
Mill Creek (tributary to Thomes Creek)	N	-
Stony Creek	Y	Y
Butte Creek	Y	N
Cache Creek	Y	Y
Eastside/Cross Canal	Y	U
Auburn Ravine	N	-
Coon Creek	Y	Y
Dry Creek (tributary to Bear River)	Y	U
Honcut Creek	N	-
South Fork Honcut Creek	Y	U
North Fork Honcut Creek	Y	U
Colusa Basin Drain	Y	N
Lower Sycamore Slough	Y	U
Upper Sycamore Slough	N	-
Wilkins Slough Canal	Y	U
Sand Creek	Y	U

Waterway	>1 cfs reduction?	>10% reduction?
Cortina Creek	Y	U
Lurline Creek	Y	U
Stone Corral Creek	N	Y
Funks Creek	N	-
Freshwater Creek	N	-
Putah Creek	Y	N
Little Chico Creek	Y	Y
Salt Creek	Y	U
Willow Creek (nr Williams)	Y	U
South Fork Willow Creek	N	Y
French Creek	N	-
Spring Valley Creek	N	-
Walker Creek (Willow Creek tributary)	N	-
North Fork Walker Creek	N	-
Wilson Creek	N	-

Y = Yes; N = No; U = Unknown

Note: Darkened rows indicate that a detailed effects analysis was not conducted because both criteria were not met.

Reductions in flows in Cache, Stony, Coon, and Little Chico creeks would be greater than ten percent and greater than one cfs (Table 3.8-3) and, therefore, the effects of the Proposed Action on vegetation and wildlife along these creeks are discussed in detail below.

Historical flow data are limited or not available for Eastside/Cross Canal, Dry Creek (tributary to Bear River), South Fork Honcut Creek, North Fork Honcut Creek, Lower Sycamore Slough, Wilkins Slough Canal, Sand Creek, Cortina Creek, Lurline Creek, Salt Creek, and Willow Creek. The percentage change in flow in these streams due to the Proposed Action could not be determined. Flow reductions as the result of groundwater declines would be observed at monitoring wells in the region and adverse effects on riparian vegetation would be mitigated by implementation of Mitigation Measure GW-1 (See Section 3.3, Groundwater Resources), because it requires monitoring of wells and implementing a mitigation plan if the seller's monitoring efforts indicate that the operation of the wells for groundwater substitution pumping are causing substantial adverse impacts. The mitigation plan would include curtailment of pumping until natural recharge corrects the environmental impact. Implementation of these measures would reduce potentially significant effects on vegetation and wildlife resources associated with small streams for which no historical flow data are available to less than significant.

Impacts on Natural Communities: Long-term water transfer actions under the Proposed Action would have a less than significant impact on surrounding natural communities (such as non-tidal fresh emergent wetlands, natural seasonal wetland, managed seasonal wetlands, valley/foothill riparian) along the Sacramento River, because changes in stream flow attributable to the Proposed Action would fall within historical ranges.

Impacts on Special-Status Wildlife: Long-term water transfer actions under the Proposed Action would have a less than significant impact on special-status wildlife species that are associated with the Sacramento River because flow changes to the Sacramento River would fall within historical ranges.

Cache, Stony, Coon, and Little Chico creeks, and the Bear River would potentially experience a greater than ten percent change in mean monthly flows in at least one water year type and month of the year under the Proposed Action. The potential impacts in these waterways are discussed individually below.

Cache Creek

The Proposed Action could cause Cache Creek flows to be lower than under the No Action/No Project Alternative. Mean monthly flows in Cache Creek under the Proposed Action would not be greater than ten percent lower than the No Action/No Project Alternative when all water year types are combined in the mean calculation (Table 3.8-4), but would be greater than ten percent lower in individual water year types within months between May and November (Table 3.8-5). In most cases when flow reductions would exceed ten percent, reductions would be less than 20 percent (13 of 16 cases), but would be up to 31 percent (0.6 cfs) lower in critical water years during November (Table 3.8-5). Flow reductions of this magnitude would have a substantial effect on the riparian natural communities associated with the stream.

Impacts on Natural Communities: The effect of groundwater substitution on natural communities under the Proposed Action could be significant, because groundwater substitution pumping would cause stream flows in Cache Creek to be substantially reduced. The reduction in stream flow would result in a substantial adverse effect on riparian natural communities associated with Cache Creek because root zones would be dewatered to such an extent to cause die back of riparian tree and shrub foliage, branches or entire plants. Implementation of Mitigation Measure GW-1 (See Section 3.3, Groundwater Resources), would reduce this effect to less than significant, because it requires monitoring of wells and implementing a mitigation plan if the seller's monitoring efforts indicate that the operation of the wells for groundwater substitution pumping are causing substantial adverse impacts. The mitigation plan would include curtailment of pumping until natural recharge corrects the environmental impact, and natural communities would recover from any adverse effects of reduced flows, and would not be substantially reduced in area or geographic range.

Impacts on Special-Status Wildlife: The Proposed Action would could a significant impact on special-status wildlife species associated with riparian natural communities along Cache Creek, because groundwater substitution pumping would cause stream flows in Cache Creek to be substantially reduced which would cause a substantial reduction in the area or habitat quality of riparian natural communities associated with the creek that provide habitat to special-status wildlife species. Implementation of Mitigation Measure GW-1, would mitigate this effect, because it requires monitoring of wells and implementing a mitigation plan if the seller's monitoring efforts indicate that the operation of the wells for groundwater substitution pumping are causing substantial adverse impacts. The mitigation plan would include curtailment of pumping until natural recharge corrects the environmental impact. Implementation of these measures would reduce significant effects on special-status wildlife because riparian vegetation that provides habitat to these species would recover as the result of natural groundwater recharge.

Table 3.8-4. Average Monthly Flow in Cache Creek Under the No Action/No Project Using Historical Data and the Proposed Action using the Groundwater Model and Reduction in Flow due to the Proposed Action[1]

Month	No Action/ No Project[1]	Proposed Action	Reduction	Percent Reduction
	Flow (cfs)			
Jan	1,255.2	1,251.2	4.1	0.3
Feb	1,625.1	1,621.8	3.4	0.2
Mar	1,706.0	1,702.6	3.4	0.2
Apr	801.8	800.0	1.8	0.2
May	157.2	155.6	1.6	1.0
Jun	34.4	33.1	1.3	3.9
Jul	18.4	17.4	1.0	5.6
Aug	16.8	15.8	1.1	6.3
Sep	16.0	14.9	1.0	6.5
Oct	16.8	15.8	1.0	5.7
Nov	72.5	71.3	1.2	1.7
Dec	444.8	442.7	2.1	0.5

USGS data, streamflow gage for Cache Creek near Yolo, gage #11452500 (1975-2013).
Groundwater model data (1976-2003).

Table 3.8-5. Average Monthly Flow by Water Year Type in Cache Creek Under the No Action/No Project Using Historical Data and the Proposed Action using the Groundwater Model and Reduction in Flow due to the Proposed Action[1]

Month	WYT	No Action/ No Project[1]	Proposed Action	Reduction	
		Flows (cfs)			Percent Reduction
Jan	W	2,677.3	2,673.7	3.8	0.1
	AN	1,604.0	1,595.3	8.7	0.5
	BN	634.7	630.4	4.3	0.7
	D	312.5	310.1	2.4	0.8
	C	231.5	228.7	2.8	1.2
Feb	W	3,713.8	3,711.6	2.3	0.1
	AN	1,945.8	1,941.6	4.1	0.2
	BN	1,014.2	1,009.7	4.5	0.4
	D	193.1	191.1	2.0	1.0
	C	168.2	162.9	5.3	3.2
Mar	W	4,159.3	4,157.3	2.1	0.0
	AN	1,758.1	1,754.7	3.5	0.2
	BN	805.1	802.7	2.4	0.3
	D	225.5	223.5	2.0	0.9
	C	103.1	96.6	6.5	6.3
Apr	W	2,170.1	2,168.2	1.9	0.1
	AN	589.7	586.5	3.2	0.5
	BN	337.0	334.9	2.1	0.6
	D	28.2	26.4	1.7	6.2
	C	11.0	10.4	0.7	6.1
May	W	367.2	365.3	1.9	0.5
	AN	219.3	216.5	2.8	1.3
	BN	60.9	60.1	0.8	1.3
	D	15.1	13.8	1.6	10.3
	C	3.8	3.2	0.4	11.5
Jun	W	86.6	84.8	1.8	2.1
	AN	33.4	30.9	2.5	7.4
	BN	6.5	5.3	1.2	18.9
	D	7.9	6.8	1.1	13.5
	C	0.6	0.5	0.2	27.9
Jul	W	43.0	41.2	1.8	4.1
	AN	18.1	16.9	1.2	6.4
	BN	7.6	6.4	1.2	15.8
	D	6.4	5.5	0.9	13.5
	C	0.6	0.4	0.1	21.5
Aug	W	41.1	39.4	1.7	4.1
	AN	13.8	12.6	1.2	8.4
	BN	3.2	2.8	0.4	13.0
	D	7.1	5.8	1.3	18.2
	C	0.5	0.4	0.1	18.0

Month	WYT	No Action/ No Project[1]	Proposed Action	Reduction	Percent Reduction
		Flows (cfs)			
Sep	W	37.6	35.9	1.7	4.6
	AN	16.2	14.6	1.7	10.2
	BN	1.3	1.3	0.0	0.0
	D	6.9	6.2	0.7	10.6
	C	0.9	0.8	0.1	13.4
Oct	W	29.9	28.4	1.5	5.0
	AN	16.5	15.9	0.5	3.3
	BN	2.0	2.0	0.0	0.0
	D	17.5	16.8	0.7	4.1
	C	4.0	3.1	0.9	22.8
Nov	W	197.1	195.1	2.0	1.0
	AN	11.0	10.6	0.4	3.8
	BN	7.3	7.3	0.0	0.0
	D	39.2	37.5	1.7	4.5
	C	2.0	1.4	0.6	30.5
Dec	W	963.4	961.6	1.8	0.2
	AN	399.6	396.8	2.8	0.7
	BN	170.7	170.7	0.0	0.0
	D	276.9	274.1	2.7	1.0
	C	26.8	25.1	1.8	6.7

[1] USGS data, stream gage Cache Creek near Yolo, gage #11452500 (1975-2013). Groundwater model data (1976-2003).

Stony Creek

Groundwater substitution under the Proposed Action could cause Stony Creek flows to be lower than under the No Action/No Project Alternative. According to the groundwater modeling, mean monthly flow rates in Stony Creek under the Proposed Action with all water year types combined would be less than three percent relative to the No Action/No Project Alternative (Table 3.8-6).

Table 3.8-7 describes flow changes for different water year types. In general, flows under the Proposed Action would be similar or less than ten percent lower than those under the No Action/No Project Alternative, except in one water year type in one month (critical water years during October) in which flows would be reduced by 10.0 percent (3.3 cfs). Flow reductions of this magnitude could have a substantial effect on the riparian natural communities associated with the stream.

Table 3.8-6. Average Monthly Flow in Stony Creek Under the No Action/No Project Using Historical Data and the Proposed Action using the Groundwater Model and Reduction in Flow due to the Proposed Action

	No Action/ No Project[1]	Proposed Action	Reduction	
Month	Flow (cfs)			Percent Reduction
Jan	1403.0	1401.9	1.1	0.1
Feb	1556.6	1555.6	1.0	0.1
Mar	891.2	890.2	0.9	0.1
Apr	168.5	167.6	0.9	0.5
May	207.1	206.5	0.7	0.3
Jun	74.5	73.8	0.7	0.9
Jul	31.0	30.3	0.6	2.0
Aug	40.9	40.3	0.6	1.5
Sep	40.5	40.0	0.5	1.2
Oct	58.8	57.2	1.6	2.7
Nov	112.8	111.7	1.1	1.0
Dec	562.4	561.4	1.0	0.2

[1] USGS data, streamflow gage for Stony Creek below Black Butte Dam, gage #11388000 (1976-2003). Groundwater model data (1976-2003).

Table 3.8-7. Average Monthly Flow by Water Year Type in Stony Creek Under the No Action/No Project Using Historical Data and the Proposed Action using the Groundwater Model and Reduction in Flow due to the Proposed Action[1]

		No Action/ No Project[1]	Proposed Action	Reduction	
Month	WYT	Flows (cfs)			Percent Reduction
Jan	W	2662.6	2661.9	0.7	0.0
	AN	1841.4	1839.9	1.6	-0.1
	BN	53.8	53.1	0.6	-1.2
	D	439.9	438.9	1.0	-0.2
	C	488.7	487.1	1.6	-0.3
Feb	W	3660.6	3659.9	0.7	0.0
	AN	1905.4	1904.5	0.9	0.0
	BN	105.0	104.3	0.6	0.6
	D	104.6	103.7	0.9	0.9
	C	54.2	52.8	1.5	2.7

		No Action/ No Project[1]	Proposed Action	Reduction	
Month	WYT	Flows (cfs)			Percent Reduction
Mar	W	2176.3	2175.6	0.7	0.0
	AN	698.9	698.1	0.8	0.1
	BN	158.0	157.4	0.6	0.4
	D	228.6	227.8	0.9	0.4
	C	48.9	47.4	1.4	2.9
Apr	W	335.7	335.1	0.6	0.2
	AN	173.0	172.3	0.8	0.5
	BN	84.7	84.1	0.6	0.7
	D	66.7	65.8	0.9	1.4
	C	49.6	48.3	1.4	2.8
May	W	449.9	449.3	0.6	0.1
	AN	201.7	201.2	0.5	0.3
	BN	55.1	54.5	0.5	1.0
	D	101.7	100.8	1.0	0.9
	C	10.8	10.2	0.6	5.6
Jun	W	177.7	177.1	0.6	0.3
	AN	47.2	46.7	0.5	1.1
	BN	30.0	29.5	0.5	1.7
	D	24.4	23.3	1.1	4.3
	C	10.5	9.9	0.5	5.0
Jul	W	47.9	47.4	0.6	1.2
	AN	46.1	45.6	0.5	1.1
	BN	26.5	26.0	0.5	1.9
	D	17.0	16.2	0.8	5.0
	C	10.9	10.3	0.5	4.9
Aug	W	80.0	79.5	0.6	0.7
	AN	47.6	47.1	0.5	1.1
	BN	23.4	22.9	0.5	2.0
	D	15.3	14.3	1.0	6.2
	C	10.2	9.6	0.5	5.4
Sep	W	64.7	64.2	0.5	0.8
	AN	66.5	66.0	0.6	0.8
	BN	13.0	12.5	0.5	3.5
	D	16.8	16.0	0.8	5.0
	C	14.9	14.8	0.1	0.9
Oct	W	108.2	107.4	0.7	0.7
	AN	44.2	43.1	1.1	2.6
	BN	27.1	26.4	0.7	2.7
	D	32.2	30.8	1.4	4.5
	C	33.0	29.7	3.3	10.0

		No Action/ No Project[1]	Proposed Action	Reduction	
Month	WYT	Flows (cfs)			Percent Reduction
Nov	W	255.8	255.1	0.7	0.3
	AN	35.3	34.5	0.8	2.2
	BN	36.7	36.0	0.7	1.9
	D	54.1	53.0	1.1	2.1
	C	45.6	43.5	2.0	4.5
Dec	W	1234.8	1234.1	0.7	0.1
	AN	367.6	366.9	0.6	0.2
	BN	53.8	52.9	0.7	1.2
	D	363.0	362.0	1.0	0.3
	C	80.7	78.9	1.8	2.2

[1.] USGS data, streamflow gage for Stony Creek below Black Butte Dam, gage #11388000 (1976-2003). Groundwater model data (1976-2003).

Impacts on Natural Communities: The effect of groundwater substitution on natural communities under the Proposed Action could be significant, because groundwater substitution pumping would cause stream flows in Stony Creek to be substantially reduced. The reduction in stream flow would result in a substantial adverse effect on riparian natural communities associated with Stony Creek because root zones would be dewatered to such an extent to cause die back of riparian tree and shrub foliage, branches or entire plants. Implementation of Mitigation Measure GW-1 (See Section 3.3, Groundwater Resources) would reduce this effect to less than significant, because it requires monitoring of wells and implementing a mitigation plan if the seller’s monitoring efforts indicate that the operation of the wells for groundwater substitution pumping are causing substantial adverse impacts. The mitigation plan would include curtailment of pumping until natural recharge corrects the environmental impact, and natural communities would recover from any adverse effects of reduced flows, and would not be substantially reduced in area or geographic range.

Impacts on Special-Status Wildlife: The Proposed Action would have a significant impact on special-status wildlife species associated with riparian natural communities along Stony Creek, because groundwater substitution pumping would cause stream flows in Stony Creek to be substantially reduced which would cause a substantial reduction in the area or habitat quality of riparian natural communities associated with the creek that provide habitat to special-status wildlife species. Implementation of Mitigation Measure GW-1 would mitigate this effect, because it requires monitoring of wells and implementing a mitigation plan if the seller’s monitoring efforts indicate that the operation of the wells for groundwater substitution pumping are causing substantial adverse impacts. The mitigation plan would include curtailment of pumping until natural recharge corrects the environmental impact. Implementation of these measures would reduce significant effects on special-status wildlife because riparian vegetation that provides habitat to these species would recover as the result of natural groundwater recharge.

Coon Creek

Groundwater substitution under the Proposed Action could cause Coon Creek flows to be lower than under the No Action/No Project Alternative.

Although existing baseline data is incomplete, the comparison of modeling results to Coon Creek stream flow data from 2003 to 2005 (Bergfeld personal communication 2014) indicates that, in a worst case scenario, there would be one water year in one month (above normal water years during April) in which flows could potentially be reduced by 13.9 percent (2.8 cfs) under Alternative 2.. This calculation represents a worst case scenario because baseline flows used in this calculation are at the low end (20 cfs) of existing flow data range (20 cfs to 40 cfs) during April in 2003-2005. If the calculation included the high end of the range (40 cfs) for baseline flows, the reduction due to the Proposed Action would be 7.0 percent. Therefore, this flow reduction would likely occur less frequently than assumed. Flows in all other months and water year types would be reduced by less than ten percent of baseline flows.

Because flow reductions would likely be less than ten percent and only occur in one month during above normal water years the flow reduction would not substantially reduce natural communities or wildlife species habitat.

Impacts on Natural Communities: Long-term water transfers under the Proposed Action would have a less than significant impact on natural communities because flow reductions would likely be less than ten percent and would occur only during above average water years.

Impacts on Special-Status Wildlife: Long-term water transfers under the Proposed Action would have a less than significant impact on special status wildlife habitat because flow reductions would likely be less than ten percent and would occur only during above average water years.

Little Chico Creek

Groundwater substitution under the Proposed Action could cause Little Chico Creek flows to be lower than under the No Action/No Project Alternative. As modeled, flows in Little Chico Creek would be reduced by more than ten percent in multiple water year types during July through October (up to 100 percent of instream flows). It is not uncommon for Little Chico Creek flows to be very low during these months. A review of existing stream gage data from 1976 to 1995 reveals that flows would be less than 0.5 cfs during at least one month in 20 of 21 years and would be 0 cfs in 14 of 21 years. The modeled changes, while greater than 10 percent, represent a very small overall change in flow (a maximum of 0.04 cfs during these months).

Because flow reductions would be small and only during months when the creek is essentially dry, changes in stream flow would not substantially reduce natural communities or wildlife species habitat.

Impacts on Natural Communities: Long-term water transfers under the Proposed Action would have a less than significant impact on natural communities because flow reductions would be small and only occur during months when the creek is essentially dry.

Impacts on Special-Status Wildlife: Long-term water transfers under the Proposed Action would have a less than significant impact on special status wildlife habitat because flow reductions would be small and only occur during months when the creek is essentially dry.

Bear River

The Proposed Action could cause Bear River flows to be lower than under the No Action/No Project Alternative. Under the Proposed Action, the only flow reduction greater than ten percent in Bear River would occur in critical water years during February (approximately 18 percent, or 45 cfs lower). This flow change would occur during wet conditions when Camp Far West Reservoir is refilling after a reservoir release transfer. The amount of surface flow in the stream would remain within the historical range of variability observed under the No Action/No Project Alternative and would meet minimum flow requirements.

Average monthly flows would be higher, compared to the No Action/No Project Alternative, in critical water years during July (approximately 240 percent, 58 cfs), and dry years during August and September (219 percent, 27 cfs and 127 percent, 12 cfs, respectively) when water is released from Camp Far West Reservoir for transfer.

These flow changes would not alter stream morphology, but may result in minor changes to habitat suitability. The flow changes that would occur on the Bear River under the Proposed Action would have a less than significant impact on natural communities.

Impacts on Natural Communities: Flow decreases, resulting from long-term water transfer actions under the Proposed Action would have a less than significant impact on natural communities. Flow reductions would occur late in the year, when plants and animals are less dependent on streamflow. While flows would be reduced, they would remain within the normal range of variability experienced under the No Action/No Project condition and would occur only during critical years (approximately one year in every five), and riparian natural communities would not be substantially reduced in area or geographic range.

Impacts on Special-Status Wildlife: Based on the changes in flows and natural communities previously described, long-term water transfer actions under the Proposed Action would have a less than significant impact on special-status wildlife species associated with Bear River, as natural communities that support these species would not be affected, as described above.

San Joaquin River Watershed

San Joaquin River

The Proposed Action could cause San Joaquin River flows to be lower than under the No Action/No Project Alternative. Under the Proposed Action, flows on the San Joaquin River would be reduced by less than two percent on the San Joaquin River relative to the No Action/No Project Alternative in all months and water year types. This small change in flows would be within the range of flow fluctuations typical of the San Joaquin River and therefore would not be considered substantial.

Impacts on Natural Communities: Long-term water transfer actions under the Proposed Action would have a less than significant impact on natural communities along the San Joaquin River, including seasonal wetland, valley/foothill riparian, and grasslands, because flow reductions would be too small to substantially affect natural communities.

Impacts on Special-Status Wildlife: Long-term water transfer actions under the Proposed Action would have a less than significant impact on special-status wildlife species along the San Joaquin River, because flow changes would be too small to substantially affect these species habitats and be within the natural range of variability and, thus, would not affect special-status species.

Merced River

The Proposed Action could cause Merced River flows to be lower than under the No Action/No Project Alternative. Under the Proposed Action, flows would generally be similar to or greater than flows under the No Action/No Project Alternative in most months. Flows would be higher compared to the No Action/No Project Alternative during April and May. The greatest relative increase in flow would occur in dry water years during April (approximately 38 percent, 85 cfs higher than existing conditions). River flows would decrease during wetter periods as the reservoir refills, but this refill would occur over longer periods of time and would have only small effects on flows.

Impacts on Natural Communities: Long-term water transfer actions under the Proposed Action would have a less than significant impact on natural communities along the Merced River, as flow reductions would be too small to substantially affect natural communities.

Impacts on Special-Status Wildlife: Long-term water transfer actions under the Proposed Action would have a less than significant impact on special-status wildlife species along the Merced River, because flow reductions would be too small to affect natural communities or associated special-status species.

Delta

The Proposed Action could cause changes to Delta hydrology relative to the No Action/No Project Alternative. Under the Proposed Action, Delta outflows would be less than two percent lower than flows under the No Action/No Project Alternative in any month or water year type. Outflow would be up to 11 percent higher in during July through September in dry and critically dry water years. The maximum mean monthly upstream shift in X2 location would be unlikely to be detected upstream during periods of decreased flow, and may be up to two km (1.0 percent) downstream during periods of increased flow. These changes to Delta outflow, and resultant changes in X2 position, would not have a substantial adverse impact on biological resources because the change is minimal and consistent with changes in annual fluctuations of X2.

These changes would not have a significant impact on biological resources.

Impacts on Natural Communities: Long-term water transfer actions under the Proposed Action would have a less than significant impact on natural communities associated with the Delta. No impacts are expected to occur to tidal perennial aquatic habitat, saline emergent wetland, and tidal fresh emergent wetland, because the project would have negligible effects on Delta hydrology, that would not substantially affect natural communities. As changes in flow are expected to be within daily and seasonal tidal fluctuations, natural communities in the Delta would be unaffected.

Impacts on Special-Status Plants and Wildlife: Long-term water transfer actions under the Proposed Action would have a less than significant impact on special-status plant and wildlife species associated with the Delta, because the project would have very small effects on Delta hydrology that would be too small to substantially affect natural communities or associated special-status species.

Cropland Idling/Crop Shifting

Upland Crop Habitat

Cropland idling/shifting under the Proposed Action could alter habitat for upland species relative to the No Action/No Project Alternative. The maximum potential acreage of upland crop that could be idled under the Proposed Action would be 800 acres of tomatoes, 2,700 acres of corn, and 5,000 acres of alfalfa/sudan grass, for a total of 8,500 acres, as indicated in Table 3.8-8. The maximum allowed acreage of corn would be idled/shifted in Solano County, just less than the 1,500 acres indicated. This would leave approximately 5,900 acres in corn in Solano County, which is well within, the historical range of 2,800 to 13,700 acres.

Table 3.8-8. Upland Cropland Idling/Shifting under the Proposed Action

Region	Alfalfa/ Sudan Grass	Corn	Tomatoes	Total
Glenn, Colusa, Yolo Counties	1,400	400	400	2,200
Butte and Sutter Counties	600	800	400	1,800
Solano County	3,000	1,500	-	4,500
Total	**5,000**	**2,700**	**800**	**8,500**

Most forage and other habitat would still be available to wildlife species within the Sacramento Valley, as indicated in Table 3.8-8. Crop idling in Glen, Colusa, and Yolo Counties could result in a two percent loss of residual feed, whereas in Sutter and Solano Counties crop idling could result in a nine percent loss in residual feed. Corn idling represents the crop with the biggest reduction of 16–20 percent depending on the County. Idling would reduce forage areas, but species would respond by looking for forage in other habitats. The bird species that would be potentially affected by idling of upland crops would be capable of dispersing to other areas or other non-idled parcels. Most species are well adapted to changes in environmental conditions such as drought and flooding, and therefore, use of specific areas can vary greatly from year to year depending on habitat conditions. Cropland idling decisions would be made early in the year before the general breeding season of most birds that have the potential to occur in the area of analysis, therefore impacts to nesting birds would not be expected.

Because of the limited amount of upland crop acreage that would be idled under this alternative, and in conjunction with the environmental commitments described in Section 2.3.2.4, and because this is within the historic range of variation for the individual crops, cropland idling/shifting in the Seller Service Area is not expected to significantly impact wildlife species dependent on upland cropland habitat.

Impacts on Natural Communities: Long-term water transfer actions under the Proposed Action would have a less than significant impact on upland cropland habitat in the Seller Service Area, as the amount of cropland idled would generally be small and within the historical range of variation.

Impacts on Special-Status Plants and Wildlife: Long-term water transfer actions under the Proposed Action would have a less than significant impact on plant and wildlife species associated with upland cropland habitat because the lack of impacts on the natural communities.

Seasonal Flooded Agriculture

Cropland idling/shifting under the Proposed Action could alter the amount of suitable habitat for natural communities and special-status wildlife species associated with seasonally flooded agriculture and associated irrigation waterways relative to the No Action/No Project Alternative. Based on proposed transfer quantities and sellers, the maximum amount of rice acreage that could be idled under the Proposed Action would be 51,473 acres throughout the Sacramento River valley (Table 3.8-9).

Table 3.8-9. Cropland Idling/Shifting for Rice under the Proposed Action

Cropland Idling under Proposed Action	Acres (Percent of Acres Idled) in Glenn, Colusa, and Yolo Co.	Acres (Percent of Acres Idled) in Sutter and Butte Co.	Acres (Percent of Acres Idled) in Solano Co.	Total Acres (Percent of Acres Idled)
Rice	40,704 (16%)	10,769 (11%)	0 (0%)	51,473 (11%)

The reduction in available habitat in rice fields and the associated reduction in the availability of waste grains and prey items as forage to wildlife species that use seasonally flooded agriculture for some portion of their lifecycle, could result in potentially significant effects to those species. These impacts are reduced by the environmental commitments in Section 2.3.2.4.

Associated with idling seasonally flooded agricultural fields is the potential for habitat fragmentation, as idling large parcels of land could impede the movement of wildlife from one area to another, inhibiting normal wildlife migration and dispersal of individuals, and potentially dissociating habitats for roosting from those for foraging. These effects would have a negative effect on individual fitness and be potentially significant effects to wildlife. The decision to idle or shift a field would be made early in the year. So for species that migrate into the area seasonally (mainly birds), those arriving in the spring would not be impacted as they would select suitable habitat upon their arrival. For year round residents (i.e., pond turtle, giant garter snake) the potential impacts would be greater. These would be minimized by the Environmental Commitments described in Section 2.3.2.4 that would preserve habitat and natural communities in canals and ditches which may serve as movement corridors.

Impacts on Natural Communities: Long-term water transfer actions under the Proposed Action would have a less than significant impact on seasonally flooded agricultural habitat communities in the Seller Service Area, because Environmental Commitments limit effects on seasonally flooded agricultural fields and associated natural communities.

Impacts on Special-Status Plants and Wildlife: Long-term water transfer actions under the Proposed Action would have a less than significant impact on special-status plant and wildlife species associated with seasonally flooded agriculture habitat because of the lack of impact to natural communities and maintenance of movement corridors within the landscape. Additional special-status species analysis is provided in 3.8.2.4.3 Special-Status Species.

3.8.2.4.2 Buyer Service Area

Reservoirs

San Luis Reservoir

The Proposed Action could alter surface water elevation and reservoir storage at San Luis Reservoir relative to existing conditions and the No Action/No Project Alternative. Under the Proposed Action, CVP storage at San Luis Reservoir would be reduced by up to 25,600 acre feet relative to the No Action/No Project Alternative in most water year types throughout the year, although these reductions would generally be less than ten percent. Exceptions include below normal water years during August (20,800 acre feet, or 10.6 percent, lower), dry years during August and September (11,000 to 13,700 acre feet, or 13.1 to 13.3 percent, lower) and critical years during September and October (13,300 to 18,400 acre feet, or 10.8 to 12.0 percent, lower).

There would be small reductions (less than five percent) in SWP storage at San Luis Reservoir due to the Proposed Action relative to the No Action/No Project Alternative in all months and water year types. The largest SWP storage reduction of 15,900 acre feet (corresponding to a 2.5 to 2.6 percent reduction) would occur in critical water years during March and April.

Changes in storage for either the CVP or SWP are generally small (less than five percent) with few exceptions. Because decreases in storage would remain within the normal range of operation for the reservoir, they would not have a substantial effect on biological resources. The most substantial changes would occur during dry and critically dry years, when the reservoir would already be at low water surface elevations, with the same types of effects as described for Camp Far West Reservoir.

At San Luis Reservoir, riparian habitat is limited to scattered patches of mule fat and occasional willows (Reclamation and DWR 2004). The water sources for riparian vegetation are dependent upon stream flows in the tributaries and would not be affected by water transfers; therefore, there would be no impacts to this habitat type. Similarly, other natural communities associated with San Luis Reservoir including freshwater emergent vegetation, upland scrub, and non-native grasslands surround San Luis Reservoir are not dependent of the reservoir for water and would not be affected by water transfers, thus wildlife associated with these habitats would not be impacted.

Impacts on Natural Communities: Long-term water transfer actions under the Proposed Action would have a less than significant impact on lacustrine and other natural communities around San Luis Reservoir because the changes in storage would fall within the normal range of operations of the reservoir and would comply with all existing operational requirements, and there would not be substantially reduced in area or geographic range of lacustrine natural communities.

Impacts on Special-Status Wildlife: Long-term water transfer actions under the Proposed Action would have a less than significant impact on special-status wildlife species associated with lacustrine and other natural communities around San Luis Reservoir because the changes in storage would fall within the normal range of operations of the reservoir and would comply with all existing operational requirements.

Effects of Water Use

Upland Crop Habitat

The Proposed Action could alter planting patterns and urban water use relative to the No Action/No Project Alternative. Under the Proposed Action, buyers would receive water made available through long-term water transfer actions. The amount of water available for purchase and the way in which water could be used, the effects of using this water on natural resources would be within the range of existing activities each CVP contract and associated BOs. Based on this, there would be no new effects on natural habitats or wildlife species in the Buyer Service Area.

Impacts on Natural Communities: Long-term water transfer actions under the Proposed Action would have a less than significant impact on natural communities in the Buyer Service Area because the effects of using the water would be within the range of existing activities under the buyers' CVP contract and associated BOs.

Impacts on Special-Status Wildlife: Long-term water transfer actions under the Proposed Action would have a less than significant impact on special-status wildlife species associated with upland crops because the water would be used on previously farmed lands and would not impact the natural communities upon which these wildlife species depend.

3.8.2.4.3 Special-Status Species

Special-Status Plant Species
The Proposed Action could impact wetlands that provide suitable habitat for Ahart's dwarf rush, Sanford's arrowhead, Red Bluff dwarf rush, and saline clover. The effects of cropland idling/shifting and groundwater substitution on the wetland habitat that special-status plant species depend on would be small and temporary as was described in the previous sections.

Seller Service Area

Cropland Idling/Shifting

An increase in cropland idling/shifting under the Full Range of Transfers Alternative (Proposed Action) would result in decreased flows in irrigation canals and return ditches adjacent to seasonally flooded agriculture (e.g., rice fields). These canals and ditches provide moderately suitable habitat for several special-status plant species including Sanford's arrowhead.

Environmental Commitments would reduce potential impacts due to cropland idling/shifting to less than significant by ensuring canals bordering rice parcels continue to carry water even when adjacent parcels are idled.

Impacts on Special-Status Plants: With incorporation of Environmental Commitments, cropland idling/shifting actions under the Proposed Action would have a less than significant impact on special-status plant species that could occur in wetlands and waterways associated with seasonally flooded agriculture in the Seller Service Area.

Groundwater Substitution

As discussed in Section 3.8.2.4.1, potential impacts to special-status plant species could result if changes in the composition and function of wetland and/or riparian plant communities occur as a result of transfer actions. As part of Proposed Action, there would be increased utilization of groundwater to irrigate crops. This would entail more groundwater pumping compared to the No Action/No Project Alternative to substitute for the seller's CVP contract water. Due to the complex interaction between groundwater and surface water, negative impacts would result from a reduction in creek flows to downstream wetland and riparian habitats. Decreased surface flows could potentially impact downstream natural communities, such as seasonal wetland and managed wetland habitats, which are reliant on creek and river flows for all or part of their water supply.

Perennial species, such as Sanford's arrowhead, could be extirpated from any areas where non-tidal freshwater emergent wetland extent is temporarily or permanently reduced during the long-term water transfer actions.

As described in the preceding sections, the effect of groundwater substitution under the Proposed Action, as predicted by the groundwater model, would generally be less than ten percent, except in Cache, Stony, Coon, and Little Chico creeks, and the Bear River. In addition, the Proposed Action has the potential to cause flow reductions of greater than ten percent on other small creeks where no data are available on existing streamflows to be able to determine this. The impacts of groundwater substitution on flows in small streams and associated water ways would be mitigated by implementation of Mitigation Measure GW-1 (see Section 3.3, Groundwater Resources) because it requires monitoring of wells and implementing a mitigation plan if the seller's monitoring efforts indicate that the operation of the wells for groundwater substitution pumping are causing substantial adverse impacts. The mitigation plan would include curtailment of pumping until natural recharge corrects the environmental impact. Implementation of these measures would reduce significant effects on vegetation and wildlife resources associated with streams to less than significant.

Impacts to Special-Status Plants: With incorporation of Mitigation Measure GW-1, groundwater substitution actions under the Proposed Action would have a less than significant impact on special-status plant species that could occur in wetlands and waterways associated with small streams in the Seller Service Area.

Giant Garter Snake

The Proposed Action could result in impacts to giant garter snake by reducing available aquatic habitat through cropland idling/shifting and groundwater substitution. Giant garter snakes require aquatic habitat during their active phase, extending from spring until fall. During the winter months, giant garter snakes are dormant and occupy burrows in upland areas. Giant garter snakes have the potential to be affected by the Proposed Action through cropland idling/shifting and the effects of groundwater substitution on small streams and associated wetlands. Idling/shifting of upland crops, water conservation actions, and reservoir releases are not anticipated to affect giant garter snakes, as they do not provide suitable habitat for this species. While the preferred habitat of giant garter snakes is natural wetland areas with slow moving water, giant garter snakes use rice fields and their associated water supply and tailwater canals for foraging and escape from predators, particularly where natural wetland habitats are not available. Because of the historic loss of natural wetlands, rice fields and their associated canals and drainage ditches have become important habitat for giant garter snakes.

The acreage to be idled/shifted under the action alternatives would be subject to the Environmental Commitments described in Section 2.3.2.4, which include measures to protect giant garter snakes. Environmental Commitments would provide additional protection to giant garter snakes with regard to cropland idling/shifting actions. These include provisions for sellers to demonstrate that any impacts to water resources needed for special-status species protection have been addressed, avoiding cropland idling actions in areas that could result in the substantial loss or degradation of habitats supporting priority giant garter snake populations, maintaining water levels in drainage canals to provide adequate movement corridors and foraging opportunities for giant garter snake, and implementing best management practices for canal maintenance activities.

Cropland Idling/Shifting

Long-term water transfers are expected to contribute a relatively small amount of rice idling/shifting acreage annually in relation to the variation in planted rice acreage resulting from drought conditions and typical farming practices. Under the Proposed Action, cropland idling/shifting transfers could idle up to a maximum of approximately 51,473 acres of rice fields (Table 3.8-9. This represents approximately 10.5 percent of the average land in rice production from 1992 to 2012 (U.S. Department of Agriculture [USDA], National Agricultural Statistics Service 2012). Any level of cropland idling/shifting would reduce the availability of stable wetland areas during a particular transfer year and may reduce suitable giant garter snake foraging habitat and increase the risk of predation on individual giant garter snakes.

Some individual giant garter snakes may have to relocate from an area that may have been their foraging area in prior years. Environmental Commitments that target priority areas that include suitable habitat with a high likelihood of giant garter snake occurrence requires that participating districts keep water in smaller drains and conveyance infrastructure such that emergent aquatic vegetation remains intact for giant garter snake escape cover and foraging. Also maintaining water in areas where occupied quality habitat occurs may limit the need for giant garter snake to relocate. If water resources do become limiting for giant garter snake, the water in these smaller drains and canals, as well as the required water in major drainage and irrigation canals, would aid movement of individuals to other foraging areas.

Although individual snakes that must relocate would be subject to greater risk of predation as they move to find new suitable foraging areas, it is likely that some individuals would be able to successfully relocate in suitable habitat elsewhere within the area. Young snakes (two years old and less) that need to relocate may be particularly vulnerable to increased predation risk. A reduction in available habitat and foraging opportunities compared to recent years where rice idling transfers were minimal may adversely affect foraging success and breeding condition if some individuals are unable to relocate. Young snakes would be anticipated to be at greater risk.

Information with which to estimate the size or age-class structure of the resident snake population in the area of analysis is not available. It is a product of annual fluctuation in acreage planted with rice in previous years, in combination with other physical and environmental factors. Regardless, some individual snakes would be likely to be displaced and would need to relocate elsewhere. Of these, it is expected that some will successfully relocate and some may be lost to predation or other forms of mortality caused by loss of foraging opportunities, either through competition with other individuals or loss of body condition and failure to thrive, particularly young snakes. The Proposed Action includes an environmental commitment to maintain water in major drains and canals in priority habitat areas to minimize the potential for such effects, with the assumption that proximity to water results in decreased stress on snake populations.

Impacts on Giant Garter Snake: Cropland idling/shifting actions under the Proposed Action would have a less than significant impact on giant garter snakes because a relatively small proportion (no more than 10.5 percent) of the rice acreage would be affected in any given year and the Environmental Commitments would avoid or reduce many of the potential impacts associated with this activity and the displacement of giant garter snake that could result. Individual giant garter snakes would be exposed to displacement and the associated increased risk of predation, reduced food availability, increased competition, and potentially reduced fecundity.

Groundwater Substitution

Natural and managed seasonal wetlands and riparian communities often depend on interactions between surface water and groundwater for part or all of their water supply. However, specific examples of streams and marshes with heavy clay soils and perched water tables, that typically provide giant garter snake habitat, do not typically depend on this interaction to a large degree to provide aquatic habitat. Also given the nature of soils in these environments it is unlikely that a direct linkage between the deeper groundwater basin and surface water in marshes exists.

Impacts on Giant Garter Snake: Groundwater substitutions under the Proposed Action are not expected to have a substantial effect on natural communities, including freshwater emergent vegetation. Thus, impacts to giant garter snake from groundwater substitution would be less than significant.

Pacific Pond Turtle

The Proposed Action could result in impacts to Pacific pond turtle by reducing available aquatic habitat through cropland idling/shifting, groundwater substitution, and reservoir drawdowns. Pacific pond turtle can utilize irrigation ditches and rice fields as aquatic habitat and adjacent uplands and levees as upland habitat. They may also use small streams and reservoirs for habitat. Actions that result in the desiccation of aquatic habitat could result in the turtle migrating to new areas, which in turn puts them at an increased risk of predation. Further reduction of turtle population as a result of long-term water transfer actions would be considered a significant impact.

The environmental commitments described above for the giant garter snake will also be beneficial to the protection of Pacific pond turtle. This includes a specific measure for Pacific pond turtle that ensures drainage canals will not be allowed to completely dry out.

Seller Service Area

Cropland Idling/Shifting

Cropland idling/shifting would reduce habitat for Pacific pond turtle. As described in the giant garter snake discussion, above, cropland idling/shifting is expected to primarily affect rice acreage, with up to 51,473 acres idled under the Proposed Action, based on the crop idling/shifting simulations. There is potential for decreased water flows in irrigation and return ditches associated with seasonally flooded agriculture such as rice fields because these distribution systems would no longer be delivering water to the fields being idled. Pacific pond turtles potentially utilize these waterways and associated upland areas for forage, shelter, nesting, estivation, overwintering, and dispersal, The decrease in available water could negatively impact habitat for Pacific pond turtle. The application of the Environmental Commitments would minimize these potential impacts.

Impacts to Pacific Pond Turtle: Cropland idling/shifting actions under the Proposed Action would have a less than significant impact on Pacific pond turtle, because a relatively small proportion (no more than 10.5 percent) of the seasonally flooded agriculture acreage would be affected in any year and environmental commitments in place as part of the project would limit the size and distribution of parcels that could be idled and ensure water remains in adjacent irrigation canals and return ditches.

Groundwater Substitution

Groundwater substitution could affect Pacific pond turtle through reduction in the flows of smaller streams in the Seller Service Area. Reduced flows could negatively impact suitable habitat for this species both in the streams themselves, and the wetlands and riparian habitats associated with them.

As described in the preceding sections, the effect of groundwater substitution under the Proposed Action, as predicted by the groundwater model, would generally be less than ten percent, except in Cache, Stony, Coon, and Little Chico creeks. In addition, the Proposed Action has the potential to cause flow reductions of greater than ten percent. Water levels naturally fluctuate depending on year type and timing of discharge in these creeks, and sections of the creeks dry up in dry or critical years. Pacific pond turtles require permanent water and would visit these water ways temporarily when they have flow. The reduction of flow caused by the Proposed Action would not substantially reduce habitat for the Pacific pond turtle and would not substantially affect habitat connectivity, because under the No Action/No Project condition these creeks are subject to substantial variability in flow, including periodic drying of reaches, and changes in groundwater levels would have a relatively small effect on this variation and the temporary Pacific pond turtle habitat in these streams.

Impacts on Pacific Pond Turtle: Groundwater substitution actions under the Proposed Action would have a less than significant impact on Pacific pond turtle because changes in flows in small streams would have a small effect on Pacific pond turtle habitat availability and would not substantially interfere with habitat connectivity.

Reservoir Drawdown

Fluctuations in water level elevation in reservoirs as a result of long-term water transfer actions could negatively impact habitat for Pacific pond turtle through dewatering of suitable aquatic habitat and alteration of upland nesting and refugia habitat. Lowering the water elevation could leave adult and juvenile Pacific pond turtle utilizing the reservoirs more vulnerable to predation. The decrease in storage may isolate Pacific pond turtles and impact juvenile turtles by limiting available cover and forage, as well as reproduction. Adult turtles could disperse safely, however hatchling maybe be preyed upon by a variety of predators including fish, bullfrogs, garter snakes, wading birds, and mammals. Hatchlings are also subject to rapid death by desiccation (Zeiner 1988). These impacts would be most noticeable at Camp Far West and New Bullards Bar reservoirs, both of which would experience the greatest increase in water elevation fluctuation as a result of the Proposed Action.

Normal operations at the reservoirs include annual average fluctuations in water levels ranging from 60 to 124 feet per year. Under the Proposed Action the average change in water level elevation would increase this average fluctuation by an extra one to three feet in any single year, with a maximum of four feet. Because the water level fluctuation is already so dramatic throughout the year, this increase of a maximum of four feet of water elevation drop would not significantly increase stress on individual Pacific pond turtle or affect populations of Pacific pond turtle that may be present within the reservoirs.

Impacts on Pacific Pond Turtle: The Proposed Action would have a less than significant impact on Pacific pond turtle on reservoirs in the Seller Service Area, as reservoirs would be operated within the same range as under the No Action/No Project Alternative. The additional change in reservoir elevation would be a small fraction of the total fluctuation experienced, and would not affect the movement or survival of Pacific pond turtle in these reservoirs.

Buyer Service Area

Though habitat for this species occurs over much of the Buyer Service Area, no changes in that habitat are anticipated as a result of the Proposed Action. The amount of water buyers could purchase would be limited by existing contracts and agreements, and they would not be able to utilize more water than is currently allotted them. There would be no appreciable change when compared to the No Action/No Project alternative in stream flows, reservoir levels, and/or cropland idling/shifting in the Buyer Service Area.

Impacts on Pacific Pond Turtle: The Proposed Action would have no impact on Pacific pond turtle in the Buyer Service Area as buyers could not purchase more water than allowed under their CVP contract. Therefore, the effects of using the water would be within the range described under the buyers' CVP contract and associated BOs.

San Joaquin Kit Fox

The Proposed Action could result in impacts to San Joaquin kit fox by reducing available habitat through cropland idling/shifting.

Buyer Service Area

Kit foxes prefer open annual grassland habitats with abundant small prey item food sources. The effects of using transfer water on natural resources would be within the range of existing activities within each CVP contract and existing BOs. Based on this, there would be no new effects on natural habitats or wildlife species in the Buyer Service Area.

Impacts on San Joaquin Kit Fox: Actions under the Proposed Action would have no impact on San Joaquin kit fox, as buyers could not purchase more water than allowed under their CVP contract. Therefore, the effects of using the water would be within the range of existing activities under the buyers' CVP contract and existing BOs.

Special-Status Bird Species

The Proposed Action could result in impacts to greater sandhill crane, black tern, purple martin, long-billed curlew, tricolored blackbird, white-faced ibis, and yellow-headed blackbird by reducing available nesting and foraging habitat through cropland idling, groundwater pumping, and reservoir drawdown.

Seller Service Area

Cropland Idling/Shifting

Birds within the area of analysis can be associated with both upland croplands and/or seasonally flooded agriculture (e.g., rice). Greater sandhill crane and long-billed curlew are the species that would be affected by idling/shifting upland crops, although both use seasonally flooded agricultural fields, as well. Black tern, purple martin, tricolored blackbird, white-faced ibis, and yellow-headed blackbird would be affected by idling seasonally flooded agriculture. As described previously, the Proposed Action would result in the idling/shifting of up to 8,500 acres of upland crops (corn, alfalfa, tomatoes) and up to 51,473 acres of seasonally flooded agriculture (primarily rice). This corresponds to a reduction of approximately five and 11 percent, respectively, of the historically planted upland and seasonally flooded crops. Associated with this reduction in planted acreage are the potential loss of water within adjacent agricultural supply and return canals, which could affect habitats associated with these canals, as well as water supply to downstream users, including the wildlife management areas, as well as streams and wetland habitats.

Seasonally flooded agriculture and associated canals that provide habitat for giant garter snake also provide foraging and nesting habitat for special-status birds. Potential impacts on special-status birds within these habitats would be avoided or reduced through the implementation of Environmental Commitments for giant garter snake that include: restricting water transfers within and adjacent to established wildlife refuges and conservation areas and maintaining water in drains and canals in priority habitat areas. Decisions about the location and amount of cropland idling/shifting that would occur in any year would be made early in the year, before those birds that nest in affected habitats would have established their nests. In the process of selecting their nest territory, the adult birds would select areas that support their needs for cover and forage and thus there would be minimal impact of idling shifting on nesting habitat.

Groundwater Substitution

Purple martin, tricolored blackbird, and yellow-headed blackbird may inhabit riparian areas and associated wetland habitats that could be impacted by the groundwater substitution. As previously described, this activity has the potential to reduce flows in small streams within the Seller Service Area, which could reduce the amount or suitability of streams and associated wetland and riparian areas for special-status bird species. This potential impact would be reduced through Mitigation Measure GW-1 (see Section 3.3, Groundwater Resources), which would be implemented if groundwater monitoring would indicate adverse environmental effects.

Releases from Reservoir Storage

Some of the species above occur in wetlands associated with reservoirs that may be affected by long-term water transfer. As described in Section 3.8.2.4.1, the effect of water transfers on natural communities associated with these reservoirs and wetlands, would be less than significant, because the elevation of the affected reservoirs fluctuate by scores of feet each year, and the additional increment of fluctuation caused by water transfers would be small.

The potential impacts of water transfers on each of the seven special-status bird species are discussed in the following sections.

<u>Greater Sandhill Crane</u>

Reducing seasonally flooded acreage in the Seller Service Area could reduce winter foraging habitat for this special-status bird species. One of five known greater sandhill crane populations in North America resides in the Central Valley (Littlefield et al. 1994). Though the Central Valley population does not breed within the area of analysis, the entire population winters in the Central Valley from Sacramento Valley south to the Bay-Delta (Pogson and Lindstedt 1991), roosting in areas of shallow water and foraging in adjacent areas of abundant waste rice, corn and other grains.

This species would be affected by water transfer activities through its cropland idling/shifting. As small streams, rivers and reservoirs are not primary habitats for this species, the effects of groundwater substitution and releases from reservoir storage would not affect this species.

Rice production cycle coincides with the bird's seasonal behavior: it uses rice grain waste (and upland corn fields) for wintering and foraging habitat from October to early spring and it over winters when rice and corn are harvested (fall). Greater sandhill cranes exhibit site fidelity (Zeiner et al. 1990), typically returning to the same location each year to winter. Idling fields or crop shifting within areas that greater sandhill cranes historically return to, may affect their wintering distribution patterns due to reduced forage availability on idled or crop shifted fields. Although the birds would disperse as their main food source diminishes, crop idling and/or crop shifting could affect the timing of dispersal and could negatively affect those individuals that have not had sufficient time to prepare for winter migration (i.e., hyperphagia - dramatic increase in appetite and food consumption) (Smithsonian Institution 2012). Environmental Commitments includes avoiding crop idling near Butte Sink, a core wintering areas for greater sandhill crane, to reduce impacts to the crane population. This species would also benefit from Environmental Commitments to protect giant garter snake and Pacific pond turtle. With these actions, this alternative would have a less than significant impact on greater sandhill crane.

Long-Billed Curlew

Reducing seasonally flooded acreage in the Seller Service Area would reduce winter forage for this special-status bird species. The curlew is a winter migrant in the Central Valley (Zeiner et al. 1990) where it generally forages on rice fields, upland croplands, and herbaceous plants. The Long-billed curlew breeds in elevated grasslands from April to September and returns to seasonally flooded agriculture (i.e. rice fields) during harvest (October through the end of fall). The curlew will use rice fields or other shallow open waters to forage for invertebrates from November through March. The winter migrants can arrive as early as June (Zeiner et al. 1990) to feed on small vertebrates and invertebrates. Winter curlews take advantage of seasonally flooded agricultural fields to probe for small prey items, but have been known to feed on dry fields. The idling of seasonally flooded agricultural fields would reduce foraging habitat for this species. Birds would generally disperse to other fields; however, idling of habitat known to support colonies of long-billed curlew would be avoided. Environmental Commitments aimed at the protection of giant garter snake would also reduce impacts on long-billed curlew. Impacts to long-billed curlew would be less than significant.

Tricolored Blackbird

Reducing seasonally flooded acreage in the Sacramento Valley would reduce summer forage and potential breeding habitat for this species. Groundwater substitution may reduce flows in small streams or reduce the availability of surface waters in wetland habitats which would affect forage and potential breeding habitat for this species. In the winter, tricolored blackbirds inhabit the Sacramento-San Joaquin Delta and central California coast. In the spring, they migrate to breeding locations in Sacramento County and throughout the San Joaquin Valley (Zeiner et al. 1990). Tricolored blackbirds generally breed from March to July, but have been observed breeding in the Sacramento Valley as early as October through December. The birds use breeding habitat adjacent to rice lands and will use shallow open water and rice land resources for foraging on small aquatic insects, emergent plants, and seeds. They also forage on cultivated grains (such as rice), on croplands and flooded fields, and forage for rice waste grain following harvest. Studies have shown that rice can constitute up to 38 percent of the annual diet of tricolored blackbirds (Zeiner et al. 1990). Although the rice plants are not tall or sturdy enough to support nests, the seasonally flooded fields provide resources required for breeding colony locations, which consist of open access to water and suitable foraging space with insect prey. Tricolored blackbirds will use emergent vegetation in return ditches and irrigation canals associated with the seasonally flooded fields. The rice agriculture cycle provides insect forage in the flooded fields during the summer and waste grain forage over winter. Because the species has specific breeding requirements and there are limited suitable breeding habitats, the same areas will often be used from year to year. Where changes in habitat prevent this, colonies are generally found in the vicinity of the previous year's colony (Zeiner et al. 1990).

The primary concern for the tricolored blackbird's association with rice fields is the use of the habitat as a source of insects and waste grain forage. Cropland idling/ crop shifting would affect the populations foraging distribution behavior and patterns and would reduce foraging and breeding habitat. Implementing the environmental commitments would help avoid or minimize these potential impacts. The Proposed Action, with the environmental commitments, would have a less than significant impact on tricolored blackbird.

White-Faced Ibis

Reducing seasonally flooded agriculture in the Sacramento Valley could reduce winter forage for this special-status species. The species is a winter migrant to the Central Valley. Important wintering locations include the Delevan-Colusa Butte Sink, northwestern Yuba County, the Yolo Bypass, Grasslands Wetlands Complex, and Mendota Wildlife Area (Zeiner et al. 1990). Central Valley breeding colonies can include the Mendota Wildlife Area and Colusa National Wildlife Area. White-faced ibis inhabit wetland habitat and seasonally flood agricultural fields, including rice fields that provide abundant prey sources. Population declines are due to drainage of wetlands and loss of nesting habitat (Zeiner et al. 1990); seasonally flooded agricultural habitat have in part, replaced the lost wetland foraging habitat for this species. This species forages in seasonally flooded agricultural field during the summer, and forages in dry or flooded rice fields during the fall and winter. Cropland idling/ crop shifting would reduce winter forage for this specie, however, the species does not rely solely on flooded fields for foraging. This species would also benefit from Environmental Commitments aimed at protecting giant garter snake and Pacific pond turtle. The Proposed Action, with the environmental commitments, would have a less than significant impact on white-faced ibis.

Black Tern

Reducing seasonally flooded acreage in the Seller Service Area would reduce breeding habitat and summer habitat for this special-status bird species. Black terns were formerly a common spring and summer migrant, and despite the presence of suitable habitat in rice farming areas and croplands, black tern numbers have declined throughout its range, especially in the Central Valley (Zeiner et al. 1990). Flooded agricultural fields have, in part, replaced the lost emergent wetland breeding and foraging habitat for this species. The rice production cycle coincides with the bird's seasonal behavior: field flooding would occur during the tern's Central Valley breeding season (May through August) and fields are drained when the birds migrate to other habitat (September and October). During breeding season the terns use flooded rice land and emergent vegetation for foraging (for insects and small vertebrates) and for nesting. This species constructs ground nests on dead vegetation; in rice fields, it will also nest on dikes that separate the patties. Reduction of seasonally flooded agricultural habitat could adversely affect local populations. However, the decisions regarding crop shifting/idling will have already been made prior to the onset of the species breeding season, and they would be able to select appropriate nesting sites for that year. Reclamation would review maps of areas proposed for crop idling/ crop shifting to ensure avoidance of core areas for black tern. This species would also benefit from environmental commitments aimed at the protection of giant garter snake and other special-status birds. Based on the forgoing, the Proposed Action, with the environmental commitments, would have a less than significant impact on black tern.

Purple Martin

Reducing seasonally flooded agriculture in the Sacramento Valley could reduce summer forage for this special-status species. Groundwater *substitution transfers could reduce the quality or extent of habitat for purple martin in the Seller Service Area.* Purple martins are generally associated with valley foothill and riparian habitats and are primarily a resident of wooded areas. They may be found in a variety of open habitats during migration, including grassland, wet meadow, and fresh emergent wetlands, usually near water (Zeiner et al. 1990), and have been observed in the Seller Service Area (CDFW 2014). This species feeds on insects. Purple martin may occur in the area of analysis from March through August. This species could be impacted by a reduction in the amount of rice and wetland habitat acreage. As previously described, crop idling/shifting would reduce the amount of rice habitat by approximately 10.5 percent under the Proposed Action. Groundwater substitution could reduce flows in small streams and wetlands associated with areas of groundwater withdrawal and in downstream areas. Reduced stream flows could result in stress on the riparian community and reduce riparian habitat suitability for the species and reduce the amount of available habitat. Implementation of the environmental commitments limit effects on irrigation system waterways, and small streams. With implementation of these environmental commitments, the impacts to purple martin would be less than significant.

<u>*Yellow-Headed Blackbird*</u>

Reducing seasonally flooded agriculture in the Sacramento Valley would reduce summer forage for this special-status species. Groundwater substitution in the Seller Service Area would reduce summer foraging and breeding habitat for this bird species. The species is associated with fresh emergent wetlands, along lakes and ponds. The yellow-headed blackbird uses these habitats for breeding, nesting, and roosting. These species has been observed in the Buyer Service Area and suitable habitat exists in both the Buyer and Seller Service Areas. Adults feed primarily on grains, but eat insects during breeding season (Zeiner et al. 1990). Nesting colonies require dense emergent wetland vegetation and a large insect prey base; nesting is timed to coincide with maximum aquatic insect emergence.

Transfer actions coincide the blackbird's breeding season (mid-April to late July) This species could be impacted by a reduction in the amount of rice and wetland habitat. As previously described, crop idling/shifting would reduce the amount of rice habitat by approximately seven percent under the Proposed Action. Groundwater substitution could reduce flows in small streams and wetlands associated with areas of groundwater withdrawal and in downstream areas. Reduced stream flows could result in stress on the riparian community and reduce suitability for the species and reduce the amount of available habitat for the species. Purple martin would benefit from the environmental commitments limiting effects on irrigation system waterways and in small streams. With implementation of these environmental commitments, the impacts to purple martin would be less than significant.

Impacts on Special-Status Bird Species: Long-term water transfer actions, including implementation of the environmental commitments, under the Proposed Action would have a less than significant impact on greater sandhill crane, black tern, purple martin, long-billed curlew, tricolored blackbird, white-faced ibis, and yellow-headed blackbird, because there would be a less than significant impact on the habitats that support these species. These species are highly mobile and could easily relocate to other suitable habitats that would continue to exist in the surrounding areas.

Buyer Service Area

Under the Proposed Action, buyers would receive water made available through long-term water transfer actions. The effects of using the purchased water on natural resources would be within the range of existing activities in each CVP contract and existing BOs. Based on this, there would be no new effects on natural habitats or wildlife species in the Buyer Service Area.

Impacts on Special-Status Bird Species: Actions under the Proposed Action would have no impact on special-status bird species, as the impacts associated with transferred water would be within the range of existing activities under the buyers' CVP contracts and their associated BOs.

3.8.2.5 Alternative 3: No Cropland Modifications

3.8.2.5.1 Seller Service Area

Under this alternative, water would not be made available through cropland idling or crop shifting. Water would be made available for transfer through groundwater substitution, stored reservoir releases, and conservation. The amount of water made available from each of these sources would be at the same levels as described for the Proposed Action.

Groundwater Levels

Groundwater Substitution Transfers

Groundwater substitution under the No Cropland Modifications Alternative could decrease available groundwater for natural communities relative to the No Action/No Project Alternative. The No Cropland Modifications Alternative would result in the same level of groundwater substitution as the Proposed Action. Effects on natural communities and special-status plant and wildlife species are described in Section 3.8.2.4.1.

Reservoirs

The No Cropland Modifications Alternative could impact reservoir storage and reservoir surface area. Under the No Cropland Modifications Alternative, model output predict that there would be no substantial (more than ten percent) decrease in end-of-month storage volume, reservoir elevation, or surface area relative to existing conditions in Shasta, Oroville, and Folsom reservoirs.

Changes in non-Project reservoirs participating in reservoir release transfers (Lake McClure and Camp Far West, Hell Hole, and French Meadows reservoirs) would be the same as described in the Proposed Action. Water elevations and storage levels during transfers would occur within the normal range of operations of these reservoirs under existing conditions.

Overall, all reservoirs would continue to be operated according to their existing requirements and within their current range of operations under the No Cropland Modifications Alternative.

Impacts on Natural Communities: Long-term water transfer actions under the No Cropland Modifications Alternative would have a less than significant impact on natural communities associated with reservoirs, because the changes caused by the project would occur within the normal range of operations for the reservoirs.

Impacts on Special-Status Wildlife: Long-term water transfer actions under the No Cropland Modifications Alternative would have a less than significant impact on special-status wildlife species associated with reservoirs, because the changes caused by the project would be within the normal range of operations for the reservoirs.

Rivers and Creeks

Sacramento River Watershed

The No Cropland Modifications Alternative could cause flows in rivers and creeks in the Sacramento River watershed to be lower than under the No Action/No Project Alternative. Under the No Cropland Modifications Alternative, mean monthly modeled flows would be reduced by less than ten percent on the Sacramento, Feather, Yuba, and American rivers. Based on the screening level criteria, these flow reductions are not considered substantial. Existing stream flow requirements (flow magnitude and timing, temperature, and other water quality parameters) would continue to be met. Among larger rivers, only the Bear River would have flows reduced by more than ten percent by the No Cropland Modifications Alternative. The effects of Alternative 3 on Bear River flows would be the same as described for the Proposed Action in Section 3.8.2.4.1.

Because smaller streams are affected only by groundwater, the effects of Alternative 3 on smaller streams would be the same as described for the Proposed Action in Section 3.8.2.4.1.

San Joaquin River Watershed

The effects to river flows in the San Joaquin and Merced rivers would be the same as those described for the Proposed Action in Section 3.8.2.4.1.

Delta

The No Cropland Modifications Alternative could cause Delta Outflows to be lower than under the No Action/No Project Alternative. Under the No Cropland Modifications Alternative, Delta outflows would not be more than 1.3 percent lower than flows under the No Action/No Project Alternative in any month or water year type. The maximum upstream shift in X2 location would be 0.1 km (0.2 percent) upstream during periods of decreased flow, and 0.6 km (0.7 percent) downstream during periods of increased flow. These flow changes would not have a significant impact on biological resources.

Impacts on Natural Communities: Long-term water transfer actions under the No Cropland Modifications Alternative would have a less than significant impact on natural communities associated with Delta Outflow. No impacts would be expected to occur to tidal perennial aquatic habitat, saline emergent wetland, and tidal fresh emergent wetland, because the project would have very small effects on Delta hydrology.

Impacts on Special-Status Plants and Wildlife: Long-term water transfer actions under the No Cropland Modifications Alternative would have a less than significant impact on special-status plant and wildlife species associated with Delta outflow, because the project would have very small effects on Delta hydrology.

3.8.2.5.2 Buyer Service Area

Reservoirs

San Luis Reservoir

The No Cropland Modifications Alternative could alter storage at San Luis Reservoir relative to the No Action/No Project Alternative. The effects to San Luis Reservoir storage would be the same as those described for the Proposed Action in Section 3.8.2.4.1.

3.8.2.6 Alternative 4: No Groundwater Substitution

3.8.2.6.1 Seller Service Area

Under this alternative, water would not be made available through groundwater substitution. Water would be made available for transfer through cropland idling or crop shifting, stored reservoir releases, and conservation. The amount of water made available from each of these sources would be at the same levels as described for the Proposed Action.

Groundwater Levels

Groundwater Substitution Transfers

Groundwater substitution under the No Groundwater Substitution Alternative would not decrease available groundwater and therefore have no impacts on natural communities that rely on groundwater.

Because the No Groundwater Substitution Alternative would not result in increased groundwater drawdown in relation to the No Action/No Project Alternative, no impacts to natural communities and associated wildlife would occur.

Reservoirs

The No Groundwater Substitution Alternative could impact reservoir storage and reservoir surface area. Under the No Groundwater Substitution Alternative, modeled storage volumes, reservoir elevations and surface areas would change. Model outputs predict that there would be no substantial (more than ten percent) decrease in end-of-month storage volume, reservoir elevation, or surface area relative to existing conditions in Shasta, Oroville, and Folsom reservoirs. Changes in non-Project reservoirs participating in reservoir release transfers (Lake McClure and Camp Far West, Hell Hole, and French Meadows reservoirs) would be the same as described in the Proposed Action in Section 3.8.2.4.1.Overall, all reservoirs would continue to be operated according to their existing requirements and within their current range of operations under the No Groundwater Substitution Alternative.

Impacts on Natural Communities: Long-term water transfer actions under the No Groundwater Substitution Alternative would have a less than significant impact on natural communities associated with reservoirs, because the changes caused by the project would occur within the normal range of operations for the reservoirs.

Impacts on Special-Status Wildlife: Long-term water transfer actions under the No Groundwater Substitution Alternative would have a less than significant impact on special-status wildlife species associated with reservoirs as the changes caused by the project would be within the normal range of operations for the reservoirs.

Rivers and Creeks

Sacramento River Watershed

The No Groundwater Substitution Alternative could cause rivers and creeks in the Sacramento River watershed to be lower than under the No Action/No Project Alternative. Under the No Groundwater Substitution Alternative, mean monthly modeled flows would be reduced by less than ten percent on the Sacramento, Feather, Yuba, and American rivers. Therefore, these flow reductions would not be considered substantial. Existing stream flow requirements (flow magnitude and timing, temperature, and other water quality parameters) would continue to be met. Therefore, the effects of the No Groundwater Substitution Alternative on terrestrial resources along these rivers would be less than significant. Among larger rivers, only the Bear River would have flows reduced by more than ten percent by the No Groundwater Substitution Alternative and, therefore, is further discussed in detail below.

Smaller streams in the Sacramento River watershed (see Table 3.8-3 for list of streams) would not be impacted by transfers under the No Groundwater Substitution Alternative because groundwater substitution would not occur.

Impacts on Natural Communities: Long-term water transfer actions under the No Groundwater Substitution Alternative would have no impact on surrounding natural communities in the Sacramento, Feather, Yuba, and American rivers and in smaller streams within the Sacramento River watershed, as no changes in streamflow would occur.

Impacts on Special-Status Wildlife: Long-term water transfer actions under the No Groundwater Substitution Alternative would have no impact on special-status wildlife species in the Sacramento, Feather, Yuba, and American rivers and in smaller streams within the Sacramento River watershed, as no changes in streamflow would occur and there would be no effect on natural communities.

Bear River

The No Groundwater Substitution Alternative could cause Bear River flows to be lower than under the No Action/No Project Alternative. Under the No Groundwater Substitution Alternative, the only flow reduction greater than ten percent would occur in critical water years during February (approximately 18 percent, or 45 cfs lower). These flow reductions would occur only in one month during critical water years.

Average monthly flows would be higher, compared to the No Action/No Project Alternative, in critical water years during July (approximately 240 percent, 58 cfs), and dry years during July and August (52 percent, 38 cfs and 22 percent, three cfs, respectively) when water is released from Camp Far West Reservoir for transfer.

Impacts on Natural Communities: Flow decreases, resulting from long-term water transfer actions under the No Groundwater Substitution Alternative, would occur in winter months, when terrestrial plants and animals are less dependent on stream flow. While flows would be reduced in some years in winter, they would remain within the normal range of variability experienced under the No Action/No Project condition and would occur only during winter critical years (approximately one year in every five). Flows would be higher in summer during dry and critically dry years, which would benefit riparian vegetation along the Bear River. Therefore, overall the flow changes that would occur on the Bear River under the No Groundwater Substitution Alternative would be beneficial to natural communities.

Impacts on Special-Status Wildlife: Long-term water transfer actions under the No Groundwater Substitution Alternative would be beneficial to terrestrial special-status wildlife species, because during summer flows would be higher than under the No Action/No Project condition, while flow reduction during winter in some years would not affect special-status species habitat.

San Joaquin River Watershed

San Joaquin River

The No Groundwater Substitution Alternative could cause San Joaquin River flows to be lower than under the No Action/No Project Alternative. Under the No Groundwater Substitution Alternative, flows would be reduced by less than ten percent on the San Joaquin River relative to the No Action/No Project Alternative. Based on the screening level criteria, these flow reductions would not be considered substantial. Further, there would be a 162.6 cfs (15 percent) increase in flows in dry water years during July.

These flow changes would not have a significant impact on biological resources.

Impacts on Natural Communities: Long-term water transfer actions under the No Groundwater Substitution Alternative would have a less than significant impact on natural communities along the San Joaquin River, because changes in flow would be small.

Impacts on Special-Status Wildlife: Long-term water transfer actions under the No Groundwater Substitution Alternative would have a less than significant impact on special-status wildlife species along the San Joaquin River, because flow reductions would be small and thus would have little effect on natural communities or associated special-status species.

Merced River

The No Groundwater Substitution Alternative could cause Merced River flows to be lower than under the No Action/No Project Alternative. Under the No Groundwater Substitution Alternative, flows in the Merced River would be reduced by less than ten percent relative to the No Action/No Project Alternative in all months and water year types. Flows would be 124 percent (163 cfs) and 59 percent (70 cfs) higher under the No Groundwater Substitution Alternative compared to the No Action/No Project Alternative in dry and critical water years, respectively, during July. While these flow changes exceed the ten percent screening criterion, the flow changes on the Merced River would not have a significant impact on biological resources, as flows would remain within the range that would occur under the No Action/No Project Alternative during this time of year.

Impacts on Natural Communities: Long-term water transfer actions under the No Groundwater Substitution Alternative would have a less than significant impact on natural communities along the Merced River, as flows would not be substantially decreased and would remain within the range of variability projected for the No Action/No Project alternative.

Impacts on Special-Status Wildlife: Long-term water transfer actions under the No Groundwater Substitution Alternative would have a less than significant impact on special-status wildlife species along the Merced River because flow changes would be small and thus would have little effect on natural communities or associated special-status species.

Delta

Delta Outflow

The No Groundwater Substitution Alternative could cause Delta Outflows to be higher than under the No Action/No Project Alternative. Under the No Groundwater Substitution Alternative, Delta outflows would not be more than one percent lower than outflows under the No Action/No Project Alternative in any month or water year type.

The maximum upstream shift in X2 location would be 0.1 km (0.1 percent) upstream during periods of decreased flow, and 0.8 km (0.5 percent) downstream during periods of increased flow. These changes to Delta outflow, and resultant changes in X2 position, would not have a substantial impact on biological resources because the change is minimal (less than ten percent).

These flow changes would not have a significant impact on biological resources.

Impacts on Natural Communities: Long-term water transfer actions under the No Groundwater Substitution Alternative would have a less than significant impact on natural communities associated within the Delta, because changes in Delta hydrology would be small. No impacts are expected to occur to tidal perennial aquatic habitat, saline emergent wetland, and tidal fresh emergent wetland, because the project would have very small effects on Delta hydrology.

Impacts on Special-Status Plants and Wildlife: Long-term water transfer actions under the No Groundwater Substitution Alternative would have a less than significant impact on special-status plant and wildlife species within the Delta, because changes in Delta hydrology would be small and thus would not affect natural communities or associated special-status species. 3.8.2.5.2 Buyer Service Area

Reservoirs

San Luis Reservoir

The No Groundwater Substitution Alternative would alter surface water elevation and reservoir storage at San Luis Reservoir relative to the No Action/No Project Alternative. Under the No Groundwater Substitution Alternative, neither CVP nor SWP storage at San Luis Reservoir would change relative to the No Action/No Project Alternative, and thus would have no effect on natural communities or special-status species associated with this reservoir.

3.8.3 Comparative Analysis of Alternatives

Table 3.8-10 summarizes the effects of each of the action alternatives. The following text supplements the table by describing the magnitude of the effects under the action alternatives and No Action/No Project Alternative.

Table 3.8-10. Comparative Analysis of Alternatives

Potential Impact	Alternative	Significance[1]			Significance after Mitigation	
		Natural Communities	Special-Status Species	Proposed Mitigation	Natural Communities	Special-Status Species
Groundwater substitution could reduce groundwater levels supporting natural communities	2, 3	LTS	LTS	None	LTS	LTS
Groundwater substitution could reduce stream flows supporting natural communities in some small streams	2, 3	S	S	GW-1	LTS	LTS
Cropland Idling/Shifting could alter habitat availability and suitability	2, 4	LTS	LTS	None	LTS	LTS
Transfer actions could impact reservoir storage and reservoir surface area and alter habitat availability and suitability associated with those reservoirs	2, 3, 4	LTS	LTS	None	LTS	LTS
Transfer actions could alter flows in large rivers, altering habitat availability and suitability associated with these rivers	2, 3, 4	LTS	LTS	None	LTS	LTS
Transfer actions could alter hydrologic conditions in the Delta, altering associated habitat availability and suitability	2, 3, 4	LTS	LTS	None	LTS	LTS
Transfer actions could impact special-status species in the area of analysis through modification of suitable lacustrine, wetland, riverine, and upland habitat	2, 3, 4	LTS	LTS	None	LTS	LTS
Transfer actions could impact San Luis Reservoir storage and surface area.	2, 3, 4	LTS	LTS	None	LTS	LTS

Potential Impact	Alternative	Significance[1]			Significance after Mitigation	
		Natural Communities	Special-Status Species	Proposed Mitigation	Natural Communities	Special-Status Species
Cropland idling/shifting under could alter the amount of suitable habitat for natural communities and special-status wildlife species associated with seasonally flooded agriculture and associated irrigation waterways	2, 4	LTS	LTS	None	LTS	LTS
Transfer actions could alter planting patterns and urban water use	2, 3, 4	LTS	LTS	None	LTS	LTS

[1] LTS = Less than significant, S = Significant

3.8.3.1 Alternative 1: No Action/No Project Alternative

There would be no changes in agricultural use or water availability in the Seller Service Area relative to existing conditions. In the Buyer Service Area, land idling could occur in response to CVP shortages which could affect habitat availability, but this would be similar to existing conditions. Conditions for natural communities and special-status species would remain the same as under existing conditions.

3.8.3.2 Alternative 2: Full Range of Transfers (Proposed Action)

Cropland idling, groundwater substitution, and reservoir storage transfers could affect the availability of water in the Seller Service Area and the availability and suitability of habitat. This could affect conditions for special-status species relative to the No Action/No Project Alternative, but the effects with the implementation of the Environmental Commitments would be less than significant to both natural communities and special-status species. The Proposed Action would increase water supplies to agricultural users in the Buyer Service Area, and the effects of using the water would be within the range of existing activities under the users' water service contracts.

3.8.3.3 Alternative 3: No Cropland Modifications

The No Cropland Modifications Alternative would not include cropland idling/shifting as a mechanism for transferring water. Effects would continue to occur from groundwater substitution and reservoir storage transfers at the same levels described for the Proposed Action. The effects of this alternative with the implementation of the Environmental Commitments would be less than significant to both natural communities and special-status species. The Proposed Action would increase water supplies to agricultural users in the Buyer Service Area, and the effects of using the water would be within the existing activities under the users' water service contracts.

3.8.3.4 Alternative 4: No Groundwater Substitution

The No Groundwater Substitution Alternative would not include groundwater substitution as a mechanism for transferring water. Effects would continue to occur from cropland idling/shifting and reservoir storage transfers. The amount of cropland idled/shifted would be greatest under this alternative, while reservoir storage transfers would be similar to the Proposed Action. The effects of this alternative with the implementation of the Environmental Commitments would be less than significant to both natural communities and special-status species. The Proposed Action would increase water supplies to agricultural users in the Buyer Service Area, and the effects of using the water would be within existing activities under the users' water service contracts.

3.8.4 Environmental Commitments/Mitigation Measures

Environmental Commitments described in Section 2.3.2.4 and Mitigation Measure GW-1 described in Section 3.3 would eliminate or reduce the potentially substantial effects of water transfer actions.

3.8.5 Potentially Significant Unavoidable Impacts

None of the alternatives would result in potentially significant unavoidable impacts on natural communities, wildlife, or special-status species.

3.8.6 Cumulative Impacts

The timeframe for the cumulative effects analysis extends from 2015 through 2024, a ten-year period. The cumulative effects area of analysis for vegetation and wildlife is the same as the area of analysis shown in Figure 3.8-1. This section analyzes cumulative effects using the project method, which is further described in Chapter 4.

The projects considered for the vegetation and wildlife cumulative condition are the SWP water transfers, CVP Municipal and Industrial Water Shortage Policy (WSP), Lower Yuba River Accord, San Joaquin River Restoration Program (SJRRP), and Exchange Contractors 25-Year Water Transfers, described in more detail Section 4.3 in Chapter 4 . SWP transfers could involve groundwater substitution transfers in the

Seller Service Area and, therefore, could affect vegetation and wildlife resources. The WSP could reduce agricultural water deliveries and increase land idling in the Buyer Service Area. Effects of the WSP in the Seller Service Area would be minor as agricultural water supplies would not substantially change relative to existing conditions.

The following section describes potential vegetation and wildlife resources cumulative effects for each of the proposed alternatives.

3.8.6.1 Alternative 2: Full Range of Transfers (Proposed Action)

3.8.6.1.1 Seller Service Area

Groundwater substitution and cropland idling/shifting under the Proposed Action in combination with other cumulative projects could decrease available groundwater for natural communities relative to the No Action/No Project Alternative. The SWP water transfers would make up to 6,800 acre feet of water available through groundwater substitution for transfer and up to 89,930 acre feet through cropland idling. The sellers for the SWP transfers are located in the Feather River Basin and receive water from Lake Oroville. There would be minimal geographic overlap between SWP transfers and long-term water transfers.

The WSP is primarily a policy development program and planning tool to clearly define water shortage conditions and what reductions in allocation CVP users should expect in the event of shortages. The WSP could reduce agricultural water deliveries and increase land idling in the Buyer Service Area. Effects of the WSP in the Seller Service Area would be minor as agricultural water supplies would not substantially change relative to existing conditions.

The effects of the long term water transfers on groundwater dependent natural communities would be small and local and the cumulative effect in combination with SWP water transfers and WSP would have a less than significant cumulative effect on groundwater dependent natural communities and special-status wildlife.

The Proposed Action in combination with other cumulative projects could cause flows in rivers and creeks in the Sacramento River watershed to be lower than under the No Action/No Project Alternative. The sellers for the SWP transfers are in the Feather River Basin and receive water from Lake Oroville. There would be minimal geographic overlap between this program and long-term water transfers, and therefore there effects on the flows in rivers and creeks in the Sacramento River watershed and the vegetation and wildlife resources that depend on them.

The WSP could reduce agricultural water deliveries and increase land idling in the Buyer Service Area. Effects of the WSP in the Seller Service Area would be minor as agricultural water supplies would not substantially change relative to existing conditions. Therefore, changes on flows in rivers and creeks in the Sacramento River watershed and the vegetation and wildlife resources that depend on them would not be substantial.

The Lower Yuba River Accord is a set of agreements designed to provide additional water to meet fisheries needs in the lower Yuba River. In addition, up to 60,000 acre feet of water per year would be made available for purchase by Reclamation and DWR for fish and environmental purposes. The Accord would provide a benefit to environmental resources within its action area and there would be no cumulative effect on vegetation and wildlife resources.

Long-term water transfers would not be cumulatively considerable with the other projects because each of the projects would have little or no impact flows in rivers and creeks in the Sacramento River watershed or the vegetation and wildlife resources that depend on them.

The Proposed Action in combination with other cumulative projects could affect reservoir storage and reservoir surface area. Changes to reservoir storage from SWP transfers, WSP, Yuba Accord, SJRRP, and Exchange Contractors 25-Year Water Transfers would be within the normal range of operations of the reservoirs. Overall, all reservoirs would continue to be operated according to their existing regulatory requirements under each of the projects. Therefore, the Proposed Action in combination with other cumulative projects would not have significant cumulative effects on vegetation and wildlife in reservoirs.

The Proposed Action in combination with other cumulative projects could cause flows in rivers and creeks in the San Joaquin River watershed to be lower than under the No Action/No Project Alternative. The SJRRP would increase flows and improve habitat conditions in and along the San Joaquin River to support spring-run and fall-run Chinook salmon, steelhead and other native fish. Portions of the Buyers service area border the area affected by the SJRRP, but do not directly overlap this area. The SJRRP would create additional habitat for sensitive vegetation and wildlife species by increasing flows and expanding floodplains. Therefore, this action would not be cumulatively adverse in combination with long-term water transfers and there would be no adverse cumulative effect on vegetation and wildlife resources.

The Proposed Action in combination with other projects could cause changes to Delta hydrology relative to the No Action/No Project Alternative. SWP transfers, WSP, Yuba Accord, and the SJRRP would have small effects on Delta hydrology and operations of these projects, and the long term transfers would be in compliance with applicable BOs for CVP and SWP operations. Generally, the SWP transfers, Yuba Accord, and Long-Term Water Transfers would increase flows in the Delta during the dry season and decrease flows slightly during other times of year. The SJRRP would increase inflows into the Delta, and the WSP would have minimal effects on Delta flows. The Proposed Action, in combination with other cumulative projects, would have only small effects on flows in the Delta, which would not result in a cumulative significant impact related to vegetation and wildlife resources.

3.8.6.1.2 Buyer Service Area

The Proposed Action in combination with other cumulative projects could alter planting patterns and urban water use relative to the No Action/No Project Alternative. Exchange contractors would sell up to 150 TAF to willing buyers under the Exchange Contractors 25- Year Water Transfers, including many of the buyers for the long-term water transfers. The Exchange Contractors service area does not overlap geographically with Long-Term Water Transfers Seller Service Area. However, both projects could sell their water to the same buyers. No buyer would be allowed to purchase more than their maximum CVP contract amount under the combined programs, so effects are existing activities under their CVP contracts and associated BOs. Therefore, the Proposed Action in combination with other cumulative projects would not have a significant cumulative effect on vegetation and wildlife resources.

3.8.6.2 Alternative 3: No Cropland Modification

The cumulative effects of Alternative 3 and other cumulative projects would be the same as those described for the Proposed Action.

3.8.6.3 Alternative 4: No Groundwater Substitution

Cropland idling/shifting under Alternative 4 would have the same effects as described in the Proposed Action; therefore, cumulative effects would be the same as effects of cropland idling/shifting described for the Proposed Action.

3.8.7 References

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Section 3.9
Agricultural Land Use

This section presents existing conditions for agricultural land use and resources within the area of analysis and discusses potential effects from the proposed alternatives.

Cropland idling would be the only water transfer method that would directly affect land use in the area of analysis. Implementation of crop shifting, groundwater substitution, conservation, or stored reservoir purchase transfers would not affect agricultural land uses and are not further discussed in this section. None of the alternatives or transfer types would affect other types of land uses (such as municipal or industrial); therefore, only agricultural land use is analyzed.

3.9.1 Affected Environment/Environmental Setting

3.9.1.1 Area of Analysis

The area of analysis for agricultural land use includes counties where cropland idling transfers could occur in the Seller Service Area and counties where transferred water would be used for agricultural purposes in the Buyer Service Area. Counties in the Seller Service Area include Glenn, Colusa, Butte, Sutter, Yolo, and Solano and counties in the Buyer Service Area include San Joaquin, Stanislaus, Merced, San Benito, Fresno, and Kings. Figure 3.9-1 shows the area of analysis for agricultural land use.

3.9.1.2 Regulatory Setting

3.9.1.2.1 Federal

Conservation Reserve Program (CRP)

The CRP is a Federal program administered by the U.S. Department of Agriculture (USDA) Farm Service Agency. The CRP is a voluntary program that offers annual rental payments, incentive payments, and annual maintenance payments for certain activities, and cost-share assistance to establish approved cover on eligible cropland. To be eligible for placement in the CRP, land must be (1) cropland that is planted or considered planted to an agricultural commodity two of the five most recent crop years (including field margins) and that is physically and legally capable of being planted in a normal manner to an agricultural commodity or (2) marginal pastureland that is either enrolled in the Water Bank Program or suitable for use as a riparian buffer to be planted to trees. As of April 1, 2012, there was a total of 103,471 acres of CRP cropland in California (USDA, Farm Service Agency 2012). Counties in the area of analysis with cropland acres in the CRP include: Glenn, Colusa, Sutter, Yolo, Solano, and Merced (USDA, Farm Service Agency 2012).

Figure 3.9-1. Agricultural Land Use Area of Analysis

3.9.1.2.2 State

Williamson Act

The California Land Conservation Act, also known as the Williamson Act, preserves agricultural and open space lands by discouraging premature and unnecessary conversion to urban uses. The Act creates an arrangement whereby private landowners contract with counties and cities to voluntarily restrict their land to agricultural and compatible open space uses. The vehicle for these agreements is a rolling term, 10-year contract (unless either party files a "notice of nonrenewal," the contract is automatically renewed for an additional year). In return, restricted parcels are assessed for property tax purposes at a rate consistent with their actual use, rather than potential market value.

The Williamson Act established a definition of Prime agricultural lands based on the actual or potential agricultural productivity of the land being restricted (California Department of Conservation [DOC] 2010; California DOC 2007a). Contracted land that meets the Williamson Act definition of prime agricultural land is designated as “Prime.” Under the law, Prime Agricultural Land is defined as (California DOC 2007b):

- Land which qualifies for rating as class I or class II in the Natural Resources Conservation Service (NRCS) land use capability classifications;
- Land which qualifies for rating 80 to 100 in the Storie Index Rating;
- Land which supports livestock used for the production of food and fiber and which has an annual carrying capacity equivalent to at least one animal unit per acre as defined by the USDA;
- Land planted with fruit or nut-bearing trees, vines, bushes or crops which have a nonbearing period of less than five years and which will normally return during the commercial bearing period on an annual basis from the production of unprocessed agricultural plant production not less than two hundred dollars per acre;
- Land which has returned from the production of unprocessed agricultural plant production and has an annual gross value of not less than two hundred dollars per acre for three of the previous five years.

Non-Prime agricultural land is defined as land that does not meet any of the criteria for classification as Prime Agricultural Land. Most Non-Prime Land is in agricultural uses such as grazing or non-irrigated crops. However, Non-Prime Land may also include other open space uses that are compatible with agriculture and consistent with local general plans.

The Williamson Act also establishes a Farmland Security Zone (FSZ), which introduces a 20-year contract between a private landowner and a county that restricts land to agricultural or open space uses.[1] FSZ lands

[1] An FSZ is essentially an area created within an AP by a board of supervisors upon request by a landowner or group of landowners. An AP defines the boundary of an area within which a city or county will enter into Williamson Act contracts with landowners. The boundary is designated by resolution of the board of supervisors or city council having jurisdiction. APs must generally be at least 100 acres in size.

Table 3.9-1. Williamson Act and Agricultural Conservation Easement Acreage in Area of Analysis (2010-2011)

County	2010 Williamson Act Prime (acres)	2010 Williamson Act Non-Prime (acres)	2010 Total (Williamson Act lands; acres)	2011 Williamson Act Prime (acres)	2011 Williamson Act Non-Prime (acres)	2011 Total (Williamson Act lands; acres)	Percent Change (Total Williamson Act lands; 2010-2011)	FSZ (2011 acres) Urban Prime	FSZ (2011 acres) Urban Non-Prime	FSZ (2011 acres) Non-Urban Prime	FSZ (2011 acres) Non-Urban Non-Prime	Agricultural Conservation Easement (through the CFCP[1]; 2011 acres) Prime	Agricultural Conservation Easement (through the CFCP[1]; 2011 acres) Non-Prime	2011 Total Conservation lands (acres)[2]
Seller Service Area														
Glenn	63,618	267,432	**331,050**	63,781	270,024	**333,805**	**+0.83**	14,112	500	73,600	2,226	--	--	**424,243**
Colusa	66,952	193,720	**260,672**	66,952	193,720	**260,672**	**0**	15,989	737	40,628	2,035	--	--	**320,060**
Butte	113,686	106,293	**219,979**	113,808	103,367	**217,175**	**-1.3**	--	--	--	--	--	--	**220,175**
Sutter	51,408	13,165	**64,573**	51,408	13,165	**64,573**	**0**	--	--	--	--	--	--	**64,573**
Yolo	240,988	176,114	**417,102**	198,642	156,651	**355,593**	**-14.7**	158	1	--	--	200	7	**355,658**
Solano	120,053	145,582	**265,635**	119,936	145,371	**265,307**	**-0.12**	--	--	--	--	1,456	2,882	**269,916**
Buyer Service Area														
Stanislaus	293,495	396,459	**689,954**	--	--	**--**	**-100**	--	--	--	--	--	--	**--**
San Joaquin	323,478	149,489	**472,967**	322,528	148,460	**470,988**	**-0.42**	15,213	79	34,608	10,098	--	--	**530,986**
Merced	258,883	209,080	**467,963**	259,199	208,768	**467,967**	**+2.64**	--	--			--	--	**467,967**
San Benito	51,759	530,783	**582,542**	52,721	528,411	**580,132**	**-0.05**	--	--	--	--	--	--	**580,132**
Fresno	982,032	483,245	**1,465,277**	982,032	483,245	**1,465,277**	**-0.06**	--	--	25,799	3,482	--	--	**1,494,558**
Kings	279,062	110,671	**389,733**	278,839	110,671	**389,510**	**-0.07**	28,851	227	248,090	10,642	--	--	**677,320**

Source: California DOC 2013

[1] CFCP = California Farmland Conservation Program

[2] 2010 total conservation lands includes all Williamson Act lands, FSZ lands, and Agricultural Conservation Easements in 2010.

are designated as Urban and Non-Urban for subvention payment purposes. FSZ contracted land within a city's sphere of influence (SOI), or within three miles or the exterior boundaries of a city's SOI, is "Urban", while all other FSZ contracted land is "Non-Urban." Table 3.9-1 summarizes farm acreage by county enrolled in the Williamson Act and FSZ program in 2010 and 2011, which is data compiled by the California DOC, Division of Land Resource Protection [DLRP].

California Farmland Conservancy Program (CFCP)
The CFCP is a voluntary program that seeks to encourage the long-term, private stewardship of agricultural lands through the use of agricultural conservation easements. The CFCP provides grant funding for projects that use and support agricultural conservation easements for protection of agricultural lands. An agricultural conservation easement is a voluntary, legally recorded deed restriction that is placed on a specific property used for agricultural production. The goal of an agricultural conservation easement is to maintain agricultural land in active production by removing the development pressures from the land. Such an easement prohibits practices that would damage or interfere with the agricultural use of the land. Because the easement is a restriction on the deed of the property, the easement remains in effect even when the land changes ownership. Table 3.9-1 summarizes the agricultural conservation easements in the area of analysis.

Farmland Mapping and Monitoring Program (FMMP)
The FMMP was established in 1982 and produces maps and statistical data used for analyzing effects on California's agricultural resources. The maps are updated every two years with the use of aerial photographs, a computer mapping system, public review, and field reconnaissance. The FMMP rates agricultural land according to soil quality and irrigation status and denotes the best quality land Prime Farmland. FMMP characterizes land use into the following categories:

- **Prime Farmland[2] –** Land with the best combination of physical and chemical features able to sustain long-term production of agricultural crops. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for production of irrigated crops at some time during the two update cycles prior to the mapping date.

- **Farmland of Statewide Importance –** Land similar to Prime Farmland that has a good combination of physical and chemical characteristics for the production of crops. This land has minor

[2] The term "Prime" as used here refers to the FMMPs designation of the location and extent of "Prime Farmland" as described above. The state's Williamson Act designates prime farmland based on different economic or production criteria, as described under the Williamson Act section above.

shortcomings, such as greater slopes or less ability to store soil moisture than Prime Farmland. Land must have been used for production of irrigated crops at some time during the two update cycles prior to the mapping date.

- **Unique Farmland –** Lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the two update cycles prior to the mapping date.

- **Farmland of Local Importance –** Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee. Often includes lands used for dryland farming and formerly irrigated land that has been left idle for three or more update cycles.

- **Grazing Land –** Land on which the existing vegetation is suited to the grazing of livestock.

- **Urban and Built-Up Land –** Land occupied by structures with a building density of at least one unit to 1.5 acres, or approximately six structures to one 10-acre parcel.

- **Other Land –** Land that does not meet the criteria of any other category.

- **Water –** Water areas with an extent of at least 40 acres.

3.9.1.2.3 Regional/Local

Cropland idling in the Seller Service Area could affect Important Farmland as well as lands enrolled in the Williamson Act and other land conservation programs by resulting in land conversion and/or incompatible land uses. The following local policies apply to agricultural lands in the Seller Service Area.

Glenn County

The Glenn County General Plan, Volume I – Policies, includes the following policies in relation to the preservation of agricultural lands (Glenn County 1993a):

- Natural Resources Policy (NRP)-1: Maintain agriculture as a primary, extensive land use, not only in recognition of the economic importance of agriculture, but also in terms of agriculture's contribution to the preservation of open space and wildlife habitat.

- NRP-2: Support the concept that agriculture is a total, functioning system which will suffer when any part of it is subjected to regulation resulting in the decline of agriculture: economics productivity, unmitigated land use conflicts and/or excessive land fragmentation.

- NRP-5: Continue participation in the Williamson Act policy, and allow new lands devoted to commercial agriculture and located outside urban limit lines to enter the program, subject to the specific standards for inclusion in this General Plan.

- NRP-8: Assure future land use decisions protect and enhance the agricultural economics industry while also protecting existing uses from potential incompatibilities.

Glenn County Code Title 15 establishes the Unified Development Code. Section 15.460 describes the Agricultural Preserve (AP) Zone. The AP Zone applies to lands covered by the Williamson Act within the county and has the purpose of:

- Preserving the maximum amount of the limited supply of agricultural land which is necessary in the conservation of the county's economic resources and vital for a healthy agricultural economy; and,

- Protecting the general welfare of the agricultural community for encroachments of unrelated agricultural uses which, by their nature, would be injurious to the physical and economic well-being of the agricultural community.

The county code defines permitted uses in AP zones. Similarly, Section 15.470 defines FSZs within the county and permitted uses on these lands (Ordinance Number 1183 § 2) (Glenn County 2006).

Colusa County

The Conservation Element of Colusa County's 1989 General Plan includes Conservation (CO) Policy CO-2, which states that agricultural land should be preserved and protected (Colusa County 1989).

Colusa County's Code, Chapter 34, Farming Practices, is intended to, in part, "preserve and protect for agricultural use those lands zoned for agricultural use" (Ordinance Number 510) (Colusa County 2012).

Appendix 1.4, Article 4 of the county's code establishes zoning district regulations for the AP Zone and the exclusive agriculture zone.

Butte County
Chapter 7 of the Butte County General Plan (Butte County 2012a) is the agricultural element of the plan and addresses agricultural resource goals and policies. Relevant goals include:

- Goal (Agriculture) AG-2: Protect Butte County's agricultural lands from conversion to non-agricultural uses.

This goal is supported by multiple policies regarding protection of agricultural lands and requirements before redesignation or rezoning of agricultural land.

Sutter County
Chapter 4 of the Sutter County General Plan (Sutter County 2010a) addresses agricultural resources and agricultural resource policies within the county. Relevant policies include the following:

- AG 1.1 – Preserve and maintain agriculturally designated lands for agricultural use and direct urban/suburban and other nonagricultural related development to the cities, unincorporated rural communities, and other clearly defined and comprehensively planned development areas.

- AG 1.5 – Discourage the conversion of agricultural land to other uses unless all of the following findings can be made:

  - The net community benefit derived from conversion of the land outweighs the need to protect the land for long-term agricultural use;

  - There are no feasible alternative locations for the proposed use that would appreciably reduce impacts upon agricultural lands; and,

  - The use will not have significant adverse effects, or can mitigate such effects, upon existing and future adjacent agricultural lands and operations.

Chapter 1500, Division 13 of Sutter County's Code establishes the zoning code for unincorporated areas in the county (Sutter County 2011). As with other counties in the area of analysis, the Sutter County zoning code establishes permitted uses for agricultural lands within the unincorporated county.

Yolo County

The Yolo County 2030 Countywide General Plan, Agriculture and Economic Development Element (Yolo County 2009) addresses the preservation of agricultural resources through the following policies:

- Policy AG-1.2: Maintain parcel sizes outside of the community growth boundaries large enough to sustain viable agriculture and discourage conversion to non-agricultural home sites.

- Policy AG-1.3: Prohibit the division of agricultural land for non-agricultural uses.

- Policy AG-1.4: Prohibit land use activities that are not compatible within agriculturally designated areas.

- Policy AG-1.5: Strongly discourage the conversion of agricultural land for other uses. No lands shall be considered for redesignation from Agricultural or Open Space to another land use designation unless all of the following findings can be made:

  - There is a public need or net community benefit derived from the conversion of land that outweighs the need to protect the land for long-term agricultural use;

  - There are no feasible alternative locations for the proposed project that are either designated for non-agricultural land uses or are less productive agricultural lands; and,

  - The use would not have a significant adverse effect on existing or potential agricultural activities on surrounding lands designated Agriculture.

- Policy AG-1.6: Continue to mitigate at a ratio of no less than 1:1 the conversion of farmland and/or the conversion of land designated or zoned for agriculture, to other uses.

- Policy AG-1.8: Regulate and encourage removal of incompatible land uses and facilities from agriculturally designated lands.

- Policy AG-1.21: Within conservation easements, preclude the practice of fallowing fields for the purpose of water export. Fallowing as a part of normal crop rotation is not subject to this policy.

Yolo County's Code, Title 8, Chapter 2, addresses zoning in the unincorporated county including AP zones, Agricultural Exclusive zones, and Agricultural General zones (Articles 4, 5, and 6) (Yolo County 2000). The zoning codes establish the principle uses for each agricultural zone.

Solano County

Chapter 3, Agriculture, of the Solano County General Plan (2008a) includes the following policies related to agricultural lands in the county:

- Agriculture Policy (Policy AG.P)-1: Ensure that agricultural parcels are maintained at a sufficient minimum parcel size so as to remain a farmable unit. Farmable units are defined as the size of parcels a farmer would consider viable for leasing or purchasing for different agricultural purposes. A farmable unit is not considered the sole economic function that will internally support a farm household.
- Policy AG.P-18: Support long-term viability of commercial agriculture and discourage inappropriate development of agricultural lands within the Delta.
- Policy AG.P-19: Require agricultural practices to be conducted in a manner that minimizes harmful effects on soils, air and water quality, and marsh and wildlife habitat.

Chapter 2.2 of Solano County's Code describes requirements for agricultural lands and operations within the unincorporated county (Solano County no date). Section 2.2-20 describes that it is the county's policy to conserve and protect both intensive and extensive agricultural land, and to protect those lands for exclusive agricultural uses that do not interfere with agricultural operations (Solano County no date). Chapter 28 of the county's code establishes zoning regulations within the unincorporated county including for agricultural districts.

3.9.1.3 Existing Conditions

The California DOC maps farmland throughout California every two years. The most recent data on farmland acreages and farmland conversions throughout the state is reported in the DOC's *Farmland Conversion Report 2006-2008* (California DOC 2011a). Additionally, the DOC has analyzed data on agricultural land conversions for the 2008 to 2010 period for some counties in the area of analysis.

The following sections describe agricultural and other land use within the counties in the area of analysis as well as recent land use conversions in each county.

3.9.1.3.1 Seller Service Area

Glenn County

In 2010, of the 849,129 acres mapped in Glenn County, 574,894 were in agricultural use, 6,420 acres were urbanized, 5,950 acres were water, and 261,775 acres were "other" (California DOC, DLRP 2012a). Table 3.9-2 summarizes further land use classifications and net changes from 2008 to 2010.

Table 3.9-2. Glenn County Summary and Change by Land Use Category

	Total Acreage Inventoried		2008-10 Acreage Changes			
Land Use Category	**2008**	**2010**	**Acres Lost (-)**	**Acres Gained (+)**	**Total Acreage Changed**	**Net Acreage Changed**
Prime Farmland	159,811	157,940	3,576	1,705	5,281	-1,871
Farmland of Statewide Importance	87,497	87,071	1,244	818	2,062	-426
Unique Farmland	17,306	17,300	1,007	1,001	2,008	-6
Important Farmland Subtotal	264,614	262,311	5,827	3,524	9,351	-2,303
Farmland of Local Importance	83,544	85,836	3,446	5,738	9,184	2,292
Grazing Land	227,391	226,837	1,587	1,033	2,620	-554
Agricultural Land Subtotal	575,549	574,984	10,860	10,295	21,155	-565
Urban and Built-up Land	6,372	6,420	123	171	294	48
Other Land	261,258	261,775	1,087	1,604	2,691	517
Water Area	5,950	5,950	0	0	0	0
Total Area Inventoried	**849,129**	**849,129**	**12,070**	**12,070**	**24,140**	**0**

Source: California DOC, DLRP 2012a.

In Glenn County, Farmland of Local Importance includes all lands not qualifying for Prime, Statewide, or Unique farmland that are cropped on a continuing or cyclic basis (irrigation is not a consideration). The classification also includes all farmable land within the Glenn County water district boundaries not qualifying for the Prime, Statewide, or Unique designations (California DOC 2011a).

Colusa County

In 2010, of the 740,393 acres mapped in Colusa County, 554,695 were in agricultural use, 5,142 acres were urbanized, 1,911 acres were water and 169,484 acres were "other" (California DOC, DLRP 2012b). Table 3.9-3 summarizes further land use classifications and net changes in land use categories.

Table 3.9-3. Colusa County Summary and Change by Land Use Category

Land Use Category	Total Acreage Inventoried 2008	Total Acreage Inventoried 2010	2008-10 Acreage Changes: Acres Lost (-)	Acres Gained (+)	Total Acreage Changed	Net Acreage Changed
Prime Farmland	197,497	196,320	1,537	360	1,897	-1,177
Farmland of Statewide Importance	2,012	2,046	14	48	62	34
Unique Farmland	121,186	120,316	1,435	565	2,000	-870
Important Farmland Subtotal	320,695	318,682	2,986	973	3,959	-2,013
Farmland of Local Importance	235,023	236,013	729	1,719	2,448	990
Grazing Land	9,111	9,161	49	99	148	50
Agricultural Land Subtotal	564,829	563,856	3,764	2,791	6,555	-973
Urban and Built-up Land	5,111	5,142	26	57	83	31
Other Land	168,542	169,484	406	1,348	1,754	942
Water Area	1,911	1,911	0	0	0	0
Total Area Inventoried	740,393	740,393	4,196	4,196	8,392	0

Source: California DOC, DLRP 2012b.

In Colusa County, Farmland of Local Importance includes all farmable lands within the county that do not meet the definitions of Prime, Statewide, or Unique, but are currently irrigated pasture or non-irrigated crops. The classification also includes non-irrigated land with soils qualifying for Prime Farmland or Farmland of Statewide Importance and lands that would have Prime or Statewide designation and have been improved for irrigation but are now idle. Additionally, lands in this category include lands with a General Plan Land Use designation for agricultural purposes, and lands that are legislated to be used only for agricultural (farmland) purposes (California DOC 2011a).

Butte County

In 2010, of the 1,073,252 acres mapped in Butte County, 640,350 were in agricultural use, 45,924 acres were urbanized, 22,858 acres were water and 364,130 acres were “other” (California DOC, DLRP 2012c). Table 3.9-4 summarizes further land use classifications and net changes in land use categories. In Butte County, the Board of Supervisors determined there would be no Farmland of Local Importance designation (California DOC 2011a).

Table 3.9-4. Butte County Summary and Change by Land Use Category

Land Use Category	Total Acreage Inventoried 2008	2010	2008-10 Acreage Changes: Acres Lost (-)	Acres Gained (+)	Total Acreage Changed	Net Acreage Changed
Prime Farmland	194,689	193,290	1,926	527	2,453	-1,399
Farmland of Statewide Importance	22,794	21,792	1,215	213	1,428	-1,002
Unique Farmland	23,078	22,190	1,143	255	1,398	-888
Important Farmland Subtotal	240,561	237,272	4,284	995	5,279	-3,289
Farmland of Local Importance	0	0	0	0	0	0
Grazing Land	401,859	403,078	873	2,092	2,965	1,219
Agricultural Land Subtotal	642,420	640,350	5,157	3,087	8,244	-2,070
Urban and Built-up Land	45,350	45,914	204	768	972	564
Other Land	362,624	364,130	977	2,483	3,460	1,506
Water Area	22,858	22,858	0	0	0	0
Total Area Inventoried	1,073,252	1,073,252	6,338	6,338	12,676	0

Source: California DOC, DLRP 2012c.

Sutter County

In 2010, of the 389,314 acres mapped in Sutter County, 339,358 were in agricultural use, 13,560 acres were urbanized, 1,883 acres were water, and 34,513 acres were "other." (California DOC, DLRP 2012d) Table 3.9-5 summarizes further land use classifications and net changes from 2008 to 2010. In Sutter County, the Board of Supervisors determined there would be no Farmland of Local Importance designation (California DOC 2011a).

Table 3.9-5. Sutter County Summary and Change by Land Use Category

Land Use Category	Total Acreage Inventoried 2008	2010	2008-10 Acreage Changes: Acres Lost (-)	Acres Gained (+)	Total Acreage Changed	Net Acreage Changed
Prime Farmland	165,315	162,673	3,266	624	3,890	-2,642
Farmland of Statewide Importance	106,597	105,395	1,709	507	2,216	-1,202
Unique Farmland	19,156	17,752	1,720	316	2,036	-1,404
Important Farmland Subtotal	291,068	285,820	6,695	1,447	8,142	-5,248
Farmland of Local Importance	0	0	0	0	0	0
Grazing Land	52,571	53,538	1,426	2,393	3,819	967
Agricultural Land Subtotal	343,639	339,358	8,121	3,840	11,961	-4,281
Urban and Built-up Land	13,230	13,560	25	355	380	330
Other Land	30,562	34,513	670	4,621	5,291	3,951
Water Area	1,883	1,883	0	0	0	0
Total Area Inventoried	389,314	389,314	8,816	8,816	17,632	0

Source: California DOC, DLRP 2012d.

Yolo County

In 2010, of the 653,453 acres mapped in Yolo County, 534,984 were in agricultural use, 30,537 acres were urbanized, 7,804 acres were water, and 80,128 acres were "other" (California DOC, DLRP 2012e).

Table 3.9-6 summarizes further land use classifications and net increases and reductions in categories from 2008 to 2010. In Yolo County, Farmland of Local Importance includes cultivated farmland having soils which meet the criteria for Prime or Statewide, except that the land is not presently irrigated, and other nonirrigated land (California DOC 2011a).

Table 3.9-6. Yolo County Summary and Change by Land Use Category

Land Use Category	Total Acreage Inventoried		2008-10 Acreage Changes			
	2008	2010	Acres Lost (-)	Acres Gained (+)	Total Acreage Changed	Net Acreage Changed
Prime Farmland	255,193	252,083	3,661	551	4,212	-3,110
Farmland of Statewide Importance	16,793	16,412	568	187	755	-381
Unique Farmland	45,750	43,629	3,071	950	4,021	-2,121
Important Farmland Subtotal	317,736	312,124	7,300	1,688	8,988	-5,612
Farmland of Local Importance	60,345	62,410	3,096	5,161	8,257	2,065
Grazing Land	157,963	160,450	2,337	4,824	7,161	2,487
Agricultural Land Subtotal	536,044	534,984	12,733	11,673	24,406	-1,060
Urban and Built-up Land	30,225	30,537	20	332	352	312
Other Land	79,370	80,128	693	1,451	2,144	758
Water Area	7,814	7,804	10	0	10	-10
Total Area Inventoried	653,453	653,453	13,456	13,456	26,912	0

Source: California DOC, DLRP 2012e.

Solano County

In 2010, of the 582,373 acres mapped in Solano County, 356,659 were in agricultural use, 59,591 acres were urbanized, 53,462 acres were water and 112,661 acres were "other" (California DOC, DLRP 2012f). Table 3.9-7 summarizes further land use classifications and net changes in land use categories from 2008 to 2010.

Table 3.9-7. Solano County Summary and Change by Land Use Category

Land Use Category	Total Acreage Inventoried 2008	Total Acreage Inventoried 2010	2008-10 Acreage Changes: Acres Lost (-)	Acres Gained (+)	Total Acreage Changed	Net Acreage Changed
Prime Farmland	135,735	131,820	4,498	583	5,081	-3,915
Farmland of Statewide Importance	7,038	6,369	873	204	1,077	-669
Unique Farmland	10,526	9,275	1,540	289	1,829	-1,51
Important Farmland Subtotal	153,299	147,464	6,911	1,076	7,987	-5,835
Farmland of Local Importance	0	0	0	0	0	0
Grazing Land	204,519	209,195	1,511	6,187	7,698	4,676
Agricultural Land Subtotal	357,818	356,659	8,422	7,263	15,685	-1,159
Urban and Built-up Land	59,157	59,591	194	628	822	434
Other Land	112,087	112,661	420	994	1,414	574
Water Area	53,311	53,462	0	151	151	151
Total Area Inventoried	582,373	582,373	9,036	9,036	18,072	0

Source: California DOC, DLRP 2012f.

In Solano County, the Board of Supervisors determined that there will be no Farmland of Local Importance (California DOC 2011a).

3.9.1.3.2 Buyer Service Area

The following sections summarize land use in the counties in the Buyer Service Area that could be affected by the proposed alternatives. Land use numbers were derived from the most recent FMMP mapping.

Stanislaus

In 2012, of the 970,168 acres mapped in Stanislaus County, 832,453 acres were in agricultural use, 64,822 acres were urbanized, 7,465 acres were water and 65,428 acres were “other” (California DOC, DLRP 2012k). Table 3.9-8 summarizes further land use classifications and net changes in land use categories from 2010 to 2012.

Table 3.9-8. Stanislaus County Summary and Change by Land Use Category

Land Use Category	Total Acreage Inventoried		2010-12 Acreage Changes			
	2010	2012	Acres Lost (-)	Acres Gained (+)	Total Acreage Changed	Net Acreage Changed
Prime Farmland	253,434	251,723	3,037	1,326	4,363	-1,711
Farmland of Statewide Importance	31,475	31,765	297	587	884	290
Unique Farmland	87,524	95,187	715	8,378	9,093	7,663
Important Farmland Subtotal	**31,366**	**31,331**	**2,312**	**2,277**	**4,589**	**-35**
Farmland of Local Importance	403,799	410,006	6,361	12,568	18,929	6,207
Grazing Land	429,545	422,447	8,968	1,870	10,838	-7,098
Agricultural Land Subtotal	**833,344**	**832,453**	**15,329**	**14,438**	**29,767**	**-891**
Urban and Built-up Land	64,529	64,822	76	369	445	293
Other Land	64,830	65,428	521	1,119	1,640	598
Water Area	7,465	7,465	0	0	0	0
Total Area Inventoried	**970,168**	**970,168**	**15,926**	**15,926**	**31,852**	**0**

Source: California DOC, DLRP 2012k.

Stanislaus County defines Farmland of Local Importance as farmlands growing dryland pasture, dryland small grains, and irrigated pasture (California DOC 2011a).

San Joaquin

In 2008, of the 912,593 acres mapped in San Joaquin County, 754,229 acres were in agricultural use, 91,929 acres were urbanized, 54,662 acres were water and 11,773 acres were "other" (California DOC, DLRP 2012l). Table 3.9-9 summarizes further land use classifications and net changes in land use categories from 2008 to 2010.

Table 3.9-9. San Joaquin County Summary and Change by Land Use Category

Land Use Category	Total Acreage Inventoried		2008-10 Acreage Changes			
	2008	2010	Acres Lost (-)	Acres Gained (+)	Total Acreage Changed	Net Acreage Changed
Prime Farmland	396,984	385,337	12,570	923	13,493	-11,647
Farmland of Statewide Importance	86,297	83,307	3,202	212	3,414	-2,990
Unique Farmland	66,621	69,481	1,590	4,450	6,040	2,860
Important Farmland Subtotal	**65,788**	**76,869**	**3,644**	**14,725**	**18,369**	**11,081**
Farmland of Local Importance	615,690	614,994	21,006	20,310	41,316	-696
Grazing Land	142,460	139,235	3,341	116	3,457	-3,225

Land Use Category	Total Acreage Inventoried 2008	2010	2008-10 Acreage Changes Acres Lost (-)	Acres Gained (+)	Total Acreage Changed	Net Acreage Changed
Agricultural Land Subtotal	**758,150**	**754,229**	**24,347**	**20,426**	**44,773**	**-3,921**
Urban and Built-up Land	90,529	91,929	127	1,527	1,654	1,400
Other Land	52,141	54,662	838	3,359	4,197	2,521
Water Area	11,773	11,773	0	0	0	0
Total Area Inventoried	**912,593**	**912,593**	**25,312**	**25,312**	**50,624**	**0**

Source: California DOC, DLRP 2012l.

San Joaquin County defines Farmland of Local Importance as lands that are farmable and do not meet the definition of Prime Farmland, Farmland of Statewide Importance, or Unique Farmland. This also includes idle lands previously designated as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland (California DOC 2011a).

Merced

In 2010, of the 1,265,619 acres mapped in Merced County, 1,160,885 acres were in agricultural use, 37,417 acres were urbanized, 16,859 acres were water and 50,458 acres were “other” (California DOC, DLRP 2012f). Table 3.9-10 summarizes further land use classifications and net changes in land use categories from 2006 to 2008.

Table 3.9-10. Merced County Summary and Change by Land Use Category

Land Use Category	Total Acreage Inventoried 2006	2010	2006-10 Acreage Changes Acres Lost (-)	Acres Gained (+)	Total Acreage Changed	Net Acreage Changed
Prime Farmland	272,095	270,644	5,739	722	6,461	-5,017
Farmland of Statewide Importance	153,249	150,874	3,207	485	3,692	-2,722
Unique Farmland	104,418	103,992	2,141	1,715	3,856	-426
Important Farmland Subtotal	529,762	525,510	11,087	2,922	14,009	-8,165
Farmland of Local Importance	59,851	67,984	1,188	9,321	10,509	8,133
Grazing Land	569,829	567,391	2,593	155	2,748	-2,438
Agricultural Land Subtotal	1,159,442	1,160,885	14,868	12,398	27,266	-2,470
Urban and Built-up Land	36,769	37,417	116	668	784	552
Other Land	48,351	50,458	340	2,258	2,598	1,918
Water Area	16,859	16,859	0	0	0	0
Total Area Inventoried	1,261,421	1,265,619	15,324	15,324	30,648	0

Source: California DOC, DLRP 2012f.

Merced County defines Farmland of Local Importance as farmlands that have physical characteristics that would qualify for Prime or Statewide except for the lack of irrigation water. Merced County also includes farmlands that produce crops not listed under Unique but are important to the economy of the county or city (California DOC 2011a).

San Benito

In 2010, of the 899,386 acres mapped in San Benito County, 672,281 were in agricultural use, 8,023 acres were urbanized, 1,145 acres were water, and 207,937 acres were "other" (California DOC, DLRP 2012g). Table 3.9-11 summarizes further land use classifications and net changes from 2008 to 2010.

Table 3.9-11. San Benito County Summary and Change by Land Use Category

	Total Acreage Inventoried		2008-10 Acreage Changes			
Land Use Category	**2008**	**2010**	**Acres Lost (-)**	**Acres Gained (+)**	**Total Acreage Changed**	**Net Acreage Changed**
Prime Farmland	28,701	27,425	2,106	830	2,936	-1,276
Farmland of Statewide Importance	6,587	6,475	700	588	1,288	-112
Unique Farmland	2,399	2,250	355	206	561	-149
Important Farmland Subtotal	37,687	36,150	3,161	1,624	4,785	-1,537
Farmland of Local Importance	23,234	21,310	5,056	3,132	8,188	-1,924
Grazing Land	612,455	614,821	3,116	5,482	8,598	2,366
Agricultural Land Subtotal	**673,376**	**672,281**	11,333	10,238	21,571	-1,095
Urban and Built-up Land	7,902	8,023	55	176	231	121
Other Land	206,968	207,937	326	1,295	1,621	969
Water Area	1,140	1,145	10	15	25	5
Total Area Inventoried	**889,386**	**889,386**	**11,724**	**11,724**	**23,448**	**0**

Source: California DOC, DLRP 2012g.

San Benito County defines Farmland of Local Importance as land cultivated as dry cropland. The usual crops grown on Farmland of Local Importance include wheat, barley, safflower, and grain hay. Orchards affected by boron in the area specified by County Resolution Number 84-3 are also included (California DOC 2011a).

Fresno

The most recent land use mapping for Fresno County was completed by the California DOC in 2008. Out of the 2,437,418 acres mapped in Fresno County, 2,203,231 were in agricultural use, 177,568 acres were urbanized, 4,915 acres were water, and 111,704 acres were "other" (California DOC, DLRP 2012h). Table 3.9-12 summarizes further land use classifications and net changes from 2006-2008.

Table 3.9-12. Fresno County Summary and Change by Land Use Category

Land Use Category	Total Acreage Inventoried		2006-08 Acreage Changes			
	2006	2008	Acres Lost (-)	Acres Gained (+)	Total Acreage Changed	Net Acreage Changed
Prime Farmland	713,084	693,173	17,455	1,112	18,567	-16,343
Farmland of Statewide Importance	478,730	439,020	39,939	576	40,515	-39,363
Unique Farmland	98,091	94,177	4,315	401	4,716	-3,914
Important Farmland Subtotal	1,289,905	1,226,370	61,709	2,089	63,798	-59,620
Farmland of Local Importance	95,534	149,906	2,344	56,716	59,060	54,372
Grazing Land	827,116	826,955	365	204	569	-161
Agricultural Land Subtotal	**2,212,555**	**2,203,231**	64,418	59,009	123,427	-5,409
Urban and Built-up Land	115,366	117,568	601	2,897	3,498	2,296
Other Land	108,783	111,704	1,680	4,790	6,470	3,110
Water Area	4,912	4,915	1	4	5	3
Total Area Inventoried	**2,441,616**	**2,437,418**	**66,700**	**66,700**	**133,400**	**0**

Source: California DOC, DLRP 2012h

In Fresno County, all farmable lands within the county that do not meet the definitions of Prime, Statewide, or Unique are defined as Farmland of Local Importance. This definition includes land that is or has been used for irrigated pasture, dryland farming, confined livestock and dairy, poultry facilities, aquaculture and grazing land (California DOC 2011a).

Kings

In 2010, of the 890,786 acres mapped in Kings County, 823,918 were in agricultural use, 35,847 acres were urbanized, 62 acres were water, and 30,959 acres were “other” (California DOC, DLRP 2012i). Table 3.9-13 summarizes further land use classifications and net changes from 2008 to 2010.

Lands that support dairies, confined livestock, and poultry operations are defined as Farmland of Local Importance in Kings County (California DOC 2011a).

Table 3.9-13. Kings County Summary and Change by Land Use Category

Land Use Category	Total Acreage Inventoried 2008	Total Acreage Inventoried 2010	2008-10 Acreage Changes: Acres Lost (-)	Acres Gained (+)	Total Acreage Changed	Net Acreage Changed
Prime Farmland	138,089	130,257	8,327	495	8,822	-7,832
Farmland of Statewide Importance	397,065	388,891	11,183	3,009	14,192	-8,174
Unique Farmland	22,928	21,801	1,792	665	2,457	-1,127
Important Farmland Subtotal	558,082	540,949	21,302	4,169	25,471	-17,133
Farmland of Local Importance	10,022	11,138	156	1,272	1,428	1,116
Grazing Land	257,746	271,831	4,610	18,695	23,305	14,085
Agricultural Land Subtotal	**825,850**	**823,918**	26,068	24,136	50,204	-1,932
Urban and Built-up Land	32,220	35,847	56	3,683	3,739	3,627
Other Land	32,654	30,959	2,445	750	3,195	-1,695
Water Area	62	62	0	0	0	0
Total Area Inventoried	**890,786**	**890,786**	28,569	28,569	57,138	0

Source: California DOC, DLRP 2012i.

3.9.2 Environmental Consequences/Environmental Impacts

These sections describe the environmental consequences/environmental impacts associated with each alternative.

3.9.2.1 Assessment Methods

Cropland idling transfers would take agricultural land out of production during the transfer year. If consecutive idling actions occur for the same fields over the ten year period, there could be a change in land use classifications.

To analyze these impacts, potential changes in land use are evaluated qualitatively within the counties that could participate in cropland idling water transfers. This analysis assesses any permanent conversions of agricultural land to other uses under transfer conditions relative to the baseline condition. Such conversions could result in a change in land classification or an incompatible use.

3.9.2.2 Significance Criteria

Impacts on agricultural land use would be considered potentially significant if transfers result in:

- Substantial conversion of any lands categorized as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland (referred together as Important Farmland) under the FMMP.

- Substantial permanent conversion of agricultural lands, including lands enrolled in the Williamson Act and other land conservation programs, to an incompatible use.
- Conflict with local land use policies.

3.9.2.3 Alternative 1: No Action/No Project

There would be no impacts to Prime Farmland, Farmland of Statewide Importance, or Unique Farmland under the No Action/No Project Alternative. Under the No Action/No Project Alternative, Central Valley Project (CVP) water supply shortages to agricultural users could result in increased land idling in the Buyer Service Area in Merced, Fresno, Kings, and San Benito counties. As shown in Tables 3.9-8 through 3.9-11, these counties have lost acres of prime farmland, farmland of statewide importance, and unique farmland in recent years. Much of this acreage was converted to non-irrigated land uses because it was fallow for three or more update cycles. This trend would likely continue under the No Action/No Project Alternative with continued CVP water shortages. Land reclassified to a non-irrigated uses would not be a permanent change in land use; farmers can place previously idled lands back into production and land could be reclassified to its previous status.

Conversions of irrigated agricultural lands under existing conditions also occur in response to urban development pressures. Important Farmland is converted to houses, commercial businesses, industrial buildings, schools, and other urban infrastructure. Continued CVP water shortages under the No Action/No Project Alternative may make more farmers willing to sell lands for urban development, which would result in permanent conversions of agricultural lands. Conversions to urban lands would likely continue as in previous years. This would further reduce agricultural lands in the future.

There would be no change in cropland conversion compared to existing conditions under the No Action/No Project Alternative.

There would be no impacts to agricultural lands under the Williamson Act and other land resource programs under the No Action/No Project Alternative. Water shortages under the No Action/No Project Alternative could increase land idling in the Buyer Service Area, similar to existing conditions. Some farmers may choose to take land out of production for one or two years and others may remove land from agricultural production for the long-term if shortages are expected to prolong and increase. Under the No Action/No Project Alternative, lands taken out of agricultural production temporarily would not affect Williamson Act or FSZ contracts. Some land may be reclassified as Non-Prime, but the land would still be in the program and be compatible with agricultural uses. From 2009 to 2010, there was very little change (0.05 – 0.07 percent decreases) in acreage of Williamson Act lands in the Buyer Service Area (Table 3.9-1). This trend is expected to continue under the No Action/No Project Alternative.

Agricultural lands enrolled in the Williamson Act and other land resources programs under the No Action/No Project Alternative would not likely change relative to existing conditions.

3.9.2.4 Alternative 2: Full Range of Transfers (Proposed Action)

Cropland idling transfers could decrease the amount of lands categorized as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland under the FMMP. Under the Proposed Action, cropland idling transfers could occur in Glenn, Colusa, Butte, Yolo, Solano, and Sutter Counties in the Seller Service Area. Table 3.9-12 shows the maximum acreages that could be idled in a year. Cropland idling transfers during a single year would likely affect less than the maximum acreages listed in Table 3.9-14.

Table 3.9-14. Maximum Annual Cropland Idling Acreages under the Proposed Action

Region	Rice	Alfalfa/ Sudan Grass	Corn	Tomatoes	Total
Sacramento Region	40,704	1,400	400	400	42,904
Feather Region	10,769	600	800	400	12,569
Delta Region	-	3,000	1,500	-	4,500
Total	**51,473**	**5,000**	**2,700**	**800**	**59,973**

Cropland idling would be temporary in nature and would not result in a permanent conversion of agricultural lands. Landowners would annually choose whether to idle their fields to transfer water and could place fields back into production the following season. Therefore, there would be no permanent effects to land categorized as Important Farmland as a result of transfers.

In order for agricultural lands to be categorized as Important Farmland on the FMMP maps, they must have been used for irrigated agricultural production at some point during the four years prior to the Important Farmland Map date (mapping is completed every two years) and the soils must meet the physical and chemical criteria as determined by the USDA NRCS (California DOC 2011a and California DOC, DLRP 2012j). Therefore, for lands to be reclassified out of Important Farmland categories, the same parcel would need to be idled for four consecutive years. Transfers would not change the soil characteristics of land.

As shown in Tables 3.9-2, 3.9-3, and 3.9-6, there was a total of 893,117 acres of Important Farmland in Colusa, Glenn, and Yolo counties (the Sacramento Region) in 2010. Of this, the maximum proposed for idling in any one year is 42,904 acres. This is about 4.8 percent of the Important Farmland in these counties. In Sutter and Butte counties (the Feather Region), there was a total of 523,092 acres of Important Farmland (Tables 3.9-4 and 3.9-5) as of the most recent FMMP mapping. Maximum idling would affect approximately 12,569 acres, or 2.4 percent of the total Important Farmland in these counties. As shown in Table 3.9-7, Solano County has 147,464 acres of Important Farmland. Cropland idling in Solano County under the Proposed Action would idle a maximum of 4,500 acres, or 3.1 percent, of Important Farmland in the county. As mentioned, these are maximum idling acreages and would not likely occur each year over the 10-year transfer period.

The proposed maximum acreages for idling do not represent a substantial amount of total Important Farmland in the counties. Further, buyers have indicated cropland idling transfers are the lowest priority transfer method under the Proposed Action (see Chapter 2); therefore, it is unlikely that the maximum cropland idling transfer would occur consecutively over four years and the same parcels would be included in the transfers for substantial amounts of land to be reclassified out of Important Farmland.

Because cropland idling would be temporary in nature and transfers would affect a small percentage of the overall Important Farmland acres within counties in the Seller Service Area, the Proposed Action's impacts on agricultural land use would be less than significant.

Cropland idling water transfers could convert lands under the Williamson Act and other land resource programs in the Seller Service Area to an incompatible use. As discussed above, cropland idling would be temporary and would not result in permanent changes to the land and land would not be converted to an incompatible use. Idling actions would not interfere with objectives of the Williamson Act, FSZ lands, or other agricultural easements to preserve open space land. Yolo and Solano counties have lands under CFCP conservation easements (Table 3.9-1) that could be idled under the Proposed Action. However, agricultural lands temporarily taken out of production as a result of cropland idling water transfers would not be converted to an incompatible use. The Proposed Action's potential effects to agricultural land use would be less than significant.

Cropland idling transfers could conflict with local land use policies. Section 3.9.1.2.3 summarizes agricultural land-related policies in local planning documents of counties in the Seller Service Area. All counties have policies to protect and maintain agricultural land uses for the long-term. Cropland idling would be temporary and not permanently change land uses or conflict with land use policies in Glenn, Colusa, Butte, Sutter, and Solano counties. Yolo County has a policy that precludes the practice of fallowing fields within conservation easements for the purpose of water export. Lands under farmland conservation easements are restricted to agricultural activities. The easement would preclude landowners from participating in cropland idling water transfers. Therefore, land would continue to be farmed and there would be no change relative to the No Action/No Project Alternative.

Water transfers could provide water to irrigators in the Buyer Service Area to irrigate existing crop fields. Water deliveries could bring lands back into agricultural production that were previously idle because of reductions in available water supply. Based on the amount of water available relative to the agricultural water needs in the San Joaquin Valley, lands returned to production would not be substantial as a result of the Proposed Action. Therefore, the Proposed Action's impacts on agricultural land use would be beneficial, but minor.

3.9.2.5 Alternative 3: No Cropland Modifications

There would be no cropland idling under Alternative 3. There would be no impacts to agricultural land use in the Seller Service Area as a result of the No Cropland Modification Alternative.

Water transfers could provide water to irrigators in the Buyer Service Area to irrigate existing crop fields. Similar to the Proposed Action, the No Cropland Modification Alternative could convert land back to agricultural use that was idled because of limited water supplies. The land conversion would not be extensive because of the amount of water available relative to the agricultural water needs in the San Joaquin Valley. Therefore, the No Cropland Modification Alternative's impacts on agricultural land use would be beneficial, but minor.

3.9.2.6 Alternative 4: No Groundwater Substitution

Cropland idling transfers could permanently or substantially decrease the amount of lands categorized as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland under the FMMP. Table 3.9-15 shows the maximum acreage that could be idled in the Seller Service Area under the No Groundwater Substitution Alternative. Cropland idling transfers could idle a maximum of 59,973 acres of farmland in counties in the Seller Service Area. These upper limits for cropland idling transfers are the same as in the Proposed Action. The maximum acreage would not likely be idled each year of the 10-year period.

Table 3.9-15. Maximum Annual Cropland Idling Acreages under Alternative 4

Region	Rice	Alfalfa/ Sudan Grass	Corn	Tomatoes	Total
Sacramento Region	40,704	1,400	400	400	42,904
Feather Region	10,769	600	800	400	12,569
Delta Region	-	3,000	1,500	-	4,500
Total	**51,473**	**5,000**	**2,700**	**800**	**59,973**

As discussed in the analysis of the Proposed Action, cropland idling would be temporary in nature and would not result in a permanent conversion of agricultural lands. The maximum number of acres idled would be small relative to the overall acreage of Important Farmland within the counties.

While the upper limit for cropland idling transfers would be the same as in the Proposed Action, cropland idling transfers could occur more often under the No Groundwater Substitution Alternative because groundwater substitution transfers would not be available.

There is a potential for cropland idling water transfers to change the classification of Important Farmland. Changes to the classification of farmland could result in a significant impact. In order to avoid a significant impact if cropland would change the classification to levels less than Prime Farmland, Farmland of Statewide Importance, or Unique Farmland under the FMMP, agencies participating in water transfers would implement Mitigation Measure Land Use (LU)-1, described in Section 3.9.4 to avoid changing land classifications. Consequently, land use effects would be less than significant with mitigation.

Cropland idling water transfers could convert lands under the Williamson Act and other land resource programs in the Seller Service Area to an incompatible use. As discussed above, crop idling would be temporary and would not result in permanent changes to the land and land would not be converted to an incompatible use under the Williamson Act, CFCP, or FSZ. Idling actions would not interfere with objectives of the Williamson Act and other agricultural easements to preserve open space land. In addition, increased net returns allowed by water transfers could help landowners avoid selling land for development and preserve farmland. Potential effects to agricultural land use would be less than significant.

Cropland idling transfers could conflict with local land use policies. Yolo County has a policy that precludes the practice of fallowing fields within conservation easements for the purpose of water export. The easement would preclude landowners from participating in cropland idling water transfers. Therefore, land would continue to be farmed and there would be no change relative to the No Action/No Project Alternative.

Water transfers could provide water to irrigators in the Buyer Service Area to irrigate existing crop fields. Water deliveries could bring lands back into agricultural production that were previously fallow due to reductions in available water supply. Potential effects would be the same as those described for the Proposed Action. Impacts would be beneficial, but minor.

3.9.3 Comparative Analysis of Alternatives

Table 3.9-16 lists the effects of each of the action alternatives. The following text supplements the table by describing the magnitude of the effects under the action alternatives and No Action/No Project Alternative.

3.9.3.1 No Action/No Project Alternative

Under the No Action/No Project Alternative, farmers in the Buyer Service Area would idle fields as a result of CVP water shortages. Depending on the extent of shortages and the number of years a particular field is idled consecutively, there could be reductions in the amount of land classified as Important Farmland. Prolonged water shortages could also result in permanent conversions of agricultural land if farmers choose to sell land to developers because of lack of irrigation water.

Table 3.9-16. Comparative Analysis of Alternatives

Potential Impact	Alternatives	Significance	Proposed Mitigation	Significance after Mitigation
Reductions in CVP water supplies for agricultural users could permanently or substantially decrease lands categorized as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland under the FMMP.	1	NCFEC	None	NCFEC
Reductions in CVP water supplies for agricultural users could convert agricultural lands under the Williamson Act and other land resource programs to an incompatible use.	1	NCFEC	None	NCFEC

Potential Impact	Alternatives	Significance	Proposed Mitigation	Significance after Mitigation
Cropland idling water transfers could permanently or substantially decrease the amount of lands categorized as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland under the FMMP.	2	LTS	None	LTS
	4	S	Mitigation Measure LU-1: Avoiding changes in FMMP land use classifications	LTS
Cropland idling water transfers could convert agricultural lands under the Williamson Act and other land resource programs to an incompatible use.	2, 4	LTS	None	LTS
Cropland idling water transfers could conflict with local land use policies.	2, 4	NI	None	NI
Water transfers could provide water to irrigators in the Buyer Service Area to irrigate existing crop fields and maintain agricultural land uses.	2, 3, 4	B	None	B

Note:
B = beneficial;
LTS = less than significant
NCFEC = no change from existing conditions
NI = no impact
S = significant

3.9.3.2 Alternative 2: Full Range of Transfers (Proposed Action)

The Proposed Action includes idling of up to 59,973 acres. This maximum acreage would not be idled each year over the 10-year transfer period or each year that transfers occur. The maximum acreage is also a small percentage of the total amount of Important Farmland in the Seller Service Area. Therefore, cropland idling transfers would not substantially decrease the amount of land classified as Important Farmland. Cropland idling transfers would also not result in permanent land reclassifications or conversions to incompatible uses. In the Buyer Service Area, increased water deliveries from transfers could result in beneficial impacts to agricultural land use because owners may start farming land again that had been idled because of limited water supplies.

3.9.3.3 Alternative 3: No Cropland Modifications

The No Cropland Modification Alternative does not include cropland idling. There would be no impacts in the Seller Service Area as a result of idling. Effects in the Buyer Service Area would be the same as the Proposed Action.

3.9.3.4 Alternative 4: No Groundwater Substitution

The No Groundwater Substitution Alternative includes the same upper limit for cropland idling as the Proposed Action. This maximum acreage would not likely be idled each year over the 10-year transfer period; however, it would occur more frequently during years that transfers occur relative to the Proposed Action because there are fewer other types of transfers. The frequency of idling in the No Groundwater Substitution Alternative could result in substantial decreases in the amount of Important Farmland. Implementation of Mitigation Measure LU-1 would make impacts to agricultural land use designations less than significant. Similar to the Proposed Action, cropland idling transfers would not result in permanent land reclassifications or conversions to incompatible uses. Effects in the Buyer Service Area would be the same as the Proposed Action.

3.9.4 Environmental Commitments/Mitigation Measures

The following mitigation measures would reduce adverse land use effects of the No Groundwater Substitution Alternative.

3.9.4.1 Mitigation Measure LU-1: Avoiding Changes in FMMP Land Classifications

Water would not be acquired from a particular parcel of land if idling the land would result in a lower classification of Important Farmland as defined under the FMMP. The selling agency will provide cropping history of specific parcels to be idled for the transfer to Reclamation to determine if idling will result in a change in classification from Important Farmland.

3.9.5 Potentially Significant Unavoidable Impacts

None of the action alternatives would result in potentially significant unavoidable impacts to agricultural land use.

3.9.6 Cumulative Effects

The timeframe for the Long-Term Water Transfers cumulative analysis extends from 2015 through 2024, a ten-year period. The cumulative effects analysis for agricultural land use considers State Water Project (SWP) water transfers and the CVP Municipal and Industrial (M&I) Water Shortage Policy (WSP). Chapter 4 further describes these projects and policies. Land protections and environmental restoration programs are also considered since these programs take actions to maintain agricultural and open space land uses.

The cumulative analysis also considers general population growth and associated urban development planned in the future in counties where cropland idling could occur. The following paragraphs describe planned land use changes in the area of analysis.

3.9.6.1 Seller Service Area

3.9.6.1.1 Glenn County

The most recent county general plan documents (1993b) describe the prominent land use in the county as agriculture, forests, and open space/grazing lands. While the general plan is from almost a decade ago, existing land uses in the county have not changed substantially during that period (Popper 2012). Approximately 500,000 acres of land in the unincorporated county is used for agricultural purposes with half in grazing land and half in farming (Glenn County 1993b). Urban and residential development is clustered around the unincorporated communities in the county including Bayliss, Glenn, Ord Bend, Capay, Codora Four Corners, Artois, Hamilton City, Butte City, North Willows, Northeast Willows, and West Orland (Glenn County 1993b).

There are currently no development applications in the unincorporated area of Glenn County which would potentially displace large acreages of irrigable ground (Popper 2012). Approximately seven miles northwest of the City of Willows, there is a pending solar power development. The proposed project is currently undergoing environmental review. It proposes to change the zoning of an approximately 170 acre parcel from AP to Recreation and Planned Motor Sports. This rezoning would also cancel a land conservation contract (Popper 2012). There is no current timeline for construction of this proposed project.

As shown in Table 3.9-1, from 2010 to 2012, there was a slight increase in Williamson Act lands in the county. However, the California DOC notes that from 2008 to 2010 there were land use changes in the county from irrigated farmland to urban land (California DOC 2011b). These changes were primarily due to the construction of new homes, buildings and parking lots.

City of Orland

Land use in the City of Orland is primarily low density residential and residential estate (City of Orland no date). Other uses that make up a smaller portion of land area within the city and the SOI include commercial, heavy and light industrial, medium and high density residential, public facility, mixed-used, and open space/resource conservation. The Land Use Element of the 2008 Draft General Plan guides the city's growth over 15-20 years (City of Orland 2010). One of the basic principles in the General Plan, Land Use Element is to preserve open space and farmland from intensive development. The land use SOI is defined as lands surrounding the city where expansion is likely to occur in the near future. While the city can work with Glenn County to affect changes to land use and proposed development within the SOI, it has no direct land use authority outside of the city limits.

From 1990 to 2000, the population of the city increased by 24.3 percent with an average annual increase of 2.2 percent. By comparison, the population of Glenn County increased by 6.7 percent over that same time period (City of Orland 2010). The General Plan also presents projected population growth from 2008-2028 using three growth rate scenarios. Table 3.9-17 summarizes these projections.

Table 3.9-17. Population Projections, City of Orland (2008-2028)

Growth Rate	Orland Population				
(%)	**2008**	**2013**	**2018**	**2023**	**2028**
High (2.6)	7,376	8,386	9,534	10,840	12,324
Medium (2.2)	7,347	8,192	9,133	10,183	11,354
Low (1.8)	7,318	8,001	8,748	9,564	10,456

Source: City of Orland 2010

The city also projects future land use demands based on projected population growth. Table 3.9-18 summarizes the land use development forecast for all residential, commercial, and industrial land use needs from 2007 through 2027 at each potential growth rate.

Table 3.9-18. Total Land Use Development Forecast

	Land Required (acres)				
Growth Rate (%)	**2007-2011**	**2012-2016**	**2017-2021**	**2022-2027**	**Total**
High (2.6)	165	189	214	244	812
Medium (2.2)	139	157	171	193	606
Low (1.8)	113	121	133	143	510

Source: City of Orland 2010

The city used the established General Plan land uses and densities of land within the city as well as the undeveloped land acreages to estimate the number of new homes and population that could result from current policies. Table 3.9-19 summarizes the maximum residential growth (on land designated for residential land use in the General Plan) and population at buildout of the General Plan. If the city's residential land were built out to its potential (assuming a density of three persons per single-family unit, 2.5 persons per medium-density multi-family unit, and two persons per high density multi-family unit) the total population could reach over 25,000 (City of Orland 2010).

Table 3.9-19. Maximum Residential Growth at Buildout

General Plan Designation	Additional Developable Acres	Additional Population	Total Possible Population[1]
Residential, low density	149	2,682	29,705
Residential, medium density	-5	-120	1,284
Residential, high density	41	2,050	4,027
Residential, estate	896	5,376	10,090
Mixed Use	29	870	870
TOTAL	**1,110**	**10,858**	**45,940**

Source: City of Orland 2010
Note:
[1] Number is based on addition to Possible Population under 2003 General Plan

Table 3.9-17 illustrates that total possible population at maximum buildout of residential lands in the city would accommodate the population projections shown in Table 3.9-15, above. Further, Policy 2.2.A in the General Plan states that the city will "maintain defined boundaries and adequate buffers between agricultural land and urbanized areas" (City of Orland 2010). Policy 2.2B states that the "City shall direct development towards existing neighborhoods by encouraging infill and redevelopment activity" (City of Orland 2010).

City of Williams
Main land uses in the city consist of business park, agriculture, and suburban residential on the edges of the city with urban residential, commercial, downtown, industrial, institutional, neighborhood conservation, and parks and recreation in the central part of the city (City of Williams 2010a).

The City of Williams' General Plan describes that the city population is expected to grow to around 9,822 persons by the year 2030 (City of Williams 2010b). This represents an increase of approximately 4,535 persons. Similar to the City of Orland, Williams developed three future growth scenarios to plan for future land use and population growth, a low growth, moderate growth, and high growth scenario (City of Williams 2010b). Table 3.9-20 summarizes the population estimates and projections from 2009 to 2030.

Table 3.9-20. Population Projections, City of Williams (2009-2030)

	Population	Actual Change
2009 Estimate	5,287	--
Year 2030 Low	7,667	2,380
Year 2030 Mid	9,822	4,535
Year 2030 High	12,048	6,761

Source: City of Williams 2010b

The city identified the mid-range growth scenario as their preferred future growth rate and the future land use plan establishes residential land acreages that will accommodate this level of growth; these are summarized in Table 3.9-21.

Table 3.9-21. District Acreages and Corresponding Populations

	Residential District			
	Estate	**Suburban**	**Urban**	**Total**
Acres	204	101	260	565
Density (units/acre)	0.43	2.13	3.48	
Persons per Household	3.7	3.7	3.7	
Total Persons	325	796	3,348	9,755[1]

Source: City of Williams 2010b

Note:

[1] Total includes total persons projected in each residential district (4,468) added to the 2009 population estimate of 5,287.

The city's General Plan and Future Land Use Plan illustrate that housing for projected population increases is anticipated to be accommodated for within the existing SOI. Land use policies related to future growth patterns including growing contiguously to maintain the efficiency of public services and a compact community form (Policy 3.30 of the City of Williams 2010b).

3.9.6.1.2 Colusa County

Existing land uses in Colusa County are primarily agricultural (Colusa County 2010). Steady population growth over the last several decades has led to corresponding increases in housing development throughout the unincorporated county and incorporated cities over the past 20 years. Table 3.9-22 summarizes the percentage of existing land uses in Colusa County.

Table 3.9-22. Existing Land Uses (2008)

Land Use Category	Percent
Cropland	75
Grazing Lands	1
National Forest	10
National Wildlife Refuge	2
Incorporated Cities	0.3
Communities	0.4
Rural Subdivisions and Settlements	0.2
Other Lands	11
Water Areas	0.3

Source: Colusa County 2010.

The county's General Plan Background Report (Colusa County 2010) lists several approved and pending development projects in the unincorporated county as well as in the Cities of Colusa and Williams. Some of the planned development within the county, both incorporated and unincorporated areas, has slowed as a result of the economic downturn in recent years; however, residential development is still occurring and more is planned for the future. The background report notes that while growth in the unincorporated county is directed primarily to Special Growth Areas designated by the county's general plan, areas in the county are slowly transitioning from orchard and field crop land uses to residential land uses.

As shown in Table 3.9-1, the county lost 0.19 percent of its Williamson Act lands from 2009 to 2010; although, this is not directly tied to increases in residential development. In light of this decrease, the California DOC notes that from 2008 to 2010, there were no conversions from irrigated farmland to urban land within the county (California DOC 2011c). While there were no direct conversions from irrigated farmland to urban land, there were land use conversions from irrigated farmland to nonirrigated uses. The majority of these changes occurred because plots of irrigated farmland had been fallow for three or more FMMP update cycles (California DOC 2011c).

City of Colusa

The City of Colusa's SOI is approximately 2,842 acres including all land within the city limits and an additional 1,668 acres outside of the city limits. Unincorporated land represents approximately 59 percent of the city's total SOI area (City of Colusa 2007). The population growth rate since 1990 has averaged 0.95 percent per year with a high of 2.56 percent between 1996 and 1997 (City of Colusa 2007). Existing land uses in the city consist of residential, commercial (along the State Route (SR) 20/45 corridor and in the core downtown area), industrial, airport, recreation, open space, and public facilities. The city's General Plan

Land Use Map identifies lands adjacent to and outside of the SOI as agricultural lands.

The city anticipates a growth rate of three to four percent over the next 20 years. The General Plan Land Use Element describes that various areas proposed for future annexation and/or development are designated as agricultural land. While this fact may lead to some continuing conversion of agricultural lands to residential or other uses, the city acknowledges the need for agricultural buffers to mitigate impacts from the agriculture-urban interface. General Plan policies support the use of various techniques such as the use of Urban Reserve land use designations, density transfers, agricultural easements, land transfers to non-profit farmland trusts, and private agreements between developers and agricultural land owners to allow necessary residential development while preserving important agricultural resources.

3.9.6.1.3 Butte County

The majority of existing land use in unincorporated Butte County is agricultural, with small areas of residential, commercial, and industrial land use types (Butte County 2012b). Table 3.9-23 summarizes existing land uses within the unincorporated county.

Table 3.9-23. Existing Land Uses (2008)

Land Use Category	Percent
Agriculture	58
Public/Quasi-Public	17
Residential – Single-Family	11
Vacant	9
Undefined	2.6
Residential – Multi-Family	0.9
Commercial and Office	0.4
Industrial	0.1
Tribal Lands	0.04

Source: Butte County 2012b.

While most residential units are located within the five incorporated municipalities, which are Cities of Chico, Oroville, Gridley, and Biggs, and the Town of Paradise, some residential units are dispersed throughout the unincorporated county. Commercial and industrial uses are primarily located near the municipalities (Butte County 2012b).

The county directs growth to existing urbanized areas and near existing infrastructure to prevent scattered development (Butte County 2012b). Existing and future planned unit developments and area, neighborhood, or specific plans have been or are being developed for areas surrounding Chico, Oroville, and Paradise. Transfers in Butte County occur in the southwestern portion of the county, near the Cities of Gridley and Biggs, and therefore these development plans do not affect agricultural resources in the transfers area.

The California DOC reports that from 2008 to 2010 there were small changes from irrigated farmland or non-irrigated land uses to urban land within the county. These changes are due to construction of homes and commercial buildings on parcels less than 15 acres adjacent to municipalities, including Gridley and Biggs. Conversions of irrigated farmland to non-irrigated uses were primarily a result of farmland going fallow for three or more FMMP update cycles. There were a large number of changes from irrigated farmland to other land, with large areas near the Gray Lodge Wildlife Area and south of Chico being tracked for seasonal flooding and return to wetlands. In Gridley, almost 20 acres planned for an industrial park was changed from urban land due to inactivity on the project. The California DOC reports that Gridley and Biggs area appear to have more land use changes on a smaller scale (California DOC 2011d).

City of Biggs

The Biggs SOI encompasses 540.6 acres and the Planning Area is 4,627 acres. The City of Biggs, which is approximately 414 acres, is predominantly single-family residential. Less than 16 percent of the total area of the city is employment-generating, commercial, or vacant and available for development. Commercial and industrial land use have been declining due to development of large retail stores in the surrounding larger cities and limited employment options. Biggs has limited infill and redevelopment opportunities and has expressed interest in extending the SOI to expand growth opportunities (City of Biggs 2014).

The Butte County Association of Governments has projected that the city could potentially double its population by the year 2035. Up to 1,090 new housing demand is projected for a high growth scenario. Development areas surrounding the city, within the current Planning Area, have been identified to accommodate new residences, schools, parks, wastewater treatment plant, and commercial and industrial uses (City of Biggs 2014).

City of Gridley

Similar to Biggs, growth within the current City of Gridley is limited. To accommodate for future growth of Gridley and Biggs, a 2,846-acre area of concern was established by the Butte Local Agency Formation Commission. Approximately 1,200 acres of this area is designated as the planned growth area for Gridley. The buildout of the General Plan could result in up to 4,700 residential units, 1.3 million square feet of commercial building space, four million square feet of industrial building space, and additional schools, parks, and infrastructure for the growth within the existing city, the SOI, and planned growth area. (City of Gridley 2010)

3.9.6.1.4 Sutter County

Unincorporated Sutter County land use is dominated by agriculture. Other uses including residential and commercial are located in unincorporated rural communities in the county as well as the cities of Yuba and Live Oak (Sutter County 2010b). Table 3.9-24 summarizes existing land uses within the county.

Table 3.9-24. Existing Land Uses (2010)

Land Use Category	Percent
Agricultural	86.6
Residential	1
Public and Airport	0.1
Commercial	0.1
Industrial	0.2
Open Space, Parks and Golf Course	11.9
Transportation and Utilities	0.5
Vacant	0.1

Source: Sutter County 2010b.

The majority of agricultural land is located in the unincorporated areas of the county outside of the boundaries of the unincorporated communities (Meridian, Sutter, Robbins, Nicolaus, East Nicolaus, Trowbridge, and Rio Oso). While most residential uses are located in these communities and Yuba City and Live Oak, there are also residential uses in the unincorporated county. Most of these residential uses are located near the cities and communities or along major transportation corridors (Sutter County 2010b).

In order to accommodate future growth, the county directs growth to five identified Growth Areas that are in close proximity to existing public infrastructure and services. In addition to these growth areas, future growth in the county is planned to be directed towards the Yuba City and Live Oak spheres of influence. In total, new growth is expected to change the land use of approximately eight percent of unincorporated county lands (Sutter County 2010b). Some of these growth areas overlap lands currently used for agriculture (Sutter County 2010b).

The California DOC reports that from 2008 to 2010 there were small additions to existing urban land within the county. These changes are noted as primarily small changes from irrigated farmland to urban land. The largest land use conversion was a residential development located near orchards south of Yuba City (California DOC 2011e). Other conversions of irrigated farmland to non-irrigated uses were primarily a result of farmland going fallow for three or more FMMP update cycles (California DOC 2011e).

City of Live Oak

The majority of land in the City of Live Oak is in residential use (City of Live Oak Nd.). Commercial uses occur along the SR-99 corridor, with both a historic commercial and new commercial district. There are also parks and civic land uses throughout the city. Through their General Plan, the city describes that they have provided sufficient land to accommodate housing and job growth through the year 2030. Table 3.9-25 summarizes the acreage and housing units of land uses in the county under full buildout.

Table 3.9-25. General Plan Land Use Designations and Housing Units, City of Live Oak (1999-2030)

Designation	Acres	Housing Units
Low-Density Residential	1,610-1,970	5,290-6,460
Smaller-Lot Residential	1,310-1,610	6,190-7,570
Medium-Density Residential	160-200	1,200-1,460
Higher Density Residential	100-130	1,410-1,720
Commercial Mixed Use	190-230	--
Downtown Mixed Use	70-90	--
Community Commercial	60-70	--
Employment	190-230	--
Civic	140-180	--
Park	160-200	--
Open Space Buffer	60-70	--

Source: City of Live Oak Nd.

As with other cities, Live Oak recognizes development pressures in the urban reserve area outside of the city boundaries. Land use policies, such as policy LU-1.5, provide for development within this urban reserve area only after a comprehensive planning and environmental review (City of Live Oak Nd.).

City of Yuba City

Lands within the urban growth boundary (UGB) for Yuba City include 12,954 acres (City of Yuba City 2004). Most of the developed land is within the existing city limits and approximately 7,079 acres are located in unincorporated Sutter County. Table 3.9-26 summarizes existing land uses with the UGB.

Table 3.9-26. Land Use in the Yuba City UGB, 2002

Designation	Incorporated (acres)	Unincorporated (acres)	Total (acres)
Single-Family Residential	2,266	1,271	3,538
Multi-Family Residential	371	51	421
Mobile Home Park	66	72	138
Commercial Retail	311	34	345
Shopping Center	95	--	95
Office	104	8	111
Other Commercial	18	2	20
Auto Services	5	1	6
Visitor Services – Hotel/Motel	11	--	11
General Industrial	380	159	539
Public and Semi-Public	601	499	1,100
School	122	17	140
Park and Recreation	84	1	85
Agricultural Land	630	4,821	5,451
Transportation, Communications, and Utilities	25	12	38
Vacant	787	130	918
Total	**5,875**	**7,079**	**12,954**

Source: City of Yuba City 2004

The General Plan describes that adequate land was provided in the planning process to accommodate anticipated housing and job development through 2025 (City of Yuba City 2004). Full buildout includes a total of 7,200 gross acres that would be developed within the UGB, including infill sites. Most areas planned for new development are residential in use and total an area of approximately 4,655 acres.

The city estimates a 2.5 percent annual growth rate and a total population within the SOI (including the City of Yuba City and surrounding unincorporated areas) in 2025 of 105,730. The Land Use Plan of the General Plan accommodates a higher population than the projection. The Plan accommodates for 19,220 new housing units and 51,310 new residents, for a projected possible population of 108,340.

While realizing the need to accommodate this growth, the Land Use Plan policies encourage maintaining the compact form of the city and continuing to protect rural areas by the establishment of the UGB. The Land Use Plan policies, such as policy 3.4-G-1, which states “maintain a well-defined compact urban form, with a defined growth boundary and urban development intensities on land designated for urban uses,” are focused on maintaining the city’s small town feel and preserving the surrounding agricultural land (City of Yuba City 2004).

3.9.6.1.5 Yolo County

The majority of land use in Yolo County is cultivated agriculture with livestock grazing and public open space as the next largest uses (Yolo

County 2005). Approximately four percent of total county lands are within the jurisdictional boundaries of a city (Yolo County 2005). Existing land uses in Yolo County (both incorporated and unincorporated areas) are summarized in Table 3.9-27.

Table 3.9-27. Existing Land Uses – Yolo County Incorporated and Unincorporated Areas[1]

Land Use Category	Percent
Agricultural commodities	0
Commercial	0
Cultivated Agricultural Lands	54
Industrial	1
Livestock	22
Office	0
Orchards/Vineyards	7
Private Recreational (developed and open space)	0
Public Open Space	8
Public/Quasi-Public	2
Residential (mobile home, multi-family, single-family)	1
Roads	0
Rural Residential	2
Unknown	0
Vacant	1
Water	1

Source: Yolo County 2005

[1] Does not account for most lands in railroad and public rights of way.

The county's *Agricultural Preservation Techniques Report* (Yolo County 2006) describes the urban development pressures Yolo County faces due to statewide population growth as well as the county's proximity to Sacramento and the San Francisco Bay Area.

The county actively protects its farmlands through Williamson Act contracts, agreements with cities to limit new development within the cities' spheres of influence, and requirements for mitigation of farmland conversion (Yolo County 2006). There are several approved and pending development projects in the county that would alter agricultural land use. One such project is the Clark Pacific Expansion Project. The Clark Pacific Company manufactures concrete products and is requesting rezoning on approximately 140 acres of their property to change the use from agriculture to industrial (Yolo County Planning and Public Works Department 2012). In addition to this development in the unincorporated county, there are several approved and completed residential and commercial developments in the community areas of Clarksburg, Dunnigan, Esparto, and Knights Landing (Yolo County 2012). These developments range from a 180-unit subdivision and proposed town center area in Esparto to a truck and travel center in

Dunnigan (Yolo County 2012). Many of these would take place on existing open space and agriculturally zoned land.

City of Woodland

The Planning Area for the Woodland General Plan Land Use and Community Design Chapter includes all land designated for or to be considered for future development as part of the city (City of Woodland 2002). The area outside of the Planning Area is designated as agriculture. The General Plan describes that "many forces are encouraging new residential and employment development in Woodland" (City of Woodland 2002). The city projects population growth to increase from approximately 42,500 in 1995 to approximately 66,000 by 2020. The urban limit line, which is within the Planning Area and is defined as a line encompassing all land to be considered for urban development within the timeframe of the General Plan, is established to accommodate projected growth through 2020.

The city recognizes that continued development and growth would convert some agricultural land to urban development. However, policies in the General Plan are aimed at maintaining agricultural uses and protecting adjacent agricultural lands from the negative effects to urban development (City of Woodland 2002). For example, Policy 1.I.1 states that "the city shall discourage leapfrog development and development in peninsulas extending into agricultural lands to avoid adverse effects on agricultural operations" (City of Woodland 2002).

3.9.6.1.6 Solano County

Approximately 85 percent of the land in Solano County is unincorporated. Of this, approximately 70 percent is currently used for agriculture (Solano County 2008b). Agricultural land is concentrated in the eastern part of the county, where cropland idling transfers would occur. Solano County's cities include Benicia, Dixon, Fairfield, Rio Vista, Suisun City, Vacaville, and Vallejo. Given the majority of residential development occurs within the incorporated areas of the county, the county's cities account for approximately 95 percent of the population (Solano County 2008b). While residential development does exist in the unincorporated county, it is at rural residential densities of one unit per 2.5 or more acres. Denser residential development is located in the cities and a small amount in the unincorporated areas in Vallejo.

The county's 2030 general plan defines future land use designations and land uses within the unincorporated county. The majority of open space and agricultural designations within the county are not proposed to change (Solano County 2008b). Table 3.9-28 summarizes existing land uses within the county as of 2006.

There are a couple of current planning projects in the unincorporated county that propose major subdivisions (Solano County 2012). One is an eight lot subdivision of an Exclusive Agriculture District, which is a zoning designation where regulations and special permitting apply, and the other is a seven lot subdivision of an Exclusive Agriculture District (Solano County 2012). The county continues to guide most residential and commercial development toward the incorporated cities using municipal service areas (generally defined as the city boundaries) (Solano County 2008b).

Table 3.9-28. Existing Land Uses – Solano County (2006)

Land Use Category	Percent
Water	8.8
Park and Recreation	0.1
Marsh	11.1
Watershed	6.3
Agriculture	56.5
Public/Quasi-Public	0.3
Residential	1.2
Commercial	0.1
Industrial	0.4
Vacant Land	0.2
Roadways/Railroad Right of Ways	1.1
Incorporated Areas	14

Source: Solano County 2008b.

3.9.6.2 Buyer Service Area

3.9.6.2.1 Stanislaus County

The vast majority of land within Stanislaus County is designated as agricultural land and lies outside of designated growth areas. The county actively directs additional growth and urban development to underused land within the incorporated cities and unincorporated communities in the county. There are nine incorporated cities in the county: Ceres, Hughson, Modesto, Newman, Oakdale, Patterson, Riverbank, Turlock, and Waterford (Stanislaus County 2013).

The most recent land use change report, published by the California DOC, for Stanislaus County is from 2012. The report notes that there was a slight land use change from irrigated farmland to urban land. The majority of these changes occurred in or adjacent to the City of Riverbank. Additional urban development took place on non-irrigated land uses (defined as grazing areas, dryland crop farming, and formerly irrigated land that has been left idle for three or more FMMP update cycles) (California DOC 2011k).

3.9.6.2.2 San Joaquin County

Like most of the counties in the area of analysis, agriculture (including grazing) accounts for the majority of existing land use in the unincorporated county, approximately 89.1 percent of the total land in the county. Residential uses make up approximately 4.8 percent of the existing land use in the county (San Joaquin County 2005). There are eleven incorporated cities in the county: Delta, Escalon, Lathrop, Linden, Lockeford, Lodi, Manteca, Ripon, Stockton, Thornton, and Tracy (San Joaquin County 2011). Table 3.9-29 summarizes the acreage and percent of lands in major land use categories in the unincorporated county.

Table 3.9-29. Existing Land Uses – San Joaquin County (2009)

Land Use Category	Percent
Agriculture	89.1
Commercial	1.2
Industrial	0.6
Residential[1]	4.8
Vacant	1.21
Miscellaneous	3.0

Source: San Joaquin County 2005.

[1] Rural parcels which are five acres are les and which contain a house are considered residential.

The most recent land use change report, published by the California DOC, for San Joaquin County is from 2010. The report notes land use changes from irrigated farmland to urban land. The majority of these changes occurred in or adjacent to the cities of Manteca, Stockton, and Tracy. Additional urban development took place on non-irrigated land uses (defined as grazing areas, dryland crop farming, and formerly irrigated land that has been left idle for three or more FMMP update cycles). While urban development is responsible for some of the conversions of irrigated farmland, land fallowing (for three or more update cycles), contributed to a large portion of land conversions from irrigated agricultural uses (California DOC 2011j).

3.9.6.2.3 Merced County

Land in Merced County is separated into specific land use designations which aid in guiding the type of development that takes place within the county. The vast majority of land within the county is designated as Agriculture and Foothill Pasture and lies outside of designated growth areas. Growth is directed towards the county's urban land use area, which include city planning areas, urban communities, rural centers, rural residential centers, highway interchange centers, and isolated urban designations (Merced County 2011). These urban area boundaries are defined either by the city jurisdictional boundaries in the county or by areas of existing concentrations of residential and commercial uses supported by existing infrastructure. The county actively directs additional growth and urban development to vacant and underused land within the incorporated cities and unincorporated communities in the county. There are six incorporated cities in the county: Atwater, Dos Palos, Gustine, Livingston, Los Banos, and Merced (Merced County 2011).

The most recent land use change report, published by the California DOC, for Merced County is from 2008. The report notes land use changes from irrigated farmland to urban land. The majority of these changes occurred in or adjacent to the cities of Atwater, Merced, and Los Banos. Additional urban development took place on non-irrigated land uses (defined as grazing areas, dryland crop farming, and formerly irrigated land that has been left idle for three or more FMMP update cycles). While urban development is responsible for some of the conversions of irrigated farmland, land fallowing (for three or more update cycles), contributed to a larger portion of land conversions from irrigated agricultural uses (California DOC 2009a).

3.9.6.2.4 San Benito County

Approximately 99.5 percent of land within the county is unincorporated, while the remaining 0.5 percent is incorporated (San Benito County 2010). Like most of the counties in the area of analysis, agriculture (including grazing) accounts for the majority of existing land use in the unincorporated county. The county also contains a significant amount of land (8.9 percent of the unincorporated county) owned by city, state, and federal governments. Residential uses make up approximately 1.1 percent of the existing land use in the county (San Benito County 2010). Table 3.9-30 summarizes the acreage and percent of lands in major land use categories in the unincorporated county.

Table 3.9-30. Existing Land Uses – San Benito County (2009)

Land Use Category	Percent
Agriculture[1]	83.2
Commercial[2]	0.1
Industrial[3]	0.3
Residential[4]	1.1
Vacant[5]	0.6
Other[6]	14.5

Source: San Benito County 2010.

[1] Agriculture includes crops, dry farming, facility, general, grazing, nursery, recreation, resource, livestock, orchard, and vineyard.

[2] Commercial includes commercial, medical, motel, and recreation.

[3] Industrial includes heavy industrial, industrial, industrial farming, industrial food, and mines or quarries.

[4] Residential includes residential, rural, single-family, multi-family, mobile homes, and mobile home park.

[5] Vacant includes vacant agriculture, vacant commercial, vacant industrial, and vacant residential.

[6] Other includes infrastructure, miscellaneous, public/quasi-public, parks/resource management land, and unknown.

The two cities within San Benito County are Hollister and San Juan Batista. The county operates with a Local Agency Formation Commission, which acts to, among other things, preserve agricultural land resources and discourage urban sprawl (San Benito County 2010).

Based on the existing general plan land use designations and zoning, there is future residential buildout potential in the county of approximately 32,300 units to 34,300 units (San Benito County 2010). Information on previous developments from the county illustrates that both residential and industrial developments resulted in some conversions of agricultural land over the past year (San Benito County 2012).

The California DOC reports changes from irrigated farmland to both residential and non-irrigated land uses as well. Between 2008 and 2010, there were only a couple conversions from irrigated farmland to urban land. These occurred in the Cities of Hollister and San Juan Bautista (California DOC 2011f). The majority of conversions from irrigated farmland to non-irrigated uses were related to land fallowing for three or more FMMP update cycles (California DOC 2011f).

3.9.6.2.5 Fresno County

As shown in Table 3.9-31, the largest land use in Fresno County is agriculture.

Table 3.9-31. Existing Land Uses – Fresno County (1997)

Land Use Category	Percent
Residential	2.5
Commercial	0.12
Industrial	0.18
Agriculture	48.0
Resource Conservation	44.8
Unclassified (includes streets, highways, and rivers)	0.18
Incorporated Cities	2.6

Source: Fresno County 2000.

The most recent land use change report, published by the California DOC, for Fresno County is from 2008. The report notes land use changes from irrigated farmland to urban land. The majority of these changes was less than 20 acres and was attributable to residential and educational facility development. Two of these changes were developments over 100 acres in size (California DOC 2009b). While urban development is responsible for some of the conversions of irrigated farmland, land fallowing (for three or more FMMP update cycles), contributed to a larger portion of land conversions from irrigated agricultural uses (California DOC 2009b).

Other recent pending and approved developments that propose rezoning agricultural land to residential and other uses in the county include a couple proposals for natural gas drilling, a solar power generation facility, and residential development (Fresno County 2012). While Fresno County faces development pressures and conversions of agricultural land uses, the county's policies of directing urban growth away from agricultural lands and to cities, unincorporated communities, and other areas planned for such development, helps maintain agriculturally designated areas for agricultural use (Fresno County 2010).

3.9.6.2.6 Kings County

Kings County has four incorporated cities, Avenal, Corcoran, Hanford, and Lemoore (Kings County 2010). Table 3.9-32 summarizes land uses in the county and illustrates the fact that agriculture is by far the dominant land use in the county (Kings County 2010).

Table 3.9-32. Existing Land Uses – Kings County

Land Use Category	Percent
Agriculture	90.17
Residential	0.38
Mixed Use	0.02
Commercial	0.10
Industrial	0.31
Other Uses (Natural Resource Conservation, Open Space, and Public)	9.03

Source: Kings County 2010.

Between 1993 and the county's most recent General Plan update, agriculture accounted for the greatest amount of land use conversions (Kings County 2010). Of the over 97,000 acres of agricultural land converted to another use, approximately 73 percent was converted to Natural Resource Conservation and Open Space (Kings County 2010).

Kings County's land use policies identify priority agricultural areas for conservation and guide development away from these areas; however, the California DOC reports land use changes from irrigated farmland to urban land in the county between 2008 and 2010 (California DOC 2011g). The majority of these changes took place within the incorporated cities in the county. Additionally, as with other counties in the area of analysis, changes from irrigated farmland to non-irrigated land uses were largely the result of land being fallow for three or more FMMP update cycles (California DOC 2011g).

3.9.6.3 Alternative 2: Full Range of Transfers (Proposed Action)

3.9.6.3.1 Seller Service Area

Water acquisition via cropland idling under the Proposed Action in combination with other water management activities, population growth, and development projects converting agricultural land to different uses could decrease the amount of land in the Seller Service Area categorized as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland under the FMMP and convert Williamson Act or other land conservation program lands to an incompatible use. Water management activities that could result in cumulative effects with long-term water transfers include the CVP M&I WSP and SWP water transfers. The CVP M&I WSP could limit water supplies to agricultural users and result in increased agricultural land idling in the Seller Service Area. These changes, however, would likely be minor because the changes in water deliveries would likely represent a small amount of the overall water supply within the area of analysis.

Cropland idling implemented under the SWP transfers could result in a maximum of 26,342 acres of idled rice land. Similar to cropland idling for CVP transfers, SWP cropland idling transfers would be a temporary effect and would not result in land being converted to incompatible uses. Under the cumulative condition, land classifications could change if parcels are repeatedly idled under other water transfer programs. The majority of SWP cropland idling transfers would occur in Butte County, where only small amounts of idling could occur under the Proposed Action. Both CVP and SWP transfers could occur in Sutter County, although SWP transfers projected from Sutter County are relatively small. The Proposed Action includes a maximum of up to 12,569 acres that could be idled in Butte and Sutter counties, which is not a substantial amount of Important Farmland acreage in the counties.

As described in Section 3.9.2.4, cropland idling under the Proposed Action would be temporary in nature and transfers would affect a small percentage of the overall Important Farmland acres within counties in the Seller Service Area. The cumulative water management activities similarly have temporary and small impacts to agricultural land classification.

Counties and cities in the Seller Service Areas continue to undergo development pressures that result in the conversion of agricultural lands to urban uses. Additionally, throughout the area of analysis, cropland idling is a large driver in the conversion of agricultural lands and the reclassification of FMMP designations. Conversions of agricultural lands to urban uses and land fallowing would likely continue into the future. While counties in the area of analysis set policies to guide development in ways that conserve agricultural lands, permanent conversions of agricultural lands would continue in the future.

As described in Section 3.9.6.1, cities in the Seller Service Area would continue to undergo population and employment growth into the future and throughout the city general plan planning horizons. In the current general plans for cities in the Seller Service Area, many cities anticipate higher annual growth rates than have been experienced over previous planning horizons. All of the cities have accounted for this future growth in their general plans, and many attempt to guide growth through the establishment of UGBs or urban limit lines. All city general plans acknowledge the possibility of future pressures for annexation of lands designated as agriculture. While cities in the Seller Service Area acknowledge the importance of preserving agricultural resources as well as the agricultural industry, future development could continue to convert agricultural land to non-agricultural uses. These cumulative land use changes as well as other agricultural land conversions in the county would be potentially significant.

Cropland idling under the Proposed Action would not result in permanent conversions of Important Farmland under the FMMP or Williamson Act and other land conservation program lands to an incompatible use. When considered in combination with other past, current, and future changes to agricultural land use in the area of analysis, agricultural land use impacts associated with acquisition of water via cropland idling in the Proposed Action would not be cumulatively considerable.

3.9.6.3.2 Buyer Service Area

Water transfers in combination with other water management activities, population growth, and development projects in the Buyer Service Area could change the amount of land in the area of analysis categorized as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland under the FMMP. Water management activities that could result in cumulative effects with long-term water transfers include the CVP M&I WSP and SWP water transfers. The CVP M&I WSP could limit water supplies to agricultural users and result in increased agricultural land idling in the Buyer Service Area. These changes, however, would likely be minor because the changes in water deliveries would likely represent a small amount of the overall water supply within the Buyer Service Area. The Proposed Action and SWP transfers would offset this minor, adverse impact by increasing the water supplies within the Buyer Service Area.

Similar to the Seller Service Area, the counties in the Buyer Service Area project agricultural conversion to urban or environmental uses in the future. The cumulative agricultural land conversions would be potentially significant. The Proposed Action's incremental contribution to this significant cumulative effect would be beneficial because it would increase water supplies and potentially allow growers to place previously idled land into production.

3.9.6.4 Alternative 3: No Cropland Modifications

Because Alternative 3 would not include cropland idling, it would not contribute to cumulative impacts as a result of conversion of Important Farmland under the FMMP in the Seller Service Area. Additionally, there would be no cumulative impacts related to conversion of Williamson Act or other land conservation program lands to an incompatible use in the Seller Service Area.

Water transfers in combination with other water management activities, population growth, and development projects in the Buyer Service Area could change the amount of land in the area of analysis categorized as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland under the FMMP. Water management activities that could result in cumulative effects with Alternative 3 include the CVP M&I WSP and SWP water transfers. The CVP M&I WSP could limit water supplies to agricultural users and result in increased agricultural land idling in the Buyer Service Area. These changes, however, would likely be minor because the changes in water deliveries would likely represent a small amount of the overall water supply within the Buyer Service Area. Alternative 3 and SWP transfers would offset this minor, adverse impact by increasing the water supplies within the Buyer Service Area.

The counties in the Buyer Service Area project agricultural conversion to urban or environmental uses in the future. The cumulative agricultural land conversions would be potentially significant. The incremental contribution from Alternative 3 to this significant cumulative effect would be beneficial because it would increase water supplies and potentially allow growers to place previously idled land into production.

3.9.6.5 Alternative 4: No Groundwater Substitution

Cumulative impacts under Alternative 4 would be similar to those described under the Proposed Action.

3.9.6.5.1 Seller Service Area

Cropland idling under Alternative 4 in combination with other water management activities could decrease the amount of land in the Seller Service Area categorized as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland under the FMMP and convert Williamson Act or other land conservation program lands to an incompatible use.

Water acquisition via cropland idling under Alternative 4 in combination with other water management activities, population growth, and other development projects converting agricultural land to different uses could decrease the amount of lands in the Seller Service Area categorized as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland under the FMMP and convert Williamson Act or other land conservation program lands to an incompatible use. As described under Section 3.9.2.6, Cropland idling transfers would occur more often under the No Groundwater Substitution Alternative relative to the Proposed Action. Thus, there is a potential for cropland idling water transfers to change the classification of Important Farmland. However, Mitigation Measure LU-1 (Section 3.9.4), would reduce this potential impact to less than significant.

Cumulatively, the M&I WSP would continue to have very small effects relative to agricultural land use (see Section 3.9.6.1). However, both Alternative 4 and the SWP transfers could idle cropland in Butte and Sutter counties.

As described for the Proposed Action (Section 3.9.6.1), permanent conversion of agricultural land would likely continue into the future despite counties' policies to guide development in ways that conserve agricultural lands. In the Seller Service Area, cumulative agricultural land conversions would be potentially significant. Cropland idling under Alternative 4, after incorporating Mitigation Measure LU-1, would not result in permanent conversions of Important Farmland under the FMMP or Williamson Act and other land conservation program lands to an incompatible use. When considered in combination with other past, current, and future changes to agricultural land use in the area of analysis, agricultural land use impacts associated with acquisition of water via cropland idling in Alternative 4 would not be cumulatively considerable.

3.9.6.5.2 Buyer Service Area

Water transfers in combination with other water management activities, population growth, and development projects in the Buyer Service Area could change the amount of land in the area of analysis categorized as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland under the FMMP. Water management activities that could result in cumulative effects with Alternative 4 include the CVP M&I WSP and SWP water transfers. The CVP M&I WSP could limit water supplies to agricultural users and result in increased agricultural land idling in the Buyer Service Area. These changes, however, would likely be minor because the changes in water deliveries would likely represent a small amount of the overall water supply within the Buyer Service Area. Alternative 4 and SWP transfers would offset this minor, adverse impact by increasing the water supplies within the Buyer Service Area.

The counties in the Buyer Service Area project agricultural conversion to urban or environmental uses in the future. The cumulative agricultural land conversions could be potentially significant. The incremental contribution from Alternative 4 to this significant cumulative effect would be beneficial because it would increase water supplies and potentially allow growers to place previously idled land into production.

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