

Listing Status

U.S. Fish and Wildlife Service

FE	Federally listed endangered	FD	Federally de-listed; to be monitored for five years
FT	Federally listed threatened	FSC	Federal Species of Concern (NMFS)
FC	Candidate for federal listing	CH	Critical habitat designated in project action area
		EFH	Essential fish habitat designated in project action area

Natomas Basin Habitat Conservation Plan

NBHCP Covered species under the Natomas Basin Habitat Conservation Plan

²The 2006 dry-season survey for federally listed large branchiopods found cysts belonging to the genus *Branchinecta*, but these cysts were not identified to species. Wet-season surveys for vernal pool invertebrates did not identify live specimens of conservancy fairy shrimp, vernal pool fairy shrimp, midvalley fairy shrimp, or vernal pool tadpole shrimp; however, the 2006 wet-season survey was determined by the U.S. Fish and Wildlife Service (USFWS) Sacramento Office to be insufficient to determine presence or absence of the species due to poor rainfall and branchiopod growth conditions. A supplemental survey is being performed in the wet season of 2007/2008 and survey results will be provided to the USFWS as a supplement to this report upon completion.

These surveys were conducted to identify and map habitat boundaries, to identify special-status species within the project area, and to locate and delineate water features with the potential to support special-status species (see Attachment E for complete field survey reports). Table 4 lists the field surveys, their dates, and the company associations of the surveyors who performed them.

Habitat Types

Habitat types in the project area were mapped based on aerial photos and field surveys conducted in 2006 and 2007 (refer to Figures 2A-2G). Wetland delineations were conducted by CH2M HILL for the Line 406 project segment, and by Gallaway for the Line 407 project segments in 2006 and 2007. The wetland delineation surveys involved an examination of botanical resources, soils, hydrological features, and determination of wetland characteristics based on the United States Army Corps of Engineers (USACE) Wetlands Delineation Manual (1987), the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (2006), and the USACE Jurisdictional Determination Form Instructional Guidebook (2007).

Special-status Plant Species

Rare plant surveys were conducted by GANDA and CH2M HILL in the Line 406 project area and by Gallaway in the Line 407 project area during spring and summer 2006 and 2007. Rare plants that were considered in these surveys included all federally and state-listed threatened and endangered species, candidates for listing, plant species proposed for listing, plants covered under the NBHCP, plants that meet the definitions of rare or endangered under the CEQA, and plant species listed by the California Native Plant Society (CNPS) as 1A (presumed extinct in California, but may occur or be rediscovered), 1B (plants rare, threatened, or endangered in California or elsewhere), or 2 (plants rare, threatened, or endangered in California, but more common elsewhere).

Surveys were conducted during the appropriate blooming periods of the species that were identified in the literature review and for which suitable habitat was determined to exist in the project area. All plants observed in the field surveys were identified to the extent necessary to determine their status as rare, threatened, or endangered. Prior to conducting rare plant surveys, known reference populations of the plants were visited to ensure that the flowering periods of the species were active. The locations of all special-status plant species observed in the project area were clearly designated on USGS 7.5-minute topographic maps.

No plant species under the jurisdiction of the USFWS were found in surveys of the project area. One rare plant, the dwarf downingia (CNPS List 2), was observed in the Line 407 East survey area. This species was observed on the opposite side of the road from the proposed alignment, but the occurrence was within the project action area (see Figure 3 of the Line 407 East Rare Plant Survey Report in Attachment E). No other special-status or rare plants were found in surveys of the Line 406 and Line 407 project area.

Table 4: Field Surveys

Survey	Survey Date(s)	Surveyor Association(s)
Special-status/Rare Plants	<ul style="list-style-type: none"> • May 5 and 12, and July 21, 24, and 26, 2006, and May 14, 2007 (Line 407 East) • May 3, 8, and 14, 2007 (Line 407 West) • May 31 and June 1, 2007 (Line 406) 	Gallaway Line 407 East and Line 407 West) GANDA/CH2MHILL (Line 406)
Valley Elderberry Longhorn Beetle	<ul style="list-style-type: none"> • May 8 and 14, 2007 (Line 407 West) • May 31 and June 1, 2007 (Line 406; conducted during rare plant surveys) 	Gallaway and GANDA/CH2MHILL (Line 406)
Vernal Pool Invertebrate Surveys (Line 407 East project segment)	<ul style="list-style-type: none"> • November 5, 6, and 18, 2006, October 7, 2007 (Dry-season survey) • December 21, 2006 through May 18, 2007 (Wet-season survey) 	Helm Biological Consulting (Dry-season survey) Gallaway (Wet-season survey)
Fish Habitat Assessment	<ul style="list-style-type: none"> • July 20, 2006 and June 21, 2007 (all project segments) 	TRC
Special-status Amphibian and Reptile Habitat Assessment	<ul style="list-style-type: none"> • June 12 and 13, 2006 (Line 407 East) • November 30 and December 5 and 7, 2006 (Line 406) • June 29, 2007 (Line 407 West) 	PG&E
Special-status Avian and Mammalian Species Habitat Assessment	<ul style="list-style-type: none"> • June 12 and 13, 2006 (Line 407 East) • November 30 and December 5 and 7, 2006 (Line 406) • June 29, 2007 (Line 407 West) 	PG&E
Delineation of Waters of the United States	<ul style="list-style-type: none"> • July 21 and 24 to 28, and August 10 and 25, 2006 (Line 407 East) • May 3, 8, and 14, June 21, and July 31, 2007 (Line 407 West) • April 4 and 5, 2007 (Line 406) 	Gallaway Line 407 East and Line 407 West) CH2MHILL (Line 406)

Special-status Wildlife Species

Special-status wildlife species that were considered in surveys of the project area included all federally listed threatened and endangered wildlife species, candidates for listing, species proposed for listing, species of concern (NMFS), and species covered by the NBHCP. A special-status species was considered a potential inhabitant of the project area if its known geographical range occurs in any of the USGS 7.5-minute quadrangles within the project action area, and its general habitat requirements (e.g., roosting, nesting, foraging habitat; specific soil type; permanent water source; etc.) are present. These habitat requirements were considered during the surveys, as described in detail below.

Invertebrates

Valley Elderberry Longhorn Beetle

Gallaway performed surveys for the VELB in the Line 407 project area during rare plant surveys conducted in April, May, and August 2006, and May 2007. CH2M HILL performed surveys for VELB in the Line 406 area in November 2006 and May and June 2007. During these surveys, Gallaway and CH2M HILL searched for the VELB's host plants, elderberry (*Sambucus* spp.), in accordance with the USFWS Conservation Guidelines for the Valley Elderberry Longhorn Beetle (1999).

Surveys focused on identifying elderberry shrubs within the 1,000-foot survey corridor and classifying the number of elderberry stems measuring greater than or equal to 1 inch at ground height. The survey also focused on the detection of emergence holes on elderberry shrubs that would indicate the presence of VELB.

Elderberry was observed in the Line 407 West project segment survey area, but no elderberry was identified during the Line 406 or Line 407 East rare plant surveys. Within the Line 407 West survey area, elderberry was found in riparian habitat along a canal adjacent to CR 16 near the west bank of the Sacramento River, and in upland habitat near the junction of CR 99A and CR 17 (see Figure 2 of the VELB Survey Report in Attachment E). All elderberry shrubs identified in field surveys were mapped using a sub-meter global positioning system unit. Adult beetles were not observed during the surveys; however, emergence holes were detected on 10 of the 23 elderberry shrubs mapped within the study area.

Vernal Pool Invertebrates

Wetland delineations in the Line 406 and Line 407 project segments revealed that suitable habitat for special-status vernal pool invertebrates only exists in the Line 407 East project segment, and thus, surveys for these species focused only on this segment. One full dry-season survey and one full wet-season survey were completed for special-status vernal pool invertebrates in the Line 407 East area. All surveys were conducted by 10(a)-permitted staff in accordance with the USFWS protocols contained in the Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for Listed Vernal Pool Branchiopods (USFWS, 1996a).

Helm Biological Consulting performed protocol-level dry-season vernal pool invertebrate sampling in the Line 407 East segment in November 2006 and October 2007. The October 2007 survey consisted of supplemental sampling of pools that were inaccessible during the 2006 survey due to landowner access issues. Dry-season sampling was completed before rains began and before any wetland feature with the potential to host vernal pool invertebrates was inundated with water. Cysts belonging to the genus *Branchinecta* were observed during dry-season sampling in soils collected from 41 basins within the study area. Within those basins, 13 are within the proposed project ROW, and 9 are within 250 feet of the project ROW and may have hydrological connectivity to the project ROW. Cysts belonging to the California fairy shrimp (*Lindneriella occidentalis*) were observed in soils collected from 21 basins in the study area. While the California fairy shrimp is not federally listed, it commonly occurs in pools along with other listed vernal pool species. The dry-season survey report and supplement are included in Attachment E.

Gallaway performed protocol-level wet-season vernal pool invertebrate sampling in the Line 407 East area between December 2006 and May 2007. Vernal pools, vernal swales, seasonal wetlands, seasonal swales, and roadside ditches were sampled in efforts to determine the presence of federally listed vernal pool invertebrates. Wet-season surveys of the site revealed the presence of the California fairy shrimp in five pools within the site; however, surveyors found no presence of federally listed vernal pool invertebrates despite the dry-season sampling findings. The wet-season survey report is included in Attachment E.

Precipitation levels for the winter of 2006-2007 were below average, and thus ponding of the suitable habitat in the project area was limited as compared to normal precipitation years. This may have led to reduced hatching and growth to maturity of listed vernal pool invertebrates that may occur in the project area. Discussions with the USFWS (USFWS, 2007b) revealed that the USFWS was not going to accept the 2006-2007 Line 407 East wet-season survey to satisfy the requirements of the protocol due to poor winter conditions; therefore, the survey will be repeated by Gallaway during the winter season of 2007-2008. Upon completion, the 2007-2008 wet-season survey report will be submitted to the USFWS for review as a supplement to this BA.

Fish

TRC conducted a literature review to identify and compile a list of special-status fish species with the potential to exist in the project area. Eight species (or distinct runs of species) were identified, some of which are Pacific salmon with designated EFH or critical habitat within the Sacramento River, Yolo Bypass, and associated creeks and canals in the project action area.

TRC conducted field reconnaissance surveys on July 20, 2006 and June 21, 2007 to identify any waterways in the survey area that may provide suitable habitat for special-status fish species. Conditions that were considered included seasonal flow and water quality characteristics, riparian cover, substrate composition, and accessibility of the waterway to species, including in-stream structures that may create barriers to fish passage. See Attachment E for the Line 406 and Line 407 Fish Habitat Assessment.

Amphibians and Reptiles

PG&E biologists performed amphibian and reptile surveys for Line 406 and Line 407. Aerial photography and GIS maps, in conjunction with ground-reconnaissance surveys, were used to assess the potential for sensitive herpetological species and their habitats to occur within the project survey corridor. Reconnaissance-level field surveys of the project alignment were performed on June 12 and 13, 2006 for Line 407 East; November 30 and December 5 and 7, 2006 for Line 406; and June 29, 2007 for Line 407 West. The purpose of these surveys was to assess site conditions, habitat types present, and to note any special-status reptile and amphibian species and habitats that may be present. The survey corridor was assessed by driving available roads and walking representative portions of the habitat within the survey area along the pipeline alignment, thus allowing a close-up inspection of the habitat. Observable habitat characteristics were noted. The only amphibians documented during surveys were nonnative bullfrogs (*Rana catesbeiana*). Both tadpole and juvenile life stages were observed (adults were not observed). See Attachment E for the Line 406 and Line 407 Amphibian and Reptile Report.

Birds and Mammals

PG&E biologists performed an avian and mammalian habitat assessment for Line 406 and Line 407 within the 1,000-foot survey corridor. In the case of arboreal nesting raptors, a 0.25-mile survey area centered on the proposed alignment was assessed (0.5-mile survey corridor). Aerial photography, GIS maps, and ground-reconnaissance surveys were used to note site conditions, habitat types (nesting, foraging, cover, roosting, maternity, or wintering), and any special-status avian or mammalian species that may be present. Reconnaissance-level field surveys were performed on June 12 and 13, 2006 for Line 407 East; November 30 and December 5 and 7, 2006 for Line 406; and June 29, 2007 for Line 407 West. See Attachment E for the Line 406 and Line 407 Avian and Mammalian Survey Report.

Additional surveys may be required for pipeline construction activities that involve significant vegetation removal and/or that occur near suitable nesting, roosting, or maternity habitats during sensitive wildlife temporal windows. Appropriate nesting bird and bat roosting/maternity surveys will be conducted as needed or required prior to commencement of construction activities. These surveys will identify active nests or roosting areas within any applicable species-specific buffers and will allow for proper mitigation or avoidance of impacts.

5. SPECIES ACCOUNTS AND STATUS OF SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA

SPECIAL-STATUS PLANT SPECIES

Suitable habitat for the eight special-status plant species identified in preliminary research for this analysis may exist in the project action area in the form of vernal pools, freshwater emergent wetlands, or grasslands. However, none of these eight species was found in protocol-level surveys within the 1,000-foot study area. Potential effects to special-status plant species that may occur out of the ROW and/or study area, but potentially within other portions of the action area, are discussed in Section 7 of this report.

SPECIAL-STATUS WILDLIFE SPECIES

The following section contains descriptions of special-status wildlife species that may occur in the project action area. Critical habitat has been designated for many of these species, but is not mentioned in the species descriptions below unless it occurs within the project action area.

Conservancy Fairy Shrimp (*Branchinecta conservatio*)

The Conservancy fairy shrimp is federally listed as endangered. It is included in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS, 2005b). It ranges in size from about 0.5 to 1 inch long. Fairy shrimp feed on algae, bacteria, protozoa, rotifers, and bits of detritus (USFWS, 2007c). Conservancy fairy shrimp inhabit rather large, cool-water vernal pools with moderately turbid water (Eriksen and Belk, 1999). The pools generally last until June. However, live shrimp are usually found between November and April.

Female fairy shrimp carry their eggs in a brood sac. When they are mature, the eggs either are dropped to the pool bottom or remain in the brood sac until the mother dies and sinks. When the pool dries out, so do the eggs. They remain in the dry pool bed until rains and other environmental stimuli hatch them. Resting fairy shrimp eggs are known as cysts. They are capable of withstanding heat, cold, and prolonged desiccation. When the pools refill, some, but not all, of the cysts may hatch. The cyst bank in the soil may contain cysts from several years of breeding. Hatching can begin within the same week that a pool starts to fill. Average time to maturity is 49 days. In warmer pools, it can be as little as 19 days (USFWS, 2007c).

As of October 15, 2007, the USFWS was aware of eight populations of Conservancy fairy shrimp, none of which is within the project action area. However, one Conservancy fairy shrimp was found in recent surveys in a pool in western Placer County north of the project alignment (USFWS, 2007c). Thus, the USFWS has requested that Conservancy fairy shrimp be considered in this BA and in wet-season vernal pool invertebrate surveys of the project area.

Conservancy fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp occupy the same vernal pool ecosystems and are threatened by similar factors. The loss, fragmentation, and isolation of functional vernal pool ecosystems have threatened the continued existence of these species. Primarily, habitat loss is the result of urbanization, agricultural conversion, and mining. Included in habitat loss is habitat alteration and degradation as a result of changes to natural hydrology, invasive species, incompatible grazing regimes, infrastructure projects (e.g., roads, water storage and conveyance, and utilities), recreational activities (e.g., off-highway vehicles and hiking), erosion, climatic and environmental change, and contamination. As previously described, habitat fragmentation includes those activities associated with habitat loss that contribute to the isolation and fragmentation of vernal pool habitats (USFWS, 2005b).

Conservancy fairy shrimp may occur in vernal features in the Line 407 East project segment. Wet-season surveys during the winter of 2007-2008 will determine if these species are present in the area. Results of the survey will be provided to the USFWS upon completion.

Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

The vernal pool fairy shrimp is federally listed as threatened and is covered by the NBHCP. It is also included in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*. This small crustacean ranges in size from 0.5 to 1 inch long. The life history of the vernal pool fairy shrimp is very similar to that of the Conservancy fairy shrimp.

Vernal pool fairy shrimp occupy a variety of vernal pool habitats, from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools. Although the species has been collected from large vernal pools, including one exceeding 25 acres, it tends to occur in smaller pools. It is most frequently found in pools measuring less than 0.05 acre. This species is most commonly found in grass or mud-bottomed swales, or basalt-flow depression pools in unplowed grasslands. Vernal pool fairy shrimp have been collected from early December to early May (USFWS, 2006b).

The breeding cycle of vernal pool fairy shrimp is similar to that of Conservancy fairy shrimp. After the cysts hatch, the average time to maturity for the vernal pool fairy shrimp is 41 days. In warmer pools, maturity can be reached in as little as 18 days (Eriksen and Belk, 1999).

Vernal pool fairy shrimp occupy the same vernal pool ecosystems as Conservancy fairy shrimp and are threatened by similar factors. Thus, details of habitat loss, fragmentation, isolation, alteration, and degradation provided in the conservancy fairy shrimp description are not repeated here. However, specific threats to the vernal pool fairy shrimp are provided below.

Most of the known occurrences of the vernal pool fairy shrimp in the Northeastern Sacramento Valley Vernal Pool Region are located on Caltrans rights-of-way and are threatened by various future road improvement projects, particularly the future expansion of Highway 99. In the northwestern region, some occurrences may be threatened by agricultural conversion or development, and in the southeastern region, the shrimp are threatened by urban development. As a result, both Sacramento and Placer Counties are currently developing Habitat Conservation Plans to address growth in the region (USFWS, 2005b).

Vernal pool fairy shrimp may occur in vernal features in the Line 407 East project segment. Wet-season surveys during the winter of 2007-2008 will determine if these species are present in the area. Results of the survey will be provided to the USFWS upon completion.

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)

The valley elderberry longhorn beetle is federally listed as threatened and is covered by the NBHCP. VELB are characterized by elongate, cylindrical bodies with long antennae, often more than two thirds of the body length. VELB are stout-bodied. Males range in length from about 0.5 to nearly 1 inch, with antennae about as long as their bodies. Females are slightly more robust than males, measuring approximately 0.75 to 1 inch, with somewhat shorter antennae (USFWS, 2007d).

There are four stages in the VELB's life: egg, larva, pupa, and adult. The species is nearly always found on or close to its host plant, elderberry. In order to serve as habitat, elderberry

shrubs must have stems that are 1 inch or greater in diameter at ground level. Females lay their eggs on the bark. Larvae hatch and burrow into the stems. The larval stage may last two years, after which the larvae enter the pupal stage and transform into adults. Adults actively feed and mate from March to June (USFWS, 2007d).

Extensive destruction of California's Central Valley riparian forests is due to agricultural and urban development, resulting in widespread alteration and fragmentation of riparian habitats, and to a lesser extent, upland habitats, which support the beetle. These primary threats include loss and alteration of habitat by agricultural conversion; inappropriate grazing; levee construction; stream and river channelization; removal of riparian vegetation and rip-rapping of shoreline; predation by nonnative animals such as the Argentine ant; and recreational, industrial, and urban development. Other factors include insecticide and herbicide use in agricultural areas and along road rights-of-way that limit the beetle's distribution. The age and quality of individual shrubs and elderberry stands as a food plant for the beetle may also be a factor in its limited distribution (USFWS, 2007d).

VELB may occur in the Line 407 West project segment west of the Sacramento River where elderberry shrubs were identified during 2007 surveys (see Attachment E for the VELB survey report).

Vernal Pool Tadpole Shrimp (*Lepidurus packardii*)

The vernal pool tadpole shrimp is federally listed as endangered and is covered by the NBHCP. It is also included in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*. Vernal pool tadpole shrimp adults reach a length of 2 inches. Tadpole shrimp climb or scramble over objects, as well as plow along or within bottom sediments. Their diet consists of organic debris and living organisms, such as fairy shrimp and other invertebrates. This animal inhabits vernal pools containing clear to highly turbid water ranging in size from 54 square feet to 89 acres (USFWS, 2006c).

The life history of the vernal pool tadpole shrimp is linked to the seasonal cycle of the vernal pool, and is similar to that of the Conservancy and vernal pool fairy shrimp described above. The vernal pool tadpole shrimp has a patchy distribution across the Central Valley of California, from Shasta County southward to northwestern Tulare County, with isolated occurrences in Alameda and Contra Costa counties. Although vernal pool tadpole shrimp are spread over a wide geographic range, their habitat is highly fragmented and they are uncommon where they are found (USFWS, 2006c).

Vernal pool tadpole shrimp are threatened by the same habitat loss, fragmentation, and isolation as Conservancy fairy shrimp and vernal pool fairy shrimp previously described. Specifically, vernal pool tadpole shrimp in the northeastern Sacramento Valley region, where most of the known occurrences are on Caltrans rights of way, are threatened by road improvement projects related to general urban growth. In the northwestern region, the shrimp are threatened by development on the few sites on private land where it is known to occur, and in the southeastern region, extant populations are threatened by continued extensive urban development (USFWS, 2005b).

Vernal pool tadpole shrimp may occur in vernal features in the Line 407 East project segment. Wet-season surveys during the winter of 2007-2008 will determine if these species are present in the area. Results of the survey will be provided to the USFWS upon completion.

Green Sturgeon (*Acipenser medirostris*)

The southern distinct population segment of green sturgeon is federally listed as threatened. The green sturgeon is the most marine of the sturgeon species, coming into rivers mainly to spawn. This species may remain in fresh water for up to two years in its early life stages. Spawning takes place in deep, fast-moving water with temperatures between 46 and 57 deg. F. Larval and juvenile green sturgeon remain near estuaries in early life stages, but they migrate considerable distances as they grow. Juveniles typically migrate out to sea before the end of their second year, primarily during summer and fall (Moyle, 2002).

A principal factor in the decline of the Southern Distinct Population Segment (DPS) of green sturgeon is the reduction of the limited spawning area in the Sacramento River. This small concentration of spawning adults increases the risk of extirpation due to catastrophic events. Other threats include insufficient freshwater flow rates in spawning areas, contaminants, bycatch of green sturgeon in fisheries, poaching, impassable barriers, entrainment by water projects, influence of exotic species, and elevated water temperatures (NMFS, 2006e).

Green sturgeon may occur in the Sacramento River within the Line 407 West project segment.

California Central Valley Steelhead (*Oncorhynchus mykiss*)

The Central Valley steelhead is federally listed as threatened and critical habitat has been designated in Steelhead Creek approximately 6 miles downstream of the project, in the Yolo Bypass and the Sacramento River (NMFS, 2005a). They are anadromous (born in fresh water, migrate to the ocean where most of their growth occurs, and return to fresh water to spawn). Unlike Pacific salmon, steelhead are iteroparous (i.e., can spawn more than once). Repeat spawning rates are generally low, however, and vary considerably among populations (Moyle, 2002).

In California, peak spawning occurs from December through April in small streams and tributaries with cool, well-oxygenated water. Steelhead eggs hatch in about 30 days at 51 deg. F. Fry (newly-hatched steelhead) usually emerge from the gravel four to six weeks after hatching. Juvenile steelhead spend between one and three years in fresh water before migrating to the ocean. Once at sea, they spend between one and four years before returning to spawn (McEwan, 2001).

California Central Valley steelhead are considered “winter” steelhead, entering streams between August and October and hold in fresh water until flows in tributaries are high enough to enter them for spawning. Steelhead typically spawn shortly after reaching spawning grounds, often traveling long distances to reach ideal spawning habitat (Moyle, 2002).

Inaccessibility to spawning and rearing habitat due to impassable dams is the primary threat to the California Central Valley Steelhead DPS. Where steelhead are still extant, natural populations are subject to habitat degradation and various impacts from water development (e.g., water storage, withdrawal, conveyance, and diversions for agriculture, flood control, and domestic and hydropower purposes) and land use activities. While not completely assessed, stocking of hatchery fish may have deleterious effects on native wild trout populations. Furthermore, it is likely many of the threats affecting Chinook salmon are also negatively impacting steelhead, such as inadequately screened water diversions, high water temperatures, and predation by nonnative species (NMFS, 2007b).

California Central Valley steelhead may occur in Steelhead Creek (wet season only) in the Line 407 East project segment, or in the Sacramento River or Yolo Bypass in the Line 407 West project segment.

Central Valley Fall- and Late-fall-Run Chinook (*Oncorhynchus tshawytscha*)

Chinook salmon, the largest of the salmon species, is one of eight species of Pacific salmonids in the genus *Oncorhynchus*. Chinook salmon are anadromous and semelparous (i.e., spawn only once and then die). Central Valley fall- and late-fall-run chinook salmon are NMFS Species of Concern.

EFH has been designated for all species of chinook salmon managed by the NMFS and the Pacific Fisheries Management Council under the Pacific Coast Salmon Plan of 1997, and Amendment 14 to the Pacific Coast Salmon Plan of 2000. Within the project area, EFH includes all watercourses accessible to chinook salmon, including Steelhead Creek, the Sacramento River, and the Yolo Bypass (NMFS, 2006d).

During spawning, adult female chinook will prepare a redd in a stream area with suitable gravel composition, water depth, and water velocity. Suitable substrate for spawning usually consists of a mixture of gravel and cobble with low silt content. The adult female chinook may deposit eggs in four to five “nesting pockets” within a single redd. After spawning, adult chinook guard the redd from 4 to 25 days before dying. Chinook salmon eggs hatch between 90 and 150 days after deposition, depending upon water temperatures. Eggs are deposited at a time to ensure that young salmon fry emerge during the following spring when the river or estuary productivity is sufficient for juvenile survival and growth (NMFS, 2006c).

Juvenile chinook may spend from three months to two years in fresh water after emergence and before migrating to estuarine areas as smolts, and then into the ocean to feed and mature. Chinook salmon remain at sea for one to six years, although they typically remain for two to four years, with the exception of a small proportion of yearling males (jack salmon), which either mature in fresh water or return after spending two to three months in saltwater (Moyle, 2002).

The Central Valley fall- and late-fall-run chinook designation consists of two distinct migrations of chinook. Fall-run chinook are adapted for spawning in lowland reaches of large rivers and their tributaries. They migrate from the ocean in late summer and early fall in mature condition and typically spawn within a few days or weeks of reaching the spawning grounds. Juveniles

emerge in spring and move downstream to rear in mainstem rivers or estuaries before heading out to sea. Late-fall-run chinook typically migrate into rivers between October and April, and hold in the river for one to three months before spawning. They are adapted for spawning and rearing in mainstem rivers such as the upper Sacramento River that remain cold and deep enough in summer for rearing of juveniles. Juveniles grow rapidly and travel to sea after spending between 7 and 13 months in fresh water (Moyle, 2002).

The late-fall-run chinook is included in the Recovery Plan for the Sacramento/San Joaquin Delta Native Fishes, and protection measures outlined by the plan are discussed in Section 6 of this report.

On April 10, 2008, the Pacific Fishery Management Council adopted final regulatory recommendations to close commercial and recreational fishing for fall- and late fall-run chinook. A state of emergency was declared by the governor of California, stating that the fall chinook salmon fishery had collapsed due to poor ocean conditions and other environmental factors. The state of emergency directed the CDFG to work to ensure the protection of the resource and to address the long-term restoration and management of the ESU in ongoing discussions with federal agencies and representatives from conservation and fishing organizations and fishing communities (Schwarzenegger, 2008).

Threats to the species are similar to those of the spring- and winter-run chinook, including elevated water temperatures and impacted water quality, water diversions and dams, and loss of suitable spawning and rearing habitat, though other factors that may have contributed to this recent decline in population could include high predation and low abundance of food in the ocean that are thought to have occurred in 2005 when the juveniles were heading out sea.

Central Valley fall- and late-fall-run chinook may occur in the Sacramento River or Yolo bypass in the Line 407 West project segment. Additionally, these fish are known to occur in Steelhead Creek approximately 6 miles downstream of the project and could potentially stray into the Line 407 East project area during wet months.

Central Valley Spring-run Chinook (*Oncorhynchus tshawytscha*)

Central Valley spring-run chinook are federally listed as threatened. Critical habitat for the species has been designated in the Sacramento River and Yolo Bypass. Central Valley spring-run chinook salmon are similar in many of their life history characteristics to other chinook salmon runs in the Central Valley, with the exception of their run timing, their spawning period, and the amount of time spent in the river by juveniles before migrating out to sea.

Threats to Central Valley spring-run chinook salmon fall into three broad categories: loss of most historical spawning habitat, degradation of remaining habitat, and genetic threats from the Feather River Hatchery spring-run chinook salmon program. Like most spring-run chinook salmon, Central Valley spring-run chinook salmon require cool freshwater while they mature over the summer. In the Central Valley, summer water temperatures are suitable for chinook salmon only above 150- to 500-meter elevations, and most such habitat in the Central Valley is now upstream of impassable dams. Only three wild populations of spring-run chinook salmon

with consistent spawning runs (on Mill, Deer, and Butte creeks, tributaries to the lower Sacramento River draining out of the southern Cascade Mountains) are extant.

In addition to outright loss of habitat, Central Valley spring-run chinook salmon must contend with widespread habitat degradation and modification of rearing and migration habitats in the natal stream, the Sacramento River, and the Sacramento delta. The natal tributaries do not have large impassable dams, like many Central Valley streams, but they do have many small in-stream flows during spring-run migration periods. Problems in the migration corridor include unscreened or inadequately screened water diversions, predation by nonnative species, and excessively high water temperatures (NMFS, 2005b).

The Feather and Yuba rivers contain populations that are thought to be significantly influenced by the Feather River Hatchery spring-run chinook salmon stock. The Feather River Hatchery spring-run chinook salmon program releases its production far downstream of the hatchery, causing high rates of straying. There is concern that fall-run and spring-run chinook salmon have hybridized in the hatchery (CDFG, 2001).

Spring-run chinook salmon enter the Sacramento River as sexually immature fish in spring and early summer, usually between March and September. They move upstream and enter tributary streams, holding in headwater pools until they spawn typically between late August and October. Adults die after spawning. Juveniles typically rear in freshwater for 3 to 15 months. Juveniles emigrate from the tributaries to estuarine waters and the ocean between mid November and June (Moyle, 2002).

Central Valley spring-run chinook may occur in the Sacramento River or Yolo Bypass in the Line 407 West project segment.

Sacramento River Winter-run Chinook (*Oncorhynchus tshawytscha*)

Winter-run chinook in California are unique to the Sacramento River. They are federally listed as endangered and critical habitat has been designated in the Sacramento River. Winter-run chinook salmon are similar in many of their life history characteristics to other chinook salmon runs in the Central Valley, with the exception of their run timing, their spawning period, and the amount of time spent in the river by juveniles before migrating out to sea.

Winter-run salmon typically migrate upstream as immature fish during winter and spring, then spawn several months later in summer. Most winter-run chinook return to fresh water at three years old, and spawn in the upper Sacramento River in clear, cool water released from Shasta Reservoir. Adults die after spawning. Juveniles remain in fresh water for 5 to 10 months, followed by an intermediate time in estuarine waters before entering the ocean. Optimal temperatures for growth and survival of winter-run chinook salmon range from between 41 and 66 deg. F. At around 72 to 73.5 deg. F, major mortality is experienced in wild populations (Moyle, 2002).

The Shasta and Keswick dams block access to the Sacramento River winter-run chinook Evolutionary Significant Unit's (ESU) historic spawning habitat and is the primary threat to the

species. With cold-water releases from Shasta Dam creating spawning habitat and conditions 100 feet below the dam, the species has been able to survive, but has experienced significant impacts. Other threats to the small remaining extant population include vulnerability to drought, adverse flow conditions, high summer water temperatures, entrainment by water diversions, pollution (e.g., Iron Mountain Mine), predation, and unsustainable harvest rates (NMFS, 2007b).

Sacramento River winter-run chinook may occur in the Sacramento River or Yolo Bypass in the Line 407 West project segment.

California Tiger Salamander (*Ambystoma californiense*)

The CTS is federally listed as threatened. This salamander is endemic to California, and occurs in low elevations of the Coast Range from Sonoma County to Santa Barbara County, and in the Central Valley from Colusa County to Tulare County. It breeds in long-lasting temporary pools as well as some permanent pools in grasslands and oak woodland habitats. Upland habitats with small-mammal burrows, particularly those of the California ground squirrel, are utilized for aestivation (Jennings and Hayes, 1994). Migration to and from breeding sites typically occurs at night following relatively warm rains from November to March. Juvenile salamanders may spend up to five years traveling farther and farther from breeding pools before finding a suitable pool or returning to their natal pools to breed.

The primary cause of the decline of California tiger salamander populations is the loss and fragmentation of habitat from human activities and the encroachment of nonnative predators. All of the estimated seven genetic populations of this species have been significantly reduced because of urban and agricultural development, land conversion, and other human-caused factors. Reduction of ground squirrel populations to low levels through widespread rodent control programs may reduce availability of burrows and adversely affect the California tiger salamander. Poison typically used on ground squirrels is likely to have a disproportionately adverse effect on California tiger salamanders, which are smaller than the target species and have permeable skins. Use of pesticides such as methoprene in mosquito abatement may have an indirect adverse effect on the California tiger salamander by reducing the availability of prey. Various nonnative subspecies have been introduced and may out-compete the California tiger salamanders, or interbreed with them to create hybrids that may be less adapted to the California climate, or are not reproductively viable. Automobiles and off-road vehicles kill a significant number of migrating California tiger salamanders, and contaminated runoff from roads, highways, and agriculture may adversely affects the species (USFWS, 2008b).

The CTS may occur in the grasslands of the Dunnigan Hills within the Line 406 project segment where mammal burrows are abundant and temporary pools and cattle ponds exist, or in grasslands in the Line 407 East segment where vernal pools are present. However, mammal burrows are not abundant in the Line 407 project area and thus the CTS is less likely to occur in the Line 407 project segment.

Western Spadefoot Toad (*Spea hammondi*)

The western spadefoot is covered by the NBHCP and is included in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (2005b). It ranges from the northern end of the Central Valley near Redding, east of the Sierra Nevada range and the deserts, and south into northwest Baja California at elevations from near sea level up to 4,000 feet. Spadefoot toads prefer open areas with sandy or gravelly soils in a variety of habitats, including mixed woodlands, grasslands, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Spadefoot toads breed from January to May in temporary pools and quiet streams that do not contain bullfrogs (*Rana catesbeiana*), fish, or crayfish (*Procambarus clarkii*). The species burrows into drying pool bottoms or seeks refuge in mammal burrows to pass the dry season (Stebbins, 2003).

The primary cause of the reduction in western spadefoot toad population is habitat loss and fragmentation from urban and agricultural development. Furthermore, most of the remaining suitable rainpool or vernal pool habitats concentrated on valley terraces along the edges of the Central Valley floor are not protected. Livestock grazing can crush or consume egg clusters or directly trample juvenile and adult toads. In addition, cattle herd management (grazing and watering) may change vernal pool hydrology, adversely affecting toad metamorphosis and reducing the population. Roads may cause direct mortality to toads from motor vehicle strikes and can be a barrier to movements, effectively isolating populations and fragmenting habitat. Industrial contaminants and chemicals used on vegetation are toxic to amphibians and their prey, detrimentally impacting the toad populations. Another reason for the population decline and displacement of the toad is the introduction of nonnative predators such as the bullfrog (USFWS, 2005b).

The western spadefoot toad may occur in the Line 407 East project segment east of Steelhead Creek or in the Dunnigan Hills area of the Line 406 project segment where temporary pools or mammal burrows exist.

Northwestern Pond Turtle (*Clemmys marmorata marmorata*)

The northwestern pond turtle is covered by the NBHCP. In California, western pond turtles were historically present in most Pacific-slope drainages between the Oregon and Mexican borders (Jennings and Hayes, 1994). The turtle is divided into two subspecies: the northwestern subspecies (*C.m.marmorata*) and the southwestern subspecies (*C.m.pallida*). The northwestern subspecies is the one considered in this assessment, and is most likely to occur in still or slow-moving permanent or nearly permanent aquatic habitats that have access to suitable basking sites (e.g., logs, rocks, or open banks) and nearby upland nesting habitat. Northwestern pond turtles are thoroughly aquatic and can be found inhabiting woodland, grassland, and open forest habitats that contain ponds, permanent pools along intermittent drainages, lakes, marshes, rivers, streams, or irrigation ditches with rocky or muddy bottoms and emergent or aquatic vegetation (Stebbins, 2003).

Factors threatening the northwestern pond turtle include loss, degradation, and fragmentation of habitat; disease; and introduced predators and competitors. Specifically, agricultural activities can destroy turtle nests or cause nests to fail. In addition, cattle may trample and eat aquatic

vegetation that serves as habitat for hatchlings, and may directly crush individuals (Jennings and Hayes, 1994).

The western pond turtle may occur in aquatic habitats such as irrigation canals, creeks, or ponds within the Line 406, Line 407 West, and Line 407 East project segments.

Giant Garter Snake (*Thamnophis gigas*)

The GGS is federally listed as threatened and is covered by the NBHCP. A draft recovery plan was proposed for the GGS in 1999. The snake is endemic to valley floor wetlands of the Sacramento and San Joaquin valleys and its current range extends from near Chico in Butte County south to Fresno County. Thirteen known populations are concentrated in portions of the rice production zones in the Butte, Colusa, Sutter, American, Sacramento, and Yolo basins. The species inhabits freshwater marshes, wetlands, slow-moving streams, drainage ditches, irrigation canals, and rice fields in the Central Valley. The GGS requires emergent or riparian vegetation for cover, foraging, and basking, and upland habitat for retreat and hibernation activities. The snake also requires permanent water during its active period of May through October (USFWS, 1993).

The primary causes for the decline of the giant garter snake are habitat loss and fragmentation, flood control activities, agricultural and land management practices, introduced predators, parasites, and pollution. One of the most notable threats has been the high channelization of rivers, resulting in the removal of oxbows and backwater areas providing suitable habitat for the snakes (USFWS, 2007e).

The GGS may occur in rice fields and other associated aquatic and upland habitats in the Line 407 East and Line 407 West project segments east of the Sacramento River.

Tricolored Blackbird (*Agelaius tricolor*)

The tricolored blackbird is covered by the NBHCP. The species is a colonial nester that requires a protected nesting substrate of tall emergent or shrubby vegetation over or near open water. Foraging habitat includes annual grasslands, seasonal wetlands, agricultural fields, riparian areas, and cattle dairies. This species may visit lowland areas within mixed species flocks from October through March. Tricolored blackbirds are nearly endemic to California and the vast majority of the breeding population occurs in the Central Valley (and encompasses all valley counties), with populations also occurring in northeastern California and along the central and southern California coast. Nesting colonies are vulnerable to agricultural practices, wetland alteration and destruction, introduced predators, pesticides, and poisons (Hamilton, 2004).

Current threats to the tricolored blackbird population include land conversion of nesting and feeding areas to agriculture and urban development, predation by Black-crowned Night-herons (*Nycticorax nycticorax*), coyotes (*Canis latrans*), raccoons (*Procyon lotor*), and ravens (*Corvus corax*), frequently causing nearly complete loss of nests at colonies, mowing active nesting colonies in grain fields, and fluctuating water levels (USDA, 2005).

The tricolored blackbird may occur in the Line 406, Line 407 West, and Line 407 East project segments where suitable foraging or nesting habitat exists.

Burrowing Owl (*Athene cunicularia*)

The burrowing owl is covered by the NBHCP. Burrowing owls inhabit open, dry, gently rolling to flat grasslands, scrublands, and agricultural lands. Essential habitat characteristics for the burrowing owl are low-growing sparse vegetation and the occurrence of burrowing rodents. Burrowing owls range throughout most of the interior western United States, southern Canada, the Central Valley of California, southern California, throughout Mexico into Central America, and along the western half of Florida. The species is declining, with many populations extirpated due to habitat loss/fragmentation and burrowing-rodent control (Johnsgard, 1988; Klute, et al., 2003).

Habitat loss and degradation from rapid urbanization of farmland in the core areas of the Central and Imperial valleys is the greatest threat to burrowing owls in California. Ongoing urbanization in coastal regions, changes in agricultural practices, and continuing eradication of ground squirrels are also serious threats. Other causes of mortality may include roadkill where owls nest near roadways, pesticide concentration through consumption of contaminated food sources, or West Nile virus which is particularly virulent in raptor species (Gervais et al., 2008).

The burrowing owl is likely to occur in agricultural lands within the Line 406, Line 407 West, and Line 407 East segments, and is found in the Line 406 project segment within the Dunnigan Hills where mammal burrows and rodents are present and suitable nesting and foraging opportunities abound.

Swainson's Hawk (*Buteo swainsoni*)

The Swainson's hawk is covered by the NBHCP. Foraging habitat for the species consists of open grasslands, grain, and alfalfa fields (supporting rodent populations) adjacent to nesting opportunities. Nesting habitat consists of open areas with stands of dense-topped trees in juniper-sage flats, riparian areas, and oak savannas. Swainson's hawks typically nest in stands with only a few trees in the abovementioned habitats, as well as within agricultural areas. Swainson's hawks can become relatively habituated to human presence and activity as they readily occupy habitat within agricultural and rural residential areas, usually along roadsides where suitable nest trees are located, but sudden changes in activity regimes (construction in previously open areas or human intrusion) frequently causes nest abandonment, particularly during certain times of the breeding season (Johnsgard, 1990; Woodbridge, 1998).

The Swainson's hawk's breeding range includes the interior western United States, north-central Mexico, northeastern Alaska, northwestern and south-central Canada, and the Central Valley of California, and it winters primarily in South America. Breeding occurs from March to August.

The loss of agricultural lands to various residential and commercial developments is a serious threat to Swainson's hawks throughout California. Additional threats are habitat loss due to riverbank protection projects; conversion from agricultural crops that provide abundant foraging

opportunities to crops such as vineyards and orchards, which provide fewer foraging opportunities; shooting; pesticide poisoning of prey animals and hawks on wintering grounds; competition from other raptors; and human disturbance at nest sites (CDFG, 1983).

The Swainson's hawk may occur in grasslands, agricultural areas, and the Line 406, Line 407 West, and Line 407 East project segments.

Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)

The western yellow-billed cuckoo is a candidate for federal listing. Cuckoos nest in riparian forests along broad, lower floodplains of larger river systems. The cuckoo requires broad, well-developed, low-elevation riparian woodlands of primarily mature cottonwoods and willows in large, contiguous tracts of habitat. Dense understory foliage seems to be an important habitat characteristic in nest-site selection, and cottonwood trees are an important foraging habitat component in California. The species exhibits some degree of nest-site fidelity and can act as a facultative brood parasite (USFWS, 2001).

The breeding range of the western yellow-billed cuckoo formerly included most of North America from southern Canada to the Greater Antilles and northern Mexico. In recent years, the species' distribution in the west has contracted. The northern limit of breeding in the coastal states is now in the Sacramento Valley, and the northern limit of breeding in the western interior states is southern Idaho. The species is threatened by riparian habitat loss and modification, water management and flood control projects, and by the introduction of invasive riparian plant species (Laymon, 1998; USFWS, 2001).

Loss of breeding riparian habitat is the primary threat to the western yellow-billed cuckoo. The principal causes of riparian habitat losses are conversions to agricultural and other uses, dams and river flow management, stream channelization and stabilization, groundwater pumping, replacement of native plants with invasive nonnative plants, and livestock grazing. Overuse by livestock can change plant community structure, species composition, relative abundance, and plant density, thereby degrading and modifying the riparian habitat (USFWS, 2007f).

The western yellow-billed cuckoo may occur along riparian corridors in the Line 407 West project segment.

Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle was de-listed from its former federally threatened listing status on June 28, 2007. Currently, the bald eagle's main California breeding territories are in northern California, but the eagles also nest in scattered locations in the central and southern Sierra Nevada mountains and foothills, in several locations from the central Coast Range to inland southern California, and on Santa Catalina Island. The bald eagle generally winters throughout its breeding range but more frequently along coastal areas. This species nests in large, mature trees and on cliffs near large bodies of water or free-flowing rivers that provide an adequate fish prey base. The bald eagle requires large bodies of water for hunting and fishing, as well as adjacent snags or structures for

perching, and is highly susceptible to human disturbance during nesting activities (Johnsgard, 1990).

Primary threats to the bald eagle population are habitat loss, environmental contaminants (i.e., organophosphate pesticides, heavy metals, and oil spills), electrocution by powerlines, and human disturbance. Human activity may disturb roosting or foraging bald eagles to a degree that interferes with breeding, feeding, or sheltering behavior, causing injury, death, or nest abandonment (USFWS, 2008c).

The bald eagle may occur as a winter migrant near suitable habitat along the Sacramento River in the Line 407 West project segment.

Loggerhead Shrike (*Lanius ludovicianus*)

The loggerhead shrike is covered by the NBHCP. The shrike is a common resident and winter visitor in lowlands and foothills throughout California. Loggerhead shrikes prefer open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. The highest population densities occur in open-canopied valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, pinyon-juniper, juniper, desert riparian, and Joshua tree habitats, but the species is also found in cropland areas (CDFG, 2006c).

The primary cause of loggerhead shrike population declines is breeding habitat loss and degradation as a result of urbanization, and agricultural conversion. Other threats to the shrikes include pesticides ingested from prey, shootings of perched birds, road kills, and increased predation (County of Sacramento, 2005).

The loggerhead shrike may occur in agricultural, riparian, or developed habitat in the Line 406, Line 407 West, and Line 407 East project segments.

White-faced Ibis (*Plegadis chihi*)

The white-faced ibis is covered by the NBHCP. White-faced ibises feed in fresh emergent wetlands, shallow lacustrine waters, the muddy ground of wet meadows, and irrigated or flooded pastures and croplands. This ibis eats amphibians and small fishes in shallow water or on the water surface, and earthworms, insects, crustaceans, and miscellaneous invertebrates by probing deep in mud with its long bill (CDFG, 2006c).

The species nests and roosts amid dense, freshwater emergent vegetation such as bulrushes, cattails, reeds, or low shrubs over water. It breeds across the western United States northward to Montana, eastward to western Louisiana, and southward to South America. It winters from Southern California and Louisiana southward. It is an uncommon summer resident in sections of Southern California, a rare visitor in the Central Valley, and is more widespread in migration. Formerly more common, especially in the San Joaquin Valley, this species no longer regularly breeds anywhere in California (Remsen, 1978; CDFG, 2006c).

In the Central Valley, the historical threat to the white-faced ibis was the loss of wetlands from reclamation projects, including levee and drainage projects, agricultural conversions, and industrial and urban development. Recently, habitat loss and degradation consists of the conversion from suitable flood-irrigated agriculture crops to pressurized water-delivery systems and urbanization. In addition, traditional breeding areas on refuges are threatened with habitat degradation from lack of water as a result of reduced water allocations. Other threats to the ibis include predation, illegal shooting, and contamination (County of Sacramento, 2005).

The white-faced ibis may occur in wetland habitat within the Line 406, Line 407 West, and Line 407 East project segments.

Bank Swallow (*Riparia riparia*)

The bank swallow is covered by the NBHCP. It is a locally common to uncommon resident in northern and central California during its breeding season. Because nesting only occurs in suitable habitat, breeding areas are spread throughout northern and central California in major lowland valleys and coastal areas where alluvial soils exist. Nesting colonies only occur in vertical banks or bluffs of friable soils suitable for burrowing by these small birds. Banks or bluffs are typically at least 3 feet tall to have some predator deterrence values, and some source of continual erosion is almost always present. Breeding habitat vegetation is extremely varied because breeding sites are mostly selected for the suitability of the soils. Throughout California, colonies are mostly located amidst lowland vegetation types, including riparian forests dominated by willow and Fremont cottonwood. Many colonies along the Sacramento and Feather rivers occur under cultivated crops, including deciduous orchards, irrigated row crops, and dryland grain crops. Coastal colonies are located under coastal grassland and coastal scrub communities, while colonies in montane environments in Shasta, Lassen, and Plumas counties occur in coniferous forests where pines (*Pinus* spp.) and firs (*Abies* spp.) dominate. Colonies in northeastern California occur under irrigated pasture, riparian forests, and desert shrub habitats (Garrison, 1998).

The major breeding population is confined to the Sacramento and Feather rivers and their major tributaries north of their confluence between Redding in Shasta County, and the Yolo Bypass in Yolo County (Laymon et al., 1988).

The primary threat to the bank swallow population is riparian habitat loss and degradation as a result of stream channelization, and bank protection and stabilization projects with the installation of riprap (CDFG, 2000).

The bank swallow may occur where vertical banks of friable soils exist in the Line 406, Line 407 West, and Line 407 East project segments.

6. REGULATORY BACKGROUND

FEDERAL ENDANGERED SPECIES ACT

The FESA protects plants and wildlife that are listed as endangered or threatened by the USFWS and the NMFS. Section 9 of the FESA prohibits the take of listed wildlife, where take is defined as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct” (50 CFR 17.3). For plants, this statute governs removing, possessing, maliciously damaging, or destroying any listed plant on federal land, and removing, cutting, digging up, damaging, or destroying any listed plant on non-federal land in knowing violation of state law (16USC1538). Under Section 7 of the FESA, federal agencies are required to consult with the USFWS and/or the NMFS if their actions, including permit approvals or funding, could adversely affect a listed plant or wildlife species or its critical habitat. Through consultation and the issuance of a biological opinion, the USFWS and/or the NMFS may issue an incidental take permit allowing take of the species that is incidental to another authorized activity, provided the action will not jeopardize the continued existence of the species. Section 10 of the FESA provides for issuance of incidental take permits to private parties, provided a habitat conservation plan (HCP) is developed.

MIGRATORY BIRD TREATY ACT

The Migratory Bird Treaty Act (MBTA) implements international treaties devised to protect migratory birds and any of their parts, eggs, and nests from activities such as hunting, pursuing, capturing, killing, selling, and shipping, unless expressly authorized in the regulations or by permit. As authorized by the MBTA, the USFWS issues permits to qualified applicants for the following types of activities: falconry, raptor propagation, scientific collecting, special purposes (rehabilitation, education, migratory game bird propagation, and salvage), take of depredating birds, taxidermy, and waterfowl sale and disposal. The regulations governing migratory bird permits are in 50 CFR part 13 General Permit Procedures and 50 CFR part 21 Migratory Bird Permits. The State of California has incorporated the protection of birds of prey in Sections 3800, 3513, and 3503.5 of the Fish and Game Code.

MAGNUSON-STEVENSON ACT

The Magnuson-Stevens Act, as amended by the Sustainable Fisheries Act of 1996, requires federal agencies to consult with the NMFS on activities that may adversely affect EFH. In addition, the law requires fishery-management councils to include descriptions of EFH and potential threats to EFH in all federal fishery-management plans. The Pacific Fishery Management Council amended the Pacific Coast Salmon Plan in 2000 to include descriptions of EFH for different salmonid species. EFH for chinook salmon was defined for fresh, estuarine, and marine waters.

Freshwater EFH for chinook salmon consists of four major components, including spawning and incubation, juvenile rearing, juvenile migration corridors, and adult migration corridors and holding habitat. Important features of EFH for spawning, rearing, and migration include substrate composition, water quality, water quantity, depth and velocity, channel gradient and

stability, food, cover and habitat complexity, space, access and passage, and floodplain and habitat connectivity.

Chinook salmon EFH includes all streams, lakes, ponds, wetlands, and other waterbodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California. Salmon EFH excludes areas upstream of longstanding naturally impassible barriers (i.e., natural waterfalls in existence for several hundred years), but includes aquatic areas above all artificial barriers except specifically cited impassible dams.

FEDERAL CLEAN WATER ACT

The federal Clean Water Act's (CWA) purpose is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." Section 404 of the CWA prohibits the discharge of dredged or fill material into waters of the United States without a permit from the USACE. The definition of waters of the United States includes rivers, streams, estuaries, the territorial seas, ponds, lakes, and wetlands. Wetlands are defined as those areas "that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3 7b). The U.S. Environmental Protection Agency also has authority over wetlands and may override a USACE permit. Substantial impacts to wetlands may require an individual permit. Projects that only minimally affect wetlands may meet the conditions of one of the existing Nationwide Permits. A Water Quality Certification or Waiver pursuant to Section 401 of the CWA is required for Section 404 permit actions; this certification or waiver is issued by the Regional Water Quality Control Board.

RECOVERY PLAN FOR VERNAL POOL ECOSYSTEMS OF CALIFORNIA AND SOUTHERN OREGON

This recovery plan prepared by the USFWS (USFWS 2005b) features 33 species of plants and animals that occur exclusively or primarily within vernal pool ecosystems in California and southern Oregon, and that may occur in vernal pool habitat in the Line 407 East project segment. The overall goals of this recovery plan are to:

- achieve and protect in perpetuity self-sustaining populations of each species,
- de-list the 20 federally listed plant and animal species, and
- ensure the long-term conservation of the 13 species of special concern.

Interim goals of this recovery plan are to:

- stabilize and protect populations to prevent further decline of each species,
- conduct research necessary to refine reclassification and recovery criteria, and
- reclassify to threatened status those species listed as endangered.

The overall objectives of this recovery plan are to:

- ameliorate or eliminate the threats that caused the species to be federally listed as endangered or threatened, and to ameliorate any newly identified threats in order to be able to de-list or down-list these species;
- ameliorate or eliminate the threats that affect the species of special concern and ameliorate any newly identified threats in order to conserve these species;
- confirm the status of bearded popcorn flower (*Plagiobothrys hystriculus*), a species of special concern that is currently presumed extinct (If extant populations are discovered, the ultimate goal would be to ensure the long-term conservation of this species.); and
- promote natural ecosystem processes and functions by protecting and conserving intact vernal pools and vernal pool complexes.

RECOVERY PLAN FOR THE SACRAMENTO/SAN JOAQUIN DELTA NATIVE FISHES

The Recovery Plan for the Sacramento/San Joaquin Delta Native Fishes (Recovery Plan) was prepared by the USFWS (USFWS 1995) in collaboration with a team of specialists and agencies, and includes recovery and restoration objectives for eight species of fish that utilize the Sacramento/San Joaquin Delta for a significant segment of their life history. The Recovery Plan includes one of the special-status species with the potential to occur near the project area, the Central Valley (Sacramento) late-fall-run chinook salmon.

The objective of the Recovery Plan is to restore wild populations of late-fall-run chinook salmon to optimum levels that can be supported by the remaining holding and spawning habitat in the Sacramento River by improving out-migrant conditions in the Delta. The Recovery Plan delineated actions believed to be necessary for the restoration and recovery of the eight species.

Recovery and restoration actions for the Sacramento late-fall-run chinook salmon include:

- providing passage of adults through the Delta to holding and spawning areas;
- improving spawning success through habitat improvements and protection of adults from harvest on the spawning grounds;
- providing passage flows for out-migrating juveniles;
- providing habitat for juvenile fish in the river;
- improving survival rates through the Delta;
- reducing catch in the ocean and stream fisheries;
- reducing the effects of hatchery fish on wild populations; and
- construction of redds on high terraces during flood events, which are subsequently exposed when flood flows recede.

DRAFT RECOVERY PLAN FOR THE GIANT GARTER SNAKE

The draft recovery plan for the federally threatened GGS, prepared by the USFWS (USFWS 1999b), examines loss and fragmentation of wetland habitats inhabited by the GGS within the

Central Valley of California. It also considers several species of special concern that occur in Central Valley wetlands that benefit from actions taken to recover the GGS. These species include the tricolored blackbird, white-faced ibis, northwestern pond turtle, and associated waterfowl.

The GGS inhabits agricultural wetlands and other waterways, such as irrigation and drainage canals, sloughs, ponds, small lakes, low-gradient streams, and adjacent uplands in the Central Valley. Because of the direct loss of natural habitat, the GGS relies heavily on rice fields in the Sacramento Valley, but also uses managed marsh areas in national wildlife refuges and state wildlife areas. Habitat loss and fragmentation, flood-control activities, changes in agricultural and land management practices, predation from introduced species, parasites, and water pollution are continuing threats and the main causes for the decline of this species.

The GGS has been given a recovery priority of 2C (full species, high degree of threat, high recovery potential) by the USFWS. The objective of the recovery plan is to de-list the GGS.

Recovery criteria have been designated in the plan, and include:

- monitoring, which shows that in 17 out of 20 years, 90 percent of the subpopulations in four recovery units contain both adults and young;
- all extant populations within the recovery unit are protected from threats that limit populations;
- supporting habitat within the recovery unit is adaptively managed and monitored;
- subpopulations are well connected by corridors of suitable habitat; and
- repatriation (reintroduction) has been successful at a specified number of suitable sites.

To satisfy these recovery criteria, the following actions have been recommended by the plan:

- Protect existing populations and habitat
- Restore populations to former habitat
- Survey to determine species distributions
- Monitor populations
- Conduct necessary research, including studies on demographics, population genetics, and habitat use
- Develop and implement incentive programs and an outreach and education plan

CONSERVATION BANKS AND PLANS

The PG&E Line 406 and Line 407 Pipeline Project will cross land covered by the following three conservation banks or plans. PG&E will coordinate with the administrators of these three areas and the USFWS to mitigate for temporary impacts to conservation bank or plan lands associated with construction of the pipeline.

River Ranch Conservation Bank

The River Ranch Conservation Bank, managed by Wildlands, Inc., is an approximately 3,600-acre mitigation bank located west of the Sacramento River in Yolo County. The bank sells conservation credits for VELB, Swainson's hawk, agricultural, and wetland impacts in a primary service area, including all of Sutter, most of Sacramento, and portions of San Joaquin, Amador, Colusa, Yolo, Napa, Solano, El Dorado, Placer, Nevada, and Yuba counties. Extended coverage includes parts of Tehama, Glenn, Butte, Plumas, and Sierra counties. As of May 2008, there were approximately 155 acres of VELB mitigation land comprising up to 3,763 units of VELB habitat, up to 800 acres of Swainson's hawk habitat available for conservation easement, up to 2,000 acres available for agricultural mitigation, and land that will be available for mitigation of jurisdictional seasonal wetland impacts.

Natomas Basin Habitat Conservation Plan

The NBHCP covers approximately 53,537 acres of land within the Natomas Basin in northern Sacramento County and southern Sutter County that has historically been utilized for agriculture. The Natomas Basin is bound by Cross Canal on the northwest corner, the Sacramento River on the west, the American River on the south, and the Natomas East Main Drainage Canal (Steelhead Creek) on the east. The Natomas Basin Conservancy acts as the plan operator for the NBHCP, and acquires and manages habitat land for the benefit of the 22 species covered under the plan.

The purpose of the NBHCP is to promote biological conservation in conjunction with economic and urban development in the permit areas. The NBHCP establishes a multi-species conservation program to minimize and mitigate expected take of covered species that could result from development, including GGS and Swainson's hawk. The NBHCP requires mitigation for designated types of development within the NBHCP area boundaries, including public and private utilities. Compliance includes the requirements for land and/or fee dedication, as well as the application of measures to avoid, minimize, and mitigate the take of species covered by the NBHCP.

A portion of the land that will be crossed by the PG&E Line 407 West and Line 407 East project segments is located in an area permitted for development in Sutter County. Projects in this area require that Sutter County issue an Urban Development Permit to allow the work to proceed under the requirements of the NBHCP. Private or public actions that are covered activities under the NBHCP may also be subject to separate Section 7 review if those actions are authorized, carried out, or funded by federal agencies. Incidental take for covered activities carried out by third-party developers acting under the authority of an Urban Development Permit issued by Sutter County will be granted under the Incidental Take Permit issued to Sutter County by the USFWS, and is subject to the take mitigation, minimization, and avoidance measures provided for under the NBHCP. Incidental take coverage for the federal action agency is granted through the incidental take statement issued with the USFWS's Section 7 biological opinion.

Draft Placer County Conservation Plan

In 2000, the Board of Supervisors directed staff to initiate the implementation of the Placer Legacy Program. As part of that direction, staff initiated the preparation of a Natural Community Conservation Plan and Habitat Conservation Plan to comply with the California and Federal Endangered Species Acts and the federal CWA related to wetlands. That effort, now referred to as the proposed Placer County Conservation Plan, is intended to address the impacts associated primarily with unincorporated growth in western Placer County and growth associated with the build out of the City of Lincoln's updated general plan. Development will require the preservation of approximately 54,300 acres of land between now and 2050, and implementation and land protection measures will be managed in perpetuity.

Conservation planning within Placer County is taking place in phases. The first phase is the development of a plan for the western portion of the County. The draft plan (February 2005) specifies the following techniques for minimizing impacts to wetlands and aquatic ecosystems when constructing utility lines.

- Aquatic and Wetland Goal 3: Protect aquatic and wetland ecosystems within reserves from human and livestock disturbances.
- 3.1: Manage vehicle use, utility crossings, and flood control activities within aquatic habitat by minimizing stream crossings that can harm watershed processes by disrupting fish passage, creating sedimentation, modifying channels, and changing drainage patterns.
- 3.1.1: Limit vehicle crossings and utility crossings to specified locations where impacts can be minimized by using bridges instead of culverts, sizing bridges to a minimum width, designing culverts to pass at least the 100-year flood event, and ensuring regular and long-term monitoring and maintenance.

Pacific Gas and Electric Company VELB Conservation Program

In 2003, PG&E developed a conservation program in consultation with the USFWS to manage mitigation of impacts to VELB resulting from their ongoing maintenance and operation of electric and natural gas transmission and distribution (USFWS, 2003). This conservation program (program) outlines best management practices (BMPs) and avoidance measures intended to minimize impacts to VELB. While the Line 406 and Line 407 Pipeline Project will consist of new construction and will not be considered a maintenance or operation project, many of the measures outlined in the program will be implemented to minimize disturbance of existing elderberry shrubs that provide VELB habitat within or near the project ROW. These avoidance and minimization measures are discussed in detail in Section 8 of this report.

7. EFFECTS ANALYSIS

The following section describes impacts to habitat types, species, and critical habitat that may result from construction of the project. Temporary and permanent impacts are described for all

habitats and species. Additionally, direct and indirect impacts are discussed for each species and critical habitat that may be affected by the project. These types of impacts are described below.

- **Temporary Impacts:** Construction of the Line 406, Line 407 West, and Line 407 East segments of the project will require temporary disturbance of an approximate 100-foot-wide ROW. Construction of the Powerline Road DFM segment will require temporary disturbance to an approximate 60-foot-wide ROW. In certain areas, the ROW may be narrowed to avoid impacts to sensitive habitats and special-status species. In other areas, additional workspace needs may require that the ROW be expanded beyond the 100- or 60-foot widths.

Potential temporary construction impacts may include loss of foraging and/or nesting habitat, decreased habitat value, disturbance of nesting sites, or habitat fragmentation. However, the majority of these impacts will be temporary, as PG&E plans to restore all disturbed habitats within the ROW following construction. Temporary impacts resulting from construction activities will be reduced to less than significant levels with the implementation of the avoidance, minimization, and mitigation measures outlined in Section 8 of this report.

- **Permanent Impacts:** The Line 406 and Line 407 Pipeline Project consists of the construction of an underground natural gas pipeline and approximately five small aboveground yards. Because the pipeline will be installed underground, permanent impacts that may result from project construction are only anticipated where the aboveground yards will permanently convert existing habitat.

Permanent impacts to special-status species may consist of loss of suitable foraging, nesting, roosting, breeding, aestivation, or hibernation habitat. However, permanent impacts will be reduced to less than significant levels by avoiding location of permanent structures in sensitive habitat to the maximum extent feasible, by properly restoring the project ROW and work areas, and by replacing sensitive habitat features such as seasonal wetlands and vernal pools through restoration and compensatory mitigation.

- **Direct Impacts:** Direct impacts are defined in the FESA as effects to species or their critical habitat that occur during the implementation of a project. These impacts are likely to result from construction of the project, but are not likely to continue once construction is complete.
- **Indirect Impacts:** Indirect impacts are defined in the FESA as effects that occur to species or their critical habitat after implementation of the project is complete. These effects are caused by or result from project activities and are reasonably certain to occur.

PLANT COMMUNITIES AND HABITAT TYPES

Project impact acreages to habitat types are summarized in Table 5.

Table 5: Project Impact Acreages

Habitat Type	Temporary Impact Acreage	Permanent Impact Acreage
Agricultural	307.1	2.5
Rice	57.4	0.2
Row crops	238.4	0.3
Orchards	11.3	2.0
Annual grassland	118.5	1.1
Developed/ornamental	21.3	0.1
Oak woodland	0.7	0.0
Riparian woodland	0.2	0.0
Riverine	0.5	0.0
Wetlands	6.4	0.0
Fresh emergent wetlands	0.0	0.0
Seasonal wetlands and swales	6.4	0.0
Vernal pools and swales	0.0	0.0

Agricultural Lands

Temporary Impacts

Construction of the project will temporarily impact approximately 307 acres of agricultural lands (approximately 238 acres of row crops, 57 acres of rice fields, and 11 acres of orchards). Impacts may include the temporary loss of portions of agricultural fields where the ROW will be located, or disruption of irrigation flows in row crops. Some trees will be removed from the ROW in the limited orchards in the project area. Following construction, a majority of agricultural lands disturbed during installation of the pipeline will be allowed to return to their previous land use, including replanting trees in orchards. However, some impacts will be permanent, as described below. PG&E will restore the ROW as agreed upon with landowners following completion of

construction activities. Additionally, PG&E will implement the mitigation measures outlined in Section 8 to minimize potential temporary construction impacts to agricultural habitat.

Permanent Impacts

The construction of the five permanent structures, including pressure limiting, pressure regulating, and metering stations and main line valve lots, and maintenance of the permanent ROW will permanently remove approximately 2.5 acres of agricultural habitat, including 0.2 acre of rice, 0.3 acre of row crops, and 2 acres of orchards. Orchards will be permanently impacted where a 30-foot-wide permanent strip of the permanent ROW centered on the pipeline will be maintained by PG&E to keep the area free of deep-rooted vegetation for safety purposes. Orchards will not be allowed to be replanted in this area.

Annual Grasslands

Temporary Impacts

Construction of the project will temporarily impact approximately 119 acres of grassland habitat. Grasslands will be cleared and graded as necessary during preparation of the ROW. Sensitive areas located in annual grasslands such as vernal pools and burrowing owl habitat will be avoided or impacts minimized using the mitigation measures outlined in Section 8 of this report.

Permanent Impacts

The construction of the Capay Metering Station and the Baseline Road Pressure Limiting Station will permanently remove approximately 1.1 acres of grassland habitat.

Developed/Ornamental

Temporary Impacts

Construction of the project will temporarily impact approximately 21 acres of developed/ornamental habitat. This habitat type is exposed to a regular regime of modification from landscaping and human influence and does not provide a great amount of habitat value to special-status species, with the exception of larger trees that may provide nesting opportunities for species like the Swainson's hawk. Where possible, clearing of the ROW will avoid removing potential nesting trees from developed/ornamental habitat. The ROW will be restored in accordance with landowner agreements following construction.

Permanent Impacts

Construction of the project will permanently impact approximately 0.1 acre of developed/ornamental habitat where the Powerline Road Pressure Regulating Station will be constructed. No other permanent impacts to this habitat type are expected.

Oak Woodland

Temporary Impacts

Impacts to oak woodland habitat resulting from project construction are expected to be minimal as there is not much of this habitat type within the project ROW, and because PG&E plans to route around or under existing trees and to avoid tree removal during construction to the maximum extent feasible. The ROW will cross approximately 0.7 acre of this habitat type. PG&E will work with a certified arborist to determine the best routing options for crossing the small portion of oak woodland habitat in the project ROW, and will comply with all ordinances to replace trees as necessary if damage occurs as a result of construction of the project. In some cases, trimming and treatment of roots and branches may be necessary to install the pipeline where the ROW crosses near existing trees. PG&E will monitor the survival of any trees that require trimming and will replace any trees that do not survive according to the methods outlined in the Restoration and Monitoring Plan to be prepared by PG&E prior to construction in coordination with the appropriate agencies.

Oak trees exist within the project ROW in other habitat types besides oak woodland, and it is possible that a few select oak trees may need to be trimmed or removed to facilitate safe installation of the pipeline. PG&E will replace any trees that are removed or that do not survive trimming as a result of pipeline construction according to the methods outlined in the Restoration and Monitoring Plan.

Permanent Impacts

Permanent impacts to oak woodland are not expected to result from the project because no aboveground facilities will be located in this habitat type. While it is not anticipated, PG&E will replace and monitor the survival of any oak trees that are damaged or removed as a result of the project, according to the replacement ratios to be outlined in the Restoration and Monitoring Plan.

Riparian Woodland

Temporary Impacts

Riparian woodland is located adjacent to the Sacramento River, the Yolo Bypass, and some of the other larger waterways in the project area. Temporary workspace is planned in approximately 0.2 acre of riparian woodland adjacent to a canal just west of the Sacramento River along CR 16, and near the east levee of the Sacramento River where the bore pit will be located for the HDD of the river. No nesting trees are located in these areas, though elderberry shrubs may occur near the CR 16 canal. Temporary impacts could include removal of riparian vegetation and temporary loss of suitable habitat for species that utilize this habitat type.

Permanent Impacts

Permanent impacts to riparian woodland are not expected to result from the project because the pipeline will be installed underground and no aboveground facilities will be located in this habitat type. PG&E will restore any riparian trees or elderberry shrubs that are damaged as a

result of construction according to the measures to be outlined in the Restoration and Monitoring Plan.

Riverine

Temporary Impacts

Construction under riverine habitat in larger waterways such as the Sacramento River, Knights Landing Ridge Cut, Steelhead Creek, and some of the larger irrigation canals will be conducted using HDD methods in order to minimize the potential for impacts. Smaller waterways that provide riverine habitat will be crossed by bores or open-cut construction methods. Where riverine habitat is bored, impacts are not expected to result from project construction. Project construction will temporarily impact approximately 0.5 acre of riverine habitat in small irrigation or drainage canals where open-cut construction will be implemented.

While it is not anticipated, temporary impacts to crossings of riverine habitat could result if a frac-out occurs during HDD activities. PG&E will prepare an HDD Fluid Release Contingency Plan that will address methods for minimizing the potential for impacts that could result from a frac-out, and will implement BMPs outlined in PG&E's Water Quality Construction Best Management Practices Manual to minimize impacts to riverine habitat.

Permanent Impacts

The pipeline will be installed under all major waterways, and all smaller waterways will be crossed using dry-crossing methods. Any open cuts of dry crossings will be restored to preconstruction conditions following installation of the pipeline. Therefore, permanent impacts to riverine habitat are not expected to result from construction of the project.

Wetlands

Wetland types that occur in the project area consist of freshwater emergent wetlands, seasonal wetlands and swales, and vernal pools and swales. Because vernal pools and swales support a number of special-status species and because mitigation for impacts to these features is required at a different ratio than for those impacts to other wetland features, discussions of potential impacts to wetlands are broken into two sections below: fresh emergent/seasonal wetlands and swales, and vernal pools and swales.

Freshwater Emergent Wetlands, Seasonal Wetlands, and Seasonal Swales

Temporary Impacts

Freshwater emergent wetlands are present in Curry Creek, Steelhead Creek, Knights Landing Ridge Cut, Tule Canal, and some of the other irrigation and drainage canals that cross the project alignment. All freshwater emergent wetlands delineated by Gallaway in the Line 407 project area will be avoided by HDD or bore construction techniques, which will place the pipeline under the feature without surface impacts. Where HDD or bore techniques are not feasible, and where the appropriate permits have been obtained, a small amount of this habitat type may be temporarily impacted during open-cut construction of the pipeline across irrigation or drainage canals. Any

temporary impacts to freshwater emergent wetland habitat will be restored as described in Section 8 and as outlined in the Restoration and Monitoring Plan to be prepared by PG&E in coordination with the appropriate agencies prior to construction.

Approximately 6.4 acres of seasonal wetlands and seasonal swales exist in the project ROW, all of which are located in the Line 407 East project segment. These wetlands may be temporarily impacted by clearing and grading activities. PG&E will avoid seasonal wetlands during construction to the maximum extent feasible by narrowing the ROW, adjusting the route, or drilling under these features. Impacts to seasonal wetlands will be further minimized through implementation of the mitigation measures outlined in Section 8. Any temporary impacts to seasonal wetland or seasonal swale habitat will be restored as outlined in the Restoration and Monitoring Plan to be prepared by PG&E prior to construction.

Permanent Impacts

No permanent structures are planned to be constructed in freshwater emergent wetlands, seasonal wetlands, or seasonal swales. Temporarily impacted wetland features will be restored to preconstruction conditions once the pipe has been installed. Permanent impacts to fresh emergent wetlands, seasonal wetlands, and seasonal swales are not expected to result from construction of the project.

Vernal Pools and Swales

Temporary Impacts

All vernal pools and swales will be avoided during construction by implementing HDD or bore crossing methods to install the pipeline under these features, or by narrowing the ROW to avoid these features. Direct surface impacts are not anticipated to result from clearing, grading, or trenching activities. Indirect impacts may occur to approximately 0.9 acre of vernal features where construction will occur within 250 feet of hydrologically-connected features that are down gradient of the ROW. Indirect impacts could include siltation or contamination of pools from runoff leaving the ROW that leads to decreased habitat value or loss of habitat.

Indirect impacts to vernal pool and swale habitat will be minimized or avoided completely by implementation of BMPs and the mitigation measures outlined in Section 8 of this report. Any indirectly impacted vernal pools or swales will be restored as described in the Restoration and Monitoring Plan. Additionally, PG&E will follow any mitigation ratio requirements of the USFWS to compensate for impacts to vernal pool or swale habitat.

Permanent Impacts

Permanent impacts to vernal pools or swales are not expected to occur, as all of these features will remain undisturbed during construction. However, indirect impacts to vernal features could result if sediment or contamination resulting from accidental construction-related spills, as described above. The USFWS often considers any direct or indirect impacts to vernal features to be permanent due to the complex nature of the subsoils that cause vernal features to pond water for extended periods of time, and the sensitivity of these features to modification of hydrology or water quality. PG&E will restore any vernal features that may be indirectly impacted during

construction, as well as compensate for impacts to vernal features as needed according to a mitigation ratio to be agreed upon with the USFWS, as described further in Section 8.

SPECIAL-STATUS PLANT SPECIES

No special-status plant species listed by the USFWS or covered by the NBHCP or the USFWS *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (2005b) were found during focused surveys of the project area. However, suitable habitat does exist in the project action area and PG&E will take the proper precautions to avoid any potential indirect impacts to suitable habitat through implementation of BMPs and the mitigation measures described in Section 8 of this report.

Because special-status plants were not found in protocol-level surveys and are not likely to occur in the project area, temporary, permanent, direct, and indirect impacts to these species are not expected to result from the project.

SPECIAL-STATUS WILDLIFE SPECIES

Vernal Pool Invertebrates

Potential impacts would be similar for all vernal pool invertebrate species considered by this biological assessment. Therefore, the following discussion of temporary, permanent, direct, and indirect impact applies to all special-status vernal pool invertebrates that could potentially be affected by the project, including the vernal pool fairy shrimp, vernal pool tadpole shrimp, and Conservancy fairy shrimp.

Temporary Impacts

Construction is planned to take place in the dry season when vernal pool invertebrate habitat will be dry and the species will not be present in live form (only cysts are expected to be present, if at all). Vernal features will be avoided during construction; therefore, no temporary impacts are anticipated to occur.

Permanent Impacts

Any alteration or contamination of soils within vernal pools, or modification of hydrology that directly connects to vernal pools within the ROW or 250 feet down gradient of the ROW may result in permanent impacts to vernal pool invertebrates. With implementation of BMP's and the measures outlined in Section 8 below, no permanent impacts are anticipated to result from the project.

Direct Impacts

Construction of the project is scheduled to take place in the dry season when live vernal pool invertebrate species are not likely to be present, and will avoid direct impacts to vernal features. Therefore, direct impacts to these species are not anticipated to occur.

Indirect Impacts

Indirect impacts to vernal pool invertebrate species may include reduced feeding opportunities or loss of habitat resulting from watershed pollution or hydrology alterations if construction-related runoff and/or sedimentation is allowed to enter vernal features that are hydrologically-connected to the ROW.

Valley Elderberry Longhorn Beetle

Temporary Impacts

Temporary impacts to VELB could include temporary loss of habitat if elderberry shrubs must be trimmed during preparation of the ROW, or decreased habitat value resulting from construction disturbances within the 100-foot buffer required by the USFWS. However, it is not anticipated that any elderberry shrubs will need to be removed or transplanted, although the ROW may be within 50 feet of existing shrubs along some portions of the project alignment.

Permanent Impacts

Permanent impacts to the VELB could result if elderberry shrubs are removed during construction and are not replaced, or if direct mortality of the species occurs as a result of the project. However, it is not anticipated that project construction will require removal or transplanting of any elderberry shrubs, though work may be required within 50 feet of elderberry shrubs that exist in the project action area.

Direct Impacts

Direct impacts to VELB could include loss of suitable habitat, direct mortality, or decreased habitat value if elderberry shrubs are removed or trimmed during construction.

Indirect Impacts

Indirect impacts could include reduced available habitat or decreased habitat value if elderberry shrubs that must be removed during construction are not replanted or transplanted, or if the ROW is not properly restored.

Fish, Critical Habitat, and Essential Fish Habitat

Because potential impacts would be similar for all fish species considered by this BA, the following impact discussions apply to all special-status fish species that may be affected by the project, including green sturgeon, steelhead, and chinook salmon.

With the exception of the Yolo Bypass, all waterways in the project area that have been designated as critical habitat, that have the potential to support special-status fish species, or that provide EFH to chinook salmon will be crossed using HDD methods. This will significantly reduce potential impacts to these species and habitats as compared to other crossing methods such as open-cut construction.

The Yolo Bypass will be crossed using traditional pipeline construction methods over most of its width, and HDD will be used to cross under the levees and canals that run along its borders. The trenched portions of the Yolo Bypass will be dry during construction and are not expected to host any fish species at that time. All trenched areas of the Yolo Bypass will be restored to preconstruction conditions prior to the rainy season when the area is likely to provide suitable habitat for fish. Agricultural practices in the project ROW within the bypass include a regular schedule of earth-disturbing activities such as discing, ripping, and trenching for irrigation ditches. Construction of the project is not expected to cause earth disturbances to the area that are significantly beyond the existing practices, and, therefore, are not expected to have significant impacts to this area.

Temporary Impacts

Temporary impacts to special-status fish, critical habitat, or chinook salmon EFH could result if sedimentation or accidental spills of hazardous materials are allowed to enter project waterways, or if a frac-out occurs during the HDD process, resulting in decreased water quality or temporary loss of suitable spawning, rearing, or foraging habitat.

The Yolo Bypass will be disturbed during construction, but will not affect special-status fish species, critical habitat, or EFH for chinook salmon because this area provides only seasonal habitat and water and fish will not be present in the trenched portions of the bypass during construction. Additionally, the ROW will be restored prior to the rainy season, as described above. PG&E will implement BMPs and the mitigation measures described in Section 8 to minimize potential temporary impacts to special-status fish species, critical habitat, and chinook salmon EFH.

Permanent Impacts

Permanent impacts to special-status fish species, their critical habitat, or chinook salmon EFH are not expected to result from construction of the project because the pipeline will be installed using HDD methods under any waterways that could potentially support special-status fish species, and the trenched portions of the Yolo Bypass will be restored to preconstruction conditions once the pipeline has been installed. Restoration will be completed before the Yolo Bypass floods and could potentially provide access to fish. Once construction is complete, no other potential impacts to these species or disturbance of their suitable habitat are expected.

Direct Impacts

Direct impacts to special-status fish species, critical habitat, or chinook salmon EFH could include decreased water quality or sedimentation if hazardous materials are allowed to enter waterways or if a frac-out occurs during an HDD crossing.

Indirect Impacts

Indirect impacts to special-status fish species, critical habitat, or chinook salmon EFH could result if the trenched portions of the Yolo Bypass are not properly restored following construction or if accidental spills occur that are not properly cleaned up, and sediment or

contaminants are washed into waterways after construction is complete. Waterways that are crossed using HDD methods are not expected to have any indirect effects.

California Tiger Salamander

Temporary Impacts

Temporary impacts to the CTS could include loss or fragmentation of upland habitat, or siltation or contamination of suitable hydrologically-connected aquatic habitat within 200 feet of the ROW.

Permanent Impacts

Permanent impacts to CTS could include direct mortality; permanent loss of foraging, breeding, or aestivation habitat; or permanent modification of the hydrology of aquatic habitat features that are down gradient and hydrologically-connected to the ROW if the ROW is not properly restored.

Direct Impacts

Direct impacts to CTS could include mortality due to construction activities (i.e. roadkill, loss of protective habitat leading to increased predation), or loss or fragmentation of habitat.

Indirect Impacts

Indirect impacts to CTS could include loss of foraging or breeding opportunities due to habitat fragmentation, or impacted water quality or hydrology in suitable aquatic habitat if hazardous materials are accidentally spilled and not properly cleaned up or if sediment is allowed to leave the ROW and deposit in hydrological features utilized by CTS after construction is complete.

Western Spadefoot Toad

Temporary Impacts

Temporary impacts to the western spadefoot toad could include habitat loss resulting from clearing and grading of the ROW, or watershed pollution caused by accidental construction-related spills or runoff. Temporary habitat fragmentation may result if the project ROW divides existing areas of suitable habitat.

Permanent Impacts

Permanent impacts to the western spadefoot toad could include direct mortality; permanent loss of foraging, breeding, or aestivation habitat; or permanent modification of the hydrology of aquatic habitat features that are down gradient and hydrologically-connected to the ROW if the ROW is not properly restored.

Direct Impacts

Direct impacts to the western spadefoot toad could include mortality, loss of habitat, habitat fragmentation, or loss of foraging opportunities resulting from clearing of the ROW.

Indirect Impacts

Indirect impacts to the western spadefoot toad could include loss of habitat or breeding opportunities if the hydrology of suitable wetlands is altered by sedimentation or construction activities, or habitat fragmentation if the ROW is not properly restored.

Northwestern Pond Turtle

Temporary Impacts

Temporary impacts to the northwestern pond turtle could include loss of habitat resulting from clearing and grading activities or watershed pollution from accidental construction-related spills or runoff. HDD and bore construction methods will place the pipeline under many of the project area waterways that contain suitable habitat for the turtle with minimal (if any) disturbance.

Permanent Impacts

Permanent impacts to the northwestern pond turtle could include direct mortality or permanent loss of foraging, breeding, or hibernation habitat if suitable aquatic or upland habitat is open cut or if the ROW is not restored.

Direct Impacts

Direct impacts to northwestern pond turtle could include mortality, loss of foraging opportunities, habitat fragmentation, or loss of aquatic or upland habitat.

Indirect Impacts

Indirect impacts could include loss of habitat if the project ROW is not properly restored.

Giant Garter Snake

Temporary Impacts

Temporary impacts to the GGS could include loss of habitat, habitat fragmentation, or reduced foraging or breeding opportunities where the ROW will temporarily remove flooded portions of rice fields and adjacent upland habitat.

Permanent Impacts

Permanent impacts to the GGS could include direct mortality or permanent loss of foraging, breeding, or hibernation habitat if the ROW is not properly restored.

Direct Impacts

Direct impacts could include mortality, loss of foraging or breeding opportunities or habitat, or habitat fragmentation.

Indirect Impacts

Indirect impacts could include loss of foraging, breeding, or hibernation opportunities or habitat if the ROW is not properly restored.

Tricolored Blackbird

Temporary Impacts

Temporary impacts to the tricolored blackbird could include loss of habitat, loss of foraging opportunities resulting from construction or clearing of the ROW, or nesting activity disruption resulting from construction noise.

Permanent Impacts

Permanent impacts to the tricolored blackbird could include direct mortality if nesting disturbance results in loss of young or eggs, or loss of habitat if the project ROW is not properly restored.

Direct Impacts

Direct impacts could include loss of habitat or loss of foraging or nesting opportunities resulting from clearing of the ROW, or direct mortality if nesting disturbance results in loss of young or eggs.

Indirect Impacts

Indirect impacts could include loss of foraging habitat if the ROW is not properly restored.

Burrowing Owl

Temporary Impacts

Temporary construction impacts to the burrowing owl could include loss of foraging or nesting habitat resulting from clearing and grading of the ROW, or nesting activity disruption resulting from construction noise that causes a loss of young or eggs, species harassment, or displacement.

Permanent Impacts

Permanent impacts to the burrowing owl could include direct mortality or permanent loss of foraging or nesting habitat if the ROW is not properly restored.

Direct Impacts

Direct effects resulting from pipeline construction could include habitat destruction resulting in loss of cover or foraging opportunities, nesting activity disruption resulting from construction noise, displacement, or direct mortality.

Indirect Impacts

Indirect effects could include adverse habitat modification that results in loss of future foraging or nesting opportunities.

Swainson's Hawk

Temporary Impacts

Temporary construction impacts to the Swainson's hawk could include loss of nesting or foraging opportunities resulting from clearing and grading of the ROW, nesting activity disruption resulting from construction noise, or displacement.

Permanent Impacts

Permanent impacts to the Swainson's hawk could include loss of nesting or foraging opportunities if the ROW is not properly restored, or if suitable nesting trees are removed during construction, or direct mortality.

Direct Impacts

Direct impacts to the Swainson's hawk could include loss of nesting or foraging opportunities resulting from clearing of the ROW, nesting activity disruption resulting from construction noise, or displacement.

Indirect Impacts

Indirect impacts to the Swainson's hawk could include adverse habitat modification that results in loss of future foraging and/or nesting opportunities.

Western Yellow-billed Cuckoo

Temporary Impacts

Temporary construction impacts to the western yellow-billed cuckoo could include loss of nesting or foraging opportunities resulting from clearing and grading of the ROW, nesting activity disruption resulting from construction noise, or displacement.

Permanent Impacts

Permanent impacts to the western yellow-billed cuckoo could include loss of nesting or foraging opportunities if the ROW is not properly restored, or if suitable nesting trees are removed during construction, or direct mortality.

Direct Impacts

Direct impacts to the western yellow-billed cuckoo could include loss of nesting or foraging opportunities resulting from clearing of the ROW, nesting activity disruption resulting from construction noise, or displacement.

Indirect Impacts

Indirect impacts to the western yellow-billed cuckoo could include adverse habitat modification that results in loss of future foraging and/or nesting opportunities.

Bald Eagle

Temporary Impacts

Temporary impacts to the bald eagle are not expected because this species is not likely to occur in the project area during construction.

Permanent Impacts

Permanent impacts to the bald eagle could include loss of suitable stopover or foraging habitat if the ROW is not properly restored, though a majority of the suitable habitat in the project area consists of riparian woodland adjacent to the Sacramento River and other larger waterways, and this habitat will not be impacted by construction of the project.

Direct Impacts

Direct impacts to the bald eagle are not expected because this species is not likely to occur in the project area during construction.

Indirect Impacts

Indirect impacts to the bald eagle are not expected to occur because the project is not likely to impact any suitable habitat for the bald eagle after construction is complete.

Loggerhead Shrike

Temporary Impacts

Temporary construction impacts to the loggerhead shrike could include loss of nesting or foraging opportunities resulting from clearing and grading of the ROW, nesting activity disruption resulting from construction noise, or displacement.

Permanent Impacts

Permanent impacts to the loggerhead shrike could include loss of nesting or foraging opportunities if the ROW is not properly restored, or if suitable nesting trees are removed during construction, or direct mortality.

Direct Impacts

Direct impacts to the loggerhead shrike could include loss of nesting or foraging opportunities resulting from clearing of the ROW, nesting activity disruption resulting from construction noise, or displacement.

Indirect Impacts

Indirect impacts to the loggerhead shrike could include adverse habitat modification that results in loss of future foraging or nesting opportunities.

White-faced Ibis

Temporary Impacts

Temporary construction impacts to the white-faced ibis could include loss of nesting or foraging opportunities resulting from clearing and grading of the ROW, nesting activity disruption resulting from construction noise, or displacement.

Permanent Impacts

Permanent impacts to the white-faced ibis could include loss of nesting or foraging opportunities if the ROW is not properly restored, or if suitable nesting trees are removed during construction, or direct mortality.

Direct Impacts

Direct impacts to the white-faced ibis could include loss of nesting or foraging opportunities resulting from clearing of the ROW, nesting activity disruption resulting from construction noise, or displacement.

Indirect Impacts

Indirect impacts to the white-faced ibis could include adverse habitat modification that results in loss of future foraging or nesting opportunities.

Bank Swallow

Temporary Impacts

Temporary construction impacts to the bank swallow could include loss of nesting or foraging opportunities resulting from clearing and grading of the ROW, nesting activity disruption resulting from construction noise, or displacement.

Permanent Impacts

Permanent impacts to the bank swallow could include loss of nesting or foraging opportunities if the ROW is not properly restored, or if suitable nesting trees are removed during construction, or direct mortality.

Direct Impacts

Direct impacts to the bank swallow could include loss of nesting or foraging opportunities resulting from clearing of the ROW, nesting activity disruption resulting from construction noise, or displacement.

Indirect Impacts

Indirect impacts to the bank swallow could include adverse habitat modification that results in loss of future foraging or nesting opportunities.

Operation and Maintenance

Operation and maintenance activities are not expected to have permanent impacts to sensitive habitats or special-status species, as all aboveground structures will be located in fenced yards within previously disturbed areas, agricultural land, or nonnative grassland, and will require minimal maintenance once construction is complete. Routine maintenance along the majority of the line will consist of quarterly to annual patrolling (e.g., foot or aerial patrol), cathodic protection, and surveys, and will not require significant disturbance of habitat along the ROW. Within the project action area, construction and maintenance vehicles will remain on designated project access routes and existing surfaced roads. PG&E has an ongoing worker education program to educate staff in recognizing and avoiding sensitive habitats in order to minimize impacts during maintenance and operation.

INTERRELATED AND INTERDEPENDENT EFFECTS

This project activity is not interrelated with any other action, and there are no known interdependent effects.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this BA. Future federal actions that are unrelated to the proposed action are not considered in this section because they will be subject to separate consultation pursuant to Section 7 of the FESA.

The project may contribute to the cumulative effects to special-status species and their habitats resulting from numerous developments and road expansions that are planned in the project area. Planned developments in the area include the Placer Vineyards Specific Plan, the Dry Creek Community Plan, the Curry Creek Community Plan, the Sierra Vista Specific Plan, the South Sutter Plan Area, and the Metro Air Park. In addition, road expansions are planned for Baseline and Riego roads between Highway 70/99 and Fiddymont Road, and for many of the side streets in the area that are currently limited to two lanes.

These new developments and road expansions are likely to permanently impact the habitats of special-status species, including rare plants and invertebrates associated with vernal pools, raptors and other avian species that utilize grasslands and agricultural lands for foraging and roosting, and GGS in the western portion of the project area. These impacts may include take of special-status species, fragmentation or permanent loss of habitat, or reductions in the quality of habitat.

While the project may contribute to the cumulative effects resulting from new development and road expansion, most of the impacts from the project are going to be temporary in nature, as

habitat will be restored to preconstruction conditions following the completion of construction activities. It is likely that many of the habitats temporarily impacted by project construction will be fully restored by the time construction begins for many of the new developments planned in the area.

Cumulative impacts will be minimized by constructing the pipeline to follow existing roadways such that fragmentation of habitat will be minimized. To the extent possible, the project will be constructed in areas that have previously been disturbed, or that are associated with landscape buffers along the expanded road segments.

ESSENTIAL FISH HABITAT

The project action area includes designated EFH for chinook salmon, as outlined by the Pacific Fishery Management Council in amendments to the Pacific Coast Salmon Plan (refer to Section 6 of this report). Effects of the project on EFH are included in “Fish, Critical Habitat, and Essential Fish Habitat” in Section 7 of this report. Therefore, further analysis and description of potential effects to EFH was deemed unnecessary.

8. IMPACT AVOIDANCE AND MINIMIZATION RECOMMENDATIONS

The following mitigation measures will be implemented by PG&E to avoid or minimize the potential impacts to biological resources that may result from project construction, operation, and maintenance. These mitigation measures have been grouped into two categories: general measures and species- or habitat-specific measures.

General mitigation measures apply to the entire project route, and are organized into preconstruction, during construction, and postconstruction measures. General mitigation measures include worker education training, erosion control, ROW restoration, and seasonal construction-timing restrictions.

Specific measures include those that will be implemented for specific species or habitat types, and detail procedures that will be utilized such as stream-crossing techniques, migratory and nesting bird surveys and monitoring, and vernal pool avoidance and minimization measures. Several of the species- and habitat-specific mitigation measures may be subject to further refinement in discussion with the appropriate resource agencies during the permitting process.

General Preconstruction

MM 1: Project Maps: Detailed construction maps showing location of sensitive environmental resources, construction sites and related features, environmental protection measures, and access routes will be provided to construction supervisors, and will be available to the construction crew members and environmental monitors prior to during construction activities.

MM 2: Worker Training: PG&E will provide a qualified biologist(s) to conduct environmental compliance training, including an endangered species/sensitive habitat education program for construction crews prior to the commencement of the project and during construction activities.

Additional “tailgate” training will be conducted for new construction personnel as needed during construction. Sessions will include discussions of regulatory requirements, including the federal and California Endangered Species Acts, the CWA, California Department of Fish and Game’s (CDFG) Fish and Game Code, permit requirements, and consequences of noncompliance with these acts and requirements. Training will also include identification of special-status species that are likely to occur in the project area and discussion of the values of sensitive habitats.

MM 3: Educational Brochure: As part of construction training, PG&E will produce an educational brochure for crews working on the project. Color photos of threatened and endangered species, including vernal pool invertebrates, GGS, CTS, burrowing owl, Swainson’s hawk, and others known or likely to occur in the area will be included, as well as a discussion of protective measures agreed to by PG&E and the resource agencies.

MM 4: Exclusion Zone Fencing: PG&E will mark the boundaries of environmentally sensitive exclusion zones and sensitive habitat features that are to be avoided (wetlands, vernal pools, etc.) before and during construction with highly visible flagging or fencing to prevent impacts from vehicles. All construction personnel will be required to conduct work activities within the defined area only.

MM 5: Vegetation Removal: PG&E will only remove vegetation within the approved work area. Overhanging trees may be trimmed as necessary per accepted arborist practices to safely construct the project.

General Construction

MM 6: Work Area: PG&E will confine all heavy equipment, vehicles, and construction work to approved roads and work areas. Stream channel work areas will be limited to what is necessary for construction. Where possible, construction vehicles will be kept out of watercourses with the potential to support special-status species. Where these avoidance measures are not feasible, PG&E will apply for and obtain the appropriate permits prior to construction from the USACE, USFWS, CDFG, and Central Valley Regional Water Quality Control Board (CVRWQCB), and will implement any additional avoidance or mitigation measures that are agreed upon during the permitting process.

MM 7: Construction Monitoring: PG&E will retain a qualified biologist(s) to be on-site during construction activities to perform pre-activity surveys just prior to construction in order to clear the work area of any special-status species, and to monitor compliance with mitigation measures. This includes monitoring in GGS and vernal pool habitat areas, and in wetland and riparian habitats, as described in greater detail below.

MM 8: Erosion and Dust Control: PG&E will implement erosion, sediment, material stockpile, and dust control BMPs on-site to minimize the potential for fill or runoff to enter wetlands or waterways. A biological monitor will be retained as necessary to monitor and inspect the installation and removal of erosion/sediment control devices if applicable.

MM 9: Workday Schedule: To the extent possible, PG&E will conduct all construction activity during daylight hours only, with the exception of HDD, which will continue 24 hours per day, 7 days per week to minimize the potential for frac-out, and hydrostatic testing, which may require holding test pressure in the pipelines past sundown. Where it is deemed necessary and feasible, night lighting and monitors will be used for work that occurs after sundown.

MM 10: Vehicle Inspection: PG&E will ensure that all construction personnel are instructed to visually check for wildlife beneath vehicles and equipment before moving or operating them.

MM 11: Speed Limit: PG&E will enforce a speed limit of 20 miles per hour on private roads and the posted speed limit on public roads.

MM 12: Trench Ramping: At the conclusion of each day's trenching or excavating activities, the end of the trench or bore pit will be ramped at an approximate 2 to 1 slope to allow any wildlife that enters the trench to escape. A biological monitor may approve the use of boards placed at an approximate 2 to 1 slope for site-specific, pre-approved locations where earthen escape ramps are not feasible.

MM 13: Sensitive Habitat Monitoring and Procedures if Listed Species are Found: In accordance with the FESA and CESA, PG&E will retain a qualified biological monitor to inspect any construction activity in habitat that is to be avoided or preserved to ensure that no unauthorized or unnecessary take of listed species or destruction of their habitat occurs. Upon recommendation of the biological monitor, the PG&E work supervisor will be responsible for avoiding and stopping all activities that may result in such take or destruction of habitat until appropriate corrective measures have been completed. PG&E will be responsible for immediately reporting any unauthorized impacts to the USFWS and the CDFG.

MM 14: Spill Prevention/Containment and Refueling Precautions: PG&E will maintain all construction equipment to prevent leaks of fuels, lubricants, or other fluids into waterways. Appropriate materials will be on-site to prevent and manage accidental spills. PG&E will take appropriate precaution when handling and/or storing chemicals (e.g., fuel and hydraulic fluid) near waterways and wetlands, and any and all applicable laws and regulations will be followed. Service and refueling procedures will take place at least 100 feet from waterways or in an upland area at least 100 feet from wetland boundaries to prevent spills from entering waterways or wetlands. These activities may be performed closer than 100 feet if a qualified biologist finds in advance that no reasonable alternative exists, and that PG&E and its contractors have taken the appropriate steps (including secondary containment) to prevent spills and provide prompt cleanup in the event of a spill. These measures will be outlined in a Hazardous Substance Control and Emergency Response Plan to be prepared by PG&E.

MM 15: Trash Cleanup: PG&E will properly contain and remove all trash and waste items generated by construction or crew activities.

MM 16: Prohibitions for Pets, Fire, Firearms: PG&E will prohibit employees, contractors, and subcontractors from having pets, campfires, or firearms at the project site. Smoking will be limited to designated smoking areas only.

General Postconstruction

MM 17: ROW Restoration: PG&E will restore work areas to pre-existing contours and conditions upon completion of work. Restoration, including revegetation and soil stabilization, will be performed as outlined in the Restoration and Monitoring Plan described below.

MM 18: ROW Restoration Plan: PG&E will prepare a Restoration and Monitoring Plan to address postconstruction revegetation, success criteria, and monitoring periods in natural areas. The intent of this plan will be to ensure that impacts are minimized and adequately mitigated to the satisfaction of the permitting agencies, property owners, and/or habitat managers. Restoration in agricultural fields and landscaped areas will be negotiated with the landowners and will result in restoration of temporarily disturbed areas to conditions similar to preconstruction conditions. The Restoration and Monitoring Plan to be developed by PG&E for review with resource agencies will include, at a minimum, the following measures:

- At the completion of construction activities, the ROW will be graded to restore flow lines and natural topography.
- Ripping or disking will be performed to relieve compaction at identified locations as needed.
- Stockpiled topsoil will be re-spread, providing organic matter and a seed bank for restoration.
- At the completion of soil work, all areas disturbed by construction activities will be subject to implementation of permanent erosion control measures.
- Permanent erosion control measures could include spreading a combination of native grass and forb seed, fertilizer, compost, and mulch for soil protection.
- Two seed mixes will be identified, one for upland areas and one for drainages and wetland areas.

MM 19: Seed Mix and Success Criteria: In sensitive communities such as wetlands or stream crossings, PG&E's Restoration and Monitoring Plan will include the use of native seed or plantings and will specify native species lists and propagule types, quantities of material, and appropriate success criteria and monitoring requirements to be determined in discussion with the appropriate resource agencies with responsibility for those areas (e.g., USACE, CDFG, and/or CVRWQCB).

MM 20: Erosion Control: PG&E will install and maintain appropriate temporary erosion and sediment control measures until revegetation is successful as defined by the success criteria to be outlined in the Restoration and Monitoring Plan.

Creek Crossings and Wetland Habitats

MM 21: Water Crossings in Special-status Species Habitats: PG&E will schedule water-crossing construction in waterways with suitable habitat for special-status aquatic species, including salmonids and other fish species, during dry months when the waterways have low or no flow in order to minimize potential impacts. This applies predominantly to the Yolo Bypass, where traditional trenching methods will be used. Other waterways that have potential to support special-status fish species but that are likely to have flows during construction will be crossed using HDD methods.

MM 22: Wetland and Waterway Avoidance During Final Design: PG&E will consider the locations of sensitive wetland habitats and waterways (including vernal pools) during final routing, and the pipeline will be routed to avoid these features wherever possible. Routing considerations will include trenchless construction technologies such as HDD, and narrowing of the ROW to the minimum needed for construction, where appropriate and feasible, to avoid impacts to sensitive wetland habitats and waterways.

MM 23: Wetland Restoration and Monitoring Plan: Where wetland and/or vernal pool avoidance is not possible, PG&E will develop and implement a Wetland Restoration and Monitoring Plan that will describe construction restoration methods and compensatory mitigation. This plan will include discussion of a combination of on-site restoration and off-site compensation for any net permanent losses of vernal pools or wetlands based on mitigation ratios developed in coordination with the USACE and USFWS. The plan will be submitted to the resource agencies, including the CDFG, USACE, CVRWQCB, and USFWS/NMFS as appropriate based on permitting requirements, for their review as part of the permitting processes for these areas. In addition to planting details such as the species to be planted and planting densities, the Wetland Restoration and Monitoring Plan will include information on performance criteria, monitoring, annual reporting, and remedial actions to be undertaken should monitoring determine that the success criteria have not been achieved.

MM 24: HDD Fluid Release Contingency Plan: Prior to construction, PG&E will prepare an HDD Fluid Release Contingency Plan that will specify procedures to contain and clean up any drilling fluids released into waterways or wetlands in the event of an inadvertent release of drilling fluids during HDD procedures.

Vernal Pool Invertebrate Habitat

MM 25: Vernal Pool Invertebrate Mitigation: Section 7 consultation is anticipated to be required for the project's effects on listed vernal pool invertebrate species. PG&E will minimize effects to these species by the general mitigation measures described above. If it is deemed necessary, additional compensation for unavoidable direct effects to vernal pool invertebrate habitat will be based on the guidelines outlined in the USFWS *Programmatic Formal Endangered Species Act Consultation on Issuance of 404 Permits for Projects with Relatively Small Effects on Listed Vernal Pool Crustaceans Within the Jurisdiction of the Sacramento Field Office, California* (1996c), and will include:

- Preservation component. For every acre of habitat directly or indirectly affected, at least two vernal pool credits will be dedicated within a USFWS-approved ecosystem preservation bank, or, based on USFWS evaluation of site-specific conservation values, 3 acres of vernal pool habitat may be preserved on the project site or on another non-bank site as approved by the USFWS.
- Creation component. For every acre of habitat directly affected, at least one vernal pool creation credit will be dedicated within a USFWS-approved habitat mitigation bank, or, based on USFWS evaluation of site-specific conservation values, 2 acres of vernal pool

habitat will be created and monitored on the project site or on another non-bank site as approved by the USFWS.

- Adequate fencing will be placed and maintained around any avoided (preserved) vernal pool habitat to prevent impacts from vehicles (as provided in MM 4 above).
- All on-site construction personnel will receive instruction regarding the presence of listed species and the importance of avoiding impacts to these species and their habitat (as provided in MM 2 above).

Valley Elderberry Longhorn Beetle

MM 26: Elderberry Shrub Avoidance: Where feasible, PG&E will maintain a 100-foot buffer around existing elderberry shrubs in the project action area with stems over 1 inch in diameter at ground height in the project action area. Signs and fencing will be erected around these buffer zones to keep construction activities away from the area. As part of the worker training to be conducted prior to construction (MM 2), a qualified biologist will discuss avoidance of impacts to VELB and elderberry shrubs and the possible consequences of noncompliance.

Where the 100-foot buffer zone is not feasible, but where a minimum of 20 feet of buffer can be retained between the drip line of existing elderberry shrubs and the project workspace, PG&E will consult with the USFWS to obtain approval to work closer than 100 feet from existing shrubs, and will provide a map of identified shrubs in the project area.

MM 27: Restoration and Maintenance near Elderberry Shrubs: Any disturbance or damage done within the buffer area (area within 100 feet of elderberry plants) during construction will be restored and erosion control and revegetation measures will be implemented where necessary.

No insecticides, herbicides, fertilizers, or other chemicals that might harm the VELB or elderberry shrubs will be used by PG&E in the buffer areas, or within 100 feet of any elderberry plant with one or more stems measuring 1 inch or greater in diameter at ground level.

If mowing of the ROW is required to reduce fire hazard, these activities will only take place between July and April. No mowing will occur within 5 feet of elderberry stems, and care will be taken to avoid damaging existing elderberry shrubs with mowing equipment.

MM 28: Transplant or Replace Elderberry from ROW: If elderberry shrubs cannot be avoided during construction of the pipeline, any stems measuring 1 inch or more in diameter at ground level will be transplanted or replaced in accordance with the USFWS *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS, 1999a). A suitable transplant site may be available in the Sacramento River Ranch Conservation Bank managed by Wildlands, Inc., which is located just north of the project alignment on the west side of the Sacramento River, and would be subject to USFWS approval. Ratios of replacement will be established as necessary during consultation with the USFWS.

If removal or transplanting of elderberry shrubs is required, native plants will also be planted based on the ratios outlined in the *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (1999a).

All transplanting or replanting of elderberry and other native plants in association with VELB habitat impacts will be monitored for 10 years as outlined in the *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (1999a), or for another length of time to be determined during consultation with the USFWS.

Giant Garter Snake

The following avoidance and mitigation measures are based on the USACE's Programmatic Biological Opinion for GGS for projects subject to Section 404:

MM 29: GGS Habitat Buffer: PG&E will avoid construction activities within 200 feet of the banks of suitable GGS aquatic habitat where feasible.

MM 30: Construction Window in GGS Habitat: With the exception of ROW isolation dike construction and irrigation flow culvert installation, PG&E will limit construction activity within GGS habitat (predominantly in rice production areas of Line 407 East and Line 407 West project segments within the Natomas Basin; refer to Figures 3B and 3C) to the period between May 1 and October 1. This is the active period for GGS and direct mortality is lessened because snakes are expected to actively move and avoid danger. For work that occurs between October 2 and April 30, PG&E will contact the USFWS and CDFG to determine if additional measures are necessary to minimize and avoid take.

MM 31: GGS Monitoring: PG&E will retain a qualified biologist to survey for GGS immediately prior to construction activities that take place in or within 200 feet of GGS habitat. Survey of the project area will be repeated if a lapse in construction activity of two weeks or more has occurred. If a snake is encountered during construction, activities will cease until the snake leaves or is removed by a permitted biologist in accordance with the Biological Opinion to be issued by the USFWS for the project.

MM 32: Dewatering GGS Habitat: To protect GGS, for any dewatering of potential GGS habitat that occurs after April 15, PG&E will keep the dewatered habitat dry for at least 15 consecutive days prior to excavating or filling the dewatered habitat. This may be required at smaller canal crossings within the Line 407 East and Line 407 West area in rice production areas within the Natomas Basin (refer to Figures 3B and 3C). Where habitat cannot be dried, a qualified biologist will survey the area for GGS immediately prior to and during all construction activities until construction is complete in the area.

Special-status and Nesting Birds

MM 33: Bird Nest Surveys and Monitoring: Because construction will take place during the breeding and nesting season of avian species in the project area (typically February 1 through August 31), PG&E will conduct nesting bird surveys prior to construction for avian species with