ACTION AREA

The action area for the NLIP Landside Improvements Project includes the footprint of construction elements, including staging/stockpiling areas and the borrow sites, as well as downstream portions of the Sacramento River. The project site and the borrow sites will be accessed via State Highways 99 and 70 and county roads, and travel between the sites will also be restricted to these routes. Therefore, no construction of new access routes will be required.

The 2008 construction phase, which would be initiated in 2008, would be implemented along 5.3-mile-long NCC south levee, the Sacramento River east levee from the NCC south levee to 2,000 feet south of the North Drainage Canal, the Elkhorn Canal between the North Drainage Canal and the Elkhorn Reservoir settling basin, the site of RD 1000 Pumping Plant No. 2, and adjacent land. The 2009-2010 construction phases include the Sacramento River east levee south of the limits of the 2008 construction phase improvements, the PGCC west levee, the area between Elkhorn Reservoir and the West Drainage Canal where a new GGS/Drainage Canal will be constructed, the West Drainage Canal, the Riverside Canal, the Elkhorn Canal downstream of Elkhorn Reservoir, and RD 1000 Pumping Plant No. 2.

The project area is largely undeveloped, except for residences widely scattered along the northern and middle reaches of the Sacramento River, the westernmost reaches of the NCC, and the PGCC. Residences are more densely spaced in the southern reaches of the Sacramento River. Levee slope maintenance zones along the landside toe are dominated by weedy ruderal vegetation that is regularly maintained via mowing and/or burning. Irrigation/drainage ditches and canals are present along many of the levee reaches, landward of the maintenance zones. These ditches generally support little native vegetation and are regularly maintained. Lateral ditches and canals also extend into the project area. The relatively limited amount of native vegetation within the project area is associated with these lateral ditches, which are concentrated in the upper reaches of the Sacramento River east levee, and remnant woodland and scrub patches scattered along the land side of the Sacramento River east levee. The dominant habitat landward of levee maintenance zones and irrigation/drainage features is agricultural. Areas along the Sacramento River are predominantly row and field crops, while those along the NCC are exclusively rice; those adjacent to the PGCC and at the potential borrow sites are a mix of rice and row/field crops.

SPECIES ACCOUNTS

CENTRAL VALLEY FALL-/LATE-FALL RUN CHINOOK SALMON

Adult Central Valley fall-/late-fall-run chinook salmon enter the Sacramento and San Joaquin River systems from September through January and spawn from October through February. During spawning, the female digs a redd (gravel nest) in which she deposits her eggs, which are then fertilized by the male. Optimal water temperatures for egg incubation are 6.7 degrees Celsius (ºC) to 12.2ºC (Rich 1997). Newly emerged fry remain in shallow, lower-velocity edgewaters, particularly where debris congregates and makes the fish less visible to predators (DFG 1998). The duration of egg incubation and time of fry emergence depends largely on water temperature. In general, eggs hatch after a 3- to 5-month incubation period, and alevins (yolk-sac fry) remain in the gravel until their yolk-sacs are absorbed (2–3 weeks).

Juveniles typically rear in freshwater (in their natal streams, the Sacramento River system, and the Sacramento–San Joaquin Delta [Delta]) for 3 to 6 months (fall run) and up to 12 months (late fall run) before entering the ocean. Juveniles migrate downstream from January through June. Juvenile chinook salmon prefer water depths of 0.5–3.3 feet and velocities of 0.26–1.64 feet per second (Raleigh, Miller, and Nelson 1986). Important winter habitat for juvenile chinook salmon includes flooded bars, side channels, and overbank areas with relatively low water velocities. Juvenile chinook salmon have been found to rear successfully in floodplain habitat, which routinely floods but is dry at other times. Growth rates appear to be enhanced by the conditions found in floodplain habitat.

Cover structures, space, and food are necessary components for chinook salmon rearing habitat. Suitable habitat includes areas with instream and overhead cover in the form of undercut banks; downed trees; and large, overhanging tree branches. The organic materials forming fish cover also help provide sources of food, in the form of both aquatic and terrestrial insects. Growth of juvenile chinook salmon in floodplain habitat is fast relative to growth in river habitat. Juvenile salmon have been found to have growth rates in excess of 1 millimeter (mm) per day when they rear in flooded habitat and as much as 20 mm in 2–3 weeks (Jones & Stokes 2001). The water temperature in floodplain habitat is typically higher than that in main channel habitats. Although increased temperature increases metabolic requirements, the productivity in flooded habitat is also increased, resulting in higher growth rates (Sommer et al. 2001). The production of drift invertebrates in the Yolo Bypass has been found to be one to two times greater than production in the river (Sommer et al. 2001). Also, grasses that are flooded support invertebrates that are also a substantial source of food for rearing juveniles. Increased areas resulting from flooded habitat can also reduce the competition for food and space and potentially decrease the possible encounters with predators (Sommer et al. 2001). Juvenile chinook salmon that grow faster are likely to migrate downstream sooner, which helps to reduce the risks of predation and competition in freshwater systems.

Juvenile chinook salmon in the Sacramento River system move out of upstream spawning areas into downstream habitats in response to many factors, including inherited behavior, habitat availability, flow, competition for space and food, and water temperature. The number of juveniles that move and the timing of movement are highly variable. Storm events and the resulting high flows appear to trigger movement of substantial numbers of juvenile chinook salmon to downstream habitats. In general, juvenile abundance in the Delta increases as flow increases (USFWS 1993). Fall-run chinook salmon emigrate as fry and subyearlings and remain off the California coast during their ocean migration (63 *Federal Register* [FR] 11481, March 9, 1998).

SACRAMENTO RIVER WINTER-RUN CHINOOK SALMON

Adult Sacramento River winter-run chinook salmon leave the ocean and migrate through the Delta into the Sacramento River system from November through July. Salmon migrate upstream past the Red Bluff Diversion Dam (RBDD) on the Sacramento River from mid-December through July, and most of the spawning population has passed RBDD by late June.

Winter-run chinook salmon spawn from mid-April through August, and incubation continues through October. The primary spawning grounds in the Sacramento River are above RBDD. Adult winter-run chinook salmon generally do not enter the American River.

Juvenile winter-run chinook salmon rear and emigrate in the Sacramento River from July through March (Hallock and Fisher 1985). Juveniles descending the Sacramento River above RBDD from August through October and possibly November are mostly pre-smolts (smolts are juveniles that are physiologically ready to enter seawater) and probably rear in the Sacramento River below RBDD. Juveniles have been observed in the Delta between October and December, especially during high Sacramento River discharge caused by fall and early-winter storms. Triggers for downstream movement are similar to those described above for fall-run chinook salmon. Winter-run salmon smolts may migrate through the Delta and bay to the ocean from December through as late as May (Stevens 1989). The Sacramento River channel is the main migration route through the Delta. Adult winter-run chinook salmon spend 1–4 years in the ocean. About 67% of the adult escapement that leaves the ocean to spawn in the Sacramento River consists of 3-year-olds, 25% consists of 2-year-olds, and 8% consists of 4-year-olds (Hallock and Fisher 1985).

CENTRAL VALLEY SPRING-RUN CHINOOK SALMON

Central Valley spring-run chinook salmon were historically the second most abundant run of Central Valley chinook salmon (Fisher 1994). They occupied the headwaters of all major river systems in the Central Valley where there were no natural barriers. Adults returning to spawn ascended the tributaries to the upper Sacramento River, including the Pit, McCloud, and Little Sacramento Rivers. They also occupied Cottonwood, Battle, Antelope, Mill, Deer, Stony, Big Chico, and Butte Creeks and the Feather, Yuba, American, Mokelumne, Stanislaus, Tuolumne, Merced, San Joaquin, and Kings Rivers. Spring-run chinook salmon migrated farther into headwater streams where cool, well-oxygenated water is available year-round.

Current surveys indicate that remnant, nonsustaining spring-run chinook salmon populations may be found in Cottonwood, Battle, Antelope, and Big Chico Creeks (DWR 1997). More sizable, consistent runs of naturally produced fish are found only in Mill and Deer Creeks. The Feather River Fish Hatchery sustains the spring-run population on the Feather River, but the genetic integrity of that run is questionable (DWR 1997). Estimates since 1953 on the Feather River indicate that numbers returning to the hatchery average around 2,115, although the estimates have increased dramatically since 1990 (DFG 2006).

Historical records indicate that adult spring-run chinook salmon enter the mainstem Sacramento River in February and March and continue to their spawning streams, where they then hold in deep, cold pools until they spawn. Spring-run chinook salmon are sexually immature during their spawning migration. Some adult spring-run chinook salmon start arriving in the Feather River below the Fish Barrier Dam in June. They remain there until the fish ladder is opened in early September. Spawning and rearing requirements for the species are similar to those identified above for fall-run chinook salmon.

Spawning occurs in gravel beds from late August through October, and emergence takes place in March and April. Spring-run chinook salmon appear to emigrate at two different life stages: fry and yearlings. Fry move between February and June, while the yearling spring-run emigrate October to March, peaking in November (Cramer and Demko 1997). Juveniles display considerable variation in stream residence and migratory behavior. Juvenile spring-run chinook salmon may leave their natal streams as fry soon after emergence or rear for several months to a year before migrating as smolts or yearlings (Yoshiyama, Fisher, and Moyle 1998). Triggers for downstream movement are similar to those described above for fall-run chinook salmon.

CENTRAL VALLEY STEELHEAD

Historically, steelhead spawned and reared in most of the accessible upstream reaches of Central Valley rivers, including the Sacramento and American Rivers and many of their tributaries. Compared with chinook salmon,

steelhead generally migrated farther into tributaries and headwater streams where cool, well-oxygenated water is available year-round. In the Central Valley, steelhead are now restricted to the upper Sacramento River downstream of Keswick Reservoir; the lower reaches of large tributaries downstream of impassable dams; small, perennial tributaries of the Sacramento River mainstem; and the San Francisco Bay/Sacramento–San Joaquin Delta (Bay-Delta) system.

The upstream migration of adult steelhead in the mainstem Sacramento River historically started in July, peaked in September, and continued through February or March. Central Valley steelhead spawn mainly from January through March, but spawning has been reported from late December through April (McEwan and Jackson 1996). During spawning, the female digs a redd (gravel nest) in which she deposits her eggs, which are then fertilized by the male. Egg incubation time in the gravel is determined by water temperature, varying from approximately 19 days at an average water temperature of 15.5ºC to approximately 80 days at an average temperature of 14.5ºC (McEwan and Jackson 1996).

Steelhead fry usually emerge from the gravel 2–8 weeks after hatching, between February and May, sometimes extending into June (Barnhart 1986, Reynolds et al. 1993). Newly emerged steelhead fry move to shallow, protected areas along streambanks but move to faster, deeper areas of the river as they grow. Juvenile steelhead feed on a variety of aquatic and terrestrial insects and other small invertebrates. Juvenile steelhead rear throughout the year and may spend 1–3 years in freshwater before emigrating to the ocean. Smoltification, the physiological adaptation that juvenile salmonids undergo to tolerate saline waters, occurs in juveniles as they begin their downstream migration. Smolting steelhead generally emigrate from March to June (Barnhart 1986, Reynolds et al. 1993).

GREEN STURGEON

Green sturgeon are found in the lower reaches of large rivers, including the Sacramento–San Joaquin River basin, and in the Eel, Mad, Klamath, and Smith Rivers. Green sturgeon adults and juveniles are found throughout the upper Sacramento River, as indicated by observations incidental to winter-run chinook monitoring at RBDD in Tehama County (NMFS 2005). Green sturgeon spawn predominantly in the upper Sacramento River. They are thought to spawn every 3–5 years (Tracy 1990). Their spawning period is March to July, with a peak in mid-April to mid-June (Moyle, Foley, and Yoshiyama 1992). Juveniles inhabit the estuary until they are approximately 4–6 years old, when they migrate to the ocean (Kohlhorst et al. 1991). Green sturgeon are found primarily in the Sacramento River and occasionally in the Feather River.

VALLEY ELDERBERRY LONGHORN BEETLE

The valley elderberry longhorn beetle has four life stages: egg, larva, pupa, and adult. The species is nearly always found on or close to its host plant, elderberry (*Sambucus* species). Females lay their eggs on the bark, and larvae hatch and burrow into the stems. The larval stage can last 2 years, after which the larvae enter the pupal stage and transform into adults. Adults are active (feeding and mating) from March to June (USFWS 2006). It appears that to function as habitat for the valley elderberry longhorn beetle, host elderberry shrubs must have stems that are 1.0 inch or greater in diameter at ground level. Use of the plants by the beetle is rarely apparent. Frequently, the only exterior evidence of the shrub's use by the beetle is an oval exit hole created by the larva just before the pupal stage. Field studies conducted along the Cosumnes River and in the Folsom Lake area suggest that larval galleries can be found in elderberry stems with no evidence of exit holes, because the larvae either succumb before constructing an exit hole or are not far enough along in the developmental process to construct an exit hole (USFWS 1996).

Valley elderberry longhorn beetles are patchily distributed throughout the remaining riparian forests of the Central Valley from Redding to Bakersfield, and appear to be only locally common (i.e., found in population clusters that are not evenly distributed across the Central Valley). Extensive loss of California's Central Valley riparian forests has occurred since 1900, declining by 80–96% depending on the region (USFWS 2006). Although

wide-ranging, the valley elderberry longhorn beetle is thought to have suffered a long-term decline because of human activities that have resulted in widespread alteration and fragmentation of riparian habitats and, to a lesser extent, upland habitats that support the beetle. Low density and limited dispersal capability may cause the beetle to be particularly vulnerable to population isolation as a result of habitat fragmentation. Insecticide and herbicide use in agricultural areas and along road rights-of-way may be factors limiting the beetle's distribution. The age and quality of individual elderberry shrubs/trees and stands as a food plant for beetle may be a factor in its limited distribution.

USFWS released a 5-year status review for the valley elderberry longhorn beetle on October 2, 2006 (USFWS 2006). This review reported an increase in known beetle locations from 10 at the time of listing in 1980 to 190 in 2006. Because of the presumed increase in the estimated population and the concurrent protection and restoration of several thousand acres of riparian habitat suitable for valley elderberry longhorn beetles, the USFWS status review determined that this species is no longer in danger of extinction, and recommended that the species no longer be listed under ESA. This recommendation is not a guarantee that the species will be delisted, however, because formal changes in the classification of listed species require a separate USFWS rulemaking process distinct from the 5-year review. If valley elderberry longhorn beetles are removed from the ESA list, the delisting is unlikely to be finalized before late 2008.

GIANT GARTER SNAKE

Giant garter snakes formerly ranged throughout the wetlands of California's Central Valley, from Buena Vista Lake near Bakersfield in Kern County north to the vicinity of Chico in Glenn and Butte Counties (Hansen and Brode 1980). This species appears to have been extirpated from the San Joaquin Valley south of Mendota in Fresno County (Hansen and Brode 1980, USFWS 1999b) and have suffered serious declines in other parts of their former range. The primary cause of decline, aquatic habitat loss or degradation caused by agricultural development, has been compounded by the loss of upland refugia and bankside vegetation cover (Thelander 1994). Other sources of decline include predation on young snakes by introduced species, modification of levees and upland habitat, and elimination of prey species by pesticides.

Giant garter snakes typically emerge from winter retreats from late March to early April and can remain active through October. The timing of their annual activities is subject to varying seasonal weather conditions. Cool winter months are spent in dormancy or periods of reduced activity. Suitable giant garter snake habitat is characterized by all of the features necessary to support permanent populations of the species, including: 1) sufficient water during the active summer season to supply cover and food such as small fish and amphibians; 2) emergent, herbaceous aquatic vegetation accompanied by vegetated banks to provide basking and foraging habitat; 3) bankside burrows, holes, and crevices to provide short-term aestivation sites; and 4) high ground or upland habitat above the annual high water mark to provide cover and refugia from floodwaters during the dormant winter season (Hansen 1988, Hansen and Brode 1980). Occupied aquatic habitats typically contain permanent or seasonal water, mud bottoms, and vegetated dirt banks (Fitch 1940, Hansen and Brode 1980).

Giant garter snakes inhabit agricultural wetlands and other waterways, such as irrigation and drainage canals, rice fields, marshes, sloughs, ponds, small lakes, low-gradient streams, and adjacent uplands in the Central Valley (USFWS 1999b). Rice fields and their adjacent irrigation and drainage canals serve an important role as aquatic habitat for giant garter snake. The elements and cycle of the rice field ecosystem coincides fairly closely with the biological needs of the giant garter snake. During the summer, giant garter snakes use the flooded rice fields as long as their prey is present in sufficient densities. During the late summer, rice fields provide important nursery areas for newborn giant garter snakes. In late summer/fall, water is drained from the rice fields and giant garter snake prey items become concentrated in the remaining pockets of standing water, which allows the snakes to gorge before their period of winter inactivity (USFWS 1999b). It appears that the majority of giant garter snakes move back into the canals and ditches as the rice fields are drained, although a few may overwinter in the fallow fields where they hibernate within burrows in the small berms separating the rice checks (Hansen 1998).

Managed marsh also provides important habitat for giant garter snake. In contrast to rice, managed marsh provides habitat year-round, and habitat elements to meet all of the giant garter snakes' daily and seasonal needs, such as dense cover, basking sites, and refugia. In the Natomas area, managed marshes have been designed to provide habitat elements throughout the marsh, as opposed to the limited availability of the same elements in rice fields that contribute to giant garter snake use occurring primarily around the perimeter of the rice fields.

The width of uplands used by giant garter snake varies considerably. Many summer basking and refuge areas used by this snake are immediately adjacent to canals and other aquatic habitats, and may even be located in the upper canal banks. While this species is strongly associated with aquatic habitats, individuals have been noted using burrows as far as 165 feet from marsh edges during the active season and retreats more than 820 feet (250 meters) from the edge of wetland habitats while overwintering (Wylie et al. 1997, USFWS 1999b); any land within this distance may be important for snake survival in some cases (Hansen 1988). Based on these observations, USFWS has defined giant garter snake upland habitat adjacent to aquatic habitat as suitable uplands within 200 feet of the edge of the aquatic habitat (USFWS 1997).

The California Natural Diversity Database (CNDDB) documents numerous giant garter snake locality records within the Natomas Basin (CNDDB 2007). Irrigation and drainage ditches, rice fields, managed marsh, and remnant marsh within the Natomas Basin provide critically important aquatic habitat for the basin's giant garter snake population, which is one of the most significant of the remaining giant garter snake populations. Irrigation and drainage ditches throughout the project area provide habitat of varying quality for giant garter snake, depending on the location. Giant garter snakes have been documented in the rice fields, ditches, canals, and TNBC reserves throughout the Natomas Basin; however, in general, recent occurrences of the species have been concentrated in the central and northern portions of the basin where higher-quality habitat tends to be present, with giant garter snakes becoming increasingly uncommon at Fisherman's Lake in the south (TNBC 2007). There are limited opportunities for exchange of individuals between key populations in the northern concentration of TNBC reserves and the population at Fisherman's Lake in the south (TNBC 2007). In general, irrigation ditches on the far western side of the basin, along the toe of the Sacramento River east levee, are of poor habitat quality. Sections of these ditches are concrete lined, and in the southern portion of the basin they are bordered by development. Although the project levees and adjacent uplands are heavily maintained and provide limited opportunities for overwintering by giant garter snakes, the potential exists for snakes to winter in burrows in these areas and to utilize the uplands for basking and travel between aquatic habitats during the active season.

Giant garter snake habitat within the project area includes rice fields adjacent to the PGCC west levee, NCC south levee and the northern portion of Reach 1 of the Sacramento River east levee. Potential borrow sites at Brookfield and the northern Airport bufferlands also support rice habitat. Ditches and canals within the project area generally occur along the landside toe of the levees. Uplands adjacent to these ditches and canals are generally actively maintained and provide limited value for giant garter snake. Levee and canal maintenance, including intensive, short-cropped mowing, burning, and occasional grading, diminish the quality of bankside and overwintering refugia. However, some potential exists for giant garter snakes to utilize the few burrows that persist in these areas and to move through the uplands in transit between areas of suitable aquatic habitat. The majority of uplands adjacent to rice and other aquatic features have limited suitability for giant garter snake because they are actively farmed orchards or row/field crops and riparian woodland dominated by tall woody shrubs and trees that completely shade the understory.

EFFECTS

LAND COVER CONVERSION

As described previously, the proposed project includes elements providing at least 100-year flood protection as quickly as possible, facilitating changes in the management of Airport lands that reduce hazards to aviation safety, and enhancing habitat values by significantly increasing the extent and connectivity of the lands in the Natomas Basin managed to provide habitat for giant garter snake, Swainson's hawk, and other NBHCP-covered species. The project features have been developed with the goal of meeting these multiple objectives simultaneously, to the extent feasible. Postproject land cover types and management practices are proposed to offset the loss of preproject habitat values on affected lands and maximize the habitat value of the project features.

The following is a summary of the anticipated changes in land cover associated with the 2008–2010 proposed project elements:

- **Flood control facility footprint:** The flood control facility footprint and maintenance access area would be on land currently occupied by cropland (mainly row crops, some rice) and field margins, groves of woodlands, and the Elkhorn and Riverside Canals. After project completion, the levee slopes, berms, and right-of-way would have a managed grass cover. The levee crown would be topped with a roadway.

- **New canal alignments:** The alignments of the relocated irrigation canals and GGS/Drainage Canal would generally be on lands currently in row crops.

- **New woodland areas:** Woodlands would most likely be planted on land that has been in row crops; they may be spread around the margins of TNBC properties.

- **Airport north bufferlands (borrow source):** Cropland in the Airport's northern bufferlands, recently in rice cultivation or fallowed rice land, would be converted to managed marsh or reclaimed as grassland. The primary management objective on reclaimed grasslands on the Airport bufferlands would be to reduce populations of hazardous wildlife to the extent necessary to comply with Title 14, Part 139 of the Code of Federal Regulations and FAA advisory circulars that address hazardous wildlife (see "Habitat Development and Management (2008-2010 Construction Phases)" section above).

- **Brookfield property (borrow source), RD 1001 borrow site (potential borrow source), and Fisherman's Lake properties (specific parcels to be determined):** The Brookfield borrow site is currently in rice cultivation and would be returned to rice cultivation in the same season following borrow operations. The potential Fisherman's Lake borrow sites are currently used for cultivation of rice and other crops and would be converted to managed marsh after borrow material is removed. The RD 1001 borrow site is currently used for rice cultivation and its ultimate land use would be at the discretion of RD 1001.

LAND COVER CHANGES FROM 2008 CONSTRUCTION PHASE IMPROVEMENTS

Land cover changes that would occur during the 2008 construction phase include those along the NCC south levee, Sacramento River east levee Reaches 1–4B, and new canal alignments in Reaches 4B–6A. Land cover types within the construction and maintenance boundary of the NCC south levee improvements are depicted in Exhibit 11. The cover classes in this and all other such exhibits in this document are based on the most recently available (2006) maps updated annually as part of the NBHCP annual monitoring efforts. Land cover changes along the NCC south levee would be relatively minimal because construction would be largely limited to the existing levee and maintenance corridor; no seepage berm construction or woodland planting would occur on the land side of this levee (Table 3).

Land cover changes along Reaches 1–4B of the Sacramento River east levee would be more extensive. Existing cover classes in these reaches are depicted in Exhibit 12. Table 3 provides a breakdown of the habitat types that would be affected within the flood facility footprint and the habitat types that would be present after implementation. The adjacent levee and related roadway improvements would occupy approximately 175 acres, resulting in an overall loss of approximately 125 acres of currently undeveloped habitat. Nearly 16 acres of woodland landward of the levee improvement footprint and currently in private ownership would be acquired by SAFCA and preserved in perpetuity.

Also summarized in Table 3 are land cover changes that would result from construction of the northern section of the new Elkhorn Canal and the GGS/Drainage Canal in Reaches 4B–6A. Habitat types within the entire alignment of these canals are depicted in Exhibit 13, and Exhibit 14 depicts a representative cross section of these parallel canals in Reaches 4B–6A. The line drawing on the lower portion of Exhibit 14 corresponds to the lettered canal footprint categories in Table 3. In general, canal construction would result in conversion of agricultural row and field crops to aquatic canal habitat and adjacent grassland. The small proportion of resulting land use that is categorized as non-compensatory in Table 3 includes maintenance roads on the crown of the Elkhorn Canal berms.

In addition to the flood facility improvement and canal footprints, large areas of habitat would be converted on the borrow sites anticipated to be utilized in the 2008 construction phase. This would include conversion of 180 acres of habitat mapped as rice and 140 acres of fallow agricultural lands to reclaimed grassland on the north Airport buffer lands. An additional 215 acres at the Brookfield borrow site would be temporarily disturbed during borrow extraction. However, this area would be transferred from private to public ownership, returned to rice production, and managed as habitat in perpetuity.

The addition of 215 acres of existing rice, over 600 acres of managed grasslands, nearly 33 acres of new or relocated canals, almost 16 acres of existing woodland, and approximately 30 acres of new woodland to the total amount of land in public ownership and managed as habitat in the Natomas Basin would compensate for the permanent loss of 205 acres of rice, 34 acres of aquatic features, less than 300 acres of agricultural lands, and approximately 10 acres of woodland and scrub, in the expanded flood facility footprint, and for temporal habitat loss resulting from construction.

SUMMARY OF LAND COVER CONVERSION IN 2008–2010 CONSTRUCTION PHASES

Land cover changes that would result from implementation of the overall Landside Improvements Project are summarized for each primary project feature in Table 4. Land cover changes along Reaches 5A-19B of the Sacramento River east levee are depicted in Exhibit 15. The majority of land cover changes would result in conversions of one type of habitat to another, and the resulting cover types would be suitable for use by a variety of species, including those covered by the NBHCP. Some of the land cover conversions, for example, agricultural lands to woodlands, would continue to function as suitable habitat for listed species (e.g., Swainson's hawk) regardless of the conversion of land cover. In addition, nearly 440 acres of land currently in private ownership would be acquired by SAFCA and specifically managed for habitat purposes and preserved in perpetuity. This includes existing rice land and row/field crops that would be preserved in production, rice that would be converted to managed marsh, existing woodland to be preserved, and created woodland. The acquisition, long-term management, and preservation of these habitats in public ownership would compensate for the permanent habitat loss and temporal habitat loss during construction.

Land acquisition and habitat preservation is a key component of the project, and SAFCA expects to achieve a 1:1 mitigation ratio for permanent losses of giant garter snake aquatic habitat through creating managed marsh and canals and preserving rice lands. However, the primary benefit of the project's conservation strategy is the increased functionality and connectivity of habitat in the Natomas Basin. This project is contributing to the large scale conservation planning and substantial Basin-wide benefits to NBHCP-covered species through providing substantially better quality habitat. Examples include: (1) designing new and replacement canals that require less

maintenance, and thus less disturbance, through increased canal flow capacity and reduced erosion resulting from stable 3:1 slopes; (2) secured water supply for managed marshes and canals through long-term contracts with NMWC; (3) installation of rock pile refugia and expansion of bank side marsh along the new GGS/ Drainage canal; (4) precise and dependable water level control for managed marshes and canals provided by check structures and ops criteria; (5) substantial enhancements to the West Drainage Canal, which is currently in very poor condition and low quality habitat; and, most of all, (6) creating permanent linkages between giant garter snake populations in the southern and northwestern portions of the Basin.

DIRECT AND INDIRECT ADVERSE EFFECTS TO SPECIES

SPECIAL-STATUS FISH

Implementation of the proposed action could potentially affect aquatic resources within the lower Sacramento River, NCC, and the PGCC. These features provide habitat for native anadromous and resident Central Valley fishes, including species that are listed under ESA. Because the potentially affected waterways support similar assemblages of fish species, all relevant species are discussed together in this section.

Project construction could result in increases in sediments, turbidity, and contaminants, which could adversely affect fish habitats immediately adjacent to and downstream of project construction activities. Water quality impacts would affect habitats and the physical health of individual fish and species populations within the Sacramento River, NCC, and PGCC. These waterways provide migratory habitat for listed adult and juvenile chinook salmon and steelhead that would be susceptible to these water quality–related effects. The Sacramento River also provides migration and spawning habitat for green sturgeon and other native anadromous fish.

Project components that could affect fish habitat include improvements to the NCC south levee, excavation of an area along the Sacramento River east levee at the Pumping Plant No. 2 site in Reach 4B, reconstruction of the Pumping Plant No. 2 outfall and intake structures in the same area, and PGCC west levee improvements. Construction activities with potential adverse effects to fish habitat would include clearing and grubbing/ stripping, levee degradation and reconstruction, waterside slope trimming and levee expansion along the NCC south levee, and excavation and in-water construction associated with the Sacramento River east levee Pumping Plant No. 2 improvements. Activities similar to those required along the NCC may be required for work in 2010 along the PGCC west levee.

The construction activities have the potential to temporarily impair water quality if disturbed and eroded soil is discharged into receiving waters. Soil and associated contaminants that enter receiving waters through stormwater runoff and erosion can increase turbidity, stimulate algae growth, increase sedimentation of aquatic habitat, and introduce compounds that are toxic to aquatic organisms. Fish population levels and survival have been linked to levels of turbidity and siltation in a watershed. Prolonged exposure to high levels of suspended sediment can result in a loss of visual capability in fish, leading to a reduction in feeding and growth rates; a thickening of the gill epithelia, potentially causing the loss of respiratory function; clogging and abrasion of gill filaments; and increases in stress levels, reducing the tolerance of fish to disease and toxicants (Waters 1995). Also, high levels of suspended sediments can cause the movement and redistribution of fish populations and affect physical habitat. Once suspended sediment is deposited, it can reduce water depths in pools, decreasing the water's physical carrying capacity for juvenile and adult fish (Waters 1995). Increased sediment loading can degrade food-producing habitat downstream of the project area by interfering with photosynthesis of aquatic flora and displace aquatic fauna. Many fish are sight feeders, and turbid waters reduce the ability of these fish to locate and feed on prey. Some fish, particularly juveniles, can become disoriented and leave areas where their main food sources are located, ultimately reducing their growth rates. In addition, the potential exists for contaminants such as fuels, oils, and other petroleum products used in construction activities to be introduced into the water system directly or through surface runoff. Contaminants may be toxic to fish or may alter oxygen diffusion rates and cause acute and chronic toxicity to aquatic organisms, thereby reducing growth and survival.

Table 3
Land Cover Changes for the 2008 Construction Phase of the NLIP Landside Improvements Project

FLOOD FACILITY FOOTPRINT

Sacramento River East Levee

Levee Station Number (x100)	Reach	Habitat Type Impacted (acres)[1]								Footprint						Compensation (acres)								
		Developed	Ruderal/ Grassland	Row and Field Crop/ Fallow Ag	Orchard	Rice	Canals/ Ditches	Open Water/ Wetland	Woodland/ Scrub	3:1 - 5:1 levee slope (60'-100')	Berm (100')	Berm (addt'l 200')	Maintenance & Utility (70')[2]	Woodland (130')	Woodland (addt'l 1000')	Developed[3]	Woodland Created	Woodland Preserved	Levee Slope Grassland[4]	Grassland Created/ Reclaimed	Irrigation Canal Created	GGS Canal Created	Rice Preserved	Field Crop Preserved
0-25	1	2.5	3.5			20				5:1						14.25			8	4				
25-32	1	0.5	4.5						1	5:1						0.5	5	[8]	2.5	3.5				
32-55	1/2	6	1.5	24					1	3:1						5	3	[1.1]	7.5	9.5				
69-110	2/3	9.5	2	25						3:1						6	7		7.5	6.5				
110-189	4A	23	4	30.5					1.5	5:1						7.5	15	[6.75]	15	31				
189-227	4B	11.5	2.5	24.5			1	<0.05	3.5	5:1						6.75			7.5	30.5				
Subtotal		*53*	*18*	*104*		*20*	*1*	*0*	*7*							*40*	*30*	*[15.85]*	*48*	*85*				
Natomas Cross Canal South Levee																								
Subtotal		6	120			5	0.5	16	1							6			112.5	25	5			
CANAL FOOTPRINTS										At-grade maint. areas (10+20+10 = 40')	Irrigation Canal land-side slope (ave.45')	Irrigation Canal berm crown (30')	Irrigation Canal water-side slope (ave. 45')	Irrigation Canal bottom (12')	GGS Canal water-side slope (ave. 55')	GGS Canal botton (10')								
	4B/5/6A	2.1	1.6	41.5	1.5		0.5	6	2.3	9.5	11	7.5	11	3	11	2.5	7.5			7.5	13	14	13.5		[50]
BORROW SITES																								
Airport N Bufferlands				140		180														320				
Brookfield						215 [5]																	215	
TOTAL		**61.1**	**139.6**	**285.5**	**1.5**	**205**	**2**	**32**	**10.3**							**53.5**	**30**	**[15.85]**	**168**	**443**	**19**	**13.5**	**215**	**[50]**

Notes: [ ] Preservation of unaffected habitat

[1] Acreages of impacted habitat are based on the most recently available Jones & Stokes NBHCP Habitat Maps (2006)

[2] Reduced to 15 feet where overlaps with existing woodland

[3] Includes Garden Highway, roadway realignment and other non-flood control structures, and crown of irrigation canal berms

[4] Includes levee slopes in expanded levee footprint

[5] Temporal loss (1 year) of rice production; not counted in impacts

Table 4
Land Cover Changes for 2008-2010 Construction Phases of the NLIP Landside Improvements Project

Reach	Habitat Type Impacted[1]										Compensation											
	Developed	Ruderal/ Annual Grassland	Row and Field Crop	Fallow Crops	Orchard	Rice	Canals/ Ditches	Open Water/ Marsh/ Wetland	Woodland/Scrub	Total	Developed[2]	Woodland Created	Woodland Preserved	Levee Slope Grassland[3]	Reclaimed Grassland	Created Grassland	Irrigation Canal Created	GGS Canal Created	Field Crop Preserved	Rice Preserved	Marsh Created	Total
Natomas Cross Canal South Levee																						
Subtotal	*6*	*120*				*5*	*0.5*	*16*	*1*	***148.5***	*6*			*112.5*		*25*	*5*					***148.5***
Sacramento River East Levee																						
1-4B	53	18	60	44		20	1	<0.05	7	***203***	40	30	[15.85]	48		85						**218.85**
5A-19B	40	70	115	20	5		10.5	3	20	***283.5***	43.5	95		45		100						**283.5**
Subtotal	*93*	*88*	*175*	*64*	*5*	*20*	*11.5*	*3*	*27*	***486.5***	*83.5*	*125*	*[15.85]*	*93*		*185*						***502.35***
Pleasant Grove Creek Canal West Levee																						
Subtotal	9	30				50	0.5			**89.5**	9			24		56.5						**89.5**
Canals																						
New Irrigation	5.5	17.5	95		1.5		0.5	5	3	**128**	30					42	56					**128**
New GGS/ Drainage	3	1.5	45				5	3	1	**58.5**	4					17		37.5				**58.5**
West Drainage Canal	2	2.5	1.5						1	**7**								7				**7**
Subtotal	10.5	21.5	141.5		1.5		5.5	8	5	**193.5**	34					59	56	44.5	[50]			**243.5**
Borrow Sites																						
Brookfield[4]						[250]				**250**										250		**250**
Airport N Bufferlands	3	50	[85]	[290]		475[5]	2			**905**					795						110	**905**
Fisherman's Lake						[120]				**120**											120	**120**
Subtotal	*3*	*50*	*[85]*	*[290]*		*845*	*2*			***1,275***					*795*					*250*	*230*	***1,275***
Temporary Total			**85**	**290**		**480**				**855**												
Permanent Total	**121.5**	**309.5**	**316.5**	**64**	**6.5**	**440**	**20**	**27**	**33**	**1,338.00**	**132.5**	**125**	**[15.85]**	**229.5**	**795**	**325.5**	**61**	**44.5**	**[50]**	**250**	**230**	**2,258.85**

Notes: [ ] Temporary (1 year) disturbance of habitat or Preservation of unaffected habitat

[1] Acreages of impacted habitat are based on the most recently available Jones & Stokes NBHCP Habitat Maps (2006)

[2] Includes Garden Highway, roadway realignment and other non-flood control structures, and crown of irrigation canal berms

[3] Includes levee slopes in expanded levee footprint

[4] Land currently in private ownership to be aquired by SAFCA and preserved in perpetuity

[5] Includes 110 acres of rice that will be converted to managed marsh in 1 season

Small amounts of riparian vegetation that could provide SRA habitat function (e.g., overhead cover for fish or contributing instream woody material to the NCC and Sacramento River [downstream] channels), may need to be removed or cleared from the waterside slope of the existing NCC south levee and waterside of the Sacramento River east levee in the vicinity of Pumping Plant No. 2 to accommodate levee improvement activities. Riparian habitat provides structure (through SRA habitat) and food for fish species. Shade decreases water temperatures, while low overhanging branches can provide sources of food by attracting terrestrial insects. As riparian areas mature, the vegetation sloughs off into the rivers, creating structurally complex habitat consisting of large woody debris that furnishes refugia from predators, creates higher water velocities, and provides habitat for aquatic invertebrates. For these reasons, many fish species are attracted to SRA habitat. Removal of riparian vegetation or woody material along the existing levee or otherwise in the floodplain could result in the loss of important SRA habitat function, although this effect is expected to be limited to a very small area. Vegetation removal along the NCC and in the vicinity of Pumping Plant 2 is anticipated to total less that 1 acre and would generally be limited to isolated trees, many of which are above the typical water elevation and do not currently provide SRA habitat.

VALLEY ELDERBERRY LONGHORN BEETLE

There are no known documented occurrences of valley elderberry longhorn beetle in the project area, but the species is known to occur nearby and could utilize elderberry shrubs in the project area. Elderberry shrubs that could support beetles are relatively sparsely scattered throughout the project area, primarily in riparian vegetation on the water side of the Sacramento River east levee. Elderberry shrubs are also scattered in some remnant riparian and oak woodland clumps on the land side of the levee, but they are relatively uncommon in these locations. Preliminary surveys for elderberry shrubs located within 100 feet of the proposed project features was conducted by EDAW biologist John Downs in October 2007 and February 2008; focused surveys for and stem counts of shrubs within the 2008 construction area were conducted by EDAW biologist Jon King on August 13, 2007, EDAW biologists John Downs and Kelly Fitzgerald on October 9, 2007, and EDAW biologist John Downs on October 25, 2007 and January 28, 2008.

Twenty-three elderberry shrubs are present in or adjacent to the footprint of the 2008 phase of Sacramento River levee improvements (numbered shrubs in Exhibit 12). One shrub is located immediately north of the intersection of Sankey Road and Garden Highway at the northern end of Reach 1, three shrubs are located in the woodland patch in Reach 1, 17 shrubs are located in woodland habitat on the land side of the levee in Reaches 4B–6, and two shrubs are located on the water side of the levee in the vicinity of Pumping Plant No. 2 in Reach 4B. All of these shrubs could require removal to accommodate construction of the adjacent levee, seepage berms, GGS/Drainage and Elkhorn Canals, and Pumping Plant No. 2 improvements.

Table 5 provides information on the number and size of stems for shrubs that have been surveyed, as well as whether or not they have beetle exit holes and whether or not they are located in riparian habitat. Nearly 200 stems (greater than 1 inch in diameter at ground level) on the surveyed shrubs could require removal during the construction of the 2008 phase of the Sacramento River levee improvements, potentially resulting in direct effects to valley elderberry longhorn beetles. If the stems are occupied by beetles, any early-stage individuals are likely to be killed when the shrub is removed. Due to project timing, removed shrubs may not be able to be transplanted during the shrub's dormant season. Although complete loss of the shrubs to be removed should be avoided with transplantation, transplanted elderberry shrubs can experience stress or health problems because of changes in soil, hydrology, microclimate, or associated vegetation, and mortality of transplanted shrubs precludes their future use by the beetle, and potential for such problems is increased by transplanting outside of the dormant season. Removal of shrubs in which larvae are present could result in larvae mortality if the health of the shrubs is adversely affected, or alternately, adverse effects on elderberry shrubs could have an overall effect on the beetle, even if larvae are absent at the time of impact, if the shrubs are relied upon for reproduction. In addition, it will take 5 or more years for replacement elderberry plantings to reach a size conducive to use as habitat by valley elderberry longhorn beetles. Therefore, there would be a temporary loss of habitat available to the beetle.

Table 5
Survey Information for Elderberry Shrubs That May Require Removal During Construction of the 2008 Sacramento River Levee Improvements

Shrub Number	Number of Stems per Diameter Category (inches)			Beetle Exit Holes Present?	Riparian?
	≥ 1 and ≤ 3	≥ 3 and ≤ 5	≥ 5		
1	6	4		No	No
2	3			No	No
3	9	4		No	No
4	10	6	6	No	Yes
5*	2	1		Unknown	Yes
6*	5	3	2	Unknown	Yes
7*	3	1	1	Unknown	Yes
8	5		2	No	No
9*	5	2	1	Unknown	No
10	3	2	5	Yes	Yes
11		1	4	No	Yes
12	11	2		Yes	Yes
13*	8	1	4	Unknown	Yes
14*	10		2	Unknown	Yes
15	1			No	Yes
16	11	2		Yes	Yes
17	4	1	2	Yes	Yes
18	3	1		No	Yes
19	8	3		No	Yes
20		2	4	No	Yes
21	5	2	1	No	Yes
22	3	1	1	No	Yes
23	3	-	-	No	Yes
Total	**118**	**39**	**35**		

* Stem number and size were estimated because of access limitations (shrubs within middle of blackberry thicket or on inaccessible side of drainage ditch)

Source: EDAW 2007 survey data

Additional shrubs would require removal during construction phases that would begin in 2009 and 2010, but focused stem counts have not been conducted because permission to access private property on which many of them occur has not been secured. Based on reconnaissance-level surveys conducted from Garden Highway and levee and canal easement corridors in 2007 and 2008, 15 shrubs are known to occur along the approximately 15-mile-long area (Exhibit 15). Direct stem counts and estimations conducted during the 2008 survey indicate approximately 200 additional stems (greater than 1 inch in diameter at ground level) would be affected, including at least 120 stems ≥ 1 and ≤ 3 inches, 30 stems ≥ 3 and ≤ 5 inches, and 40 stems ≥ 5 inches. Formal stem surveys of these shrubs will be conducted after authorization to access private properties is obtained.

Elderberry shrubs that are located within 100 feet of the project footprint but do not need to be removed would be avoided onsite. High visibility fencing would be established at least 20 feet around the dripline of these shrubs, unless a reduced buffer is approved by USFWS, to prevent the encroachment of construction personnel and vehicles and protect the shrubs.

GIANT GARTER SNAKE

There are numerous giant garter snake locality records within the rice fields, ditches, canals, and TNBC reserves throughout the Natomas Basin (CNDDB 2007). While these habitats can be of variable quality, the Natomas Basin is one of the most significant of the remaining giant garter snake populations. Recent occurrence surveys of giant garter snakes throughout the Natomas Basin indicate higher densities of this species in the central and northern portions of the basin where higher-quality habitat tends to be present; conversely, the data indicates giant garter snakes are becoming increasingly uncommon at Fisherman's Lake in the south (TNBC 2007). There are a number of likely causes for this disparity, including limited opportunities for exchange of individuals between key populations in the northern concentration of TNBC reserves and the population at Fisherman's Lake in the south (TNBC 2007). In addition, irrigation ditches on the far western side of the basin, including those in the project area, are of poor habitat quality. Sections of these ditches are concrete lined, and in the southern portion of the basin they are bordered by urban development and no longer convey irrigation water. Although the project levees and adjacent uplands are heavily maintained and provide limited opportunities for overwintering by giant garter snakes, there is potential for snakes to winter in burrows in these areas and to utilize the uplands for basking and travel between aquatic habitats during the active season.

The proposed project would result in permanent loss and temporary loss and disturbance of potential giant garter snake habitat. Tables 3 and 4 summarize land cover conversions, including the amount of habitat that is currently present and the amount that would be present after project implementation. Fill, temporary and permanent dewatering, land conversion, and staging and other construction disturbances would adversely affect snakes utilizing affected habitats, including irrigation ditches, drainage canals, rice fields, and associated uplands. Project construction activities in areas of potentially suitable habitat could also result in direct disturbance and loss of individual giant garter snakes.

Although the project would also result in creation of a substantial amount of aquatic and upland habitat, there would be some temporal loss in potential habitat while the created habitat develops into a suitable state. As feasible, this temporal loss would be minimized by constructing the replacement irrigation canals and GGS/Drainage Canal before most of the fill of existing ditches and canals occurs, providing some time for habitat development before the loss. In addition, marsh habitat creation would occur as soon after soil borrow extraction as possible and borrow areas that are not being converted to grasslands will be returned to rice cultivation within the same season of borrow use.

While most of the rice acreage on Airport lands that will be utilized for borrow will be converted to grassland (to function as foraging habitat for Swainson's hawk) and are characterized as a permanent habitat loss for the snake, approximately 110 acres of Airport rice would be converted to managed marsh concurrently with borrow operations; therefore, this effect would be temporary in nature as replacement habitat would be constructed in the same use. Similarly, approximately 120 acres of rice lands in the Fisherman's Lake area would be converted to managed marsh concurrently with borrow operations, and, thus, this is characterized as a temporary effect. Rice lands on the Brookfield site will be utilized for borrow over at least 2 years of construction phasing. However, borrow activities will not be conducted in the same portion of the site across multiple years; rather, soil would be borrowed from different areas of the site across construction years so that no more than one season of rice production will be lost in each portion. Therefore, this effect is also considered temporary in nature.

The Elkhorn Irrigation Canal is partially concrete-lined; the Riverside Canal is entirely concrete-lined. While the replacement irrigation canals will only be concrete-lined along the bottom 6 inches of the canals and not on the canal side slopes, this design is considered an improvement over the existing canal design. The Service generally

considers all canals in the Natomas Basin to be potential aquatic habitat for giant garter snake regardless of whether or not they are concrete-lined; therefore, it is expected that the replacement canals will continue to function as habitat for this species even with the canal bottoms being concrete-lined. Lining the bottom of the replacement irrigation canals with concrete is expected to improve water quality because periodic sediment removal will be less disruptive and release less of a sediment plume. A concrete-lined canal bottom also reduces the establishment of aquatic weeds which are present throughout the Basin and are known to have adverse effects on dissolved oxygen and on the frequency of canal biomass removal. The GGS/Drainage Canal will not be concrete-lined.

Any project-related construction that may occur between October 1 and May 1 will not be within 200 feet of potential giant garter snake aquatic habitat. Some areas within the adjacent levee construction footprint may be considered suitable habitat at the beginning of the construction season, but as the construction proceeds and aquatic habitat is filled and relocated to areas at least 200 feet away from the adjacent levee construction footprint, the areas within the construction footprint will no longer be suitable habitat for the giant garter snake. Therefore, no additional effects to this species would be expected should construction within the levee footprint continue beyond October 1, as needed. Generally, construction activities that may extend beyond October 1 will be limited to site restoration (e.g., hydroseeding, gravelling) and demobilization.

NATOMAS BASIN HABITAT CONSERVATION PLAN

Implementation of the proposed project could have substantial adverse effects on the viability of populations of species covered in the NBHCP, the effectiveness of the NBHCP's conservation strategy, and attainment of the goals and objectives of the NBHCP. The proposed project's consistency with the NBHCP was evaluated based on the project's anticipated effects on the viability of populations of species covered by the NBHCP, the effectiveness of the NBHCP's conservation strategy, and attainment of the goals and objectives of the NBHCP. Adverse effects on these evaluation criteria could jeopardize successful implementation of the NBHCP. These potential effects are described below.

EFFECT ON POPULATION VIABILITY OF COVERED SPECIES

Implementation of the proposed project would not threaten the population viability of most species covered by the NBHCP because a relatively small amount of the total habitat in the Natomas Basin available to these species would be affected by the levee improvements and/or because potential direct effects would affect a very small proportion of the population. However, potential effects on some species—giant garter snake and Swainson's hawk—could be substantial. Because of the relative scarcity of available habitat, the potential for reduced habitat quality, and/or the potential for adverse effects on the breeding success of relatively large numbers of individuals, the viability of populations of these species within the Natomas Basin could be threatened by project implementation. As described in the "Description of the Proposed Project," habitat creation, enhancement, and preservation components of the proposed project are anticipated to offset potential adverse effects on habitat for these species.

Implementation of the proposed project could also result in loss and/or disturbance of habitats that serve as wildlife corridors and could substantially interfere with wildlife movements. Disturbance of wildlife movement corridors provided by riparian and aquatic habitats along the NCC, Sacramento River, and PGCC could occur during project construction. However, such disturbance is unlikely to substantially interfere with wildlife movement because these corridors are relatively wide and wildlife could continue to move through less-disturbed portions of the corridors. Patches of woodland habitat that would be lost on the land side of the Sacramento River east levee provide habitat for a variety of wildlife species, but do not necessarily function as a movement corridor because of their very fragmented distribution. Species that require a more continuous corridor of woodland habitat are more likely to travel on the water side of the levees.

Irrigation/drainage ditches and canals within the project area and larger Natomas Basin serve as critical corridors for movement of aquatic species. These corridors would be adversely affected by project implementation, including temporary disturbance of them and permanent loss in some cases. As described in the "Description of the Proposed Project," replacement canals would be created as part of the proposed project, including approximately 50 acres of aquatic habitat in the new GGS/Drainage Canal and expansion of the existing West Drainage Canal. The configuration and design of these features were specifically formulated based on the goal of enhancing giant garter snake movement opportunities between populations in the northern and southern portions of the Natomas Basin. This would result in an overall, long-term enhancement in the quality of aquatic movement corridors in the western portion of the basin.

EFFECT ON THE CONSERVATION STRATEGY OF THE NBHCP

The NBHCP describes key components of the conservation strategy and how the components provide effective mitigation. These components are a 0.5:1 mitigation ratio, site-specific management plans for reserve lands, buffers within reserve lands, connectivity, minimum habitat block size requirements for reserve lands, and foraging habitat.

In describing the basis for the 0.5:1 mitigation ratio, the NBHCP states that the ratio mitigates the impacts of the incidental take authorized under the NBHCP because:

- much of the land to be developed does not provide habitat or provides only marginal habitat,
- the TNBC-managed reserves would provide habitat of higher quality than the eliminated habitat, and
- the land outside the permit area but within the Natomas Basin would not be developed.

The proposed project would not result in the development of land outside the permit area, but it would result in land use conversions. Land use conversion would not, however, cause a net loss in the habitat values provided by these lands for NBHCP-covered species in the Natomas Basin. Conversion from agricultural crops to managed grassland would not reduce overall habitat quality. Although approximately 440 acres of rice fields would be converted to grassland, the overall habitat quality for NBHCP species that use rice fields is unlikely to be adversely affected because up to 250 acres of existing rice fields would be acquired and brought under the management of the TNBC and 230 acres of rice fields would be converted to managed marsh with higher habitat quality. This increase in habitat quality is anticipated to offset the loss associated with conversion to grassland.

The proposed project would not reduce connectivity of reserves or habitats within the Natomas Basin, and would actually improve connectivity between reserves managed for giant garter snake purposes in the northern and southern portions of the basin. The project would also benefit the establishment of large blocks of preserved habitat by creating and/or preserving grassland, woodland, marsh, and rice habitats in the western portion of the basin. In some cases, these habitats would be adjacent to existing TNBC reserves and directly increase the size of some preserved habitat blocks.

The proposed project would not reduce the overall amount of foraging habitat available to NBHCP-covered species. Land use changes would reduce the overall amount of some habitats (i.e., agricultural crops), but these would be converted to grassland and managed marsh of comparable or higher overall foraging quality. Although agricultural crops can provide enhanced foraging opportunities during specific periods of the cultivation cycle, the grassland and marsh habitats would be more consistently available throughout the year.

Effect on TNBC Reserves

Proposed improvements to the Sacramento River east levee would encroach slightly on four existing TNBC reserves: Huffman West, Atkinson, Cummings, and Alleghany 50. A total of 10-15 acres of TNBC preserve land at Huffman West and Atkinson would be within the 2008 construction phase improvements along the expanded Sacramento River east levee footprint and the anticipated maintenance easement corridor in Reaches 2–4A;

approximately 10 acres at Cummings and Alleghany 50 are anticipated to be within the 2010 construction phase footprint and easement area. Encroachment on these reserves would affect their overall size, potentially jeopardizing the ability to meet the minimum-size and mitigation-ratio requirements and requiring revision of existing management plans. It could also affect revenue-generation requirements that must be met for successful implementation of the NBHCP. As discussed under the "Avoidance and Minimization Measures" section of this document (under the subsection titled "Natomas Basin Habitat Conservation Plan/ The Natomas Basin Conservancy"), these potential conflicts with these requirements will be alleviated through implementation of several options, including land acquisition to offset acre-per-acre losses, and possible funding supplementation for TNBC.

EFFECT ON ATTAINMENT OF NBHCP GOALS AND OBJECTIVES

Several goals and objectives of the NBHCP are relevant to the proposed project. In general, they address similar issues as the conservation strategy, such as establishing and managing a habitat reserve system and ensuring connectivity between reserves. Relevant habitat-specific goals and objectives include establishing a mosaic of habitats and connecting corridors to provide breeding, wintering, foraging, and cover areas for wetland and upland species; and providing habitat to maintain viable populations of NBHCP-covered species. As described above, components of the proposed project would support attainment of these goals and objectives by creating, enhancing, and preserving habitat and creating a valuable aquatic corridor linking TNBC reserves in the northern and southern portions of the Natomas Basin.

CUMULATIVE EFFECTS

There are a number of present and future projects that could result in effects similar to those of the NLIP Landside Improvements, including an undetermined number of future land use conversions and routine agricultural practices not subject to federal authorization or funding that could alter the habitat for and/or increase incidental take of valley elderberry longhorn beetle and giant garter snake and other listed species. These projects are, therefore, cumulative to the NLIP Landside Improvements and could contribute to cumulative adverse effects to these species.

Many other current and potential future projects likely to affect the valley elderberry longhorn beetle and giant garter snake require a federal action, and will, therefore, be subject to Section 7 consultation. In addition, projects within the Natomas Basin are either covered by the NBHCP and associated permits or would be subject to review for consistency with the NBHCP. Effects of these projects would not be considered cumulative to the NLIP Landside Improvements because they will undergo federal review and permitting, as necessary, which will ensure that adverse effects are fully mitigated and do not threaten successful implementation of the NBHCP.

PLANNING CONTEXT AND PROJECTS CONSIDERED

The following information on relevant projects and studies is excerpted from the Landside Improvements DEIR.

RELEVANT LAND USE PLANS AND PROJECTIONS

Section 5.3.3 of the Local Funding EIR provides a description of Sacramento area population trends, a summary of trends in regional agricultural land conversion, and detailed descriptions of the following land use plans that provided the context for the analysis of cumulative impacts in the Natomas Basin.

- *North Natomas Community Plan*: The approximately 9,038-acre *North Natomas Community Plan* (NNCP) area is designated in the City of Sacramento's general plan as the city's major growth area for new housing and employment opportunities. The NNCP area is bounded by Elkhorn Boulevard to the north, I-80 to the south, NEMDC/Steelhead Creek to the east, and the Natomas West Drainage Canal and SR 99/70 to the west. Development within the NNCP area started in 1999. At buildout (year 2016), the NNCP estimates a population of 66,495 in the NNCP area occupying approximately 9,038 acres (City of Sacramento 1996). The environmental consequences of buildout of the NNCP were addressed in the 1986 NNCP Environmental Impact Report (EIR) (certified by the Sacramento City Council in May 1986) and the 1993 Supplement to the 1986 NNCP EIR, which identified significant and unavoidable impacts related to agriculture; traffic; air quality; species habitat, including Swainson's hawk foraging habitat; noise; drainage, groundwater, and water quality; and flooding potential (City of Sacramento 1994).

- *Natomas Joint Vision Plan*: *The North Natomas Joint Vision Plan* (Joint Vision) (City of Sacramento 2006) is a long-term agreement between the City and County of Sacramento to collaboratively manage growth and preservation of open space and habitat in the 10,000-acre portion of unincorporated Natomas in Sacramento County. The area is north of the Sacramento city limits and generally bounded by Sutter County on the north, the Sacramento River on the west, and the NEMDC/Steelhead Creek on the east. Approximately 28% of this area is developed, and the Joint Vision anticipates that a substantial portion of the Natomas Basin will become urbanized. A specific land use plan has not been developed, but general concepts have been considered. In general, the preferred land use scenario for the Joint Vision area consists of a mixture of residential densities, an industrial park adjacent to the eastern edge of the Airport, and open spaces in the northern extent separating development from the Sutter County boundary. The Greenbriar project site (see below) is within the Joint Vision area.

- *Sacramento Area Council of Governments (SACOG) Sacramento Region Blueprint*: The "Blueprint" is a preferred scenario for regional growth in the Counties of El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba. The Blueprint is intended to serve as a framework to guide local government planning for orderly growth of population and transportation systems and integrates smart growth concepts such as higher-density developments. The Blueprint assumes extensive development in the Natomas Basin.

- *South Sutter County Specific Plan and Measure M*: In 1996, the Sutter County Board of Supervisors identified a 10,500-acre South Sutter County Industrial/Commercial (SSCI/C) Reserve in the *Sutter County General Plan* (Sutter County 1996). The SSCI/C Reserve is in Sutter County adjacent to the Sacramento County boundary. Sutter County began development in 2004 of a 3,500-acre specific plan area within the SSCI/C Reserve. In 2004, Sutter County voters also passed Measure M, an advisory measure providing guidance on the type of development preferred for a 7,500-acre portion of the SSCI/C Reserve area: at least 3,600 acres for commercial/industrial uses, at least 1,000 acres for public and retail uses, and no more than 2,900 acres for residential development. The *Sutter Pointe Specific Plan* area (see below) is within the SSCI/C Reserve.

- *Natomas Basin Habitat Conservation Plan (NBHCP)*: The NBHCP (City of Sacramento, Sutter County, and The Natomas Basin Conservancy 2003) was developed to promote biological conservation in conjunction with expected economic and urban development in the Natomas Basin. The NBHCP establishes a multispecies conservation program to minimize and mitigate the expected loss of habitat values and incidental take of "covered species" that could result from urban development and operation and maintenance of irrigation and drainage systems in the basin. The NBHCP currently authorizes take associated with 17,500 acres of urban development in southern Sutter County and within the City and County of Sacramento, with effects on habitat to be offset by the protection of 8,750 acres of habitat preserve land. As development is approved within the development areas covered under the NBHCP, developers pay mitigation fees to TNBC, the nonprofit "plan operator" of the NBHCP. TNBC uses the funds to acquire, establish, enhance, monitor, and manage mitigation lands in perpetuity. As of January 2006, nearly 4,000 acres of mitigation property had been acquired in the Natomas Basin (TNBC 2006).

RELATED PROJECTS IN THE NATOMAS BASIN

The major past projects in the proposed project area (generally the northern and western boundaries of the Natomas Basin) are development of the Airport and Teal Bend Golf Club; residential development along Garden Highway and county roads; and numerous projects within the Sacramento city limits that make up the urbanized portion of the Natomas Basin south of Elkhorn Boulevard and west of Powerline Road. Other relevant completed projects are components of the plans described in the previous section (e.g., development within the NNCP area). These past projects have reduced the acreage of agricultural land and natural habitats in the basin.

Present and future projects are those projects that are currently under construction or are in various stages of planning but that have yet to break ground. Some of these projects are planned to be under construction during the period in which SAFCA's proposed project would be under construction (2008–2010), while others are expected to be developed after 2010. The following projects are organized into five categories:

- SAFCA NLIP elements,
- other flood control system improvements,
- *Sacramento International Airport Master Plan* elements,
- development projects, and
- utility infrastructure projects.

SAFCA NATOMAS LEVEE IMPROVEMENT PROGRAM

NLIP Natomas Cross Canal South Levee Phase 1 Improvements

SAFCA is currently constructing the first phase of the NLIP, consisting of improvements to correct seepage potential in the western portion of the Natomas Cross Canal (NCC) south levee and northernmost 500 feet of the Sacramento River east levee. The improvements, which will be completed by the end of September 2007, consist of the construction of a seepage cutoff wall through the levee, which requires degradation of the upper third of the levee, installation of the cutoff wall, and reconstruction of the levee.

This work does not require the conversion of any agricultural land or habitat loss.

NLIP Bank Protection Project

SAFCA is proposing improvements to nine erosion sites on the east (left) bank of the Sacramento River between River Mile (RM) 69 (upstream of the confluence with the American River) and RM 79 (the confluence with the NCC). Construction would take place between April 1 and October 15 during one or all of the 2008, 2009, and 2010 construction seasons. The improvements would stabilize the banks to ensure that the levees are not eroded during a large flood event. Toe stabilization would arrest retreat of the emergent upper bank and stop the reduction in berm width, thereby preventing loss of extensive mature riparian vegetation, destabilization of the levee foundation, and shortening of seepage pathways under the Sacramento River east levee.

The environmental effects of this project are analyzed in the *Environmental Impact Report on Natomas Levee Improvement Program Bank Protection Project*, prepared by SAFCA (Jones & Stokes 2007).

Removal of Relief Wells and Completion of Seepage Berms along the Sacramento River East Levee

As described in the "Description of the Proposed Action" above, seepage berms would be interrupted at the locations of some residences and tree groves along the Sacramento River east levee, and relief wells would be installed around the structures and trees so they could be retained during the 20–30 years of the effective functioning of the wells. After this time, however, the wells would need to be removed and the berms completed, requiring the removal of the structures and trees from these locations (see "Use of Relief Wells to Avoid Removal of Structures and Trees along Sacramento River East Levee Reaches 4B–20A" under the "Description of the Proposed Action").

Structures would be removed from the locations and landowners and tenants relocated. The tree removals would add to the significant biological and visual resource impacts identified in the near term for the proposed project. Woodland plantings included in the current proposed project are intended to help offset the losses of these trees, in addition to the losses that would be incurred in the near term.

Post-2010 NLIP Seepage Remediation Projects

Completion of the "200-year" level of protection for the Natomas Basin flood control system will require constructing seepage mitigation along the Sacramento River east levee and the American River north levee that is in addition to the seepage mitigation included in the current proposed project. SAFCA would undertake this work after completing the improvements necessary to achieve the 100-year level of protection in 2010. The work is not currently proposed or designed but is a necessary part of SAFCA's overall program to provide a "200-year" level of protection to the Sacramento area. SAFCA anticipates that along the Sacramento River east levee, 100-foot seepage berms will be required in Reaches 5B, 11A, and 11B and a 65-foot-deep cutoff wall will be required in Reach 19B. Along the American River north levee, the anticipated through-seepage remediation is an internal layer of drain rock that would be built in the landside slope of the existing levee. This would require the excavation of the levee slope, followed by the installation of the drainage layer and the reconstruction of the

levee. The American River north levee improvements would include a combination of internal drains and slope flattening along a total of 11,850 feet of levee.

Construction activities would be similar to those described for the proposed project but would be on a much smaller scale. Because additional seepage berms are anticipated, these improvements would add to the conversion of agricultural land to nonagricultural uses. As in the case of the proposed project, it is expected that these future berms would be vegetated with grasses that would be managed to provide foraging habitat for Swainson's hawks and that borrow sites would be restored as managed habitat conducive to supporting special-status species.

OTHER FLOOD RISK REDUCTION SYSTEM IMPROVEMENTS

SAFCA Levee Integrity Program

As part of its long-term program to improve the Natomas Basin levee system, SAFCA expects to continue waterside and landside levee strengthening efforts, including increasing bank protection, levee armoring, levee toe stabilization, and flattening of landside levee slopes to a 5H:1V profile. These activities are part of the improvements evaluated at a conceptual, program level in the Local Funding EIR and would be funded in part by the development fee component of the local funding mechanisms being developed by SAFCA. The intention is to adapt the future flood control system as needed to changing hydrologic and floodplain conditions (e.g., changes in hydrology resulting from global climate change, increases in the amount of damageable property protected by the levee system).

Construction activities would be similar to those evaluated in this biological assessment for the proposed project and in the *Environmental Impact Report on Natomas Levee Improvement Program Bank Protection Project*, prepared by SAFCA. However, specific construction activities are not yet planned, designed, or funded, and their timing is not known. The potential landside slope modifications would be within the boundaries of the maintenance access area that is included in the current proposed project.

California Department of Water Resources/U.S. Army Corps of Engineers Repairs to Critical Erosion Sites

On February 24, 2006, Governor Arnold Schwarzenegger declared a state of emergency for California's levee system. Soon after, he signed Executive Order S-01-06, directing DWR to identify and repair eroded levee sites on the state/federal levee system to prevent catastrophic flooding and loss of life. By the end of summer 2006, 33 critical erosion sites on the levee system had been identified as being in urgent need of repair. Two of these sites are along the bank of the Sacramento River east levee between the NCC and the American River. Rock toe protection has been installed at these sites.

These improvements do not overlap temporally with proposed project construction, and the sites are separated from the proposed project area by the levee itself.

SACRAMENTO INTERNATIONAL AIRPORT MASTER PLAN

The *Sacramento International Airport Master Plan* (SMF Master Plan) covers planned Airport improvements through 2020. The EIR for the SMF Master Plan was certified and the project approved in August 2007. The master plan includes three phases, as described below. The new facilities are planned to be constructed within the boundaries of existing Airport property, which totals approximately 5,670 acres, of which 2,300 acres are currently developed.

Development of many of the planned facilities will be on land historically in agricultural production. Most lands outside the current Airport Operations Area provide foraging habitat of varying quality for a variety of wildlife species and that the facility expansion would reduce the overall availability of such habitat in the western portion

of the Natomas Basin. The SMF Master Plan EIR estimates that 190 acres of Swainson's hawk foraging habitat would be converted to developed uses in Phases 1 and 2 of master plan buildout. Construction of some of the planned facilities is likely to coincide with construction of SAFCA's proposed project in 2008–2010.

SMF Master Plan Phase 1 (2007–2013)

Phase 1 of the SMF Master Plan includes the construction of a new landside passenger terminal, a new airside concourse and aircraft apron, new parallel taxiways, a new airport traffic control tower, a new community fire station, new parking lots and a new parking garage, and new maintenance buildings. This phase of development would entail expanding the rental car surface parking lot and the rental car terminal facility. In addition, Elkhorn Boulevard and Airport Boulevard would both be extended. The acquisition of two areas (48 acres and 313 acres) north of I-5 for buffers is also identified for this phase of development.

SMF Master Plan Phase 2 (2014–2020)

Phase 2 of the SMF Master Plan includes the expansion of landside Terminal B and the addition of four gates along Concourse B and a new Terminal B parking garage. Terminal A concourse piers would be extended to accommodate four additional aircraft gates, and a 2,400-foot extension of the east runway. This phase of development also includes the construction of a new instrument landing system, new taxiways and terminal aprons, a new air cargo building, and a new Aircraft Rescue & Fire Fighting building. In addition, Cy Homer Road would be extended and Elverta Road would be relocated, and most of the ditches in the Runway Protection Zone and road areas would be culverted or piped. This phase of development also identifies commercial development on approximately 135 acres north of the existing alignment of Elverta Road, on about 77 acres north of I-5 and east of Airport Boulevard, and on approximately 79 acres south of I-5. The construction of a light rail and/or bus rapid transit line to the passenger terminals is also a component of this development phase. Finally, this phase includes the construction of a new 8,600-foot-long runway parallel to and 1,200 feet west of the existing west runway and a new passenger concourse to support this new runway.

SMF Master Plan Phase 3 (After 2020)

Phase 3 of the SMF Master Plan, while still conceptual, includes the construction of a new 8,600-foot-long runway parallel to and 1,200 feet west of the existing west runway and a new passenger concourse to support this new runway. This phase of development also identifies commercial development on approximately 137 acres north of the existing alignment of Elverta Road between the existing parallel runways and on about 77 acres north of I-5 and east of Airport Boulevard. The construction of a light rail line into the airport terminal complex is also a component of this development phase.

DEVELOPMENT PROJECTS

Camino Norte Project

The Camino Norte/Leona Circle project area—generally located east of El Centro Road south of Arena Boulevard—has been proposed by the City of Sacramento as Phase 1 of the more extensive Sphere of Influence amendment for the Natomas Joint Vision area. There is no development application for this project for this project. The concept is to develop the approximately 400-acre area for residential and commercial uses. Preparation of an EIR for the Camino Norte Sphere of Influence Amendment began in 2007 (Mende, pers. comm., 2007).

If developed, this project would convert land historically in row crops to nonagricultural uses.

Greenbriar

Greenbriar is a proposed 577-acre, mixed-use project proposed for the northwest corner of the intersection of I-5 and SR 99/70. The Greenbriar project site lies 1 mile east of the Airport and is bounded on the north by Elkhorn Boulevard and on the west by the Lone Tree Canal. The site, which is included in the Natomas Joint Vision area, is zoned agricultural and is located outside the Sacramento city limits and Sacramento County's Urban Services Boundary. The development would include nearly 3,500 residential units, about 50 acres of commercial development, a 10-acre elementary school, about 50 acres of neighborhood parks, and a 40-acre lake for stormwater retention. The project would include two connections with SR 99/70—the existing Elkhorn Boulevard and a new east/west thoroughfare, Meister Way, which would require creation of a new interchange just north of the I-5 exit. The final EIR for the Greenbriar project was issued in August 2007.

Implementation of the project would result in the conversion of 577 acres of farmland historically rotated between rice, alfalfa, wheat, and row crops to nonagricultural uses. A project-specific habitat conservation plan (HCP) is being developed to address the mitigation requirements for effects of the project on special-status species and habitats, particularly Swainson's hawk foraging habitat and giant garter snake habitat (City of Sacramento and Sacramento Area Local Agency Formation Commission 2007).

Sutter Pointe Specific Plan

The *Sutter Pointe Specific Plan* area encompasses approximately 7,500 acres in southeastern Sutter County within the SSCI/C Reserve described above (Sutter County 2007). The site is generally bounded by Natomas Road on the east, the Sacramento/Sutter County line on the south, and, at its westernmost point, Powerline Road; the northern boundary is approximately 4 miles north of the Sacramento-Sutter County line. SR 99/70 divides the southern portion of the specific plan area and serves as the western boundary of its northern portion. The *Sutter Pointe Specific Plan* is a mixed-use project that combines industry, commerce, housing, open space, and civic and associated uses.

Buildout of the proposed project would be split into five residential/mixed-use development phases and five employment center development phases and is anticipated to occur over approximately 30 years.

Development of this specific plan area would convert land historically in a mixture of agricultural row crops to nonagricultural uses. An EIR for the *Sutter Pointe Specific Plan* is in preparation.

Metro Air Park Specific Plan

The *Metro Air Park Specific Plan* area encompasses 1,887 acres just east of the Airport on the north side of I-5. The specific plan area is bordered by Elverta Road to the north, Lone Tree Road to the east, Bayou Way to the south, and Powerline Road to the west. The following land uses are proposed for Metro Air Park: light manufacturing (551 acres), airport related (277 acres), office (682 acres), and recreation/open space (275 acres). However, no development plans had been submitted at the time of preparation of this EIR. Metro Air Park cannot be redesignated for residential use because of its proximity to the Airport, and the habitat conservation plan for Metro Air Park requires that the land be used in agriculture until developed.

UTILITY INFRASTRUCTURE PROJECTS

American Basin Fish Screen Habitat Improvement Project

This project involves the consolidation of diversions and the addition of state-of-the-art fish screens to Natomas Central Mutual Water Company's (NMWC's) diversions on the Sacramento River between Verona and the American River, and on the NCC. The specific objectives of the project are to remove migration barriers; prevent straying and entrainment of federally listed anadromous fish species and other high-risk species; and to improve aquatic, riverine, and riparian habitat. As part of this project, NMWC would construct the Sankey diversion, a

screened intake and pumping plant in Reach 1 of the Sacramento River east levee at the proposed realignment of the Sankey Road intersection with Garden Highway. Construction would take place on both sides of the levee.

The timing of the Sankey diversion project has not yet been established. The land use conversion that would be required at the intake site is already assumed as part of the land acquisition for the Sankey Road realignment.

Western Area Power Administration Transmission Line/Sacramento Area Voltage Support Project

The Western Area Power Administration of the U.S. Department of Energy, the Sacramento Municipal Utility District (SMUD), and the City of Roseville are proposing to construct and operate approximately 38 miles of 230-kilovolt (kV), new double-circuit transmission line in the Sacramento area. A joint supplemental environmental impact statement (SEIS) and EIR were prepared for this project in 2003. Segments of the line would run along established roadways in the Natomas Basin; alternative alignments have been identified for these segments.

The draft SEIS/EIR estimated that in the Natomas Basin, the project would permanently affect up to 17 acres of Prime and Unique Farmland, approximately 19 acres of rice, 1.4 acres of riverine/riparian habitat, up to 0.3 acre of riverine/riparian habitat, 1 acre of vernal pools, and up to 1.4 acres of emergent wetlands (WAPA 2007).

Placer Parkway Corridor Preservation Project

The Placer Parkway Corridor Preservation Project is a proposal to identify and preserve an approximate 15-mile-long, 500- to 1,000-foot-wide corridor between SR 65 and SR 99/70 for future development of a roadway that would connect SR 65 in the Lincoln/Roseville/Rocklin area to SR 99/70 in Sutter County and the Airport (Placer Parkway Corridor Preservation 2007). The draft EIS/EIR for the Tier 1 corridor assessment is expected to be released in 2007. Design and construction have not been funded. Implementation is anticipated by 2020 (Placer Parkway Corridor Preservation 2007.)

The proposed corridor would occupy 90–180 acres, approximately one-quarter of which (22–45 acres) would be in the Natomas Basin, on land currently in agricultural use.

Downtown Natomas Airport Light Rail Transportation Project

A 13-mile, 13-station light rail transit corridor would extend from downtown to the Airport, serving the future Railyards development and Regional Intermodal Facility, the Richards Boulevard Redevelopment Area, and the communities of South and North Natomas (Sacramento RT 2006). Extension of the light rail into Natomas is not anticipated to occur until after 2012.

Sacramento Municipal Utility District Power Line–Elkhorn Substation Capacity Expansion Project

SMUD plans to expand an existing distribution substation located on Powerline Road (approximately 1.25 miles north of I-5) along the east side of the Airport in northern Sacramento County. The proposed Power Line–Elkhorn Substation Capacity Expansion Project would increase the capacity of the substation from 16.25 MVA to 50 MVA, mainly to serve the Airport's terminal modernization and demand from Metro Air Park development (SMUD 2007).

The project would increase the footprint of the substation by approximately 0.5 acre.

Sacramento River Water Reliability Study

The U.S. Bureau of Reclamation and Placer County Water Agency in 2002 initiated the Sacramento River Water Reliability Study on behalf of cost-sharing partners—the City of Roseville, the City of Sacramento, and Sacramento Suburban Water District—to develop a water supply plan that would use a Sacramento River diversion to meet water supply needs of the Placer-Sacramento region. The plan would include water supply infrastructure components, water treatment and pumping facilities, storage facilities, and major transmission and distribution pipelines. The study will include a feasibility study and an EIS/EIR for identified water supply alternatives as the basis for seeking necessary biological opinions and permits from the responsible resource agencies to allow execution of necessary agreements and construction of the recommended water supply infrastructure.

The final version (March 2005) of the Initial Alternatives report for the study identified an Elverta Diversion Alternative and recommended it for further study. The alternative would pump water from the Sacramento River near Elverta Road and Garden Highway to a new treatment facility north of the Airport. After treatment, the water would be transported via pipeline to areas east of the Natomas Basin. It is anticipated that the intake and water treatment plant would be owned and operated by the City of Sacramento. No project-specific analysis has been prepared yet for any of the alternatives identified in the study.

Upper and Lower Northwest Interceptor Projects

These projects are managed by the Sacramento Regional County Sanitation District (SRCSD 2007). The Upper Northwest Interceptor (UNWI) is an underground sewer interceptor—a large sewer pipeline—that extends approximately 20 miles from Orangevale to Natomas. When complete, the UNWI pipeline will carry wastewater flows from northeast Sacramento County to the new Natomas Pump Station located near the junction of I-5 and I-80. All segments of the UNWI are expected to be complete by 2010. The Lower Northwest Interceptor (LNWI) will convey flows from the Natomas Pump Station to the Sacramento Regional Wastewater Treatment Plant (SRWTP) in Elk Grove. The LNWI alignment is approximately 20 miles long and begins at the existing Natomas Pump Station in northwestern Sacramento County and ends at the SRWTP in southern Sacramento County. The LNWI is scheduled to be completed in 2007.

ANALYSIS OF CUMULATIVE IMPACTS

Many of the projects described above would permanently disturb undeveloped land that is currently in agricultural use or that has recently been in agricultural use. These projects would have cumulative significant effects on agricultural resources through the conversion of agricultural land to nonagricultural uses, which has the potential to cause permanent adverse cumulative effects on terrestrial special-status species for which these lands provide habitat. However, federal and state resource agency approvals of these projects would depend on their ability to offset species impacts through the provision of preserved or enhanced habitats.

SPECIAL-STATUS FISH AND AQUATIC RESOURCES

Construction activities have the potential to temporarily degrade water quality and fish habitat through the direct release of soil and construction materials into water bodies or the indirect release of contaminants into water bodies through runoff. Other projects, including the extensive array of development projects anticipated in the Natomas Basin and SAFCA's bank protection project, have the potential to release materials into watercourses that support fish. The implementation of BMPs and adherence to the conditions of a storm water pollution prevention plan would achieve avoidance and minimization of potential effects on water quality and fish habitat. Consequently, the potential effects of project construction on water quality are not expected to constitute a cumulatively considerable contribution to an impact on water quality, fish habitat, or aquatic species.

The proposed improvements along the NCC south levee would also include waterside slope stabilization activities that would require the removal of vegetation, some of which may constitute a loss of SRA habitat. Adherence to Section 1602 (California Fish and Game Code) permit conditions would limit potential disturbance to fish habitat associated with levee improvements on the water side of the NCC and would ensure that restoration, rehabilitation, and/or replacement of any affected channel habitat would result in no net loss of SRA habitat. Other projects in the Natomas Basin would be required to implement similar measures to prevent impacts. In addition, SAFCA's bank protection project would incorporate features that would compensate for temporary effects on SRA habitat and result in long-term increases in nearshore and SRA cover values relative to pre-project conditions. Consequently, the proposed project would not contribute to a cumulative impact on fish habitat.

SPECIAL-STATUS PLANTS AND WILDLIFE AND TERRESTRIAL RESOURCES

Implementation of the proposed project has the potential to contribute to the loss or degradation of sensitive habitats and to adversely affect special-status species, including special-status plants, valley elderberry longhorn beetle, giant garter snake, and state-listed species such as Swainson's hawk. Potential effects of the proposed project related to wildlife would be associated with construction disturbances of wildlife and their habitats, as well as permanent loss of habitat for the affected species. These effects could contribute to species declines and losses of habitat that have led to the need to protect these species under ESA and the CESA.

Potential cumulative adverse effects on sensitive biological resources in the Natomas Basin include elements of SAFCA's long-term flood control improvement program, such as post-2010 seepage remediation projects on the Sacramento and American River levees, the replacement of relief wells with seepage berms in 20–30 years, and further flattening of the landside slopes of the levees. These actions would increase the footprint of the flood control features and result in additional habitat conversion. However, land acquisition and habitat conversion for the proposed project includes the anticipated area necessary to provide adequate access for inspection and maintenance of proposed improvements, as well as a buffer between the flood control system and adjacent land uses. It is anticipated that future landside expansion of levee and berm footprints would be accommodated within this currently proposed buffer area. Therefore, no additional land acquisition or conversion of agricultural crop lands would occur. However, additional removal of woodland habitat and minimal (likely less than 1 acre) fill of irrigation/drainage ditches may be required.

Future levee improvements would have adverse effects on sensitive habitats and special-status species similar to those of the proposed project, including loss of suitable habitat and wildlife disturbance, and potential loss, during construction. The proposed project is intended to provide up-front habitat replacement, enhancement, and preservation adequate to compensate for anticipated future loss of woodland habitat. Replacement woodland habitat would be planted as part of the proposed project, in advance of the future loss, so the created habitat has time to develop and provide habitat benefits at the time of the loss.

Bank protection at the nine Sacramento River erosion sites to be conducted by SAFCA in 2008–2010 would result in wildlife disturbances during construction. However, the overall effect is anticipated to be beneficial, because this project would prevent future loss of extensive mature riparian vegetation that provides nest sites for Swainson's hawk and important habitat for many common and sensitive wildlife species.

Proposed NMWC projects, including the Sankey Diversion and Fish Screen Project, would also result in habitat and wildlife disturbances during construction. The Sankey Diversion would include permanent loss of habitat for some special-status species, including giant garter snake, but an appropriate habitat replacement and management plan is being developed in consultation with the USFWS and DFG to provide adequate compensation for the loss. Despite construction-related adverse effects from the fish screen project, the overall effect would be beneficial and habitat quality would improve.

The SMF Master Plan includes a number of components that are anticipated to result in adverse effects on sensitive habitats and special-status species. The majority of these effects would be associated with Phases 2 and

3, which would not commence until 2014. Adverse effects in all phases could include a combination of permanent habitat loss and construction-related effects. There could also be effects from expanded long-term operation of the Airport. SCAS has identified some habitat enhancement and protection measures that would be implemented to compensate for adverse effects, and additional measures are anticipated to be identified as subsequent CEQA evaluation and regulatory permitting is completed.

Substantial adverse effects on special-status species and sensitive habitats will be associated with the extensive future urban growth expected to occur in the Natomas Basin. This growth will continue to reduce the amount of habitat available to support populations of special-status species. Potential adverse effects from future approved expansion within the NBHCP permit area have been addressed, and successful implementation of the NBHCP would ensure that there is no overall adverse effect on special-status species from implementation of these projects. Similarly, an HCP is being implemented for the *Metro Air Park Specific Plan*. Additional urban expansion is being promoted through the Natomas Joint Vision, which would result in development and open space conservation within the Sacramento County portion of the Natomas Basin that was not covered in the NBHCP. Potential effects on biological resources from implementation of this potential future development are at various stages of evaluation. Projects will be required to incorporate adequate impact avoidance and minimization measures and permanent habitat conservation to mitigate and compensate for the anticipated adverse effects.

Implementation of the proposed project and the avoidance and minimization measures would ensure that the effects of the proposed project are reduced or avoided in accordance with the requirements of the ESA and CESA and other regulatory programs that protect habitats, such as Section 404 of the Clean Water Act and Section 1602 of the California Fish and Game Code. The proposed project incorporates habitat creation, enhancement, and preservation components designed to offset adverse effects of the project. In addition, avoidance and minimization measures require further development of these habitat improvement components, including preparation and approval of management plans. Successful implementation of these mitigation measures would result in permanent protection and management of habitat for giant garter snake, including creation and enhancement of connectivity between giant garter snake populations in the Natomas Basin, expected to result in an overall improvement of conditions for giant garter snakes in the basin. An increase in permanently protected foraging habitat for Swainson's hawk, eventual increase in potential nesting habitat, and preservation of existing nest sites would also maintain or improve current conditions for this species in the Natomas Basin. Implementation of project components and mitigation measure would similarly ensure that potential adverse effects on other special-status species and on sensitive habitats are reduced and would not be cumulatively considerable.

Successful implementation of the NBHCP depends on a number of assumptions that could be jeopardized by implementation of other projects and activities in the basin, including the proposed project and the various cumulative projects. The proposed project has been designed to support achievement of the goals and objectives of the NBHCP, and implementation of the proposed avoidance and minimization measures would ensure that the proposed project does not jeopardize successful implementation of the NBHCP.

Because SAFCA would implement minimization, avoidance, and compensation measures in accordance with the requirements of ESA, CESA, and other relevant regulatory requirements and the proposed project would include additional habitat protection and enhancement components, the project's contributions to impacts on terrestrial species would not be cumulatively considerable.

GROWTH-INDUCING IMPACTS

The proposed project, in itself, would not be growth inducing because it consists of improving the existing levee system in the Natomas Basin and making related landscape modifications and drainage and infrastructure improvements. As a component of SAFCA's overall program of flood control improvements, the growth-inducing impacts of the project have already been addressed in the Local Funding EIR, Volume I, Section 6.1, "Growth-Inducing Effects," which is summarized below.

Because the proposed project would not involve the construction of housing, it would not be directly growth inducing. Construction activities associated with the proposed project would generate short-term employment, but it is anticipated that the construction jobs would be filled using the existing local employment pool, and the proposed project would not directly result in a population increase.

Implementation of the NLIP would achieve "200-year," urban-standard flood protection for the Natomas Basin, which includes lands identified in the City and County of Sacramento general plans and additional planning policy documents described below as the areas most suitable for urban growth. The approximately 9,038-acre North Natomas Community Plan (NNCP) area is designated in the City of Sacramento's general plan as the city's major growth area for new housing and employment opportunities (City of Sacramento 1996). In 2000, the estimated population of the North Natomas area of Sacramento County was 1,082 people occupying 416 housing units (Sacramento Area Council of Governments [SACOG] 2002). At buildout (year 2016), the NNCP estimates a population of 66,495 in the NNCP area occupying approximately 9,038 acres (City of Sacramento 1996). The more than 9,000 acres of the NNCP area were historically used for agriculture. The environmental consequences of buildout of the NNCP were addressed in the 1986 NNCP EIR (certified by the Sacramento City Council in May 1986) as well as the 1993 Supplement to the 1986 NNCP EIR. In addition, the 1986 NNCP EIR and the 1993 NNCP EIR Supplement found that the development of the NNCP area would itself have growth-inducing effects on the adjacent areas surrounding the NNCP area (City of Sacramento 1994). There is existing, substantial pressure to develop the northern portion of Natomas. Recent proposals have included developing the area and using revenues from development to help fund a new sports arena. This proposal did not result in formal application to the City or County of Sacramento but suggests that interest in the area is high.

Another indicator of anticipated future growth of the Natomas area is the City/County North Natomas Joint Vision Plan (Joint Vision). The Joint Vision is a long-term agreement between the City and County of Sacramento to collaboratively manage growth and preservation of open space and habitat in the 10,000-acre portion of unincorporated Natomas in Sacramento County. The Joint Vision anticipates that a substantial portion of the Natomas area will become urbanized. Both jurisdictions determined that it would be mutually beneficial to cooperatively plan for the urbanization of the area in accordance with smart growth principles. Concepts for development include a mixture of residential densities, an industrial park, and open spaces throughout, particularly in the northern part of Natomas to separate development from the Sutter County boundary. To date, no land use plans have been adopted.

Finally, in addition to the NNCP and the Joint Vision, Sutter County voters in 2004 passed Measure M, an advisory measure intended to provide the Sutter County Board of Supervisors with an indication of public sentiment regarding the types and level of development in the 7,500-acre area of the South Sutter County Industrial/Commercial Reserve in the northern part of Natomas. The southern boundary of the Measure M area forms the Sutter/Sacramento county line

Based on the information presented above, the proposed project would accommodate regional growth currently planned for undeveloped lands in the Natomas Basin. Accordingly, it is reasonable to assume that this growth will proceed with or without implementation of the proposed project. In the absence of SAFCA's proposed improvements, the Natomas area may be mapped back into the federally regulated 100-year floodplain. However, developments would likely provide their own 100-year flood protection through measures such as the

construction of ring levees around the developments. The Natomas Basin HCP assumed that portions of the Natomas Basin were in the process of urban development, including portions of Sutter County; this anticipated development, however, is now restricted due to FEMA levee certification issues. Therefore, there is no growth-inducing effect as a result of the project, but rather a return to the previously accepted status quo for flood-protected urbanization.

ANALYSIS OF ALTERNATE ACTIONS

Several alternatives to the proposed NLIP Landside Improvements were evaluated in the DEIR for the project (EDAW 2007a), including a No-Project Alternative and alternative flood control improvement configurations, such as a 500-foot and a 1000-foot levee setback in the upper 1.4 miles along the Sacramento River east levee.

NO PROJECT

The No-Project Alternative assumes that existing conditions at the project site would remain. No new flood control improvements would be constructed. Under this alternative, SAFCA would not provide 100-year flood protection to the Natomas Basin or lay the groundwork for "200-year" flood protection over time, thus resulting in Federal floodplain regulations preventing the Natomas Basin from absorbing new development as currently anticipated in the regional blueprint for future (2030) growth adopted by the Sacramento Area Council of Governments (Sacramento Area Council of Governments and Valley Vision 2006). Further, landscape changes in the Airport bufferlands that could reduce hazardous wildlife presence near the Airport Operations Area would not occur, and the extent and connectivity of the lands in Natomas being managed to provide habitat for giant garter snake, Swainson's hawk, and other special-status species would not be increased. The No-Project Alternative would not meet any of the project objectives because implementation of flood control improvements and associated habitat enhancements would not occur.

OTHER PROJECT ALTERNATIVES

NO SAFCA LEVEE IMPROVEMENTS—COMPARTMENT LEVEES IN NATOMAS

Under this alternative, SAFCA would not provide the Natomas Basin with at least a 100-year level of flood protection by the end of 2010 and would not be able to facilitate achieving a "200-year" level of protection by the end of 2012. None of the flood control improvements or related habitat enhancements previously described in this biological assessment would be implemented. However, some of the new developments being planned for the Natomas Basin may choose to separately fund individual flood protection in the form of private compartment levees that would protect the new developments to provide the affected developments with at a least a 100-year level of flood protection. This alternative would partially meet the first project objective by providing 100-year protection to a portion of the Natomas Basin, but would not provide 100-year flood protection to the remainder of the Natomas Basin or lay the groundwork for "200-year" flood protection for the basin over time. The alternative would not meet the second or third project objectives in that landscape changes in the Airport bufferlands that could reduce hazardous wildlife presence near the Airport Operations Area would not occur, and the extent and connectivity of the lands in Natomas being managed to provide habitat for giant garter snake, Swainson's hawk, and other special-status species in the basin would not be increased. It is likely that connectivity of habitat would be substantially and adversely affected by construction of a compartment levee.

This alternative would conflict with established land use plans and policies for the Natomas Basin that promote planning on a regional scale and would result in the physically dividing an existing community The construction of compartment levees would convert more than 300 acres of agricultural area to nonagricultural use in the levee footprint because of the substantial amount of borrow material required. Further, the implementation of this alternative would convert a large part of the central Natomas Basin, within the compartment levee system, to uses that may be incompatible with the habitat needs of special-status species in the basin. The overall adverse effects on listed species resulting from implementation of this alternative would be greater than those of the proposed project.

RAISE LEVEE IN PLACE WITH A 1,000-FOOT LEVEE SETBACK IN THE UPPER 1.4 MILES ALONG THE SACRAMENTO RIVER EAST LEVEE

All elements of this alternative would be the same as the proposed project except for levee raising and seepage remediation with respect to the Sacramento River east levee, proposed habitat creation, and removal of encroachments from the Sacramento River east levee. This alternative would involve setting back 1.4 miles of the Sacramento River east levee by 1,000 feet and constructing a 100-foot seepage berm along the setback levee, and raising a portion of the existing levee and constructing seepage berms, relief wells, and cutoff walls for seepage remediation. This alternative would provide a location for a substantial amount of tree planting on the water side of the levee, thereby partially offsetting the trees that may need to be removed along the existing levee to meet USACE criteria. This alternative would also involve the removal of substantial encroachments from the water side and land side of the Sacramento River east levee to ensure that the levee can be certified as meeting the minimum requirements of the NFIP and USACE design criteria. While this alternative would meet the second and third specific project objectives listed in "Description of the Proposed Action,", improving the existing Sacramento River levee in place is unlikely to provide the same level of assurance as the proposed project that the USACE will accept that the flood control system meets FEMA criteria for the 100-year level of protection.

Most impacts of this alternative would be the same as, or very similar to, the impacts of the proposed project, although construction of the setback levee would convert a 150-acre agricultural area to nonagricultural use, resulting in a greater farmland conversion than under the proposed project. Further, the levee setback would convert approximately 10 additional acres of rice (giant garter snake habitat) and 100 acres of generally high-quality agricultural foraging habitat for Swainson's hawk to nonagricultural uses, and remove as much as 35 acres of waterside riparian woodland. Thus, the overall adverse effects on listed species resulting from implementation of this alternative would be substantially greater than those of the proposed project.

CONSTRUCT AN ADJACENT SETBACK LEVEE WITH A 500-FOOT LEVEE SETBACK IN THE UPPER 1.4 MILES ALONG THE SACRAMENTO RIVER EAST LEVEE

All elements of this alternative would be the same as the proposed project except for levee raising and seepage remediation with respect to the Sacramento River east levee and proposed habitat creation, and removal of encroachments from the Sacramento River east levee. This alternative would involve setting back 1.4 miles of the Sacramento River east levee by 500 feet and constructing a 100-foot seepage berm along the setback levee, and constructing an adjacent setback levee from the southern end of the setback levee to the American River north levee. This alternative would provide a location for a substantial amount of tree planting on the water side of the levee, thereby partially offsetting the trees that may need to be removed along the existing levee to meet USACE criteria. This alternative would also provide an opportunity for partially offsetting the loss of landside tree groves through the establishment of new riparian plantings in the levee setback area as well as woodland plantings on the land side of the adjacent setback levee. This alternative would meet all the specific project objectives listed in "Description of the Proposed Action," however, because the setback levee would have a greater footprint than the adjacent setback levee, this alternative would require approximately 11% more material and 11% more haul trips than the proposed project.

Implementation of this alternative would not eliminate or reduce any of the significant environmental effects of the project. Most impacts of this alternative would be the same as, or very similar to, the impacts of the proposed project, although construction of the setback levee would convert a 75-acre agricultural area to nonagricultural use, resulting in a greater farmland conversion than under the proposed project. The construction of the levee setback would result in the loss of approximately 5 additional acres of rice (giant garter snake habitat) and the conversion of 75 acres of generally high-quality agricultural foraging habitat for Swainson's hawk to woodland. The overall adverse effects on listed species resulting from implementation of this alternative would be similar to those of the proposed project.

OTHER PROJECT ALTERNATIVES CONSIDERED AND REJECTED

The following alternatives were considered in the Landside Improvement DEIR but were rejected from detailed consideration.

RAISE EXISTING SACRAMENTO RIVER EAST LEVEE

Improving the existing Sacramento River east levee without constructing either an adjacent setback levee or a levee setback farther east of the existing levee would result in the need to apply USACE policy regarding levee encroachments and vegetation removal to this levee. It is likely that a substantial number of encroachments may be determined to reduce the integrity of the levee or increase flood risk unacceptably and would need to be removed. Disputes with landowners over the legal implications of removing appurtenant structures can be expected, and removal would likely take several years to achieve because of environmental and legal issues. An estimated 35 acres of trees also may need to be removed from the water side of the levee and within 15 feet of the levee toe. Removal would trigger significant mitigation requirements that could be difficult, if not impossible, to complete. To adequately replace the habitat and aesthetic value of these trees, replacement would need to occur in a similar waterside location along the Sacramento River levee system. It is unknown where sufficient acreage is available to implement such replacement in a manner that would be acceptable to the USACE. In addition, it would be very difficult or impossible to compensate for the likely loss of a number of trees that are preferred Swainson's hawk nest sites along the edge of the Natomas Basin. For these reasons, an alternative that includes raising the Sacramento River east levee in place, without a setback levee, was rejected from detailed consideration in the Landside Improvement DEIR.

SET BACK UP TO 5 MILES OF THE SACRAMENTO RIVER EAST LEVEE

SAFCA previously considered setting back up to 5 miles of the upper reaches of the Sacramento River east levee. However, a levee setback of more than the upper approximately 1.4 miles is complicated by (1) the presence of waterside residences along the existing levee, and the need to maintain access to these residences from Garden Highway, and (2) the proximity of the Sacramento River east levee to the Airport, and the need to prevent project features from increasing potential hazards to aviation safety. SCAS has previously expressed objections to consideration of a levee setback within the 10,000-foot Airport Critical Zone because of the potential that the setback area, which would likely hold shallow water during winter and spring, could attract wildlife that would increase hazards to aircraft. For these reasons, a setback levee of more than 1.4 miles was rejected from detailed consideration in the Landside Improvement DEIR.

YOLO BYPASS IMPROVEMENTS

This measure would consist of lengthening the Fremont Weir and widening the Yolo Bypass to increase the amount of flood water conveyed through the bypass and reduce the amount of flood water conveyed through the Sacramento River channel downstream of the bypass. Depending on the design of the bypass improvements, this measure could reduce water surface elevations in the Sacramento River channel during very large floods (100-year or greater) by up to 3 feet at the mouth of the NCC declining to about 0.5 feet downstream of I-5. This would reduce the extent of the levee raising and seepage remediation work that is needed along the NCC south levee, the Sacramento River east levee, and the PGCC west levee.

The Yolo Bypass improvements that could be incorporated in this measure include the following:

- redesign and reconstruction of the Fremont Wier,
- construction of a new setback levee along the eastern edge of the Yolo Bypass extending from the Fremont Weir to the north levee of the Sacramento Bypass,

- construction of a weir and closure structure in the Sacramento Deep Water Ship Channel south of I-80, and
- removal of existing SRFCP levees in the lower reach of the Yolo Bypass.

Because of the extent and likely cost of these improvements, all of which would lie outside SAFCA's jurisdiction, this measure would require an unprecedented degree of State, Federal, and local cooperation and funding, and therefore would not meet the project objective of providing 100-year flood protection to the Natomas Basin as quickly as possible. For this reason, this measure was not pursued as a component of the early implementation project but was considered worthy of further evaluation as part of the State's pending update of the State plan of flood protection for the Central Valley.

CONCLUSION AND DETERMINATION

The project would result in potential adverse effects to special-status fish, the valley elderberry longhorn beetle, and the giant garter snake.

FISH

Implementation of the proposed project could potentially affect federally listed fish species within the NCC, the lower Sacramento River, and the PGCC. These waterways provide migratory habitat for listed adult and juvenile chinook salmon and steelhead, and the Sacramento River, in particular, provides migration and spawning habitat for green sturgeon and other native anadromous fish. Project construction could result in increases in sediments, turbidity, and contaminants, which could adversely affect fish habitats immediately adjacent to and downstream of project construction activities. In addition, the potential exists for contaminants such as fuels, oils, and other petroleum products used in construction activities to be introduced into the water system directly or through surface runoff. Further, a very small amount (approximately 1 acre) of riparian vegetation, potentially providing SRA habitat function, would be removed from the waterside slope of the NCC south levee and Sacramento River east levee.

SAFCA and its primary contractors for engineering design and construction will implement avoidance and minimization measures to minimize potential project effects on fish habitat. These measures will include the implementation of standard erosion, siltation, and good housekeeping BMPs, the preparation of a SWPPP, and compliance with the conditions of the NPDES general stormwater permit for construction activity. SAFCA and its primary contractors for engineering design and construction will also implement conservation measures to restore, replace, or rehabilitate any potential loss of SRA habitat function for fish, including consulting with DFG and complying with all permit conditions of the streambed alteration agreement to protect fish habitat or to restore, replace, or rehabilitate any habitat on a no-net-loss basis. All sensitive habitats that are located adjacent to construction areas, but can be avoided, shall be protected by temporary fencing during construction.

With implementation of the proposed impact avoidance and minimization measures, the proposed project is unlikely to adversely affect Sacramento River winter-run Chinook salmon ESU, Central Valley spring-run Chinook salmon ESU, Central Valley steelhead ESU, green sturgeon, and Central Valley fall-/late fall-run Chinook salmon ESU or critical habitat designated for the first three of these ESUs. In addition, implementation of the proposed project would not jeopardize the existence of any of these species.

VALLEY ELDERBERRY LONGHORN BEETLE

Elderberry shrubs that are located within 100 feet of the project footprint but would not need to be removed would be avoided through implementation of avoidance zones and other measures, as described above. However, construction activities proposed to begin in 2008 would require removal of up to 23 elderberry shrubs with 192 stems ≥1 inch and ≤5 inches in diameter at ground level. A total of 15 shrubs with an estimated 200 stems ≥1 inch and ≤5 inches are known to occur along the footprint of 2009–2010 Sacramento River east levee construction and would likely require removal during 2009 and 2010 construction.

Compensation for unavoidable adverse effects to valley elderberry longhorn beetle will be provided, in accordance with the USFWS Conservation Guidelines (USFWS 1999a). Elderberry shrubs that require removal will be transplanted to the woodland planting areas in the project area or an alternative suitable site approved by USFWS. A habitat creation, monitoring, and management plan will be prepared and will specify how the woodland/elderberry habitat creation areas would be managed to ensure that the appropriate habitat conditions are provided. Replacement elderberry cuttings or seedlings and associated plants of appropriate native species will also be planted in the mitigation areas. The appropriate number of replacement plantings will be determined based on the habitat in which the transplanted shrubs were located, the size of the stems on the transplanted shrubs,

whether or not beetle exit holes are present on the transplanted shrubs, and whether or not transplantation occurs during the shrub's dormant season. The transplant area will include a minimum of 1,800 square feet (0.04 acre) for each transplanted shrub and up to five replacement elderberry seedlings and five associated native plants. Long-term protection of the planting area for elderberry and associated species, and funding for its management, shall be provided through appropriate mechanisms to be determined by SAFCA, USFWS, and other entities cooperating in implementation of the proposed project. The management plan shall be reviewed and approved by USFWS.

Implementation of the proposed action would adversely affect habitat for valley elderberry longhorn beetle and could result in take of the species. However, based on implementation of avoidance and minimization measures and mitigation to compensate for adverse effects to shrubs that cannot be preserved in place, the proposed project would not jeopardize the continued existence of valley elderberry longhorn beetle.

GIANT GARTER SNAKE

The proposed project would result in permanent loss and temporary loss and disturbance of aquatic and upland habitat currently suitable for giant garter snake habitat. Fill, temporary and permanent dewatering, land conversion, and staging and other construction disturbances would adversely affect snakes utilizing affected habitats, including irrigation ditches, drainage canals, rice fields, and associated uplands. Some project activities are anticipated to occur beyond the defined giant garter snake active season (and up to November 1 of all construction years); however, these activities would be largely limited to site restoration and demobilization and would occur outside of suitable giant garter snake habitat. Project construction activities in areas of potentially suitable habitat could also result in direct disturbance and loss of individual giant garter snakes.

Compensation for unavoidable adverse effects to giant garter snakes during construction and land use conversions that would result in loss of currently suitable habitat would be offset by various habitat creation and enhancement aspects of the projects. These include construction of a new habitat corridor linking preserves in the northern and southern potions of the Natomas Basin, preservation of rice land, and creation of managed marsh. As feasible, temporal habitat loss would be minimized by constructing the replacement irrigation canals and GGS/Drainage Canal before most of the fill of existing ditches and canals occurs, providing some time for habitat development before the loss. In addition, marsh habitat creation would occur as soon after borrow extraction as possible, and rice lands used for borrow would be returned to rice within the same season (unless converted to grassland).

Implementation of the proposed action would adversely affect habitat for giant garter snake and could result in take of the species. However, based on implementation of avoidance and minimization measures and habitat creation and enhancement components to compensate for this temporary and permanent habitat loss, the proposed project would not jeopardize the continued existence of giant garter snake.

NATOMAS BASIN HABITAT CONSERVATION PLAN

Implementation of the proposed project could have substantial adverse effects on the viability of populations of species covered in the NBHCP, the effectiveness of the NBHCP's conservation strategy, and attainment of the goals and objectives of the NBHCP.

Implementation of the project could threaten the population viability of a few of the species covered by the NBHCP, such as the giant garter snake and Swainson's hawk, Because of the relative scarcity of available habitat, the potential for reduced habitat quality, and/or the potential for adverse effects on the breeding success of relatively large numbers of individuals, the viability of populations of these species within the Natomas Basin could be threatened by project implementation. Project implementation could also result in loss and/or disturbance of habitats that serve as wildlife corridors. Since some of these corridors are relatively wide, wildlife are expected to continue to move through less-disturbed portions of the corridors. Other more narrow corridors, such as the irrigation/drainage ditches and canals within the project area and larger Natomas Basin that serve as critical

corridors for movement of aquatic species, are more susceptible to being adversely affected by project implementation through including temporary disturbance and permanent loss. However, replacement canals would be created as part of the proposed project, including the new GGS/Drainage Canal and expansion of the existing West Drainage Canal, thereby enhancing giant garter snake movement opportunities between populations in the northern and southern portions of the Natomas Basin.

The proposed project would not result in the development of land outside the NBHCP permit area, but it would result in land use conversions. Land use conversion would not, however, cause a net loss in the habitat values provided by these lands for NBHCP-covered species in the Natomas Basin, since the land conversions will either maintain habitat value (e.g., agricultural crops to managed grasslands) or increase the habitat value (e.g., rice fields to managed marsh). The overall amount of foraging habitat available to NBHCP-covered species would not be reduced.

Proposed improvements to the Sacramento River east levee would encroach slightly (approximately 17 acres) on four existing TNBC reserves: Huffman West, Atkinson, Cummings, and Alleghany 50. Encroachment on these reserves would affect their overall size, potentially jeopardizing the ability to meet the minimum-size and mitigation-ratio requirements and requiring revision of existing management plans, and also potentially affecting revenue-generation requirements that must be met for successful implementation of the NBHCP. SAFCA would alleviate these potential conflicts acre-per-acre of land acquisition for lands lost and through the provision of funds to replace lost revenue. Further, the proposed project would not reduce connectivity of TNBC reserves within the Natomas Basin, and would actually improve connectivity between reserves managed for giant garter snake purposes in the northern and southern portions of the basin. The project would also benefit the establishment of large blocks of preserved habitat by creating and/or preserving grassland, woodland, marsh, and rice habitats in the western portion of the basin. In some cases, these habitats would be adjacent to existing TNBC reserves and directly increase the size of some preserved habitat blocks.

Thus, many components of the proposed project would support attainment of NBHCP goals and objectives by creating, enhancing, and preserving habitat and creating a valuable aquatic corridor linking TNBC reserves in the northern and southern portions of the Natomas Basin. Although implementation of the proposed action would have potentially substantial adverse effects on the implementation of the NBHCP, based on implementation of avoidance and minimization measures, proposed mitigation to compensate for temporary and permanent habitat loss, the proposed project would not jeopardize the implementation and efficacy of the NBHCP.

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