9.0 SECTION CONTENTS

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9.0 ALTERNATIVES

9.1 SUMMARY

Under the ESA, applicants for Section 10 permits must specify in an HCP those alternatives to the take of federally-listed species that were considered and the reasons those alternatives were not selected.

This chapter describes the alternatives considered in developing the Solano HCP and identifies the differences between the alternatives and the HCP, namely the proposed conservation measures detailed in Section 4.0 and the effects analysis for the 37 proposed Covered Species described in Section 6.0. The alternatives are not presented at the same level of detail as the proposed conservation program (e.g., effects on all 37 proposed Covered Species are not discussed individually). However, Table 9-1 summarizes the relative level of effect to each Natural Community and Covered Species under each alternative as compared to the Proposed HCP. Table 9-1 also provides the rationale for rejecting each alternative. The following section assesses the effects of each alternative on groups of species or community associations, except where a discussion of the effects on individual species is warranted. The analysis follows the progression of community associations and species presented in Sections 4.0 and 6.0. A more detailed assessment of the alternatives is provided in the EIR/EIS that accompanies the Draft HCP.

For the Solano HCP, four alternatives were considered:

- Alternative 1: No Action Alternative
- Alternative 2: Coverage of Federally-Listed Species Only Alternative
- Alternative 3: Reduced Potential for Incidental Take Alternative
- Alternative 4: Increased Conservation Alternative – Combined HCP/NCCP

9.2 ALTERNATIVE 1: NO ACTION ALTERNATIVE

9.2.1 Alternative Description

Under the No Action Alternative, an HCP would not be implemented. As a result, compliance with the ESA and CESA would be considered on a case by case basis, essentially maintaining the current system of evaluation, assessment, and permitting. SCWA and its member agencies would be required to continue implementing the Short-term Conservation Measures as required in the Solano Project Biological Opinion (USFWS 1999a).

The Short-term Conservation Measures include general and species-specific conservation measures to protect listed species and their habitats. Such measures would only apply to the required Plan Participants. Voluntary HCP participants such as Rio Vista, Dixon, and RD 2068 would not be

required to comply with these measures. The most significant general conservation measures are the following:

- Fairfield, Suisun City, Vacaville, and Vallejo will require new project applicants to provide evidence of compliance with the ESA prior to approval of any project that may affect listed species or by conditioning the aforementioned entitlements on compliance with the ESA.
- Member agencies will not undertake any action or project (including issuance of grading or other permits, plan amendments, or zoning changes) that would potentially result in degradation of habitat for soft bird's beak, Suisun thistle, Contra Costa goldfields, Delta green ground beetle, Conservancy fairy shrimp, and Solano grass prior to obtaining concurrence from USFWS or by conditioning the aforementioned entitlements on compliance with the ESA.
- Member agencies will work with USFWS and the USBR to develop and implement an interim plan for protecting California red-legged frog, giant garter snake, and California tiger salamander, and areas needed for their recovery or conservation.
- Member agencies will work with USFWS, USBR and other agencies as appropriate to develop an interim plan to ensure that land management actions by the agencies are consistent with the protection of Contra Costa goldfields, Suisun thistle and their habitats.

The Short-term Conservation Measures also contain six species-specific conservation measures, consisting of avoidance, minimization, and mitigation measures for 24 special-status plant species, giant garter snake, Callippe silverspot butterfly, valley elderberry longhorn beetle, salt marsh harvest mouse, California clapper rail, and Sacramento splittail, consistent with General Conservation Measure 1.1 (adoption and use of the Operations and Maintenance Manual and general notification requirements to ensure compliance with ESA prior to issuing grading plans and other approvals that could result in take or conversion of habitat).

The above measures have been implemented by the applicable agencies and it is assumed that the current interim measures, protocols, and coordination procedures would continue for the duration of the current Solano Project Water Contract, until 2024.

9.2.2 Valley Floor Grassland and Vernal Pool Natural Community and Associated Species

Zone 1 Urban Development Impacts. Under the No Action Alternative, the level of development and the corresponding extent of valley floor grassland and venal pool communities to be protected within existing urban boundaries would be determined on a case by case basis. Under the interim conservation measures, cities would be required to notify USFWS and avoid issuing any grading permits or adopting other actions that could result in take of or adverse affects to listed species until USFWS has determined that the project complies with the ESA. USFWS would likely continue current policies that preclude any conversion/take of habitat for extremely rare and range-limited listed species such as Solano grass and Conservancy fairy shrimp (Limited potential for take/conversion of habitat is anticipated for these species within current urban area boundaries; see Section 6.2).

For other key species within urban boundaries, such as Contra Costa goldfields, the proposed Solano HCP conservation program establishes specific limits on conversion (and requires specific levels of

conservation) of habitat within known core populations areas. Under the No Action alternative, conservation actions for each Contra Costa goldfields Core Population Area would be determined on a project by project basis as parcels are proposed for development. No comprehensive plan for conservation of Contra Costa goldfields or other species would exist. The likely outcome would be the establishment of smaller reserves encompassing the highest density core population areas and higher impact mitigation ratios. Contra Costa goldfields in isolated wetlands (e.g., wetlands not subject to Section 404 regulation) would not be protected under the ESA from private actions, therefore, no conservation actions are possible for development of these types of areas.

However, the ultimate (20 to 30 years) extent of development of occupied Contra Costa goldfields wetland habitat would likely be only slightly greater than identified in the Solano HCP. The USFWS has not issued authorizations for conversion of occupied Contra Costa goldfield habitat in Solano County for typical urban development activities since at least 1998. If the USFWS continues their current practice, significant populations of occupied habitat would not be authorized for conversion. However, a greater level of development may occur in surrounding watersheds in the vicinity of core population areas, increasing the potential for indirect effects and reducing the long-term viability of these remaining core areas.

For more widespread, federally-listed vernal pool species such as the vernal pool fairy shrimp and vernal pool tadpole shrimp, smaller projects that impact "low value" habitats for these species would likely continue to be processed/approved under the Vernal Pool Programmatic Biological Opinion (USFWS 1999) or future programmatic actions (the majority of projects in Solano County are currently processed under the Programmatic Opinion or no effect determinations are made). The current Vernal Pool Programmatic Biological Opinion bases the preservation (2:1) and constriction/creation (1:1) mitigation requirements on the extent of occupied or potentially occupied wetland habitat for these species. For example, a 5-acre site with 0.5 acres of occupied vernal pool fairy shrimp habitat would be required to preserve 1.0 acre and construct 0.5 acre of vernal pool fairy shrimp habitat at an established mitigation bank. Depending on how the individual bank is established and the conditions at the bank site, some amount of upland could also be preserved.

Assuming a similar level of valley floor grassland and vernal pool conversion to the Proposed HCP, the No Action Alternative could be expected to result in the loss of 270 to 400 acres of wetlands (see Section 6.2.1). Under current mitigation requirements, 580 to 800 acres of wetlands would be preserved and 290 to 400 acres of wetlands would be constructed. In addition, an unknown amount of upland would be preserved, probably on the order of 2,610 to 4,100 acres (assuming a 3:1 ratio of upland to wetland mitigation acreage, and that upland habitat is not sold or used as credits for other species such as Swainson's hawk, burrowing owl, or California tiger salamander).

Larger projects would be expected to provide increased levels of mitigation, equal to or greater than those proposed in the HCP. The only local, large-scale project located in vernal pool habitat is the North Village project in Vacaville. This project will develop approximately 609 acres of valley floor grassland/vernal pool habitat and agricultural lands on historic vernal pool soils. The USFWS Biological Opinion for this project (USFWS 2004) requires the applicant implement the following compensation and mitigation measures:

- Preserve 540 acres of wetlands and associated uplands (220 acres onsite and 320 acres at an offsite location), providing a 0.83:1 mitigation to development ratio (gross acres);

- Preserve approximately 116 acres of wetlands for the loss of approximately 21 acres (5.6:1 mitigation ratio) due to the higher density of wetlands on the two mitigation parcels; and
- Construct/restore approximately 31 acres of wetland (1.5:1 mitigation ratio).

Under the proposed Solano HCP, the same project in Vernal Pool and Valley Floor Grassland Conservation Area 2 would be required to (assuming the same development footprint):

- Preserve 1,176 acres of upland (609 minus 21 acres of wetland or 588 acres at a 2:1 ratio);
- Preserve a minimum of 42 acres of vernal pool habitats (2:1 ratio), and
- Construct/restore 21 acres of new vernal pool/wetland habitat.

Under the Solano HCP, additional mitigation would be required to compensate for indirect effects to retained habitats within 250 feet of development. However, mitigation for indirect effects was not calculated for comparison as such mitigation was not quantified under the individual project permit.

In this example, total gross habitat preservation under the Solano HCP would be 1,239 acres compared to 687 acres under the requirements of the Biological Opinion. The individual permit required approximately 50 percent more wetland construction/restoration than would be required under the Proposed HCP conservation program. As a consequence of the lands selected for preservation, a greater ratio of wetlands were persevered than under the HCP. The Solano HCP emphasizes preservation over restoration in response to the Vernal Pool Species Recovery Plan (2005) that focuses recovery goals on preservation of extant habitat rather than wetland or vernal pool restoration. Vernal pool restoration is also considered by many experts to be more speculative or experimental in conserving vernal pool functions and values. The increased habitat preservation costs under the HCP would be offset by the reduced costs of constructing and establishing additional wetland acreage, and the reduced time to comply with the ESA. For example, the North Village Section 7 Consultation required almost 4.5 years to complete (August 6, 1999 to April 9, 2004). Under the Solano HCP, inclusion of a project in the Section 10 permit would allow ESA compliance to be concluded as part of the normal City approval process (See Section 8.4.1). The trend for future permit actions is unknown and required mitigation requirements could change.

Future mitigation requirements under the No Action Alternative could increase substantially for lands located within the vernal pool core recovery areas. The recovery criteria for these areas include preservation of 80 to 95 percent of suitable habitat, depending on the specific species and areas (USFWS 2005a). If the USFWS imposes compensation ratios on individual projects that would begin to contribute to recovery, wetland/vernal pool habitat mitigation ratios could increase to 19:1 in order to meet the 95 percent preservation standard. If ratios increase to recovery standards, the amount habitat preservation resulting from individual projects could increase to 7,600 acres of wetlands and 22,800 acres of uplands under the assumptions described above.

Other unlisted or special-status plants and animals occurring within the Valley Floor Grassland and Vernal Pool Natural Community would receive some conservation benefit, such that habitat conservation required for federally-listed species overlap with the habitat needs and mitigation requirements for other special-status species as required by CEQA. Uniform requirements for salvage or transplanting to re-establish non-listed plant species would not be required. Less coordination on

long-term management actions, less consistency in funding assurances for reserves, and no coordinated adaptive management and monitoring of mitigation actions would result.

In summary, under the No Action Alternative, the potential conversion of valley floor and vernal pool grassland habitat and wetland habitat supporting or potentially supporting federally-listed species is expected to be slightly greater and the amount of habitat conservation would likely be less than the Proposed HCP. Implementation of the No Action Alternative would also result in less consistency in conducting conservation actions, less assurance and no local oversight for consistent implementation of reserve management requirements, and no comprehensive adaptive management and monitoring.

Zone 2 Remote Facilities and Operations and Maintenance Impacts. Approximately 29 miles of Plan Participant facilities (canals and pipelines) pass through or are located adjacent to valley floor and vernal pool grassland habitats. Plan Participants would be required to implement the Solano Operations and Maintenance Manual (per the conditions of the Solano Project Biological Opinion). Protocols in the Operations and Maintenance Manual are designed to avoid impacts to federally-listed vernal pool species to the maximum extent practicable. Operation and maintenance activities conducted by participating agencies that can not avoid impacts would be required to comply with the ESA through Section 7 consultations or individual Section 10 permits.

Non-listed vernal pool species would only receive protection to the extent that they co-occur with federally-listed species. Most operation and maintenance activities are exempt from CEQA; therefore, CEQA-required mitigation measures are unlikely.

Zone 3 Preserve Management and Implementation. Take and other regulated activities under the ESA on reserves and preserves would need to be authorized through individual Section 7 consultations or individual Section 10 permits. Mitigation requirements and authorized take would depend on the specific circumstances of each site and the method or approval for establishing the preserve.

9.2.3 California Red-legged Frog

Zone 1 Urban Development Impacts. Under the No Action Alternative, direct impacts to California red-legged frog habitat within the Jameson Canyon-Lower Napa River Core Recovery Area would be similar to the Proposed HCP, about 1,100 acres (approximately 1,340 acres are currently zoned for development). The Core Recovery Area is the same as under the Proposed HCP, and encompasses all known records of this species within urban development areas. Mitigation for urban development activities in this area would be imposed through local CEQA review and project approvals and additional measures may be added as a condition of any incidental take permits that may be required (i.e., if take may occur). Compliance with the ESA would be determined through the interim coordination procedures that require cities to notify the USFWS prior to issuing grading permits or adopting other actions that could lead directly to take. Individual applicants would responsible for implementing any mitigation resulting from such assessments and conservation funds would not be pooled for maximum effect as under the HCP.

Outside of the Jameson Canyon-Lower Napa River Core Recovery Area, an additional 2,200 acres of land zoned for development occurs within the potential range of this species in the western hills of Solano County (primarily within Vacaville and Fairfield). Under the Proposed HCP, conservation

measures to maintain connectivity and limit the expansion of aquatic predators such as bullfrog and warm water fish through perennialization of intermittent streams and construction of artificial waterbodies (Conservation Measure RSM 12) would be implemented in this area. Under the No Action Alternative, Vacaville and Fairfield would not be required to implement such measures, except when these measures are necessary mitigation for impacts to species or communities other than California red-legged frog.

Zone 2 Remote Facilities and Operations and Maintenance Impacts. Approximately 87 miles of irrigation district and flood control facilities are located within the range of the California red-legged frog in Solano County. Of these, only SID's Terminal Reservoir and approximately 0.6 mile of canals and ditches occur within the Jameson Canyon-Lower Napa River Core Recovery Area. Potential impacts to California red-legged frog from irrigation and flood control district activities are primarily addressed through avoidance and minimization procedures described in the Operations and Maintenance Manual. However, some operations and maintenance activities cannot be completed within avoidance parameters. Under these conditions, temporary loss of habitat may occur. The extent of such occurrences is unknown, but in these cases compliance with the ESA would considered under individual Section 10 permits.

Zone 3 Preserve Management and Implementation. Take and other regulated activities under the ESA on mitigation sites, reserves, and preserves would need to be authorized through individual Section 7 consultations or individual Section 10 permits. Mitigation requirements and authorized take would depend on the specific circumstances of each mitigation site and the method or approval for establishing the preserve.

9.2.4 Callippe Silverspot Butterfly

Zone 1 Urban Development Impacts. Approximately 1,560 acres of habitat are located in potential urban development areas of Fairfield (680 acres) and Vallejo (880 acres) within the known/expected distribution of the butterfly in Solano County. Mitigation for urban development activities in this area would be imposed through local CEQA review and project approvals, and additional measures may be added as a condition of any incidental take permits that may be required (i.e., if take may occur). Determination of compliance with the ESA would be decided through interim coordination procedures that require cities to notify the USFWS prior to issuing grading permits or adopting other actions that could lead to take. Individual applicants would be responsible for implementing any mitigation resulting from such assessments, and conservation funds would not be pooled for maximum effect as under the HCP.

Zone 2 Remote Facilities and Operations and Maintenance Impacts. Only SID's Terminal Reservoir and approximately 0.6 mile of canals and ditches are located within the potential range of this species. No adverse effects are anticipated, as these facilities do not support significant natural vegetation to support the larval host plants.

Future remote facilities such as water supply reservoirs proposed by Fairfield and Vallejo may be sited in Callippe silverspot butterfly habitat areas. Potential impacts and any required compensation/mitigation would be determined on a project-by-project basis similar to Zone 1 activities.

Zone 3 Preserve Management and Implementation. No Zone 3 activities would be authorized except as may be permitted under individual incidental take permits issued under Section 7 or Section 10 of the ESA.

9.2.5 Stream and Riparian Associated Species

Zone 1 Urban Development Impacts. The direct loss of riparian habitat and impacts to listed and other special status species (e.g., Covered Species and Special Management Species) under the No Action Alternative will likely be similar to the Solano HCP. No changes are anticipated in the urban boundaries for at least the foreseeable future. Either through practice or City regulation, Plan Participant cities have adopted setback requirements from "significant" or perennial streams that tend to support well-developed riparian zones. However, these setbacks are generally narrower than prescribed under the HCP. Some increase in fill of smaller, intermittent streams could occur that are not covered by local stream protection regulations. However, significant fills (e.g., over 300 feet in length) of such streams must be justified under current federal Section 404 permit regulations (e.g., such fills are limited to the maximum extent practicable). While such fills could occur under the Solano HCP, riparian conservation measures require applicants to demonstrate the lack of practicable alternatives to reduce the loss of intermittent streams supporting riparian vegetation. Mitigation, in the form of replacement/restoration of riparian habitats, is usually required for such projects. Under the Solano HCP, required compensation for such impacts would be standardized. Under the No Action Alternative, mitigation would be determined on a case-by-case basis.

Direct mitigation requirements for removal of elderberry, the host plant for the threatened valley elderberry longhorn beetle, would be higher under the No Action Alternative for the near future. The USFWS' five year review of the beetle's status (USFWS 2006) recommended delisting the beetle; however, no official actions have been initiated to implement this recommendation. If this species is delisted, mitigation in compliance with the ESA would not be required. Under the HCP, conservation /mitigation for this species would continue for the life of the HCP.

With or without the HCP, applicants would be required to pre-treating stormwater prior to discharge into local creeks in compliance with the NPDES permit conditions. Thus, water quality for steelhead and other aquatic species would be maintained to the maximum extent practicable under either alternative.

In contrast to the HCP, conservation measures to minimize indirect effects and improve connectivity and riparian habitat quality would not be implemented on a broad-scale under the No Action Alternative. These measures include:

- Conservation Measure RSM 13 identifies specific stormwater retention requirements to minimize increases in channel-forming base flows in key natural drainages. This measure is designed to minimize channel down-cutting and widening that leads to erosion and loss of streamside habitats. The Fairfield-Suisun NPDES permit (Order No. R2-2003-0034; NPDES Permit No. CAS612005) requires measures to minimize modification of the hydrograph for peak flows in Laurel and Ledgewood Creeks, but does not address other key drainages such as Green Valley Creek, Suisun Creek, and other watercourses where steelhead are known or expected to occur.

- Conservation Measure RSM 3 requires new urban development near key drainages and in eastern Vacaville to restore and expand riparian habitats by constructing multi-stage channel designs rather than standard trapezoidal flood control channels. Under the No Action Alternative, such measures might be developed and required for specific development projects in the future, but there would be no requirement to implement such measures.
- Plan Participants would not be required to implement Goal 3 and associated conservation measures to improve connectivity and habitat quality in stream and riparian zones within their jurisdictions. These conservation measures include assessment and removal of barriers within key streams that support steelhead and other native fish, identification of degraded riparian areas, implementation of control measures for invasive weeds, and restoration of riparian habitats.

Zone 2 Remote Facilities and Operations and Maintenance Impacts. In Zone 2, the majority of the Plan Participant irrigation and flood control facilities are regularly maintained and, except in a few limited areas, support little or no riparian vegetation. The operation and maintenance of water district facilities could affect listed riparian species such as the valley elderberry longhorn beetle. Protocols in the Operations and Maintenance Manual prescribe measures that, in most instances, will avoid take of valley elderberry longhorn beetle. In instances where avoidance is not possible or maintenance activities would result in the trimming of elderberry limbs over one inch in diameter, authorization for take, and any required mitigation, would need to be obtained for each individual project through either a Section 7 consultation (where the activity involves a federal permit) or individual Section 10 permit.

Zone 3 Preserve Management and Implementation. Take and other regulated activities under the ESA on mitigation sites, reserves, and preserves would need to be authorized through individual Section 7 consultations or individual Section 10 permits. Mitigation requirements and authorized take would depend on the specific circumstances of each mitigation site and the method or approval for establishing the preserve

9.2.6 Giant Garter Snake

Zone 1 Urban Development Impacts. Giant garter snakes are not known from Zone 1. However, the City of Rio Vista falls within the Mid-Valley Recovery Unit (MVRU) (Figure 4-19) and approximately 30 acres of open water and marsh habitat that may be suitable for giant garter snake is planned for development in Rio Vista. Mitigation for urban development activities in this area would be imposed through local CEQA review and project approvals, and additional measures may be added as a condition of any incidental take permits that may be required (i.e., if take may occur). Determination of compliance with the ESA would be decided through interim coordination procedures that require cities to notify the USFWS prior to issuing grading permits or adopting other actions that could lead to take.

However, direct habitat loss in not the primary concern for giant garter snakes as a result of Zone 1 activites. The primary concern for this species involves the indirect effects of increased urban runoff in downstream receiving waters. Under the HCP, Avoidance and Minimization Measure RSM 5, Conservation Measures RSM 9 and RSM 10 and Conservation Measure GGS 1 provide criteria for new development that will minimize adverse effects to downstream water quality to the maximum extent practicable. Under the No Action Alternative, it is likely that no such measure would be

implemented, providing not net increase to habitat quality for giant garter snakes within Solano County.

Zone 2 Remote Facilities and Operations and Maintenance Impacts. Two occurrences of the giant garter snake are known from Zone 2, although recent, intensive surveys in 2004 and 2005 failed to detect this species within Solano County. The operation and maintenance of water district facilities could affect this species. Impacts could include construction of new infrastructure and maintenance activities, including vegetation trimming and removal, bank stabilization, levee strengthening. Removal of vegetation to allow for the free flow of water along irrigation ditches, canals, and other Zone 2 facilities could result in take of the giant garter snake.

Since this species is federally-listed, procedures in the Operations and Maintenance Manual would be implemented to avoid impacts within designated giant garter snake habitat. Where such measures are not practicable, incidental take permits and associated habitat compensation/mitigation would be required and would need to be obtained in compliance with ESA and CESA on a project-by-project basis.

Zone 3 Preserve Management and Implementation. No Zone 3 activities would be authorized except as may be permitted under individual incidental take permits issued under Section 7 or Section 10 of the ESA.

9.2.7 Coastal Marsh Community

Zone 1 Urban Development Impacts. As discussed in Section 6.4, approximately 615 acres of coastal marsh habitat occur within the urban development boundaries of the Plan Participants. In most instances, these coastal marsh habitats are managed or incorporated into established open space areas to protect and enhance existing values (e.g., White Slough, River Park, San Pablo Bay National Wildlife Refuge, and Mare Island in Vallejo; Hill Slough in Suisun). Development within coastal marsh communities is significantly regulated and constrained by a number of laws and policies, most notably the Suisun Marsh Protection Act that precludes activities within the Primary and Secondary Marsh zones that would diminish the values of the marsh.

In Zone 1, approximately 53 acres of coastal marsh are located within the potential development area of western Suisun, outside of designated Suisun Marsh Protection zone. In Vallejo, approximately 310 acres of severely degraded, non-tidal marsh communities occur within former developed areas of Mare Island beyond BCDC and San Pablo Bay National Wildlife Refuge boundaries. Potential development within these two areas would be constrained by need to comply with other State and federal regulations that protect endangered species. If these areas are inhabited by the salt marsh harvest mouse (the Suisun site is a known, recorded location), state statutes that prohibit take of fully protected species for other than restoration or scientific purposes would essentially prohibit development in these areas.

As with the Proposed HCP, the primary concern for coastal marsh habitat is the potential for indirect effects associated with additional urban growth in Solano County. Some minor direct impacts may occur as a result of road projects (widening of Cordelia Road in Fairfield), construction of a redundant outfall pipeline for the Fairfield-Suisun Sewer District main effluent outfall, and flood control channel maintenance. Potential indirect effects include increased human visitation, increased

fire frequency, increased non-native plant species, increased habitat fragmentation, increased predation by domestic animals (pets), alteration of the hydrologic and salinity regimes, potential increased channelization of watercourses, increased sedimentation, and increased input of pesticides and chemical fertilizers (see Section 6.4.1 for additional discussion).

Under the No Action Alternative, direct and indirect impacts to coastal marsh communities and associated species would continue to be subject to individual project review under CEQA and, to the extent that wetland communities are directly affected, individual Section 7 consultations. Potential development of coastal marsh habitat would be the same as the proposed Solano HCP.

Under the No Action Alternative, indirect effects associated with urban runoff would be regulated in a similar manner to the Proposed HCP conservation measures (Conservation Measure CM 1), primarily through implementation of Phase 2 NPDES stormwater permits.

In contrast to the HCP, no coordinated conservation measures would be implemented under the No Action Alternative. These conservation measures include: CM 2 (invasive species control as part of routine O&M activities), CM 3 (funding for invasive species control grants in coastal marsh communities), and CM 4 (public education programs addressing domestic, urban-adapted native, and nonnative species effects on coastal marsh associated species).

Zone 2 Remote Facilities and Operations and Maintenance Impacts. SCWA and the cities of Fairfield, Suisun, and Vallejo would be required to implement the protocols and associated protection measures contained in the Operations and Maintenance Manual to avoid impacts to listed species that could occur in the lower reaches of flood control channels in coastal marsh areas. Mitigation requirements for any unavoidable impacts to listed and special status species would be determined and imposed only to the extent that such activities are subject to CEQA (and impacts are identified), or permits are required from and specific conditions are imposed by the Corps of Engineers and/or the CDFG.

Zone 3 Preserve Management and Implementation. Take and other regulated activities under the ESA on mitigation sites, reserves, and preserves would need to be authorized through individual Section 7 consultations or individual Section 10 permits. Mitigation requirements and authorized take would depend on the specific circumstances of each mitigation site and the method or approval for establishing the preserve.

9.2.8 Swainson's hawk

Zone 1 Urban Development Impacts. Under the No Action Alternative, potential impacts or loss of suitable Swainson's hawk habitat would be 5,770 acres of irrigated agricultural lands and another 7,250 acres of grassland/natural vegetation foraging habitat. This loss of habitat would be the same under the HCP (see Section 8.8). Under the No Action Alternative, mitigation for loss of suitable foraging habitat would be determined through local CEQA analysis and project approvals. Under the CESA, the CDFG, could only exert its authority when a project requires removal of a known nest site. The Solano HCP has specific requirements for intensively managing hawk reserves to maximize foraging habitat values and provide for future nest tree replacement. These measures are more comprehensive than traditional hawk mitigation that establishes conservation easements that eliminate development rights and place limitations on suitable crop types. Without the comprehensive

conservation approach described in the HCP, CDFG may recommend higher levels of farmland preservation in the future. Since the Swainson's hawk is not currently federally-listed, cities would not be required to obtain USFWS approval prior to issuing permits for projects that would impact this species or its foraging habitat.

Zone 2 Remote Facilities and Operations and Maintenance Impacts. Potential operations and maintenance impacts to Swainson's hawk include disturbance to or loss of nest sites during routine activities and construction/repair of new and existing facilities. Although this species is not federally-listed and protection is not directly mandated under the Solano Project Biological Opinion, protocols are included in the Operations and Maintenance Manual (Appendix C, Conservation Measure LAN 10) to avoid disturbance to and take of active nest sites. Operation and maintenance activities associated with Plan Participant irrigation and flood control facilities and other remote facilities are not expected to result in any significant loss of foraging habitat for this species.

Zone 3 Preserve Management and Implementation. Potential preserve management activities that could impact Swainson's hawk include disturbance to or loss of nest sites during routine land management and restoration activities. Any take (primarily removal of a known nest site) would depend on the specific circumstances of each site and conditions imposed by CDFG under Section 2081 of the Fish and Game Code.

9.2.9 Burrowing Owl

Zone 1 Urban Development Impacts. Under the No Action Alternative, potential impacts and loss of suitable burrowing owl habitat would be approximately 13,020 acres of suitable foraging habitat, essentially the same as the HCP (see Section 8.9). Under the No Action Alternative, mitigation for loss of suitable foraging habitat would be determined through local CEQA analysis and project approvals. Traditionally, habitat mitigation has only been required for demonstrated loss of a known nest site. Loss of habitat for wintering owls is seldom addressed. Standard CDFG mitigation requirements also stipulate 6.5 acres of habitat preservation per breeding pair. Since the burrowing owl is not currently state or federally-listed, cities would not be required to obtain CDFG or USFWS approval prior to issuing permits for projects that would impact habitat for this species. The CDFG may exert its authority only when a project would require removal of a known nest site in an area subject to regulation under Section 1600 of the Fish and Game Code (e.g., stream banks). At such time, CDFG may require compensation for nest site removal and impacts to foraging habitat for a specific project. As such, burrowing owl conservation would be significantly less under the No Action Alternative than under the HCP.

Zone 2 Remote Facilities and Operations and Maintenance Impacts. As with the Swainson's hawk, potential operations and maintenance impacts to the burrowing owl include disturbance to or loss of nest sites during routine activities and construction/repair of new and existing facilities. Although this species is not federally-listed and protection is not directly mandated under the Solano Project Biological Opinion, protocols are included in the Operations and Maintenance Manual (Appendix C, General Conservation Measure 1.1) to avoid disturbance to and take of active nest sites. Operation and maintenance activities associated with Plan Participant irrigation and flood control facilities and other remote facilities are not expected to result in any significant loss of foraging habitat for this species.

Zone 3 Preserve Management and Implementation. Potential preserve management activities that could impact burrowing owl include disturbance to or loss of nest sites during routine land management and restoration activities. Removal of any active nest site would be precluded under the Fish and Game Code and the federal Migratory Bird Treaty Act.

9.2.10 Rational for Rejection

Compared to the Solano HCP, the following general outcomes are likely under the "status quo" or No Action Alternative:

- Less consistency in mitigation and conservation efforts between individual projects is anticipated, with some projects required to provide greater levels of conservation while others may not contribute to conservation activities for similar levels of impact.
- Given the lack of a comprehensive approach for conservation actions, a greater emphasis would be placed on onsite avoidance and mitigation. As a result, small blocks of isolated habitats would be created with little or no protection or long term management as applicants choose to avoid such areas to circumvent the need for Section 7 consultations or Section 10 permits.
- Projects/regulated activities would continue to be subject to potentially significant delays in local and federal permit issuance as a result of the time and expense necessary to determine presence or absence of listed species (up to 2 years of studies may be required for certain species such as vernal pool invertebrates) and review/consultation with respective state and federal agencies for issuance of individual take permits.
- Reduced coordination and less efficiency in implementing conservation actions are anticipated. Mitigation banks for vernal pool species and Swainson's hawk would still be established (probably a reduced number or acreage due to reduced demand), but the level of consistency and coordination between the banks (e.g. sharing of information regarding adaptive management and monitoring results) is likely to be limited. Coordination under the No Action Alternative would need to be initiated by federal and state agencies as part of their mitigation bank monitoring program rather than through SCWA and the HCP adaptive management program.
- Regional NPDES permits would not have ESA concurrence (e.g., individual take authorization/review under Section 7 or Section 10 of the ESA), therefore, additional requirements may be imposed on future, individual projects in addition to regional requirements for minimizing the direct and indirect effects of stormwater on listed species.
- Overall, the level of conservation of natural communities is expected be reduced, by an unknown amount, under the No Action Alternative as less mitigation would likely be required for urban development activities. While private conservation organizations (e.g., Solano Land Trust, The Nature Conservancy) will still pursue conservation of high value habitats within Solano County, the Plan Participants are not likely to increase open space acquisition above current levels.

9.3 ALTERNATIVE 2: COVERAGE OF SPECIES LISTED IN THE USFWS' 1999 SOLANO PROJECT BIOLOGICAL OPINION ONLY ALTERNATIVE

Alternative 2 would consist of implementing an HCP that addresses only those 17 listed species specified in the USFWS' 1999 Biological Opinion and one additional species, California tiger

salamander that has been listed as threatened under the ESA since the Biological Opinion was issued (see Table 9-1). This alternative, however, would not include threatened steelhead ESUs, which were not included in the Solano Project Biological Opinion (steelhead are regulated by NOAA NMFS). The USFWS would issue incidental take permits for species under their jurisdiction in compliance with the ESA.

Plan Participants would not seek 2081 or NCCP incidental take permits for state listed species. However, Plan Participants could request that CDFG concur with the federal Biological Opinion for the issuance of State incidental take permits for dual, state and federally-listed species as allowed under Section 2080.1 of the Fish and Game Code. Seven species are listed as threatened or endangered at both the federal and state level. Under this process, if CDFG concurred that the HCP fully mitigated for impacts to these species, Plan Participants would obtain incidental take permits for five of the seven species (two of the dual listed species are State Fully Protected Species and incidental take of these species is prohibited under state law, except for actions necessary for recovery of the species). The five jointly listed species include Colusa grass, Solano grass, giant garter snake, soft-bird's-beak, and delta smelt. Activities covered under Alternative 2 would be the same as the Proposed HCP. The permit term would be 30 years. While adoption of the federal opinion would be requested, CDFG may choose not to concur with the Biological Opinion and determine that issuance of 2081 incidental take permits is warranted.

Under Alternative 2, applicable conservation measures described in Section 6.0 would be implemented to mitigate for impacts to the 18 covered species. These measures would include all the Valley Floor Grassland and Vernal Pool Natural Community and Coastal Marsh Natural Community conservation measures, and species-specific conservation measures for California red-legged frog, Callippe silverspot butterfly, Valley elderberry longhorn beetle, and giant garter snake. Conservation measures for the Riparian and Freshwater Marsh Natural Community, Swainson's hawk , and burrowing owl would not be implemented.

Under Alternative 2, Plan Participants would not receive incidental take coverage for the 20 additional species covered under the Proposed HCP should any of these species become listed in the future, even if applicable community conservation measures were implemented. As a result, higher mitigation requirements could be required in the future as mitigation for these species would not be guaranteed under the federal No Surprise assurances (see Section 10.7.5). On average, one species per year has been listed, proposed, or petitioned for listing since the Solano Project Water Contract was renewed in 1999. Critical Habitat has also been designated for 13 species within Solano County during this period. Under CEQA, potential impacts to the 20 additional species would also need to be addressed through the local, project-level review and approval process. Additional mitigation for these non-listed species could be required. Local review requirements would not achieve the Proposed HCP objectives for streamlining permitting and providing more consistent conservation of rare species.

9.3.1 Valley Floor Grassland and Vernal Pool Natural Community and Associated Species

Under Alternative 2, eight (44 percent) of the 18 Covered Species occur within this Natural Community. Per the requirements of the Solano Project Biological Opinion, conservation actions would also need to be considered for 19 additional plant species that are primarily associated with vernal pools.

All of the Valley Floor Grassland and Vernal Pool conservation measures described in Section 6.3.2 would be implemented under this alternative. Conservation actions for the 19 additional plant species are primarily addressed through these community-level conservation measures.

Zone 1 Urban Development Impacts. Under Alternative 2, the level of development and potential impacts (level of take/habitat conversion) to valley floor grassland and venal pool communities and associated species would be the same as described for the HCP (see Section 6.3).

Zone 2 Remote Facilities and Operations and Maintenance Impacts. Proposed impacts, take, and conversion of habitat would be the same as the Proposed HCP (see Section 8.2).

Zone 3 Preserve Management and Implementation. Proposed impacts, take, and conversion of habitat would be the same as the Proposed HCP (see Section 8.2).

9.3.2 California Red-legged Frog

The California red-legged frog is a federally-listed threatened species. As such, conservation measures for this species proposed in the HCP (see Section 6.4) would also be implemented under Alternative 2.

Zone 1 Urban Development Impacts. Impacts to and requested take for California red-legged frog would be the same as described under the HCP (see Section 8.3.1).

Zone 2 Remote Facilities and Operations and Maintenance Impacts. The effects to California red-legged frog would be the same as described under the HCP (see Section 8.3.2).

Zone 3 Preserve Management and Implementation. The effects to California red-legged frog would be the same as described under the HCP (see Section 8.3.3).

9.3.3 Callippe Silverspot Butterfly

The Callippe silverspot butterfly is a federally-listed threatened species and its expected/known range largely overlaps the known distribution of California red-legged frog in the western portion of Solano County. Under Alternative 2, impacts would be the same for this species as under the Proposed HCP. The Proposed HCP Conservation Program for this species would also be implemented under Alternative 2.

Zone 1 Urban Development Impacts. Impacts to, requested take of and conservation measures for Callippe silverspot butterfly would be the same as described under the HCP (see Section 8.4.1).

Zone 2 Remote Facilities and Operations and Maintenance Impacts. The effects to Callippe silverspot butterfly would be the same as described under the HCP (see Section 8.4.2).

Zone 3 Preserve Management and Implementation. The effects to Callippe silverspot butterfly would be the same as described under the HCP (see Section 8.4.3).

9.3.4 Stream and Riparian Associated Species

Only one of the seven Covered Species in the Stream and Riparian Natural Community would be covered under the HCP: the valley elderberry longhorn beetle. Although also a federally-listed threatened species, steelhead (Central Valley and Central California Coast ESUs), would not be covered under this alternative as it was not required to be addressed under the Solano Project Biological Opinion (this species is being voluntarily addressed in the Proposed HCP). Under Alternative 2, only Conservation Measure RSM 14 Elderberry Shrub Mitigation would be implemented. Other conservation measures related to removal of instream barriers, control of exotic vegetation on a broader scale, requirements for riparian setbacks and mitigation ratios, and measures to improve water quality would not be implemented.

Zone 1 Urban Development Impacts. Requested take for valley elderberry longhorn beetle would be the same as described under the HCP (see Section 8.5.6.1). Under Alternative 2, conservation and mitigation for the other six species covered under the Proposed HCP and protection/restoration of riparian habitats would be determined on a project-by-project basis as part of local CEQA review and project approvals and/or to the extent that steelhead may be taken and NMFS is consulted to obtain incidental take permits for this species in compliance with the ESA.

Zone 2 Remote Facilities and Operations and Maintenance Impacts. Most of the Plan Participant irrigation and flood control facilities in Zone 2 are regularly maintained and, except in a few limited areas, support little or no riparian vegetation. Protocols in the Operations and Maintenance Manual prescribe measures that, in most instances, will avoid take of valley elderberry longhorn beetle. Where avoidance is not possible or maintenance activities would result in the trimming of elderberry limbs over one inch in diameter, species-specific conservation measures would be required to reestablish habitat at appropriate levels consistent with the Proposed HCP.

Zone 3 Preserve Management and Implementation. Authorized activities in Zone 3 would be associated with management actions for approved elderberry relocation and establishment.

9.3.5 Giant Garter Snake

The giant garter snake is listed as threatened under both the ESA and CESA. Alternative 2 assumes that the State would adopt the federal Biological Opinion and incidental take findings (as allowed under Section 2080.1 of the Fish and Game Code) or would concurrently issue a separate 2081 agreement. Impacts and associated conservation would be the same as the Proposed HCP.

Zone 1 Urban Development Impacts. Under Alternative 2, the level of development and potential impacts (level of take/habitat conversion) to giant garter snake habitat would be the same as described for the HCP (see Section 6.7).

Zone 2 Remote Facilities and Operations and Maintenance Impacts. The operation and maintenance of water district facilities and construction of new infrastructure could affect this species. Adverse impacts could result from trimming and vegetation removal, bank stabilization, and levee strengthening to maintain flood capability. Removal of vegetation to allow for the free flow of water along irrigation ditches, canals, and other Zone 2 facilities could result in take of the giant garter snake.

Since this species is federally-listed, procedures in the Operations and Maintenance Manual would be implemented to avoid impacts within designated giant garter snake habitat. Where such measures are not practicable, mitigation and habitat conservation would be required pursuant to the Conservation Measures described in Section 6.7.2. Under Alternative 2, requested take would be the same as the Proposed HCP (see Sections 8.6.2 and 8.6.4).

Zone 3 Preserve Management and Implementation. No adverse effects are anticipated from Zone 3 activities.

9.3.6 Coastal Marsh Natural Community and Associated Species

Five federally-listed species are associated with coastal marsh communities and must be considered in accordance with the Solano Project Biological Opinion. Under Alternative 2, all conservation measures described in Section 6.7.2 would be implemented to minimize and mitigate direct and indirect impacts to these species.

Three of the Covered Species, California clapper rail, salt marsh harvest mouse, and Delta smelt, are also listed under the CESA. CDFG would not be able to issue 2081 permits for the clapper rail and salt marsh harvest mouse for Zone 1 or Zone 2 activities as both species are also listed as state Fully Protected species (Fully Protected species may only be taken for recovery actions and scientific study). Alternative 2 assumes that CDFG would adopt the findings of the federal Biological Opinion for Delta smelt and that take of this species would also be addressed at the state level.

Zone 1 Urban Development Impacts. Impacts to coastal marsh species would be the same as the proposed HCP (see Section 8.7.1).

Zone 2 Remote Facilities and Operations and Maintenance Impacts. Impacts to coastal marsh species would be the same as the proposed HCP (see Section 8.7.2).

Zone 3 Preserve Management and Implementation. Impacts to coastal marsh species would be the same as the proposed HCP (see Section 8.7.3).

9.3.7 Swainson's Hawk

The Swainson's hawk is a state-listed threatened species with no federal status under the ESA. Under Alternative 2, HCP conservation measures for this species would not be implemented. Mitigation for impacts to foraging habitat and loss of known nests could be required under CEQA on a project-by-project basis. Swainson's hawk would likely obtain some indirect conservation benefit from habitat preservation and management associated with implementation of the Valley Floor Grassland and Vernal Pool conservation actions.

Zone 1 Urban Development Impacts. Under Alternative 2, the anticipated loss of foraging habitat and nest sites for this species would be the same as the Proposed HCP. However, compensation for impacts to Swainson's hawk from Zone 1 urban development activities would be determined on a project-by-project basis through CEQA and local project approvals as described under the No Action Alternative. Section 2081 agreements may be required under CESA when a project removes a known

nest site. At such time, CDFG may issue a 2081 Incidental Take Permit and require project-specific compensation for removal of the nest site removal and impacts to foraging habitat. Overall, implementation of Alternative 2 would likely result less consistency in implementation of and lower overall acreage devoted to conservation for Swainson's hawk.

Zone 2 Remote Facilities and Operations and Maintenance Impacts. Potential impacts to this species for Zone 2 activities would be the same as described for the No Action Alternative.

Zone 3 Preserve Management and Implementation. Potential impacts to this species for Zone 3 activities would be the same as described for the No Action Alternative.

9.3.8 Burrowing Owl

The burrowing owl is not currently listed under either the ESA or CESA. Under Alternative 2, HCP conservation actions solely for this species would not be implemented. However, this species would receive some conservation benefit, although to a lesser degree than under the HCP, as a result of conservation actions associated with the Valley Floor Grassland and Vernal Pool Conservation Program.

Zone 1 Urban Development Impacts. Impacts to this species associated with Zone 1 urban development activities would be the same as described under the Proposed HCP. Any mitigation or conservation actions required for this species would be determined on a project-by-project basis through CEQA and local project approvals as described under the No Action Alternative. Traditionally, habitat mitigation has only been required for demonstrated loss of a known nest site. Standard CDFG mitigation requirements typically require 6.5 acres of habitat preservation per breeding pair. Under Alternative 2, this species would experience a substantially reduced level of conservation than under the Proposed HCP.

Zone 2 Remote Facilities and Operations and Maintenance Impacts. Potential operations and maintenance impacts to burrowing owl include disturbance to or loss of nest sites during routine activities and construction or repair of new and existing facilities. Although this species is not federally-listed and protection is not directly mandated under the Solano Project Biological Opinion, protocols are included in the Operations and Maintenance Manual (Appendix C, General Conservation Measure 1.1) to avoid disturbance to and take of active nest sites in compliance with other state and federal regulations. Operation and maintenance activities associated with Plan Participant irrigation and flood control facilities and other remote facilities are not expected to result in any significant loss of foraging habitat for this species.

Zone 3 Preserve Management and Implementation. Potential preserve management activities that could impact burrowing owl include disturbance to or loss of nest sites during routine land management and restoration activities. Removal of any active nest sites would be precluded under the Fish and Game Code and the federal Migratory Bird Treaty Act.

9.3.9 Rational for Rejection

Under Alternative 2, impacts/take of and conservation actions for the 18 threatened or endangered species under USFWS jurisdiction would be the same as described under the Proposed HCP (Table 9-1). This alternative was rejected from consideration primarily because it fails to achieve a number of HCP goals and does not provide assurances related to future mitigation requirements for currently non-listed, Covered Species that may become listed in the future. Specific reasons for rejection include:

- This alternative fails to achieve the HCP guiding goal of improving land use planning to prevent piecemeal preservation/mitigation that limits habitat value.
- This alternative does not provide the permit and environmental review streamlining benefits desired by the applicants. Currently non-listed, special-status species would need to be addressed separately through individual project review under CEQA.
- This alternative does not provide assurances that additional mitigation will not be required for currently non-listed Covered Species that may become listed in the future.
- The conservation requirements for most (30 of the 38) of the additional proposed Covered Species (e.g., those not currently federally-listed) are addressed by the conservation actions for required species (e.g., there is no or minimal additional cost for including these species).
- One species, steelhead, is federally-listed as threatened and activities affecting steelhead habitat would be required to comply with federal ESA requirements (separate consultation or individual HCP) in conflict with HCP goals and objectives to simplify and streamline ESA compliance and permitting.
- Two species (burrowing owl and Swainson's hawk) are widespread, and impacts and mitigation are often required for many projects. Elimination of these two species from consideration would require many projects to seek separate approvals and permits in conflict with HCP goals to simplify and streamline the permitting process and minimize conservation and development conflicts.

9.4 ALTERNATIVE 3: REDUCED POTENTIAL FOR INCIDENTAL TAKE ALTERNATIVE

Alternative 3 identifies measures to provide greater avoidance and minimization of potential take of each federally-listed animal species covered under the HCP. The term "take," as defined in the federal ESA does not include plants.

Under this alternative, an HCP would be developed to address conservation of the 37 species associated with the Proposed Action. However, Alternative 3 would minimize potential impacts to federally-listed animal species and habitat by reducing the footprint of urban development. Conservation strategies for these Covered Species would be qualitatively the same as the proposed HCP; however, less mitigation (e.g., the amount of land/habitat set aside for protection that is needed for mitigation) would be required because impacts associated with Covered Activities would be reduced.

The USFWS and NOAA NMFS would issue incidental take permits and CDFG would authorize incidental take under a 2081 agreement resulting from this level of development. Under Alternative 3, the HCP and associated permits would be in effect for a 30-year term.

The following discussion focuses on federally-listed animal species (and those species that are expected to be listed at the time the HCP is adopted) in order to address Section 10 requirements. Alternative 3 assumes, unless otherwise noted, that reductions in impacts to federally-listed animal species would result in correspondingly lower levels of impact to covered plant species. Information on the relative effects on all species under this alternative compared to the Proposed HCP is summarized in Table 9-1.

9.4.1 Delta Green Ground Beetle

None of the currently known Delta green ground beetle occurrences are located within potential urban development areas. Since this species appears to be primarily associated with larger playa pools with long hydroperiods, suitable habitat does not appear to be present within development areas; therefore, potential conversion or loss of habitat is not likely to occur.

This species shares similar habitat as some of the no take plant species (i.e., Colusa grass and Solano grass). As range-limited species, no adverse impacts will occur to Colusa grass and Solano grass under the HCP. It is unlikely that any take will occur for this species under the current HCP; therefore, there is no anticipated change in the level of take under Alternative 3.

9.4.2 Vernal Pool Fairy Shrimp, Vernal Pool Tadpole Shrimp, Conservancy Fairy, Shrimp and California Tiger Salamander

Zone 1 Urban Development Impacts. Vernal pool fairy shrimp, vernal pool tadpole shrimp, and California tiger salamander are widely distributed throughout the High Priority Vernal Pool Conservation Areas, occurring in many, but not all of the remaining vernal pool/seasonal wetland complexes. To reduce take of these species, additional lands within designated urban boundaries be withdrawn from any future development. Additional take avoidance would likely occur within the High Value and Medium Value Vernal Pool Conservation Areas. Approximately 5,548 acres of valley floor grassland and vernal pool habitat are located within the Plan Participants' urban boundaries and are zoned for urban development under current General Plan or relevant growth assumptions (see Figures 2-2 through 2-7 for General Plan designated zoning). Under the proposed HCP, impacts to valley floor grassland and vernal pool habitats would be reduced to 4,390 acres, with most of the avoided areas being within High Value Conservation Areas. This is a significant reduction in planned growth, particularly for the City of Fairfield that absorbs most of this additional habitat avoidance. However, the need for substantial habitat avoidance in northeastern Fairfield is recognized in the Fairfield General Plan (City of Fairfield 2002, 2003).

Under Alternative 3, an unknown percentage of these lands would need to be preserved and avoided. Applicants in these areas would need to perform surveys consistent with USFWS protocols to determine presence or absence of vernal pool fairy shrimp and vernal pool tadpole shrimp. Wetland areas supporting these two species and associated uplands needed to maintain the physical and chemical integrity of these wetlands would need to be preserved.

In areas supporting California tiger salamanders, such as northeastern Fairfield and potentially Rio Vista, most of the remaining lands in the High and Medium Value Conservation Areas that are planned for development, approximately 1,890 acres, would need to be excluded from future development in order to achieve full avoidance. Reduction of this amount of planned development would essentially eliminate any future growth in northeastern Fairfield and Rio Vista, if the species is present in these areas.

9.4.3 California Red-legged Frog

Approximately 1,350 acres of California red-legged frog habitat is located within the potential urban development areas of Fairfield (735 acres) and Vallejo (615 acres) within the Californa Red-legged Frog Conservation Area. This is the only area within Zones 1 and 2 where this species occurs. Covered Activities in these areas would primarily affect upland movement habitat at the edges of and in between existing urban development. To reduce take of this species, additional lands within this portion of the Conservation Area would need to be withdrawn from or avoided by urban development.

9.4.4 Callippe Silverspot Butterfly

Although approximately 1,560 acres of habitat are located in potential urban development areas of Fairfield (680 acres) and Vallejo (880 acres) within the known/expected distribution of the butterfly in Solano County, requested take of occupied stands of breeding habitat is limited to a maximum 10 percent of any area supporting larval host plants of sufficient density to support breeding. Under the HCP, conservation measures for Callippe silverspot butterfly focus on protecting significant viola stands, providing buffers from development and maintaining corridors between core breeding sites to the maximum extent practicable s. Therefore, the proposed conservation program already achieves substantial avoidance. Maximizing avoidance would require additional lands be precluded from development.

9.4.5 Giant Garter Snake

The giant garter snake is not known or expected to occur in Zone 1, except in one small potential development area in Rio Vista. As described in Section 8.6.1, potential indirect impacts to this species from Zone 1 activities relate to the degradation of downstream waters in giant garter snake habitat areas. The Proposed HCP adopts water quality measures required under NPDES regulations that have been determined by the EPA and State Water Resources Control Board to treat new urban stormwater runoff to the maximum extent practicable.

Higher quality habitats within Solano County that are most likely to support giant garter snake (see Species description in Appendix B) occur in several of the Plan Participant facilities in Zone 2. Potential take in these areas could result from activities such as construction of new infrastructure and maintenance activities, including vegetation trimming and removal, bank stabilization, and levee strengthening to maintain flood capability. Removal of vegetation to allow for the free flow of water along irrigation ditches, canals, and other Zone 2 facilities could result in take of giant garter snake.

The Operations and Maintenance Manual identifies procedures for avoiding impacts within designated giant garter snake habitat areas. These measures are to be implemented to the maximum extent practicable. Where such measures are not practicable, habitat compensation is required. These waterways are also integral to the surface water tributary and flood control system in eastern Solano County. Elimination or reduction of current maintenance activities to reduce potential take is not practicable as other serious environmental and economic consequences (e.g., increased flooding, inability to transport irrigation and drainage water effectively – the primary purpose of several of the facilities) could result.

9.4.6 California Clapper rail

No direct take of this species or its habitat is anticipated as a result of the Solano HCP. The California clapper rail is a State Fully Protected species. As such, direct take of individuals is prohibited.

9.4.7 Salt Marsh Harvest Mouse

No direct take of this species or its habitat is anticipated as a result of the Solano HCP. The salt marsh harvest mouse is a State Fully Protected species. As such, direct take of individuals is prohibited.

9.4.8 Delta Smelt

The delta smelt is listed as a threatened species by CDFG and USFWS. In Solano County, Delta smelt are found in the sloughs of Suisun Bay/Suisun Marsh upstream through the Delta in Contra Costa, Sacramento, San Joaquin, Solano, and Yolo counties. In Solano County, delta smelt have been known to spawn in the Sacramento River and in Barker, Lindsey, and Cache sloughs (Wang 1991, USFWS 1994b). Delta smelt also spawn north of Suisun Bay in Montezuma and Suisun sloughs and their tributaries (USFWS 1994b).

The delta smelt is not likely to be harmed by the actions of the Solano HCP. Urban runoff from development authorized under the Solano HCP will be treated to the maximum extent practicable such that significant harm resulting from degradation of water quality is avoided. While a number of endemic coastal marsh plant species appear to require high salinity gaps and can be adversely affected by urban runoff and wastewater effluent discharge, such discharges appear to be beneficial for this species although increased summer temperatures of discharge waters could cause Delta smelt to avoid wastewater discharge points (ESA 2005).

Suitable habitat for Delta smelt occurs along the lower reaches of the McCoy Creek, Ledgewood Creek, Green Valley Creek, and lower Ulatis Creek flood control channels. Maintenance activities in these channels periodically result in disturbance of habitat for this species. Avoidance protocols contained in the Operations and Maintenance Manual define procedures for avoiding impacts to this and other fish species.

Authorized take under the Solano HCP will only be allowed in conjunction with Zone 2 activities and would consist of temporary impacts to habitat during non-breeding times (e.g., all practicable avoidance measures have already been incorporated into the HCP conservation measures). Reduced levels of take are not practicable.

9.4.9 Rational for Rejection of this Alternative

This alternative was rejected from consideration for the following reasons:

- Mandated avoidance for all or a substantial portion of a site may not be practicable, especially for projects with minor impacts or low quality habitat. Logistically, applicants are unlikely to participate in the HCP if they can obtain greater take authorization through other means (such as a Section 7 consultation).
- Avoidance of occupied habitats in many areas would lead to the creation of small, non-viable preserves within urban areas or isolated by roads and other urban related infrastructure. While increased avoidance would decrease direct take, such small sites have limited long- term biological value and contribute little to the recovery of these species.
- Reduced take would discourage voluntary Plan Participants such as the cities of Dixon and Rio Vista, RD 2068, and the Dixon RCD from participating in the HCP. The absence of these voluntary Plan Participants would greatly decrease available funding for broader conservation programs for recovery of these species.
- Alternative 3 would remove additional areas planned for urban development in conflict with local plans and policies. Growth pressures and the need to comply with regional and state-mandated programs for housing and other programs would increase pressure to develop other areas that may adversely affect other Covered Species (e.g., increase pressure on development in agricultural lands that could lead to loss of Swainson's hawk habitat.)

The above reasons conflict with several of the guiding principles for the Solano HCP (see Section 1.3.2). Most notably, Alternative 3 would conflict with Guiding Principle #1 (Reduce conflicts between listed species and economic development), #2 (Streamline local state and federal regulatory processes), and #3 (Replace project-by-project mitigation with a comprehensive plan for protecting and maintaining viable populations of Covered Species).

9.5 ALTERNATIVE 4: COMBINED HCP/NCCP ALTERNATIVE

Alternative 4 would implement a greater level of conservation than being considered under the Proposed Action. This alternative would consist of a combination of increased mitigation ratios (e.g., greater acreage of habitat set aside for species protection as required for mitigation) to compensate for the loss of habitats than included in the Proposed Action and/or greater conservation actions as required to meet and implement state NCCP Act standards.

This alternative would entail preparation of a joint HCP/NCCP covering 37 species for a period of 30 years. The Solano HCP was initially developed and evaluated to address State NCCP Act standards. The NCCP Act requires that Plan Participants commit to conserve Covered Species and communities within the Plan Area to the level of recovery. Section 4.0 addresses the questions and issues associated with determining the recovery standards for the Covered Species and Natural Communities and estimates the acreage of each community needed to achieve the NCCP recovery standard. Table 9-2 summarizes the natural community impacts, acreage required for recovery, anticipated mitigation (based on the conservation measures for the Proposed HCP), extent of protect

land, the acreage at low risk for loss or alteration, and the additional acreage and estimated land costs (in 2005 dollars) required to meet the recovery standard.

As seen in Table 9-2, the projected total cost to implement recovery would be approximately $403 million with an annualized cost of approximately $13.5 million over the 30-year span of the HCP (all in 2008 dollars). These costs represent the amount needed for habitat protection and do not include costs for adaptive management and monitoring or long term management. A majority of these recovery costs (62%) are associated with commitments to riparian and Swainson's hawk conservation. Information from the Science Advisors suggests that preservation of most of the currently irrigated agriculture in its present form would be needed to conserve the Swainson's hawk population in Solano County. For this assessment, recovery objectives were assumed to be achieved if 50 percent of the lands were intensively managed and protected as Swainson's hawk foraging habitat. If protection of all foraging habitat were necessary to maintain the current population, recovery standard costs could double bringing the total to approximately $502 million or $17.3 million per year. Conversely, if lower conservation requirements could be negotiated and shown to achieve recovery objectives, implementation costs for this alternative would be lower. Nevertheless, the costs to implement Alternative 4 would still likely exceed the costs to implement the Proposed HCP.

Substantially increasing mitigation requirements to achieve a recovery level of conservation is not practicable. The additional cost burden cannot be solely tied to future development impacts, as no nexus exists for future development to fund more than its fair-share of recovery costs. The Proposed HCP incorporates a fair-share contribution toward recovery into its conservation strategies.

State, federal, and private grants would also contribute to funding the additional recovery commitment. However, grant funds cannot be guaranteed and the Resource Agencies are unwilling to provide specific commitments for such funding. As such, the Plan Participants would be solely responsible for funding the recovery commitment.

Plan Participants have carefully reviewed the potential costs and have determined that local funding could not be obtained to cover such costs or even a substantial portion of such costs. General funds are not available (cities throughout California are traditionally under funded with respect to providing even basic services) and the local electorate has not supported bonds or other types of taxes to help fund basic services such as schools, police, fire, and regional transportation. Therefore, any funding source that could be considered a tax (and would by state law require approval by a two-thirds vote of the electorate) is considered unlikely to be approved.

Alternative 4 achieves the HCP conservation goals and provides greater long term assurances from the regulatory agencies. However, this alternative was rejected as impracticable due to costs because of the potential liability to the Plan Participants for fully funding the NCCP Conservation Program.

Table 9-1: Relative Comparison of Conservation Benefit of the Alternatives Compared to the Proposed Solano HCP on Covered Natural Communities and Species

Table 9-2: Summary of Potential Additional Costs to Implement NCCP Recovery Conservation Standards