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9.0 ALTERNATIVES

9.1 SUMMARY

Under the Federal Endangered Species Act (FESA), applicants for Section 10 permits must specify in a Habitat Conservation Plan (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 proposed Solano HCP, namely the proposed conservation program detailed in Chapters 5.0, 6.0, and 7.0 and the effects analysis for the 36 proposed Covered Species described in Chapter 8.0. The alternatives are not presented at the same level of detail as the proposed conservation program (e.g., effects on all 36 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 Solano 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 Chapter 4.0. A more detailed assessment of the alternatives is provided in the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) that accompanies the Draft HCP.

Table 9.1: Relative Comparison of Conservation Benefit of the Alternatives Compared to the Proposed Solano HCP on Covered Natural Communities and Species

Natural Communities	Alternative 1 – No Action	Alternative 2 – Required Species Only	Alternative 3 – Reduced Take	Alternative 4 – Increased Conservation, HCP/NCCP
Valley Floor Grassland and Vernal Pool	<	<	<	>
California Red-Legged Frog	<	=	<	>
Callippe Silverspot Butterfly	<	=	>	>
Coastal Marsh	<	< or =	=	>
Riparian, Stream, and Freshwater Marsh	<	<	>	>
Swainson's Hawk	<	<, NC	>	>
Burrowing Owl	<	<, NC	>	>
Giant Garter Snake	< or =	=	=	>
Rationale for Acceptance/Rejection	1, 2	1, 2	1, 2, 3, 4	3

Conservation Benefit Legend:

< Less Conservation Benefit than the Proposed Solano HCP
NC Not Covered, no conservation actions
> Greater Conservation Benefit than the Proposed Solano HCP
= Equal Conservation Benefit to the Proposed Solano HCP

Rationale for Rejection of Alternative:

1. Less Conservation Benefit for Similar Cost
2. Conflicts with Plan Goals and Objectives
3. Conflicts with Local Land Use Plans
4. Impracticable from Cost and Logistics Standpoint

HCP = Habitat Conservation Plan
NCCP = Natural Community Conservation Plan

For the Solano HCP, four alternatives were considered:

- Alternative 1: No Action Alternative
- Alternative 2: Coverage of Species Listed in the USFWS 1999 Solano Project Biological Opinion Only Alternative
- Alternative 3: Reduced Potential for Incidental Take Alternative
- Alternative 4: Increased Conservation Alternative – Combined HCP/Natural Community Conservation Plan (NCCP) Alternative

9.2 ALTERNATIVE 1: NO ACTION ALTERNATIVE

9.2.1 Alternative Description

Under the No Action Alternative (Alternative 1), an HCP would not be implemented. As a result, compliance with the FESA and California Endangered Species Act (CESA) would be considered on a case-by-case basis, essentially maintaining the current system of evaluation, assessment, and permitting. The Solano County Water Agency (SCWA) and its member agencies would be required to continue implementing the Short-Term Conservation Measures 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[1] 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 FESA prior to approval of any project that may affect listed species or by conditioning the aforementioned entitlements on compliance with the FESA.
- 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 the United States Fish and Wildlife Service (USFWS) or by conditioning the aforementioned entitlements on compliance with the FESA.
- Member agencies will work with the USFWS and the United States Bureau of Reclamation (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.

[1] The Voluntary HCP Participants are the City of Rio Vista, City of Dixon, Reclamation District No. 2068 (RD 2068), Dixon Resource Conservation District (Dixon RCD), Dixon Regional Watershed Joint Powers Authority (DRW JPA), Vallejo Sanitation and Flood Control District (VSFCD), and Fairfield-Suisun Sewer District (FSSD).

- Member agencies will work with the 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 respective habitats.

The Short-Term Conservation Measures contain six species-specific conservation measures, which consist 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. There are also measures pertaining to operation and maintenance activities of the required Plan Participants, including the development and implementation of an Operations and Maintenance Manual and implementation of guidance for interim operation and maintenance activities.

The above measures have been implemented by the applicable agencies, and it is assumed the current interim measures, protocols, and coordination procedures would continue for the duration of the current Solano Project Water Contract (i.e., until 2024), for which the Biological Opinion was issued in 1999.

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

9.2.2.1 Urban Development Impacts

Under the No Action Alternative (Alternative 1), the level of development and the corresponding extent of the Valley Floor Grassland and Vernal Pool Natural Community to be protected within existing urban growth boundaries (UGBs) would be determined on a case-by-case basis. Under the interim conservation measures, cities would be required to notify the USFWS and avoid issuing any grading permits or adopting other actions that could result in take of or adverse effects to listed species until the USFWS has determined that the project complies with the FESA. The 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 UGBs; see Section 6.2).

For other key species within the UGBs, 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 (Alternative 1), conservation actions for each Contra Costa Goldfield 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 FESA from private actions; therefore, there are no likely conservation actions for the development of these types of areas.

However, under individual Section 7 consultations, the ultimate (20 to 30 years) extent of development of occupied Contra Costa goldfield wetland habitat would likely be only slightly greater than identified in the proposed Solano HCP. The USFWS has required similar mitigation ratios for take of occupied and suitable Contra Costa goldfield habitat in Solano County. In

addition to a 9:1 mitigation ratio for direct impacts, the USFWS has also required a 9:1 mitigation ratio for indirect impacts to occupied Contra Costa goldfield habitat within 250 feet (ft) of a development. All mitigation for impacts to occupied and suitable Contra Costa goldfield habitat has required preservation of occupied habitat. The proposed Solano HCP only has that requirement for occupied habitat. If the USFWS continues their current practice, significant populations of occupied habitat would not be authorized for conversion because suitable occupied habitat for mitigation would not be available. However, a greater level of development may occur in surrounding watersheds in the vicinity of core population areas, thereby 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 (see Section 4.3.2.3) for these species would likely continue to be processed/approved under the Vernal Pool Programmatic Biological Opinion (USFWS 1999a) or future programmatic actions (the majority of projects in Solano County are currently processed under the Programmatic Opinion or "not likely to adversely affect/no effect" determinations are made). The current Programmatic Formal Federal Endangered Species Act Consultation on Issuance of 404 Permits for projects with relatively small effects on listed vernal pool crustaceans within the jurisdiction of the Sacramento Field Office bases the preservation (2:1) and construction/creation (1:1) mitigation requirements on the extent of occupied or potentially occupied wetland habitat for these species (USFWS 1996). For example, a 5-acre (ac) site with 0.5 ac of occupied vernal pool fairy shrimp habitat would be required to preserve 1.0 ac and construct 0.5 ac 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 Solano HCP, the No Action Alternative (Alternative 1) could be expected to result in the loss of 100 to 200 ac of wetlands (see Section 6.2.1). Under current mitigation requirements, 580 to 800 ac of wetlands would be preserved and 100 to 200 ac 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 ac (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 in the proposed Solano 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 ac of Valley Floor Grassland and Vernal Pool habitat and agricultural lands on historic vernal pool soils. The USFWS Biological Opinion for this project (USFWS 2004c) requires the applicant to implement the following compensation and mitigation measures:

- Preserve 540 ac of wetlands and associated uplands (220 ac on site and 320 ac at an off-site location), providing a 0.83:1 mitigation-to-development ratio (gross acres);
- Preserve approximately 116 ac of wetlands for the loss of approximately 21 ac (5.6:1 mitigation-to-development ratio) due to the higher density of wetlands on the two mitigation parcels; and
- Construct/restore approximately 31 ac of wetland (1.5:1 mitigation-to-development ratio).

Under the proposed Solano HCP and assuming the same development footprint, the same project in a Medium Value Valley Floor Grassland and Vernal Pool Conservation Area (Figure 4-8) would be required to:

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

Under the proposed Solano HCP, additional mitigation would be required to compensate for indirect effects to retained habitats within 250 ft 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 proposed Solano HCP would be 1,239 ac compared to 687 ac 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 Solano HCP conservation program. As a consequence of the lands selected for preservation, a greater ratio of wetlands was preserved than under the proposed Solano HCP. The proposed Solano HCP emphasizes preservation over restoration in response to the Vernal Pool Species Recovery Plan (USFWS 2005b), which focuses recovery goals on the 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 proposed Solano HCP would be offset by the reduced cost of constructing and establishing additional wetland acreage, and the reduced time to comply with the FESA. For example, the North Village Section 7 Consultation required almost 4.5 years to complete (August 6, 1999, through April 9, 2004). Under the proposed Solano HCP, inclusion of a project in the Section 10 permit would allow FESA 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 (Alternative 1) 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 of habitat preservation resulting from individual projects could increase to 7,600 ac of wetlands and 22,800 ac 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 benefits (e.g., habitat conservation required for Federally listed species would overlap with the habitat needs and mitigation requirements for other special-status species as required by the California Environmental Quality Act [CEQA]). Uniform requirements would not be required for salvage or transplantation operations to re-establish non-listed plant species. 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 (Alternative 1), the potential conversion of valley floor and vernal pool grassland and wetland habitats 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 Solano HCP. Implementation of the No Action Alternative (Alternative 1) 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.

9.2.2.2 Construction, Operation, and Maintenance of Facilities

Approximately 29 miles (mi) of Plan Participant facilities (canals, pipelines, etc.) 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 cannot avoid impacts would be required to comply with the FESA 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.

9.2.2.3 Activities on Preserves and Reserves

Take and other regulated activities under the FESA on preserves and reserves would need to be authorized through individual Section 7 consultations or 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/reserve.

9.2.3 California Red-Legged Frog

9.2.3.1 Urban Development Impacts

Under the No Action Alternative (Alternative 1), direct impacts to California red-legged frog habitat within the Jameson Canyon-Lower Napa River Core Recovery Area would be similar to the proposed Solano HCP, about 1,000 ac (approximately 1,340 ac are currently zoned for development). The Jameson Canyon-Lower Napa River Core Recovery Area is similar to the proposed Solano HCP California Red-Legged Frog Conservation Area, 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 FESA 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 be responsible for implementing any mitigation resulting from such assessments, and conservation funds would not be pooled for maximum effect as described under the proposed Solano HCP.

Outside of the Jameson Canyon-Lower Napa River Core Recovery Area, an additional 2,200 ac of land zoned for development occurs within the potential range of California red-legged frog in the western hills of Solano County (primarily in Vacaville and Fairfield). Under the proposed Solano HCP, conservation measures to maintain connectivity and limit the expansion of aquatic predators (e.g., bullfrog and warm water fish) through perennialization of intermittent streams and construction of artificial water bodies (Mitigation Measure RLF 5) would be implemented in this area. Under the No Action Alternative (Alternative 1), the Cities of 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.

9.2.3.2 Construction, Operation, and Maintenance of Facilities

Approximately 87 mi of irrigation district and flood control facilities are located within the range of the California red-legged frog in Solano County. Of these, only the Solano Irrigation District (SID) Terminal Reservoir and approximately 0.6 mi 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 measures described in the Operations and Maintenance Manual. However, some operation 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 FESA would be considered under individual Section 10 permits.

9.2.3.3 Activities on Preserves and Reserves

Take and other regulated activities under the FESA on mitigation sites, preserves, and reserves would need to be authorized through individual Section 7 consultations or 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/reserve.

9.2.4 Callippe Silverspot Butterfly

9.2.4.1 Urban Development Impacts

Approximately 1,560 ac of habitat are located in potential urban development areas of Fairfield (680 ac) and Vallejo (880 ac) within the known/expected distribution of the callippe silverspot 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 FESA 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 described under the proposed Solano HCP.

9.2.4.2 Construction, Operation, and Maintenance of Facilities

No adverse effects are anticipated because these facilities do not support significant natural vegetation to support the larval host plants.

Future remote facilities such as water supply reservoirs proposed by the Cities of 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 other development-related activities.

9.2.4.3 Activities on Preserves and Reserves

No activities associated with preserves and reserves would be authorized except as may be permitted under individual incidental take permits issued under Section 7 or Section 10 of the FESA.

9.2.5 Stream and Riparian Associated Species

9.2.5.1 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 (Alternative 1) will likely be similar to the proposed Solano HCP. No changes are anticipated in the UGBs 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 proposed Solano HCP. Some increases in fill of smaller, intermittent streams could occur that are not covered by local stream protection regulations. However, significant fills (e.g., over 300 ft 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 proposed Solano HCP, the HCP requires 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 proposed Solano HCP, required compensation for such impacts would be standardized. Under the No Action Alternative (Alternative 1), mitigation would be determined on a case-by-case basis.

Direct mitigation requirements for removal of elderberry, which is the host plant for the threatened valley elderberry longhorn beetle, would be higher under the No Action Alternative (Alternative 1) for the near future. The USFWS 5-year review of the beetle's status (USFWS 2006) recommended delisting the valley elderberry longhorn beetle; however, no official actions have been initiated to implement this recommendation. If this species is delisted, mitigation in compliance with the FESA would not be required. Under the proposed Solano HCP, conservation/mitigation for this species would continue for the life of the HCP.

With or without the proposed Solano HCP, applicants would be required to pre-treat storm water prior to discharge into local creeks in compliance with National Pollutant Discharge Elimination System (NPDES) permit conditions. Thus, water quality for steelhead and other aquatic species would be maintained to the maximum extent practicable under the No Project Alternative (Alternative 1) and the proposed HCP.

In contrast to the proposed Solano HCP, 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 (Alternative 1). These measures include:

- Mitigation Measure RSM 6 identifies specific storm water 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 Creek and Ledgewood Creek, 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.
- Mitigation Measure RSM 7 requires new urban development near key drainages and in eastern Vacaville to restore and expand riparian habitats by constructing multistage channel designs rather than standard trapezoidal flood control channels. Under the No Action Alternative (Alternative 1), 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 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.

9.2.5.2 Construction, Operation, and Maintenance of Facilities

In Covered Activity 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 1 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.

9.2.5.3 Activities on Preserves and Reserves

Take and other regulated activities under the FESA 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/reserve.

9.2.6 Giant Garter Snake

9.2.6.1 Urban Development Impacts

Giant garter snakes are not known from Covered Activity Zone 1. However, the City of Rio Vista falls within the Mid-Valley Recovery Unit (MVRU) (Figure 4-19) and approximately 30 ac 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 FESA 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 is not the primary concern for giant garter snakes as a result of Covered Activity Zone 1 activities. The primary concern for this species involves the indirect effects of increased urban runoff in downstream receiving waters. Under the proposed Solano HCP, Avoidance and Minimization Measure RSM 2, Mitigation Measure RSM 10, and Mitigation Measure GGS 3 provide criteria for new development that will minimize adverse effects to downstream water quality to the maximum extent practicable. Under the No Action Alternative (Alternative 1), it is likely no such measure would be implemented, thereby providing no net increase to habitat quality for giant garter snakes within Solano County.

9.2.6.2 Construction, Operation, and Maintenance of Facilities

Two occurrences of giant garter snake are known from Covered Activity 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, and levee strengthening. Removal of vegetation to allow for the free flow of water along irrigation ditches, canals, and other Covered Activity 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 the FESA and CESA on a project-by-project basis.

9.2.6.3 Activities on Preserves and Reserves

Activities on preserves and reserves as described in Chapter 7.0 would not be authorized except as may be permitted under individual incidental take permits issued under Section 7 or Section 10 of the FESA.

9.2.7 Coastal Marsh Community

9.2.7.1 Urban Development Impacts

As discussed in Section 6.4, approximately 615 ac of Coastal Marsh habitat occur within the UGBs 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; and 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 Management Areas (Figure 4-19) that would diminish the values of the marsh.

In Covered Activity Zone 1, approximately 53 ac of Coastal Marsh are located within the potential development area of western Suisun, outside of the designated Primary and Secondary Suisun Marsh Management Areas. In Vallejo, approximately 310 ac of severely degraded, non-tidal marsh communities occur within former developed areas of Mare Island beyond the boundaries of the San Francisco Bay Conservation and Development Commission (BCDC) and San Pablo Bay National Wildlife Refuge. Potential development within these two areas would be constrained by a 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, except for limited activities that could be implemented following Avoidance and Minimization Measures CM 6 and CM 7 that would avoid take (see Section 6.3.7.2).

As with the proposed Solano 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 (e.g., the widening of Cordelia Road in Fairfield), construction of a redundant outfall pipeline for the FSSD main effluent outfall, and flood control channel maintenance. Potential indirect effects include increased human visitation, increased fire frequency, increased nonnative 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.

Under the No Action Alternative (Alternative 1), 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 under the No Action Alternative (Alternative 1) as under the proposed Solano HCP.

Under the No Action Alternative (Alternative 1), indirect effects associated with urban runoff would be regulated in a manner similar to the proposed Solano HCP mitigation measures (Mitigation Measure CM 5), which is primarily through implementation of Phase 2 NPDES storm water permits.

In contrast to the proposed Solano HCP, no coordinated measures would be implemented under the No Action Alternative (Alternative 1). These measures include Objective CM 1.2 (invasive species control as part of routine operation and maintenance activities) and Mitigation Measure CM 6 (funding for invasive species control grants in Coastal Marsh communities).

9.2.7.2 Construction, Operation, and Maintenance of Facilities

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 United States Army Corps of Engineers (Corps) and/or the California Department of Fish and Game (CDFG).

9.2.7.3 Activities on Preserves and Reserves

Take and other regulated activities under the FESA on mitigation sites, preserves, and reserves 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/reserve.

9.2.8 Swainson's Hawk

9.2.8.1 Urban Development Impacts

Under the No Action Alternative (Alternative 1), potential impacts or loss of suitable Swainson's hawk habitat would be 5,970 ac of irrigated agriculture lands and another 10,125 ac of grassland/ natural vegetation foraging habitat. This loss of habitat would be the same under the proposed Solano HCP. Under the No Action Alternative (Alternative 1), mitigation for loss of suitable foraging habitat would be determined through local CEQA analysis and project approvals. Under the CESA, Fish and Game Code, and the Federal Migratory Bird Treaty Act (MBTA), the CDFG could only exert its direct authority when a project requires removal of a known nest site. The proposed 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, which only establishes conservation easements that eliminate development rights and place limitations on suitable crop types. Without the comprehensive conservation approach described in the proposed HCP, the CDFG may recommend higher mitigation ratios for impacts to farmland in the future. Since 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.

9.2.8.2 Construction, Operation, and Maintenance of Facilities

Potential operation 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 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.

9.2.8.3 Activities on Preserves and Reserves

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

9.2.9.1 Urban Development Impacts

Under the No Action Alternative (Alternative 1), potential impacts and loss of suitable burrowing owl habitat would be approximately 16,095 ac of suitable foraging habitat, essentially the same as described under the proposed Solano HCP (see Section 8.9). Removal of any active nest site would be precluded under the Fish and Game Code and the Federal MBTA. Under the No Action Alternative (Alternative 1), 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, and CDFG mitigation requirements have only stipulated 6.5 ac of habitat preservation per breeding pair. Since 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 would have direct regulatory authority when a project requires removal of a known nest site. At such time, the 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 (Alternative 1) than under the proposed Solano HCP.

9.2.9.2 Construction, Operation, and Maintenance of Facilities

As with Swainson's hawk, potential operation and maintenance impacts to burrowing owl include disturbance to or loss of nest sites during routine activities and the construction/repair of new and existing facilities. Removal of any active nest site would be precluded under the Fish and Game Code and the Federal MBTA. 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 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 burrowing owl.

9.2.9.3 Activities on Preserves and Reserves

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 MBTA.

9.2.10 Rationale for Rejection

Compared to the proposed Solano HCP, the following general outcomes are likely under the No Action Alternative (Alternative 1):

- 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 on-site 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 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 (Alternative 1) would need to be initiated by Federal and State agencies as part of their mitigation bank monitoring program rather than through SCWA and the proposed Solano HCP Monitoring and Adaptive Management Program.
- Regional NPDES permits would not have FESA concurrence (e.g., individual take authorization/review under Section 7 or Section 10 of the FESA); therefore, additional requirements may be imposed on future individual projects in addition to regional requirements for minimizing the direct and indirect effects of storm water on listed species.
- Overall, the level of conservation of natural communities is expected be reduced, by an unknown amount, under the No Action Alternative (Alternative 1) because 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 Biological Opinion (1999a) and one additional species, the California tiger salamander, which has been listed as threatened under the FESA since the Biological Opinion was issued (see Table 9.1). Alternative 2 would not include the threatened steelhead Evolutionarily Significant Units (ESUs), which were not included in the Solano Project Biological Opinion (steelhead are regulated by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service [NOAA NMFS]). The USFWS would issue incidental take permits for species under their jurisdiction in compliance with the FESA.

Plan Participants would not seek a 2081 incidental take permit for State-listed species. However, Plan Participants could request that the CDFG concur with the Federal Biological Opinion for the issuance of a State incidental take permit for dual, State, and Federally listed species as allowed under Section 2080.1 of the Fish and Game Code. Eight species are listed as threatened or endangered at both the Federal and State level. Under this process, if the CDFG concurred that the proposed Solano HCP fully mitigated for impacts to these species, Plan Participants would obtain incidental take permits for six of the eight 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 six jointly listed species include Colusa grass, Solano grass, California tiger salamanders, giant garter snake, soft bird's-beak, and Delta smelt. Activities covered under Alternative 2 would be the same as under 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 measures described in Chapter 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, Stream, 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 Solano HCP should any of these species become listed in the future, even if applicable community 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 nonlisted species could be required. Local review requirements would not achieve the proposed Solano 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, 8 (44 percent) of the 18 Covered Species occur within the Valley Floor Grassland and Vernal Pool 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 measures described in Chapter 6.0 would be implemented under Alternative 2. Conservation actions for the 19 additional plant species are primarily addressed through these community-level measures.

9.3.1.1 Urban Development Impacts

Under Alternative 2, the level of development and potential impacts (level of take/habitat conversion) to the Valley Floor Grassland and Vernal Pool Natural Community and associated species would be the same as described under the proposed Solano HCP (see Chapter 6.0).

9.3.1.2 Construction, Operation, and Maintenance of Facilities

Proposed impacts, take, and conversion of habitat would be the same as described under the proposed Solano HCP (see Section 8.2).

9.3.1.3 Activities on Preserves and Reserves

Proposed impacts, take, and conversion of habitat would be the same as described under the proposed Solano 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 Solano HCP (see Section 6.4) would also be implemented under Alternative 2.

9.3.2.1 Urban Development Impacts

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

9.3.2.2 Construction, Operation, and Maintenance of Facilities

The effects to California red-legged frog would be the same as described under the proposed Solano HCP (see Section 8.3.2).

9.3.2.3 Activities on Preserves and Reserves

The effects to California red-legged frog would be the same as described under the proposed Solano 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 described under the proposed Solano HCP. The proposed Solano HCP Conservation Program for this species would also be implemented under Alternative 2.

9.3.3.1 Urban Development Impacts

Impacts to, requested take of, and conservation measures for callippe silverspot butterfly would be the same as described under the proposed Solano HCP (see Section 8.4.1).

9.3.3.2 Construction, Operation, and Maintenance of Facilities

The effects to callippe silverspot butterfly would be the same as described under the proposed Solano HCP (see Section 8.4.2).

9.3.3.3 Activities on Preserves and Reserves

The effects to callippe silverspot butterfly would be the same as described under the proposed Solano HCP (see Section 8.4.3).

9.3.4 Stream and Riparian Associated Species

Only one of the seven Covered Species in the Riparian, Stream, and Freshwater Marsh Natural Community would be covered under the proposed Solano HCP: the valley elderberry longhorn beetle. Although also a Federally listed threatened species, steelhead (Central Valley and Central California Coast ESUs) and Chinook salmon (Central Valley Spring-run ESU and Sacramento River Winter-run ESU), would not be covered under Alternative 2 because they were 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 Mitigation Measure RSM 12 would be implemented. Other measures related to removal of in-stream 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.

9.3.4.1 Urban Development Impacts

Requested take for valley elderberry longhorn beetle would be the same as described under the proposed Solano HCP (see Section 8.5.7.1). 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 the NOAA NMFS consulted to obtain incidental take permits for this species in compliance with the FESA.

9.3.4.2 Construction, Operation, and Maintenance of Facilities

Most 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. Avoidance and minimization measures in Chapter 6.0 will, in most instances, avoid take of valley elderberry longhorn beetle. Where avoidance is not possible or maintenance activities would result in the trimming of elderberry limbs over 1 inch in diameter, species-specific mitigation measures would be required to re-establish habitat at appropriate levels consistent with the proposed Solano HCP.

9.3.4.3 Activities on Preserves and Reserves

Authorized activities in Covered Activity Zone 3 would be associated with management actions for approved elderberry relocation and establishment.

9.3.5 Giant Garter Snake

Giant garter snake is listed as threatened under both the FESA 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 permit. Impacts and associated conservation would be the same as described under the proposed Solano HCP.

9.3.5.1 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 under the proposed Solano HCP (see Section 8.6).

9.3.5.2 Construction, Operation, and Maintenance of Facilities

The operation and maintenance of water district facilities and construction of new infrastructure could affect giant garter snake. 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 Covered Activity Zone 2 facilities could result in take of the giant garter snake.

Since this species is Federally listed, avoidance and minimization measures 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 mitigation measures described in Section 6.4.6. Under Alternative 2, requested take would be the same as described under the proposed Solano HCP (see Section 8.6).

9.3.5.3 Activities on Preserves and Reserves

No adverse effects are anticipated from activities on preserves and reserves. Any impacts due to habitat restoration would be temporary. Under Alternative 2, requested take would be the same as described under the proposed Solano HCP (see Section 8.6).

9.3.6 Coastal Marsh Natural Community and Associated Species

Five Federally listed species are associated with the Coastal Marsh Natural Community and must be considered in accordance with the Solano Project Biological Opinion. Under Alternative 2, all measures described in Chapter 6.0 would be implemented to avoid, minimize, and mitigate direct and indirect impacts to these species.

Four of the Covered Species (California clapper rail, salt marsh harvest mouse, Delta smelt, and longfin smelt) are also listed under the CESA. The CDFG would not be able to issue 2081 permits for California clapper rail and salt marsh harvest mouse for activities in Covered Activity Zone 1 or Covered Activity Zone 2 because 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 the 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.

9.3.6.1 Urban Development Impacts

Impacts to Coastal Marsh species would be the same as described under the proposed Solano HCP (see Section 8.7).

9.3.6.2 Construction, Operation, and Maintenance of Facilities

Impacts to Coastal Marsh species would be the same as described under the proposed Solano HCP (see Section 8.7).

9.3.6.3 Activities on Preserves and Reserves

Impacts to Coastal Marsh species would be the same as described under the proposed Solano HCP (see Section 8.7).

9.3.7 Swainson's Hawk

Swainson's hawk is a State-listed threatened species with no Federal status under the FESA. Under Alternative 2, the proposed Solano HCP conservation strategy 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.

9.3.7.1 Urban Development Impacts

Under Alternative 2, the anticipated loss of foraging habitat and nest sites for this species would be the same as described under the proposed Solano HCP. However, compensation for impacts to Swainson's hawk from 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 (Alternative 1). Section 2081 permits may be required under CESA when a project removes a known nest site or an adjacent disturbance leads to take. At such time, the CDFG may issue a 2081 incidental take permit and require project-specific compensation for removal of the nest site and impacts to foraging habitat. Overall, implementation of Alternative 2 would likely result in less consistency in implementation of and lower overall acreage devoted to conservation for Swainson's hawk.

9.3.7.2 Construction, Operation, and Maintenance of Facilities

Potential impacts to this species for these activities would be the same as described for the No Action Alternative (Alternative 1).

9.3.7.3 Activities on Preserves and Reserves

Potential impacts to this species for these activities would be the same as described for the No Action Alternative (Alternative 1).

9.3.8 Burrowing Owl

Burrowing owl is not currently listed under either the FESA or CESA. Under Alternative 2, the proposed Solano 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 proposed Solano HCP, as a result of conservation actions associated with the Valley Floor Grassland and Vernal Pool Conservation Program.

9.3.8.1 Urban Development Impacts

Impacts to burrowing owl associated with urban development activities would be the same as described under the proposed Solano 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 (Alternative 1). Traditionally, habitat mitigation has only been required for demonstrated loss of a known nest site with a mitigation requirement of 6.5 ac of habitat preservation per breeding pair. Under Alternative 2, this species would experience a substantially reduced level of conservation than under the proposed HCP.

9.3.8.2 Construction, Operation, and Maintenance of Facilities

Potential operation 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 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 burrowing owl.

9.3.8.3 Activities on Preserves and Reserves

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 MBTA.

9.3.9 Rationale 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 Solano HCP (Table 9.1). Alternative 2 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 nonlisted Covered Species that may become listed in the future. Specific reasons for rejection include:

- Alternative 2 fails to achieve Guiding Principle 3 (Section 1.3.2), which is to improve land use planning to prevent piecemeal preservation/mitigation that limits habitat value.

- Alternative 2 does not provide the permit and environmental review streamlining benefits desired by the applicants. Currently nonlisted special-status species would need to be addressed separately through individual project review under CEQA.
- Alternative 2 does not provide assurances that additional mitigation will not be required for currently nonlisted Covered Species that may become listed in the future.
- The conservation requirements for most 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). However, if not covered, there would be additional costs for obtaining permits in the future if the species become Federally-listed or to comply with CEQA.
- Two species, steelhead and Chinook salmon, are Federally listed as threatened/endangered, and activities affecting habitat for these species would be required to comply with FESA requirements (separate consultation or individual HCP) in conflict with Guiding Principle 2 (Section 1.3.2) to simplify and streamline FESA 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 Guiding Principle 2 (Section 1.3.2) 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 proposed Solano HCP. The term "take," as defined in the FESA, does not include plants.

Under Alternative 3, an HCP would be developed to address conservation of the 36 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 described under the proposed Solano 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 the CDFG would authorize incidental take under a 2081 permit resulting from this level of development. Under Alternative 3, the Federal 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 Solano 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 Alternative 3 compared to the proposed Solano 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 proposed Solano HCP. It is unlikely that any take will occur for this species under the proposed Solano 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

Vernal pool fairy shrimp, vernal pool tadpole shrimp, and California tiger salamander are widely distributed throughout the High Value 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 would have to be withdrawn from any future development. Additional take avoidance would likely occur within the High Value and Medium Value Vernal Pool Conservation Areas. Approximately 7,270 ac of Valley Floor Grassland and Vernal Pool habitat are located within the Plan Participants' UGBs 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 Solano HCP, impacts to Valley Floor Grassland and Vernal Pool habitats would be reduced to 6,620 ac, 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, which 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 lands proposed for development would need to be preserved and avoided. Applicants in these areas would need to perform surveys consistent with USFWS protocols to determine the 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, which is approximately 1,860 ac, 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 California tiger salamander is present in these areas.

9.4.3 California Red-legged Frog

Approximately 1,350 ac of California red-legged frog habitat are located within the potential urban development areas of Fairfield (735 ac) and Vallejo (615 ac) within the California Red-Legged Frog Conservation Area. This is the only area within Covered Activity 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 ac of habitat are located in potential urban development areas of Fairfield (680 ac) and Vallejo (880 ac) in 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 proposed Solano 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. Therefore, the proposed conservation program already achieves substantial avoidance. Maximizing avoidance would require that additional lands be precluded from development.

9.4.5 Giant Garter Snake

The giant garter snake is not known or expected to occur in Covered Activity Zone 1, except in one small potential development area in Rio Vista. As described in Section 8.6, potential indirect impacts to this species from Covered Activity Zone 1 activities relate to the degradation of downstream waters in giant garter snake habitat areas. The proposed Solano HCP adopts water quality measures required under NPDES regulations that have been determined by the United States Environmental Protection Agency (EPA) and State Water Resources Control Board (SWRCB) to treat new urban storm water 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 Covered Activity 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 Covered Activity Zone 2 facilities could result in take of giant garter snake.

Chapter 6.0 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, or inability to transport irrigation and drainage water effectively, which is the primary purpose of several of the facilities) could result.

9.4.6 California Clapper Rail

No direct take of California clapper rail or its habitat is anticipated as a result of the proposed 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 salt marsh harvest mouse or its habitat is anticipated as a result of the proposed 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 the 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 the Barker, Lindsey, and Cache sloughs (Wang 1991, USFWS 1994b). Delta smelt also spawn north of Suisun Bay in the Montezuma and Suisun sloughs and their tributaries (USFWS 1994b).

The Delta smelt is not likely to be harmed by the actions of the proposed Solano HCP. Urban runoff from development authorized under the proposed 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 Delta smelt although increased summer temperatures of discharge waters could cause this species 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 Chapter 6.0 define procedures for avoiding impacts to this and other fish species.

Authorized take under the proposed Solano HCP will only be allowed in conjunction with operation and maintenance 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 proposed HCP conservation measures). Reduced levels of take are not practicable.

9.4.9 Rationale for Rejection

Alternative 3 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 an Alternative 3 version of the Solano 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 in 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 Covered 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 an Alternative 3 version of the Solano HCP. The absence of these Voluntary Plan Participants would greatly decrease available funding for broader conservation programs for recovery of Covered Species.
- Alternative 3 would remove additional areas planned for urban development that 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 (see Section 1.3.2) developed by the Plan Participants and Steering Committee. 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: INCREASED CONSERVATION ALTERNATIVE – COMBINED HCP/NCCP ALTERNATIVE

Alternative 4 would implement a greater level of conservation than what is being considered under the proposed Solano HCP. 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 what is included in the proposed Solano HCP and/or greater conservation actions as required to meet and implement State Natural Communities Conservation Planning Act (NCCPA) standards.

Alternative 4 would entail preparation of a joint HCP/NCCP covering 36 species for a period of 30 years. The Conservation Analysis (Chapter 4.0) was initially developed to address State NCCPA standards. The NCCPA requires that Plan Participants commit to conserve Covered Species and Natural Communities within the Plan Area to the level of recovery. Chapter 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 NCCPA recovery standard. Table 9.2 summarizes the natural community impacts (based on the impact numbers in Chapter 2.0), acreage required for recovery, anticipated mitigation (based on the proposed Solano HCP), extent of protected 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 $389 million with an annualized cost of approximately $13 million over the 30-year permit duration (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 percent) 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 $587 million or $19.6 million per year. Conversely, if lower conservation requirements could be negotiated and shown to achieve recovery objectives, implementation costs for Alternative 4 would be lower. Nevertheless, the costs to implement this alternative would still likely exceed the costs to implement the proposed Solano 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 because no nexus exists for future development to fund more than its fair share of recovery costs. The proposed Solano 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 underfunded 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 conservation goals in the proposed HCP 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 9.2: Summary of Potential Additional Costs to Implement NCCP Recovery Conservation Standards

Community Association/Species	Extent in County (ac)	Projected Impact (ac)	Recovery Goal (ac)	Existing Protected (ac)	Mitigation (ac)	Very Low to Low Risk (ac)	Recovery Requirement (ac)	Estimated Current Cost per Acre[1]	Total Cost (maximum of range)	Annualized Cost (30 years)
Valley Floor Grassland and Vernal Pool	115,340	4,340	49,880	16,540	9,400	13,730	10,910			
General Community							10,570	$ 2,750	$ 16,417,500	$ 547,250
Contra Costa Goldfields	7,540	1,968	7,140	890	4,000	2,610	-360	$ 17,050	$ (6,138,000)	$ (204,600)
Inner Coast Range Communities	107,050						2,000	$ 11,550	$ 3,100,000	$ 770,000
Oak Woodland/Oak Savanna/Scrub[2]	48,170	2,590	24,220	9,060	7,770	15,160	-7,770			
California Red-Legged Frog/Callippe Silverspot Butterfly	31,520	1,100	31,160	8,320	3,300	8,700	10,840	$ 6,050	$ 5,582,000	$ 2,186,067
Coastal Marshes	85,955	25			75					
Habitat Restoration			5,000–7,000	5,720			1,280	$ 6,050	$,744,000	$ 258,133
Management										$ 27,500
Swainson's Hawk (Irrigated Agriculture)[3]	55,528	5,700	27,764	4,888	5,700		17,176	$ 27,500	$ 135,025,000	$ 4,500,833
Giant Garter Snake	5,870	420	3,472	1,100	175	10	2,187	$ 11,000	$ 3,947,000	$ 798,233
Riparian	3,430		6,940	280	50	1,700	4,910	$ 27,500	$ 135,025,000	$ 4,500,833
								Total	**$ 389,338,400**	**$ 13,005,447**

[1] All costs are in 2008 dollars.

[2] As calculated using Species Area Relationships (see Section 4.4); more than adequate Inner Coast Range communities are either protected or are at low risk for loss. However, the protected/low risk lands do not cover the full range of community conditions, necessitating additional protection of certain high risk lands in order to fully achieve natural community conservation.

[3] Recovery goal assumes that 50 percent of irrigated agriculture is intensively managed and protected for Swainson's hawk.

ac = acres

NCCP = Natural Community Conservation Plan

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