

VII. TAKE LEVELS/IMPACTS OF THE PLAN

This chapter estimates take levels anticipated under the NBHCP and the anticipated effect of that take on the Covered Species, as required by the federal and state ESAs. Covered Activities addressed under the NBHCP consist of Authorized Development in the Permit Areas of Sutter County and the City of Sacramento operations and maintenance activities by the Water Agencies, and management activities conducted by TNBC on the habitat reserves. Within the respective Land Use Agencies' Permit Areas, Authorized Development must be lawful and otherwise approved according to their adopted general plans, specific plans and community plans and shall not conflict with the activities of TNBC. Addressing urban development, the NBHCP also satisfies the requirement in the USFWS's March 11, 1994, biological opinion, as amended, concerning the proposed Sacramento Area Flood Control Agency project that the indirect effects of that project on federally listed species--these being the increased urbanization that the flood control project would make possible--be addressed and mitigated. State law requires each of the local agency prospective applicants and CDFG to comply with California Environmental Quality Act (CEQA) prior to issuance of any incidental take permit under CESA. Likewise the prospective applicants and USWFS must comply with National Environmental Policy Act (NEPA) prior to issuance of any incidental take permit under ESA.

The USFWS actions of approving the NBHCP and issuing the requested Section 10(a)(1)(B) permits are subject to NEPA compliance and will be the subject of an Environmental Impact Statement. Issuance of take permits by CDFG and local agency implementation of the NBHCP are also subject to compliance with CEQA and will be the subject of an Environmental Impact Report.

Take levels included in this plan were developed using a GIS system prepared by CH2MHill, as refined by actual field studies conducted by May & Associates in 2001. The impacts or take levels to Covered Species are fully covered in the "Natomas Basin Habitat Conservation Plan Impacts to Covered Species" prepared by CH2MHill in February 2002, (also referred to as the Technical Memo) which is included in the Appendices to this document. The method for estimating impacts to species is habitat based, which is an acceptable method identified in the USFWS' HCP Handbook to conform to Section 10 of the ESA. Thus, suitable habitat for each Covered Species is calculated as both a baseline condition, as well as a future condition assuming all Authorized Development within the Land Use Agencies' Permit Areas is developed. The California Endangered Species Act (CESA) is more specific and references impacts to populations or numbers of individuals. In consultation with the CDFG, habitat acreage impacts are accepted and may in some cases be worst case estimate of impacts insofar as there are no known occurrences in the Natomas Basin for some Covered Species.

A. EFFECTS ON COVERED WILDLIFE SPECIES

Authorized Development expected to take place under the NBHCP will result in the loss of habitat for the giant garter snake and nesting and foraging habitat for the Swainson's hawk. Since these habitats are, or may be, occupied by numerous additional Covered Species (see Tables I-1 and I-2), these species will also experience habitat loss under the Plan. It is also

expected that individuals of these species will or may be taken during urban development as well as other Covered Activities addressed in the Plan (e.g., Water Agency Covered Activities, TNBC activities). This take could occur in many ways--e.g., immediate death or injury through crushing, either inside burrows or on the ground surface; road kill; abandonment or loss of young birds at nest sites or nest colonies as a result of disturbance or nest site destruction; starvation or exposure on construction sites as a result of displacement and disorientation; and indirect effects as described in Section VII.E below.

However, the NBHCP sets forth a program to minimize and mitigate the loss of these wildlife habitat values through long-term protection, creation, and enhancement of upland and wetland habitats under the NBHCP's proposed reserve system (Chapter IV) as well as under each Permittee's avoidance, minimization, and mitigation measures (Chapter V). The Plan's reserve system will provide for the protection of these habitat types as well as the plant and animal communities they support. The following sections describe the extent of expected take of the Plan's Covered Species taking into account the reserve system program described in Chapter IV and the take avoidance, minimization and mitigation measures set forth in Chapter V.

B. EFFECTS ON VERNAL POOL SPECIES

According to current Sutter County and City of Sacramento general plans, extensive development is not anticipated in the vernal pool portions of the seasonal ponds and wetland areas. Although vernal pool habitat is limited in the Basin, it is anticipated that small areas of vernal pool habitat, generally less than one-half acre in size, potentially could be directly affected by Covered Activities. Elsewhere in the Basin and outside these existing vernal pools, vernal pool species (especially vernal pool fairy shrimp) are not found in natural habitat and are present only in transient or incidental populations in artificial habitats. These incidental populations and artificial habitats (referred to here as "non-vernal pool habitat") are not considered to have long-term significance to the survival and recovery of the vernal pool species.

Direct loss of vernal pool species habitat will be minimized and mitigated in accordance with the measures set forth in Chapters IV and V.

Although anticipated to be minimal due to the limited presence of vernal pool habitat in the Basin, indirect effects to vernal pool habitat could result from human encroachment, invasive species, altered hydrology and non-point source pollution within vernal pool watersheds. These effects could result in changes in species mortality rates, hydrology changes, reductions in habitat area, and isolation of species. Incidental take effects on individual vernal pool species are described further below. Reserve management activities described in Chapter IV and minimization measures described in Chapter V for vernal pool habitat would be implemented to minimize incidental take of vernal pool species.

C. EXTENT OF INCIDENTAL TAKE

The federal and state Incidental Take Permits will apply to the respective Permit Areas of each Land Use Permittee and will apply to the entire Plan Area including Area B for TNBC. The NBHCP specifies particular areas where urban development can occur, the amount of

Authorized Development allowed in each Land Use Agencies' jurisdiction, and the total Planned Development in the Basin of 17,500 acres. Additionally, the RD 1000 and Natomas Mutual facilities that are covered by the NBHCP extend to areas outside of the Land Use Agencies' Permit Areas. Thus, collectively, the permits issued under the NBHCP will allow take to occur broadly within the Natomas Basin, but limits Authorized Development to specific locations. Take related to Authorized Development will be mitigated on a 0.5 to 1 mitigation ratio. Based upon 17,500 acres of Planned Development, 8,750 acres of land will be placed into habitat reserves to mitigate for that take (under the Plan's provisions, a minimum of 80% of this reserve land would occur inside the Basin).

Planned Development within the Basin could potentially result in the conversion of up to 17,500 acres of undeveloped land (primarily lands currently in agriculture) in the Land Use Agencies' Permit Areas to urban use during the 50-year life of the permit (see Figure 16). The future growth scenario is based on projections contained in the approved Sutter County General Plan, the Metro Air Park Plan, the North and South Natomas Community Plans, and the City of Sacramento General Plan (see Chapter III) and the limit on Authorized Development established by the NBHCP.

The NBHCP provides a means of maintaining a par between mitigation and development in the Permit Areas by generating enough reserve land through the 0.5 to 1.0 mitigation ratio, enough money through the associated mitigation fees, and other TNBC revenues to acquire and manage rice fields, wetlands, and upland reserves (see Section IV.C). In addition to acquisition of lands, the TNBC will also manage and enhance reserve lands for the benefit of the Covered Species, thereby providing more productive habitat than the habitat displaced by Authorized Development.

The greatest impact of urban development in the Basin on the Covered Species will be the loss of agricultural land, particularly land in rice cultivation. However, all of the projected Authorized Development will not happen at once, and many areas of the Basin will continue to support agricultural uses over the next 50 years. Figure 16, Historic, Existing and Projected Urban Development Areas, and Figure 15, Rice Cultivation (1997), show land currently in agriculture. Since agriculture, particularly rice cultivation, has an anticipated long-term future in the Basin irrespective of the Plan's mitigation program, rice lands will continue to support wetland habitat for the giant garter snake and other irrigated croplands will continue to provide foraging habitat for Swainson's hawks, in addition to such areas that may be established within the reserve system. The initial reserve system goal is to manage 50% of reserve lands as rice fields in order to continue the agriculturally based wetland habitat characteristics of the Natomas Basin.

Calculations of Reserve Lands by Habitat to be Created to Compensate for Impacts

Based on the historic habitat characteristics of the Natomas Basin, and the expected impacts by species, the Conservation Plan calls for TNBC to create a system of reserves. The reserve system is to be comprised of 50% rice reserves, 25% managed marsh reserves and 25% upland reserves. It is important to note that a portion of the managed marsh reserves will include

upland edges which will also allow for upland species to benefit from the managed marsh reserves. Based on the mitigation program of the Land Use Agencies, reserves are to be created at a ratio of 0.5 acres of reserve for every acre of Authorized Development. Based on these requirements, the overall authorized take of 17,500 would generate a reserve system of 8,750 acres comprised of 50% rice reserves, 25% managed marsh reserves and 25% upland reserves. Table VII-I below shows the amount of mitigation lands to be funded by each Land Use Permittee as well as the total amount of mitigation land.

**TABLE VII-1
ACREAGE CALCULATIONS**

Permittee	Planned Development	Reserve Total to be Created at 0.5 to 1.0	50% Rice Reserves	25% Managed Marsh Reserves	25% Upland Reserves
City of Sacramento	8,050	4,025.0	2,012.5	1,006.3	1,006.3
Sutter County	7,467	3,733.5	1,866.8	933.4	933.4
Metro Air Park	1,983	991.5	495.8	247.9	247.9
TOTAL	17,500	8,750.0	4,375.0	2,187.5	2,187.5

D. IMPACTS ON INDIVIDUAL SPECIES

Discussed below are: 1) the significance of the Natomas Basin to each Covered Species, 2) the extent of take of each Covered Species as a result of the Covered Activities, 3) the measures to avoid, minimize, or mitigate take of each species required by each Land Use or Water Agency Permittee, and 4) the impacts of take on each Covered Species as a result of the Covered Activities of the NBHCP. Many of the conclusions made in this section are based on the technical memorandum, Final Draft Natomas Basin Habitat Conservation Plan Impacts to Proposed Covered Species (Tech Memo), completed by CH2MHill, dated February 25, 2002.

1. Giant Garter Snake

Significance of the Natomas Basin to Giant Garter Snake

The giant garter snake is listed as Threatened under both the Federal Endangered Species Act (ESA) and the State of California Endangered Species Act (CESA). The Natomas Basin sub-population of the giant garter snake is part of the larger American Basin population. Rice fields and agricultural water supply and drainage canals in the Natomas Basin are important to the species dispersion, feeding, and reproduction. The Natomas Basin provides a portion of the remaining habitat that the larger American Basin population requires to persist. Therefore the

Basin and its giant garter snake sub-population is important to the continued viability of the species.

Extent of Take of Giant Garter Snake as a Result of Covered Activities

An estimate of take of the giant garter snake under the NBHCP would ideally be based on an estimate of the size of the existing garter snake population in the Natomas Basin and an estimate of how many of these snakes would likely be killed or injured during activities addressed in the Plan. However, for the reasons discussed in Section II.C.2.d, reliable quantitative estimates of the Basin's giant garter snake population do not exist. Another complicating factor is that the exact distribution of garter snakes within the rice land habitats of the Natomas Basin is also unknown. However, though the distribution is probably somewhat patchy, most rice lands in the Basin are probably occupied or could be occupied by giant garter snakes, and the intervening unoccupied agricultural terrain, mostly ditches (but also fields), probably provides avenues for dispersal and other movements.

Therefore, an alternative method of estimating take of the giant garter snake under the NBHCP is to estimate take in terms of loss of habitat acres instead of loss of numbers of snakes by assuming that all rice lands and other potential habitat in the Basin are occupied by snakes to some extent, and then estimating the amount of rice lands and other habitat that could or will be lost to Authorized Development.

Potential habitat for the giant garter snake in the Natomas Basin currently consists of rice fields, irrigation canals/ditches, ponds and seasonally wet areas, and uplands adjacent to these habitat types. The changes in potential habitat in the Basin for the giant garter snake that would result from Authorized Development are shown on Table 5-1 of the Biological Technical Memorandum. According to Table 5-1, the Natomas Basin supported about 24,567 acres of habitat (marsh, rice and canals) for giant garter snakes, about 45% of the Basin. The Future scenario (assuming 17,500 acres of urban development) shows 16,055 acres of potential habitat, resulting in a loss of habitat of 8,512 acres in the whole Basin. Of the 8,512 acres expected to be impacted, 1,617 acres are located within Metro Air Park, which is subject to a separate HCP and mitigation program that is based on and consistent with the NBHCP. This leaves 6,896 acres of habitat which would be affected by future development of the authorized activities of this HCP. Impacts by Permittee are shown in the table below:

**TABLE VII-2
GIANT GARTER SNAKE CHANGE IN POTENTIAL HABITAT (ACRES)**

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition ¹	Overall % Change
Ponds / Seasonal wet areas	96	-7	-4	-10	-21	75	-21.8%
Rice	22,693	-970	-1,541 ²	-5,577	-8,087	14,606	-36.6%
Canals (all)	1,778	-117	-72	-215	-404	1,374	-22.7%
TOTAL	24,567	-1,094	-1,617	-5,802	-8,512	16,055	-34.6%

Source: CH2MHill, February 2002

1/ Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.

2/ This rice is no longer in production as MAP has prepared for urbanization.

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that giant garter snake might use and does not represent habitat known to be occupied by the species.

The actual reduction in habitat value, however, is expected to be considerably less than the projected 8,489 acres because:

- (1) Snakes primarily use the edges of rice fields, not the entire rice field. Because snakes would not use all the acreage identified as rice habitat, the actual amount of giant garter snake habitat in the Natomas Basin is overestimated and is not directly correlated to the projected changes in land use acreage that result from Authorized Development. Additionally, rice fields generally only provide summer habitat for the snake whereas, the existing canals and ponds provide a more permanent year round habitat. It is important therefore, to note that the loss of 21 acres of wet areas and ponds and 404 acres of canals, will be mitigated by the creation of 2,187.5 acres of managed marsh habitat. Rice, which for the reasons noted above, provides only seasonal habitat will also be provided under the reserve system with a total of 4,375 acres of rice in reserves;
- (2) Managed marsh habitat would provide more habitat for snakes than rice fields on an acre-for-acre basis because of the larger amount of edge habitat (see Figure 18). Managed marsh habitat would also be superior to the current canal habitat in that it will not be subject to periodic degradation from maintenance activities;
- (3) Managed marsh habitat would be designed to accommodate year-round habitat requirements (e.g., year-round wetland habitat to maintain prey populations, integration of wetland and upland habitats so snakes are not exposed to hazards as they move to their over-wintering sites, and absence of mortality sources associated with rice production); and
- (4) Rice in the reserve system would be managed to provide better habitat quality than existing rice fields.

In addition to the change in potential habitat, additional effects of urban development that may cause take of giant garter snakes include the elimination of dispersal opportunities leading to population isolation, the results of edge effects on remaining habitat, death or injury to snakes during construction activities, or entombment of snakes in their winter retreats. Also, experience with the USFWS refuge system suggests that operation and maintenance of the RD 1000 and Natomas Mutual conveyance systems will result in killing or injury of some snakes, and there will be additional take associated with short-term loss of habitat following dredging or cleaning activities. Finally, some take of giant garter snakes will likely occur during rice farming activities on TNBC's reserves, as well as during TNBC's construction and maintenance of managed marshes required for the reserve system. However, levels of take of garter snakes during each of these activities (ditch/drain maintenance, rice farming, and marsh construction) are expected to be minor; this is because the Plan's take avoidance, minimization, and mitigation measures (Section V) will be implemented, and because some of these activities (e.g., rice farming) are inherently low-impact with respect to giant garter snakes. The issuance of Incidental Take Permits therefore, will not likely jeopardize the continued existence of this species.

Measures to Avoid, Minimize, and Mitigate Take of the Giant Garter Snake

The NBHCP includes measures to avoid, minimize, and mitigate direct loss of giant garter snakes from construction activities associated with urban development and TNBC's creation of the reserves. The measures related to construction include: timing restrictions, dewatering requirements, and construction monitoring, as well as restrictions on management and maintenance practices. For example, canal and ditch maintenance activities would be limited to no more than 10% of the total miles of canals and ditches per year, including resloping. By conducting construction during the summer months when snakes are active, there is a high probability that snakes in the construction area would be able to avoid construction equipment. By dewatering habitat between November 1 and April 1, snakes would not inhabit construction zones when they emerge from their winter retreats. If dewatering must occur after April 15, it must remain dry for 15 consecutive days prior to excavating or filling habitat. Snakes have been found to leave habitat within a few days of dewatering. By waiting for 15 days after dewatering, it is reasonable to expect that any snakes would have left the construction zone prior to the start of construction activities and injury to snakes would be avoided. Providing construction monitoring (including pre-construction surveys) by a qualified biologist would help ensure that any snakes remaining in the construction area would be relocated in accordance with USFWS and CDFG procedures.

The NBHCP includes measures to avoid, minimize, and mitigate direct loss of giant garter snakes from Water Agency Covered Activities. These measures include the timing restrictions and dewatering requirements listed above, as well as restrictions on management intensity and management of vegetation control measures. Vegetation control along ditches and canals would be limited to one side of the ditch per year. With this restriction, vegetation that potentially provides habitat for snakes would be retained on one side of the ditch and the ditch could continue to provide cover for snakes following maintenance activities. Restrictions on mowing, application of herbicides/ pesticides, and burning are provided to ensure that habitat features important to the giant garter snake would not be removed as part of maintenance

activities and that individual snakes are not killed or injured as a result of vegetation control practices.

In combination with the Conservation Plan, these measures would avoid, minimize and mitigate take of giant garter snakes to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

Impacts to Giant Garter Snake from Development within the City of Sacramento under NBHCP

Development within the City of Sacramento will result in the loss of foraging, rearing, and hibernation habitat for the giant garter snake and may directly kill or injure individual giant garter snakes due to construction activities although the HCP includes measures to avoid construction take to the maximum extent possible. Foraging and rearing habitat eliminated will consist of agricultural fields and irrigation supply and return ditches and their adjacent levees and berms. Roadside and other types of ditches and channels are also suitable aquatic habitat or movement corridors that may be affected either directly or indirectly by development within the City of Sacramento. Absent the take avoidance, minimization and mitigation measures of the NBHCP, this loss of habitat could potentially represent a substantial impact on the local (American Basin) and statewide population of the snake. To avoid the potential that development within the City of Sacramento would have to adversely affect the continued existence of the species in the American Basin, the City will implement the measures proposed within this NBHCP.

According to Table 5-1 of the Tech Memo, the number of acres of canals, ponds, and rice in the City's Permit Area which may be impacted by future development is 1,094. Of this, 7 acres are ponds and wet areas, 117 acres are canals and 970 acres are rice. The 8,050 acres of Authorized Development in the City of Sacramento will generate mitigation fees and as a result, 4,025 acres of permanent reserves will be acquired by TNBC. Using 25 % marsh, 50% rice, and 25% uplands proportions, 1,006 acres of managed marsh, 2,013 acres of rice, and 1,006 acres of uplands will be acquired by TNBC as permanent reserves as a result of the City's Covered Activities. The permanent managed marsh would be of a higher quality habitat value than the habitat converted to urban uses because: 1) a higher amount of wetland/upland edge habitat would be provided than rice; 2) a water management regime would provide habitat through the snake's active period; 3) year-round wetland habitat will be provided to maintain prey populations; 4) there will be an integration of marsh and upland to reduce hazards while moving to overwintering sites; and 5) it will provide decreased mortality sources. In addition, under the NBHCP more rice land would be provided in permanent preserves (2,013 acres) than would be lost by urban development in the City's Permit Area (970 acres). While much of the rice land acquired by TNBC for mitigation land is already rice land, the enhanced habitat value results from the permanence of the reserve system and TNBC's rice production practices. Moreover, the NBHCP's reserve system will be permanent and not subject to future pressures for its urban development.

The North Natomas Community Plan (NNCP) designates a 250 foot wide non-urbanized buffer along the City side of Fisherman's lake, an area owned and managed by RD1000 and

known to support giant garter snakes. Development within the NNCP will be available to pay for the acquisition of the buffer land through the North Natomas Financing Plan Land Acquisition Program, separate from the NBHCP mitigation fees. The NBHCP imposes no obligations upon RD 1000 related to this buffer.

Development in the City is expected to result in a net loss of habitat for giant garter snakes. Despite a net loss of habitat and direct take of giant garter snakes, implementation of the NBHCP in the City's Permit Area, including the creation of a permanent system of reserves, provision for a non-urbanized buffer adjacent to Fisherman's Lake, and compliance with required avoidance, minimization, and mitigation measures, will facilitate the persistence of giant garter snakes in the Basin because: 1) the quality of both marsh and rice in the reserve system would be greater than the affected habitat and could support a larger population of giant garter snakes; and 2) the habitat reserves would provide habitat that is stable in location, amount, availability, and quality thereby providing conditions conducive to supporting a stable population of giant garter snakes. The NBHCP Operating Conservation Plan will avoid, minimize and mitigate take of giant garter snakes to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

Impacts to Giant Garter Snake from Development within Sutter County under NBHCP

Development within Sutter County will result in the loss of foraging and rearing habitat for the giant garter snake. Foraging and rearing habitat lost will consist of agricultural fields and irrigation supply and return ditches. Absent the measures proposed to avoid, minimize and mitigate take of giant garter snake proposed within the NBHCP, this loss would be considered potentially significant to the continued existence of the species in the American Basin.

According to Table 5-1 of the Tech Memo, the number of acres of canals, ponds, and rice in Sutter's Permit Area which would be impacted by Authorized Development is 5,802 acres. Of this, 10 acres are ponds and seasonally wet areas, 215 acres are canals, and the balance or 5,577 acres are rice fields. The 7,467 acres of Authorized Development in Sutter County will generate mitigation fees and as a result, 3,733 acres of permanent reserves will be acquired by TNBC. Using 25 % marsh, 50% rice, and 25% uplands proportions, 933 acres of managed marsh, 1,867 acres of rice, and 933 acres of uplands will be acquired by TNBC as permanent reserves. Thus, loss of habitat which is predominantly in rice fields will occur, however, the Conservation Plan calls for a substantial increase in the amount of managed marsh (933 acres) which will provide a substantial increase in snake habitat over the loss of 215 acres of canals and 10 acres of ponds. The permanent managed marsh would be of a higher quality habitat value than the habitat converted to urban uses, even rice land, because: 1) a higher amount of wetland/upland edge habitat would be provided than rice; 2) a water management regime would provide habitat through the snake's active period; 3) year-round wetland habitat will be provided to maintain prey populations; 4) there will be an integration of marsh and upland to reduce hazards while moving to overwintering sites; and 5) there will be a decrease in mortality sources. Although, much of the rice land acquired by TNBC, for mitigation land is already rice land, the enhanced habitat value results from the permanence of the reserve system and TNBC's rice production

practices. Moreover, the NBHCP's reserve system will be permanent and not subject to future pressures for its urban development.

Development in Sutter County is expected to result in a net loss of habitat for giant garter snakes in that jurisdiction whether or not the City of Sacramento participates. Despite a net loss of habitat and potential direct take of giant garter snakes, implementation of the NBHCP in Sutter's Permit Area, including the creation of a permanent system of reserves and compliance with required avoidance, minimization, and mitigation measures, would encourage persistence of giant garter snakes in the Basin because: 1) the quality of both marsh and rice in the reserve system would be greater than the affected habitat and could support a larger population of giant garter snakes; 2) the habitat reserves would provide habitat that is stable in location, amount, availability, and quality thereby providing conditions conducive to supporting a stable population of giant garter snakes; and 3) the Changed Circumstances and Adaptive Management sections of the plan allow for monitoring of impacts to ensure that the type of habitat created by the reserve system supports the species impacted by Authorized Development and also includes changes to incorporate and Recovery Plans adopted for the giant garter snake. The NBHCP Operating Conservation Plan will avoid, minimize and mitigate take of giant garter snakes to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

Impacts to Giant Garter Snake from the Water Agencies' Covered Activities

The impacts that may result from RD 1000's Covered Activities, and those that may result from Natomas Mutual's Covered Activities are substantially the same. As a result, the impacts of the two agencies are defined collectively for giant garter snake as well as all species addressed by the NBHCP and discussed within this section.

Experience with the USFWS refuge system suggests that operation of the RD 1000 and Natomas Mutual water conveyance systems may result in killing or injury of some snakes, and there will be additional take associated with short-term loss of habitat following dredging or cleaning activities.

Possible take of the giant garter snake by the Water Agencies' Covered Activities is mitigated under the NBHCP because: (1) the NBHCP requires the Water Agencies to employ take avoidance measures to ensure that a minimum number of giant garter snakes are directly killed or injured during the Water Agencies' Covered Activities; (2) some habitats in the Basin may be currently underutilized by giant garter snakes, allowing for some giant garter snakes to disperse to, or be re-introduced into, those underutilized habitats; (3) the fact that the ditches and canals already support the primary giant garter snake habitat, indicates that the Water Agencies' Covered Activities may not be substantially detrimental to giant garter snake populations; and 4) additional mitigation measures as appropriate will be included in the specific management plans for the Water Agencies. The NBHCP Operating Conservation Plan will avoid, minimize and mitigate take of giant garter snakes to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

Overall Impacts to Giant Garter Snake under NBHCP

Urban development within the Permit Areas is likely to destroy giant garter snake habitat (e.g., rice fields, marshes and sloughs, and irrigation ditches and drains), and may directly kill or injure individual garter snakes. Giant garter snakes may be killed or injured through vehicle strikes on roads, crushing beneath heavy construction equipment, or entombment in their winter retreats. Giant garter snakes that escape initial destruction in construction areas may also be killed or injured because of disorientation or lack of suitable cover resulting in starvation or predation. Non-construction related operations and maintenance activities by the water agencies may have similar effects on the snake. The behavior of giant garter snakes, especially their response to construction related disturbance, is not well understood. However, the NBHCP's take avoidance strategy for giant garter snakes, recognizes that some such measures could be modified under the Plan's Adaptive Management provisions.

Anticipated take of the giant garter snake, as described above, is expected to be adequately mitigated under the Plan because: (1) the Plan will establish up to 6,562.5 acres of reserve lands in both managed marsh wetlands and rice lands, designed to best meet the giant garter snake's biological needs; (2) the Plan describes take avoidance measures to ensure that a minimum number of garter snakes are directly killed or injured during development and other activities; (3) some habitats in the Basin may be currently underutilized by snakes, allowing for some snakes to disperse to or be re-introduced into them; and (4) some existing rice lands will likely not be developed under the Plan, leaving a component of rice land habitat that would work in concert with the Plan's reserve system to support the Basin's giant garter snake population.

Giant garter snake mitigation includes a combination of overall measures (i.e., pre-construction surveys), species-specific measures (i.e., timing restrictions, dewatering requirements), up-front acquisition of mitigation lands, and planned long-term protection, creation, and enhancement of upland and wetland (i.e., marsh) habitats in the reserve system. Mitigation for the species also includes a substantial monitoring program that will aid in the timely evaluation of mitigation program efficacy.

The NBHCP Operating Conservation Plan will avoid, minimize and mitigate take of giant garter snakes to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

2. Swainson's Hawk

Significance of the Natomas Basin to Swainson's Hawk

The Swainson's hawk is listed as a Threatened species under the California Endangered Species Act. Swainson's hawks use the Natomas Basin for the breeding season from March to September for nesting and foraging. The hawk overwinters in Mexico and South America. A study conducted by the Swainson's Hawk Technical Advisory Committee in 2000 monitored 24 nesting sites in the Basin, of which 17 were active. Of these, only 10 successfully nested in 2000 (i.e., reared young to fledgling), producing a total of 20 fledglings (Swainson's Hawk TAC 2000). Two new nesting territories were found in the interior of the Natomas Basin in 2001 and a

third new site was found adjacent to the East Main Drainage Canal (Swainson's Hawk TAC 2001). Of the 27 territories in the Basin, 19 were active in 2001. About 35 additional nesting sites are located outside the Basin, 22 sites on the water side of the Sacramento River east levee (adjacent to the Basin) and 13 sites on the water side of the Sacramento River west levee. Loss of foraging (i.e., grassland and agricultural fields) and nesting habitat (i.e., tall oaks or other trees in riparian and other habitats) continues to impact this species statewide. The Natomas Basin provides foraging and nesting habitat for the Swainson's hawk and is important to the continued viability of the Swainson's hawk.

Extent of Take of Swainson's Hawk as a Result of Covered Activities

The HCP includes a number of protocols and mitigation measures to prevent harm to individual hawks. However, indirect or incidental take of the Swainson's hawk could result under the Covered Activities of the NBHCP from the effects of: (1) conversion of Swainson's hawk nesting and foraging habitat to urban uses; (2) adverse edge effects on Swainson's hawk habitat remaining in the Basin after development occurs; and (3) disturbance to or removal of trees which may support nesting activities of Swainson's hawk. The issuance of Incidental Take Permits in combination with the provisions of the NBHCP will not likely jeopardize the continued existence of this species.

Nesting Habitat: The Natomas Basin supports both nesting and foraging habitat for Swainson's hawk. For nesting, Swainson's hawks typically use riparian forest habitats but can use isolated trees or groves of trees outside of riparian zones (Swainson's Hawk TAC 2000). Of the existing land use types in the Natomas Basin, Riparian, Oak Groves and Tree Groves are considered potential nesting habitat for Swainson's hawk. Based on these land use types, the Natomas Basin currently supports about 328 acres of potential nesting habitat for Swainson's hawk. This acreage does not include riparian habitat along the Sacramento River on the water side of the levees which is located outside of the HCP Plan Area. The land use analysis indicates a reduction in potential nesting habitat of 65 acres.

**TABLE VII-3
SWAINSON'S HAWK CHANGE IN POTENTIAL NESTING HABITAT (ACRES)**

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition ¹	Overall % Change
Riparian	124	-24	0	0	-24	100	-19.4%
Oak Groves	98	-6	-2	0	-8	89	-8.2%
Tree Groves	106	-10	-23	0	-33	73	-31.1%
TOTAL	328	-40	-25	0	-65	263	-19.8%

Source: CH2MHill, February 2002

^{1/} Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat Swainson's hawk might use and does not represent habitat known to be occupied by the species.

However, the actual loss of nesting habitat would be effectively less than this amount because: 1) it is estimated that only 4 of the active nest sites are located in the area of potential nesting habitat lost to urban development; 2) riparian habitat, suitable for nesting trees, would be incorporated into the habitat reserves; and 3) tree mitigation will be advanced for these four trees following approval of the HCP regardless of when or if the nest trees are actually disturbed ; and 4) measures would be implemented to protect trees that are used by Swainson's hawk and to increase the availability of suitable nesting trees.

The tree planting program for TNBC lands is in progress and ongoing. A variety of native tree species will be planted to provide trees with differing growth rates, maturation and life span. This will ensure that nesting habitat will be available quickly (5-10 years in the case of cottonwoods and willows), and in the long term (i.e., valley oaks and sycamores), and minimize the temporal losses from impacts to trees within areas scheduled for development within the 50-year permit life. Trees will be planted throughout the Basin, increasing nesting habitat within close proximity of quality foraging habitat within the reserves. The trees will also be located in more protected areas (away from development and highways), and near ore consistent food sources. This increased value in foraging habitat based on quality and proximity to nesting habitat will enhance the nesting success (better bioenergetics) of future generation of Swainson's hawks. In addition, a total of 2,187.5 acres of upland reserves with tree groves as well as the upland edges (approximately 25% or 547 acres) of the 2,187.5 acres of managed marsh will be established under the NBHCP. Over time, tree groves and nest tree planting mitigation will create substantial new nesting habitat for the Swainson's hawk. Thus, although 263 acres of potential nesting habitat will be impacted, substantially more acres of upland habitat and edges with trees will be created.

Foraging Habitat: Foraging habitat for Swainson's hawk consists of alfalfa, grasslands, pasture and certain row crops, such as tomatoes and sugar beets. Swainson's hawks have been observed foraging along the margins of rice fields when the fields are flooded, and to forage in rice fields that are not flooded. Nonetheless, rice provides relatively little habitat for Swainson's hawks; therefore this habitat type is not considered as foraging habitat in the analysis. Based on this characterization, the Natomas Basin supports about 21,908 acres of foraging habitat for Swainson's hawks (Table 5-5 of the Tech Memo). The future scenario shows 12,703 acres of habitat remaining after completion of Authorized Development including Authorized Development by Metro Air Park. Of the foraging habitat which would be impacted by urban development, 6,917 acres are within the City of Sacramento, 1,860 acres are within Sutter County, and 403 acres are attributed to build-out in Metro Air Park.

The importance of suitable foraging habitat to Swainson's hawks however is influenced by the proximity of foraging habitat to nest sites. Swainson's hawks have been found to forage up to 18 miles from nest sites, but most foraging occurs much closer to nest sites. The CDFG considers habitat within 1.0 mile from the nest site as the more valuable foraging habitat than habitat at greater distances. The baseline amount of foraging habitat for Swainson's hawk within 1 mile of nest sites is 12,446 acres (Table 5-6 of the Tech Memo). At the Future scenario, a total of 4,149 acres are expected to be impacted in the Basin, leaving 8,279 acres of foraging habitat within 1 mile of nesting sites remaining. Of the 4,149 acres expected to be impacted by

development, 3,679 acres are located in the City of Sacramento, 165 acres are located in Sutter County, and 305 acres are located in Metro Air Park. This net reduction would be at least partially, if not entirely, offset by the greater quality of upland habitat (a total of 2,187.5 acres of upland reserves) in the habitat reserves (i.e., native grassland and managed specifically to provide foraging habitat), and by upland components of the other reserve habitats.

**TABLE VII-4
SWAINSON'S HAWK CHANGE IN POTENTIAL FORAGING HABITAT* (ACRES)**

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition¹	Overall % Change
Non-rice Crops	9,698	-2,523	-232	-159	-2,915	6,784	-30.0%
Pasture	353	-3	-20	0	-23	330	-6.5%
Ruderal	1,444	-868	-6	-5	-879	565	-60.9%
TOTAL	12,446	-3,679	-305	-165	-4,149	8,297	-33.3%

Source: CH2MHill, February 2002

* Within 1 mile of nesting sites

¹ Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.

In addition to the 2,188 acres of upland reserve habitat proposed under the NBHCP, there will be numerous other opportunities for Swainson's hawk forage within TNBC reserve system. It is anticipated that 10% of rice crops will be rotated out of rice production annually, thus providing additional rotating forage land each year. Rice fields are drained for two of the seven month period during which Swainson's hawk forage in the Natomas Basin and, when drained, these rice fields provide additional foraging habitat. Within TNBC managed marsh reserve component, substantial upland areas and the seasonally dry component of the managed marsh provide foraging habitat for Swainson's hawk. (See Section IV.C.3.d which requires that on wetland reserves, typically include 20-30% of the reserve as upland habitats (for basking, hibernacula, etc.) Based upon the upland reserve component and these additional opportunities, Swainson's hawk foraging habitat within TNBC reserve system will be greater than the 0.5 to 1.0 mitigation required under the NBHCP. The table below shows the total acreage of upland habitat projected to be included in the TNBC reserve system. The proposed Mitigation Ratio (0.5:1), in combination with restoration and enhancement efforts, and operational and management practices of rice reserves, would comprise a system of upland areas for foraging equivalent to 3,371.8 acres.

**TABLE VII-5
UPLAND FORAGING HABITAT WITHIN TNBC RESERVES**

Reserve Habitat Type	Acreage	Percent Upland Area	Upland Acreage
25% Upland Areas	2,187.5	100	2,187.5
25% Managed marsh of which 20-30% is upland edges	2,187.5	25	546.9
MAP Additional Swainson's Hawk Mitigation Land	200	100	200
Fallow rice reserves	4,375	10	437.5
TOTAL UPLAND FORAGING ACREAGE			3,371.9

While not under the authority of TNBC or the Permittees, Sacramento International Airport maintains approximately 4,050 acres of buffer lands surrounding the existing airport. These buffer lands provide a large contiguous block of habitat within and adjacent to the Swainson's Hawk Zone and provide substantial foraging habitat for Natomas Basin Swainson's hawk populations. Development of these buffers lands to urban uses would require that Sacramento County either participate in a revision to the NBHCP or a separate consultation process with the Wildlife Agencies to secure an Incidental Take Permit. Analysis of such a permit application would consider the impacts of proposed development on the viability of Natomas Basin Swainson's hawk populations and the project applicants would be required to fully mitigate the impacts of proposed development.

Measures to Avoid, Minimize, and Mitigate Take of the Swainson's Hawk

The NBHCP includes measures to avoid, minimize, and mitigate take of Swainson's hawks related to change in potential habitat within the Basin. These measures include: 1) avoiding removal of known nest trees, if practicable; 2) preserving valley oaks, wherever possible; 3) preserving and restoring riparian habitat, particularly within the buffer at Fisherman's Lake; and 4) implementing a tree planting program on TNBC habitat reserves. The tree planting program could create nesting opportunities in areas with limited nesting habitat but that have adequate foraging habitat and increase overall the nesting population of hawks in the Basin.

Also, the NBHCP includes measures to avoid, minimize, and mitigate take of Swainson's hawk related to construction impacts of urban development or TNBC activities: 1) pre-construction surveys to determine locations of nest sites; 2) timing restrictions to avoid

disturbing Swainson's hawks during the breeding season; and 3) on-site biologist to monitor construction activity that might cause nest abandonment or forced fledgling. The effects of the Water Agency Covered Activities on Swainson's hawks would be minimal because most of the Covered Activities are expected to occur outside Swainson's hawk nesting areas. In combination with the Conservation Plan, these measures would avoid, minimize and mitigate take of Swainson's hawk to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

Impacts to Swainson's Hawk from Development within the City of Sacramento under NBHCP

Development within the City of Sacramento will result in the loss of foraging habitat and could disturb or eliminate active nest sites due to construction activities. Foraging habitat includes alfalfa, non-rice crops, grassland, and pasture. Absent the avoidance, minimization and mitigation measures of the NBHCP, this loss of habitat would potentially represent a substantial impact on the Swainson's hawk in the City's Permit Area. that might adversely affect the continued existence of the species in the Basin.

According to Tables 5-5 and 5-6 in the Biological Tech Memo, the number of acres of potential foraging habitat, including alfalfa, non-rice crops, grassland, ruderal and pasture, in the City's Permit Area which would be impacted by urban development is 6,925 acres. Of this, Table 5-6 of the Tech Memo estimates that 3,679 acres are located within 1 mile of nesting sites and therefore, are considered more productive habitat for the hawk. The Future Scenario, assuming 8,050 acres of Authorized Development, shows 1,006.3 acres of uplands reserve would be created and managed to minimize City impacts to foraging habitat. The uplands habitat will be managed by TNBC to specifically provide the habitat requirements of the Swainson's hawk (i.e., grasslands and nesting trees). In addition, approximately 25% (or an additional 251 acres) of the managed marsh reserves will be upland edges which will also be managed for the benefit of the hawk.

Authorized Development within the City's Permit Area (Figure 2) is within the Swainson's Hawk Zone is limited to the 252 acres designated for urban development by the City in 1994. The City is not proposing any additional lands within the Swainson's Hawk Zone for coverage under the NBHCP and its associated Permits. The foraging habitat converted to urban uses, therefore, is not generally within one mile of the majority of nesting sites. Also, the NNCP designates a 200 foot wide agricultural buffer along the western boundary of the community plan area between the City limits and designated urban uses (page 59 - NNCP). This buffer is part of and contained within the 252 acres of City designated urban development located within the Swainson's Hawk Zone. This buffer is intended to reduce the disturbance of the riparian habitat, including existing hawk nest sites, along Fisherman's Lake from human and other activities associated with the urban area.

In the 2001 Settlement Agreement, the City was obligated to amend the North Natomas Financing Plan to provide for a 250 foot wide agricultural buffer, 50 feet wider than NNCP. The Financing Plan was amended to include this increased buffer width in the Land Acquisition Program in June 2002. Also, the Settlement Agreement requires the City to consider a

community plan amendment to widen the agricultural buffer from 250 feet to 800 feet wide. As of January 2003, the Council has not taken action on this proposed buffer width amendment.

Development in the City will be subject to avoidance, minimization, and mitigation measures designed to reduce removal and disturbance of hawk nest trees.

The NBHCP Operating Conservation Plan will avoid, minimize and mitigate take of Swainson's hawk to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

Impacts to Swainson's Hawk from Development within Sutter County under NBHCP

Development within Sutter County will result in the loss of foraging habitat and could disturb or eliminate active nest sites due to construction activities. Foraging habitat includes alfalfa, non-rice crops, grassland, and pasture. Absent the avoidance, minimization and mitigation measures of the NBHCP, this loss of habitat could potentially represent a substantial impact on the Swainson's hawk in Sutter's Permit area and could adversely affect the continued existence of the species in the Basin.

According to Tables 5-5 and 5-6 in the Biological Tech Memo, the number of acres of potential foraging habitat, including alfalfa, non-rice crops, grassland, ruderal and pasture, in the Sutter's Permit Area is 1,860 acres of which 165 acres are located within 1 mile of nesting sites. Foraging habitat for Swainson's hawk within Sutter County is limited due to the type of agricultural practices that occur in the County. Rice is the predominant crop and does not promote a large prey base when compared to more favorable crops, such as alfalfa, or ruderal habitats. Based on Authorized Development in Sutter County (7,467 acres), Sutter County's contribution to the reserve system would include 933.4 acres of upland reserves and 933.4 acres of managed marsh with upland edges. The loss of foraging habitat will be offset by the fact that the uplands habitat reserves will be managed by TNBC to specifically provide that habitat requirements of the Swainson's hawk (i.e., grasslands). And the amount of quality habitat to be created by the reserves will be significantly greater than the amount of high quality habitat (within 1 mile of nesting sites) currently available in the Sutter County portion of the Basin.

No Authorized Development under the NBHCP within Sutter County may occur within the one-mile wide Swainson's Hawk Zone adjacent to the Sacramento River. This area is not included in Sutter County's NBHCP Permit Area. Additionally, upon execution of the NBHCP IA, Sutter County will initiate a General Plan Amendment to redesignate land in the Swainson's Hawk Zone from Industrial/Commercial Reserve to Agriculture. Avoiding development within this zone will reduce impacts to nesting and foraging Swainson's hawks, however, suitable foraging habitat outside that one-mile zone may still be lost as a result of the County's Authorized Development. Additional mitigation practices such as tree preservation and planting within NBC reserves will further offset the loss of Swainson's hawk foraging habitat in the Permit Area.

Given the relatively low value foraging habitat and the minimal number of existing nesting trees, the Sutter County portion of Natomas Basin is neither critical nor unique

habitats in the Swainson's Hawk Zone for inclusion in the Plan's reserve system in order to minimize the loss of nesting and foraging habitat.

With respect to urban development outside the Swainson's Hawk Zone, the NBHCP requires the retention and maintenance of sufficient nesting and foraging habitat to mitigate for the loss of habitat needed to maintain existing Swainson's hawk population levels throughout the Natomas Basin. This will be achieved through the acquisition or protection of suitable upland habitats outside the Swainson's Hawk Zone as well as within the zone. The Plan also requires establishment of a nest tree planting program, as described in Chapter V, to ensure the availability of future Swainson's hawk nest trees to mitigate for the loss of or impacts to nest trees in urban development areas. Also, irrespective of these measures, some portion of the Basin's agricultural lands – some of which represent suitable Swainson's hawk foraging habitat – are expected to remain in agricultural production. Thus, the Basin's anticipated ongoing land use patterns, together with the NBHCP's specific measures to mitigate for the impacts of urban development in the Basin, are expected to support long-term survival of the Swainson's hawk within the Plan Area.

With respect to edge effects, the NBHCP establishes two means to minimize such effects. First, it directs the NBC to focus upland reserve site acquisition in the Swainson's Hawk Zone; second, it requires that habitat contiguity be a primary factor in selecting upland habitat reserve sites. These provisions will ensure that substantial amounts of Swainson's hawk habitat will be protected in the Basin's most important habitat area (the Swainson's Hawk Zone), and that upland habitats will not be selected for the reserve system randomly (either inside the zone or outside), but with a strategy that maximizes habitat contiguity.

Little to no direct killing or injury of individual Swainson's hawks is expected to occur under the NBHCP. This is because Swainson's hawks occur in the Natomas Basin for only a portion of the year (the nesting season), because most development activities under the Plan are expected to occur outside Swainson's hawk nesting areas, and because take avoidance measures are required to avoid disturbance to individual Swainson's hawk nest trees during the nesting season (see Section IV.C). However, a few nest trees could be unavoidably lost during the non-nesting season if development occurs along the Sacramento River corridor or in other currently unspecified nesting areas over the life of the permit. The effects of these losses are expected to be minor, however, because the Plan sets avoidance of nest trees as a first priority (and nest tree destruction as a last resort), and because the Swainson's hawk nest tree planting program will offset any such nest tree losses over the long term.

Swainson's hawk mitigation that is proposed under the NBHCP includes a combination of overall measures (i.e., annual surveys for nesting raptors, advance acquisition of 200 acres per year), species-specific measures (e.g., acquisition of upland reserves within the Swainson's Hawk Zone, construction windows and buffer zones for occupied nests), measures to prevent the loss of nest tree, and avoidance or minimization of impacts to nesting Swainson's hawks or their nest trees.

The planned long-term protection, creation, and enhancement of upland and wetland habitats in the reserve system, in combination with upland reserves being established in the Swainson's Hawk Zone adjacent to the Sacramento River will offset the loss of Swainson's hawk foraging habitat. Additionally, the Conservation Plan and mitigation measures project 10% of TNBC rice fields to fallow each year allowing additional foraging area for the hawk. It is important to note that it will be essential that development be avoided in this zone to minimize and fully mitigate adverse effects to this species under the NBHCP.

Wetland complexes require a 75 foot upland buffer around wetlands designed for giant garter snake habitat. This buffer is to provide giant garter snake basking areas and refugia, but will also contribute to the amount of Swainson's hawk foraging habitat within the refuge. The proximity of this upland habitat to water and green feed will increase forage base production in these areas.

The Technical Memo Table 5-5 estimates that 9,188 acres of general foraging habitat (excluding reserves) will be lost to urban development within the Natomas Basin area overall. Of these acres, 6,925 acres are located in the City of Sacramento Permit Area and 1,860 acres in the Sutter County Permit Area and the balance of 403 acres is located in Metro Air Park. Relative to foraging habitat within one mile of nesting sites, Table 5-6 of the Tech Memo indicates more limited impacts of 4,149 acres comprised of 3,679 acres within the City of Sacramento, 165 acres in Sutter County and 305 acres in Metro Park. The Conservation Plan calls for the creation of 2,187.5 acres of upland habitat managed to support the Swainson's hawk and other upland species. Additionally: each managed marsh area includes an upland edge which will provide additional habitat for foraging hawks; approximately 10% of TNBC rice fields will remain fallow each year, providing additional foraging habitat; and, TNBC seasonal marsh and rice fields will be drawn down for a substantial portion of the Swainson's hawk foraging season, thus providing additional foraging habitat. The HCP seeks to enhance the survival of the species through limiting development within the Swainson's Hawk Zone and through careful creation and enhancement of new habitat areas. This determination of mitigation effectiveness assumes the establishment of upland reserves in the Swainson's Hawk Zone that are managed as optimal Swainson's hawk foraging habitat. The NBHCP will avoid, minimize and mitigate take of Swainson's hawk to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

3. Valley Elderberry Longhorn Beetle (VELB)

Significance of the Natomas Basin to VELB

While there are numerous blue elderberry shrubs adjacent to the Sacramento River, there are only scattered isolated shrubs along roadsides and the edges of agricultural fields within the interior of the Natomas Basin. VELB has not been documented to occur in the Permit Areas, however, elderberry shrubs present in the Basin are potential habitat for the species. The Permit Areas are not important to the viability of the species in that VELB has not been documented to occur there.

Extent of Take of VELB as a Result of Covered Activities

Quantifying habitat for the VELB for the purposes of the NBHCP is focused on riparian areas within the Natomas Basin and the creation of upland habitat that may include riparian areas. Little change is expected in the potential for VELB to occur in the Natomas Basin, with minimal riparian habitat occurring within the area proposed for development. In addition, the potential exists for elderberry shrubs to be planted in the managed marsh reserves, which would include 2,187.5 acres of permanent, managed marsh area. Assuming potential VELB habitat includes riparian habitat and habitat reserve land, the number of acres of VELB habitat increases from 123 to 2,187.5 acres within the Natomas Basin. Overall habitat conditions are expected to improve for the VELB.

Measures to Avoid, Minimize, and Mitigate Take of VELB

Although habitat conditions are expected to improve, removal of individual elderberry shrubs (resulting in potential elderberry beetle mortality) could still occur. Potential impacts to VELB during urban development are addressed in the NBHCP by requiring compliance with the USFWS' Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USFWS, 1999b). Key aspects of the guidelines include: 1) survey for the beetles and host shrubs by a qualified biologist through the required pre-construction survey; 2) avoidance of occupied elderberry bushes with a 100-foot construction buffer area (may be reduced with the approval of the USFWS); and 3) mitigation of occupied elderberry bushes where avoidance is not possible. Construction impacts could also occur during development of the habitat reserve system. TNBC is also required to comply with the USFWS Conservation Guidelines. Impacts to the VELB may also occur through the Water Agencies' Covered Activities. The Water Agencies are required to comply with the USFWS Construction Guidelines in areas containing VELB.

Impacts to VELB from Development within the City of Sacramento under NBHCP

Development within the City of Sacramento is not anticipated to result in a large-scale loss of elderberry shrubs or VELB within the riparian areas along the Sacramento River because no development activities will occur in that area under the NBHCP. Isolated shrubs, or patches of elderberry shrubs, within undeveloped farmland may be affected by City development, which could result in a loss of potential habitat (i.e., elderberry shrubs) for the species. In such cases, impacts to the species shall be mitigated in accordance with USFWS Conservation Guidelines for the species, thus take of VELB in the Permit Area is unlikely to adversely affect the species.

Impacts to VELB from Development within Sutter County under NBHCP

Development within Sutter County is not anticipated to result in a large-scale loss of blue elderberry shrubs or VELB within the riparian areas along the Sacramento River because no development activities will occur within a one-mile radius of the river. Isolated shrubs may be affected by development within Sutter County, which could result in a loss of potential habitat (i.e., elderberry shrubs) for the species. In such cases, impacts to the species shall be mitigated in accordance with USFWS Conservation Guidelines for the species, thus take of VELB within the Permit Area is unlikely to adversely affect the species.

Impacts to VELB from the Water Agencies' Covered Activities under NBHCP

Because relatively little of the Water Agencies' Covered Activities is expected to occur in river corridors that support valley elderberry shrubs and because no VELB has been found in the Natomas Basin, take of the VELB not likely to occur; and there may be occasional disturbance to, or destruction of, elderberry bushes during the Water Agencies' Covered Activities.

Overall Impacts to VELB under NBHCP

Elderberry bushes found in the Permit Areas will be avoided and protected from development, and, where avoidance is not feasible, the bushes will be moved to and mitigated for within TNBC reserves. If valley elderberry longhorn beetles or elderberry bushes are found, required mitigation consistent with USFWS Conservation Guidelines shall be required. Retaining existing elderberry shrubs and planting new elderberry shrubs within the TNBC habitat reserves would create and preserve potential habitat for VELB should it inhabit the Permit Areas.

The Natomas Basin does not include banks of the Sacramento River (See Section I). Overall, neither the Permit Areas nor the Natomas Basin support a significant amount of riparian habitat supporting blue elderberry nor does the Permit Area support abundant isolated blue elderberry shrubs.

Mitigation for VELB includes a combination of overall measures (e.g., pre-construction surveys); species-specific measures (e.g., avoidance of blue elderberry shrubs); compliance with current USFWS habitat conservation guidelines for the species; maintenance of the Swainson's Hawk Zone which encompasses numerous blue elderberry bushes; and long-term protection, creation, and enhancement of upland and wetland habitats in the reserve system.

Given the limited effects on VELB due to Authorized Development and Water Agency Covered Activities, the NBHCP will avoid, minimize and mitigate take VELB to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

4. Tricolored Blackbird (*Agelaius tricolor*)

Significance of the Natomas Basin to Tricolored Blackbird

The tricolored blackbird is listed as both a Federal Species of Concern and a State Species of Special Concern. A 1997 tricolored blackbird survey conducted by Ted Beedy and Bill Hamilton found approximately 230,000 breeding tricolored blackbirds in California (Thomas Reid Associates, 2000). A follow-up survey conducted in 1999 found fewer than 95,000 breeding individuals in California. The tricolored blackbird is occasionally observed within the Natomas Basin and was observed foraging on the Metro Air Park site during field reconnaissance during 1993 (Thomas Reid Associates, 2000). During surveys conducted in 1997 and 1999, no breeding sites for tricolored blackbird were found in the Natomas Basin. However,

subsequent surveys identified a nesting colony in the TNBC's mitigation land reserve in the eastern edge of the Basin (Betts-Kismat-Silva property).

The Permit Area supports scattered copses of emergent marsh vegetation mostly within agricultural ditches that may potentially provide nesting habitat for the species, although it is not currently known to be utilized. However, the tricolored blackbird is an occasional visitor and actively forages in the Natomas Basin. On the basis of the opportunistic behavior of tricolored blackbirds and the limited extent of native marsh habitat in the Permit Area, emergent vegetation associated with agriculture and irrigation canals in the Basin provide marginal nesting habitat for tricolored blackbirds.

Extent of Take of Tricolored Blackbird as a Result of Covered Activities

Changes in potential habitat in the Natomas Basin for tricolored blackbird with the implementation of the NBHCP are presented in Table 5-4 of the Tech Memo. These land use categories would be attributable to urban development in the Basin and would result in the overall net loss of potential foraging habitat acreage for tricolored blackbird of about 15,311 acres. Of this, 6,083 acres are located in the City of Sacramento, 7,341 acres in Sutter County and 1,888 acres in Metro Air Park. This is a very broad estimate of foraging habitat since the species is only infrequently observed in Natomas Basin, and sightings have largely been in proximity to wetland or emerging marsh areas which also support nesting habitat. A more realistic assessment of habitat impacts would be to consider habitat which supports both nesting and foraging. Table 5-4 of the Tech Memo, estimates that prime habitat for both nesting and foraging includes ponds and seasonally wet areas, riparian corridors, and canals. A total of 449 acres of prime nesting and foraging habitat for the tricolored blackbird is expected to be impacted. Of this total, 148 acres would be located in the City of Sacramento, 225 acres in Sutter County and 76 acres in Metro Air Park. With the development of habitat reserves, including 2,187 acres of marsh reserves, and avoidance, minimization and mitigation measures included in the HCP, the issuance of Incidental Take Permits therefore, will not jeopardize the continued existence of this species.

**TABLE VII-6
TRICOLORED BLACKBIRDS CHANGE IN POTENTIAL HABITAT (ACRES)**

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition¹	Overall % Change
Nesting Habitat							
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75	-21.9%
Riparian	124	-24	0	0	-24	100	-19.4%
Canals (all)	1,778	-117	-72	-215	-404	1,374	-22.7%
TOTAL	1,998	-148	-76	-225	-449	1,549	-22.5%
Foraging Habitat							
Alfalfa	371	0	0	0	0	371	0.0%
Non-rice Crops	16,686	-4,663	-325	-1,529	-6,517	10,169	-39.1%
Grassland	886	-427	0	-134	-560	325	-63.2%
Pasture	674	-23	-22	-101	-147	527	-21.8%
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606	-35.6%
TOTAL	41,310	-6,083	-1,888	-7,341	-15,311	25,998	-37.1%

Source: CH2MHill, February 2002

¹ Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that tricolored blackbird might use and does not represent habitat known to be occupied by the species.

Measures to Avoid, Minimize, and Mitigate Take of the Tricolored Blackbird

The NBHCP includes measures to avoid, minimize, and mitigate take of the giant garter snake. Because the tricolored blackbird shares some habitat similarities with the giant garter snake, these measures would also serve to protect the blackbird. Specific measures include: timing restrictions, dewatering requirements, and vegetation control management. Additionally, the plan calls for the development of 2,187 acres of marsh reserves with upland components which more than compensates for the loss of 449 acres of foraging and nesting habitat. This type of managed reserve habitat has already been shown to be successful in supporting the species. The only known colony of the tricolored blackbird in the Natomas Basin is within the TNBC Betts-Kismat-Silva reserve. In combination with the Conservation Plan, these measures would avoid, minimize and mitigate take of tricolored blackbirds to the maximum extent practicable in

accordance with the ESA and will minimize and fully mitigate effects in accordance with the CESA.

Impacts to Tricolored Blackbird from Development within the City of Sacramento under NBHCP

Development within the City of Sacramento may result in the loss of patches of suitable emergent marsh nesting habitat and could result in the loss of foraging habitat, which may be used by tricolored blackbirds. The preferred habitats for tricolored blackbird nesting (e.g., marsh and riparian) are very limited in the City's Permit Area, including 7 acres of ponds and seasonally wet areas, 117 acres of canals and 24 acres of riparian habitat. Based on the required take avoidance, minimization, and mitigation measures, take of the tricolored blackbird is expected to be rare to infrequent during the term of the permits. Authorized Development in the City of Sacramento will be required to fund the development of 1,006 acres of managed marsh reserves with upland components which will more than compensate for the loss of foraging and nesting habitat. The NBHCP will create new habitat to support the species, and will avoid, minimize and mitigate take of tricolored blackbirds to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with the CESA.

Impacts to Tricolored Blackbird from Development within Sutter County under NBHCP

Development within Sutter County may result in the loss of small areas of suitable emergent marsh nesting habitat and could also result in the loss of marginal nesting habitat consisting of agricultural fields (i.e., silage and rice). The preferred habitats for tricolored blackbird nesting (e.g., marsh and riparian) are very limited in the County's Permit area, including 10 acres of ponds and seasonally wet areas and 72 acres of canals. Based on the required take avoidance, minimization and mitigation measures, take of the tricolored blackbird in the Permit Area is expected to be rare to infrequent during the term of the permits. It is noteworthy that the only known tricolored blackbird nesting site within the Basin occurs in Sutter County and is located within the TNBC Betts-Kismat-Silva reserve site. Authorized Development in Sutter County will be required to fund the development of 933 acres of marsh reserves with upland components which will more than compensate for the loss of foraging and nesting habitat. The NBHCP will create new habitat to support the species, and will avoid, minimize and mitigate take of tricolored blackbirds to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with the CESA.

Impacts to Tricolored Blackbird from the Water Agencies' Covered Activities under NBHCP

The CNDDDB shows only sparse utilization of the Natomas Basin by the tricolored blackbird. These birds are very mobile and, consequently, take of individual blackbirds as a result of the Water Agencies' Covered Activities is expected to be rare to infrequent. Such take shall be minimized through the NBHCP's Water Agencies' Covered Activities conservation measures (Chapter V.C).

Overall Impacts to Tricolored Blackbird under NBHCP

A total of 449 acres of prime nesting and foraging habitat for the tricolored blackbird is expected to be impacted. Of this total, 148 acres would be located in the City of Sacramento, 225 acres in Sutter County and 76 acres in Metro Air Park. The Permit Areas support scattered copses of emergent marsh vegetation mostly within agricultural ditches, which are sparsely utilized by the species. Emergent marsh is the preferred nesting habitat for the species. In the absence of significant marsh habitat, the Permit Area offers little to the conservation of the species. The NBHCP Conservation Plan however, calls for the creation of 2,187.5 acres of managed marsh which will provide good quality nesting and foraging area for the tricolored blackbird.

The combination of the overall measures (i.e., pre-construction surveys for nesting tricolored blackbirds and its habitat); species-specific measures (e.g., avoidance of tricolor blackbird nesting colonies within development lands and reserve lands); planting of nesting habitat (e.g., cattail and tule marsh); and long-term protection, creation, and enhancement of upland and wetland habitats in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP.

The NBHCP will create new habitat to support the species, and will avoid, minimize and mitigate take of tricolored blackbirds to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with the CESA.

5. Aleutian Canada Goose (*Branta canadensis leucopareia*)

Significance of the Natomas Basin to Aleutian Canada Goose

The Aleutian Canada goose has been delisted by the USFWS, but continues to be a Species of Concern. The Aleutian Canada goose is known to forage in a variety of agricultural settings, however, no records of foraging Aleutian Canada goose are known from the Basin. Abundant foraging habitat for the species is present to the north of the Basin (Humboldt and Del Norte Counties) and to the south in the San Joaquin Valley near Modesto. However, the Aleutian Canada Goose may be an occasional visitor to the Basin in its winter migration from the Aleutian Islands to winter sites in the south, notably areas near Modesto and Los Banos.

Extent of Take of Aleutian Canada Goose as a Result of Covered Activities

Take of the Aleutian Canada goose could result under the Covered Activities of the NBHCP from the effects of conversion of foraging habitat to urban uses. Foraging habitat for the goose includes non-rice crops, pasture, and rice (roosting and foraging). Changes in potential habitat in the Permit Area for Aleutian Canada goose with the implementation of the NBHCP are presented in Table 5-8 of the Tech Memo. Changes to the Permit Areas' land uses attributable to Covered Activities represent a loss of potential Aleutian Canada goose foraging habitat of 14,751 acres as shown in Table VII-6 below. These figures include impacts to rice lands which also affect roosting habitat for the goose. Because the Aleutian Canada goose is an occasional visitor in the Natomas Basin, and due to other additional foraging habitat to the north and south of the

Basin, the issuance of Incidental Take Permits therefore, will not likely jeopardize the continued existence of this species.

**TABLE VII-7
ALEUTIAN CANADA GOOSE CHANGE IN POTENTIAL HABITAT (ACRES)**

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition ¹	Overall % Change
Non-rice Crops	16,686	-4,663	-325	-1,529	-6,517	10,169	-39.1%
Pasture	674	-23	-22	-101	-147	527	-21.8%
Rice (foraging)	22,693	-970	-1,541	-5,577	-8,087	14,606	-35.6%
TOTAL	40,053	-5,656	-1,888	-7,207	-14,751	25,302	-36.8%

Source: CH2MHill, February 2002

¹ Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that Aleutian Canada goose might use and does not represent habitat known to be occupied by the species.

Measures to Avoid, Minimize, and Mitigate Take of Aleutian Canada Goose

In addition to pre-construction surveys and other avoidance, minimization and mitigation measures, the NBHCP includes the development of both upland reserves and rice and marsh reserve areas which may attract the Aleutian Canada goose to the Basin. As noted above, the goose is an infrequent visitor. The creation of 2,197 acres of upland reserves may provide suitable foraging and resting areas for the migrating goose. The preservation and enhancement of over 4,300 acre of rice lands in TNBC reserves will further ensure attractive foraging and nesting areas are available in the basin and will ensure the conservation needs of the species is met.

Impacts to Aleutian Canada Goose from Development in the City of Sacramento under NBHCP

The Aleutian Canada goose is an uncommon winter visitor to the Natomas Basin. Suitable foraging habitat (e.g., rice and other grain crops) would be impacted by development within the City of Sacramento. A total loss of potential habitat for the goose within the City's Permit Area is estimated at 5,656 acres. The managed reserve units to be developed under the NBHCP may offer improved wintering habitat conditions for this species, thereby improving the value of potential wintering habitat in the Natomas Basin compared to current conditions. Authorized Development within the City will be required to fund 4,025 acres of reserves including rice, wetlands and upland areas which would be suitable foraging habitat for the goose and will ensure the conservation needs of the species is met.

Impacts to Aleutian Canada Goose from Development within Sutter County under NBHCP

Due to the infrequent use of the Natomas Basin by Aleutian Canada Goose, the anticipated reduction in forage and roosting habitat are not expected to substantially impact this species. The managed reserve units to be developed under the NBHCP may offer improved wintering habitat to this species, thereby improving the value of habitat within the Natomas Basin. Authorized Development within the Sutter County will be required to fund 3,733.4 acres of reserves including rice, wetlands and upland areas which would be suitable foraging habitat for the goose and will ensure the conservation needs of the species is met.

Impacts to Aleutian Canada Goose from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are zero, rare, or infrequent, and the adverse effects of such take will be insignificant.

Overall Impacts to Aleutian Canada Goose under NBHCP

The Aleutian Canada goose winters in areas both north and south of the Natomas Basin and is expected to be only an occasional winter visitor in the Basin. It grazes in marshes and grain crops (e.g., stubble fields) and roosts on the water. Conflicts between the Aleutian Canada goose and development activities in the Natomas Basin are expected to be minor--e.g., periodic, potential disturbance when winter stubble fields are prepared for construction projects.

Abundant foraging grounds for the species are present both to the north and south of the Basin. Because the Basin has not been known to support foraging Aleutian Canada geese, little to no take of this species is expected to occur during the life of the permits and it is unlikely that the Basin is significant to the continued existence of the species. Additionally, the creation of new habitat areas managed to support and attract the species, along with other HCP measures will avoid, minimize and mitigate impacts to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

6. White-faced Ibis (*Plegadis chihi*)

Significance of the Natomas Basin to White-faced Ibis

The white-faced ibis forages in fresh, emergent wetland, shallow flooded pond margins, and muddy ground of wet meadows and irrigated, or flooded, pastures and croplands. The ibis requires extensive marshes for nesting. No suitable nesting habitat occurs in the Natomas Basin for this species. White-faced ibis are now common winter visitors to the Basin. The intensive agricultural use of the Basin largely precludes the presence of nesting white-faced ibis. The lack of suitable nesting habitat in the Natomas Basin limits the area's value as habitat for white-faced ibis. Therefore, development within the Basin is not anticipated to jeopardize the continued existence or preservation of the species.

Extent of Take of White-faced Ibis as a Result of Covered Activities

Changes in potential habitat in the Natomas Basin for white-faced ibis with the implementation of the NBHCP are presented in Table 5-3 of the Tech Memo. Land uses identified as potential habitat for the Ibis include: alfalfa fields, ponds and seasonally wet areas, rice fields and canals. The land use changes would be attributable to urban development in the Basin and would result in the overall net loss of potential foraging and roosting habitat acreage for white-faced ibis of about 8,512 acres of which 1,097 acres are within the City's Permit Area, 5,802 acres are within Sutter County's Permit Area and 1,617 acres are within Metro Air Park.

Measures to Avoid, Minimize, and Mitigate Take of the White-faced Ibis

The NBHCP includes measures to avoid, minimize, and mitigate take of the giant garter snake. Because the white-faced ibis shares some habitat similarities with the giant garter snake, these measures would also serve to protect the ibis. Specific measures include: timing restrictions, dewatering requirements, and vegetation control management. Additionally, the plan calls for the development of 2,187 acres of marsh reserves and over 4,300 acres of rice which will provide enhanced resting and foraging habitat for the Ibis which will provide higher quality areas for birds wintering in the area. The creation of new habitat areas managed to support and attract the species, along with other mitigation measures will ensure the conservation needs of the species is met.

**TABLE VII-8
WHITE-FACED IBIS CHANGE IN POTENTIAL HABITAT (ACRES)**

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition ¹	Overall % Change
Alfalfa	371	0	0	0	0	371	0.0%
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75	-21.9%
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606	-35.6%
Canals (all)	1,778	-117	-72	-215	-404	1,374	-22.7%
TOTAL	24,938	-1,097	-1,617	-5,802	-8,512	16,426	-34.1%

Source: CH2MHill, February 2002

¹ Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.
 Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that white-faced ibis might use and does not represent habitat known to be occupied by the species.

Impacts to White-faced Ibis from Development within the City of Sacramento under NBHCP

Of the total habitat which may be impacted by urban development, 1,094 acres is located in the City of Sacramento. White-faced ibis do not nest in the Natomas Basin and potential nesting habitat (e.g., large emergent marshes) is very limited in the Basin; therefore, the species is not likely to nest there in the future. The rice fields in the Basin are considered suitable foraging habitat for ibis. Development within the City of Sacramento has the potential to reduce the quantity of ibis foraging habitat in the Permit Area. However, rice fields are locally and regionally common outside of the Basin. The lack of suitable nesting habitat in the Natomas Basin limits the area's value as habitat for white-faced ibis. The NBHCP would provide enhanced habitat reserves that could provide nesting habitat suitable for use by this species. Suitable nesting habitat in proximity to flooded fields could provide improved habitat for white-faced ibis in the Plan Area. Since the plan requires authorized development in the City to finance the development of 3,089 acres of wetland and seasonally inundated areas (wetland reserves and rice field reserves) which will provide enhanced habitat, impacts will be well compensated for and would not adversely affect the species. The creation of new habitat areas managed to support and attract the species, along with other mitigation measures will ensure the conservation needs of the species is met.

Impacts to White-faced Ibis from Development within Sutter County under NBHCP

While the large amount of rice fields make the Natomas Basin an attractive habitat for foraging and breeding, rice fields and the associated farming practices are often incompatible with the nesting and breeding patterns of the white faced ibis. While development in Sutter County's portion of Natomas Basin would reduce foraging habitat for the white-faced ibis, such foraging habitat is locally prevalent and the development within Sutter County would not substantially affect this species. The lack of appropriate nesting habitat within the Natomas Basin restricts the area's value as habitat for white-faced ibis. The NBHCP will provide enhanced habitat reserves that may offer appropriate nesting habitat for this species. Such nesting habitat, in proximity to flooded rice fields that provide forage, could provide substantially improved habitat for the white-faced ibis within the Sutter County portion of the Natomas Basin. It is estimated that approximately 5,802 acres of habitat would be affected in Sutter County including rice fields. Since the plan calls for the Authorized Development in Sutter County to finance 2,799.4 acres of wetland and seasonally inundated areas (wetland reserves and rice field reserves) which will provide substantially enhanced habitat, impacts will be compensated and development will not adversely affect the species. The creation of new habitat areas managed to support and attract the species, along with other mitigation measures will ensure the conservation needs of the species is met.

Impacts to White-faced Ibis from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to White-faced Ibis under NBHCP

The white-faced ibis is a common winter visitor of the Natomas Basin although it is not known to nest in the Basin. The combination of the overall measures (i.e., pre-construction surveys), species-specific measures (i.e., avoidance of disturbance of nesting colonies during the nesting season both within development lands and reserve lands), planting of suitable nesting and foraging habitat in the reserve system, and long-term protection, creation, and enhancement of upland and wetland habitats in the reserve system are anticipated to effectively compensate for potential adverse effects to this species, if it were to occupy this area in the future. The NBHCP calls for the creation of 8,750 acres of reserves, of which 6,562.5 acres will be managed marsh and rice fields which will provide direct benefit for the ibis.

If implemented, this combination of measures will minimize and mitigate potential future effects to the white-faced ibis to the maximum extent practicable in accordance with the ESA and fully mitigate effects in accordance with the CESA. If the species occupies the NBHCP in the future, and the measures will also protect and enhance the conservation needs of the white-faced ibis habitat in the NBHCP Plan Area.

7. Loggerhead Shrike (*Lanius ludovicianus*)

Significance of Plan Area to Loggerhead Shrike

The loggerhead shrike is a State Species of Special Concern. The loggerhead shrike is observed regularly throughout the Natomas Basin. Suitable nesting and foraging habitat is common throughout the Basin. Foraging habitat for the loggerhead shrike (i.e., annual grassland and to a lesser extent agricultural fields) is widespread in the Plan Area and in the region. The species' primary prey items include grasshoppers and other small terrestrial insects, as well as small rodents. The majority of the Plan Area is farmed in rice, which requires significant management and pest control to be economically viable. Given the intensive nature of the agricultural practices in the Plan Area, the quality of foraging and nesting habitat for the loggerhead shrike is compromised. Habitat of higher quality (i.e., annual grassland) is present both to the east and to the west of the Plan Area. Because suitable loggerhead shrike habitat within the Plan Area is of low quality and higher quality habitat is present elsewhere in the region, it is unlikely that the Plan Area represents an area important to the continued existence or preservation of the species.

Extent of Take of Loggerhead Shrike as a Result of Covered Activities

According to Table 5-12 in the Tech Memo, foraging habitat for the shrike is expected to decrease in the future (about 9,014 acres) due to urban development and other Covered Activities throughout the Basin. As noted above, annual grasslands, pasture and ruderal areas are potentially higher quality habitats for the shrike because of the presence of exterior fencing (perching sites), absence of mechanical disturbance and limited pesticide use which would limit insect prey. Of the 9,014 acres of potential habitat to be impacted, 560 acres are grasslands, 147 acres are pasture and 1,231 acres are ruderal lands. Assuming pasture, grasslands and ruderal lands are the more productive and significant habitat types a total of 1,938 acres would be

impacted by future development. Future land use conditions include 2,187.5 acres of permanent upland habitat reserves which would provide potential foraging areas for shrikes. The system of habitat reserves would be managed primarily with a habitat focus and would be protected from market and other forces that would continue to affect agricultural lands in the Basin. Accordingly, the stability and quality of reserve lands helps offset the loss of foraging acreage and ensure that loggerhead shrikes can continue to use portions of the Basin for foraging. The issuance of Incidental Take Permits therefore will not likely jeopardize the continued existence of this species.

Measures to Avoid, Minimize, and Mitigate Take of Loggerhead Shrike

The measures to be implemented to avoid, minimize and mitigate take of loggerhead shrikes include: 1) habitat preservation and enhancement, 2) promote agricultural practices on TNBC reserves that enhance habitat values for shrike, and 3) retain suitable lookout perches, including fence posts and tree limbs. Avoidance, minimization and mitigation measures implemented as part of the giant garter snake and northwestern turtle management plans for O&M activities would protect any loggerhead shrike habitat that would potentially occur in RD1000 and Natomas Mutual's system of canals and drainages.

**TABLE VII-9
LOGGERHEAD SHRIKE CHANGE IN POTENTIAL HABITAT (ACRES)**

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition ¹	Overall % Change
Alfalfa	371	0	0	0	0	371	0.0%
Grassland	886	-427	0	-134	-560	325	-63.2%
Non-rice crops	16,686	-4,663	-325	-1,529	-6,517	10,169	-39.1%
Oak Groves	98	-6	-2	0	-8	89	8.2%
Orchard	182	-132	0	0	-13	169	7.1%
Pasture	674	-23	-22	-101	-147	527	21.8%
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75	-21.9%
Riparian	124	-24	0	0	-24	100	19.4%
Ruderal	1,970	-1,137	-6	-88	-1,231	739	62.5%

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition ¹	Overall % Change
Rural Residential	377	-46	-10	0	-56	321	14.9%
Tree Groves	106	-10	-23	0	-33	73	31.1%
Canals (all)	1,778	-117	-72	-215	-404	1,374	-22.7%
TOTAL	23,348	-6,473	-464	-2,077	-9,014	14,332	-38.6%

Source: CH2MHill, February 2002

¹ Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that loggerhead shrike might use and does not represent habitat known to be occupied by the species.

Impacts to Loggerhead Shrike from Development within the City of Sacramento under NBHCP

The Plan Area supports low-quality habitat in the Plan Area for the loggerhead shrike. Also, only a few individuals have been observed during reconnaissance-level surveys and habitat mapping surveys. Development within the City of Sacramento would reduce suitable loggerhead shrike habitat in the Plan Area, but City development is anticipated to have minimal effects on the shrike because the species is uncommon in the NBHCP area, and relatively common elsewhere in the Sacramento Valley. Assuming higher quality habitat is comprised of grasslands, ruderal areas and pasture, a total of 1,587 acres of such lands would be impacted by Authorized Development in the City. Authorized Development in the City will however, be required to fund the reserve system of which 1,006 acres will be uplands and 1,006 acres will be managed marsh with upland components. Based on the avoidance and compensation measures described above, City Authorized Development is expected to have minimal effects on the loggerhead shrike in the Plan Area.

Impacts to Loggerhead Shrike from Development within Sutter County under NBHCP

Because the Plan Area only supports marginal quality habitat for the species, development within Sutter County is anticipated to have a very little effect on the species. Assuming higher quality habitat is comprised of grasslands, ruderal areas and pasture, a total of 323 acres of such lands would be impacted by Authorized Development in the Sutter County. Authorized Development in the Sutter County will however, be required to fund the reserve system of which 933.4 acres will be uplands and 933.4 acres will be managed marsh with upland components. Based on the above take avoidance measures, little to no take of loggerhead shrikes in the Sutter County portion of the Basin as a result of Authorized Development.

Impacts to Loggerhead Shrike from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Loggerhead Shrike under NBHCP

Because habitat of higher quality (i.e., annual grassland) is present both to the east and to the west of the Plan Area, and because suitable loggerhead shrike habitat within the Plan Area is of low quality, it is unlikely that development in the Plan Area will substantially affect the continued existence or preservation of the species.

The combination of the overall measures (i.e., pre-construction surveys); species-specific measures (e.g., avoidance of nest sites during the nesting season within development and reserve lands, maintenance of perching and nesting habitat within reserve lands); and long-term protection, creation, and enhancement of upland and wetland habitats in the reserve system is expected to effectively compensate for potential adverse effects to this species under the NBHCP. Also as noted above, assuming pasture, grasslands and ruderal lands are the more productive and significant habitat types a total of 1,987 acres would be impacted by future development which would be compensated by the development of 2,187 acres of upland reserves.

If implemented, the NBHCP will minimize and mitigate potential future effects to the Loggerhead shrike to the maximum extent practicable in accordance with the ESA and fully mitigate effects in accordance with the CESA.

8. Burrowing Owl (*Athene cunicularia hypugea*)

Significance of Plan Area to Burrowing Owl

The burrowing owl is a Federal Species of Concern and a State Species of Special Concern. Burrowing owls are known to occur sporadically in grassland habitats, the borders of agricultural fields, roadsides, and airports (CNDDDB 2000) throughout much of the Central Valley. Because the majority of the Plan Area is significantly disturbed, and in many areas undergoes recurring disturbance as a result of agricultural practices, the majority of the Plan Area is of low value to the species.

Extent of Take of Burrowing Owl as a Result of Covered Activities

Potential foraging habitat for the burrowing owl is provided by alfalfa, canals, grassland, pasture, and upland habitat reserves. According to Table 5-10 of the Tech Memo, 1,931 acres of potential habitat are included in the Basin. The Future scenario, assuming 17,500 acres of urban development, shows that a total of 707 acres would be impacted. Of this, 450 acres are in the City of Sacramento, 235 acres are in the Sutter County and 22 acres are located in Metro Air Park. The proposed reserve system would establish 2,187 acres of upland reserves suitable for the burrowing owl, which more than compensates for the loss of 707 acres of potential habitat. Overall habitat conditions are expected to improve for the burrowing owl. As such, the issuance of Incidental Take Permits will not jeopardize the continued existence of this species. Additionally, although not under the direct control of the City of Sacramento or Sutter County, buffer lands surrounding the Sacramento International Airport (approximately 4,000 acres) are expected to remain in open space which may also provide habitat for the owl.

Measures to Avoid, Minimize, and Mitigate Take of Burrowing Owl

Potential impacts to burrowing owls during urban development are addressed in the NBHCP by requiring compliance with CDFG's Staff Report on Burrowing Owl Mitigation. Key aspects of the Staff Report include: 1) surveys of the project site and a 500 foot buffer by a qualified biologist during both the wintering and the nesting seasons, 2) avoidance of burrows with a 160-foot construction buffer area, and 3) mitigation where avoidance is not possible, including translocating owls to a permanent mitigation area.

Impacts to Burrowing Owls from Development within the City of Sacramento under NBHCP

Burrowing owls are uncommon in the NBHCP area. Burrowing owls in the Plan Area tend to occur along undisturbed levees or in undisturbed fields (i.e., uncultivated), such as portions of the Sacramento International Airport. Development in the City of Sacramento may result in the loss of nesting or wintering burrowing owls. The loss of nesting or wintering burrowing owls could have a substantial effect on the species in the Plan Area without the implementation of compensatory mitigation involving the passive relocation of owls to a dedicated mitigation area. Development within the City of Sacramento in the Plan Area is not likely to have a substantial effect on the overall continued existence of the species throughout its range, but local owl populations could be reduced in the Plan Area. The Tech Memo estimates that 450 acres of grasslands, pasture and alfalfa suitable for habitat by the owl would be affected by urban development in the City of Sacramento's portion of Natomas Basin. The reserve system calls for the Authorized Development in the City's Permit Area to finance 1006.3 acres of upland habitat throughout the Basin.

**TABLE VII-10
BURROWING OWL CHANGE IN POTENTIAL HABITAT (ACRES)**

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition ¹	Overall % Change
Alfalfa	371	0	0	0	0	371	0.0%
Grassland	886	-427	0	-134	-560	325	-63.2%
Pasture	674	-23	-22	-101	-147	527	-21.8%
TOTAL	1,931	-450	-22	-235	-707	1,223	-36.6%

Source: CH2MHill, February 2002

¹ Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.

Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that burrowing owl might use and does not represent habitat known to be occupied by the species.

Impacts to Burrowing Owls from Development within Sutter County under NBHCP

Development within Sutter County may result in the loss of nesting burrowing owls. The loss of nesting burrowing owls would be considered a significant effect on the species in the Plan Area without implementing compensatory mitigation involving the relocation of the bird to a dedicated mitigation area. However, because of the limited extent of undisturbed suitable habitat

in the Plan Area, development within Sutter County is not likely to have a significant effect on the overall continued existence or preservation of the species. The Tech Memo estimates that 235 acres of grasslands, pasture and alfalfa suitable for habitat by the owl would be affected by urban development in Sutter County. The reserve system calls for Authorized Development in Sutter County to finance 933.4 acres of upland habitat throughout the Basin.

Impacts to Burrowing Owls from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be minor or insignificant.

Overall Impacts to Burrowing Owls under NBHCP

The burrowing owl will benefit from the upland reserves established under the Plan as well as upland habitats established in association with the wetland reserves. Based on the implementation of measures within this document, take of burrowing owls in the Natomas Basin is expected to be infrequent to rare during the term of the permits.

The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat); species-specific measures (e.g., avoidance of burrow sites during the breeding season both within development lands and reserve lands, species relocation); additional mitigation according to California Department of Fish and Game guidelines; and long-term protection, creation, and enhancement of upland habitat in the reserve system are expected to effectively compensate for potential adverse effects to western burrowing owl under the NBHCP. A total of 727 acres of potential burrowing owl acreage would be impacted in the Basin. The reserve system will create 2,187 acres of enhanced upland habitat.

These HCP measures will avoid, minimize and mitigate take of burrowing owls to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance CESA.

9. Bank Swallow (*Riparia riparia*)

Significance of Plan Area to Bank Swallow

The bank swallow occurs in California during breeding season (May through July) and winters in South America. Suitable nesting habitat for the species is limited in the Plan Area for several reasons. The bank swallow requires vertical cliffs or banks for nesting with friable soils. Vertical banks or cliffs are not present in Natomas Basin except in areas along the Sacramento River (outside the HCP Plan Area). This species has only been observed nesting in natural riverbanks, typically away from the active channel, with friable soils (CNDDDB 2000, Small 1994). Waterways within the Plan Area are largely channelized and designed to resist erosion even under the highest velocity flood flows. Many of these channels are also cleared of vegetation periodically to maintain their capacity. The combination of channel configuration and

recurring disturbance from vegetation clearing probably precludes the presence of this species in the Plan Area.

Extent of Take of Bank Swallow

Foraging habitat for the bank swallow includes alfalfa, canals, grassland, pasture, ponds, rice, riparian, and non-rice crops. According to Table 5-11 in the Tech Memo, foraging habitat for the swallow is expected to decrease in the future due to urban development and other Covered Activities throughout the Basin. Because this habitat is located remote from nesting sites, it may support foraging by the species, but would be of lesser quality than foraging habitat in proximity to suitable cliffs or bluffs for nesting. Future land use conditions could impact a total of 15,760 acres of land uses which might support foraging by the swallow. Of this 6,231 acres is located in the City of Sacramento, 7,566 acres are located in Sutter County and 1,964 acres are located in Metro Air Park. The Conservation Plan includes 8,750 acres of permanent habitat reserves which would provide potential foraging areas for the swallows. The system of habitat reserves would be managed primarily with a habitat focus and would be protected from market and other forces that would continue to affect agricultural lands in the Basin. Accordingly, the stability and quality of reserve lands helps offset the loss of foraging acreage and ensure that swallows can continue to use portions of the Basin for foraging. As such, the issuance of Incidental Take Permits will not likely jeopardize the continued existence of this species.

Measures to Avoid, Minimize and Mitigate Take of Bank Swallow

Pre-construction surveys will be conducted by the Permittees to identify if the species has resettled in the Natomas Basin. As noted above no bank swallow nesting colonies are currently recorded in the Basin because of the absence of cliffs and bluffs. The species could benefit from any riparian habitats protected or created under the NBHCP because it could use the created habitat for nesting or foraging. In addition, the following measures would be implemented to avoid and minimize take of the species: 1) TNBC would use applicable USFWS or CDFG approved bank swallow recovery or management plans, 2) disturbance of nesting colonies would be strictly avoided within the nesting season by TNBC during their construction activities, and 3) disturbance of nesting colonies would be strictly avoided within the nesting season by urban development during their construction activities.

Additionally, limitations of development within the Swainson's Hawk Zone adjacent to the Sacramento River will also benefit this species because the bank swallow is more likely to nest and forage along the banks of the Sacramento River. In addition, the NBHCP does not authorize urban development on the water side of Sacramento River levees.

Impacts to Bank Swallow from Development within the City of Sacramento under NBHCP

No suitable bank swallow nesting habitat (i.e., streams with steep, erodible banks) occurs in the City's Permit area. The agricultural fields, ditches, and canals in the Plan Area are considered suitable foraging habitat, but no suitable nesting habitat occurs in the area; therefore, bank swallows are likely to occur in the area during migration, but they are not likely to nest in

the Plan Area. Therefore, development within the City of Sacramento would not have an effect on nesting bank swallows and minimal effects on the quantity of foraging habitat in the region.

**TABLE VII-11
BANK SWALLOW CHANGE IN POTENTIAL HABITAT (ACRES)**

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition ¹	Overall % Change
Alfalfa	371	0	0	0	0	371	0.0%
Grassland	886	-427	0	-134	-560	325	63.2%
Non-rice crops	16,686	-4,663	-325	-1,529	-6,517	10,169	39.1%
Pasture	674	-23	-22	-101	-147	527	21.8%
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75	-21.9%
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606	35.6%
Riparian	124	-24	0	0	-24	100	19.4%
Canals (all)	1,778	-117	-72	-215	-404	1,374	-22.7%
TOTAL	43,308	-6,231	-1,964	-7,566	-15,760	27,547	-36.4%

Source: CH2MHill, February 2002

¹ Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.
Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that bank swallow might use and does not represent habitat known to be occupied by the species.

Impacts to Bank Swallow from Development within Sutter County under NBHCP

Because the species is not known to occur in the Plan Area and because potentially suitable habitat in the Plan Area is of low quality and high quality habitat is available to the north of the Plan Area, it is unlikely that the Plan Area represents an area important to the continued existence or preservation of the species. As planned, a one-mile buffer from the Sacramento River would avoid impacts to the species.

Impacts to Bank Swallow from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Bank Swallow under NBHCP

No bank swallow nesting colonies are currently recorded in the NBHCP Plan Area; however, the species does nest to the north along the Sacramento and Feather Rivers and may occur in the NBHCP area over the life of the Plan. Consequently it may benefit from any riparian habitats protected or created under the NBHCP, which it could use for nesting or foraging. If the presence of this species in the Plan Area increases in the future, appropriate conservation measures could be implemented. Take of bank swallows in Natomas Basin is expected to be rare to infrequent during the life of the permits.

Although unlikely to occur in the NBHCP area, the combination of the overall measures (i.e., pre-construction surveys for Covered Species or their habitat), species-specific measures (i.e., avoidance of nesting sites during the nesting season both within development lands and reserve lands), and establishment of reserves within the Swainson's Hawk Zone that encompasses nesting habitat for bank swallow on the Sacramento River side of the levee will avoid, minimize and mitigate take of bank swallows to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

10. Northwestern Pond Turtle (*Clemmys marmorata marmorata*)

Significance of Plan Area to Northwestern Pond Turtle

The Northwestern Pond Turtle is both a State (CESA) Species of Special Concern and Federal (ESA) Species of Concern. The Plan Area supports agricultural supply and return ditches that may have suitable foraging and basking habitat for the species, however, the intense management of the adjacent agricultural land (i.e., plowing, planting, chemical application, flooding) probably precludes significant reproduction of the species in the area. Pond turtles have been observed in the Natomas East Main Drain canal (known as Steelhead Creek) to the east of the Plan area, and some have been reported on Conservancy lands.

Extent of Take of Northwestern Pond Turtle as a Result of Covered Activities

Changes in potential habitat in the Natomas Basin for northwestern pond turtle with the implementation of the NBHCP are presented in Table 5-2 of the Tech Memo. These land use changes would be attributable to urban development in the Basin and would result in the overall net loss of potential habitat acreage for northwestern pond turtle of about 8,536 acres. In addition to direct impacts to acreage, the Tech Memo also reports that proximity to canals in urban areas may increase predation by cats and other domestic animals. The HCP does however, include buffer lands adjacent to Fisherman's Lake which will assist in maintaining or improving the habitat for this species. In combination with the Conservation Plan which will create new habitat to support the species, additional measures are included to ensure that issuance of Incidental Take Permits will not likely jeopardize the continued existence of the species.

**TABLE VII-12
NORTHWESTERN POND TURTLE CHANGE IN POTENTIAL HABITAT (ACRES)**

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition ¹	Overall % Change
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75	-21.9%
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606	35.6%
Riparian	124	-24	0	0	-24	100	19.4%
Canals (all)	1,769	-117	-72	-215	-404	494	72.1%
TOTAL	24,691	-1,118	-1,617	-5,802	-8,536	16,155	-34.6%

Source: CH2MHill, February 2002

¹ Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.
 Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that pond turtle might use and does not represent habitat known to be occupied by the species.

Measures to Avoid, Minimize, and Mitigate Take of the Northwestern Pond Turtle

The NBHCP includes measures to avoid, minimize, and mitigate take of the giant garter snake. Because the northwestern pond turtle shares some habitat similarities with the giant garter snake, these measures would also serve to protect the turtle. Specific measures include: timing restrictions, dewatering requirements, vegetation control management and the creation of managed marsh habitat.

Impacts to Northwestern Pond Turtle from Development in the City of Sacramento under NBHCP

The Plan Area supports limited aquatic and upland breeding habitat for pond turtles. Most of the aquatic habitat occurs along managed canals and ditches. Potential breeding habitat is limited to undisturbed areas near aquatic habitats in the Plan Area. Development within the City of Sacramento will result in the loss of foraging and basking habitat for the turtle and may affect individuals residing in suitable habitat; however, development within the City of Sacramento is not anticipated to have a substantial overall effect on the species. A total of 1,118 acres of potential habitat for the turtle (including rice) will be impacted by Authorized Development in the City. Of this total, 970 acres are rice fields, which because of mechanical and chemical disturbance and lack of dry basking sites, is not considered high quality habitat for the turtle. The remaining 148 acres of ponds, seasonally wet areas, riparian areas and canals represents a more realistic estimate of impacts to areas that may provide higher quality habitat. Authorized Development will be required to finance a reserve system, of which the City's contribution would include 1,006 acres of managed marsh which will provide enhanced habitat for turtles.

Impacts to Northwestern Pond Turtle from Development within Sutter County under NBHCP

Development within Sutter County will result in the loss of foraging and basking habitat for the turtle and may affect individuals that are resident in suitable habitat; however, development within Sutter County is not anticipated to have a significant overall effect on the species. A total of 5,802 acres (including rice fields) of potential habitat for the turtle will be impacted by Authorized Development in Sutter County. Of this total, 5,577 acres are rice fields, which because of mechanical and chemical disturbance is not considered high quality habitat for the turtle. The remaining 225 acres of ponds, seasonally wet areas and canals represents a more realistic estimate of impacts to areas that may provide higher quality habitat. Sutter County's contribution to the reserve system will support 933.4 acres of managed marsh which will provide enhanced habitat for the turtle.

Impacts to Northwestern Pond Turtle from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Northwestern Pond Turtle under the NBHCP

Low numbers of northwestern pond turtles may inhabit the aquatic habitats of the Natomas Basin, including the canals and ditches of the water conveyance system. If present in the Basin, pond turtles will benefit from the managed marsh and rice field habitats established within the NBHCP's reserve system. If present, take of the northwestern pond turtle could occur under the NBHCP as a result of habitat destruction during construction activities, including the removal of irrigation ditches and drains, and during ditches and drain maintenance. However, such take within the Plan Area will be minimized by the dewatering requirement and is therefore expected to be at relatively minor levels.

The combination of the overall measures (i.e., pre-construction surveys for Covered Species and its habitat, preservation of the area adjacent to Fisherman's Lake); species-specific measures (i.e., dewatering procedures requirement under giant garter snake mitigation); and long-term protection, creation, and enhancement of upland habitat and suitable wetland habitat in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP.

These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

11. California Tiger Salamander (*Ambystoma californiense*)

Significance of Plan Area to California Tiger Salamander

The California tiger salamander (CTS) is a federal and state Candidate species. The California tiger salamander has not been documented either historically or presently from the Plan Area. Because potentially suitable habitat (i.e., seasonally ponded areas) are limited and because adjacent upland areas supporting ground squirrels are constrained by agricultural operations, it is unlikely that the Plan Area represents a significant area to the continued existence or preservation of the salamander.

Extent of Take of California Tiger Salamander as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat values for vernal pool species.

In addition, there are 21 acres of seasonally wet areas and ponds within the Basin that would be affected by development which could result in direct impacts to the California tiger salamander, if the species is identified in the area. Finally, indirect impacts may result if urban development in proximity to ponds and wet areas limits access of the California tiger salamander to upland areas. While these impacts may occur it is important to note that the species has not been reported in the Natomas Basin to date.

Measures to Avoid, Minimize, and Mitigate Take of California Tiger Salamander

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the tiger salamander: 1) report to USFWS development plans that affect vernal pools within the Basin, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters subject to separate Section 404 permits are present, and 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and a separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional Waters of the U.S. or not - will be authorized through the Incidental Take Permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4. of Chapter V of the NBHCP.

In addition to the above vernal pool actions, the HCP requires that TNBC will consult with the TAC and California tiger salamander researchers and experts periodically during implementation of the Plan to determine what if any additional conservation opportunities for this species might exist within the Plan's proposed reserve system. Such opportunities might

include but are not limited to establishment of creation of wetland and upland habitats suitable for tiger salamanders within the reserve system (e.g., stock ponds or "artificial" vernal pools) and if appropriate, possible re-introduction of tiger salamanders into the Basin.

For habitat areas with seasonally wet areas and ponds, the required pre-construction surveys will also help identify if the California tiger salamander is present and any appropriate avoidance and mitigation standards available at that time from USFWS and CDFG will be employed.

Impacts to Tiger Salamander from Development within the City of Sacramento under NBHCP

The California tiger salamander has not been documented historically or currently in the Plan Area, and the Plan Area supports limited marginal habitat for the species.

Development in the City of Sacramento is not likely to adversely affect California tiger salamanders or threaten the preservation or conservation of this species because this salamander species is not known to occur in the Plan Area and the vernal pools in the Plan Area that represent potentially suitable habitat are not designated for development.

Impacts to Tiger Salamander from Development within Sutter County under NBHCP

Because the California tiger salamander has not been documented to occur either historically or presently within the Plan Area and because the Plan Area only supports limited marginal (i.e., disturbed) habitat for the species, development within Sutter County is anticipated to have a negligible effect on the species.

Impacts to Tiger Salamander from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to California Tiger Salamander under NBHCP

Tiger salamanders will benefit under the NBHCP from the vernal pool protections of the NBHCP, or, if necessary, from any mitigation implemented to offset development impacts in vernal pool areas. The species could also benefit from other wetland and upland habitats established within the NBHCP's reserve areas. However, California tiger salamander terrestrial habitat requirements are not clearly understood, and the extent to which the Plan's reserve areas can contribute to salamander conservation is similarly unclear. Any such measures shall be incorporated into the NBHCP's conservation program through its Adaptive Management provisions. Because California tiger salamanders have not been known to historically or currently exist in the Permit Areas or in areas not currently designated for development (e.g., the vernal pool areas), take of this species under the NBHCP is expected to be rare to infrequent during the life of the permits.

Although not known to occur in the NBHCP area, suitable vernal pool and other seasonal wetland habitats for the California tiger salamander are present in the eastern portion of the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat), the vernal pool protections that are already incorporated into the NBHCP; and long-term protection, creation, and enhancement of upland and suitable wetland habitats in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP.

These HCP measures will avoid, minimize and mitigate take of species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

12. Western Spadefoot Toad (*Scaphiopus hammondi*)

Significance of Plan Area to Western Spadefoot Toad

The western spadefoot toad is a California Species of Special Concern which to date, has not known to occur in the Plan Area. Limited suitable habitat in the form of seasonal wetlands are present in the Plan Area. However, the highly disturbed nature of the Plan Area combined with the recurring disturbance of agricultural fields which support the majority of these seasonal wetlands probably precludes the presence of the species. Additionally, the majority of occurrences of spadefoot toad are in the San Joaquin Valley and southern Coast Range indicating that the Plan Area is not a significant area important to the continued existence or preservation of the species.

Extent of Take of Western Spadefoot Toad as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat values for vernal pool species.

It is possible that other seasonally wet areas and ponds (non-vernal pool areas) could also provide habitat for the western spadefoot toad, although as noted above, this type of habitat is relatively limited in Natomas Basin and there are no records of the western spadefoot toad occurring in the Natomas Basin. As such, issuance of Incidental Take Permits is not expected to jeopardize the continued existence of this species.

Measures to Avoid, Minimize, and Mitigate Take of the Western Spadefoot Toad

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the Western spadefoot toad: 1) report to USFWS development plans that affect vernal pools within the Permit Areas to the USFWS, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have

a qualified biologist identify whether or not jurisdictional waters subject to separate Section 404 permits are present, and 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation and mitigation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional Waters of the U.S. or not - will be authorized through the Incidental Take Permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4. of Chapter V of the NBHCP.

In addition to the above vernal pool actions, the HCP requires that TNBC will consult with the TAC and western spadefoot toad experts periodically during implementation of the NBHCP to determine what if any additional conservation opportunities for this species might exist within the Plan's proposed reserve system. Any such opportunities shall be incorporated into the NBHCP's conservation program through its Adaptive Management provisions.

For habitat areas with seasonally wet areas and ponds, the required pre-construction surveys will also help identify if the western spadefoot toad is present and any appropriate avoidance and mitigation standards available at that time from USFWS and CDFG will be employed.

Impacts to Western Spadefoot Toad from Development in the City of Sacramento under NBHCP

The western spadefoot toad has not been documented historically or currently in the Plan Area, and the Plan Area supports limited marginal habitat for the species. Development within the City of Sacramento is not likely to adversely affect western spadefoot toads or threaten the preservation or conservation of this species because this toad species is not known to occur in the Plan Area and the vernal pools in the Plan Area that represent potentially suitable habitat are not designated for development.

Impacts to Western Spadefoot Toad from Development within Sutter County under NBHCP

Because the species is not known to occur in the Plan Area or in Sutter County and because suitable habitat is limited in the Plan Area, development within Sutter County is not anticipated to have a significant effect on the continued existence or preservation of the species.

Impacts to Western Spadefoot Toad from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Western Spadefoot Toad under NBHCP

Although not known to occur in the NBHCP area, suitable vernal pool and other seasonal wetland habitats for the western spadefoot toad is present in the eastern portion of the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat), the vernal pool protections that are already incorporated into the NBHCP; and long-term protection, creation, and enhancement of upland and suitable wetland habitats in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP.

These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will fully mitigate effects in accordance with CESA.

13. Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

Significance of Plan Area to Vernal Pool Fairy Shrimp

The vernal pool fairy shrimp is a Federally Listed Threatened Species. The Plan Area supports habitat for the vernal pool fairy shrimp in the form of roadside ditches and seasonal wetlands. The majority of the potential habitat for the species within the Plan Area is artificial in origin and lacks linkages to larger intact habitat areas (i.e., vernal pool grasslands) limiting the value of the Plan Area to the continued existence or preservation of the species.

Extent of Take of the Vernal Pool Fairy Shrimp as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat for vernal pool species.

Measures to Avoid, Minimize and Mitigate Take of the Vernal Pool Fairy Shrimp

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the vernal pool fairy shrimp: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters subject to separate Section 404 permits are present, and 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional waters of the U.S. or not - will be authorized through the incidental take permits

and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition, the HCP requires that TNBC will consult with the TAC, and fairy shrimp and tadpole shrimp experts periodically during implementation of the NBHCP to determine what if any additional conservation opportunities for Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp and midvalley fairy shrimp might exist within the Plan's proposed reserve system. Any such opportunities shall be incorporated into the NBHCP's conservation program through its Adaptive Management provisions.

Impacts to Vernal Pool Fairy Shrimp from Development in the City of Sacramento under NBHCP

Development within the City of Sacramento could result in the loss of suitable habitat for the species and this loss may have a substantial effect on individuals of this federally listed species; however, because of the limited extent, and relatively low quality, of the habitat present in the Plan Area, development within the City of Sacramento is not anticipated to have a substantial effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for development within the City of Sacramento. Implementation of compensatory mitigation that is consistent with USFWS programmatic guidelines for large brachiopod species may be required to offset impacts on the species.

Impacts to Vernal Pool Fairy Shrimp from Development within Sutter County under NBHCP

Development within Sutter County will result in the loss of suitable habitat for the species and this loss may have a significant effect on individuals of this federally listed species; however, because of the limited extent and relatively low quality of the habitat present in the Plan Area, development within Sutter County is not anticipated to have a significant effect on the species as a whole.

Impacts to Vernal Pool Fairy Shrimp from the Water Agencies' Covered Activities under NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Vernal Pool Fairy Shrimp under NBHCP

Vernal pool fairy shrimp could benefit under implementation from the vernal pool protections of the NBHCP, or if necessary, from any mitigation implemented to offset development impacts in vernal pool areas. The species could also benefit from other wetland and upland habitats established in the NBHCP's reserve areas. However, vernal pool fairy shrimp occurrence and distribution in the Plan Area is not well understood, and the extent to which the Plan's reserve areas can contribute to vernal pool fairy shrimp conservation is similarly unclear.

Any such measures shall be incorporated into the NBHCP's conservation program through Adaptive Management provisions.

This species is likely to occur in the NBHCP area and suitable vernal pool and seasonal wetland habitat for the vernal pool fairy shrimp is present in scattered locations of the Plan Area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitats); the vernal pool protections incorporated into the NBHCP; and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., seasonal wetlands) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

14. Vernal Pool Tadpole Shrimp (*Lepidurus packardii*)

Significance of Plan Area to Vernal Pool Tadpole Shrimp

The vernal pool tadpole shrimp is a Federally Listed Endangered Species. There have been 154 reported occurrences of this species in California, of which 54 reports were in Sacramento County and four (4) were in Sutter County (CDFG 2001). The Plan Area supports habitat for the vernal pool tadpole shrimp in the form of roadside ditches and seasonal wetlands. The majority of the habitat for the species within the Plan Area is artificial in origin and lacks linkages to larger intact habitat areas (i.e., vernal pool grasslands) limiting the value of the Plan Area to the continued existence or preservation of the species.

Extent of Take of Vernal Pool Tadpole Shrimp as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat for vernal pool species.

Measures to Avoid, Minimize, and Mitigate Take of the Vernal Pool Tadpole Shrimp

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the vernal pool tadpole shrimp: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters are subject to separate Section 404 permits are present, and 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional waters of the U.S. or not - will be

authorized through the incidental take permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition, the HCP requires that TNBC will consult with the TAC, and fairy shrimp and tadpole shrimp experts periodically during implementation of the NBHCP to determine what if any additional conservation opportunities for Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp and midvalley fairy shrimp might exist within the Plan's proposed reserve system. Any such opportunities shall be incorporated into the NBHCP's conservation program through its Adaptive Management provisions.

Impacts to Vernal Pool Tadpole Shrimp from Development in the City of Sacramento under NBHCP

Development within the City of Sacramento could result in the loss of suitable habitat for the species and this loss may have a substantial effect on individuals of this federally listed species; however, because of the limited extent and relatively low quality of the habitat present in the Plan Area, development within the City of Sacramento is not anticipated to have a substantial effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for development within the City of Sacramento. Implementation of compensatory mitigation that is consistent with USFWS programmatic guidelines for large brachiopod species may be required to offset impacts on the species.

Impacts to Vernal Pool Tadpole Shrimp from Development within Sutter County under NBHCP

Development within Sutter County will result in the loss of suitable habitat for the species and this loss may have a significant effect on individuals of this federally listed species; however, because of the limited extent and relatively low quality of the habitat present in the Plan Area, development within Sutter County is not anticipated to have a significant effect on the species as a whole. Implementation of compensatory mitigation that is consistent with USFWS programmatic guidelines for large brachiopod species may be required to offset impacts.

Impacts to Vernal Pool Tadpole Shrimp from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur within the Permit Areas, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Vernal Pool Tadpole Shrimp under NBHCP

Vernal pool tadpole shrimp could benefit under implementation from the vernal pool protections of the NBHCP, or, if necessary, from any mitigation implemented to offset development impacts in vernal pool areas. The species could also benefit from other wetland and

upland habitats established in the NBHCP's reserve areas. However, vernal pool tadpole shrimp occurrence and distribution in the Plan Area is not well understood, and the extent to which the Plan's reserve areas can contribute to vernal pool tadpole shrimp conservation is similarly unclear. Any such measures shall be incorporated into the NBHCP's conservation program through Adaptive Management provisions.

Although not known to occur in the NBHCP area, marginally suitable vernal pool habitat for the vernal pool tadpole shrimp (*Lepidurus packardii*) is present in scattered locations in the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat); the vernal pool protections incorporated into the NBHCP; and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., seasonal wetlands) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

If implemented, this combination of measures will minimize and fully mitigate potential future effects to the vernal pool tadpole shrimp, if the species occupies the NBHCP in the future, and will also protect vernal pool tadpole shrimp habitat in the NBHCP Plan Area.

15. Midvalley Fairy Shrimp (*Branchinecta n.sp.*)

Significance of Plan Area to Midvalley Fairy Shrimp

This species has no official State or Federal listing however it occurs in vernal pool habitats that support associated fairy shrimp which are either threatened or endangered. Although seasonal wetlands present in the Plan Area may provide suitable habitat for the species, it has not been documented in the area nor has the species been documented from elsewhere in Sutter County. The lack of known occurrences and the generally disturbed nature of the Plan Area probably preclude the presence of significant populations of the species. Therefore the Plan Area does not represent an area important to the continued existence or preservation of the species.

Extent of Take of the Midvalley Fairy Shrimp as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat for vernal pool species.

Measures to Avoid, Minimize, and Mitigate Take of the Midvalley Fairy Shrimp

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the midvalley fairy shrimp: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require developers to

conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters are subject to separate Section 404 permits are present, 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional waters of the U.S. or not - will be authorized through the incidental take permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition, the HCP requires that TNBC will consult with the TAC, and fairy shrimp and tadpole shrimp experts periodically during implementation of the NBHCP to determine what if any additional conservation opportunities for Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp and midvalley fairy shrimp might exist within the Plan's proposed reserve system. Any such opportunities shall be incorporated into the NBHCP's conservation program through its Adaptive Management provisions.

Impacts to Midvalley Fairy Shrimp from Development within the City of Sacramento under NBHCP

Development within the City of Sacramento could result in the loss of suitable habitat for the species and this loss may have a substantial effect on individuals of this special-status species; however, because of the limited extent and relatively low quality of the habitat present in the Plan Area, City development is not anticipated to have a substantial effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for City development. Implementation of compensatory mitigation that is consistent with USFWS programmatic guidelines for large brachiopod species may be required to offset impacts on the species.

Impacts to Midvalley Fairy Shrimp from Development within Sutter County under NBHCP

Because the midvalley fairy shrimp has not been documented to occur either historically or presently within the Plan Area and because the Plan Area only supports marginal (i.e., disturbed) habitat for the species, development within Sutter County is anticipated to have a negligible effect on the species.

Impacts to Midvalley Fairy Shrimp from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur within the Permit Areas, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Midvalley Fairy Shrimp under NBHCP

Midvalley fairy shrimp could benefit under implementation from the vernal pool protections of the NBHCP, or if necessary, from any mitigation implemented to offset development impacts in vernal pool areas. The species could also benefit from other wetland and upland habitats established in the NBHCP's reserve areas. However, midvalley fairy shrimp occurrence and distribution in the Plan Area is not well understood, and the extent to which the Plan's reserve areas can contribute to midvalley fairy shrimp conservation is similarly unclear. Any such measures shall be incorporated into the NBHCP's conservation program through Adaptive Management provisions.

Although not known, or expected to occur in the NBHCP area due to species range and known habitat affinities, some marginally suitable vernal pool habitat for the midvalley fairy shrimp is present in the eastern portion of the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat); the vernal pool protections incorporated into the NBHCP; and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., seasonal wetlands) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

If implemented, this combination of measures will minimize and fully mitigate potential future effects to the midvalley fairy shrimp, if the species occupies the NBHCP in the future, and will also protect potential midvalley fairy shrimp habitat in the NBHCP Plan Area.

16. Delta Tule Pea (*Lathyrus jepsonii* var. *jepsonii*)

Significance of Plan Area to Delta Tule Pea

The Delta tule pea is a Federal Species of Concern. The vast majority of the known Delta tule pea occurrences are in the Sacramento-San Joaquin Delta and these occurrences are generally stable or increasing in size. This species has not been documented from the Plan Area and suitable habitat for the species is limited in extent. Because the species is not known from the Plan Area and because the species is currently relatively stable within the center of its historic range in the Sacramento-San Joaquin Delta, the Plan Area does not represent an area important to the continued existence or preservation of the species.

Extent of Take of the Delta Tule Pea as a Result of Covered Activities

Potential habitat for the Delta tule pea is provided by ponds and marsh habitat reserves. According to Table 5-13 of the Tech Memo, a total of 1,874 acres of potential habitat for the Delta tule pea exists in the Basin comprised of ponds and seasonally wet areas, and canals. Impacts associated with development would effect a total of 425 acres, of which 124 acres are located in the City of Sacramento, 225 acres are located in Sutter County and 76 acres are located in Metro Air Park.

**TABLE VII-13
DELTA TULE PEA CHANGE IN POTENTIAL HABITAT (ACRES)**

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition ¹	Overall % Change
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75	-21.9%
Canals (all)	1,778	-117	-72	-215	-404	1,374	-22.7%
TOTAL	1,874	-124	-76	-225	-425	1,449	-22.7%

Source: CH2MHill, February 2002

¹ Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.
 Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that Delta tule pea might use and does not represent habitat known to be occupied by the species.

Measures to Avoid, Minimize and Mitigate Take of the Delta Tule Pea

The NBHCP includes a measure for TNBC to consider introducing the Delta tule pea into suitable locations in the Natomas Basin. Introducing the Delta tule pea into the system of habitat reserves would benefit the species by increasing population size and distribution. In addition, the NBHCP requires TNBC to monitor any known populations of covered plant species within the NBHCP area.

Impacts to Delta Tule from Development within the City of Sacramento under NBHCP

The Delta tule pea has not been documented in the Plan Area and potential habitat is limited to emergent marsh areas in ditches and canals. The NBHCP requires the creation and management of wetland and upland reserves and the enhanced maintenance and operation of canals and ditches in the Plan Area may result in enhanced habitat that could support this species. Potential habitat impacts in the City of Sacramento are 124 acres of canals and seasonally wet areas. In turn, the City development will contribute 1,006 acres of managed marsh to the reserve system. Therefore, potential impacts to the Delta tule pea under the NBHCP are not anticipated to be substantial.

Impacts to Delta Tule Pea from Development within Sutter County under NBHCP

Because the species has not been documented to occur either historically or presently within the Plan Area and because the Plan Area only supports a limited extent of suitable habitat for the species, development within Sutter County is not anticipated to have a substantial effect on the continued existence or preservation of the species. Potential habitat impacts in the Sutter County are 225 acres of canals and seasonally wet areas. In turn, the Sutter County development will contribute 933.4 acres of managed marsh to the reserve system.

Impacts to Delta Tule Pea from the Water Agencies' Covered Activities under the NBHCP

As a result of the limited occurrence of the species, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are zero, rare, or infrequent, and the adverse effects of such take will be insignificant.

Overall Impacts to Delta Tule Pea under NBHCP

Although not known to occur in the NBHCP area, suitable habitat for the Delta tule pea is present wherever emergent marsh occurs in the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat); species-specific measures (i.e., potential for species introduction into suitable habitats in the reserve system); and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., emergent marsh) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. A total of 425 acres of potential habitat in the Basin would be impacted by Authorized Development which will be compensated by the creation of 2,187 acres of managed marsh reserve areas. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

17. Sanford's Arrowhead (*Sagittaria sanfordii*)

Significance of Plan Area to Sanford's Arrowhead

Sanford's arrowhead is a Federal Species of Concern. The Plan Area is not known to support Sanford's arrowhead; however, suitable habitat is present in the Plan Area in the form of unmaintained agricultural supply and return ditches. Because the Plan Area is not known to support the species and because the majority of suitable habitat in the Plan Area is maintained for water conveyance (i.e., cleared of vegetation) the Plan Area does not represent an area important to the continued existence or preservation of the species.

Extent of Take of Sanford's Arrowhead as a Result of Covered Activities

Potential habitat for the Sanford's arrowhead is provided by ponds and marsh habitat reserves. According to Table 5-14 of the Tech Memo, 1,874 acres of ponds, seasonally wet areas and canals which could serve as potential habitat are included in the Basin. The Future scenario, assuming 17,500 acres of urban development, shows impacts to 425 acres of potential habitat. The NBHCP mitigation program will create 2,187.5 acres of managed marsh reserves resulting in an improvement to Sanford's arrowhead habitat of 1,762 acres. Overall habitat conditions are expected to improve for the Sanford's arrowhead.

**TABLE VII-14
SANFORD'S ARROWHEAD CHANGE IN POTENTIAL HABITAT (ACRES)**

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition ¹	Overall % Change
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75	-21.9%
Canals (all)	1,778	-117	-72	-215	-404	1,374	-22.7%
TOTAL	1,874	-124	-76	-225	-425	1,449	-22.7%

Source: CH2MHill, February 2002

¹ Future condition does not include the minimum 2,187.5 acres of Mitigation Lands to be restored as managed marsh.
 Note: The above acreage is based on broad land use categories developed by CH2MHill using the Cals system. The land use categories represent potential habitat that the Sanford's arrowhead might use and does not represent habitat known to be occupied by the species.

Measures to Avoid, Minimize, and Mitigate Take of the Sanford's Arrowhead

The NBHCP includes a measure for TNBC to consider introducing Sanford's arrowhead into suitable locations in the Natomas Basin. Introducing Sanford's arrowhead into the system of habitat reserves would benefit the species by increasing population size and distribution. In addition, TNBC shall monitor any known populations of covered plant species within the NBHCP area.

Impacts to Sanford's Arrowhead from Development within the City of Sacramento under NBHCP

The Sanford's arrowhead has not been documented in the Plan Area and potential habitat is limited to wetlands in ditches and canals. The NBHCP requires the creation and management of wetland and upland reserves and the enhanced maintenance and operation of canals and ditches in the Plan Area may result in enhanced habitat that could support this species. Therefore, potential impacts to the Sanford's arrowhead under the NBHCP are not anticipated to be substantial and the creation of new habitat in the reserve system may benefit the species. Authorized Development in the City may impact 124 acres of potential habitat for Sanford's arrowhead which is compensated by the City's contribution to the managed marsh reserve system of 1,006 acres.

Impacts to Sanford's Arrowhead from Development within Sutter County under NBHCP

Because the species has not been documented to occur either historically or presently within the Plan Area and because the Plan Area only supports a limited extent of suitable habitat for the species, development within Sutter County is not anticipated to have a substantial effect on the continued existence or preservation of the species. Authorized Development in the Sutter County may impact 225 acres of potential habitat for Sanford's arrowhead which is compensated by the County's contribution to the managed marsh reserve system of 933.4 acres.

Impacts to Sanford's Arrowhead from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur either historically or presently in the Plan Areas, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Sanford's Arrowhead under NBHCP

Although not known to occur in the NBHCP area, suitable habitat for Sanford's arrowhead is present wherever seasonal marsh occurs in the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat); species-specific measures (i.e., potential for species introduction into suitable habitats in the reserve system); and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., emergent marsh and seasonal wetland) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

18. Boggs Lake Hedge-Hyssop (*Gratiola heterosepala*)

Significance of Plan Area to Boggs Lake Hedge-Hyssop

This species occupies a variety of seasonally wet habitats including vernal pools and seasonally inundated lake margins (Skinner and Pavlik 1994, Hickman 1993). Boggs Lake hedge-hyssop has not been found in highly disturbed or altered landscapes supporting seasonal wetlands such as the lands present within the Plan Area (CDFG 1992b). Because the Plan Area is highly disturbed and because the species has not been previously documented from the area, it can be presumed that the Plan Area is not significant in the continued existence or preservation of the species.

Extent of Take of the Boggs Lake Hedge-Hyssop as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat values for vernal pool species.

Measures to Avoid, Minimize, and Mitigate Take of the Boggs Lake Hedge-Hyssop

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the Boggs Lake hedge-hyssop: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require

developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters are subject to separate Section 404 permits are present, 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional waters of the U.S. or not - will be authorized through the incidental take permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition, TNBC shall evaluate the potential for furthering the conservation of covered plant species within the NBHCP's vernal pool areas or its wetland reserve system through appropriate means including but not limited to, the introduction of Boss's Lake hedge-hyssop, Sacramento orcutt grass, slender orcutt grass, Colusa grass and legenere into the vernal pool areas or other suitable locations in the NBHCP Plan Area.

Impacts to Boggs Lake Hedge-Hyssop from Development in the City of Sacramento under NBHCP

Bogg's Lake hedge-hyssop has not been documented in the Plan Area. Development within the City of Sacramento could result in the loss of suitable habitat (i.e., seasonal wetlands and vernal pools) for the species. This habitat loss could result in the loss of individuals of this special-status plant species; however, because of the limited extent and relatively low quality of the habitat present in the Plan Area, City development is not anticipated to have a substantial effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for urban development.

Impacts to Boggs Lake Hedge-Hyssop from Development within Sutter County under NBHCP

Because Bogg's Lake hedge-hyssop has not been documented to occur either historically or presently within the Plan Area and because the Plan Area has been significantly disturbed, it is unlikely that the species would be present, therefore development within Sutter County is not anticipated to have a significant effect on the species.

Impacts to Boggs Lake Hedge-Hyssop from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur either historically or presently in the Plan Areas, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Boggs Lake Hedge-Hyssop under NBHCP

Although not known, or expected, to occur in the NBHCP area, marginally suitable habitat for the Boggs's Lake hedge-hyssop is present in the eastern portion of the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species or their habitat), the vernal pool protections incorporated into the NBHCP, and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., seasonal wetlands) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

19. Sacramento Orcutt Grass (*Orcuttia viscida*)

Significance of Plan Area to Sacramento Orcutt Grass

Because the species has not been documented from the Plan Area and because suitable habitat for the species is not present, the Plan Area is not considered significant in the continued existence or preservation of the species.

Extent of Take of Sacramento Orcutt Grass as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat values for vernal pool species.

Measures to Avoid, Minimize, and Mitigate Take of the Sacramento Orcutt Grass

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the Sacramento orcutt grass: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters are subject to separate Section 404 permits are present, 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional waters of the U.S. or not - will be authorized through the incidental take permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition, TNBC shall evaluate the potential for furthering the conservation of covered plant species within the NBHCP's vernal pool areas or its wetland reserve system through

appropriate means including but not limited to, the introduction of Boss's Lake hedge-hyssop, Sacramento orcutt grass, slender orcutt grass, Colusa grass and legenera into the vernal pool areas or other suitable locations in the NBHCP Plan Area.

Impacts to Sacramento Orcutt Grass from Development within the City of Sacramento under NBHCP

Sacramento orcutt grass has not been documented in the Plan Area and potential habitat is limited to few vernal pools on the far eastern edge of the Plan Area. Development within the City of Sacramento could result in the loss of marginally suitable habitat for the Sacramento orcutt grass in the form of seasonal wetlands and vernal pools. This habitat loss may result in the loss of individuals of this federally listed species; however, because of the limited extent of potential habitat and relatively low quality of the habitat present in the Plan Area, City development is not anticipated to have an effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for development.

Impacts to Sacramento Orcutt Grass from Development within Sutter County under NBHCP

Because Sacramento orcutt grass has not been documented to occur either historically or presently within the Plan Area and because the Plan Area does not support suitable habitat for the species, development within Sutter County is not anticipated to have a significant effect on the species.

Impacts to Sacramento Orcutt Grass from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur either historically or presently in the Plan Areas, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species, were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Sacramento Orcutt Grass under NBHCP

The Plan Area generally does not include vernal pools with the required high terrace formation that supports this species. Vernal pool restoration programs could provide enhanced habitat for this species.

Although not known, or expected, to occur in the NBHCP area, some marginally suitable deep vernal pool habitat for the Sacramento orcutt grass is present in the eastern portion of the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat); the vernal pool protections incorporated into the NBHCP; and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., seasonal wetlands) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

20. Slender Orcutt Grass (*Orcuttia tenuis*)

Significance of Plan Area to Slender Orcutt Grass

Because the species has not been documented from the Plan Area and because suitable habitat for the species is not present, the Plan Area is not considered significant in the continued existence or preservation of the species.

Extent of Take of the Slender Orcutt Grass as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat values for vernal pool species.

Measures to Avoid, Minimize, and Mitigate Take of the Slender Orcutt Grass

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the slender orcutt grass: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters are subject to separate Section 404 permits are present, 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional waters of the U.S. or not - will be authorized through the incidental take permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition, TNBC shall evaluate the potential for furthering the conservation of covered plant species within the NBHCP's vernal pool areas or its wetland reserve system through appropriate means including but not limited to, the introduction of Boss's Lake hedge-hyssop, Sacramento orcutt grass, slender orcutt grass, Colusa grass and legenera into the vernal pool areas or other suitable locations in the NBHCP Plan Area.

Impacts to Slender Orcutt Grass from Development within the City of Sacramento under NBHCP

Slender orcutt grass has not been documented in the Plan Area and potential habitat is limited to few vernal pools on the far eastern edge of the Plan Area. Development within the City of Sacramento could result in the loss of marginally suitable habitat for the slender orcutt grass in the form of seasonal wetlands and vernal pools. This habitat loss may result in the loss of individuals of this federally listed species; however, because of the limited extent of potential

habitat and relatively low quality of the habitat present in the Plan Area, City development is not anticipated to have an effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for development.

Impacts to Slender Orcutt Grass from Development within Sutter County under NBHCP

Because slender orcutt grass has not been documented to occur either historically or presently within the Plan Area and because the Plan Area does not support suitable habitat for the species, development within Sutter County is not anticipated to have a significant effect on the species.

Impacts to Slender Orcutt Grass from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur either historically or presently in the Plan Areas, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Slender Orcutt Grass under NBHCP

The Plan Area generally does not include vernal pools with the required high terrace formation that supports this species. Vernal pool restoration programs could provide enhanced habitat for this species. Due to the current lack of suitable habitat and the lack of known occurrences of this species, development and other Covered Activities under the NBHCP are not likely to effect the continued existence or preservation of this species. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

21. Colusa Grass (*Neostapfia colusana*)

Significance of Plan Area to Colusa Grass

Although Colusa grass is known to occur in large vernal pools with clay soils similar to those soils occurring in the Plan Area, past disturbances (i.e., leveling and filling of large vernal pools) precludes this species occurrence. There are no known occurrences of this species within the Plan Area. The Plan Area is not considered significant in the continued existence or preservation of the species.

Extent of Take of the Colusa Grass as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin,

however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat values for vernal pool species.

Measures to Avoid, Minimize, and Mitigate Take of the Colusa Grass

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the Colusa grass: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters are subject to separate Section 404 permits are present, 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within jurisdictional waters of the U.S. or not - will be authorized through the incidental take permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition, TNBC shall evaluate the potential for furthering the conservation of covered plant species within the NBHCP's vernal pool areas or its wetland reserve system through appropriate means including but not limited to, the introduction of Boss's Lake hedge-hyssop, Sacramento orcutt grass, slender orcutt grass, Colusa grass and legenere into the vernal pool areas or other suitable locations in the NBHCP Plan Area.

Impacts to Colusa Grass from Development within the City of Sacramento under NBHCP

Colusa grass has not been documented in the Plan Area and potential habitat is limited to few vernal pools on the far eastern edge of the Plan Area. Development within the City of Sacramento could result in the loss of marginally suitable habitat for this species in the form of seasonal wetlands and vernal pools. This habitat loss may result in the loss of individuals of this federally listed species; however, because of the limited extent of potential habitat and relatively low quality of the habitat present in the Plan Area, City development is not anticipated to have an effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for development.

Impacts to Colusa Grass from Development within Sutter County under NBHCP

Because suitable habitat does not occur in the Plan Area, no impacts to Colusa grass are expected from the implementation of the NBHCP. However, lands within the Plan Area are suitable (i.e., basin rim landforms with clayey soils) for restoration and creation of suitable Colusa grass habitat.

Impacts to Colusa Grass from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur either historically or presently in the Plan Areas, and as a result of the fact that the Water Agencies' Covered Activities will not

typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be minor or insignificant.

Overall Impacts to Colusa Grass under NBHCP

Although not known, or expected, to occur in the NBHCP area, marginally suitable habitat for Colusa grass is present in the eastern portion of the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species or their habitat), the vernal pool protections incorporated into the NBHCP, and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., seasonal wetlands) in the reserve system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

22. Legenere (*Legenere limosa*)

Significance of Plan Area to Legenere

Although seasonal wetlands present in the Plan Area may provide suitable habitat for the species, it has not been documented in the Plan Area. The lack of known occurrences and the generally disturbed nature of the Plan Area probably preclude the presence of significant populations of the species, therefore the Plan Area does not represent an area important to the continued existence or preservation of the species.

Extent of Take of the Legenere as a Result of Covered Activities

The NBHCP identifies small, relatively undisturbed areas of vernal pools in the Natomas Basin. Currently, the Basin does not contain a significant component of vernal pools and implementation of the NBHCP is not expected to affect the continued existence of the vernal pool species. Because potentially suitable habitat for vernal pool species occurs in the Basin, however, vernal pool conservation and establishment of wetland and upland reserves would protect and enhance habitat values for vernal pool species.

Measures to Avoid, Minimize, and Mitigate Take of the Legenere

The Land Use Agencies will implement the following measures to avoid, minimize, and mitigate take of vernal pool species, including the legenere: 1) report to USFWS development plans that affect vernal pools within the Permit Areas, 2) require developers to conduct biological surveys for vernal pool species in the Permit Areas and to have a qualified biologist identify whether or not jurisdictional waters are subject to separate Section 404 permits are present, 3) if jurisdictional waters subject to Section 404 permit requirements of the Federal Clean Water Act are present, the applicant must apply for a 404 permit, and separate consultation under Section 7 will be required if vernal pool obligate or associated species are discovered. However, all incidental take of vernal pool or wetland Covered Species - whether found within

jurisdictional waters of the U.S. or not - will be authorized through the incidental take permits and the applicant will be required to implement the take avoidance, minimization and mitigation measures provided for under Section A.4 of Chapter V of the NBHCP.

In addition, TNBC shall evaluate the potential for furthering the conservation of covered plant species within the NBHCP's vernal pool areas or its wetland reserve system through appropriate means including but not limited to, the introduction of Boss's Lake hedge-hyssop, Sacramento orcutt grass, slender orcutt grass, and legenera into the vernal pool areas or other suitable locations in the NBHCP Plan Area.

Impacts to Legenera from Development within the City of Sacramento under NBHCP

Development within the City of Sacramento could result in the loss of suitable habitat for the legenera. This habitat loss may have a substantial effect on individuals of this special-status species; however, because of the limited extent and relatively low quality of the habitat present in the Plan Area, City development is not anticipated to have a substantial effect on the species as a whole. Also, the areas with the highest habitat quality are not in areas designated for development.

Impacts to Legenera from Development within Sutter County under NBHCP

Because legenera has not been documented to occur either historically or presently within the Plan Area and because the Plan Area only supports marginal (i.e., disturbed) habitat for the species, development within Sutter County is not anticipated to have a substantial effect on the species.

Impacts to Legenera from the Water Agencies' Covered Activities under NBHCP

Because the species has not been documented to occur either historically or presently in the Plan Areas, and as a result of the fact that the Water Agencies' Covered Activities will not typically result in take of the species were it to occur, the expected take of the species as a result of the Water Agencies' Covered Activities are not likely to occur, and the adverse effects of such take will be insignificant.

Overall Impacts to Legenera under NBHCP

Legenera is found along lake shores and in vernal pools, and other seasonally inundated habitat areas. The Plan Area does not currently support deep vernal pools that remain inundated for significant periods during the winter and spring. However, creation of wetland reserves may result in enhanced habitat that could support this species.

Although not known to occur in the NBHCP area, suitable vernal pool and seasonal wetland habitat for legenera is present in the eastern portion of the area. The combination of the overall measures (i.e., pre-construction surveys for Covered Species and their habitat); the vernal pool protections incorporated into the NBHCP; and long-term protection, creation, and enhancement of upland and suitable wetland habitats (i.e., seasonal wetlands) in the reserve

system will effectively compensate for potential adverse effects to this species under the NBHCP. These HCP measures will avoid, minimize and mitigate take of the species to the maximum extent practicable in accordance with the ESA and will minimize and fully mitigate effects in accordance with CESA.

E. TAKE AS A RESULT OF INDIRECT KILLING OR INJURY

The impacts of urban development and other Covered Activities in the Natomas Basin on Covered Species would not be through direct killing or injury as a result of construction and O&M activities alone. For example, in some cases, individual garter snakes or other Covered Species may escape direct death or injury by fleeing the construction area, but may subsequently perish if they do not reach suitable, available habitat. Similarly, some animals may reach alternate habitat but perish from competition or reproductive exclusion if the habitat reached by refugees is already at carrying capacity, or, animals already inhabiting such habitats may perish as a result of the same increased competition. Other mortality factors that may come into play as a result of urban development are road kills and depredations by domestic pets. For example, giant garter snakes are susceptible to road kills (see Section II.C.2); thus, increased traffic in the Natomas Basin as a result of development may increase this mortality factor for snakes as well as other wildlife in areas near or adjacent to development. Also, human population increases associated with development will likely increase pet populations, which, in turn, may increase wildlife mortality in some areas as a result of predation by domestic dogs and cats. Because indirect take will predominantly occur within areas of Authorized Development, such take has already been largely accounted for within the discussions of impacts to individual species. Some minor additional take beyond those levels previously discussed could occur along the margins of Authorized Development and throughout the Basin due to an overall increase in vehicular traffic.

F. EFFECTS OF THE PLAN ON LONG-TERM SURVIVAL OF WETLAND-DEPENDENT SPECIES

The giant garter snake is the principal wetland dependent species expected to be significantly affected by habitat loss as a result of urban development in the Permit Areas. However, the issuance of incidental take permits for the Permit Areas is not expected to jeopardize the long-term survival of the giant garter snake. This is because the Plan will result in a reduction of take due to: (1) the NBHCP's establishment of a permanent system of managed rice lands and wetlands designed and managed specifically for consistency with giant garter snake biology; (2) the Plan's emphasis on hydrological connectivity between existing and newly created habitat areas within the Basin; and (3) the Plan includes substantial measures to avoid and minimize take by the Land Use Agencies and TNBC.

Although the NBHCP will protect and enhance wetland and upland habitat values in the Basin, urban development will result in a net conversion of agricultural land (rice lands and row crops) to urban uses. Nevertheless, over the term of the permits, continued rice farming and construction and management of managed marshes are expected to play an essential role in sustaining long-term populations of giant garter snakes in the Basin as well as of other Covered Species utilizing the same habitat. In the event that new information indicates that the Plan's current provisions are not optimal for protecting giant garter snakes and other wetland species,

the Plan's Adaptive Management, recovery plan adaptation, 9,000-acre and individual Land Use Agency Independent Mid-Point Review provisions will provide for significant corrective measures to be implemented over the 50 year term of the permits.

In the Natomas Basin, the current giant garter snake population is believed to have been maintained over the past 20 years or so in a land use pattern of about 50% rice and 50% other irrigated non-wetland crops. The extent of rice land in the Basin, both actively farmed and fallow, has been somewhat over 21,000 acres in recent years (see Chapter III). If development occurs as described in the NBHCP, but the current pattern of rice, non-wetland irrigated crops, and the present water conveyance system (the ditches and drains) otherwise remain, the Basin's giant garter snake population would reasonably be expected to persist into the future, if considered together with the conservation program for the snake as described in the Plan.

The best information available from the rice industry indicates that good growing conditions and a strong future market for rice imply a stable, continuing level of rice farming in northern California. The Natomas Basin is reputed to be prime rice growing land. However, the viability of rice farming depends on a federal price subsidy program and on the availability of plentiful summer irrigation water (see Chapter III), and conditions changing these factors could lead to a reduction or elimination of rice farming from the Basin over the long term.

If rice farming were to cease in the Basin, the remaining non-wetland cropland and irrigation system would probably be insufficient to sustain the giant garter snake population. This conclusion is based, in part, on the fact that giant garter snakes used to inhabit rice growing regions in northern San Joaquin Valley, but have largely disappeared since the rice lands were converted to other crops. Similarly, if an excessive proportion of the Basin were to be urbanized, resulting in extensive losses of rice lands and other snake habitats, the giant garter snake population might decline to the point of extirpation. The impacts of urban development on the giant garter snake in the Basin may result from three sources (see Section VII.D.1 above): (1) take of individual snakes due to the activities described in the Plan; (2) take as a result of habitat loss; and (3) take as a result of indirect effects of development, including increased traffic, domestic animal predation, water pollution, and similar effects associated with urbanization. In addition, if urban development occurred at levels that ultimately would substantially reduce or eliminate agriculture in the Basin, the components of the irrigation system (e.g., ditches, drains, canals) that currently support giant garter snakes and the extent of the system would likely also decline or disappear, probably resulting in extirpation of the giant garter snake from the Basin (winter drainage alone does not provide sufficient giant garter snake habitat).

Anticipated take of giant garter snakes resulting from urban development activities in the Permit Areas are described in Section VII.D.1 above. This section considers the effects of proposed development on overall wetland acreage available in the Basin through time, and the likelihood that rice farming will persist in the Basin over the long-term.

One measure of gross habitat value in the Basin is the acreage of extant wetlands (i.e., marsh lands and rice lands). However, the conversion of rice land to urban uses is not necessarily the full measure of the impacts of urban growth. It is the matrix of rice land, non-rice land, other

wetlands, and the irrigation and drainage system that constitutes present giant garter snake habitat in the Basin. Nonetheless, when addressing gross land use changes on the scale of thousands of acres, an estimated accounting of rice land and other wetland acreage through time is a reasonable measure of the anticipated long-term effects of urban development in the Basin and the effectiveness of the NBHCP's proposed mitigation program. Table VII-14 presents projected data on the status of land use over time in the Natomas Basin, and Table VII-15 presents projected data on the area of rice lands and wetlands anticipated in the Basin as a result of the NBHCP's mitigation program. As can be seen from these tables, the OCP anticipates preserving or creating 4,375.5 acres of rice land habitat managed to support wetland species such as the giant garter snake, and creation of an additional 2,263.5 acres of managed marsh habitat. Table VII-15 shows that the overall projected loss of wet habitat (rice and marsh lands) as a result of the adoption of the HCP would be a 3% decline in wet areas in the Natomas Basin overall. Of this, the majority of decline is attributable to conversion of rice to urban uses. While rice shows an overall net loss in the future, marsh land is projected to substantially increase over current levels from 96 acres (present condition in the Basin) to 2,263 (or a 24 fold increase) acres after implementation of the HCP and associated mitigation program.

Under the provisions of the NBHCP, habitat land acquisition would transfer some rice land into the reserve system. Rice lands acquired by TNBC for Mitigation Lands are expected to remain in rice cultivation or to be converted to managed marsh lands. Either of these habitats would support continuation of the giant garter snake. TNBC managed rice and managed marsh habitat will also include upland edges to support cover and hibernation sites for the giant garter snake during winter months

Similarly, the flexibility of the NBHCP to allow in-Basin and out-of-Basin mitigation purchases is expected to have a minor impact on the total amount of rice farmed in the Basin. If the TNBC buys land outside the Basin, then land in the Basin will likely remain in private hands and in rice production and other types of farming. The principal loss would then be from urbanization. Assuming development of 17,500 acres, the total extent of wetland--rice and marsh--however, there would be a substantial gain in marsh habitat. The permanent protection of NBC reserve lands and the substantial increase in the extent of marsh are thus anticipated to result in a benefit to the long-term stability of giant garter snake populations in the Natomas Basin.

**TABLE VII-15
STATUS OF WETLAND OVER TIME (IN ACRES)**

Wetland Type	Baseline Acreage	Acres Impacted by Planned Development	Lands to be Preserved or Created by TNBC	Lands Not Included as Planned Development under this HCP	Remaining Lands (TNBC Mitigation Lands plus lands not impacted by Planned Development)
Rice Lands	22,693.0	(8,087.0)	4,375.0	14,606.0	14,606.0 to 18,981.0
Marsh, ponds and wet areas	96.0	(21.0)	2,187.5	75.0	2,262.5
Canals	1,778.0	(404.0)	N/A	1,374.0	1,374.0
TOTAL	24,854.0	(8,512.0)	6,562.5	16,055.0	18,242.0 to 22,617.5

Note: TNBC may acquire rice fields. It is assumed that these rice fields would be fields located outside of the area of Planned Development. Therefore, the lower range for remaining lands does not credit TNBC with providing a net increase in rice lands. On the other hand, if TNBC acquires land suitable for rice and enters that land into active rice cultivation as part of the reserve system, a net increase in remaining rice lands may result. It is also possible that some existing rice lands would be acquired and converted to managed marsh, resulting in a reduction in rice lands remaining, but an increase in marsh lands which may be more valuable to the wetland Covered Species.

**TABLE VII-16
PROPORTION OF WETLAND BY TYPE OVER TIME (IN ACRES)**

Plan Year	RICE LANDS				MARSH LANDS				WET AREAS OVERALL	
	Mitigation Lands	Other In Basin	TOTAL	% of Basin	Mitigation Lands	Other In Basin	TOTAL	% of Basin	Basin Wetlands (Rice plus Marsh)	% of Basin
Present	0.0	22,693.0	22,693.0	42.9%	0.0	96.0	97.0	0.2%	22,790.0	42.6%
Project Completion	4,375.0	14,606.0	18,981.0	35.5%	2,187.5	75.0	2,262.5	4.2%	21,243.5	39.7%

Notes:

Plan Year: 1997

Basin: Defined as the Natomas Basin Plan Area comprised of 53,537 acres.

Mitigation Lands: Lands to be preserved at a 0.5 to 1 Mitigation Ratio of which 50% of lands are planned to be rice and 25% of lands are planned to be managed marsh habitat and the balance of 25% planned for upland reserves.

G. SPECIES RECOVERY

The appropriate role of the NBHCP in giant garter snake and Swainson's hawk recovery is not known at this time because the USFWS has not yet completed a final Giant Garter Snake Recovery Plan and the CDFG has not developed a Swainson's Hawk Recovery Plan. However, the NBHCP incorporates a recovery plan adaptation provision (see Section VI.H) that allows for modifications to the NBHCP in light of future recovery plans when and if such plans are approved.

Ultimately, recovery of the giant garter snake depends on conservation of garter snake populations throughout the Central Valley, including the Natomas Basin. The NBHCP provides a system of reserves and establishes an entity (The Natomas Basin Conservancy) to administer the program in perpetuity. By providing mitigation for the impacts of urban development on giant garter snakes in the Permit Areas and providing them with a protected reserve system in the Plan Area, and through the recovery plan adaptation described above, the NBHCP effort will contribute to statewide giant garter snake recovery efforts.

The NBHCP also allows, if certain conditions are met for some Mitigation Lands to be purchased out-of-Basin (see Section IV.B). The purpose of this provision is potentially to reduce the cost of the Plan by allowing acquisition of lower-cost land and to reduce the impact of land acquisition on farming in the Basin.

H. IMPACTS OF RESERVE MANAGEMENT

Habitat restoration and management activities in the NBHCP reserve system at times will require significant amounts of earth moving and surface disturbance (e.g., to create managed marsh wetlands). These activities may result in some levels of take of the Covered Species, especially the giant garter snake. Additional ongoing reserve management activities may also result in take (e.g., through ditch and drain maintenance, road kills, etc.), and take for scientific purposes (e.g., during monitoring) will periodically occur. However, take levels as a result of these activities are expected to be minor to negligible because: (1) TNBC will implement all take avoidance measures as described in Section V.B; and (2) the benefits of these activities in creating and maintaining the Mitigation Land system is expected to more than offset any such minor take levels.

1. Authorizing Management Take/Take for Scientific Purposes

As explained above, certain operations associated with reserve establishment and management (e.g., construction of managed marshes) could result in incidental take of giant garter snakes and other Covered Species. Other activities undertaken during reserve management (e.g., trapping of giant garter snakes for population monitoring purposes or for relocation to other habitats) could result in intentional (as opposed to "incidental") take. The take would be for scientific purposes or for the propagation and enhancement of survival and must be authorized by a permit under Section 10(a)(1)(A) of the federal ESA. Both these types of take are authorized under the NBHCP subject to the conditions described below.

For purposes of management activities, the federal Section 10(a)(1)(B) permit and state Section 2081 permit issued to TNBC pursuant to the NBHCP shall authorize all take of Covered Species resulting from mitigation activities and management and operation of the NBHCP's reserve system, provided that: (1) such take results from mitigation measures (e.g., capture/relocation) specifically intended to minimize more serious forms of take (e.g., killing/injury) or that are part of a monitoring program specifically described in the NBHCP; (2) such activities are directly associated in time or place with activities authorized under the permits; (3) such take occurs during activities conducted by the agents or employees of the USFWS, CDFG, TNBC, or any person acting under the direct guidance or authority of these entities; and/or (4) such take occurs during activities specifically described in a reserve management or monitoring plan approved by the USFWS and CDFG. These provisions are consistent with USFWS policy as described in the USFWS "Habitat Conservation Planning Handbook" (USFWS 1996). In addition, the state and federal permits issued to TNBC shall authorize all management related take that occurs on duly established NBHCP Mitigation Lands, irrespective of the location of those lands (i.e., management take occurring on out-of-Basin reserve sites is covered).

With respect to activities requiring take for scientific purposes (e.g., trapping, handling, and marking of Covered Species), the federal permit issued pursuant to the NBHCP shall be considered a joint Section 10(a)(1)(B)/10(a)(1)(A) permit. However, the permit shall only authorize take during those activities provided that: (1) the activities are directly associated with monitoring or similar requirements under the NBHCP; (2) the person(s) undertaking or retained to undertake the activities submits a resume to the USFWS describing their relevant qualifications; (3) the USFWS authorizes the person(s) to undertake the activities via a written letter or memorandum; and (4) the person(s) implements such additional terms and conditions as may be described in the USFWS' letter of authorization.

I. MAXIMUM EXTENT PRACTICABLE

1. Summary of Findings Under ESA and CESA

To issue a Section 10(a) permit, the U.S. Fish and Wildlife Service must have sufficient evidence to find that take has been avoided, minimized, and mitigated to the maximum extent practicable. To make this finding, USFWS must examine a variety of facets - biological, physical, legal, and economic. To issue a Section 2081 Permit, CDFG must have sufficient evidence demonstrating the applicants will minimize and fully mitigate the impacts of the take authorized under the 2081 permits. The Conservancy and the Land Use Permittees have proposed minimization measures and mitigation in the NBHCP to adequately address all of the impacts resulting from the proposed take under ESA and CESA.

To address the findings required under ESA and CESA, it is necessary to review all aspects - biological, physical, legal, and economic. As evidence to support the findings, the Land Use Permittees and The Conservancy submit Appendix H, the Biological Resources Tech Memo to identify take of the Covered Species; Appendix A, the Economic Analysis for the economic

discussion of maximum extent practicable; as well as the conservation strategies and measures to reduce take identified in the NBHCP.

The Conservancy and the other Permittees evaluated the extent of take on Covered Species and proposed mitigation and minimization measures in the NBHCP to offset fully the impacts of such take as described in detail earlier in Chapter VII. The NBHCP conservation strategies and mitigation program provide for the collection of Mitigation Fees to purchase 0.5 acres of Mitigation Land for each acre of land developed, resulting in approximately 8,750 acres of Mitigation Lands as replacement habitat for Covered Species. Habitat on Mitigation Lands will be preserved, established, enhanced and actively managed to maximize the values of the Mitigation Lands to the Covered Species. Under the NBHCP, take would be avoided, minimized, mitigated and monitored through the following measures:

1. Identification and implementation of incidental take conservation measures to minimize impacts to NBHCP Covered Species as set forth in Chapters V and VI.
2. Establishment, enhancement and active management of up to 8,750 acres of high quality reserve habitat in perpetuity that is managed specifically for the benefit of NBHCP Covered Species. Of this Mitigation Land, approximately 6,562.5 acres would be managed marsh and rice fields which would provide direct benefits to giant garter snake and other wetland dependent species. Approximately 2,187.5 acres would be in upland reserves for the benefit of Swainson's hawk and other upland dependent species. The NBHCP also provides additional habitat for hawk foraging along upland edges of wetland reserves.
3. Establishment of a monitoring and reporting plan to gauge the anticipated biological success and effectiveness of the NBHCP and to provide information for the Adaptive Management Plan which is designed to improve the biological success of the NBHCP as new information becomes available or conditions change.
4. Implementation of a funding program which contains assurances that the NBHCP will be implemented.

From a biological standpoint, the Mitigation Ratio of 0.5 to 1 is appropriate given the paucity of extant natural, undisturbed habitat for the Covered Species found within the Plan Area when compared to the enhanced value of the reserve lands that will result from habitat restoration, creation and management. Limited natural habitat remains within the Plan Area. Some of the habitat within the Permit Areas subject to urban development is of high quality and some is of very low or limited value. Agricultural lands, and agricultural drainage canals and ditches provide artificial habitat within the Plan Area. All land converted to Authorized Development within the Permit Areas are subject to the NBHCP and required to pay the Mitigation Fees or contribute Mitigation Lands, including those portions of the Mitigation Fee related to future management and monitoring, whether the land lost to urban development is of high, low, or limited value to the Covered Species. In addition, the system of habitat reserves established and actively managed by The Conservancy in implementing the NBHCP will provide

higher quality habitat for the Covered Species than currently exists. For example, as described in Chapter VII, the managed marsh, with its islands and lagoons, provides significantly more beneficial "edge" habitat for the snake than a typical rice field. The enhanced value of the Mitigation Lands thus, will establish improved habitat for the benefit of the Covered Species and their range.

Also, the system of habitat reserves, both in size and distribution, is beneficial to the biological diversity of species and is designed to specifically benefit the Covered Species. Because of the varied quality of habitat throughout the Permit Areas and the required enhancement of habitat by The Conservancy, the NBHCP proposes a Mitigation Ratio of one half acre of habitat land in the Plan Area for one acre of development within the Permit Areas. Nonetheless, for giant garter snake, one of the primary Covered Species under the NBHCP, habitat values will result in an effective mitigation ratio much higher than the 0.5 to 1 mitigation ratio because the quality of both marsh and rice habitat in the reserve system would be greater than the quality of the habitat lost to development and because the enhanced reserves will be designed, managed and monitored to support viable populations of such species. Similarly, under the NBHCP, the loss of Swainson's hawk nesting habitat would be mitigated by active management of reserve lands to increase the number of available nest trees and the quality of foraging habitat, thus meeting the CDFG mitigation requirements for this species. Take of the remaining Covered Species also would be mitigated by the acquisition and active management of Mitigation Lands under the NBHCP.

The NBHCP also requires the following conservation measures to avoid and minimize take of giant garter snake, Swainson's hawk, and the other NBHCP Covered Species. These measures must be implemented before disturbance of the land (i.e., grading) can occur: 1) a pre-construction biological survey by a qualified biologist must be completed for each development site, 2) grading can only occur during the active season of the giant garter snake (May through September each year), 3) grading can only take place within certain distance of Swainson's hawk nesting trees (i.e., ½ mile) during nesting until after the young have fledged (March 15 to September 15 each year), and 4) ditches and canals must be dewatered for at least 15 days before they are filled and notice of dewatering provided to the California Department of Fish and Game and the U.S. Fish and Wildlife Service in order that they might take steps to re-locate any giant garter snakes or other Covered Species found during the dewatering process. The Permittees will require these measures also to minimize impacts on other Covered Species.

Based upon the analysis to identify take of the Covered Species contained in Chapters V and VII of the NBHCP, and in the Biological Resources Technical Memo, and for the reasons stated above, the Permittees believe the mitigation and conservation strategies provided in the NBHCP would mitigate fully the effects of incidental take.

The Permittees also have considered the physical constraints of providing mitigation to the maximum extent practicable and to achieve mitigation that minimizes and fully mitigates take of Covered Species. Within the Natomas Basin, a limited number of acres would be available for acquisition by TNBC under the willing seller / willing buyer process. Consequently, the NBHCP provides a "release valve" by allowing the TNBC to acquire reserve land located

outside the Basin under specified circumstances, and up to a maximum of 20 percent of the total required mitigation land.

In determining whether the mitigation proposed by the Permittees is the maximum extent practicable and minimizes and fully mitigates take, the Permittees also have considered legal requirements pertaining to the imposition of mitigation on Covered Activities. In this regard, the Permittees must comply with statutory and constitutional nexus requirements. Those legal constraints require that: (i) mitigation imposed on Authorized Development bear a rational relationship to the impacts of such development on existing habitat, and (ii) the mitigation be roughly proportional to the impacts caused by the Authorized Development (e.g., as measured by the amount of habitat lost and the amount of habitat required to be provided to offset this loss. As described in Chapters V, VI and VII and the accompanying technical reports, the Land Use Permittees have proposed a mitigation ratio and a corresponding Mitigation Fee which the applicants believe fairly compensates for the impacts of take caused by the Authorized Development, and at a level that is roughly proportional to the impacts caused by such development. In other words, for Authorized Development which would impact low quality or no habitat, a higher mitigation ratio requirement would result in those developers paying Mitigation Fees at a level which would exceed the impact caused by their projects. Thus, the mitigation ratio takes into account the varying quality of extant habitat impacted by Authorized Development and distributes the mitigation measures in an equitable manner by requiring developers to fund the mitigation measures designed to address the direct and indirect impacts of their development.

In determining the applicable mitigation for impacts resulting from Authorized Development, from an economic standpoint, the NBHCP proposes that a Mitigation Fee is required to be paid by the developer (both private and public) of each acre of Authorized Development whether or not the land has known or potential habitat for any of the Covered Species. Moreover, there is no maximum amount of Mitigation Fee (or fee cap) proposed in the NBHCP. TNBC is responsible for analyzing the fee and recommending to the Land Use Permittees the amount of the Mitigation Fee or necessary fee increases sufficient to implement the NBHCP. Each Land Use Agency will evaluate, consider and take action on any proposed increase in the Mitigation Fee. If a particular Land Use Agency does not take action to adopt an appropriate Mitigation Fee that will provide for the successful implementation of the NBHCP with respect to the impacts caused by Covered Activities within that Land Use Agency's Permit Area, the Wildlife Agencies would consider the circumstances and, if necessary, revoke the Land Use Permittee's Incidental Take Permit.

The Conservancy and the Permittees also evaluated the Mitigation Fee to determine its effect on the cost burden sustained by Authorized Development. The historic and current Mitigation Fee is reviewed and analyzed in the Economic Analysis prepared by Economic and Planning Systems, see Appendix A. According to EPS, the cost burden that can be placed on urban development must generally not exceed a range of 15 to 20 percent if the development is to be feasible. With the current Mitigation Ratio 0.5 to 1 and the historic trend of the Mitigation Fee, the Economic Analysis demonstrates that the mitigation required by the NBHCP is economically feasible. In conjunction with the development fees and other infrastructure the cost

burdens for urban development within the Basin already push the industry standard for feasibility. Nonetheless, although the NBHCP allows the Mitigation Fees to increase each year because there is no cap, the economic analysis indicates that the fees likely will increase in step with increases in land values such that the costs to developers and the Conservancy will not exceed the maximum cost burden of 20%.

Additionally, land acquisition prices for habitat have increased since 1997, when the HCP originally was adopted. As the land acquisition prices have increased, the Mitigation Fee accordingly has increased. As the supply of land suitable for habitat mitigation in the Basin diminishes over time, the land acquisition price will increase because less land will be available for reserve lands. Consequently, the upward pressure on land acquisition prices would increase significantly if the NBHCP mitigation ratio increased to a ratio of 1 to 1 or higher, or if the NBHCP required the purchase of lands in specified reserve areas. Thus, a mitigation ratio above 0.5 to 1 would require the purchase of more reserve lands as mitigation. This would result in a higher price per acre for land, forcing the Mitigation Fee above the acceptable margin, and likely making the development infeasible.

The Land Use Permittees and The Conservancy also considered the effects on Authorized Development resulting from the Mitigation Fees in combination with other development fees to which developers would be subject. From an economic market perspective, if the Mitigation Fees were increased to an amount that is too high to justify urban development by a project proponent, urban development within the Natomas Basin will slow down and the corresponding impact on the Covered Species within the Natomas Basin will decrease or be delayed. Alternately, developers may choose to locate their development projects outside of the Natomas Basin and in other jurisdictions, which could result in additional impacts to species at locations outside of the Permit Areas. It must be noted that the purpose and objective of the Land Use Permittees is to secure Permits to allow Authorized Development to occur in the Basin under the NBHCP. Approving too high of a mitigation fee could make development infeasible, making it impossible to achieve the goals and objectives of the Land Use Permittees.

Based upon the analysis contained in Appendices A, H and I, and for the reasons stated above, The Conservancy and the other Permittees believe the mitigation, conservation strategies and minimization measures provided in the NBHCP would minimize and mitigate the impacts of the Covered Activities to the maximum extent practicable under the ESA and in accordance with CESA's requirements to minimize and fully mitigate effects on Covered Species.

J. ALTERNATIVES TO THE PROPOSED NBHCP

1. No Action Alternative

The No Action Alternative, in which all take would be avoided and no federal or state permits would be obtained, for the Land Use Agencies or for the Water Agencies-was considered but rejected for the following reasons. The North Natomas Community Plan Area is an area that the City of Sacramento has designated as needed to provide an adequate housing mix for the City. Additionally, the Sutter County General Plan has for sometime contemplated and committed lands in south Sutter County for urban uses necessary to support the economic health

of Sutter County. Due to the nearly ubiquitous presence of the giant garter snake in the rice fields and in the man-made water supply and drainage system, alternatives that avoid take are impractical. Finally, because of the pattern of widespread giant garter snake use in the Basin and the various impacts to wildlife that accompany urban development, urbanization of the Natomas Basin in the absence of the NBHCP would likely result in the cumulative, unmitigated destruction of giant garter snake habitat and ultimately extirpation of the species from the area.

2. Alternative Reserve Management

Alternative reserve management systems were evaluated that would not allow hunting and/or rice production on any reserve lands. The alternative was rejected as financially unacceptable. Even small ongoing revenues will be effective in helping fund the NBHCP and its conservation programs, and can help lower endowment costs for long-term reserve land management. Coupled with the cost of infrastructure, flood protection, schools, and the like, the burden of funding the NBHCP through development fees alone could, over the long-term, become a strain on landowners. To the extent that rice farming and hunting are compatible with the NBHCP's wetland reserve objectives and operation of the Sacramento International Airport, these revenue sources should be utilized to help distribute the costs of the program and to keep the mitigation fee as low as possible. The improved prospects for NBHCP funding of an adequate long-term revenue stream from these sources, so long as they are compatible with Plan objectives, are therefore important to the long-term success of the Plan's conservation program. Nevertheless, under the NBHCP's funding provisions (see Sections VI.B), the development fee must be raised as necessary to ensure adequate funding to maintain the Plan's mitigation obligations.

3. Alternate Proportions of Marsh and In-Basin Land

The proposed proportion of mitigation lands managed as seasonal or permanent marsh (as opposed to rice farming) or acquired in-Basin (as opposed to out-of-Basin) represents a balancing between biological and local interests. Retention of land in rice farming in the Natomas Basin and on NBHCP reserve lands, while having a biological basis (based on currently available data), also has economic, political and social considerations affecting the practicality of local implementation. The biological objective for the giant garter snake under the Plan is persistence of the Natomas Basin garter snake population and contribution to long-term recovery of the species in its historical range. However, limitations to local acceptability of the Plan have been conveyed during public review of early drafts of the NBHCP. Public acceptability means a reasonable mitigation fee, limited uncertainty, general compatibility with land use plans and existing agriculture, and minimal loss of tax revenue.

The key issues between biological and local objectives balanced by the NBHCP are: (1) the proportion of mitigation land that can be maintained in rice production; and (2) the proportion of mitigation land that can be established out-of-Basin. On the biological side, the current percentage of managed marsh (25%) and out-of-Basin land (20%) allowed by the Plan may not be biologically optimal. On the local interest side, acquisition of lands in-Basin and large amounts of conversion of rice lands to marsh has a high economic cost and exacerbates the

impact of urbanization on loss of productive agricultural land. However, the NBHCP can adapt to meet changing biological circumstances through: (1) USFWS adoption of a Giant Garter Snake Recovery Plan and CDFG adoption of a Swainson's Hawk Recovery Plan (see Sections VI.H.1 and VI.H.2, respectively); (2) the Plan's Adaptive Management provisions (see Section VI.F); (3) 9,000-acre Overall Program Review as described in Section VI.I; and (4) the Land Use Permittees' Independent Mid-Point Reviews as described in Section VI.J. These provisions allow the NBHCP program to pursue alternatives of greater or lesser proportions of marsh and greater or lesser in-Basin land, and other measures if it is later demonstrated that this is biologically necessary. However, prior to acquisition of Mitigation Lands in Area B, the NBHCP TAC, including USFWS and CDFG representatives, must review and approve the acquisition. The NBHCP further stipulates conditions under which Mitigation Lands may be acquired in Area B (see Section IV.C.2.b of this NBHCP).