EXHIBIT. E

ENVIRONMENTAL ASSESSMENT

For The
Issuance of an Incidental Take Permit
Under Section 10(a)(1)(B) of the Endangered Species Act

For The

Natomas Basin Habitat Conservation Plan

To

CITY OF SACRAMENTO

Prepared By:

U. S. Fish and Wildlife Service
3310 El Camino Ave., Suite 130
Sacramento, California 95821

December 1997

I. PURPOSE AND NEED FOR THE ACTION

A. Background

The City of Sacramento (City or applicant) seeks an incidental take permit from the U.S. Fish and Wildlife Service (USFWS) pursuant to section 10(a)(1)(B) of the Endangered Species Act of 1973, as amended (ESA). The permit would authorize incidental take of the giant garter snake (*Thamnophis gigas*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), vernal pool fairy shrimp (*Branchinecta lynchi*), Colusa grass (*Neostaphia colusana*) and slender orcutt grass (*Orcuttia tenuis*), which are federally listed as threatened; and the Aleutian Canada goose (*Branta canadensis leucopareia*), American peregrine falcon (*Falco peregrinus anatum*), conservancy fairy shrimp (*Branchinecta conservatio*), longhorn fairy shrimp (*Branchinecta longiantenna*), vernal pool tadpole shrimp (*Lepidurus packardi*), Sacramento orcutt grass (*Orcuttia viscida*), which are federally listed as endangered. The proposed taking would be incidental to development for urban uses, rice farming, and water conveyance system operations and maintenance within the 53,000-acre Natomas Basin in Sacramento and Sutter Counties, California.

Section 9 of the ESA prohibits the "take" of federally listed species of wildlife unless otherwise authorized under the provisions of section 7, section 10(a), or section 4(d) of the ESA. Section 3 of the ESA defines take as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Section 10(a)(1)(B) defines "incidental take" as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." Federal regulation defines the terms "harass" and "harm" as follows. Harass means, "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering." Harm means "an act which actually kills or injures wildlife" and "may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering." A permit under section 10 (a)(1)(B) of the ESA constitutes an exception to the taking prohibition of section 9.

Pursuant to section 10(a)(2)(A), the City has submitted a Habitat Conservation Plan (HCP) with the permit application. The HCP, a statutory requirement of the permit application, estimates the level of incidental take of federally listed species expected to occur during the proposed activities and specifies how the impacts of the taking will be minimized and mitigated. In addition, the HCP submitted by the City addresses the following currently unlisted species, and the City has requested that these species be covered by the permit should they be listed in the future: midvalley fairy shrimp (*Branchinecta* n. sp.), Swainson's hawk (*Buteo swainsoni*), white-faced ibis (*Plegadis chichi*), bank swallow (*Riparia riparia*), greater sandhill crane (*Grus canadensis tubida*), tricolored blackbird (*Agelaius tricolor*), loggerhead shrike (*Lanius ludovicianus*), burrowing owl (*Athene cunicularia*), northwestern pond turtle (*Clemmys marmorata marmorata*), California tiger salamander (*Ambystoma californiense*), western spadefoot toad (*Scaphiopus hammondii*), delta tule pea (*Lathyrus jepsonii* var. *jepsonii*), Sanford's arrowhead (*Sagittaria sanfordii*), Boggs Lake hedge-hyssop (*Gratiaola heterosepala*) and legenere (*Legenere limosa*). Collectively, the listed and unlisted species described above are referred to as Covered Species. The current status of these Covered Species is shown in Table 1. The permit would be in effect for 50 years.

This Natomas Basin Habitat Conservation Plan (NBHCP or Plan), dated November 1997, was developed by the Natomas Basin HCP Working Group, which is comprised of all agencies and organizations with interests in the Basin. The NBHCP is intended to guide development, conservation, and other land use decisions throughout the Natomas Basin. It is also intended to support expected ESA Section 10(a)(1)(B) and CESA Section 2081 permit applications from each of the five affected land use agencies or irrigation districts within the Basin (Sacramento

City, Sacramento County, Sutter County, Irrigation District No. 1000, and Natomas Central Mutual Water Company). In substance, the NBHCP is expected to be similar when submitted by each affected agency. However, the Implementing Agreement (IA) developed by each agency or jurisdiction may vary to some extent based on the activities or specific circumstances within each respective jurisdiction and permit area.

It is hoped that all land use agencies and other entities with relevant land use authorities or activities in the Natomas Basin ultimately will adopt the NBHCP and receive Section 10(a)(1)(B) and Section 2081 permits based on the NBHCP. However, the NBHCP could be implemented independently by some individual permittees, but not by others, without adversely affecting the conservation program as a whole. This is because all endangered species habitat impacts within any Natomas Basin permit area must be mitigated under the Plan, and each jurisdiction must mitigate for its own impacts. Also, the same conservation strategy described in the NBHCP would be applied, at a minimum, in project-by-project review if certain jurisdictions elect not to adopt the NBHCP and obtain regional permits, and instead to conduct ESA and CESA compliance through individual permit applications.

This Environmental Assessment (EA) examines the environmental impacts associated with the issuance of an ESA section 10(a)(1)(B) permit and implementation of the Natomas Basin HCP. The NBHCP provides a complete and detailed description of the proposed taking of federally listed species.

B. Description of Purpose and Need for the Action

The purpose of issuing a Federal section 10(a)(1)(B) permit and implementing the associated NBHCP is to authorize incidental taking of the federally listed species listed above and indicated in Table 1 during urban development and other activities in the Natomas Basin. Such authorization is necessary because activities proposed or authorized by the applicants may result in take of the federally listed species described in Table 1, as well as other unlisted species shown in Table 1 should they become listed in the future. With respect to the unlisted species, the City has requested that the IA between the USFWS, California Department of Fish and Game (CDFG), Natomas Basin Conservancy (the Plan Operator), and the City provide assurances that, should the currently unlisted species noted above and in Table 1 be subsequently listed, the NBHCP would be deemed adequate for purposes of permit coverage for those species and no further mitigation would be required. These assurances are consistent with the Department of the Interior's August 11, 1994, "No Surprises" policy. The City and the USFWS consider implementation of the NBHCP in connection with a section 10(a)(1)(B) permit to be an effective means to reconcile development in the Natomas Basin with the section 9 prohibition and other conservation mandates under the ESA.

The Natomas Basin is subject to several approved land use plans that would convert portions of the Basin to urban use. These plans represent a foreseeable urban development scenario for evaluating the HCP. Approximately 17,500 acres of currently undeveloped land is expected to be urbanized under the 50-year permit. This area represents 37 percent of existing undeveloped land in the Basin. These development activities may result in take of covered species and permanent disturbance to their habitats within the 53,000-acre plan area. The NBHCP establishes a mitigation program for such urban development, as well as for water system operation and maintenance and rice farming. The focus of the NBHCP conservation program is a system of mitigation lands which will be managed as wetland and upland habitat for the giant garter snake, the Swainson's hawk, and the other Covered Species. One-half acre of mitigation land would be established for every acre of land developed within the NBHCP Area (a mitigation ratio of 0.5-to-1.0). The mitigation land would be acquired and managed by the Natomas Basin Conservancy (NBC), which will serve as the Plan Operator. The NBC is a

TABLE 1
LISTED, CANDIDATE, AND OTHER SPECIES ADDRESSED IN THE NBHCP AND COVERED BY ITS ASSOCIATED PERMITS*

HABITAT & SPECIES	FEDERAL STATUS	STATE STATUS	HABITAT NOTES
WETLAND ASSOCIATED SPECIES			
Aleutian Canada goose *Branta canadensis leucopareia*	T		Grazes in marshes and stubble fields, roosts on the water
Swainson's hawk *Buteo swainsoni*		T	Breeds in riparian forest; known nesting sites in trees along Sacramento River in Natomas Basin
giant garter snake *Thamnophis gigas*	T	T	Forages in low gradient open waterways and flooded rice fields, hibernates in canal berms and other uplands; several known occurrences in Natomas Basin
white-faced ibis *Plegadis chihi*	SC	SSC	Forages in flooded rice fields
bank swallow *Riparia riparia*		T	Nests in river banks, forages for insects over open water, croplands, and grasslands
American peregrine falcon *Falco peregrinus anatum*	E	E	Preys on birds, including waterfowl in and around wetlands
greater sandhill crane *Grus canadensis tubida*		T	Forages in moist croplands with stubble and emergent wetlands
tricolored blackbird *Agelaius tricolor*	SC	SSC	Nests in marshes with bulrush, blackberry or cattails; three known occurrences in Natomas Basin
northwestern pond turtle *Clemmys marmorata marmorata*	SC	SSC	Lives in permanent bodies of water; requires floating vegetation, logs, rocks or banks for basking
valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T		Lives and reproduces on elderberry shrubs found along rivers and canals
delta tule pea *Lathyrus jepsonii* ssp.*jepsonii*	SC		Perennial twinning vine occurs in both riparian and marsh habitats
Sanford's arrowhead *Sagittaria sanfordii*	SC		Tuberose perennial likely to occur in drainage or irrigation ditches
UPLAND ASSOCIATED SPECIES			
Swainson's hawk *Buteo swainsoni*		T	Forages for small mammals in grasslands and croplands
tricolored blackbird *Agelaius tricolor*	SC	SSC	Forages on the ground in grasslands and croplands; three known occurrences in Basin
loggerhead shrike *Lanius ludovicianus*	SC	SSC	Prefers open habitats with scattered shrubs, trees, fences, and posts. Will use cropland.
burrowing owl *Athene cunicularia*		SSC	Prefers open, dry grassland and desert habitats

HABITAT & SPECIES	FEDERAL STATUS	STATE STATUS	HABITAT NOTES
VERNAL POOL ASSOCIATED SPECIES			
Conservancy fairy shrimp *Branchinecta conservatio*	E		Vernal pool obligate; inhabits large, turbid pools; six disjunct populations known
vernal pool fairy shrimp *Branchinecta lynchi*	T		Vernal pool obligate; widely distributed in Sacramento County
vernal pool tadpole shrimp *Lepidurus packardi*	E		Vernal pool obligate; widely distributed in Sacramento County
longhorn fairy shrimp *Branchinecta longiantenna*	E		Vernal pool obligate; inhabits long-lasting pools; four disjunct populations known
midvalley fairy shrimp *Branchinecta n. sp.*			Vernal pool obligate often found in small pools; likely to occur in plan area
California tiger salamander *Ambystoma californiense*	C	SSC	Winters in ground squirrel burrows or other holes; breeds in vernal pools
western spadefoot toad *Scaphiopus hammondii*	SC		Primary habitat is grasslands; breeds in shallow temporary pools
Colusa Grass *Neostapfia colusana*	T		Occurs in large deep pools with substrates of adobe mud but also in smaller pools; known in Yolo County
Boggs Lake hedge-hyssop *Gratiaola heterosepala*		E	Low-terrace species found in shallow water margins of vernal pools
Sacramento Orcutt grass Orcuttia viscida	E	E	Found in relatively large, deep vernal pools in eastern Sacramento County
slender Orcutt grass *Orcuttia tenuis*	T	E	Associated with vernal pools in the Coast Ranges and Cascade Foothills; sometimes found in shallower pools
legenere *Legenere limosa*	SC		Found in wet places or vernal pools below 400 feet in elevation

* Note that some species occur in more than one habitat category and thus are listed twice. A total of 26 species are included in Table I-1 and are covered by the permits.

Key to Abbreviations

Federal

E = Listed as endangered
T = Listed as threatened
C = Candidate for federal listing, data sufficient
SC = Species of Concern--informal category, formerly called candidate 2 species (data for listing insufficient)

State

E = Listed as Endangered
T = Listed as Threatened
R = Listed as Rare
SSC = Species of Special Concern

nonprofit corporation formed under the laws of the State of California in 1994. Habitat acquisition and management would be funded by a one-time assessment ("base mitigation fee") on all development projects. This base mitigation fee is set at $2,240.00 per acre of development in 1995 dollars. The base mitigation fee would be adjusted as necessary, using the Consumer Price Index (CPI) or other agreed upon index, to reflect current dollars at the time of permit issuance. In the future, the base mitigation fee also would be adjusted as necessary to account for inflation/deflation.

The incidental take permit would only authorize the taking of the federally listed species shown in Table 1. The unlisted species in Table 1, however, are adequately covered by the NBHCP and would be automatically covered under the permit in the event that they are listed. Other species not currently listed or covered by the NBHCP could be considered in the future for addition to the section 10(a)(1)(B) permit by an amendment, subject to approval of the USFWS.

The needs and goals of USFWS are:

(1) To conserve listed and unlisted species and their habitat during the proposed action.

(2) To ensure compliance with the ESA, National Environmental Policy Act (NEPA), and other applicable Federal laws and regulations.

Through implementation of the NBHCP, the City would minimize the effects of take of the covered species. The NBHCP sets forth a program to mitigate the loss of wildlife habitat values, including the loss of habitat of the giant garter snake, Swainson's hawk, and the other Covered Species, as well as the loss of some individual animals. The NBHCP's focus on the preservation and enhancement of existing habitat values within the Natomas Basin would provide for the preservation of the ecological communities which support species associated with the wetland and upland habitats. This would compensate for habitat loss resulting from the project and benefit the long-term conservation of the covered species.

C. Proposed Action and Decisions Needed

The proposed action is issuance of a permit by the USFWS to allow incidental take of the federally listed species shown in Table 1 during urban development and other activities within the 53,000-acre Natomas Basin.

Pursuant to section 10(a)(2)(B) of the ESA (which comprise the issuance criteria for incidental take permits), decisions to be made by the USFWS are:

1. Is the proposed take incidental to an otherwise lawful activity?

2. Are the impacts of the proposed taking minimized and mitigated to the maximum extent practicable?

3. Has the applicant ensured that adequate funding will be provided to implement the measures proposed in the HCP?

4. Is the proposed take such that it will not appreciably reduce the likelihood of the survival and recovery of the species in the wild?

5. Are there other measures that should be required as a condition of the permit?

The USFWS may choose to issue a permit conditioned on implementation of the NBHCP as submitted by the applicant, to issue a permit conditioned on implementation of the NBHCP as submitted together with other measures specified by the USFWS, or to deny the permit.

D. Scope of the Document

Chapter III of the NBHCP describes the land use issues within the Natomas Basin and summarizes the major projects which could result in urban development according to the City's and Counties' current General Plans (see NBHCP Figure 16, General Plans). All of the major projects, including South Sutter County General Plan Amendment, Metro Air Park, and the North Natomas Community Plan, have already undergone environmental review with the respective lead agencies. The significant impacts of each of the above named projects are described in their individual project Environmental Impact Reports. The local agencies with jurisdiction over the individual projects have the responsibility of approving or denying land use plans based on expected environmental impacts.

The Sacramento Area Flood Control Agency (SAFCA) flood control project also has undergone environmental review. That process resulted in the preparation of an Environmental Impact Report (Fugro-McClelland Inc., Final Environmental Impact Report for the Revised Natomas Area Flood Control Improvement Project, May 1993). The Final Environmental Impact Report (FEIR) includes a discussion of growth-inducing impacts of the flood control project. The FEIR states:

> "Completion of the project would thus permit removal of the Natomas Basin and portions of the lower Dry and Arcade Creek watersheds from the 100-year (FEMA) floodplain. Flood plain management restrictions tied to the 100-year flood and imposed by local jurisdictions pursuant to FEMA regulations could then be removed by these jurisdictions. This would permit new development to proceed where it might otherwise have been severely constrained." (page 7.0-1)

SAFCA is regionally responsible for providing flood control protection in the Sacramento Area. Urban growth resulting from such flood control is the responsibility of each of the local jurisdictions. The NBHCP and associated securing of a section 10(a)(1)(B) permit is proposed as mitigation for the biological impacts of resulting urban growth; thus, issuance of a permit would not directly cause the urbanization or its associated impacts.

Water quality in the Natomas Basin is currently affected by agricultural practices and is subject to the legal authorities of the state of California and the Environmental Protection Agency (EPA). Issuance of the permit will not affect these legal authorities; therefore, issuance of the permit is not anticipated to significantly impact water quality and, therefore, impacts to water quality will not be further discussed in this document. Air quality in the Basin is impacted by the practice of burning rice-fields at the end of the harvest season, and by development activity that ultimately leads to increased automobile traffic. The practice of burning rice-fields is currently being phased out by the regional Air Quality Control Board and will not be affected by the issuance of the permit. Development activity (i.e., which areas can be developed) is controlled by local jurisdictional General Plans and local and State laws and regulations, such as the California Environmental Quality Act (CEQA). Issuance of the permit will not affect these General Plans; thus, air quality is not expected to be significantly affected by issuance of the permit; therefore, impacts to air quality will not be further discussed in this document.

Impacts to land use and cultural and aesthetic resources are likewise affected by local jurisdictional General Plans and are subject to local and State laws and regulations, such as CEQA. These laws and regulations require that each development activity implemented under

any of the alternatives examined below, adequately minimize and mitigate potential impacts to these resources. Issuance of the permit is not expected to affect this process and, thus, is not expected to significantly impact land use and cultural and aesthetic resources; therefore, impacts to these resources will not be discussed further in this document.

The General Plans identify those areas potentially impacted by development activities that may affect the geology of the Basin. As discussed above, issuance of the permit will not affect local General Plans. Additionally, the vast majority of the geologic resources of the Basin have been and are currently being impacted via the implementation of agricultural activity; this process is expected to continue with or without the issuance of the permit. For these reasons the geology of the Natomas Basin is not expected to be significantly impacted by permit issuance and will not be discussed further in this document.

Since there will be no substantial difference (compared to the No Action Alternative) in impacts to soil, water, air, land use, geology, and cultural and aesthetic resources due to development expected to occur in the Natomas Basin, discussion of these impact is not warranted in this EA. However, under the NBHCP, impacts to the Covered Species would be mitigated in a comprehensive manner rather than on a project-by-project basis, resulting in a difference (compared to the No Action alternative) in impacts to NBHCP associated species. Also, while the alternatives examined in this document would not affect the implementation of the existing General Plans, they may affect socioeconomic issues. Therefore, this EA will focus on effects to HCP identified species and their habitats, and socioeconomic issues associated with NBHCP implementation.

II. ALTERNATIVES

A. Preferred Alternative - Approval of the NBHCP/Permit Issuance

1. Area/Uses Subject to Permit

Following is a summary of the Natomas Basin Habitat Conservation Plan (NBHCP or Plan). For a more complete description of the preferred alternative, please see the NBHCP.

Alternative 1 involves the issuance of a section 10(a)(1)(B) permit and subsequent implementation of the NBHCP.

Currently only the City of Sacramento is seeking a section 10 permit to cover land use approvals and public works activities. The following entities, however, could be added to this permit or have additional permits issued to cover their activities and to ensure complete implementation of the NBHCP:

a. County of Sacramento as a local land use authority, to cover land use approvals, public works and special functions such as the Sacramento Metropolitan Airport;

b. County of Sutter as a local land use authority, to cover land use approvals and public works;

c. Reclamation District Number 1000 (RD1000), to cover maintenance and operations;

d. Natomas Central Mutual Water Company (NCMWC), to cover maintenance and operations, but as the NBHCP is currently designed, not future water intake from the Sacramento River.

The proposed action would permit take of covered species only within the jurisdiction of the City of Sacramento; the Counties of Sacramento and Sutter may request in the future to be added to the permit or apply for their own permits to implement the NBHCP within their jurisdictions. The addition of any of the above entities, or the issuance of additional permits, would require an additional public comment period. The City and the Counties are the local land use authorities and would be direct permittees (see NBHCP Figure 3, Jurisdictions). Individual landowners would be protected by the permit for development or land use activities through a development agreement, enforceable conditions of approval issued by the appropriate local land use authority, or "Certificates of Inclusion."

The Section 10(a)(1)(B) permit also would cover incidental take that occurs during rice-farming activities within the permit area. This is because rice-fields are currently being used as habitat by the giant garter snake and the species may be taken during rice farming activities. All lands within the permit area would be subject to the proposed 10(a)(1)(B) permit; no distinction would be made between areas with approved land use plans and areas with agricultural zoning. Current development approvals and local General Plans are the basis for estimating impacts that would occur upon issuance of the Permit. The permit request is for a period of 50 years to correspond with the expected gradual build-out of the Basin. The mitigation lands established under the permit and other actions implemented to mitigate urbanization would be maintained and operated in perpetuity. If ongoing activity (e.g., water system operation) needs additional permit protection at the end of the 50-year period, then the permit could be renewed at the discretion of the USFWS.

The Natomas Basin Conservancy (NBC), will serve as the Plan Operator and will be responsible for acquisition and management of habitat lands under the NBHCP. The NBC will be governed by the terms of the NBHCP, its commitments within the Implementation Agreements for the respective jurisdictions, a Board of Directors, and Bylaws adopted November 23, 1994 (see Appendix G of the NBHCP). The NBC Board of Directors will be comprised of representatives from each of the three land use agencies (Sacramento City, Sacramento County, and Sutter County); each agency will at the appropriate time appoint three representatives, for a total of nine persons. The NBC will establish a Technical Advisory Committee comprised of representatives from the USFWS, CDFG, the land use agencies, and administrative and legal personnel, as needed, to assist it in making habitat purchase and management decisions.

The NBC will perform an important function for the NBHCP by establishing and overseeing a concerted Basin-wide program for acquiring and managing mitigation lands on behalf of the permittees. Specifically, the NBC will be responsible for collecting and managing mitigation fees required by the City and Counties, for using the fees to establish mitigation lands, and for managing the mitigation lands for the benefit of the covered species. Mitigation lands will be established through fee simple or easement acquisition. The NBC may legally buy and sell land, lease land for revenue, etc. As a non-governmental entity, the NBC has no powers of condemnation and can only purchase lands from willing sellers.

All proceedings of the NBC will be open to the public and the NBC will comply with the Ralph M. Brown Act regarding open and public meetings and the California Public Records Act. The NBC may, in time, be succeeded by another suitable non-profit entity or by CDFG (see CDFG, letter to the City and Counties, February 28, 1995, and Section 3.4.7 of the City of Sacramento's Implementation Agreement).

2. Species Proposed to be Covered by the Permit

A system of wetland and upland reserves managed primarily for giant garter snakes and Swainson's hawks will be the primary focus of the NBHCP mitigation plan; however, all of the species listed in Table 1 (Covered Species) are expected to benefit from implementation of the NBHCP. Also, development of any lands within the Basin (with the exception of those areas identified as nonmitigating on figure 17 of the NBHCP) is expected to adversely impact Covered

Species and their habitat either directly or cumulatively with other development activities; therefore, permit requirements would not be based on individual assessments of habitat quality of lands subject to development in any specific project (see Section II.B of this EA). The conservation program described in Chapter IV, Section C of the NBHCP also provides additional conservation measures for the vernal pool species covered by the plan (see Table 1), the valley elderberry longhorn beetle, and many of the Plan's other Covered Species.

The emphasis of the NBHCP is on maintaining and enhancing wetland and upland habitat values for Covered Species. Also, it is expected that the measures described below will provide benefits for other species. If other species found in the area become listed, the conservation program has the flexibility to be modified to meet their needs and the permit could be amended to include those species.

3. Conservation Program

The principal conservation effort would be the establishment of a system of habitat reserves which would provide wetland and upland habitat values for giant garter snakes, Swainson's hawks, and other Covered Species. The wetland reserves would be hydrologically connected to the existing system of canals and ditches, or to other water sources, and would have to have an assured water supply from March through September.

The NBC would establish mitigation lands as follows:

After 800 acres of mitigation land has been established in reserves within the basin, the NBHCP will allow up to but not more than twenty percent (20%) of the conservation lands for the giant garter snake to be located outside the Natomas Basin within Area B as shown in NBHCP Figure 21, provided the NBC obtains the concurrence of USFWS and CDFG that such lands contain habitat values suitable for the support of a viable giant garter snake population.

During the development of the NBHCP there was concern that the plan be compatible with the yet undeveloped Giant Garter Snake Recovery Plan, to be prepared by the USFWS in the near future. To address this concern, the NBHCP has been designed to adapt to recommendations of the Giant Garter Snake Recovery Plan. Any changes to the NBHCP necessitated by the Giant Garter Snake Recovery Plan will be treated as a major amendment under the NBHCP's Adaptive Management provisions which are described in Section E, Chapter IV of the NBHCP. Also, the NBHCP allows, if recommended by the completed Giant Garter Snake Recovery Plan, up to but not more than thirty percent (30%) of the conservation lands for giant garter snakes to be located within Area C as shown on Figure 21 of the NBHCP, subject to the concurrence of USFWS and CDFG. Thus, after the completion of the Giant Garter Snake Recovery Plan, a minimum of fifty percent (50%) of the conservation lands would be within the Basin (Area A); an additional twenty percent (20%) of the conservation lands may be outside the Basin in Area B. The remaining thirty percent (30%) could be located either within the Basin (Area A), within Area B, or within Area C, as directed by the Giant Garter Snake Recovery Plan and approved by the USFWS and CDFG.

Acquisition by the NBC of upland conservation lands for the Swainson's Hawk would be focused within the Swainson's hawk zone, as shown on Figure 21 of the NBHCP, but could also be established elsewhere in the Basin. Specific conservation objectives and upland reserve land acquistion criteria for the Swainson's hawk are provided in the NBHCP, Chaper IV, Section C.2.

Of that portion of the reserve system that is committed to wetlands, 75% of its total area will be maintained as rice lands and 25% will be maintained as managed marsh. This 25% managed marsh requirement will be satisfied by the end of the fifth year after issuance of the state and federal permits. However, this rice-to-marsh proportion may be revised if the Giant Garter Snake Recovery Plan, when such a plan is approved by the USFWS, makes any recommendations with respect to the relative importance of these habitats to giant garter

snakes. However, under any future Giant Garter Snake Recovery Plan recommendations, the maximum that may be committed to managed marsh under the NBHCP is 75% of the wetland reserve system's land area.

Mitigation lands would be allowed to be managed for multiple uses such as duck hunting and bird watching, only as long as such uses were fully compatible with the needs of the giant garter snake and other Covered Species. For example, the lands must be flooded from March through September to meet giant garter snake breeding/foraging needs.

Mitigation lands will include adequate buffers to minimize the effects of immediately adjoining land uses, including roads, on the reserves. In addition, the buffers will ensure that the management of reserve lands does not impose a burden on adjoining landowners. It is the responsibility of the NBC to establish the necessary buffers on NBC mitigation lands (i.e., the buffers will be part of, not outside of, the reserves). The width or extent of the buffer may vary with the situation, as long as it adequately reduces population mortality effects. For example, if the reserve lands are adjacent to other protected natural habitat or open space, then buffer widths could be reduced. Decisions about buffer widths in individual cases will be made by the NBC's Technical Advisory Committee.

All habitat mitigation lands acquired by the NBC or for which conservation easements are obtained will be situated a minimum of 800 feet from existing urban lands or lands that are designated for urban uses in an adopted General Plan at the time the mitigation land or easement is acquired. However, mitigation lands or easements closer than this setback distance may be acquired on a case-by-case basis, provided that the USFWS and CDFG approve of such purchase in writing. Intervening lands between urban development and mitigation lands should be in agriculture or another non-urban use; they will not necessarily be under the control of the NBC and it will not count as mitigation land area. It is the responsibility of the NBC, to the best of its ability, to locate reserve lands sufficiently far from urban areas or from lands designated for urban uses to fulfill this requirement. The setback is intended to minimize the potential conflict between urban uses and wildlife areas. The setback restriction described in this section applies only to land acquisition by the NBC and is not to be construed as a land use restriction on privately owned land within 800 feet of mitigation land.

The NBHCP contains Adaptive Management provisions described in detail in Chapter IV, Section E of the NBHCP. Adaptive Management is a process that allows the NBHCP's conservation program and reserve acquisition and management decisions to be adjusted throughout the life of the permit to ensure that the most up-to-date information available on covered species is being utilized and that the conservation program is as effective as possible. Chapter IV, Section E explains how the Adaptive Management provisions will work and how decisions under the Adaptive Management program will be made. Four aspects of the NBHCP could result in Adaptive Management modifications being adopted during the life of its associated section 10(a)(1)(B) permit: (1) new information resulting from ongoing research on the giant garter snake (see Chapter II, Section C.2.d of the NBHCP) or other covered species; (2) recovery strategies under the future USFWS Giant Garter Snake Recovery Plan or CDFG Swainson's Hawk Recovery Plan that could differ from the measures currently described in the NBHCP (see Chapter IV, Section H); (3) certain mitigation measures described in the NBHCP (e.g., marsh configuration and design and the reintroduction of certain plants into reserve areas) that may need to be revised through time based on the Plan's monitoring program; and (4) a requirement that habitat block sizes be a minimum of one 2,500-acre block and the remainder in 400-acre minimum blocks may need to be revised (see Chapter IV, Section C.1.a). Each of these situations could result in new information, new approaches, or new recovery or conservation standards that would need to be incorporated into the NBHCP. The NBHCP's Adaptive Management provisions are designed to address these types of uncertainties.

In addition, the NBHCP establishes a comprehensive program review designed to evaluate the performance and effectiveness of the Plan, to be conducted when and if urban development

within the Basin reaches a total of 9,000 acres. This program review will be triggered at the point that 9,000 acres of the Basin's currently undeveloped lands have been converted to urban uses. During the course of time the review is being undertaken, up to, but not more than, an additional 3,000 acres may be developed in the Basin. In other words, no more than a total of 12,000 acres of land will have been urbanized prior to completion of the program review and re-certification or re-permitting of the NBHCP, as appropriate. The program review is described in detail in Chapter IV, Section I of the NBHCP.

4. Mitigation Requirements

The primary obligation for impacts of urbanization would be the establishment of 0.5 acre of conservation lands for each 1.0 acre of gross development within the Mitigation Fee Zone of the Natomas Basin (a mitigation ratio of 0.5-to-1.0) (See NBHCP Figure 17). Prior to any urban development an initial reserve area of at least 400 acres would be established. This initial area could be either rice land or marsh land provided that by Year 5 of the Permit, the area or its equivalent acreage is converted to managed marsh, unless otherwise directed by the USFWS.

In order to allow the NBC to accumulate sufficient funds for acquisition of suitable parcels, after the initial 400 acres have been established, acquisition of additional land could be deferred until fees for a total of 1,500 developed acres have been accumulated.

Mitigation lands acquired and converted to and managed as seasonal or perennial marsh and marsh lands acquired by the NBC and managed as seasonal or perennial marsh would count fully toward the 0.5-to-1.0 habitat mitigation ratio. NBC lands maintained in rice production would also count fully toward the 0.5-to-1.0 habitat mitigation ratio subject to the limits described above.

The Natomas Basin has small, relatively undisturbed areas of vernal pools, as shown in NBHCP Figure 9, Current Native Habitats. These vernal pools constitute jurisdictional wetlands under U.S. Army Corps of Engineers (Army Corps) authorities under Section 404 of the Clean Water Act. Extensive development is not anticipated in these vernal pool areas; however, if vernal pools or other jurisdictional wetlands do become subject to development during the life of the NBHCP, specific surveys will be conducted to determine if any covered vernal pool species (see Table I) are associated with the pools or wetlands. If vernal pool obligate species are discovered, then the USFWS must be consulted to determine the appropriate mitigation for those species. Should this occur, the USFWS will apply whatever vernal pool mitigation standards or protocols that are then in effect, and any such standards are incorporated as conditions of the NBHCP. Furthermore, take of any vernal pool species inside these vernal pools will be authorized under the NBHCP and its associated permits only if such mitigation is fully implemented.

The conservation strategy for the valley elderberry longhorn beetle under the NBHCP will be consistent with the conditions of the USFWS's "Mitigation Guidelines for the Valley Elderberry Longhorn Beetle," dated September 19, 1996. Current USFWS policy regarding the valley elderberry longhorn beetle is that any elderberry bushes found within the range of the species are likely to provide beetle habitat, and any destruction or loss of such elderberry shrub habitat must be mitigated for according to the Guidelines. These Guidelines are presented in their entirety in Appendix D of the NBHCP. These Guidelines, or any revision or successor to the Guidelines approved by the USFWS, are incorporated as conditions of the NBHCP.

All other Covered Species listed in Table 1 not previously discussed in this document, if they occur within the Natomas Basin during the life of the permit, are expected to be protected and

conserved under the NBHCP through: (1) conservation program measures that apply to the giant garter snake, Swainson's hawk, vernal pool species, or the valley elderberry longhorn beetle because they share the same habitats; or (2) the additional measures described in the accounts of the Covered Species provided in Chapter IV, Section C.3 of the NBHCP.

The sole mitigation obligation for individual developers would be payment of a mitigation fee consisting of five components: habitat acquisition; habitat development (e.g., restoration, enhancement, and monitoring); operation and maintenance administration; habitat endowment, and fee collection administration. The fees are set per gross acre of development (including roads, public facilities, and recreation).

An initial fixed fee total of approximately $2,240.00 (in 1995 dollars, to be adjusted to reflect current dollar value at the time of permit issuance) per acre of development has been established through a funding study conducted by Economic and Planning Systems, Inc. In the base year (using a 1995 dollar value), the acquisition fee component would be $1,829.00, the habitat development fee would be $142.00, operations and maintenance administration would be $150.00, the endowment fee would be $75.00, and the City/County administration fee would be $44.00 (dollar amounts to be adjusted for base fee at time of permit issuance). The fee would be adjusted annually for inflation based on the Consumer Price Index or other suitable index. After adjustments for inflation, the fee could increase no more than ten percent per year. For the purposes of base fee adjustments due to NBHCP amendments resulting from the USFWS Giant Garter Snake Recovery Plan, or the Plans's Adaptive Management provisions, the maximum cumulative amount that the base fee can be increased is an additional 50% above the 1995 value during the 50-year life of the permit. However, with respect to maintaining the NBC's financial ability to acquire mitigation habitat at the 0.5-to-1.0 ratio prescribed by the HCP, there is no limit to the base fee increases. In other words, the base fee may be increased as necessary to maintain land acquisitions at the 0.5-to-1.0 ratio. At no time would the NBHCP be allowed to mitigate below the 0.5-to-1.0 ratio and at all times, a minimum of twenty-five percent of the mitigation lands would have to remain in managed marsh. If these minimum conditions could not be met, the permit would be considered to be out of compliance.

The NBC would use fees to establish basin-wide mitigation. Mitigation lands would be established through acquisition in fee, easement or other binding agreement. The NBC would be allowed to buy and sell land or lease land to others for revenue.

To receive coverage under the section 10(a)(1)(B) permit, water system operators (Reclamation District 1000 and Natomas Central Mutual Water Company) would have to adopt specific management provisions as described in the NBHCP for the canal system as mitigation for their own maintenance and operations. See NBHCP Figure 4, Water Delivery and Drainage Systems.

5. Monitoring and Enforcement

On behalf of the permittees, the NBC will report annually to USFWS and CDFG regarding compliance with the NBHCP's mitigation requirements. The annual report will include an accounting of take, mitigation, and financial status as described in Chapter IV, Section G.4 of the NBHCP.

The annual report will also include: (1) the amount and location of all lands approved for urban development by private parties for which mitigation fees were paid to the NBC in the preceding year; (2) the amount and location of all lands approved for urban development by public agencies (e.g., public works projects) for which mitigation fees were paid to the NBC in the

preceding year; (3) a description of the locations and condition of any mitigation lands acquired in fee simple or conservation easement in the preceding year; (4) an accounting of the taking of any individual giant garter snakes, Swainson's hawks, or other covered species, if known, as a result of activities in the City's or Counties' permit areas in the preceding year, including any specimens taken for scientific purposes; (5) plans for the acquisition of reserve lands in fee simple or conservation easement in the forthcoming year; (6) an outline of habitat management, enhancement, and monitoring activities conducted in the preceding year and planned activities and goals for the forthcoming year; (7) pertinent results of biological surveys and monitoring activities conducted in the preceding year; (8) pertinent information from RD 1000 and NCMWC as described in Section C.1.e of the NBHCP; and (9) any other pertinent information regarding implementation by the permittees of the terms of the NBHCP and its associated permits or circumstances within the reserve system specifically or the plan area generally.

The USFWS or CDFG can suspend the permits if any permittee fails substantially to implement the NBHCP or the permit's terms and conditions. The USFWS has specific permit suspension and revocation powers under 50 CFR Part 13, as well as other enforcement powers under Section 11 of the ESA.

With respect to enforcement actions, the permits will be severable among the respective permittees. Thus, failure on the part of one permittee may result in suspension of that permittee's prerogatives under the permit, but the rights of the other permittees will remain. The activities of the public or private permittees could be suspended until non-compliance is corrected. For this reason, annual reports will provide a separate accounting of development and mitigation actions for the City, Counties, and the other permittees. The USFWS or the CDFG could suspend the permit if adequate compliance has not been demonstrated.

B. Alternative 2 - Variable Giant Garter Snake Mitigation Ratio

During the local public review process for the NBHCP, comments were made suggesting that the mitigation ratio should reflect the relative habitat quality of wetland habitat affected. Thus, landowners with known giant garter snake occurrences or "high quality" habitat would face a higher compensation ratio than landowners with "poor quality" habitat. For example, a high ratio (e.g., 10-to-1) could be assessed if the land had documented occurrences of giant garter snake, and lower ratios could be required if no Covered Species existed or habitat quality was poor. This approach would require the permittee to inspect each parcel proposed for development and assess a mitigation ratio based on existing habitat quality or species utilization. This alternative would cover take of the same species as Alternative 1, above.

C. Higher Proportion of Marsh - Alternative 3

This alternative examines the consequences of increasing the minimum percentage of the Plan's wetland mitigation lands to be maintained in managed marsh from twenty-five percent to fifty percent. Under this alternative the NBHCP would be basically unchanged with this single exception.

D. No Action Alternative - Alternative 4

The No Action alternative means that no section 10(a)(1)(B) permit would be issued for take of listed species during urban development and other activities in the NBHCP area. This alternative would maintain the status quo. Under this alternative development within the NBHCP area could occur with individual development projects mitigating for their impacts independently

in a regionally unplanned, unstructured manner. In addition, it is likely that SAFCA's flood improvements would be completed (see Section I.D of this EA).

Alternatives Matrix

Alternative	Habitat Mitigation Ratio	Mitigation Fees	Percent Mitigation Land Out-of-Basin	Percent Mitigation Land in Marsh Habitat
A	0.5-to-1.0	$2,240/acre	20% to 50%	25% to 75%
B	Variable; dependent on habitat status of area to be developed	Unknown	20% to 50%	25% to 75%
C	0.5-to-1.0	More than $2,240/acre	20% to 50%	50% to 75%
D	Unknown	Unknown	Unknown	Unknown

III. AFFECTED ENVIRONMENT

A. Vegetation and Wildlife

Agriculture is the dominant land use in the Natomas Basin. The predominant crops are rice, corn, sugar beets, grain, tomatoes and pasture lands. The overall topography of the Basin remains -- it is still a shallow bowl -- but the irregular small-scale topographic features have largely been eliminated by the implementation of agricultural practices. The drainage pattern of the Basin has been altered so that runoff is pumped into the surrounding canals and the Sacramento River at several places. Even with pumping, significant portions of the area are subject to shallow flooding.

Natural and uncultivated vegetation types are interspersed throughout the agricultural areas of the Natomas Basin. See NBHCP Figure 9, Current Native Habitats. Natural areas are found primarily along irrigation canals, drainage ditches, pasture and uncultivated fields. The borders of drainage canals are often associated with narrow strips of emergent vegetation (cattails and bulrushes) and/or wooded riparian areas. The presence of water conveyance systems of the Natomas Central Mutual Water Company and RD 1000 among the mosaic of agricultural fields, fallow fields, and riparian areas provide important habitat for the nesting, feeding and migration corridor requirements of a variety of wildlife species. Areas which provide such habitat include those southeast of the Sacramento Metropolitan Airport along Powerline Road and Fisherman's Lake.

A search of the Natural Diversity Data Base (NDDB) was conducted in October 1994 to determine the known occurrences of listed or candidate species within the Natomas Basin. Although the NDDB may not contain all records of sightings within an area, it is the most consistent, published source of information available. NDDB occurrence records were used to determine which listed or candidate species are likely to occur in the Basin; these include the giant garter snake and Swainson's hawk, which are described below. Other species addressed in the NBHCP and covered by the section 10(a)(1)(B) permit, are listed in Table 1 of this EA,

which provides habitat associations for each species. For a more complete description of these species see Chapter II of the NBHCP.

The species occurrences in and immediately adjacent to the plan area known from the NDDB are shown on NBHCP Figure 10, Giant Garter Snake Records, NBHCP Figure 11, Swainson's Hawk Records, and NBHCP Figure 12, Other Species Records. NBHCP Figure 10 reflects published information and illustrates the occurrence of giant garter snake throughout the Basin. Unpublished records (George Hansen, pers. comm.) confirm the widespread distribution of giant garter snakes.

1. Giant Garter Snake

The giant garter snake is one of the largest garter snakes of the genus *Thamnophis*, with a total length up to 4.5 feet or greater. The snake in the Sacramento Valley and Delta regions has a dorsal ground color often dark brown to olive or nearly black, a complete dorsal strip varying in color from dull yellow to bright orange, and often orange on the ventral surfaces as well (Hansen and Hansen, 1990). The giant garter snake was formerly listed as a subspecies of *Thamnophis conchii* but has more recently been elevated to a full species status as *T. gigas* (Rossman and Stewart, 1987). Since *T. gigas* is adapted to a different ecological habitat than other subspecies of either *T. elegans* or *T. couchii*, *T. gigas* is largely isolated from its related species and subspecies.

The species can occur in rice growing areas, seasonal wetlands, marshes and sloughs in the Basin and throughout its range in the Central Valley of California. The species conducts most of its activities within the immediate vicinity of water. Giant garter snakes usually occur within a few feet of water (diving distance) and are often found between the water level and the top of the bank. Habitat components include slow-moving water, mud-bottom ditches, canals, flooded rice fields, sloughs, and low-gradient streams with vegetated banks. Holes in banks provide shelter.

Although the distribution is patchy, giant garter snakes are known to occur in rice fields, agricultural waterways and some other man-made wetland types as long as they have the primary requirements of: (1) adequate water during the active summer season to supply food and cover (minimum April - July; optimum March - October); (2) grassy banks for basking; (3) emergent vegetation for cover during the active season (March - October); and (4) high ground or uplands that provide cover and refuge during the dormant season (October - March).

Hansen and Brode (1992), describe daily activity to generally include: "(1) emergence from burrows in the bank after sunrise; (2) basking to warm their bodies up to activity temperatures during cool weather or on cool early mornings, and (3) foraging or courting activity throughout the remainder of the day. Giant garter snakes were observed several times after sunset during hot weather, usually lying motionless on warm pavement or dirt roads." Giant garter snakes can move distances of over four miles, and have been documented to move as much as ½ mile in a single day (Glenn Wylie, pers. comm.).

In areas where rice is grown, giant garter snakes move around to find suitable habitat as conditions in the fields change. The connectivity between areas of suitable habitat provided by the canal and ditch/drain systems probably facilitates long and short-distance dispersal and other movements.

Detailed studies of the diet of giant garter snakes in the wild have not been conducted. However it is widely assumed that the species preys most heavily on fish and amphibians. Small carp and mosquitofish, bullfrogs and Pacific treefrogs can be quite abundant where rice is grown and

probably make up the bulk of the diet in those localities. Giant garter snakes also probably exploit, to a smaller extent, other fish and amphibians and small mammals and birds.

At present there is no quantitative estimate of the number of giant garter snakes inhabiting the Natomas Basin. However, previous surveys and other historical information indicate a fairly widespread distribution of giant garter snakes within the Basin (see NBHCP Figure 10, Giant Garter Snake Records). Virtually all these Natomas sightings are from areas where rice is grown. However, there is expected to be considerable patchiness in giant garter snake distribution, even within the rice-growing regions of the Basin, and field surveys, to some extent, have supported this expectation (Brode and Hansen 1992). Where garter snakes do occur, as many as 10 snakes have been observed per linear mile of ditch or drain during walk-through surveys under optimal conditions (Hansen, pers. comm.). However, there are significant limitations in the capability of visual survey methods to estimate actual snake population densities, because giant garter snakes spend the majority of their time resting in burrows, beneath dense vegetation or under objects, and because they often do not move as observers approach. Consequently, visual surveys may underestimate actual abundance, perhaps by an order of magnitude. Giant garter snakes in the Natomas Basin live primarily where rice is grown. Within this area they are strongly associated with the rice fields themselves and the associated ditch/drain components of the water conveyance system. Therefore, a reasonable surrogate variable for estimating the total amount of giant garter snake habitat in the Natomas Basin is the amount of rice fields in the Basin and ditch/drain habitat embedded in the rice landscape. These are estimated at 20,000 acres of rice fields and 300 miles of ditches and drains extant in the Basin.

2. Swainson's Hawk

The state-listed threatened Swainson's hawk (*Buteo swainsoni*) is a medium sized buteo (25 - 35 ounces) and is distinguished from other buteos by long, narrow, pointed wings; their plumage varies greatly. Light phase birds have buff white wing linings with darkly barred brown flight feathers; dark phase birds are dark brown with white undertail coverts, and intermediate reddish plumage occurs between phases.

Swainson's hawks begin to arrive in the Central Valley from South America in March to breed and raise their young. Territories are established by April with incubation and brooding occurring through June. The earliest fledging occurs in July with the young remaining with the parents until the southern migration in early fall.

Swainson's hawks are opportunistic foragers, flushing prey (birds, rodents and some insects) from fields, pastures and grasslands adjacent to their nests. Males provision the females while they incubate eggs; later both parents feed the young. Swainson's hawks require large nesting trees, 40 - 60 feet tall, with a panoramic view of their foraging grounds. The foraging habitats, open fields and grasslands, need to be within flying distance and large enough to support the high densities of microtine rodent populations and birds upon which they feed. Their nesting preference is for large valley oaks (*Quercus lobata),* cottonwoods (*Populus fremontii*), or willows (*Salix goodingii*) within one mile of riparian areas.

The area required for Swainson's hawk foraging depends on vegetation, prey populations supported, and the type of farming that occurs in the foraging habitat (e.g., farming activities that make prey available to predation, such as reduction of cover after harvesting, discing, mowing, flood irrigation, and burning, are advantageous). Swainson's hawks highly active foraging behavior often results in birds traveling as far as 18 miles from a nesting site (Estep 1989). Swainson's hawks have been observed foraging behind farm machinery (moving harvester

blade or disc) and capturing rodents exposed by ground disturbance (Estep 1989). Swainson's hawk foraging ranges during the breeding season have been estimated to be 1,000 acres to almost 7,000 acres (Bechard 1982, Estep 1989, Johnsgard 1990).

Suitable cover types for foraging habitats include, in order of suitability: (1) native grassland; (2) agriculture soon after discing; (3) alfalfa and other hay crops: (4) fallow fields; (5) lightly grazed pasture; (6) combinations of hay, grain, and row crops; (7) rice fields prior to flooding and after draining; (8) and heavily grazed pasture. Unsuitable cover types for foraging habitat include vineyards, mature orchards, cotton, thistle in fallow fields and any crop where prey are unavailable due to high vegetation height and density.

IV. ENVIRONMENTAL CONSEQUENCES

A. Introduction

Chapter III of the NBHCP describes the land use issues within the Basin and summarizes the major projects which could result in urban development according to the current General Plans of the City and Counties (see NBHCP Figure 16, General Plans).

B. Summary of Impacts on Vegetation and Wildlife

1. Alternative 1 - Preferred Alternative

Urban development likely to take place as a result of permit issuance would result in the loss of some existing occupied and potential habitat for the giant garter snake, Swainson's hawk, and other Covered Species. Also, some individual animals would be taken. The NBHCP sets forth a program to mitigate this loss by combining the mitigation for individual development projects into one conservation strategy designed to enhance habitat values within the remaining undeveloped within the Natomas Basin. By combining mitigation that would otherwise be implemented in an unstructured, opportunistic manner, the NBHCP should better preserve the ecological values and wetland and upland haitats in the Basin that support the Covered Species.

The General Plans for the City of Sacramento and Sacramento and Sutter Counties are the basic planning and growth documents used for assessing the level of urbanization that may take place within the Natomas Basin in the reasonably foreseeable future (see NBHCP Chapter II, Land Use Issues). The Natomas Basin incidental take permit would apply to all undeveloped land within the NBHCP area (as defined in NBHCP Figure 17).

Reasonably foreseeable development within the Basin could potentially result in the conversion of as much as 17,500 acres of undeveloped land (primarily lands currently in agriculture) to urban use during the 50-year life of the requested permit. This is a high growth case predicted by the General Plans of the land use jurisdictions and by the USFWS as part of the Feasibility Study for the American River Watershed Investigation (USFWS 1991), and is adopted as the basis for the analysis of impacts in the NBHCP. A more conservative growth scenario has been projected for the first twenty years of the NBHCP. This growth scenario is based on projections by the Sacramento Area Council of Governments (SACOG), and existing information contained in the environmental documents for the South Sutter County General Plan Amendment, Metro Air Park, the North and West Natomas Community Plans, and the Sacramento County General Plan.

The NBHCP provides a means of assuring that mitigation keeps pace with development by generating enough money through mitigation fees to acquire and manage rice fields, wetlands, and upland preserves (see NBHCP Chapter IV, Section C).

The greatest impact of growth in the Natomas Basin is the loss of agricultural land that supports habitat for wildlife species; of particular importance is land in rice cultivation. However, urbanization will be gradual with many areas of the Basin continuing to support agricultural uses during the life of the requested permit. Since agriculture, particularly rice cultivation, is expected to have a long-term future in the Basin, these rice lands are expected to continue to support habitat for the giant garter snake and dry land farming areas are expected to continue to provide foraging habitat for the Swainson's hawk.

a. Take of Giant Garter Snake

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 Chapter II, Section C.2.d of the Plan, 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 by giant garter snakes, and the intervening unoccupied agricultural terrain, mostly ditches (but also fields), probably provides avenues for dispersal and other movements.

An alternative method of estimating take of the giant garter snake under the Plan is to assume that all rice lands in the Basin are occupied by snakes to some extent, and then to estimate the amount of rice lands that could or will be developed (i.e., to estimate take in terms of habitat acres instead of numbers of snakes). Based on the foreseeable development scenario described in Chapter III of the NBHCP, an estimated 17,500 acres of land will be urbanized under the 50-year permits. This area comprises approximately 37% of existing undeveloped land in the Natomas Basin. If it is assumed that all these currently undeveloped lands are in rice, the NBHCP would result, at a maximum, in take of roughly 37% of the Basin's existing giant garter snake population (i.e., those individual snakes inhabiting developed areas). If, however, it is assumed that development occurs on undeveloped land use types in the same proportions as these land use types currently exist in the Basin (as described in Table III-1), then the NBHCP would result, at a minimum, in take of roughly 14% of the Basin's giant garter snake population (21,000 acres of rice in the Basin represents 39% of the Basin's total acreage; 39% of 17,500 acres of development is 6,825 acres; and 6,825 acres of developed rice land represents 14% of total undeveloped land in the Natomas Basin). In fact, take of the giant garter snake over the life of the Plan will fall somewhere between these minimum (14%) and maximum (37%) figures. This is because development will not occur exclusively on rice lands (much of the development expected to occur in the City of Sacramento is not in rice), and because rice land is likely to be developed in a proportion larger than its current representation in the Basin. Also, with respect to either figure, not all individual snakes inhabiting developed rice lands will necessarily be taken. This is because individual snakes may avoid direct killing or injury through the NBHCP's take avoidance measures (see NBHCP Chapter IV, Section C.1.f) and may survive and migrate to new or unoccupied habitats. With respect to the estimate of 14% or 37% of the Basin's giant garter snake population, these estimates include those portions of the water conveyance system (ditches and drains) that would be eliminated during urban development in agricultural areas.

Additional effects of urban conversion that may cause take of giant garter snakes include the elimination of dispersal opportunities leading to population isolation, and the results of edge effects on remaining habitat. Also, experience with the USFWS refuge system suggests that maintenance of the RD 1000 and NCMWC water 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 and the 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 measures (Chapter IV, Section C.1.f) and best management practices for the water conveyance system (Chapter IV, Section C.1.e) will be implemented, and because some of these activities (e.g., rice farming) are inherently low-impact with respect to giant garter snakes.

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 8,750 acres of reserve lands, much of which will be in wetlands or 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.

b. Take of Swainson's Hawk

Take of the Swainson's hawk could result under 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 destruction of Swainson's hawk nesting trees.

Estimating the amount of Swainson's hawk habitat likely to be converted to urban uses under the NBHCP is difficult because, although the location of most Swainson's hawk nests in the Natomas Basin is known, the exact foraging ranges for these nests is not, and the location of future development within the Basin and its distribution across land use types (e.g., agricultural foraging habitat) is also unknown.

However, it can be assumed that the greatest adverse impact of urban development in the Basin would occur if significant portions of the Swainson's hawk zone (as described in Chapter IV, Section C.2.a of the NBHCP) were developed. This is because most known Swainson's hawk nesting sites in the Basin are located in this zone, and because a significant proportion of hawk foraging likely occurs in this zone. Under the Plan's 0.5-to-1 mitigation ratio, up to two-thirds of the Swainson's hawk zone could theoretically be developed, absent other provisions preventing this. However, while the NBHCP does not explicitly prevent development in the Swainson's hawk zone at any specific level, its assumes that development in the zone will be much more limited than the theoretical two-thirds level because: (1) the Counties' and City of Sacramento's general plans do not currently designate this area for development; and because the NBHCP requires that the NBC: (2) track urban development in the Swainson's hawk zone in order to minimize the loss of foraging habitat there; (3) acquire or protect sufficient foraging habitat to support successful Swainson's hawk nesting in the zone; and (4) prevent a net loss of nesting habitat in this zone (see NBHCP Chapter IV, Section C.2.a). The NBHCP also establishes as a priority the acquisition of upland habitats in the Swainson's hawk zone for inclusion in the Plan's

reserve system. Thus, although the NBHCP does not describe specific take levels (i.e., acres of habitat to be converted) for the Swainson's hawk inside the Swainson's hawk zone, in light of the above discussion it is expected that urban development in the Swainson's hawk zone, if it occurs at all, will be consistent with long-term maintenance of Swainson's hawk nesting and foraging habitat within this zone.

With respect to urban development outside the Swainson's hawk zone, again, the distribution of such development is difficult to predict. However, the NBHCP requires the retention and maintenance of sufficient nesting and foraging habitat to maintain existing Swainson's hawk population levels throughout the Plan area and to allow for population increases to meet any future recovery plan goals. 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 to ensure the availability of future Swainson's hawk nest trees. Also, irrespective of these measures, much of the Basin's agricultural lands--many 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 several 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.

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 NBHCP Chapter IV, Section C.2.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. However, the effects of these loses are expected to be minor, because the Plan sets avoidance of nest trees as a first priority, and because the Swainson's hawk nest tree planting program proposed in the Plan will offset any such nest tree losses over the long term.

c. Take of Vernal Pool Species

Vernal pool species covered under the NBHCP are expected to occur primarily in areas containing existing vernal pools, though they may occur periodically in non-vernal pool habitats elsewhere in the Basin. Little to no urban development is expected in existing vernal pool areas, and such development as does occur will be subject to specific USFWS mitigation requirements. Therefore, little to no take as a result of destruction of vernal pool habitat under the NBHCP is anticipated. However, such take as does occur as a result of urban development is authorized, provided that: (1) any plans for development in existing vernal pool areas is reported to the USFWS and CDFG prior to commencement of any such development; (2) biological surveys are conducted to determine which of the vernal pool species listed in Table 1, if any, are actually present in the vernal pools to be developed; and (3) any such development is mitigated for according to USFWS mitigation guidelines for vernal pool species that are applicable or in effect at the time of such development. In the event that USFWS mitigation standards in effect at the time of any future development proposals in the Basin's vernal pool areas do not include some

of the vernal pool species listed in Table 1, then specific mitigation measures for those species that are consistent with overall conservation standards then in effect for those species will be developed by the NBC or the permittees and approved by USFWS and CDFG prior to approval and commencement of any development in the vernal pool areas.

d. Take of the Valley Elderberry Longhorn Beetle

A few records of the valley elderberry longhorn beetle in the vicinity of the Natomas Basin are documented in the NDDB. All these occurrences were near the American River or the Sacramento River. None were actually in the Basin itself. The NBHCP identifies the VELB as a species which could occur in the Basin and identifies a program to mitigate impacts on the beetle as specified in the Mitigation Guidelines for the Valley Elderberry Longhorn Beetle (see Chapter IV, Section C.3.b and Appendix D of the NBHCP).

Because relatively little of currently planned development in the Basin is expected to occur in these River corridors, take of the VELB is expected to be uncommon to rare and to be limited to occasional disturbance to or destruction of elderberry bushes during urban development activities and water conveyance system operations and maintenance. The NBHCP therefore authorizes all take of valley elderberry longhorn beetles during these activities, including destruction of elderberry bushes where it is unavoidable, provided that: (1) appropriate pre-construction biological surveys have been conducted; (2) such take is mitigated for according to the VELB Mitigation Guidelines described in Appendix D of the NBHCP; and (3) such take is duly reported in the annual report.

e. Take of the Tricolored Blackbird

The California Natural Diversity Data Base shows only sparse utilization of the Natomas Basin by the tricolored blackbird, with only one sighting indicated. These birds are very mobile, and avoidance of nesting colonies will be required during development and other activities. Consequently, take of individual blackbirds as a result of activities under the Plan is expected to be rare to infrequent, and any such take is authorized provided that: (1) appropriate pre-construction surveys to determine tricolored blackbird presence have been conducted; (2) all applicable mitigation as described in Chapter IV, Section C.3.c of the NBHCP is implemented; (3) the take, to the extent known, is duly reported in the annual report; and (4) the USFWS or CDFG do not determine that such take is inconsistent with or exceeds the biological intent or limits of the Plan or that it is having or would have adverse biological effects on the species not mitigated by the Plan. In the event that additional measures are determined to be needed to reduce excessive take levels of this species, such measures would be established either through a permit amendment or through the Plan's Adaptive Management provisions. Since the tricolored blackbird is not widespread in the Natomas Basin, the impact on the species of Plan activities is not considered significant. Furthermore, the establishment of wetland reserves would benefit the species by creating new marsh habitat and associated ruderal upland habitat suitable for this species.

f. Take of Other Covered Species

Available data indicate that the other Covered Species listed in Table 1 either do not occur extensively in the NBHCP plan area or that their occurrence in the plan area is unconfirmed. Nevertheless, considering the lack of reliable survey data in many cases, and the habitat protection and enhancement measures expected to take place under the Plan (which could conceivably attract these species), it is possible that many either do occur in the plan area in unspecified numbers or that they will occur in the NBHCP area over the life of the permits. It

is therefore possible that individuals of these species will be taken over the life of the permits or that their habitat may be modified or destroyed. Again, given the paucity of data concerning these species, it is difficult to quantify exactly at what levels they are likely to be taken. However, it is generally expected that take levels or occurrences of take for these species will be zero, rare, or infrequent, and that the adverse effects of such take will be minor or insignificant. This conclusion is based on their scattered or infrequent distribution in the Plan area, the fact that many activities under the Plan (e.g., development of farmland) will not typically result in take of individual animals, and the provision under the Plan for avoidance and mitigation measures and the development of a reserve system that is expected to benefit these species.

In light of these considerations, the NBHCP and its associated federal permit authorizes all take for these species that occurs as a result of urban development, rice farming, or water conveyance system operation and maintenance, provided that: (1) appropriate pre-construction surveys to determine presence of these species have been conducted; (2) such take is mitigated through full implementation of all applicable conservation measures described in Chapter IV, Section C.3.c. and C.3.d of the NBHCP; (3) such take is duly reported in the annual report; and (4) the USFWS or CDFG do not determine that any such take is inconsistent with or exceeds the biological intent or limits of the Plan or that it is having or would have adverse biological effects on the species not mitigated by the Plan. In the event that additional measures are determined to be needed to reduce excessive take levels of any of these species, such measures would be established through a permit amendment or through the Plan's Adaptive Management provisions.

g. Take as a Result of Indirect Killing or Injury

The impacts of urban development in the Natomas Basin on Covered Species would not be through direct killing or injury as a result of construction 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 depradations by domestic pets. For example, giant garter snakes are susceptible to road kills; 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.

2. Alternative 2 - Variable Giant Garter Snake Mitigation Ratio

This strategy would place a greater emphasis on proving presence or absence of giant garter snake through biological surveys. There is some level of uncertainty associated with the survey procedures that are utilized to locate giant garter snake and/or determine the suitability of habitat. Specifically, if surveys determined that no giant garter snakes are utilizing a particular habitat parcel at a particular time, this does not ensure that the species does not utilize that habitat area at some time during its life cycle. Likewise, there are areas that would not be considered classic examples of giant garter snake habitat, but that are utilized by the species.

With respect to impacts on the giant garter snake, the broadly applied 0.5-to-1.0 mitigation ratio in the preferred alternative is based on the fact that: (1) the giant garter snake is a mobile

species which requires both wetland and upland habitat throughout its life stages, and (2) the lack of any significant acreage of "native" giant garter snake habitat in the Basin. The major activity period for the garter snake is in the spring and summer months when they can be found in irrigation canals and adjacent uplands. The large system of irrigation canals in the Basin provide giant garter snake access to much of the Basin's uplands. During the winter, giant garter snakes rely on these upland shelters where they hibernate. Giant garter snake experts believe that nearly all of the undeveloped land in the Natomas Basin is potential habitat for the giant garter snake. Thus, a variable ratio mitigation requirement would not adequately reflect the ecology of the giant garter snake and would not effectively deal with the indirect and cumulative impacts of urbanization of unoccupied or marginal habitat quality land.

In addition, rather than basing a variable mitigation ratio on only the giant garter snake, the preferred alternative mitigates for the entire range of impacts of development within the Natomas Basin. Thus, the applicants have determined that it is not appropriate for the determination of mitigation needs to focus on simply one set of impacts (those on the garter snake), but must address the mitigation needs of all the Plan's Covered Species. For example, a very low ratio on some habitat types may be appropriate for giant garter snakes but inappropriate for other species. Thus, a consistent overall ratio of 0.5-to-1.0 is thought to balance the mitigation needs for all the Plan's Covered Species.

This alternative is similar to the No Action alternative, which would result in the assessment of impact and mitigation on a project-by-project basis. The major difference would be that, like the preferred alternative, implementation of mitigation for relatively small projects would be coordinated to provide a greater environmental benefit by consolidating mitigation for numerous small parcels of land.

3. Alternative 3 - Higher Proportion of Marsh

Under Alternative 3, the NBHCP would be implemented as presented in the Preferred Alternative, but the minimum proportion of the preserve that would be enhanced to managed marsh habitat would be increased from twenty-five to fifty percent. This alternative is similar to the preferred alternative in that mitigation from relatively small projects would be combined into a habitat preserve system that would provide greater ecological values. However, this alternative could provide greater habitat values than the preferred alternative because a greater proportion of the preserve habitat would be enhanced to high value marsh lands. On the other hand, this alternative also contains a greater risk that the smaller amount of revenue-generating rice lands would result in mitigation fee increases necessary to keep pace with Plan costs, and a greater cost burden on Natomas Basin landowners.

4. Alternative 4 - No Action

The No Action alternative would involve the USFWS denying the request for a section 10(a)(1)(B) permit. This would maintain the current process of individual consultation on each proposed development project and the implementation of uncoordinated mitigation efforts. This process has been shown to be time consuming and can result in mitigation of limited biological values. The mitigation developed under this process can be fragmented in nature and is believed to be insufficient to provide for the ultimate conservation of the giant garter snake. While the mitigation obtained for the Swainson's hawk also has been fragmented in nature, this is less of a concern due to the mobility of this species. The relatively small and fragmented preserves that could result from this alternative also would not have the biological attributes necessary to provide for many of the nonlisted species that would benefit from implementation of the NBHCP (see Table 1 of this EA). Also, this alternative would not eliminate the potential for

conversion of land currently cultivated for rice, which maintains habitat for giant garter snakes, to dry land farming. Thus, under this alternative there may be a continued degradation of habitat areas with no resulting mitigation.

C. Summary of Socioeconomic Impacts

Chapter III of the NBHCP describes the land use issues within Natomas Basin and summarizes the major projects which could result in urban development according to the City and Counties current General Plans (see NBHCP Figure 16, General Plans). While the alternatives examined in this document would not affect the implementation of the existing General Plans, they may affect socioeconomic issues. During the local public review process on the NBHCP, concern was expressed relating to the following issues: the amount of the mitigation fee, uncertainty that may occur from increasing mitigation costs, interference with existing agriculture, and the loss of tax revenue that may occur as lands are removed from agricultural production for the purpose of creating mitigation habitat.

Alternatives 1, 2, and 3 as described above involve implementation of some version of the NBHCP. The Plan provides a means of ensuring that mitigation keeps pace with development by generating money through mitigation fees to acquire and manage rice fields, wetlands, and upland preserves (see NBHCP Chapter IV, Section C.). Alternative 3 would result in the highest mitigation fees, as a greater proportion of the mitigation lands would be in non-income producing marsh habitat. Alternative 2 would generate an inconsistent mitigation fee, as areas without existing habitat or with low-quality habitat would pay relatively small fees and areas with high quality habitat would pay relatively high fees. The preferred alternative represents a compromise between Alternatives 2 and 3, with all development paying a moderate fee, regardless of the location of the development or the habitat quality in which it occurs. The fees for the No Action alternative are likely to be similar to those for Alternative 2, since areas containing habitat would likely pay high fees and while areas without habitat would pay no or lower fees. While mitigation fees for individual properties may vary between alternatives, overall mitigation fees for the entire Basin over time are likely to be decreased under Alternatives 1, 2, and 3, since the coordination of mitigation into an overall regional conservation strategy is likely to provide greater habitat values on fewer mitigation lands. The No Action alternative would result in no change in this factor.

Alternatives 1, 2 and 3 contain fee caps, as described in the "Preferred Alternative" above, that would limit the uncertainty associated with rising mitigation costs. The No Action alternative would maintain the maximum economic uncertainty, because the amount of the mitigation fees assessed would be unknown and no currently known fee caps would exist.

Alternatives 1 and 2 would have similar impacts on existing agriculture and the local tax base, since they would both result in the same mitigation requirements with the same percentages of marsh and rice lands. Alternative 3 would have the greatest impact on existing agriculture and the local tax base, since a higher proportion of the mitigation land would be converted from agricultural lands to managed marsh habitat. Again, the impacts of Alternatives 1, 2, and 3 are expected to decrease due to the coordination of mitigation efforts. The impact of the No Action alternative on agriculture is unknown, since the mitigation for each development project would be developed in the future on a case-by-case basis or under another type, as yet unknown, of Basin-wide management plan.

V. COMPARISON OF IMPACTS

Under the Preferred Alternative (Alternative 1), habitat preserves would be established and managed by the Natomas Basin Conservancy to ensure that long-term wetland and upland habitat values are maintained for the giant garter snake, Swainson's hawk, and the Plan's other Covered Species. The Variable Mitigation Ratio Alternative (Alternative 2) would require that biological surveys be done to determine which mitigation ratio is applicable on a case-by-case basis. Due to the uncertainty of the biological survey process, the appropriateness of each project's mitigation would be in question. In addition, some mitigation fees would not accurately reflect the impacts of urbanization on all Covered Species; thus mitigation under this alternative may be inadequate. The environmental consequences of Alternative 3 would be similar to those of the Preferred Alternative, but both the overall habitat value and financial risk may be slightly greater. The No Action alternative (Alternative 4) would result in a continuation of the current biological situation within the Basin.

The socioeconomic consequences of Alternatives 1, 2, and 3 would be similar. The No Action alternative would fail to meet the current needs of the land use jurisdictions and local community (i.e., the flood control needs of the community would require additional planning efforts by the local jurisdictions).

ALTERNATIVES	DECISION MAKING CRITERIA	
	PRINCIPAL ENVIRONMENTAL EFFECTS	PRINCIPAL SOCIOECONOMIC EFFECTS
ALTERNATIVE 1: PREFERRED ALTERNATIVE	Full mitigation for take of covered species	Moderate mitigation fees = moderate economic impact as a result of permit issuance
ALTERNATIVE 2: VARIABLE MITIGATION RATIO	Partial mitigation for take of covered species	Inconsistent mitigation fees = moderate economic impact as a result of permit issuance
ALTERNATIVE 3: INCREASED PROPORTION OF MARSH HABITAT	Full mitigation for take of covered species	Highest mitigation fees = greatest economic impact as a result of permit issuance
ALTERNATIVE 4: NO ACTION ALTERNATIVE	Partial mitigation for take of covered species	Unknown mitigation fees = unknown economic impact

VI. CUMULATIVE EFFECTS

Cumulative effects are two or more separate effects that, when considered together, increase or compound environmental impacts. An effect may be considered cumulative and significant even if it results from actions with individually insignificant effects.

Past, present, and reasonably foreseeable future actions have and will likely continue to impact the same resources impacted by the proposed NBHCP. Cumulative effects within the Natomas Basin have been addressed in this EA and other environmental documents by virtue of the fact

that the NBHCP is a comprehensive, Basin-wide planning effort--i.e., all future development that occurs within the Natomas Basin will be addressed by the Plan. In the absence of the NBHCP, Covered Species habitat would likely still be impacted by future development, but such development would be permitted under section 10 or section 7 of the ESA on a case-by-case basis. However, the degree to which Covered Species habitat will continue to be impacted outside the NBHCP plan area and throughout the species' ranges is not known, because the amount, timing, and design of future development projects in these areas have not been specified. Section 9 of the ESA, however, is intended to prevent take of listed species which would jeopardize the survival and recovery of those species. Future land development projects throughout the Covered Species ranges will likely add to local impacts in the Natomas Basin. The degree of these increased effects is unknown; however, the requirements of section 7, 9, and 10 of the ESA will ensure that such effects are appropriately addressed as these projects are proposed and their associated impacts are incurred.

VI. CONSULTATION AND COORDINATION WITH OTHERS

A. Agencies and Individuals Consulted

Sacramento Area Flood Control Agency
F. I. Hodgkins
1007 7th Street, 5th Floor
Sacramento, CA 95814

City of Sacramento
Terence Moore
City Hall, Room 301
915 I Street
Sacramento, CA 95814

County of Sacramento
Pat Groff
Public Works Administration
827 7th Street, Room 304
Sacramento, CA 95814

County of Sutter
Jeff Pemstein
10419 Old Placerville Road, Suite 270
Sacramento, CA 95827

RD 1000
Jim Clifton
1633 Garden Highway
Sacramento, CA 95833

California Department of Fish and Game
David Zezulek
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670

Army Corps of Engineers
1325 J Street
Sacramento, CA 95814

Natomas Central Mutual Water Company
2601 West Elkhorn Boulevard
Rio Linda, CA 95673

Thomas Reid Associates
560 Waverley Street, Suite 200
(P.O. Box 880)
Palo Alto, CA 94301

B. List of Preparers

U.S. Fish and Wildlife Service
Sacramento Field Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95825

C. Distribution List

Distribution of the Notice of Availability of this Environmental Assessment and associated documents has been made to the following:

AKT DEVELOPMENT
PHIL ANGELIDES
2424 K STREET, 2ND FLOOR
SACRAMENTO, CA 95816

AKT DEVELOPMENT
BRIAN VAIL
7700 COLLEGE TOWN DRIVE
SACRAMENTO, CA 95826

BARRY BATES
COMMERRCE SAVINGS BANK
71 45TH STREET
SACRAMENTO, CA 95819

BILL CARNAZZO
CITY OF SACRAMENTO
921 10TH STREET #702
SACRAMENTO CA 95814

BOB RYAN
SAC COUNTY COUNSEL
700 H STREET ROOM 2650
SACRAMENTO, CA 95814

BOB HERKERT
RICE GROWERS ASSOCIATION
2538 THIRD STREET
COLUSA CA 95932

BRUCE HANDLEY
BRUCE HANDLEY & ASSOCIATES
1985 OXFORD STREET
SACRAMENTO, CA 95815

BUTCH HODGKINS
SAFCA
1007 7TH STREET, 5TH FLOOR
SACRAMENTO, CA 95814

CAMERON DOYEL
NORTH ELKHORN LANDOWNERS
1004 SILVER LAKE DRIVE
SACRAMENTO, CA 95831

CARLO S. FOWLER
ATTORNEY AT LAW
400 SANSOME
SAN FRANCISCO, CA 94111

CAROL SHEARLY
CITY PLANNING
1231 I STREET, STE. 302
SACRAMENTO, CA 95814

D. KETSCHER
1817 MARYAL DRIVE, #100
SACRAMENTO, CA 95825

DAVE ZEZULAK
DEPARTMENT OF
FISH AND GAME
1701 NIMBUS ROAD, SUITE A
RANCHO CORDOVA,CA 95670

DAVID MACCHIAVELLI, ESQ.
MCDONOUGH, HOLLAND & ALLEN
555 CAPITOL MALL, STE. 950
SACRAMENTO, CA 95814

DAVID BUGATTO
ALLEGHANY PROPERTIES
2150 RIVER PLAZA DRIVE
SACRAMENTO, CA 95833

DIANE BRISTOW
ALLEGHANY PROPERTIES
2150 RIVER PLAZA DRIVE
SACRAMENTO, CA 95833

DWIGHT MOORE TRUST
5508 STATE AVENUE
SACRAMENTO, CA 95819

EDWARD F. FONG
5431 PLEASANT DRIVE
SACRAMENTO, CA 95822

ELERNI TSAKOPOULOS
AKT DEVELOPMENT
7700 COLLEGE TOWN DRIVE
SACRAMENTO, CA 95826

F.D. MACHADO
3600 AIRPORT ROAD
SACRAMENTO, CA 95834

GAIL ERVIN
GEC
6833 WALNUT AVENUE
ORANGEVALE, CA 95662

GARY ESTES
4135 EAGLES NEST
AUBURN, CA 95603

GEORGANNA FOONDOS
REMY & THOMAS
455 CAPITOL MALL STE. 210
SACRAMENTO, CA 95814

GEORGE TSAKOPOULOS
300 FLORIN ROAD
SACRAMENTO, CA 95822

GREGORY THATCH
LAW OFFICE OF GREGORY THATCH
1730 I STREET SUITE 220
SACRAMENTO, CA 95814

HAL CRIBBS
NORTH NATOMAS LANDDOWNERS
11140 FAIR OAKS BLVD., STE 3
FAIR OAKS, CA 95628

JACK DEWIT
44718 S. EL MACERO DR.
EL MACERO, CA 95618

JEFF PEMSTEIN
10419 OLD PLACERVILLE RD STE 270
SACRAMENTO CA 95827

JERRY KAMILOS
7700 COLLEGE TOWN DRIVE
SUITE 113
SACRAMENTO, CA 95826

JERRY MERAL
PLAN & CONSERV. LEAGUE
926 J STREET, STE. 612
SACRAMENTO, CA 95814

JIM CLIFTON
RD 1000 DISTRICT ENGINEER
1633 GARDEN HIGHWAY
SACRAMENTO, CA 95833

JOE COOMES
MCDONOUGH HOLLAND & ALLEN
555 CAPITOL MALL STE 950
SACRAMENTO, CA 95814

JOHN PITALO
MORTON & PITALO
1788 TRIBUTE ROAD, STE. 200
SACRAMENTO, CA 95815

JOHN PERRY
350 COURT STREET
WOODLAND, CA 95695

JOHN BOHL
THE BOHL CORPORATION
1331 Q STREET
SACRAMENTO, CA 95814

JOHN TAYLOR
TAYLOR & HOOPER
1435 RIVERPARK DRIVE

SUITE 300
SACRAMENTO, CA 95815

JUDE LAMARE
SIERRA CLUB
1823 11TH STREET
SACRAMENTO, CA 95814

KAREN DIEPENBROCK
DIEPENBROCK LAW FIRM
400 CAPITOL MALL STE. 1800
SACRAMENTO, CA 95814

KATHLEEN HARRIS
BUILDING INDUSTRY ASSOC.
3800 WATT AVENUE, STE. 140
SACRAMENTO, CA 95833

KERN SCHUMACHER
P.O. BOX 3567
INCLINE VILLIAGE, NV 89450

LARRY COMBS
1160 CIVIC CENTER BLVD
YUBA CITY CA 95993

LEWIS HOMES OF CA
1156 N. MOUNTAIN
UPLAND, CA 91786

MARCIA FRITZ
ANN KOHL'S OFFICE
5530 BIRDCAGE #130
CITRUS HEIGHTS, CA 95610

MARTY VAN DUYNE
PSOMAS & ASSOCIATES
2485 NATOMAS PARK DR
SUITE 250
SACRAMENTO, CA 95833

MARVIN OATES
8615 ELDER CREEK ROAD, #10
SACRAMENTO, CA 95828

MARY OSE
P.O. BOX 254977
SACRAMENTO, CA 95865-4977

METRO AIR PARK
2590 VENTURE OAK WAY
SACRAMENTO, CA 95833

MICHELLE MILAM
ECONOMIC AND PLANNING
1750 CREEKSIDE OAKS DR SUITE 290
SACRAMENTO, CA 95833

MIKE DEVEREAUX
LAW OFFICE OF GREGORY THATCH
1730 I STREET SUITE 220
SACRAMENTO, CA 95814

MIKE WINN
WINNCREST HOMES
9985 FOLSOM BLVD.
SACRAMENTO, CA 95827

PAT GROFF
PUBLIC WORKS ADMINISTRATION
827 7TH STREET ROOM 304
SACRAMENTO CA 95814

PAUL GEORGE
JB/RJB
460 DRAKE CIRCLE
SACRAMENTO, CA 95864

PAUL WOODBERRY
ALLEGHANY PROPERTIES
2150 RIVER PLAZA DRIVE
SACRAMENTO, CA 95833

PAYNE WILLIAM CROSALIE
2520 E. TIFFANY LANE
SACRAMENTO, CA 95823

PETE SAVIATTI
LEAL FAMILY TRUST
P.O. BOX H
YUBA CITY, CA 95992

RALPH HANTS
6801 W. ELKHORN
SACRAMENTO, CA 95837

RAY TRETHEWAY
SAC TREE FOUNDATION
201 LATHROP WAY SUITE F
SACRAMENTO, CA 95815

RICHARD BENVENUTI
JB/RJB
460 DRAKE CIRCLE
SACRAMENTO, CA 95864

ROBERT THOMAS
CITY OF SACRAMENTO
5770 FREEPORT BLVD #200
SACRAMENTO CA 95822

ROBERT WITTER
501 CROCKER ROAD
SACRAMENTO, CA 95864

RON ERICKSON
SUTTER COUNTY
1160 CIVIC CENTER STE C
YUBA CITY CA 95993

RON STORK/CHARLIE CASEY
FRIENDS OF THE RIVER
128 J STREET
SACRAMENTO, CA 95814-2207

ROY & PATRICIA STEELE
631 ELVERTA ROAD
ELVERTA, CA 95626

SACRAMENTO METROPOITAN
CHAMBER OF COMMERCE
917 7TH STREET
SACRAMENTO, CA 95814

SACRAMENTO SPORTS ASSOCIATION
2101 EVERGREEN STREET
SACRAMENTO, CA 95815

SCOTT MENDE
CITY PLANNING
1231 I STREET, STE. 302
SACRAMENTO, CA 95814

TERRY TEEPLE
22672 LAMBERT #616
LAKE FOREST, CA 92630

TERRY MOORE
CITY OF SACRAMENTO
1023 J STREET #208
SACRAMENTO CA 95814

TIM TARON
HEFNER STARK & MAROIS
2710 GATEWAY OAKS DRIVE
SUITE 300 SOUTH
SACRAMENTO, CA 95833

TINA THOMAS
REMY & THOMAS
455 CAPITOL MALL STE. 210
SACRAMENTO, CA 95814

TOM REID & ASSOCIATES
505 HAMILTON AVE STE 201
PALO ALTO CA 94301

TOM HUTCHINGS
COUNTY PLANNING DEPT.
827 7TH STREET ROOM 230
SACRAMENTO CA 95814

WAYNE WILLEY
NATOMAS GROWERS
15 COVE COURT
SACRAMENTO, CA 95831

WILL BOEGER
W.K. BOEGER & CO
2150 RIVER PLAZA DRIVE
SUITE 100
SACRAMENTO, CA 95833

WILLIAM H. EDGAR
CITY OF SACRAMENTO
915 I STREET #101
SACRAMENTO CA 95814

NATOMAS COMMUNITY ASSOCIATION
KATE NICHOLS
3021 CLOUDVIEW DRIVE
SACRAMENTO CA 95833

ECOS
TOM WHITNEY
2417 CASTERO WAY
SACRAMENTO CA 95818

ALTA TURA
4633 Q STREET
SACRAMENTO CA 95819

TOM WHITNEY
2417 CASTRO WAY #9
SACRAMENTO, CA 95818

JOHN HOPKINS
409 JARDINE PLACE
DAVIS, CA 95616

ANDY SAWYER
2777 HARKNESS ST
SACRAMENTO, CA 95818

JOSEPH BRECHER, ATTY
1970 BROADWAY #1200
OAKLAND, CA 94612

TARA MUELLER, ATTY
NATURAL HERITAGE INSTITUTE
114 SANSOME ST #1200
SAN FRANCISCO, CA 94104

JOHN MCCAULL
AUDUBON SOCIETY
LEGISLATIVE OFFICE
926 J ST #618
SACRAMENTO, CA 95814

DAN TAYLOR
NATIONAL AUDUBON
555 AUDUBON PLACE
SACRAMENTO, CA 95825

LINDA BARR
SIERRA CLUB CALIF
923 12TH ST #200
SACRAMENTO, CA 95814

DARRYL YOUNG
OFFICE OF SENATOR TOM HAYDEN
STATE CAPITOL
SACRAMENTO, CA 95814

JIM ESTEP
C/O: JONES & STOKES
2600 V ST #100
SACRAMENTO, CA 95818

VICKI LEE
1360 PERKINS WAY
SACRAMENTO, CA 95818

BOB SCHNEIDER
2402 WESTERNESSE RD
DAVIS, CA 95616

MIKE EATON
C/O: NATURE CONSERVANCY
1330 21ST ST #103
SACRAMENTO, CA 95814

SHERRY TERESA
CENTER FOR NATURAL LANDS
1808 TRIBUTE RD #B
SACRAMENTO, CA 95815

JERRY MERAL
PLANNING & CONSERVATION LEAGUE
926 J ST #612
SACRAMENTO, CA 95814

RONALD STORK
FRIENDS OF THE RIVER
128 J ST, 2ND FLOOR
SACRMENTO, CA 95814

STACEY SHULL
ENDANGERED SPECIES
DEFENSE CAMPAIGN
114 SANSOME ST #1200
SAN FRANCISCO, CA 94104

SID ENGLAND
830 DONOVAN CT
DAVIS, CA 95616

BILL YEATES, ATTY
926 J ST
SACRAMENTO, CA 95814

WALDO HOLT
3900 RIVER DRIVE
STOCKTON, CA 95201

RON SCHLORF
DEPT FISH & GAME
1416 9TH ST
SACRAMENTO, CA 95814

JOHN BRODE
DEPT OF FISH & GAME
1701 NIMBUS RD #C
RANCHO CORDOVA, CA 95670

JAMES P. PACHL
80 GRAND AVENUE, SIXTH FLOOR
OAKLAND, CA 94612

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Personal Communications

Glenn D. Wylie, National Biological Service, California Science Center, 6924 Tremont Road, Dixon, CA 95620.

George Hansen, Consulting Environmental Biologist, 3230 Brookwood Road, Sacramento, California 85821.