

IV. CONSERVATION PLAN

A. PLAN PURPOSE

This chapter describes the Conservation Plan to be implemented by the Plan Operator, The Natomas Basin Conservancy (TNBC). The Chapter sets forth the guidelines and practices to be used by TNBC including the size and amount of reserves to be established, acquisition criteria for upland and wetland areas to be acquired and managed by TNBC, and reserve management practices to be employed by the TNBC to ensure successful habitat enhancement to support the Covered Species. Chapter V describes related and supportive avoidance and mitigation measures which will be undertaken by the Permittees including the TNBC, Land Use Agencies and Water Agencies. It is important to review both Chapters IV and V in concert in order to understand the full mitigation strategy of the HCP. Finally, Chapter VI describes provisions related to NBHCP implementation and establishes additional procedures and obligations for both TNBC and the other Permittees. (Note that the TNBC is both Plan Operator and a Permittee. The TNBC is a Permittee for purposes of participation in the NBHCP and for receipt of an Incidental Take Permit related to management of the habitat reserves on behalf of the City, Sutter County and other potential Permittees. The TNBC's Permit Area is however, different from the other Permittees in that it includes the entire Natomas Basin Plan Area which includes the water side of the levees surrounding the basin, and Area B thereby allowing the TNBC to purchase or otherwise control and operate habitat lands throughout the greater Natomas Basin area.)

(Note: *During the final NBHCP approval process by the City Council of the City of Sacramento and the Board of Supervisors of Sutter County, authorization to purchase Mitigation Lands to offset the impacts of development was limited to the Natomas Basin and the “outer” ring around the levees of the Natomas Basin. No authorization to purchase lands to mitigate impacts of Authorized Development in Area B (out of basin area) was granted by the City Council and the Board of Supervisors.*)

The NBHCP sets forth a program for the preservation and protection of habitat for threatened and endangered species potentially found in the Natomas Basin. Of the 53,537 acre Natomas Basin, about 7,267 acres were already developed in 1997, leaving a balance of 46,270 acres of undeveloped and agricultural land. The primary objective of the NBHCP is to provide a practical program to promote biological conservation along with Authorized Development in the Permit Areas and Water Agencies Covered Activities. The NBHCP is not intended to cover incidental take of listed species within the Natomas Basin resulting from activities which are not included as Covered Activities or are conducted by entities other than the NBHCP participants outside of the Permit Areas.

Among the mitigation and minimization measures outlined in the Plan, is a program that establishes a multi-habitat, multi-species conservation program to mitigate the incidental take of and expected loss of habitat for state and federally listed species and other species noted as covered by the Plan that would result from urban development and operation of irrigation and drainage systems. Activities covered by the NBHCP could result in incidental take, or take for scientific purposes (see Section VII), of some of the Covered Species (see Table I-1). Thus, the

NBHCP constitutes the basis for requested incidental take permits for these species under the state and federal ESAs. Take of other species addressed by the NBHCP is expected to be infrequent or unlikely, but may occur in isolated cases (see Chapter VII). These species also would be covered by the permits if such take should occur.

Current development approvals, City and County general plans and community plans, and other plans (including MAP) are the basis for estimating development rates anticipated in the Basin, the resulting habitat loss expected from the Covered Activities authorized by the incidental take permits, and for evaluating the corresponding environmental impacts pursuant to NEPA and CEQA. Take resulting from urban development on Sacramento International Airport land would not be authorized by the NBHCP Incidental Take Permits. Apart from take associated with the MAP HCP which is accounted for in the NBHCP, the Plan does not permit the take of Covered Species within Sacramento County, with the following two exceptions: (1) take resulting from TNBC reserve operations; and (2) take resulting from the Water Agencies Covered Activities. The airport will mitigate for take of listed species affected by activities on airport lands through coordination between the Airport and Sacramento County, with USFWS and CDFG approval as previously described.

Under the NBHCP, the acquisition of lands or conservation easements for the purpose of creating and managing permanent habitat reserves is the primary mitigation for impacts to habitat of Covered Species resulting from urban development. For purposes of the Plan, the term "system of reserves" means mitigation lands generally and includes all habitat conserved and managed for the Covered Species, including rice fields by TNBC. The NBHCP describes a method for funding the land acquisition and management program for the acquired lands.

B. PLAN OPERATOR

In anticipation of the completion of the HCP and issuance of ITPs, TNBC was formed as a public benefit non-profit corporation under the laws of the State of California in 1994. It is governed by the terms of the NBHCP, its commitments within the NBHCP Implementation Agreement for the respective Permittees, a Board of Directors, and Bylaws. Since January 1998, with the issuance of the ITP on December 31, 1997, the City of Sacramento appointed five (5) Board members to TNBC. The City collected Mitigation Fees of \$13.9 M from 1996 (when the interim fee was put in place) to December 2001. The history of fee increases is shown on Table VI-3. In cooperation with USFWS, CDFG and the City, TNBC has acquired 2,104.14 acres of habitat reserve land to date on behalf of the City (See Table IV-1 below). To date, 100 percent of the mitigation land is within the Natomas Basin.

As well as acquiring habitat reserve land, the Conservancy has completed Site Specific Management Plans (SSMPs) on all but the two most recently acquired properties. A contract was granted in November 2001 to complete a Site Specific Land Management Plan for those two properties. The Conservancy has also completed an annual report each year since its inception per Section VI.G of the NBHCP, including Authorized Development activities, Conservancy activities, and annual surveys of the GGS and Swainson's Hawk. A five-year comprehensive Basin-wide survey of the Covered Species will be started in 2003 and completed in 2004.

TABLE IV-1
TNBC MITIGATION LAND ACQUISITION (January 2002)

Property	Date Acquired	Acres
Silva	1.7.99	159.200
Betts	4.5.99	138.992
Kismat	4.16.99	40.293
Bennett North	5.17.99	226.675
Bennett South	5.17.99	132.486
Lucich North	5.18.99	267.986
Lucich South	5.18.99	351.889
Brennan	6.15.00	241.376
Frazer	7.31.00	92.600
Souza	7.2.01	44.68
Natomas Farms	7.9.01	96.46
Ayala	2.2.02	311.5
Sills	7.15.02	575.56
Total		2679.7
Alleghany	pending	50.00
Total		2729.7

TNBC Board of Directors is comprised of representatives from NBHCP Permittees, to be appointed as follows:

Number: The authorized number of Directors shall be a minimum of three and a maximum of fifteen. No reduction of the authorized number of Directors shall have the effect of removing any Director before that Director's term of office expires.

Designation by the City of Sacramento: The City of Sacramento, as the original NBHCP Permittee, designated five (5) Directors when the City received its Permits in December 1997.

Designation by Sutter County: At such time as Sutter County adopts the NBHCP and executes the associated I.A., Sutter County shall be entitled to designate five (5) Directors when Sutter County has received its Permits.

Designation by Natomas Mutual: At such time as Natomas Mutual adopts the NBHCP, executes an Implementation Agreement with the USFWS and CDFG, and receives its Permits, it may appoint one (1) Director to TNBC Board.

Designation by RD 1000: At such time as RD 1000 adopts the NBHCP, executes an Implementation Agreement with the USFWS and CDFG, and receives its Permits, it may appoint one (1) Director to TNBC Board.

TNBC performs an important function for the NBHCP by establishing and overseeing a concerted program for acquiring, enhancing and managing mitigation lands in perpetuity on behalf of the Permittees. Specifically, TNBC will receive mitigation fees collected by the City and County (and from the County of Sacramento for the Metro Air Park Project), using the fees to establish mitigation lands, and to manage the mitigation lands for the benefit of the Covered Species. Mitigation lands are established through fee simple or easement acquisition. TNBC may legally buy and sell land, lease land for revenue, hold title to conservation easements, etc. As a non-governmental entity, TNBC has no powers of condemnation and can only purchase lands from willing sellers. TNBC also has the authority to establish and sign contracts with appropriate individuals or organizations for the purpose of carrying out specific activities under the NBHCP, including, but not limited to, managed marsh construction, habitat restoration, and monitoring.

All proceedings of TNBC shall be conducted in public, in a manner consistent with the Ralph M. Brown Act (California Government Code, Section 54950 *et seq.*) regarding open and public meetings, and with the California Public Records Act (California Government Code, Section 6250, *et. seq.*) regarding maintenance of public records. TNBC may conduct closed sessions for real estate negotiations as permitted in its bylaws, included in Appendix F as may be amended from time to time (“TNBC Bylaws”). Pursuant to the TNBC Bylaws, the provisions of the Ralph M. Brown Act regarding the disclosure of information with respect to real property transactions (including but not limited to Gov. Code Sections 54954.5(b); 54956.8 and 54957.1(a)(1)) whether such transactions are pending or completed shall not apply. As used herein, “real property transactions” shall include options to purchase or lease real property, conservation easements, as well as farming contracts affecting real property that TNBC has acquired or is in negotiations to acquire. Moreover, any documents relating to real property transactions, either pending or completed, of TNBC shall be exempt from disclosure. TNBC may, in time, be succeeded by another suitable non-profit entity or by CDFG (see Section 3.2.11 of the Implementation Agreement).

1. NBHCP Technical Advisory Committee

Upon approval of the 1997 City of Sacramento NBHCP and issuance of ITPs, the NBHCP Technical Advisory Committee (TAC) was formed. The TAC is and shall be comprised of representatives from the USFWS, CDFG, the Permittees, and any other future Permittees to advise TNBC in implementing the NBHCP. Each Land Use Agency, Water Agency, or other Permittee, the USFWS, and CDFG will appoint one or more members to the TAC. In addition, TNBC Board of Directors may invite, as needed, other qualified experts on Covered Species or

marsh construction, administrative and legal personnel to assist the TAC, for limited time periods. The TAC's role under the NBHCP is intended to be strictly technical and scientific. It is to advise TNBC in making technical and biological decisions with respect to: reserve land selection, enhancement, and management; monitoring programs and needs; species relocation or reintroduction plans; and other issues pertinent to technical implementation of the Plan. Only TAC representatives from the Permittees, the USFWS, and CDFG shall have the authority to vote with respect to any TAC decision.

C. CONSERVATION STRATEGIES TO MITIGATE FOR URBAN DEVELOPMENT

1. General Strategies to Mitigate the Impacts of Urban Development

This section describes the Conservation Plan that will serve to mitigate the impacts of Authorized Development on Covered Species and habitat values in the Natomas Basin. Generally, this Conservation Plan will be implemented by TNBC, with direction provided by USFWS, CDFG and the Permittees through the TAC and through agency approval of acquisitions and management plans. Mitigation required of Authorized Development projects will include the collection and use of mitigation fees, and in some cases acceptance of land dedications, to set aside and manage 0.5 acres of habitat mitigation land for each 1.0 gross acre of development that occurs in the Basin. Additionally, the Land Use Agencies shall apply measures to avoid, minimize and mitigate take of Covered Species as described in Chapter V. The 0.5-to-1 ratio will specifically mitigate for the loss of wetland habitat values necessary for the giant garter snake and other wetland associated species (see below, Section IV.C.2), and for the loss of upland habitat values necessary for the Swainson's hawk and other upland species (see below, Section IV.C.3).

Habitat reserves will be managed by TNBC and will consist of managed marsh habitats, upland habitats, rice fields (which will typically be leased for use to rice farmers), and associated buffers and infrastructure. The NBHCP does not specify any particular land area for acquisition for habitat reserves, since many factors will affect which land areas are ultimately purchased. Rather, this section specifies the criteria to be considered when reserve lands are selected. An exception to this policy for reserve locations is the City of Sacramento's Settlement Agreement that resulted from the NBHCP litigation. The Settlement Agreement requires a limited number of reserve acres to be located within Sacramento County, including specific target lands near Fisherman's Lake, a requirement that may further enhance the ultimate TNBC reserve system. The Settlement Agreement applies only to a limited number of acres of the City's Authorized Development that occurred between the settlement agreement and the adoption of this NBHCP.

For purposes of the NBHCP, Authorized Development of all currently undeveloped land within the Permit Areas of the City of Sacramento and Sutter County will be subject to the mitigation fee, including urban uses (residential, commercial, industrial), roads and utilities (public or private), schools and other public facilities, golf courses, and other developed parks, except as otherwise specified (see Section 4.6 of the Implementation Agreement).

a. Basis for 0.5 to 1 Mitigation Ratio

The NBHCP proposes a 0.5-to-1 mitigation ratio to be applied to the 17,500 acres of Authorized Development. This mitigation strategy will result in 8,750 acres of habitat reserves to be established and managed by TNBC. It should be noted that the effective habitat reserve ratio is actually higher than the 0.5 to 1 ratio, because not all lands to be developed under the NBHCP Permits are of high value to the Covered Species as habitat. Because portions of the Natomas Basin currently have marginal value as habitat, and because all land to be developed in the Basin will be subject to mitigation fees, in some cases the 0.5-to-1 mitigation ratio will result in a substantial increase in overall habitat value. Listed below are the key considerations in determining that the 0.5 to 1 mitigation ratio mitigates the impacts of incidental take authorized under the NBHCP:

- (1) Overall, TNBC reserves will be of greater habitat value than the existing agricultural land that will be converted to urban development. The TNBC reserves will be specifically managed to create habitat to support the covered species, and species friendly management practices will be utilized by TNBC for the rice reserves operated by TNBC.
- (2) Much of the land to be developed after issuance of the NBHCP Permits is either of limited value as habitat or serves as habitat to a limited number of the Covered Species. In contrast, TNBC reserves will be enhanced and managed to provide a greater diversity of habitat that will serve a larger number of Covered Species. Thus, the reserves to be created through habitat management will offer greater opportunities for species survival by providing a refuge from persistent mechanical or in some cases chemical disturbance often associated with common agricultural practices.
- (3) In the case of several wetland and vernal pool related plant species, TNBC reserves will provide habitat for native species' restoration and reintroduction, if appropriate.
- (4) Numerous migratory bird species currently have minimal utilization of the Basin, but would have increased opportunities within TNBC managed reserves.
- (5) TNBC reserves will be managed to minimize take related to agricultural and land management activities.
- (6) TNBC system of reserves will be managed and maintained in perpetuity, providing permanent habitat for the Covered Species.
- (7) The NBHCP incorporates a detailed monitoring program that will track Covered Species population trends within TNBC reserves as well as at selected locations outside TNBC reserves within the Natomas Basin. The NBHCP monitoring data will inform and guide the Adaptive Management process, to achieve the Plan biological goals and objectives.

- (8) TNBC reserves will generally be consolidated into large, biologically viable units with connectivity between individual reserve units.

b. Preparation of Site Specific Management Plans

Generally, TNBC will improve and manage the system of reserves in a manner that will, to the maximum extent practicable, benefit all Covered Species. This shall be accomplished through preparation and implementation of Site Specific Management Plans that will address the specific resources and habitat values of each reserve site. While the TNBC system of reserves is intended to benefit all Covered Species, individual reserve sites may focus on either upland or wetland habitat that supports only a portion of the Covered Species. Overall, public access to TNBC reserves will be limited and TNBC endeavor will use its best efforts to eliminate illegal and incompatible uses such as dumping, trespass, or unauthorized off-road vehicles. Specific guidelines for the management of TNBC Reserves are provided in Section IV.D.1. The TAC will participate in the review of the management plans, and shall ensure that the management guidelines are incorporated into each management plan. The Wildlife Agencies will approve all SSMPs.

c. Buffers within the Reserve Lands

Buffers shall be considered during the preparation of a site specific management plan for each reserve site.

Definition of Buffers: To the extent necessary and practicable, reserve lands that are modified to create improved wetland habitat shall be surrounded by adequate buffers to minimize the effects of incompatible adjoining land uses, and to ensure a functional transition from improved habitat to adjacent land uses. In addition, the buffers will help ensure that the management of reserve lands does not impose an unnecessary burden on adjoining landowners. Buffers shall be established so that they are inside the reserve system (i.e., the buffers shall be part of, not outside of, reserve lands) and shall count as mitigation land. For example, an upland buffer surrounding a wetland area, may in the individual site management plan be designed to provide foraging areas for some species, as well as providing a buffer or transition between uses

Buffers between improved wetlands and surrounding land uses will extend from the outside edge of the reserve (i.e., levee toe or maintenance road) to the boundary edge of the improved wetland area. The width of the buffer and the management/uses of the buffer area shall be established at the time a Site Specific Management Plan is prepared for the particular reserve site. Typically, buffers will consist of native or ruderal vegetation and will vary between 30 and 75 feet in width, based on the compatibility of adjacent land uses. Where agricultural uses are incorporated within a reserve site, such agricultural uses (with appropriate best management practices to protect wildlife) may serve as the buffer area. Other uses that may be appropriate within the buffer area include TNBC access roads.

Reduction in Buffer Width: Buffers may be reduced to less than 30-feet in width where so designated in Site Specific Management Plans as reviewed by TAC and approved by USFWS and CDFG. Reduction of buffers may occur only where: (1) there is clear evidence that the

buffer is unnecessary (e.g., the reserve site is adjacent to another reserve or similar natural habitat); (2) it is determined that buffers are not the best use of reserve land; and, (3) that the lack of buffers will not create use conflicts for owners of property adjacent to the reserve (e.g., issues of vector control or other nuisance). Decisions about the need for buffers and buffer widths shall be included in the management plan(s) for any given parcel or block of reserve land (see below, Section IV.C.1.d.).

Thus, the presence, width, or extent of buffers may vary with the situation, as long as they adequately reduce 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 or eliminated.

d. Connectivity

A primary goal of the NBHCP is to ensure connectivity between individual reserves, and connectivity between reserves and surrounding agricultural lands. Connections can be provided on land, through water and through air to enable the necessary mobility of species within their ranges. One primary means of connection between water areas will be the drainage/irrigation canals within the Basin. Under the management of RD 1000 and Natomas Mutual, this system of canals will be managed to enhance habitat values and minimize harm to Covered Species as specified in the NBHCP.

The NBHCP conservation strategy emphasizes maintaining connectivity between TNBC reserves to allow giant garter snake movement within the Natomas Basin. This species is highlighted for two reasons: 1) giant garter snake is the most prevalent Covered Species within the Basin that requires land/water connectivity to travel within the Basin and 2) if adequate connectivity is provided for giant garter snake, then, it is anticipated that other Covered Species will also be afforded adequate opportunities to migrate within the Basin.

The primary opportunity for connectivity between reserves is the system of channels maintained and operated by RD 1000 and Natomas Mutual. RD 1000 and Natomas Mutual anticipate continuing the maintenance and operation of the canals into the future. These Water Agencies have noted that the elimination of existing channels within the Land Use Agencies' Permit Areas would generally only occur in response to urban development. Because TNBC, under the guidelines of the NBHCP, generally acquires land separated from urban development, it is anticipated that urban development impacts on channels adjacent to reserves will be minimal.

The Water Agencies have not elected to apply for incidental take permits through this NBHCP, but may elect to pursue permits either through this Plan as written or through a modified version of this plan in the future. As such, this NBHCP and the related EIR/EIS have assessed the effectiveness of the NBHCP in the event the Water Agencies choose to participate or should they choose not to participate in the NBHCP. Since the canal system operated by Water Agencies provides the key movement corridors for the GGS, as identified through monitoring, the NBHCP acknowledges the process of avoidance and mitigation of impacts to GGS and connectivity in the event a canal essential to the GGS is closed. Once TNBC reserves

have been acquired and key connectivity corridors have been identified, changes in water delivery and drainage operations affecting key channels must be considered by TNBC and appropriate actions shall be taken to ensure connectivity is maintained between reserves, thus ensuring connectivity throughout the reserve system. One of the mechanisms identified in the NBHCP to ensure viability of the reserve system is through relocating reserve components. Other options, which could be used to maintain integrity of existing reserves, include MOAs, easements, and outright purchases of land, which would be designed to ensure connectivity for GGS between TNBC reserves.

Since the system of canals in the Natomas Basin has shown the presence of the GGS and is known as habitat for the GGS, the NBHCP does not include the closure of canals as a Covered Activity. In other words, the proposed Covered Activities of the Water Agencies (See Chapter I, Covered Activities) do not include closure of canals or substantial modifications of canals, which may be subject to Section 404 of the Clean Water Act. Therefore, in the event of a proposed canal closure, the Water Agency (or project sponsor for canal closure) would likely be required to comply with the ESA and mitigate impacts under either Section 10 of the ESA (amendment of the NBHCP if the Water Agencies participate in this HCP effort, or preparation of a separate HCP) or Section 7, if federal funds or federal approval is required (as in the case of Section 404 Clean Water Act permits). Under either of these processes, direct impacts to the GGS as well as indirect impacts to the NBHCP/TNBC reserve system would be considered by USFWS and CDFG and would be mitigated by the Water Agency and/or project sponsor. Where possible, this HCP contemplates that the USFWS will support granting of MOAs or transfer easements or land in fee title to the TNBC to reduce impacts to the GGS and preserve connectivity of habitat areas between reserves in the Natomas Basin. In the event TNBC purchases essential canals to protect the GGS and connectivity, such acquisition shall be considered part of the reserve system, shall be counted as Mitigation Lands, and shall not be subject to the minimum reserve size, buffer and setback criteria established in the NBHCP for typical Mitigation Land reserves.

While TNBC will be the entity directly responsible for implementing measures to maintain connectivity between TNBC reserves, it is ultimately the obligation of the Land Use Agency Permittees to ensure that the NBHCP Operating Conservation Plan succeeds in achieving the goals and objective of the NBHCP. If it is determined that adequate connectivity is not being maintained within the Basin, then the Land Use Agencies' incidental take permits will be at risk. Under such circumstances, the Land Use Agencies would be obligated to provide TNBC with the means to maintain adequate connectivity, possibly through increasing the NBHCP Mitigation fee, seeking outside funding sources to enhance connectivity between TNBC reserves, or other strategies available to the Land Use Agencies.

With regard to basin-wide connectivity, RD 1000 has identified key drainage channels (see Figure 17) that provide the backbone drainage system within the Basin and would be retained regardless of urban development. Urban development in the Natomas Basin relies on the system of canals for flood protection and to convey storm water runoff to the rivers. As evidenced on Figure 17, the channels of RD 1000 and Natomas Mutual are extensive throughout the Natomas Basin. The combination of primary drainage channels (drainage channels anticipated to remain through the term of the Permits), secondary drainage channels (which tend

to remain unless affected by urban development), and irrigation channels provide substantial connectivity between the existing TNBC reserves. The system of canals identified on Figure 17, is anticipated to remain to serve both approved urban development and also provide the backbone of canal connections between reserves. In addition to the primary drainage structures identified on Figure 17, the one-mile wide Swainson's Hawk Zone has been excluded from the Sutter County Permit Area. This land will remain undeveloped until such time as the County addresses impacts to listed species. As such, this land is anticipated to remain available for purposes of biological connectivity. In addition to the major canal within the Swainson's Hawk Zone that is identified on Figure 17, there are numerous lesser canals operated by RD 1000 and Natomas Mutual, as well as lesser irrigation canals operated by individual farmers. Therefore, it is anticipated that this area will continue to provide connectivity between present and future reserves located in Sacramento and Sutter Counties.

As noted above, any substantial change to the connectivity of reserves that would affect Covered Species will be considered by the TNBC Board and TAC and Adaptive Management strategies, or longer term channel control strategies such as MOA's, MOU's, and easements will be considered and implemented as feasible and appropriate to ensure connectivity is maintained. This decrease in connectivity is considered a relatively remote circumstance since the system of canals identified in Figure 17 are essential for flood control and drainage in the Basin.

In addition to the channel connectivity described above, TNBC will consolidate reserve acquisitions during the fifty (50) year life of the permits in order to build larger blocks of habitat reserve lands. Minimum requirements for reserve sizes are discussed below. The connectivity promoted through TNBC acquisitions will reduce isolation of habitat reserves, thereby increasing the long-term viability of wildlife populations within the Natomas Basin.

In addition to promoting connectivity between reserves and surrounding agriculture, the Land Use Agencies, through their adopted general plans, community plans, and specific plans, will promote compact urban development within limited portions of the Natomas Basin. The boundaries of City of Sacramento and Metro Air Park development are clearly defined and well consolidated. Urban development within Sutter County will be limited to the Industrial/Commercial Reserve (exclusive of that portion of the Industrial/Commercial Reserve within the SHZ), an area totaling 8,575 acres within the Natomas Basin. A total of 7,467 acres of development is allowed within this area under the NBHCP, leaving 1,100 acres within the Industrial/Commercial Reserve with no take coverage under the NBHCP. Because of the cost of constructing and extending facilities and roads, development in Sutter County will be consolidated and will follow the footprint of the Permit Area shown for Sutter County. Additionally, during Sutter County's Mid-Point Review, development patterns shall be analyzed to determine whether the remainder 1,100 acres of habitat within the Industrial/Commercial Reserve is becoming fragmented.

Additional connectivity review measures shall include Plan Operator approval to grant access across reserve lands for canal modification unless the authority for such access already exists. The Plan Operator's approval of any canal modification on Mitigation Lands will be contingent upon Wildlife Agency review.

While the NBHCP allows for the participation of the Water Agencies, such participation is not anticipated until outstanding issues affecting the Water Agencies are resolved. Because the NBHCP does not contemplate coverage for canal closure or substantially modified canal management guidelines for the Water Agencies, whether or not the Water Agency participates in the NBHCP will not substantially affect connectivity between TNBC reserves.

e. Foraging Habitat

The NBHCP Operating Conservation Program provides avoidance, take minimization and mitigation for impacts to Covered Species. An underlying assumption of the NBHCP is that the system of reserves comprising the Mitigation Lands, in conjunction with foraging opportunities within the general area, will provide for the long-term viability of Covered Species within the Natomas Basin. While these additional foraging areas will not be under the control of TNBC, are not mitigation included in the NBHCP, and the Land Use Agency Permittees have limited control over the use of such lands, the presence of foraging lands outside of TNBC reserves supports various Covered Species, in particular, the Swainson's hawk.

Analysis of the effectiveness of the NBHCP is based on the assumption that some portion of the existing foraging habitat would remain outside of the Permit Areas as development occurs under the NBHCP. This assumption is based on the following historic land use patterns, adopted general plans and policies, state and Federal regulations and provisions of the NBHCP:

1. Outside of the Permit Areas, limited changes to existing land uses are allowed by right, including development of individual homes on existing agricultural parcels (e.g., 1 dwelling unit on 40-acre parcels). Based on data available as of 2002, historic land use patterns indicate that approximately 377 acres within the entire 53,537 acres of the Basin are in rural residential uses. Substantial increases in this type of land use are not anticipated over the life of the NBHCP due to (a) the limited amount of such development which has occurred historically in the Basin, (b) the County of Sutter and the County of Sacramento General Plan and zoning designations limiting most land to agricultural and open space uses, (c) the large parcel sizes of Basin land outside of the Permit Areas, and (d) limitations on the provision of water and sewer services to areas located outside of the Sacramento County Urban Services Boundary and the City of Sacramento Sphere of Influence.
2. Under the adopted land use plans and policies, extensive analysis and amendments to the adopted plans and policies would be required prior to the approval of urban development outside of the Permit Areas. If such changes in land use were to occur during the 50-year life of the NBHCP, conversion of Basin lands from agricultural and open space uses to urban uses, beyond the 17,500 acres of Planned Development and outside the Permit Areas, very likely would only result from the expansion of Sacramento International Airport, expanded development by the City or Sutter beyond the NBHCP Planned Development, or other urban development within Sacramento County. Expansion of the airport would require amendments to the Airport Master Plan, as well as local and federal approvals. Conversion of undeveloped lands to urban development within the remaining

Sacramento County or the City of Sacramento portions of the Basin outside the Permit Areas would require either expansion of the City's Sphere of Influence or adjustments to the County's Urban Services Boundary, approval by the Local Agency Formation Commission, general plan amendments, rezoning, and changes in policies regarding the provision of services. Urban development within Sutter County beyond the NBHCP Authorized Development or outside the Sutter Permit Area also would trigger general plan amendments, specific plans, and rezoning.

3. Under the provisions of the NBHCP, neither the City or Sutter County may approve any urban development beyond the Authorized Development until the applicable Permittee conducts an evaluation of the effects of the additional development on the NBHCP's Operating Conservation Program, and the City's or the County's permit is amended to include the new areas or a new permit is issued for such additional areas. If such development is proposed and take associated with this development is authorized through either amended or new incidental take permits, the mitigation requirements applied to the additional development may vary from those established under the NBHCP. However, authorization of such additional development under a permit amendment or new permit would not alter the mitigation requirements established for the 15,517 acres of Authorized Development addressed under this NBHCP.
4. Discretionary actions including the actions described in Item 2, above which are required for the approval of major urban development by the City of Sacramento, the County of Sutter or the County of Sacramento are subject to review under CEQA. In accordance with CEQA, such analysis would consider both the effects of the actions on federal and state-listed species and the effects of the actions on the effectiveness of the NBHCP.
5. In the event Sacramento County proposes to expand the Sacramento International Airport, such actions would be subject to Section 7 review under the ESA, CESA compliance, and CEQA and NEPA analyses. As part of these reviews, Sacramento County would be required to evaluate the effects of such activities on state and federally-listed species and the NBHCP.

Notwithstanding the above discussion, in the 50-year term of the NBHCP and ITPs, it is possible that changes in the existing land uses outside the Permit Areas and within the Basin could occur over time that could impact foraging habitat anticipated under the NBHCP Operating Conservation Program. Analysis completed for the NBHCP determined that 9,188 acres of Swainson's hawk foraging habitat would be impacted by take authorized under the Natomas and MAP ITPs. Under the two HCP's, 3,372 acres of high and moderate quality upland habitat would be provided within TNBC Mitigation Land reserves. Additionally, Sutter County's Permit Area specifically excludes 1,015 acres of the Sutter Industrial/Commercial Reserve and the County will process a general plan amendment to redesignate this land to Agriculture. This 4,387 acres of Mitigation Land and avoidance of Sutter urban development impacts, in conjunction with nesting and foraging habitat retained in the Swainson's Hawk Zone, and the NBHCP's avoidance, minimization and mitigation measures, fully mitigates the impacts of take of foraging habitat resulting from Planned Development. In addition to the 4,387 acres

affected by the NBHCP, additional lands within and directly adjacent to the Plan Area are anticipated to continue to provide foraging habitat for Swainson's hawk, as described in Table IV-2.

TABLE IV-2
AVAILABLE FORAGING OPPORTUNITIES

Within Basin & TNBC Permit Area	Acreage
Available Foraging Provided Under NBHCP	4,387
Other Lands Available for Foraging Within Sutter County ¹	3,632
Other Lands Available for Foraging Within Sacramento County ²	10,756

¹ Includes Triangle Parcel, levee slopes, and agricultural zoned lands

² Includes agricultural zoned lands, airport buffer lands, Sacramento County portion of Swainson Hawk's zone

Although the existing baseline foraging habitat is not considered mitigation under the NBHCP, the NBHCP adaptive management program is designed to respond to changes in baseline habitat which could occur if existing undeveloped lands in the Basin were converted to urban uses. As part of the Overall NBHCP Program Review and the Independent Program Reviews (see NBHCP Sections VI.I and VI.J), a general evaluation of Basin land uses will be conducted to determine whether amendments to adopted General Plan land use designations, master plan amendments, specific plan adoption or amendments, or rezonings to allow urban land uses outside the Permit Areas have the potential to adversely affect the NBHCP Operating Conservation Plan. In the event that foraging opportunities, as identified in Table IV-2, are converted to urban uses without adequate provisions to maintain foraging habitat, such that the effectiveness of the NBHCP Operating Conservation Program is potentially compromised, the City and Sutter County would consider and TNBC, on behalf of the City and Sutter, would implement appropriate actions, including the following or similar measures:

1. Modification of acquisition criteria to adjust for impacts to foraging habitat outside of reserves.
2. Substitution of reserve sites that have not been restored and are impacted by substantial land use changes, with replacement reserve sites that would provide improved foraging habitat opportunities.
3. Modification of the percentages of the habitat types comprising the TNBC reserve sites. Such modifications would be applied prospectively to future TNBC acquisitions and would not affect existing, improved TNBC reserves.
4. Pursuit of outside funding sources, including private, state and Federal grants, to acquire, improve and manage additional TNBC reserves that would maintain Basin foraging lands. TNBC would be responsible for preparing grant applications or undertaking other actions, as necessary, to secure these funds. Such programs would supplement the Mitigation Fees required by the NBHCP and would not be used to fund NBHCP

mitigation obligations. Lack of outside funding would not preclude the City and Sutter County's obligation to implement appropriate action consistent with this provision and their respective obligations under the NBHCP.

f. 2,500-Acre/400-Acre Minimum Habitat Block Size Requirements

In order to ensure adequately sized reserves that will support long-term viability of Covered Species, the NBHCP requires that by the end of the 50 year permits, one habitat block within the reserve system shall be a minimum of 2,500 acres in size and the balance of reserve lands shall be in habitat blocks that are a minimum of 400 acres in size. It must be understood that these are minimum sizes of reserve land holdings which will be acquired over time. Also, TNBC with the approval of the Wildlife Agencies, may acquire properties smaller than 400 acres in size where biological resources merit such acquisitions.

TNBC will always have the flexibility to buy land in smaller blocks in order to eventually build up its land holdings to the required sizes by the end of 50 years. In addition, at times TNBC may determine that smaller reserves have biological significance and should be preserved. Moreover, TNBC will be able to sell or lease land in order to accomplish this minimum block requirement and other goals of the plan. Based upon the recent progress of TNBC in acquiring contiguous properties for the establishment of habitat reserves, the City and Sutter County anticipate successfully meeting the NBHCP minimum size objectives for reserve land acquisition within 50 years. Within the western portion of the Natomas Basin in Sutter County, TNBC now holds three contiguous properties and two nearby contiguous properties that total 1,071.6 acres.

After development of reserves and analysis of the function of reserves less than 400 acres in size, compelling evidence in support of reserves less than 400 acres in size may be discovered. In such cases, it would not be the intent of the NBHCP to sacrifice high quality sites of less than 400 acres in size in order to develop larger, but less biologically valuable, reserve sites.

Basis for the 2,500 Acre / 400 Acre Reserves Sizes: The basis for the 400 acres minimum block and 2,500 acre reserve block size is: 1) large blocks minimize the “perimeter effect,” 2) large blocks promote biodiversity by allowing multiple species and niches to occupy the site, and 3) the benefit to genetic diversity of dispersing interconnected reserves throughout the Natomas Basin, and 4) the 400 acre reserve size is considered the minimum size to allow persistence of Covered Species.

The large block reserve site results in less perimeter relative to the area of the site. A lower ratio of perimeter to area is an advantage because it reduces the potential incompatible interface between the reserve site and surrounding land uses. The information below shows the perimeter/ area ratio for three differently sized reserve sites:

Reserve Size (acres)	Perimeter (lin. ft.)	Area (acres)	Perimeter/Area Ratio
10	2,640	10	264 : 1
400	16,697	400	42 : 1
2,500	41,744	2,500	17 : 1

The larger reserve block results in more biodiversity on the site. A mosaic of habitats can be created on a reserve site which supplies more habitat types than a monoculture of habitat. The mosaic of habitat types encourages more types of species to fill the greater number of niches provided on site. A larger block also provides more efficient management, improved monitoring and an overall economy of scale. This reduced cost of management can be used for additional enhancement and adaptive management on the reserves.

The 400-acre blocks of reserves interconnected by waterways and dispersed throughout the Basin are beneficial to the reserve system because such a system allows for greater genetic intermixing of subpopulations, particularly amongst giant garter snake sub-populations. This system of interconnected waterways, operated by RD1000 and Natomas Mutual, will provide irrigation water delivery and flood control throughout the Basin, thereby providing connectivity between TNBC reserves.

Review of Progress on 2,500- Acre / 400- Acre Reserve Sizes: Notwithstanding TNBC's success in the Natomas Basin to date, in order to further ensure that the 2,500 -acre reserve objective and the 400-acre minimum reserve size objective are met, the City of Sacramento and Sutter County will each conduct an Independent Mid-Point Review to verify that appropriate progress is achieved in meeting the reserve size objectives. Additionally, an Overall Program Review is required once approval for 9,000 acres of Authorized Development under the NBHCP has been granted by the Land Use Agencies. The timing of these program reviews is discussed in Sections VI.I and VI.J.

2. Reserve Acquisition Guidelines and Criteria

Described below are criteria that TNBC and the NBHCP TAC shall consider when evaluating potential reserve acquisitions.

a. Setbacks Adjacent to Reserve Lands

Setback zones shall be considered prior to the acquisition of reserve lands. The purpose of the setback requirement is to minimize conflicts between reserve lands and nearby existing development or lands that are designated for urban development by one of the Land Use Agencies on one another. The setback zone functions as a limitation on where reserve lands can be located. However, the reserve land setback zone does not affect the ability of each of the Land Use Agencies to approve development within the setback zone and adjacent to the boundaries of reserve lands.

Width of Setback Zone: All mitigation lands acquired by TNBC or for which conservation easements are obtained shall, at the time of acquisition and with the exceptions described below, be situated a minimum of 800 feet from existing urban lands or lands that are designated for urban uses in an adopted general plan. For purposes of this provision, "existing urban lands" means lands that are intensively or completely developed for urban, commercial, or residential uses or are adjacent to or within the immediate vicinity of intensively developed areas, such that the direct and indirect effects of such development are significantly incompatible with the objectives and purposes of the reserve system and would be likely to have significant

adverse effects on reserve viability or on Covered Species inhabiting the reserve lands. Lands that are located within either the City of Sacramento's or Sutter County's Permit Area shall not be acquired or accepted as TNBC Mitigation Lands without the prior review and approval by the decision making body of the Land Use Agency Permittee within which the proposed Mitigation Land is located.

Exception: Mitigation lands or easements that do not comply with the 800-foot setback requirement may be acquired on a case-by-case basis, if: (1) NBHCP's Technical Advisory Committee, including its USFWS and CDFG representatives, concur unanimously in a decision to reduce the setback distance; or (2) if not unanimous, the USFWS and CDFG concur in writing that a reduction in the setback distance is necessary or appropriate. For example, the reserve site acquired by TNBC on the west side of Fisherman's Lake was acquired because the high quality of the site warranted the acquisition, in spite of the less than 800-foot setback from designated urban lands. If TNBC proposes to establish all or part of the 800-foot setback on TNBC mitigation land (that is, the setback would be part of the reserve system), the USFWS and CDFG must review the status and adequacy of the area as mitigation land on a case-by-case basis and approve any such decision or purchase in writing. If TNBC proposes an acquisition that would result in a setback of less than 800-feet from urban development and the USFWS and CDFG approve such an acquisition, then the rationale for decisions about setback distances shall be included in the management plan(s) for any given parcel or block of reserve land.

Use of Setback Zone Land: Lands in the 800-foot setback zone between urban development and reserve areas should be in agriculture or another open-space or non-urban use. However, such lands will not likely be under the control of TNBC and will not count as mitigation land. The purpose of the 800-foot setback requirement is to ensure that reserve lands, to the maximum extent practicable, are not established near or adjacent to existing or reasonably foreseeable incompatible urban land uses. The setback standard is also intended not to impose an obligation on TNBC or the owners of the setback lands to manage such lands in any particular fashion. Thus, it is the responsibility of TNBC to locate reserve lands sufficiently far from urban areas or from lands designated for urban uses to fulfill this requirement; however, the setback requirement applies only to land acquisition by TNBC and is not to be construed as a land use restriction on privately owned land within 800 feet of any land within the NBHCP reserve system.

Review of Setbacks: The status and adequacy of the setback criteria will be reviewed and, where necessary and appropriate as determined by the USFWS and CDFG amended or corrected during the individual Permittees' (City of Sacramento and Sutter County) Independent Mid-Point Reviews and the NBHCP 9,000-acre Overall Program Review described in Section VI., I. and J. for future reserve acquisitions.

b. Out-of-Basin Reserves

Pursuant to the action by the Sacramento City Council on May 13, 2003 and action by the Sutter County Board of Supervisors on June 10, 2003, acquisition of mitigation lands by TNBC pursuant to this NBHCP and the associated permits shall be limited to the Natomas Basin and the

outer ring of the levees of the Natomas Basin. Acquisition of mitigation lands to offset the impacts of Authorized Development pursuant to the City of Sacramento and Sutter County's Incidental Take Permits may not occur in the area defined by the NBHCP as Area B. Similarly, the NBHCP does not provide for TNBC to acquire Mitigation Lands in Area B to fulfill Metro Air Park's Mitigation Land acquisition obligations.

Most mitigation lands under the NBHCP will be situated inside the Natomas Basin. However, the Plan recognizes one potential out-of-Basin mitigation area, shown in Figure 20, Out-of-Basin Mitigation Area. Area "B" is a 60,000-acre area of agricultural land, north of the Basin within Sutter County. While the overall habitat values and presence of Covered Species within Area B are not as well documented as within the interior of the Natomas Basin, giant garter snake presence has been confirmed in Area B. Area "B" is not within the Permit Area of Sutter County; thus, incidental take of Covered Species resulting from development in this area would not be covered by the Sutter County's ITP's. However, any take associated with management and habitat enhancement conducted by TNBC in reserve areas within Area "B" would be covered by the TNBC permits (see Section V.A).

Under the NBHCP, up to 20 percent of the reserve lands may be established in Area "B," if approved in writing by USFWS and CDFG based on available scientific information that a reserve of adequate size, viability, and habitat value can be established in this area and can support a population of giant garter snakes, Swainson's hawk and/or other Covered Species. Acquisition of reserve lands in Area "B" may occur if: (1) the NBHCP Technical Advisory Committee, including its USFWS and CDFG representatives, concur unanimously in a decision to acquire reserve lands in Area "B" and the reasons for such decision are clearly documented in the TNBC's administrative record; or (2) if not unanimous, TNBC submits a proposal for such an acquisition in writing to the USFWS and CDFG, together with an explanation of how and why the acquisition would benefit the NBHCP's reserve system and be consistent with reserve system and overall Plan goals and objectives, and the USFWS and CDFG concur with the acquisition in writing. Generally, the NBHCP assumes that flood bypass areas or other areas in Area "B" that experience deep flooding will not be acceptable as mitigation lands unless they are specially managed to meet giant garter snake needs.

Area B Acquisition Criteria

The purpose of allowing out-of-Basin reserves is to provide an alternative method for achieving the NBHCP reserve objectives that preserve suitable habitat with high habitat values, that reduces the impact of TNBC acquisitions on continuing farming in the Basin, and that allows acquisition of potentially lower cost lands that support the goals and objectives of the NBHCP. At a minimum, such acquisitions must be consistent with the NBHCP's Conservation Strategies (see above, Section IV.C.1), reserve acquisition criteria (see Section IV.C.2), and provide clear benefits to the Covered Species of the NBHCP.

In reviewing Area B acquisitions, the Wildlife Agencies shall consider the effect of acquiring out-of-Basin reserves on the viability of Covered Species populations within the Basin.

In addition to the value of proposed acquisition lands in meeting the biological goals and objectives of the NBHCP, the following factors shall be taken into consideration should TNBC seek to pursue or acquire lands in Area B:

- (1) To preserve a balance, no more than 20% of the total reserve system at any given time shall be located in Area B.
- (2) Area B sites may be considered and purchased when market conditions in the Natomas Basin serve as a limiting factor to successful, timely and cost effective land acquisitions in the Basin. For example, if there is a limited inventory of available land (willing seller at a reasonable price) within the basin, and/or such parcels have limited habitat value or do not meet major portions of the reserve acquisition criteria and goals, then the TNBC Board may seek acquisition of parcels in Area B.
- (3) Specific circumstances under which Area B acquisitions might be appropriate include land costs for appropriate land within the Basin that are in excess of the established fair market land acquisition price established in the latest NBHCP Fee Report, or inability to conclude transactions within a reasonable time frame (approximately 6 months of initiation of negotiations).

If out-of-Basin reserve lands are acquired in Area "B" as described above, TNBC shall be responsible for managing such lands in accordance with Section IV.D below, unless: (1) another reliable, willing reserve manager for such lands is located; (2) management of such lands by another land manager is consistent with all applicable conditions of the NBHCP; and (3) such land manager continues to be subject to and to act under the direct control of TNBC; and (4) delegation of management authority to such a reserve manager is authorized by the USFWS and CDFG in writing and through revision of the NBHCP and Implementation Agreement if necessary. If TNBC desires to delegate ownership or management of any reserve lands to a third party without retaining direct control over such third party, then, in addition to the measures identified in (4) above, such delegation must be processed as an amendment to TNBC's permits and the third party must obtain separate incidental take permits.

The purpose of allowing out-of-Basin reserves is to provide an alternative method for achieving the NBHCP reserve objectives, to reduce the potential cost of establishing reserve areas by allowing acquisition of potentially lower-cost land that supports suitable habitat with high habitat values, and to reduce the impact of TNBC acquisitions on continuing farming in the Basin. However, at a minimum, such acquisitions must be consistent with the NBHCP's Conservation Strategies (see above, Section IV.C.1), reserve acquisition criteria (see Section IV.C.2), and provide clear benefit to the Covered Species of the Natomas Basin.

In summary, it is currently expected that at least 80 percent of the NBHCP's reserve lands will be established within the Natomas Basin, and up to 20 percent of the total mitigation lands required by the Plan may be acquired out-of-Basin pursuant to compliance with the criteria established above.

c. Mitigation of Effects Related to Sale or Transfer of Habitat Mitigation Reserve Sites

(1) Requirement to Mitigate Impacts Resulting from Real Estate, Right of Way or Other Acquisitions or Uses Affecting TNBC Lands. In the event public works projects or other projects require acquisition of mitigation lands operated by the TNBC, the sponsor of such activity shall be required to mitigate the impacts to the reserve system. At a minimum, the sponsor of such activities shall pay for the value of replacing every acre of reserve land impacted, and may be required to also pay for direct and indirect impacts related to the established (existing, enhanced, or restored) habitat value on the land. In addition to compensating TNBC for lost habitat reserves, such an agency shall also provide mitigation as determined appropriate to mitigate the impacts of the project that necessitated the elimination of the Mitigation Lands reserve. Such additional mitigation may include payment of the NBHCP Mitigation Fee and implementation of appropriate measures to avoid and minimize take of Covered Species. This provision for example, may apply to an agency that is requiring rights of way on TNBC lands or other activities that result in the sale or loss of reserve lands for public necessity.

(2) Requirement to Compensate for Habitat Value in the Event of Sale or Trade of a TNBC Reserve Site. In the event the TNBC Board of Directors decides to voluntarily sell or trade a Mitigation Lands reserve site, the TNBC Board shall ensure that the terms of the sale or trade include coverage for the costs or value of replacing each acre of Mitigation Lands impacted, and estimated direct and indirect impacts related to the established (existing, enhanced or restored) habitat value on the land. In the event a TNBC reserve is sold or transferred for purposes of urban development within the Permit Area(s) of the NBHCP, the developer shall also comply with the obligations of the NBHCP, including but not limited to payment of the Mitigation Fee and implementation of applicable measures specified in Chapters IV and V of the NBHCP.

d. Overall Acquisition Criteria

TNBC will apply the following criteria when evaluating potential reserve acquisitions. Additional criteria for primarily wetland reserves and primarily upland reserves are provided in the following sections. Prior to acquiring Mitigation Land, TNBC shall conduct a Pre-Acquisition field reconnaissance to determine the suitability of the proposed site as habitat for Covered Species and the type of habitat and associated species present on the site. This will be an overview assessment and not a full biological assessment. The purpose of this survey is to determine the potential and/or limiting factors for establishment of habitat for Covered Species.

(1) The NBHCP provides for a general division of habitat types within TNBC's system of reserves as follows: 25% managed marsh; 50% rice production; and, 25% upland habitat. The percentages described herein apply to the entire TNBC system of reserves and percentages within individual reserves will vary from the percentages described above. While percentages of land use types within individual reserves will vary based on site-specific conditions, the reserve system will generally contain a combination of appropriate habitats that reflect characteristics of the reserve site. For example, a reserve site may be appropriate for upland habitat and not suited to rice production or managed marsh. Therefore, a TNBC reserve site could contain only

upland habitat and no managed marsh or rice production. Alternatively, a reserve may consist entirely of rice, or may be primarily marsh with a small percentage of upland habitat.

- (2) Land has legal water rights to an adequate water supply to serve the anticipated uses (wetland or upland) of the proposed reserve. This would normally mean rights to water from the Natomas Mutual (or its equivalent supplier if outside the Basin), but may solely include groundwater if a groundwater well or wells exist on the property and that such wells can meet acceptable water quantity and quality needs.
- (3) Land is capable of supporting appropriate agricultural cultivation in conjunction with either wetland or upland habitat reserve.
- (4) Land is capable of either supporting or being improved to support various Covered Species associated with the anticipated type of habitat (wetland or upland) proposed for the potential reserve.
- (5) Upland or wetland specific criteria, as described in the following sections, will be applied as determined appropriate by TNBC in consultation with the TAC.
- (6) Land is adequately removed from incompatible urban development or uses (see Section IV.C.2.a. above).
- (7) Habitat reserves will be established by TNBC in consultation with the TAC. Prior to purchase, all lands being considered for acquisition will be submitted to USFWS and CDFG for review and concurrence; such concurrence will be required before any land acquisitions are completed. However, formal USFWS and CDFG concurrence may be waived, provided that NBHCP's TAC, including the USFWS and CDFG representatives, unanimously concur in the proposed acquisition and that documentation of such concurrence is placed into TNBC's administrative record. If, however, there is not TAC concurrence and the TNBC's Board of Directors approves an action pursuant to this section in a regular, noticed meeting of the Board, then following the 60th day after TNBC has notified CDFG and USFWS of the proposed action, in writing by CDFG or USFWS, it is approved unless denied in writing by CDFG and USFWS.

3. Conservation Strategy for Wetland Habitat as Mitigation for Urban Development

a. Establishment and Management of Wetland Habitats

Wetland reserves are intended to provide for the long-term protection of existing and potential wetland species populations in the Basin, including the giant garter snake. In most cases, wetland reserves established for the giant garter snake will also be planned to benefit other wetland-associated Covered Species, including a range of wetland associated species such as tricolored blackbird, northwestern pond turtle and Delta tule pea. Consequently, selection of wetland reserve sites will usually focus on the needs of the giant garter snake, except in cases

where, in the judgement of TNBC and the Technical Advisory Committee, specific or important needs of other wetland-associated species can be met at sites not selected primarily for giant garter snake.

A primary goal of the NBHCP is to create a system of reserves, with wetland habitats and associated uplands, that would support populations of the giant garter snake and other Covered Species which co-exist with the garter snake in the same habitat.

A primary goal of the NBHCP is to create a system of reserves, with wetland habitats and associated uplands, that would support populations of the giant garter snake and other Covered Species which co-exist with the garter snake in the same habitat. Generally habitat which supports the giant garter snake will also be of habitat value to other associated wetland species. For example, the wetland reserve management policies are designed to ensure that a water regime which provides for inundation of wetland areas to support the needs of multiple species including spring and summer inundations to support the giant garter snake, and other Covered Species that are aquatic breeders (California tiger salamander). Seasonal inundations in the fall will support waterfowl such as the Aleutian Canada goose. The wetland reserve criteria also includes upland areas within marshes for cover and hibernacula needed for a number of covered wetland species including the giant garter snake, the western pond turtle and others. Upland areas of marsh will also be designed to support habitat for the tricolored blackbird, burrowing owl and loggerhead shrike. Each Site Specific Management Plan will consider the optimal reserve restoration and management regime to support the wetland associated covered species.

b. Wetland Reserve Acquisition Criteria/Methodology

The following guidelines will be used to identify lands for wetland reserve area acquisition (see Section C.3.e below for additional reserve acquisition criteria for rice fields):

- (1) Land has existing or potential wetland habitat values that currently support or can support, with necessary enhancement and restoration, giant garter snakes and other wetland associated Covered Species.
- (2) Land contains soils that can support rice farming or the type of managed marsh wetlands proposed in the Plan (see Section IV.C.3.d. below).
- (3) Blocks of reserve lands must also be hydrologically connected to other blocks through irrigation and drainage systems or other systems to ensure connectivity and opportunity for travel by giant garter snakes between sections of the reserve system. To the extent practicable, reserve lands should also be near or adjacent to other protected habitat lands; this would increase the overall effectiveness and size of protected lands in the Basin for Covered Species.
- (4) Lands selected to provide for the NBHCP wetland habitat system shall be situated outside areas known to regularly receive deep flood waters (e.g., the Yolo and Sutter Bypasses). They shall also be situated so that they do not directly receive runoff from paved surfaces or inflow from urban storm water drainage systems.

c. Protection from Flooding

Flood water can destroy giant garter snake underground retreats by (1) liquefying the fine clay-silt substrate, allowing tunnels to collapse; (2) saturating the substrate with water, allowing the soil to swell and thus eliminating deep cracks that had been created by shrinking during a previous drying of the soil; (3) exposing slopes lying below the high water mark to the erosive force of wave action; and (4) depositing silt that blankets substrate surfaces and covers any underground retreats that survive (1), (2), and (3). While giant garter snakes can survive being flooded from underground retreats (Glenn Wylie, BRD, pers. comm.), such disruptive events are not advantageous either to garter snakes or to management of wetland reserves under the NBHCP.

The drainage regime for managed wetlands or rice fields inside the reserve system shall be designed to ensure that giant garter snake retreats are not inundated when water is drained from ditches, fields, canals or wetland areas. It is also desirable to locate upland habitats inside the wetland reserve system to avoid flooding of winter retreats.

d. Managed Marsh Design/Management

The NBHCP recognizes the wildlife values for many Covered Species associated with natural marsh and managed marsh areas as well as rice fields and seeks to protect, restore, or create such areas through the NBHCP's conservation program. Management of rice fields is discussed in Section IV.C.3.e below.

Section IV.C.2.c. above currently requires that at least 25% of the land acquired for the NBHCP reserve system be converted into managed marsh wetlands to enhance habitat values for the giant garter snake and other Covered Species. These managed marsh wetlands, together with associated uplands, rice fields, and water conveyance ditches and canals, are expected to form a mosaic of diverse wetland habitats in the wetland portion of the reserve system that will support giant garter snakes and other wetland associated species. Embedded within an agricultural landscape dominated by rice farming, managed marsh wetlands based on such biological principles should support giant garter snakes as well as many other Covered Species (e.g., white-faced ibis, tricolored blackbird, and northwestern pond turtle).

The specific locations where TNBC will develop managed marsh habitat are not identified in the NBHCP. Such lands will be identified by TNBC as the NBHCP is implemented, and site-specific management and monitoring plans for each managed marsh area will be developed when the site is acquired. When TNBC proposes to acquire a particular land parcel as mitigation, it will submit the proposal to the USFWS and CDFG for review and approval. Development of specific management and monitoring plans for managed marshes and other mitigation lands is discussed in Section IV.D below.

Similarly, the NBHCP does not provide site-specific prescriptions for marsh design and management, but outlines the basic habitat elements needed for managed marshes within the Plan's reserve system to support giant garter snakes and other Covered Species. It is important that these marsh elements, including the water regime and physical structure, are consistent with

giant garter snake biology and that, to the extent known, they mimic relevant features of the original marsh complexes of the Central Valley where the giant garter snake evolved, or the rice culture ecosystem that currently supports the snake. These features include, but are not limited to: (1) summer dry-down of seasonal marsh; (2) availability of summer water either as pockets of deeper water that persist in the seasonal marsh or as permanent marsh, located near or adjacent to vegetated banks or suitable upland habitat; (3) open water channels in marsh habitat to provide movement corridors and foraging edge; (4) availability of abundant emergent vegetation and near shore habitat; (5) a good food supply; and (6) availability of diverse habitat elements.

The following describes these managed marsh components and other factors in more detail. Note, however, that the following descriptions for managed marsh design under the NBHCP (including water management and marsh configuration) may be modified throughout the life of the Plan according to its Adaptive Management provisions (see Section VI.F). Marsh management plans will be developed in accordance with Section IV.D below.

Water Regime: The NBHCP's wetland reserves may consist of two types of managed marsh wetlands--seasonal wetlands or permanent wetlands. As its name implies, the first type is flooded seasonally to accomplish a variety of purposes, including benefits to wildlife and vegetation management. The season when such wetlands are flooded depends on the wildlife species being targeted (e.g., spring and summer for giant garter snakes; winter for waterfowl). Though seasonal marsh may have pockets of permanent water as described below, these are the result of deep water areas that are nevertheless within the seasonal wetland, and are therefore considered separately from permanent marsh. Permanent marsh retains water year round.

Seasonal managed marshes will be flooded by about mid-April (if not flooded during the winter) so that water and prey are available when giant garter snakes emerge from winter retreats. Water will be maintained within the managed marsh during the period when rice fields dry down (approximately mid-August). This irrigation regime is intended to provide alternative habitat to GGS as rice fields are drained and concentrate giant garter snake prey species from rice field into canals and managed marshes.

Giant garter snakes are also known to use areas of permanent marsh habitat at Gilsizer Slough, Cosumnes River Preserve and on the Sacramento NWR complex, as well as permanent marsh along Fisherman's Lake in the Natomas Basin. It is considered advantageous to include within the NBHCP's wetland reserve system some areas of permanent marshes and sloughs interspersed with the seasonal marshes, rice fields, and uplands. This will increase the overall habitat diversity of the reserves for the giant garter snake as well as other Covered Species.

Uplands: While a portion of the terrestrial component of the managed marsh system will be designed to meet the buffer requirements of the NBHCP, the rest will be designed and managed to meet the needs of giant garter snakes and other upland Covered Species.

The specific proportion of wetland to upland habitat within a given managed marsh will be determined by TNBC in consultation with the Technical Advisory Committee pursuant to the provisions described in Sections IV.D below. However, a typical proportion for upland habitats within the reserve system would be approximately 20 to 30 percent. Upland areas have several

purposes: (1) providing basking and resting sites, escape cover and winter retreats for giant garter snakes; and (2) providing foraging and nesting areas for other Covered Species (e.g., loggerhead shrike, tricolored blackbird, burrowing owl, and Swainson's hawk). Upland areas intended to provide upland habitat for GGS under the NBHCP may consist of dryland pasture, grasslands, levees, and any other land use approved by NBHCP's Technical Advisory Committee.

Giant garter snakes that have been flooded in their winter retreats are subject to many forms of mortality, or may be killed directly by drowning. Therefore, uplands in and around the reserve's managed marshes will be designed so that a significant portion is above expected winter flood levels. They should also provide escape cover where the permanent pools of water described above may attract garter snakes as well as snake predators.

Water Conveyance Structures/Edge: Marsh design should include edge habitat to provide foraging and movement corridors for GGS and other Covered Species. Edge can be created by providing open water channels within marsh to provide open water/emergent vegetation interface. Upland/aquatic habitat interface may also provide edge habitat where sufficient vegetation is present to provide cover for giant garter snake.

Vegetation/Cover: Vegetation in a managed marsh should support a diversity of wildlife. Plant species that currently occur in the emergent marsh habitat found in the Natomas Basin will be included in the NBHCP's managed marsh wetlands. These include cattails (*Typha latifolia*), tules (*Scirpus acutus*), rushes (*Juncus* sp.), river bulrush (*S. fluviatilis*), sedges (*Carex* sp., *Cyperus* sp.), and vervain (*Verbena hastata*). Marsh edges and "islands" should be well-vegetated with plants that discourage the movement of garter snake predators, such as herons, egrets, rats, and domestic animals. Plant species such as wildrose and thimbleberry are relatively impenetrable to many predator species but not to giant garter snakes and serve as basking sites for the snakes. For illustration purposes Figure 19 shows an example of a marsh cross section depicting the distribution of wetland plants in relation to flooding depth. This figure does not necessarily reflect a specific marsh design recommended by the NBHCP.

Exotic pest plants, such as giant reed grass and Johnson grass, can choke out native vegetation and have low habitat value. Such exotics will be periodically removed from the reserve system's managed marshes where feasible and necessary. Specific decisions about the need for exotic plant control shall be included in the management plan(s) for any given parcel or block of reserve land (see below, Section IV.D).

Garter snakes utilize a variety of sites for escape cover and winter retreats, including small mammal burrows, thick vegetation such as wildrose and thimbleberry, and areas of jumbled rock such as rip rap, chunks of rock, or broken concrete. Management of wetland reserves under the NBHCP shall thus include protection and/or construction of such types of giant garter snake cover and retreats as deemed appropriate by NBHCP Technical Advisory Committee.

Access: Road kills are believed to be a significant giant garter snake mortality factor, especially for males (see Chapter II). Consequently, new roads within acquired reserve lands

will be constructed to the minimum extent necessary to provide for the adequate maintenance of the marshes and other reserve lands. If roads already exist in an area acquired as a reserve, access to these roads will be restricted as necessary to protect the reserves from unnecessary disturbance and as described in the reserve management plans.

Other Factors: Soils are an important factor in designing and constructing managed marshes because they dictate whether water will be retained or lost through percolation. Generally, only those lands within the Natomas Basin that are underlain by clay soils will be conducive to the development of levee constructed managed marshes. Managed marshes must also be kept clear of winter storm runoff coming directly from urban areas. In addition, preserves cannot be used for any additional purpose for flood control or receive directly storm water or other off-site drainage from urban development. Pollutants such as petroleum compounds (e.g., motor oil) in urban runoff have been observed to cause respiratory and skin problems for the giant garter snake and may also reduce its food supply (George Hansen, pers. comm.). Water quality must also be maintained in order to maintain wildlife productivity and preclude the outbreak of wildlife diseases.

Water Control Structures: Managed marshes require a controlled source of good quality water at suitable depths, usually less than three feet (water depth is important to the establishment of appropriate vegetation). Management and enhancement of a managed marsh can be maximized through water control. A variety of water manipulation approaches can be utilized, including levees, stoplog and screwgate water control structures to regulate water flows and depths, and dewatering systems. In fact, a dewatering system is as important to successful wetland management as a flooding system. Water manipulation can also contribute to control of exotic plants and other undesirable vegetation, wildlife diseases (such as botulism and cholera), non-native fish populations, etc.

Levees constructed on natural contours have been found to be more effective for marsh management than levees constructed across contours. Figure 19, Wetland Plant Depths and Levee Structures, provides examples of the dimensions of levees constructed for: (1) a permanent or semipermanent impoundment; (2) a seasonally flooded impoundment; (3) a header-ditch levee; and (4) a rice-dike levee.

Permanent or semipermanent impoundment levees will be used to create marsh which sets above the natural elevation of the land, much in the same way a bathtub holds water. Header-ditch levees are used along the upper elevation of a field or marsh to create the ditch or canal which brings water to the wetland. Water drops through control structures are then made through the header-ditch levee to the marsh or field. Rice-dike levees are used along natural contours in a rice field to back up water to flood the land. Depending upon the topography and the water conveyance and flooding regimes, TNBC will use a combination of these levee types to develop its marsh and rice wetlands.

Mosquito Control: Mosquito control programs operate throughout Natomas Basin. Generally, conventional mosquito control methods are compatible with garter snake habitat. Use of mosquito fish and low intensity pesticide applications would not directly threaten garter

snakes or their habitat, and mosquito fish may actually serve as garter snake prey. However, mosquito control programs are more focused near urban areas, and the more intensive control methods there could harm giant garter snakes. If necessary TNBC should work directly with Mosquito Abatement Districts to determine suitable methods to resolve mosquito problems near urban areas in a manner consistent with the management of giant garter snake wetland habitats established under the NBHCP. The Site Specific Management Plans prepared for each wetland site shall identify appropriate types of mosquito control and shall also be coordinated as necessary with the Mosquito Abatement Districts.

Summary: In summary, the NBHCP wetland conservation strategy is designed to produce a net positive effect for giant garter snake in the Natomas Basin and to contribute to the recovery of the species. In order to achieve this objective, reserve lands established under the NBHCP would consist of a combination of TNBC rice cultivation and managed marsh wetland habitat for giant garter snakes, comprised of a mosaic of habitat types with variations in topography and an abundance of edges within and between habitats. Managed marsh would include seasonal marshes with shallow and deep water configurations; some permanent marshes; and upland habitats in the form of buffers, higher ground resembling the ditch banks, and levees of the Basin's water conveyance system, and "islands" scattered throughout the marshes wetland component. Permanent water features would be constructed so that they ensure adequate nearby escape cover. A significant portion of the upland component would be above winter flood levels to protect giant garter snakes in their winter retreats. Natural marsh vegetation such as cattails, spike rush, tule clumps, wildrose and thimbleberry would be placed to maximize protected resting and basking sites and escape cover for the snakes.

Consistent with the NBHCP conservation strategy for giant garter snakes, Figure 18, Comparison of a Rice Field to a Managed Marsh, depicts for illustration purposes only, a rice field and a theoretical managed marsh design. As shown on this conceptual diagram, serpentine channels would be constructed throughout the marsh to increase channel habitat. The channels and open water areas would hold water during the summer dry-down, concentrating prey and providing surviving prey with overwintering habitat where water and aquatic invertebrates persist. Terrestrial habitat components, permanently above the flood level, would provide winter retreats as well as basking and resting sites for garter snakes.

Specific marsh designs may vary from the conceptual design illustrated in Figure 18. As explained above, specific marsh configuration and designs will be determined by TNBC in consultation with the Technical Advisory Committee and other species and restoration specialists as reserve system lands are acquired. Also, specific marsh designs will depend on the circumstances on parcels actually acquired, including the parcels' topography, location, relation to other habitats and land uses, and the presence of water conveyance systems. Preferred marsh designs under the NBHCP may change during the life of the Plan under its Adaptive Management procedures described in Section VI.F below.

In some cases, TNBC may be able to acquire an historical marsh area that has been degraded, but retains components of the original marsh, such as topography or plant communities. In such cases, the NBHCP encourages restoration of the historical marsh.

Nevertheless, to the extent applicable, the same principles and factors of marsh design and management as described above will guide marsh restoration activities where such restoration opportunities can be found, either in the NBHCP Plan Area or in the out-of-Basin Area "B" as described above.

e. Management of Reserved Rice Lands for the Giant Garter Snake

As explained in Chapter II, the rice growing areas of the Natomas Basin are known to support the giant garter snake (George Hansen, pers. comm.; Glenn Wylie, BRD, pers. comm.). For example, in its ongoing radio-telemetry studies, BRD has found that half of all garter snakes telemetered utilize rice fields at one time or another (Wylie, pers. comm.). The features of these rice lands that support garter snakes appear to include the rice fields themselves, the water conveyance system that supports the fields (including delivery canals, ditches, drains, and their associated levees) and other associated features, such as tailwater marshes. The reasons giant garter snakes persist in this man-made rice culture ecosystem, and why some fields support snakes while others do not, are not fully understood (G. Hansen, pers. comm.). However, it may be because the rice fields, together with their supporting infrastructure, mimic to some extent the area's original marsh and upland habitats. It may also be because the water regime in the rice fields (spring and summer flooding and fall dry-down) coincides fairly closely with the biological needs of the species. The rice growing ecosystem also appears to provide many of the garter snake's basic habitat needs--e.g., warm, shallow water in the rice fields with sheltering emergent vegetation (e.g., rice plants); ditches and drains, some of which retain water year round and in which giant garter snake prey species (e.g., mosquito fish) can overwinter; and associated upland areas (e.g., levees) with suitable winter retreats.

In any case, the fact that giant garter snakes persist in the Natomas Basin's rice growing areas is well documented. The rice fields themselves support giant garter snakes through the active summer season, and the water conveyance systems that serve the rice fields support snakes throughout the year. The water conveyance systems in many parts of the Basin contain pockets of permanent water where prey such as bullfrog larvae and mosquito fish overwinter, resulting in high prey availability in the spring when snakes emerge from winter retreats and begin to use the aquatic components of the rice ecosystem. The late summer/early fall dry-down of the rice fields may be important by removing predatory fish large enough to prey on giant garter snakes, and because giant garter snake prey, which have been proliferating in the ditches, drains, and rice fields, may be concentrated in the remaining pockets of standing water where snakes can gorge prior to the period of winter inactivity.

What is known about the relationship between rice farming and giant garter snakes is summarized above and in Chapter II. Additional studies are needed to better understand giant garter snake habitat needs, why and under what conditions giant garter snake populations persist where rice is farmed, and what types of reserve management would best benefit this species. Where appropriate, the results of such studies will be incorporated into the NBHCP through the Plan's Adaptive Management provisions (see, Section VI.F). Nevertheless, the NBHCP recognizes that: (1) continued rice farming in the Natomas Basin supports the giant garter snake; and (2) that maintaining rice farming on a significant portion of acquired TNBC reserve lands is-

-unless otherwise indicated by the Giant Garter Snake Recovery Plan (see Section VI.H.1), the Plan's Adaptive Management and Monitoring programs (Sections VI.F and G), other new scientific information, the individual Mid-Point Reviews, or the 9,000-acre Overall Program Review (Section VI.I)--an integral component of the overall conservation strategy.

With respect to the selection of rice fields for inclusion in the NBHCP reserve system, and subsequent management, the following criteria shall be applied:

- (1) Rice fields will generally be selected in areas that are within, or that have connectivity to, known giant garter snake populations or known occupied garter snake habitat.
- (2) Rice fields located in areas designated to receive winter flood waters will be avoided (e.g., the Yolo and Sutter Bypasses).
- (3) Rice fields in the NBHCP reserve system will be managed to maximize giant garter snake compatibility. This includes maintenance of rice checks, berms, and other water control structures in as natural a state as practicable maintenance of garter snake prey species (e.g., mosquito fish) in or near the rice fields through appropriate management, and other measures as appropriate. However, any such management will also, to the extent compatible with GGS conservation, be compatible with the needs of commercial rice production.

Specific measures for managing rice fields in the NBHCP's reserve system will be as determined by TNBC in consultation with the Technical Advisory Committee and as described in Reserve Management Plans (see below, Section IV.D).

4. Conservation Strategy for Upland Habitat as Mitigation for Urban Development

a. Establishment and Management of Upland Habitat

The upland habitat conservation strategy is intended to provide for the long-term protection of existing and potential upland habitat in the Basin that currently supports or could support the Swainson's hawk and other upland species listed in Table I-1. In most cases, upland reserves established and managed for the Swainson's hawk will also benefit other upland-associated Covered Species (e.g., the loggerhead shrike and burrowing owl). Consequently, selection of upland reserve sites will usually focus on the needs of the Swainson's hawk, except in cases where, in the judgement of TNBC and the Technical Advisory Committee, specific or important needs of other upland-associated species can be met at sites not selected primarily for Swainson's hawks.

b. Upland Reserve Acquisition Criteria/Methodology

The NBHCP's primary strategies to mitigate impacts to the Swainson's hawk caused by Authorized Development are to avoid development in the Swainson's Hawk Zone (within the City of Sacramento and Sutter County) and to acquire upland habitat as Mitigation Lands inside

the Swainson's Hawk Zone (see Figure 13). However, land outside the zone can be made attractive for the Swainson's hawk through appropriate habitat design as specified elsewhere in the NBHCP and in consultation with the Technical Advisory Committee. These primary strategies will provide optimum nesting and foraging habitat for the hawk in the area where most nesting occurs currently within the Natomas Basin along the Sacramento River. Minimum foraging habitat needed for Swainson's hawk nesting sites can vary depending on prey availability and density, which is in part a function of vegetation cover type within the foraging habitat and the activities (management practices, agricultural activities, etc.) associated with that habitat and proximity to water and other green feed that supports a prey base (Wunder, 1992). The goal of these strategies is to maintain optimum nesting and foraging habitat for the hawks nesting in this zone by providing an abundant and available prey source. In order to optimize the use of the entire Natomas Basin by Swainson's hawks, the Plan also calls for maintenance of nesting and foraging habitat for hawks nesting elsewhere in the Basin, as well as acquisition of reserve lands that benefit the other upland-associated species. In light of these considerations, upland reserve acquisition sites will be evaluated based upon the following criteria:

- (1) The land contains known or potential Swainson's hawk nest trees, or includes or is adjacent to suitable foraging habitat (e.g., agricultural croplands and grasslands).
- (2) Agricultural croplands and grasslands that, based on crop type or surveys, are expected to have a suitable Swainson's hawk prey base and, preferably, have historically been used by Swainson's hawks (as determined by NDDB or CDFG data and reports).
- (3) The land is or can be used to grow crops conducive to Swainson's hawk foraging, including alfalfa and other hay crops, lightly grazed pasture, fallow fields, summer harvested row crops, but not cotton and other late harvest crops (see Section II.C.3.c).
- (4) If possible, the land contains appropriate areas for the establishment of riparian woodland habitat, or isolated groves in agricultural fields, for future use by Swainson's hawks. Trees which may be planted include valley oaks, cottonwoods, willows, sycamores, and California walnut.
- (5) Contiguity of upland reserve sites will be maximized. The Swainson's hawk conservation objectives in Chapter I direct TNBC to focus acquisition of upland reserves in the Swainson's Hawk Zone. That objective, together with this provision, is intended to ensure that Swainson's hawk habitat protected in reserves will not be excessively fragmented, either inside the Swainson's Hawk Zone or outside the zone, and that habitat contiguity will be a primary criteria under which upland reserve sites will be selected. However, the value of edge habitat with wetlands will be considered in reserve design.
- (6) The land supports or has the potential to support other Covered Species which utilize upland habitat (see Tables I-1 and II-4).

Generally, priority for acquiring upland habitat is as follows (in descending priority order): (1) sites located within the Swainson's Hawk Zone; (2) sites that, in the judgement of TNBC and the Technical Advisory Committee, would provide specific, important benefits to other upland-associated Covered Species (e.g., tricolored blackbird nesting colonies); (3) sites supporting Swainson's hawk nests or foraging habitat outside the Swainson's Hawk Zone; (4) sites that would provide a good potential for enhancement of upland habitat values; and (5) any other site that would result in a benefit to any upland Covered Species.

5. Conservation Strategies for Vernal Pool Species as Mitigation for Urban Development

Vernal pools represent important remnants of the natural landscape of the foothills and valley floor of the Central Valley. Resulting from a combination of surface topography (shallow, closed depressions) and soil condition (low permeability), vernal pools support numerous special status species. Ten species associated with vernal pools or other seasonal wetlands are proposed for incidental take coverage under the NBHCP's incidental take permits, including three species of shrimp, five plant species and the western spadefoot toad and the California tiger salamander. While ten species associated with vernal pool habitats are covered by the NBHCP, only two of the species, vernal pool tadpole shrimp and vernal pool fairy shrimp, have been confirmed within the Natomas Basin.

The primary purpose of listing the vernal pool associated species within the NBHCP is to provide protection to TNBC with regard to the management of future wildlife reserves. It is anticipated that the complex of wetland/upland habitat to be developed by TNBC will provide enhanced opportunities for the establishment and proliferation of these species. In the event these species do benefit from TNBC's efforts, it will be necessary to provide coverage to TNBC for activities that could result in incidental take of protected species.

As noted within this NBHCP, undisturbed areas of vernal pools within the Natomas Basin, as shown in Figures 9 - 11, Habitat Types Maps, are few and relatively small. Other vernal pools and seasonal wetlands that may support vernal pool species may occur throughout the Basin. These vernal pools and other seasonal wetlands may constitute jurisdictional wetlands under U.S. Army Corps of Engineers (Army Corps) authorities under Section 404 of the Clean Water Act. In order to ensure that vernal pools and their associated species are adequately protected on reserve lands, TNBC shall implement the following conservation strategies:

- (1) TNBC shall consult with the TAC and California tiger salamander researchers and experts periodically during implementation of the Plan to determine what, if any, additional conservation opportunities for this species might exist within the Plan's proposed reserve system. Such opportunities might include, but are not limited to, establishment or creation of wetland and upland habitats suitable for tiger salamanders within the reserve system (e.g., stock ponds or "artificial" vernal pools) and, if appropriate, possible re-introduction of tiger salamanders into the Basin. Any conservation measures identified through this process, shall

be incorporated, as appropriate, into the NBHCP's conservation program through its Adaptive Management provisions.

- (2) TNBC shall consult with the TAC and western spadefoot toad experts periodically during implementation of the NBHCP to determine what, if any, additional conservation opportunities for this species might exist within the proposed reserve system. Any conservation measures identified through this process, shall be incorporated, as appropriate, into the NBHCP's conservation program through its Adaptive Management provisions.
- (3) TNBC shall consult with the TAC and fairy shrimp and tadpole shrimp experts periodically during implementation of the NBHCP to determine what, if any, additional conservation opportunities for Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, and midvalley fairy shrimp might exist within the proposed reserve system. Any conservation measures identified through this process, shall be incorporated, as appropriate, into the NBHCP's conservation program through its Adaptive Management provisions.
- (4) TNBC shall evaluate the potential for furthering the conservation of covered plant species within the NBHCP's vernal pool areas or its wetland reserve system through appropriate means including, but not limited to, the introduction of Bogg's Lake hedge-hyssop, Sacramento orcutt grass, slender orcutt grass, Colusa grass, and legenere into the vernal pool areas or other suitable locations in the NBHCP Plan Area. Any conservation measures identified through this process, shall be incorporated, as appropriate, into the NBHCP's conservation program through its Adaptive Management provisions.

D. RESERVE MANAGEMENT/SITE SPECIFIC MANAGEMENT PLANS

All land acquired for reserves under the NBHCP, whether it is controlled through easement or purchased outright, will require preservation, management, enhancement and/or restoration, and monitoring activities.

Following the mitigation land acquisition process, Site-Specific Management Plans (SSMPs) will be prepared for each reserve unit. Within the first year following reserve site acquisition, TNBC shall complete a biological assessment of the site, and shall prepare and submit to the TAC for their review and comment. Each SSMP shall be approved by the Wildlife Agencies prior to implementation. Each SSMP shall include a Biological Monitoring Plan for the site. SSMP's can be simple or complex depending on the level of management necessary to provide or maintain habitat for the Covered Species. Each SSMP will specify: (1) management policies not otherwise prescribed by the NBHCP (see Section IV.D.1 below); (2) specific management activities, including establishment of suitable monitoring programs (see Section IV.D.2); (3) restoration and enhancement needs (see Section IV.D.3); and (4) reserve water management (see Section IV.D.4). TNBC will be responsible for preparing management plans for all reserve lands in consultation with the Technical Advisory Committee. Prior to

implementation, each management plan will be submitted to the USFWS and CDFG for review, revision if appropriate, and written approval; however, formal USFWS and CDFG review of proposed management plans may be waived if all members of NBHCP's Technical Advisory Committee, including its USFWS and CDFG representatives, unanimously concur in the plan and documentation of such concurrence is placed into TNBC's administrative record. If TNBC's Board of Directors approves an action pursuant to this section in a regular, noticed meeting of the Board, then after the 60th day TNBC has notified CDFG and USFWS of the proposed action, in writing, it is approved unless denied in writing by CDFG or USFWS. See Section 3.2.4 of the Implementation Agreement for further information on the development of reserve management plans.

1. Site-Specific Management Plan Policies

Once a block or parcel of mitigation land has been acquired, general goals for the land will be established and management activities will be guided by TNBC according to the policies set forth below. Each SSMP will outline the policies under which the parcel will be managed, will describe the specific management activities that will be implemented, will specify the restoration and enhancement needs, and will define reserve water management. Management plans will be modified periodically as appropriate pursuant to NBHCP's Adaptive Management provisions to respond to changing conditions in the reserve areas and new scientific information. In cases where land purchased is added to an existing reserve area, policies or goals for the existing area may, if appropriate, be applied to the area of expansion. SSMP policy formulation will address the following issues:

a. Identification of Covered Species Present/Habitat Requirements Determination

An existing Conditions Biological Assessment of newly acquired TNBC reserves will be conducted to determine the specific Covered Species the parcel currently supports or could potentially support. The results of this survey will be included in the SSMP for the subject Mitigation Land. The habitat type present or desired (e.g., wetlands or uplands) will also be a critical determination in establishing management policies. Management policies and activities will be oriented toward the species and habitats indicated or selected, and specific management policies established will be consistent with the needs of those species or habitats. Land parcels that are unsuitable for or are not expected to support any of the Covered Species will be eliminated from consideration through use of the mitigation site selection criteria described in Sections IV.C.2, C.3.b, and C.4.b above.

b. General Design/Management Criteria for Site Specific Management Plans

The following design and management criteria shall be considered during the preparation, review and approval of Site Specific Management Plans for TNBC reserves:

Generally, public access to TNBC reserves shall be limited or regulated. Riparian and wetland areas are more valuable as wildlife habitat when they are located where human access is limited.

TNBC will protect the Covered Species and their habitat by limiting and regulating public access to TNBC reserves. Reserves shall be patrolled to control prohibited and incompatible activities, including, but not limited to, dumping, off-road vehicle activity and trespass.

Site specific management plans shall address the habitat needs of a maximum possible number of Covered Species, as determined feasible based upon the physical characteristics (topography, soil types, water availability, vegetation, etc.) of the individual reserve site under consideration.

Water bodies within habitat reserve units shall vary in size, depth and edge planting to provide varied habitat opportunities.

Plantings of native trees, including valley oak (*Quercus lobata*), cottonwood (*Populus fremontii*), and willow (*Salix goodingii*) shall generally be incorporated within each habitat reserve unit as determined feasible by TNBC and in consultation with NBHCP TAC.

c. Appropriateness of Hunting

Management plans will identify the level of hunting allowed, if any, and will include parcel-specific restrictions to protect the Covered Species during any hunting activities. No take of Covered Species as result of hunting will be covered under the permits.

d. Controlled/Prohibited Activities

Activities that would potentially conflict with mitigation goals or would endanger habitat resources will be described and controlled or prohibited as necessary. Examples of activities that will typically be prohibited include dumping, vandalism, unauthorized hunting and fishing, collection of plants or animals, and off-road vehicle use.

e. Avoidance of Conflicts with the Sacramento International Airport

It is imperative that reserve lands in the vicinity of the Sacramento International Airport be managed to avoid the potential for aircraft/bird collisions and other potential conflicts with airport operation. Reserve management plans must therefore be developed with these issues in mind. Draft management plans for reserve lands in the vicinity of the Sacramento Airport must be submitted to the Airport Facilities Manager to provide a reasonable opportunity for review and comment prior to approval by TNBC, the USFWS, or CDFG. See Section III.B.5. for a discussion of potential wildlife safety hazards near the airport, and Chapter VI for further discussion of reserve management/airport safety issues.

f. Take Avoidance

TNBC will implement take avoidance measures to minimize potential take that may occur during habitat creation, restoration, preservation, enhancement and management activities on Mitigation Lands (e.g., road kills, take during construction of managed marsh wetlands, etc.). To accomplish this, TNBC shall, where applicable, ensure that all take avoidance measures

described in Chapter V (e.g., dewatering of irrigation ditches owned by TNBC) are implemented during preservation, restoration, creation, enhancement, management, and use of reserve lands. TNBC shall ensure that all such take avoidance measures as are necessary and appropriate are included in SSMPs.

2. Management Activities

The objectives of management activities conducted on Mitigation Lands generally will be to maintain and support applicable Covered Species over the long term, and, specifically, will be to meet the goals set forth in Section IV.C.2.a above. Specific management activities will be set forth in the management plan prepared for each suitable block of reserve land. Management activities to be implemented include, but are not limited to, the following:

a. Habitat Management

Habitat management will be a critical function within all reserves, and ensuring appropriate habitat management will be an important task of TNBC and the management plan. Habitat management activities will vary depending on the habitats found within a particular area and the degree to which they must be managed and enhanced.

Habitat management activities are discussed in Sections IV.C.3 and C.4 above with respect to giant garter snakes and Swainson's hawks, respectively. In addition, consistent with the Site-Specific Management Plan prepared for each reserve, management activities can include: (1) control of water supply and availability; (2) suitable agricultural practices (e.g., rice growing for giant garter snakes and production of other crops for Swainson's hawk foraging); (3) grazing or mowing programs to eliminate weeds or control vegetation; (4) exotic species control; (5) erosion control; (6) enhancement of native plant communities; (7) habitat enhancement activities for the Covered Species (e.g., construction of artificial burrows for giant garter snakes); (8) predator control; (9) enhanced ditch and drain management for the ditches owned by TNBC on reserve lands; and (10) coordination of any research conducted within reserves with outside species experts and other individuals and groups. Management activities will be conducted so as to limit the potential for the management activities benefitting one Covered Species to adversely affect another Covered Species. A copy of any and all research documents produced having to do specifically with NBHCP reserve lands will be obtained where possible and kept as part of the documentation and records for all TNBC lands.

b. Monitoring

Management plans will address monitoring objectives, needs, and specific methodologies as necessary and as described in Section VI.E.

c. Patrolling

TNBC will periodically patrol the reserves to control prohibited activities such as dumping, shooting, off-road vehicle activity, trespassing, and any other prohibited activity. Patrolling frequency needed to control prohibited activities will vary with each area and will

depend on the area's location, surrounding land uses, proximity to urban areas, and historic uses of the land. The patrol function may be performed by any suitable entity approved by TNBC.

d. Rice Production Practices

Rice farming on any land under TNBC control and serving to mitigate impacts of Authorized Development shall be managed in a manner to enhance habitat values for giant garter snakes and other NBHCP Covered Species. Overall, TNBC rice production practices promote enhanced habitat values through minor to moderate adjustments in cultivation practices. The rice production practices include guidelines related to vegetation management (including weed management, treatment of crop stubble through burning and discing), and maintenance of those ditches that are owned by TNBC (time of maintenance, alternating bank maintenance on an annual basis) shall be subject to the Site Specific Management Plan prepared for each reserve. The rice production practices will be reviewed and revised as needed based on monitoring or other relevant information.

3. Restoration and Enhancement Programs

The ultimate goal of the NBHCP reserve system is to provide sustainable habitat communities capable of supporting the appropriate Covered Species, and to convert disturbed lands in the NBHCP reserve system into such sustainable communities. It is expected that many of the lands purchased for the reserve system will be disturbed to some degree or previously used for other purposes and will require restoration or enhancement. Restoration and enhancement programs will therefore play an important role in developing sustainable habitat communities on reserve lands.

The management plan for each parcel or block of reserve lands will identify specific restoration and enhancement needs and discuss the expected costs of such restoration and the timing of implementation. Some important habitat enhancement activities for the giant garter snake (e.g., construction of managed marshes) and Swainson's hawk (e.g., planting of future nest trees) are discussed in Section IV.C.3 and C.4 above. Additional restoration activities that may be implemented on NBHCP reserve lands include, but are not limited to, the following:

a. Restoring Natural Drainage Patterns/Erosion Control

Restoring the natural drainage pattern of a reserve unit, whether it is to prevent unnatural ponding, to restore natural ponding, or to channel runoff to appropriate areas, is the precursor to establishing or enhancing some native habitat communities. For example, it is important to provide drainage patterns and moisture regimes suitable for certain native plants. In addition, the growth of exotic plant species and erosion may be deterred by the restoration of natural moisture regimes.

b. Exotic/Invasive Plant Control

If necessary, integrated pest management programs for exotic or other plants will be implemented in consultation with County Agricultural Commissioner's offices or other suitable

experts (e.g., if exotic or invasive plant species threaten native plant communities) and as covered by the SSMP prepared for the reserve.

c. Domestic/Feral Animal Control

In some portions of the Plan Area, cats are a possible threat to giant garter snakes, burrowing owls, tri-colored blackbirds and small mammals that are prey forage. If feral cats become established, control of feral cats in reserve areas may be necessary. Control programs for domestic or feral animals will also be implemented for other species as necessary.

4. Reserve Water Management

One of the primary functions of the Mitigation Lands under the NBHCP is to provide wetland habitat values through rice farming or through establishment of managed marsh. Any land to be managed as rice or marsh for the reserve system must have an adequate water supply (see Section IV.C.2.c.2 above).

a. Water Needs for TNBC Rice Cultivation

The majority of water used for rice cultivation in the Natomas Basin is diverted through a system of channels from the Sacramento River. Following the discing and leveling of the fields, water is introduced to the fields and aerial seeding is conducted, usually from mid-April to mid-May (University of California 1983). The water in the fields initially serves to stimulate rice seed germination, and thereafter assists in controlling weed growth (California Rice Promotion Board 1991).

To control the growth of undesirable aquatic vegetation, herbicides are usually applied to the majority of flooded rice fields once the rice seedlings have emerged in April or May. The water system in the Natomas Basin is a “closed system.” As a closed system, it does not release flows into the River until late August or early September, and even then in controlled amounts. The area does not fully drain until October.

The total amount of water typically supplied to rice fields during a year differs from the actual net usage. The ultimate fate of water applied to rice fields can be broken into three general fractions: (1) evapotranspiration (solar evaporation and transpiration from vegetation), (2) percolation into the soil, and (3) outflow from the rice field. Using data from various individual rice fields, Jack Williams, the Sutter County Rice Farm Advisor for the University of California Cooperative Extension, has calculated the average net water use at about 6.5 acre-feet per acre of rice (about 1.5 acre feet of this is outflow) for rice farms in Sutter County, outside of the Natomas Basin. The Rice Experimental Station in Biggs, located in southern Butte County, has estimated that between 4.8 and 6.7 acre-feet of water per acre are used in rice cultivation.

Rice growers that use a water recycling system save an average of 0.6 acre-feet of water per acre. Estimates of water reuse by districts vary from 1 to 28 percent of the applied water, depending on feasibility within the district (California Rice Promotion Board 1991).

The most significant variable between individual rice fields that affects these figures of average net water use is percolation. One reason why these lands are so well suited for rice growing is that most fields have tight clay soils which greatly restrict water loss through percolation. Most rice fields have a hydraulic conductivity (percolation) in the range of 0.32 to 0.42 inches per day. However, certain areas have rice fields with higher percolation rates because of a greater percentage of sandy soils (California Rice Promotion Board 1991). Through the removal of rice fields with high percolation rates from production, and improved water irrigation systems and cultivation practices, water use for rice cultivation has decreased significantly in the past decade. The average net water use for individual fields in the Sacramento Valley rice fields as a whole has dropped from approximately 6.5 acre-feet in the 1970's to the present level of 4.4 acre-feet per acre (California Rice Promotion Board 1991). Within the Natomas Basin, rice crop irrigation requires approximately 3.9 acre-feet per acre (Natomas Mutual 2001), a relatively low level of water demand reflecting the efficiency of the Natomas Mutual system, as well as the local soil characteristics and the carefully leveled fields of the Natomas Basin.

b. Water Needs for Managed Wetlands

Water requirements for maintaining natural and managed marsh areas are similar to those needed for rice cultivation. Until TNBC identifies specific marsh lands for acquisition, it is impossible to determine the exact water needs for maintaining these marsh areas within a given habitat reserve. It is, however, possible to predict water requirements for marsh maintenance based on data from the state-managed Gray Lodge Wildlife Management Area. Gray Lodge consists of approximately 8,375 acres. It is estimated that to achieve full use of habitat development opportunities at Gray Lodge, a firm water supply of about 44,000 acre-feet of water would be required--for an average requirement of 5.25 acre-feet of water per acre. These water requirements for Gray Lodge are likely to be higher than those for the Natomas Basin. This is because of the efficiency of the Natomas Basin recirculation system (approximately 85%) and extensive land leveling within the Natomas Basin. Nonetheless, the Gray Lodge water needs have been used to determine whether water supply would be available to create and maintain managed marsh within the Natomas Basin.

c. Available Water Supply

The most critical element required in the establishment and maintenance of wetland habitat is the continued availability of a source of good quality water. TNBC, as a landowner within Natomas Mutual's agricultural irrigation service area, will be entitled to its fair share of water entitlements on an annual basis. TNBC will look to Natomas Mutual for irrigation water for both rice cultivation and marsh management. Based upon information obtained from Natomas Mutual, TNBC is expected to receive sufficient water annually to meet its needs.

TNBC estimates that managed marsh will require somewhat less annual irrigation than rice cultivation. Additionally, some portion of each TNBC reserve will be maintained as upland habitat that would require less irrigation than the irrigated crops that dominate active and long-

term agricultural lands. Therefore, it is not anticipated that TNBC reserves will result in water demands beyond the service ability of Natomas Mutual.

In determining the likelihood of adequate irrigation water supplies to support TNBC reserves, reliability of Natomas Mutual water supplies is a key factor. Natomas Mutual possesses a number of senior water rights, most of which precede the Central Valley Project. Based upon these rights, Natomas Mutual's water allocation may be reduced by up to 25 percent in critically dry years (critically dry years are defined as years when annual inflow to Shasta Lake is less than 4.2 million acre feet).

In recent years, Natomas Mutual has installed sophisticated improvements to allow substantial increases in water recirculation within the Natomas Basin. Utilizing this infrastructure, Natomas Mutual has, in recent years, been able to serve all of their water users fully during periods of drought-related water supply reductions.

If long-term water shortages occur, possibly through a complete restructuring of water rights in response to state or federal habitat restoration and/or species recovery programs, restructuring of the CVP/SWP, Calfed or other similar programs, then TNBC would be required to implement alternative water supply strategies. The most immediately available alternative irrigation source would be groundwater. Groundwater is readily available throughout the Basin and it is estimated that reliance on ground water resources would increase irrigation costs for TNBC reserve by approximately 50% to 100% (John Roberts, TNBC). While such cost increases would be significant, it is reasonable to assume that TNBC could adjust for this expense for the following reasons: 1) irrigation costs are only one of many costs associated with reserve management; 2) farmers leasing TNBC lands are obligated to pay for their agricultural water use, and the agricultural water demand is in excess of 50% of total irrigation costs for given reserve site, thereby substantially offsetting any increases in water costs; and, 3) as part of the mitigation fee, developers contribute to a contingency fund for each acre of land developed and this fund is established for expenses such as unanticipated irrigation costs. In addition to groundwater, TNBC might also seek to acquire tailwater from other water users or water providers within the Natomas Basin where TNBC in consultation with the NBHCP TAC, determine such water is of appropriate quality for Mitigation Lands.

In response to the high level of importance associated with adequate water supplies for reserves, TNBC currently explores various water supply options prior to acquiring reserve lands. In the case of TNBC's reserve known as the BKS property, three alternative water sources were identified, including: 1) tail water from the Stolt Sea Farm; 2) ground water wells (the property has six operational wells, three in daily operation and three with no engines); and 3) Natomas Water Company which has agreed to explore water deliveries with TNBC. In order to ensure adequate water availability, TNBC will continue to seek alternative water supplies in addition to Natomas Mutual as reserve sites are acquired. If there is not an adequate water supply for the type of reserve (i.e., wetlands) or an existing reserve site loses all available water, then TNBC may consider converting that site to an upland reserve, or selling the reserve site and seeking an alternative reserve location with adequate water.

5. Avoiding Management Conflicts With the Sacramento Airport

All mitigation lands established for the NBHCP reserve system will need to be located and managed to avoid potential safety conflicts relating to collisions between aircraft and birds, and to be consistent with the May, 1997 Federal Aviation Administration Advisory Circular concerning wildlife attractants in the vicinity of airports (see Appendix E). The Advisory Circular recommends the following distances between an airport's aircraft movement areas, loading ramps, or aircraft parking areas and the wildlife attractant: (1) 5,000 feet for airports serving piston-powered aircraft; and (2) 10,000 feet for airports serving turbine-powered aircraft. In addition, the Circular recommends that a distance of five statute miles be maintained between a wildlife attractant and the airport's approach or departure airspace if the attractant may cause hazardous wildlife movement into or across the approach or departure airspace.

The primary potential conflict of reserve land management with the Sacramento International Airport would be where permanent or seasonal wetlands are managed in a way that attracts wintering waterfowl within the distances indicated above. To some extent, attracting waterfowl to reserve lands is contemplated by the Plan, since hunting revenues form a portion of the Plan's funding mechanisms (see Section VI.B). Consequently, where waterfowl hunting is to be incorporated into reserve land management, potential conflicts with the airport will need to be considered, and, if necessary, hunting (especially of waterfowl) will need to be foregone or increased in certain areas if potential conflicts with the airport cannot be adequately resolved. Hunting for upland species (e.g., pheasant), on the other hand, is unlikely to result in airport hazards unless the activity occurs in the airport's immediate vicinity.

Rice farming is also a form of mitigation land management (see Section IV.D.4) as well as a potential revenue source (Section VI.B). Rice farming is a common land use in the airport vicinity and is not typically regulated by the airport; however, some rice farming operations (e.g., winter flooding) could attract waterfowl hazardous to aircraft (see Section III.B.5). Consequently, rice farming on NBHCP reserve lands must also be incorporated into reserve management in a way that is consistent with safe airport operation.

To address these problems, reduction or elimination of potential conflicts between reserve land management and airport operation will be a specific component of reserve management plans to be developed by the NBC, and all draft reserve management plans will be submitted to the Airport Facilities Manager for coordination and review prior to approval by TNBC and the NBHCP Technical Advisory Committee (see Section IV.D.1).