APPENDIX JJ

Formal Consultation with U.S. Fish and Wildlife Service

July 3, 2007

Holly Herod, Sacramento Valley Branch Chief
U.S. Fish and Wildlife Service (USFWS)
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

RE: Graton Rancheria Casino and Hotel Project – Request to Initiate of Formal Consultation

Dear Ms. Herod:

The National Indian Gaming Commission (NIGC) is considering the approval of a management contract between the Federated Indians of Graton Rancheria (Tribe) and SC Sonoma Management, LLC. Prior to approval of the management contract, the National Environmental Policy Act (NEPA) requires that the NIGC consider the impacts of the resulting proposed casino development project in Sonoma County, California. A Draft Environmental Impact Statement (DEIS) has been prepared that analyzes the impacts of six development alternatives (including the proposed project) and a No-Action Alternative.

Biological assessments and wetland delineations have been completed for the alternatives analyzed in the DEIS. These documents are located in Appendices I-L of the DEIS. Also contained in Appendix J is the USFWS Biological Opinion (USFWS File No. 1-1-05-F-0211) issued on August 5, 2005 for the commercial/residential development that was planned for the area now proposed for the Tribe's casino/hotel project. As part of these assessments and in the DEIS, the proposed project was analyzed to determine its potential to affect federally listed endangered or threatened species and mitigation measures were recommended in order to reduce or eliminate those impacts. Based on these assessments and the DEIS, the NIGC has preliminarily determined that the proposed project is likely to affect federally listed species. Therefore, due to the changed use now proposed since the August 2005 Biological Opinion, the NIGC wishes to re-initiate formal consultation with the USFWS to ensure that the appropriate mitigation is implemented and that the proposed project does not adversely affect any federally listed species.

The NIGC and the Tribe would like to meet with the USFWS to ensure that there is a clear understanding of the project for which we are requesting consultation and to answer any initial questions that you may have. We stand ready to provide any additional information that you may need in order to facilitate this consultation. Please contact Brad Mehaffy, NIGC NEPA Compliance Officer, to schedule a meeting, or if you need additional information, at (202) 632-7003. Thank you for your time in reviewing this request for consultation.

Sincerely,

Brad Mehaffy, REM, CIPS
NEPA Compliance Officer
National Indian Gaming Commission

Cc: Yana Fawn Ross
Interim Tribal Council Executive Assistant
Federated Indians of Graton Rancheria
P.O. Box 14428
Santa Rosa, CA 95402

September 18, 2007

Mr. Chris Nagano
Assistant Deputy Director
Endangered Species Office
U.S. Fish and Wildlife Service
2800 Cottage Way, W-2605
Sacramento, CA 95825

Subject: Graton Rancheria Casino and Hotel Project

Dear Mr. Nagano:

The purpose of this letter is to memorialize discussions with you and Ms. Cay Goude regarding potential impacts to California tiger salamander (CTS) resulting from the above-referenced project.

The National Indian Gaming Commission (NIGC) is considering approval of a management contract between the Federated Indians of Graton Rancheria (Tribe) and SC Sonoma Management, LLC. A Draft Environmental Impact Statement has been prepared that analyzes the impacts of the proposed Graton Rancheria Casino and Hotel project, as well as various potential alternatives.

The U.S. Fish & Wildlife Service (USFWS) previously prepared a Biological Opinion (BO) for impacts to CTS resulting from a commercial/residential development that was planned for the area now proposed for the Tribe's casino/hotel project.[1] As Dr. Terry Huffman discussed with you and Ms. Goude, the project proponent agrees to provide 1:1 mitigation for impacts to CTS resulting from project activities on the site covered by the existing BO. Impacts occurring outside the area covered by the BO would be mitigated according to the requirements of the current Santa Rosa Plain Conservation Strategy.

1 USFWS Biological Opinion of August 5, 2005 (USFWS File No. 1-1-05-F-0211).

Please contact me if you have any questions and/or require further information.

Sincerely,

Brad Mehaffy, REM, CIPS
NEPA Compliance Officer
National Indian Gaming Commission

cc: Chad Brossard (AES)
Terry Huffman, (HBG)

April 4, 2008

Vincent Griego
Senior Fish and Wildlife Biologist
Coast Bay Delta Branch
U.S. Fish and Wildlife Service
2800 Cottage Way Room W-2605
Sacramento, CA 95825

Subject: NIGC Section 7 Consultation; Graton Rancheria Casino and Hotel Project, Rohnert Park, CA

Dear Mr. Griego:

As a result of our meeting on March 13, 2007 we understand that the U.S. Fish and Wildlife Service will be preparing a new Biological Opinion (BO) for the above-referenced project given that (1) the prior BO dated August 9, 2005 only covers a portion the Graton Rancheria Casino and Hotel Project area where the EIS Preferred Alternative is located, and (2) the BO evaluated a different type of project with different associated impacts. Given that the evaluation is based on a new project impact area, it is our understanding that potential impacts for the Federally-listed California tiger salamander (CTS) will be assessed following the Santa Rosa Plain Conservation Strategy and the February 5, 2008 study area mapping included as Enclosure 1 within the November 9, 2007 Programmatic Biological Opinion related to the CTS and three endangered plant species on the Santa Rosa Plain. The map from the Programmatic BO is attached (Enclosure 1).

Our proposed conservation/mitigation measures are enclosed (Enclosure 2) for your review, and include measures to compensate for impacts to suitable habitat for both CTS and endangered plant species from the Santa Rosa Plain. The conservation/mitigation measures for CTS are based on the mapped proximity of CTS occurrences to the EIS Preferred Alternative as determined from Enclosure 1. A small portion of the study area for the Preferred Alternative, including a portion of the development site, is located within the area noted in Enclosure 1 in green background indicating "*May adversely affect listed plants and would likely adversely affect CTS*", and a large area of yellow back ground indicating "May *adversely affect listed plants, but would not likely adversely affect CTS*" is also included within the study area boundary. The remainder of the background mapping on Enclosure 1 indicates "no effect" to listed plants or CTS. The entirety of the project area for the

Preferred Alternative is located within the zone that is between 2200 feet and 1.3 miles from a known CTS breeding site, where 1:1 mitigation for CTS habitat would be warranted. Also, a portion of a blue circle indicating "500 feet from adult occurrences" intercepts the area of the Preferred Alternative, where 2:1 mitigation is recommended by the Programmatic BO.

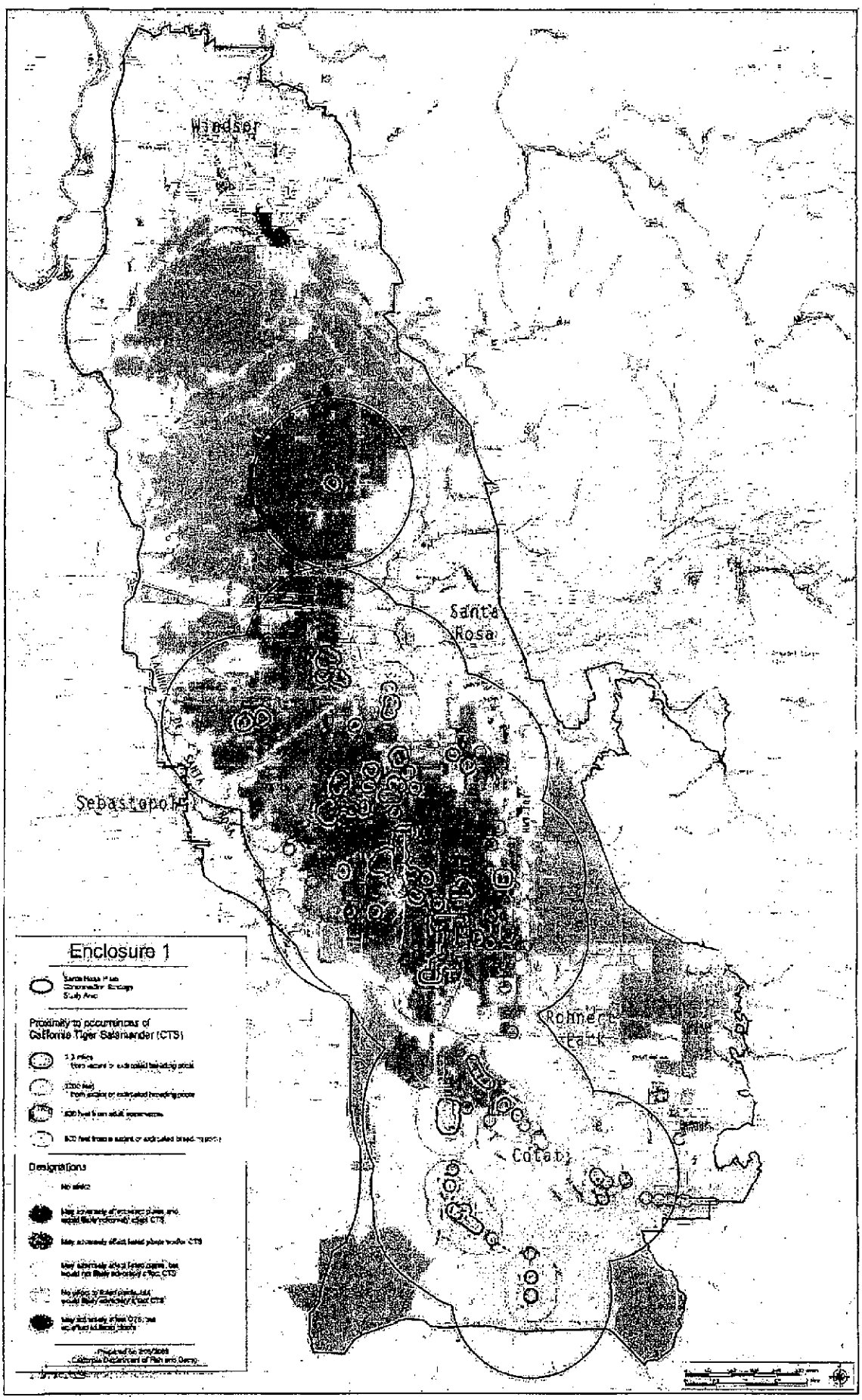
If you have any questions or need any additional information please do not hesitate to call me.

Sincerely,

Brad Mehaffy, REM, CIPS
NEPA Compliance Officer
National Indian Gaming Commission

CC: Chad Broussard (AES)
Terry Huffman (HBG)

Enclosures: 1. Santa Rosa Plain Conservation Strategy Study Area (Enclosure 1 from the November 9, 2007 Programmatic BO)
2. Proposed Conservation/Mitigation Measures


Windsor
Santa Rosa
Sebastopol
Rohnert Park
Cotati
Enclosure 1
Proximity to occurrences of California Tiger Salamander (CTS)
Designations

Enclosure 2
Proposed Conservation/Mitigation Measures For the EIS Preferred Alternative

1. The applicant will develop a management plan for the proposed open space preserves subject to a conservation easement. The plan should be developed to conserve ecological resources in that area and to provide necessary mitigation for impacts to sensitive species resulting from development. The plan should address management activities to ensure maintenance of breeding refugial, and dispersal habitats for California tiger salamander, and should provide a grazing regimen that could allow reestablishment of populations of Sonoma sunshine and Burke's goldfields.

2. Mitigation of impacts to listed plant species of the Santa Rosa Plain will be accomplished according to requirements of the Programmatic Consultation and can be accomplished onsite. Protocol special status plant surveys within the development footprint of the Preferred Alternative reveal that none of the three listed species is present; therefore all mitigation would be accomplished according to requirements stipulated for suitable habitat rather than occupied habitat.

3. The development footprint for the Preferred Alternative would impact approximately 82.17 acres of CTS aestivation habitat. All CTS mitigation would be accomplished offsite and would consist of purchase of CTS credits from an approved mitigation bank or purchase of farm land providing suitable habitat for CTS (where CTS are known to occur) and placing the area under conservation easement. Mitigation will consist of credits or purchased acreage under a conservation easement as follows:

    a. Three acres for each acre of impact within 500 feet from an extant or extirpated breeding pool
    b. Two acres for each acre of impacts within 500 feet of adult occurrences.
    c. Two acres for each acre of impact within 2200 feet from extant or extirpated breeding pools
    d. One acre for each acre of impact within 1.3 miles from extant or extirpated breeding pools

4. The applicant should implement the general mitigation guidelines advanced by the Santa Rosa Plain Conservation Strategy related to CTS.

    a. Prior to construction, fencing will be installed to exclude CTS from entering the project site. Fences with ramps may be required to allow any

CTS onsite to move into an adjacent habitat offsite. In these instances translocation may occur and would be determined on a case-by-case basis.

b. A USFWS approved biological monitor will be on site each day during wetland restoration and construction, and during initial site grading of development sites where CTS have been found.

c. The biological monitor will conduct a training session for all construction workers before work is started on the project.

d. Before the start of work each morning, the biological monitor will check for animals under any equipment such as vehicles and stored pipes. The biological monitor will check all excavated steep-walled holes or trenches greater than one foot deep for any CTS. CTS will be removed by the biological monitor and translocated as necessary.

e. An erosion and sediment control plan will be implemented to prevent impacts of wetland restoration and construction on habitat outside the work areas.

f. Access routes and number and size of staging and work areas will be limited to the minimum necessary to achieve the project goals. Routes and boundaries of the roadwork will be clearly marked prior to initiating construction/grading.

g. All foods and food-related trash items will be enclosed in sealed trash containers at the end of each day, and removed completely from the site once every three days.

h. No pets will be allowed anywhere in the project site during construction.

i. A speed limit of 15 mph on dirt roads will be maintained.

j. All equipment will be maintained such that there will be no leaks of automotive fluids such as gasoline, oils, or solvents.

k. Hazardous materials such as fuels, oils, solvents, etc., will be stored in sealable containers in a designated location that is at least 200 feet from aquatic habitats. All fueling and maintenance of vehicles and other equipment and staging areas will occur at least 200 feet from any aquatic habitat.

l. Grading and clearing will typically be conducted between April 15 and October 15, of any given year, depending on the level of rainfall and/or site conditions.

m. Project areas temporarily disturbed by construction activities will be re-vegetated with native plants approved by USFWS/CDFG.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:
81420-2009-F-0336

FEB 3 2009

Mr. Brad Mehaffy
NEPA Compliance Officer
National Indian Gaming Commission
1441 I Street, NW
Suite 9100
Washington, D.C. 20005

Subject: Biological Opinion on the Proposed Graton Rancheria Casino and Hotel Project, City of Rohnert Park, Sonoma County, California

Dear Mr. Mehaffy:

This letter is in response to the National Indian Gaming Commission (NIGC) July 3, 2007, request for the initiation of formal consultation with the U.S. Fish and Wildlife Service (Service) regarding the proposed Graton Rancheria Casino and Hotel Project located in the City of Rohnert Park, Sonoma County, California (APNs 046-021-020; 143-040-068; 045-073-001, 045-073-002, 045-073-003, 045-073-004, 045-074-009, 045-074-010, 046-021-040, 046-021-039, and 046-021-021). Your request for formal consultation was received by this office on July 6, 2007. At issue are the potential effects of the NIGC's preferred alternative on the endangered Sonoma County Distinct Population Segment of the California tiger salamander (*Ambystoma californiense*), Burke's goldfields (*Lasthenia burkei)*, Sonoma sunshine (*Blemnosperma bakeri)* and Sebastopol meadowfoam (*Limnanthes vinculans*). This document is issued under the authority of the Endangered Species Act, as amended (16 U.S.C. 1531 *et seq.*) (Act).

A biological opinion dated August 5, 2005 for the Redwood Equities Northwest Specific Plan (Service File Number 1-1-05-F-0211) (August 2005 Biological Opinion) was issued to the Corps of Engineers (Corps). This biological opinion concluded a consultation with the Corps for a variety of commercial, residential and light industrial uses within an 80-acre area that includes 66 acres of the 82.17-acre development portion of the Graton Rancheria project site evaluated herein. The August 2005 Biological Opinion provided authorization for incidental take for the mixed use Northwest Specific Plan project which included compensation for California Tiger Salamander (CTS) habitat at a ratio of 0.5:1 and mitigation for wetlands and listed plants at a 1:1 ratio. Since the release of the August 2005 Biological Opinion, the Service and California Department of Fish and Game has issued updated guidelines for compensation for effects to listed species in the Santa Rosa Plain in the December 1, 2005 Final Santa Rosa Plain Conservation Strategy, the May 16, 2006 Interim Mitigation Guidelines, and the November 9, 2007, *Programmatic Biological Opinion for Corps Permitted Projects that May Affect California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain, California*

(Service File Number 81420-2008-F-0261 and Corps File Number 223420N) (2007 Programmatic).

This Biological Opinion is based on: (1) your July 3, 2007, letter requesting initiation of formal consultation; (2) formal consultation at the Proposed Redwood Equities Northwest Specific Plan Site in Rohnert Park, Sonoma County, California dated August 5, 2005 (Service File Number 1-1-05-F-0211); (3) Biological Assessment for a Proposed Gaming Facility, Sonoma County, California, with attachments, prepared by Huffman Broadway Group, Inc. (HBG) dated December 2006; (4) February 2007 Draft Environmental Impact Statement (DEIS), Graton Rancheria Casino and Hotel Project, National Indian Gaming Commission, dated February 2007, prepared by Analytical Environmental Services (AES); (5) Biological Assessment for a Proposed Gaming Facility, Rohnert Park Site, Sonoma County, California, with attachments, prepared by HBG, revised September 2007; (6) your April 4, 2008, letter proposing conservation measures for the Preferred Alternative; (7) Biological Assessment for a Proposed Gaming Facility, Rohnert Park Site, Sonoma County, California, with attachments, prepared by HBG, revised July 2008 (2008 BA); (7) numerous telephone, mail, and electronic mail communications between representatives of the Service, the NIGC, Corps, AES and HBG; and (8) other information available to the Service.

It is important to note that Figure 52 of the Preferred Alternative (A3) in the July 2008 Biological Assessment for the Proposed Gaming Facility, Rohnert Park Site, Sonoma County, California, does not reflect the finding of a California tiger salamander at the project site. This biological opinion includes this finding as part of evaluating the effects of the proposed action. We recommend the final EIS accurately reflect the finding of the California tiger salamander at the project site. The December 2004, *Biological Resource Assessment for the 80-Acre Rohnert Park Northwest Specific Plan Area, Rohnert Park, Sonoma County, California* and Enclosure 1 of your April 4, 2008, letter, addressed to Vincent Griego of my staff accurately depicts this finding.

Consultation History

January 28, 2005:	The Corps initiates formal consultation with the Service for the Proposed Redwood Equities Northwest Specific Plan Site in Rohnert Park, Sonoma County, California.
August 5, 2005:	The Service issues Biological Opinion for the Formal Consultation on the Proposed Redwood Equities Northwest Specific Plan Site in Rohnert Park, Sonoma County, California (Service File Number 1-1-05-F-0211).
July 6, 2007:	The NIGC initiates formal consultation with the Service.
July 3, 2007:	The NIGC transmits a copy of the Draft EIS for the Graton Rancheria Casino and Hotel Project (including a copy of the Biological Assessment for the project) to the Service.
September 18, 2007	Letter from Brad Mehaffy of NIGC addressed to Chris Nagano of the Service with an offer of a compensation ratio of 1:1 for the effects to CTS.

March 13, 2008	HBG transmits to the Service a copy of the Biological Assessment, Proposed Gaming Facility, Sonoma County, California, revised September 2007.
March 13, 2008	NIGC, HBG, and AES representatives met with the Service to discuss the project, alternatives, and mitigation ratios.
April 4, 2008	NIGC sent revised proposed CTS conservation measures to the Service.

BIOLOGICAL OPINION

Description of the Proposed Action

Purpose and Need

The purpose and need for approving the gaming management contract is to allow the Tribe to develop uses that will improve the long-term economic condition of the Tribe and its members through the development of a stable, sustainable source of employment and revenue. Revenues generated from the economic development would be used to improve the quality of life of Tribal members by supporting social, housing, governmental, administrative, educational, and health and welfare services. Revenues could also be used to provide capital for other revenue generating activities, for contributions to charitable organizations, and to fund local government activities. The Federal action additionally serves the purpose of the Indian Gaming Regulatory Act (IGRA) to promote economic development and the self-governance of the Tribe. Finally, the action would effectuate the Congressional directive embodied in the Graton Rancheria Restoration Act of 2000.

Preferred Alternative

The project description included herein is taken primarily from the 2008 BA, April 4, 2008 revised conservation measures, and DEIS document, prepared by the NIGC. The proposed action will consist of the NIGC's approval of a gaming management contract between the Tribe and SC Sonoma Management, LLC. The foreseeable consequence of this action would be the development of the proposed project on approximately 432.7 acres of land (Wilfred Site), a casino-hotel resort development on 82.17 acres and 170 acres that would include recycled water sprayfields, flood storage ponds, open space, biological habitat, and existing wetlands. Approximately 252.17 acres of the Wilfred Site would be taken into trust for the Tribe and the remaining will be preserved for its biological values.

The NIGC, in consultation with the Tribe, evaluated alternatives for development of a gaming facility in Sonoma County. The gaming facility, water treatment ponds and sprayfields are planned for a portion of the Wilfred Site, which consists of three areas: an approximately 66-acre northern area bounded roughly by Langner Avenue on the west, Wilfred Avenue on the north, Dowdell on the east, and Business Park Drive on the south; an approximately 182-acre southern area, which is north of Rohnert Park Expressway between Stony Point Road and the City's Urban Growth Boundary; and an approximately 4.7-acre central area west of Business Park Drive and northwest of the terminus of Park Court, which connects the northern and southern areas described above.

The preferred alternative is evaluated as Alternative A, Option 3 in the July 2008 BA and DEIS prepared pursuant to the National Environmental Policy Act (NEPA), with the NIGC as the federal lead agency. Alternative A is judged by the NIGC to best meet the purpose and need while minimizing impacts on the human environment. Alternative A includes three options for wastewater disposal. The NIGC would prefer to select option 1 (connection to the regional sewer system) in the preferred alternative; however, as an agreement to allow a sewer connection has not yet been reached, this option does not appear to be viable at this time. Option 3 includes the construction of an on-site wastewater treatment facility designed to satisfy criteria that would comply with the standards established by the USEPA. Option 3 assumes that effluent will be disposed of through irrigation of sprayfields at agronomic rates from April to October and stored for future irrigation in an on-site reservoir during the remainder of the year. Of the two on-site treatment and disposal options, Option 3 is viable and has fewer environmental impacts than Option 2, which includes a surface water discharge to the Bellevue-Wilfred Channel. Also, option 2 requires a Clean Water Act, National Pollutant Discharge Elimination System (NPDES) permit prior to operation, which has not been obtained. Therefore, the NIGC has selected Alternative A with wastewater disposal Option 3 as its preferred alternative.

The development of an approximately 762,300 square foot casino-hotel resort and ancillary facilities are planned on 82.17 acres on the northern, central, and 12.17 acres of the southern area of the Wilfred Site. The casino-hotel resort would include restaurants, a 300-room, 8-story hotel, an entertainment venue, banquet/meeting space, and a pool and spa. The casino-hotel resort would employ approximately 2,400 employees. A total of approximately 6,100 parking spaces would be provided to serve the patrons and employees of the resort and supporting facilities. A parking structure, providing a total of 2,000 parking spaces, would be connected to the southeast corner of the casino. Access to the casino-hotel resort would be gained from access points on Business Park Drive (south) and Wilfred Avenue (north). The graded development footprint extends beyond the extent of facilities shown on project plans by as much as 100 feet in some locations to allow for impacts associated with construction equipment access and other construction-related activities. The remainder of the Wilfred Site beyond the 82.17-acre CTS impact area, which is also being taken into trust by the Federal Government, would consist of approximately 170 acres that would include recycled water sprayfields, flood storage ponds, open space, biological habitat, and existing wetlands. All created flood storage ponds and recycled water sprayfields would be setback from existing wetlands by at least 50 feet.

The Tribe would enter into a Tribal-State Compact, as required by the Indian Gaming Regulatory Act (IGRA) to govern the conduct of Class III gaming activities, or comply with procedures established by the Secretary of the Interior (pursuant to IGRA and 25 C.F.R. 291) in the event that the State and the Tribe are unable to agree to a compact. In April 2003, the Tribe and SC Sonoma Development or its affiliates entered into a development contract for the construction and development of the proposed project. Under the terms of the development contract, SC Sonoma Development has assisted the Tribe in obtaining funding for the purchase of land to be taken into trust. SC Sonoma Development would also assist in the construction of the proposed project under the terms of the development contract.

The preferred alternative would be constructed after the Wilfred Site has been placed into Federal trust and mitigation for listed species required in this Biological Opinion has been

implemented. Construction duration is estimated at 27 months. Among other activities, construction would involve demolition (of 2 unoccupied dwellings); earthwork; placement of concrete foundations; steel, wood and concrete structural framing; masonry; electrical and mechanical work; building and site finishing; and paving. Construction of the facility would also comply with best management practices (BMPs) for paving operations, structure construction, painting, material delivery/storage, material use, spill prevention/control, solid waste management, hazardous waste management, concrete waste management, sanitary/septic waste management, vehicle/equipment cleaning, vehicle/equipment fueling, and vehicle/equipment maintenance.

Grading and Drainage Plan

The preliminary grading and drainage plan for the preferred alternative incorporates fill to elevate the proposed gaming facility sufficiently to allow stormwater to gravity flow and empty into a detention basin. The development area for the casino/hotel/parking facilities is outside of the 100-year floodplain. All of the proposed facilities would be constructed at least one foot above the 100-year floodplain elevation. Specifically, the buildings would be approximately five feet above the floodplain and the parking lot would be approximately one foot above the floodplain. It is estimated that 300,000 cubic yards of earthwork will be required for construction. On-site excavation in the northern area of the Wilfred Site would yield approximately 25,000 cubic yards of fill material. On-site excavation from the remainder of the Wilfred Site would yield the remaining fill material, resulting in a "balanced" site.

Runoff from the Wilfred Site would be conveyed by an underground drainage system to the detention basin, and, after filtration, to Labath Creek located adjacent to the proposed detention basin. Labath Creek feeds into Hinebaugh Creek and then into the Laguna de Santa Rosa. The drainage plan includes the use of several features designed to filter the surface runoff prior to release into the natural drainage channels on-site. Runoff from the Wilfred Site primarily will be directed into storm drainpipes, with sheet flow to vegetated swales present along the perimeter of developed areas. Overflow drainage releases will be developed on-site, along the western and eastern edges of the developed area.

Inlets would be placed at appropriate intervals along drainpipes to capture runoff and convey it to the detention basin. Prior to release into the storm drainpipes, runoff would pass through a sediment/grease trap ("Stormceptor") that would filter out suspended solids such as trash and soil sedimentation, oil, grease, and other potential materials that could degrade surface water quality. Vegetated swales would also provide filtering of runoff prior to release into the site drainage channels, by capturing sediment and pollutants.

The grading and drainage plan incorporates two areas for storm water detention to reduce increased peak flows resulting from increased impervious surfaces to pre-project levels and to offset reduced floodplain storage caused by the development of project facilities. The first stormwater detention basin would assure that post-development runoff peaks from the Wilfred Site would be equal to or slightly lower than existing conditions. The detention of water on-site would reduce potential downstream erosion and effects to water quality. Approximately 14 acre-feet of storage would be provided in the stormwater detention basin to account for the increase in runoff created by increased impervious surfaces. The detention system would be located on the southern edge of the proposed casino-hotel development area. A second storm water detention /

flood storage area would be created in the southern area of the Wilfred Site. This detention area will create a flood storage area to account for the fill placed in the non-regulated 500-year floodplain (Zone X).

Wastewater Treatment and Disposal
Typical gaming facilities have higher biochemical oxygen demand (BOD) and total suspended solids (TSS) values compared to domestic wastewater. Shock loads are also typical of gaming facility wastewater. Weekend flows are much higher than weekday flows, and evening flows are higher than daytime flows. The preferred alternative would require the capability to treat the preferred alternative's maximum weekend demand of approximately 354,000 gallons per day (gpd). A concrete equalization tank or basin will be included in the treatment plant design. The required volume of equalization is expected to be approximately 80,000 gallons, with a 15 percent factor of safety. The elements of the wastewater treatment and disposal facility include a wastewater treatment plant, wastewater piping, landscape irrigation, surface disposal, and a recycled water reservoir.

Under the preferred alternative all effluent will be disposed of through sprayfields in the southern area of the Wilfred Site from April to October and stored in on-site reservoirs during the remainder of the year. The wastewater treatment facility planned for the preferred alternative would be designed to satisfy criteria that would comply with the standards established by the USEPA. Irrigation of the sprayfields would occur at agronomic rates during the summer dry season when water will be absorbed into the soil, taken up by the vegetation or will evaporate. Under the preferred alternative, 111.4 acres of spray fields would be laid out such that a 50-foot buffer would be provided from any wetland.

Conservation Measures

The following conservation measures are proposed and will be incorporated into the project description for the preferred alternative in the Final Environmental Impact Statement. These conservation measures will be Service-approved and accomplished prior to groundbreaking of the casino project site.

1. Direct impacts to CTS will occur on 82.17 acres. Mitigation will be provided at a 1:1 mitigation ratio for the 77.49 of 82.17 acres of impacts to CTS upland and wetland habitat within 1.3 miles from extant or extirpated breeding pools. Additional mitigation will be provided at a 2:1 mitigation ratio for the 4.68 of 82.17 acres of impacts to CTS upland and wetland habitat within 500 feet of adult occurrences (i.e. 9.36). The total CTS mitigation will be 86.85 acres (i.e. 77.49 + 9.36). All CTS mitigation will be accomplished off-site and will consist of purchase of CTS credits from an approved mitigation bank or purchase of land providing suitable habitat for CTS (where CTS are known to occur) and placing the area under conservation easement. The establishment of an off-site mitigation preserve by the applicant, if chosen, must meet the following requirements: land dedication in fee title or conservation easement, third party management pursuant to an approved resources management plan for conservation purposes, performance monitoring, maintenance monitoring and compliance reporting, an adaptive management plan, and a funding mechanism to assure long-term management and monitoring.

2. Prior to construction, fencing will be installed to exclude CTS from entering the development portion of the site. Fences with ramps or similar measures will be required to allow any CTS on-site to move into an adjacent habitat off-site. In these instances translocation may occur and would be determined on a case-by-case basis.

3. The applicant will implement the following protective measures:

   (a) A Service approved biological monitor will be on site each day during wetland restoration and construction, and during initial site grading of development sites where CTS have been found.

   (b) The biological monitor will conduct a training session for all construction workers before work is started on the project.

   (c) Before the start of work each morning, the biological monitor will check for animals under any equipment such as vehicles and stored pipes. The biological monitor will check all excavated steep-walled holes or trenches greater than one foot deep for any CTS. CTS will be removed by the biological monitor and translocated as directed by the Service.

   (d) An erosion and sediment control plan will be implemented to prevent impacts of construction on habitat outside the work areas.

   (e) Access routes and number and size of staging and work areas will be limited to the minimum necessary to achieve the project goals. Routes and boundaries of the roadwork associated with construction will be clearly marked prior to initiating construction/grading.

   (f) All foods and food-related trash items will be enclosed in sealed trash containers at the end of each day, and removed completely from the site once every three days.

   (g) No pets will be allowed anywhere on the project site during construction.

   (h) No more than a maximum speed limit of 15 mph will be permitted.

   (i) All equipment will be maintained such that there will be no leaks of automotive fluids such as gasoline, oils, or solvents.

   (j) Hazardous materials such as fuels, oils, solvents, etc., will be stored in sealable containers in a designated location that is at least 200 feet from aquatic habitats. All fueling and maintenance of vehicles and other equipment and staging areas will occur at least 200 feet from any aquatic habitat.

   (k) Grading and clearing will typically be conducted between April 15 and October 15, of any given year, depending on the level of rainfall and/or site conditions.

   (l) Project areas temporarily disturbed by construction activities will be re-vegetated with locally-occurring native plants.

4. The preferred alternative would impact 1.60 acres of seasonal wetlands that provide suitable habitat for the listed plant species of the Santa Rosa Plain. The applicant will

compensate for these areas with conservation of 1.6 acres of occupied or established habitat, and conservation of an additional 0.8 acres of established habitat. This will be accomplished through purchase of land with 2.4 acres of Sonoma sunshine at an approved habitat preserve/conservation bank. The establishment of an off-site conservation preserve by the applicant, if chosen, must meet the following requirements: land dedication in fee title or conservation easement, third party management pursuant to an approved resources management plan for conservation purposes, performance monitoring, maintenance monitoring and compliance reporting, an adaptive management plan, and a funding mechanism to assure long-term management and monitoring.

5. A management plan will be developed for approximately 170 acres of the 182-acre southern area of the Wilfred site (all portions of the southern area, except those portions planned for use as treated wastewater retention ponds). The plan should be developed to conserve ecological resources in the area. The plan should address management activities to ensure maintenance of breeding, refugial, and dispersal habitats for California tiger salamander, and should provide prescriptions for management of resources including existing wetlands and a known population of Sonoma sunshine. If the developer chooses to provide wetland mitigation on the portion of the site located west of the Bellevue-Wilfred Channel, management of these created wetlands will be addressed in the plan as well. Vegetation management must provide a grazing regimen that would promote native plants including listed species. The plan must also include a management and monitoring plan including management actions necessary to manage, enhance, and protect the resources protected (and any created) on the site, and monitoring actions to determine plan success, the status of the protected resources and effectiveness of specified management actions.
6. All created flood storage ponds and sprayfields would be setback from existing wetlands by at least 50 feet.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The action area for the proposed project is 432.7 acres. This includes three separate areas with a size of 360, 4.7, and 68 acres. Of these 432.7 acres, the 252 acre Wilfred Site will be used for the Graton Rancheria Casino and Hotel Project located in the City of Rohnert Park, Sonoma County, California consisting of the following assessor parcel numbers: 046-021-020 (which is largely in the 100-year floodplain) would contain sprayfields, flood storage ponding areas, treated wastewater storage ponds and three seasonal wetlands; 143-040-068 would contain treated wastewater storage ponds; 045-073-001, 045-073-002, 045-073-003, 045-073-004, 045-074-009, and 045-074-010 would contain the hotel/casino resort, parking facilities, the wastewater treatment plant, treated wastewater storage ponds, and the stormwater detention pond. The action area also includes the mitigation sites which will be located within one or more of the Conservation Areas described in the Santa Rosa Plain Conservation Strategy (Conservation Strategy Team 2005).

Status of the Species

California Tiger Salamander

The Sonoma County Distinct Population Segment of the California tiger salamander was emergency listed as endangered on July 22, 2002 (Service 2002). The salamander was listed as endangered on March 19, 2003 (Service 2003). The California tiger salamander was listed as threatened on August 4, 2004 (Service 2004). This latter listing changed the status of the Santa Barbara and Sonoma county populations from endangered to threatened. On August 10, 2004, the Service proposed 47 critical habitat units in 20 counties. No critical habitat was proposed for Sonoma County. On October 13, 2004, a complaint was filed in the U.S. District Court for the Northern District of California (Center for Biological Diversity and Environmental Defense Council v. U.S. Fish and Wildlife Service *et al.*). On February 3, 2005, the District Court required the Service to submit for publication in the **Federal Register**, a final determination on the proposed critical habitat designation on or before December 1, 2005. On August 2, 2005, the Service noticed in the **Federal Register** a proposed critical habitat designation (Service 2005a). On August 19, 2005, a court order was filed on the above complaint, which upheld the section 4(d) rule exempting grazing from Section 9 prohibitions, but vacated the downlisting of the Santa Barbara and Sonoma populations and reinstated their endangered distinct population segment status. On December 14, 2005, (Service 2005b), we made a final determination to designate and exclude approximately 17,418 acres of critical habitat for the Sonoma population. All of critical habitat was excluded based on interim conservation strategies and measures being implemented by those local governing agencies with land use authority over the area and also as a result of economic exclusions authorized under section 4(b)(2) of the Act. Therefore, no critical habitat was designated for the Sonoma County Distinct Population Segment of the California tiger salamander in Sonoma County, California. On October 2, 2008, a complaint was filed in the U.S. District Court for the Northern District of California (Center for Biological Diversity and Environmental Defense Council v. U.S. Fish and Wildlife Service *et al.*). The complaint claimed, in part, that the determination to exclude critical habitat was based on the local jurisdictions on fully implementing the Santa Rosa Plain Conservation Strategy and that the local jurisdictions have abandoned their efforts to do so. Among other things, the Center for Biological Diversity in their complaint requested that the Court enter a judgment to require the Service to revise the critical habitat designation within 60 days of the court's order.

The California tiger salamander is a large, stocky, terrestrial salamander with a broad, rounded snout. Adults may reach a total length of 8.2 inches (Petranka 1998). Tiger salamanders exhibit sexual dimorphism with males typically larger than females. The coloration of the California tiger salamander is white or yellowish markings against black. Adult California tiger salamanders usually have creamy yellow to white spotting on the sides and reduced spotting on the dorsal surface of the animal, whereas other tiger salamander species have brighter yellow spotting that is heaviest on the dorsal surface. California tiger salamander larvae have yellowish gray bodies, broad fat heads, large feathery external gills, and broad dorsal fins extending well up their back and range in length from approximately 0.45 to 0.56 inches (Petranka 1998).

The California tiger salamander has an obligate biphasic life cycle (Shaffer *et al.* 2004). Although larvae salamanders develop in vernal pools and ponds in which they were born, they are otherwise terrestrial salamanders and spend most of their postmetamorphic lives in widely

dispersed underground retreats (Shaffer *et al.* 2004; Trenham *et al.* 2001). Although tiger salamanders are members of the Family Ambystomatidae (mole salamanders), also known as "burrowing salamanders," California tiger salamanders are not known to create their own burrows in the wild, which may be due to the hardness of soils in the California ecosystems in which they are found. Subadult and adult California tiger salamanders spend the dry summer and fall months of the year in the burrows of small mammals, such as California ground squirrels (*Spermophilus beecheyi*) and Botta's pocket gopher (*Thomomys bottae*) (Storer 1925; Loredo and Van Vuren 1996; Petranka 1998; Trenham 1998a). Burrows often harbor camel crickets (*Ceuthophilus* spp. and *Pristoceuthophilus* spp.) and other invertebrates that provide likely prey for California tiger salamanders. Underground refugia also provide protection from the sun and wind associated with the dry California climate that can cause excessive drying of amphibian skin. Burrows may be active (in use by small mammals) or inactive (small mammals are absent), but because burrows tend to be short lived without continued small mammal activity, they typically collapse within approximately 18 months if not maintained (Loredo *et al.* 1996). An active population of burrowing mammals is necessary to sustain sufficient underground refugia for the species. California tiger salamanders also may utilize leaf litter or desiccation cracks in the soil. Because they live underground in small mammal burrows, California tiger salamanders are rarely encountered in the uplands by humans even where they are abundant. Recent surveys performed within the East Bay Regional Parks District (EBRPD) have demonstrated that California tiger salamanders may utilize less than 50% of suitable breeding habitat during any given year. This data indicates that even in ponds where the species appears to have been extirpated, regular breeding activities may still occur (Bobzien and DiDonato 2007)

The upland burrows inhabited by California tiger salamanders have often been referred to as "aestivation" sites, which implies a state of inactivity; however, recent studies show that the animals move, feed, and remain active in their burrows (Trenham 2001; Van Hattem 2004). Researchers have long inferred that they are feeding while underground because the animals arrive at breeding ponds in good condition and are heavier when entering a pond than when leaving. Thus, upland habitat is a more accurate description of the terrestrial areas used by California tiger salamanders.

Once fall or winter rains begin, the salamanders emerge from the upland sites on rainy nights to feed and to migrate to the breeding ponds (Stebbins 1985 and Shaffer *et al.* 1993). Adult salamanders mate in the breeding ponds, after which the females lay their eggs in the water (Twitty 1941; Shaffer *et al.* 1993; Petranka 1998). Historically, California tiger salamanders utilized vernal pools, but the animals also currently breed in livestock ponds. Females attach their eggs singly, or in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris (Storer 1925; Twitty 1941). In ponds with no or limited vegetation, they may be attached to objects, such as rocks and boards on the bottom (Jennings and Hayes 1994). California tiger salamander populations at eastern San Francisco Bay locations may have higher reproductive success in ponds with limited to no emergent vegetation, potentially due to a reduced number of aquatic predators that rely on more highly shaded areas (Bobzien and DiDonato 2007). After breeding, adults leave the pool and return to the small mammal burrows (Loredo *et al.* 1996; Trenham 1998a), although they may continue to come out nightly for approximately the next two weeks to feed (Shaffer *et al.* 1993). In drought years, the seasonal pools may not form and the adults can not breed (Barry and Shaffer 1994).

California tiger salamander eggs hatch in 2 to 4 weeks (Storer 1925; Shaffer *et al.* 2004). The larvae are aquatic with yellowish gray coloration and have broad fat heads, possess large, feathery external gills, and broad dorsal fins that extend well onto their back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about six weeks after hatching, after which they switch to larger prey (J. Anderson 1968). Larger larvae have been known to consume the tadpoles of Pacific treefrogs (*Pseudacris regilla*), and California red-legged frogs (*Rana aurora draytonii*) (J. Anderson 1968; P. Anderson 1968). California tiger salamander larvae are among the top aquatic predators in seasonal pool ecosystems. When not feeding, larvae often rest on the bottom in shallow water, but are also found throughout the water column in deeper water. Young salamanders are wary and typically escape into vegetation at the bottom of the pool when approached by potential predators (Storer 1925).

The larval stage of the California tiger salamander usually last three to six months, as most seasonal ponds and pools dry up during the summer (Petranka 1998). The peak emergence of these metamorphs is typically between mid-June to mid-July (Loredo and Van Vuren 1996; Trenham *et al.* 2000) but in some areas as early as late February or early March. Amphibian larvae must grow to a critical minimum body size before they can metamorphose (change into a different physical form) to the terrestrial stage (Wilbur and Collins 1973). Individuals collected near Stockton in the Central Valley during April varied from 1.88 to 2.32 inches (47.75 to 58.93 mm) in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left the breeding pools 60 to 94 days after the eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. The longer the ponding duration, the larger the larvae and metamorphosed juveniles are able to grow, and the more likely they are to survive and reproduce (Pechmann *et al.* 1989; Semlitsch *et al.* 1988; Morey 1998; Trenham 1998b). The larvae will perish if a site dries before metamorphosis is complete (P. Anderson 1968; Feaver 1971). Pechmann *et al.* (1989) found a strong positive correlation with ponding duration and total number of metamorphosing juveniles in five salamander species. In Madera County, California Feaver (1971) found that only 11 of 30 pools sampled supported larval California tiger salamanders, and five of these dried before metamorphosis could occur. Therefore, out of the original 30 pools, only six (20 percent) provided suitable conditions for successful reproduction that year. Size at metamorphosis is positively correlated with stored body fat and survival of juvenile amphibians, and negatively correlated with age at first reproduction (Semlitsch *et al.* 1988; Scott 1994; Morey 1998). In the late spring or early summer, before the ponds dry completely, metamorphosed juveniles leave them and enter upland habitat. This emigration occurs in both wet and dry conditions (Loredo and Van Vuren 1996; Loredo *et al.* 1996). Unlike during their winter migration, the wet conditions when adult California tiger salamanders typically move do not generally occur during the months when their breeding ponds begin to dry. As a result, juveniles may be forced to leave their ponds on rainless nights. Under these conditions, they may move only short distances to find temporary upland sites for the dry summer months, waiting until the next winter's rains to move further into suitable upland refugia. Once juvenile California tiger salamanders leave their birth ponds for upland refugia, they typically do not return to ponds to breed for an average of 4 to 5 years (Trenham *et al.* 2000). However, the minimum age at sexual maturity has been observed to be two years for males and 2 to 3 years for females (Loredo and Van Vuren 1996; Trenham et al. 2000). Individuals remain active in the uplands, coming to the surface during rainfall events to disperse or forage (Trenham and Shaffer 2005).

Lifetime reproductive success for California and other tiger salamanders is low. Trenham *et al.* (2000) found the average female bred 1.4 times and produced 8.5 young that survived to metamorphosis per reproductive effort. This resulted in roughly 11 metamorphic offspring over the lifetime of a female. Two reasons for the low reproductive success are the preliminary data suggests that most individuals of the California tiger salamanders require two years to become sexually mature, but some individuals may be slower to mature (Shaffer *et al.* 1993); and some animals do not breed until they are four to six years old. While individuals may survive for more than ten years, many breed only once, and in some populations, less than 5 percent of marked juveniles survive to become breeding adults (Trenham 1998b). With such low recruitment, isolated populations are susceptible to unusual, randomly occurring natural events as well as from human caused factors that reduce breeding success and individual survival. Factors that repeatedly lower breeding success in isolated pools can quickly extirpate a population.

Movements made by California tiger salamanders can be grouped into two main categories: (1) breeding migration; and (2) interpond dispersal. Breeding migration is the movement of salamanders to and from a pond from the surrounding upland habitat. After metamorphosis, juveniles move away from breeding ponds into the surrounding uplands, where they live continuously for several years. At a study in Monterey County, it was found that upon reaching sexual maturity, most individuals returned to their natal/ birth pond to breed, while 20 percent dispersed to other ponds (Trenham *et al.* 2001). Following breeding, adult California tiger salamanders return to upland habitats, where they may live for one or more years before breeding again (Trenham *et al.* 2000).

California tiger salamanders are known to travel large distances from breeding sites into upland habitats. Maximum distances moved are generally difficult to establish for any species, but California tiger salamanders in Santa Barbara County have been recorded to disperse 1.3 miles (2.09 km) from breeding ponds (Sweet *in litt.* 1998). California tiger salamanders are known to travel between breeding ponds; one study found that 20 to 25 percent of the individuals captured at one pond were recaptured later at ponds approximately 1,900 and 2,200 feet away (Trenham *et al.* 2001). In addition to traveling long distances during migration to or dispersal from ponds, California tiger salamanders may reside in burrows that are far from ponds. At one site in Contra Costa County, hundreds of California tiger salamanders have been captured three years in a row in upland habitat approximately 0.75 miles from the nearest breeding pond (Orloff 2003).

Although the observations above show that California tiger salamanders can travel far, typically they stay closer to breeding ponds. Evidence suggests that juvenile California tiger salamanders disperse further into upland habitats than adults. A trapping study conducted in Solano County during winter of 2002/2003 found that subadults used upland habitats further from breeding ponds than adults (Trenham and Shaffer 2005). More subadults were captured at distances of 328, 656, and 1,312 feet from breeding ponds than at 164 feet. Large numbers, approximately 20 percent of total captures, were found 1,312 feet from a breeding pond. Fitting a distribution curve to the data revealed that 95 percent of subadults could be found within 2,067 feet of the pond, with the remaining 5 percent being found at even greater distances. Results from the 2003/2004 trapping efforts detected subadult California tiger salamanders at even further distances, with a large proportion of the total salamanders caught at 2,297 feet from the breeding pond (Trenham and Shaffer, 2005). During post-breeding emigration, radio-equipped adult California tiger salamanders were tracked to burrows 62 to 813 feet from their breeding ponds

(Trenham 2001). These reduced movements may be due to adult California tiger salamanders having depleted physical reserves post-breeding, or also due to the drier weather conditions that can occur during the period when adults leave the ponds.

In addition, rather than staying in a single burrow, most individuals used several successive burrows at increasing distances from the pond. Although the studies discussed above provide an approximation of the distances that California tiger salamanders regularly move from their breeding ponds, upland habitat features will drive the details of movements in a particular landscape. Trenham (2001) found that radio-tracked adults favored grasslands with scattered large oaks, over more densely wooded areas. The same study showed no indication that certain habitat types are favored as corridors for terrestrial movements (Trenham 2001). In addition, at two ponds completely encircled by drift fences and pitfall traps, captures of arriving adults and dispersing new metamorphs were distributed roughly evenly around the ponds. Thus, it appears that dispersal into the terrestrial habitat occurs randomly with respect to direction and habitat types.

Several species have either been documented to prey or likely prey upon the California tiger salamanders including coyotes (*Canis latrans*), raccoons (*Procyon lotor*), opossums (*Didelphis virginiana*), egrets (Egretta species), great blue herons (*Ardea herodias*), crows (*Corvus brachyrhynchos*), ravens (*Corvus corax*), garter snakes (*Thamnophis* spp), bullfrogs (*Rana catesbeiana*), mosquito fish (*Gambusia affinis*), and crayfish (*Procrambus* spp.). In addition, predacious aquatic hexapods (arthropods) have also been shown to have a significant negative association with California tiger salamanders (Bobzien and DiDonato 2007). Domestic dogs (*Canis familiaris*) have been observed eating California tiger salamanders at Lake Lagunitas at Stanford University (Barry, pers. comm. 2004).

Historically, the California tiger salamander inhabited low elevation grassland and oak savanna plant communities of the Central Valley, and adjacent foothills, and the inner Coast Ranges in California (Jennings and Hayes 1994; Storer 1925; Shaffer *et al.* 1993). The species has been recorded from near sea level to approximately 3,900 feet in the Coast Ranges and to approximately 1,600 feet in the Sierra Nevada foothills (Shaffer *et al.* 2004). Along the Coast Ranges, the species occurred from the Santa Rosa area of Sonoma County, south to the vicinity of Buellton in Santa Barbara County. The historic distribution in the Central Valley and surrounding foothills included northern Yolo County southward to northwestern Kern County and northern Tulare County.

The Sonoma County Distinct Population Segment of the California tiger salamander is discrete in relation to the remainder of the species. The population is geographically isolated and separate from other California tiger salamanders. The Sonoma County population is widely separated geographically from the closest populations, which are located in Contra Costa, Yolo, and Solano counties. These populations are separated from the Sonoma County population by the Coast Range, Napa River, and the Carquinez Straits, at a minimum distance of approximately 45 miles. There are no known records of the California tiger salamander in the intervening areas (D. Warenycia, California Department of Fish and Game, personal communication with the Service, 2002). The Service has no evidence of natural interchange of individuals between the Sonoma County population and other California tiger salamander populations.

The Sonoma County Distinct Population Segment of the California tiger salamander inhabits low-elevation (below 500 feet) vernal pools and seasonal ponds, associated grassland, and oak savannah plant communities. The historic range of the Sonoma County population also may have included the Petaluma River watershed, as there is one historic record of a specimen from the vicinity of Petaluma from the mid-1800s (Borland [1856], as cited in Storer [1925]).

Between 2001 and 2002, five breeding sites for Sonoma County Distinct Population Segment of the California tiger salamander were destroyed. Loss of real and potential salamander breeding sites, upland refugia, dispersal, and foraging habitat continues to occur in the Santa Rosa Plain. To date, there have been 25 biological opinions (i.e., section 7 formal consultations) authorizing incidental take to all individuals inhabiting 569.107 acres of California tiger salamander habitat since the emergency listing on July 22, 2002. Five of these 25 biological opinions address adverse and beneficial affects associated with the construction of seasonal wetlands and creation of California tiger salamander breeding habitat and establishment of Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine. These five sites are the Hazel Mitigation Bank, Wright Preservation Bank, Slippery Rock Conservation Bank, Terra Bagnatta Mitigation Site, and the Alton North Conservation Bank . Temporary ground disturbance associated with these five sites include approximately 206.51 acres; There has been 394.812 acres of permanent California tiger salamander habitat loss permitted by the Service through section seven consultations. The development projects have integrated in their project proposals to conserve a total of 536.655 acres of California tiger salamander habitat at Service approved locations within Sonoma County via the purchase of mitigation or conservation credits, recording conservation easements, or offering fee title to the CDFG or another Service approved entity.

As of October 15, 2007, there are approximately 730 acres of existing Preserves that support occupied California tiger salamander habitat within conservation areas. Some of these existing preserves also support the listed plants. There are also approximately 165 ac of pending Preserves within conservation areas that are anticipated to be protected in perpetuity.

The California tiger salamander is imperiled throughout its range by a variety of human activities (Service 2004). Current factors associated with declining populations of the salamander include continued degradation and loss of habitat due to agriculture and urbanization, hybridization with non-native eastern tiger salamanders (*Ambystoma tigrinum*) (Fitzpatrick and Shaffer 2004; Riley *et al.* 2003), and introduced predators. Hybridization with non-native eastern tiger salamanders has not yet been identified within the Sonoma County population. Fragmentation of existing habitat and agricultural activities that degrade and/or eliminate breeding pools may represent the most significant current threats to the Sonoma County Distinct Population Segment of the California tiger salamander, although populations are likely threatened by more than one factor. Isolation and fragmentation of habitats within many watersheds have precluded dispersal between sub-populations and jeopardized the viability of metapopulations (broadly defined as multiple subpopulations that occasionally exchange individuals through dispersal, and are capable of colonizing or "rescuing" extinct habitat patches). Other threats are predation and competition from introduced exotic species, various chemical contaminants, road-crossing mortality, and certain unrestrictive mosquito and rodent control operations.

Diseases may also pose a significant threat though the specific effects of disease on the California tiger salamander are not known. Pathogens, fungi, water mold, bacteria, and viruses

are known to adversely affect other tiger salamander species and/or other amphibians. Pathogens are suspected of causing global amphibian declines (Davidson *et al.* 2003). Pathogen outbreaks have not been documented in the California tiger salamander, but chytrid fungus infections (chytridiomycosis) have been detected in California tiger salamander (Padgett-Flohr and Longcore 2005). Chytridiomycosis and ranaviruses are a potential threat to the California tiger salamander because these diseases have been found to adversely affect other amphibians, including tiger salamanders (Davidson *et al.* 2003; Lips *et al.* 2003). A deformity-causing infection, possibly caused by a parasite in the presence of other factors, has affected pond-breeding amphibians at known tiger salamander breeding sites. This same infection has become widespread among amphibian populations in Minnesota and poses the threat of becoming widespread in California. Nonnative species, such as bullfrogs and nonnative tiger salamanders, are located within the range of the California tiger salamander and have been identified as potential carriers of these diseases. Human activities can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by acting as carriers themselves (i.e. contaminated boots or fishing equipment). Human activities can also introduce stress by other means, such as habitat fragmentation, that results in tiger salamanders being more susceptible to the effects of disease. Disease will likely become a growing threat because of the relatively small and fragmented remaining California tiger salamander breeding sites, the many stresses on these sites due to habitat losses and alterations, and the many other potential disease-enhancing anthropogenic changes that have occurred both inside and outside the species' range.

Burke's Goldfields

Burke's goldfields was federally listed as endangered on December 2, 1991 (Service 1991). No critical habitat has been designated for this species.

Burke's goldfields is a slender annual herb in the aster family (Asteraceae). Plants are typically less than 11.8 inches in height (Hickman 1993) and usually branched (CNPS 1977). Leaves are narrow and opposite, less than two inches (5 centimeters) in length, may be entire or pinnately lobed, and with or without hairs (Ornduff 1993). Ray and disk flowers are yellow. The blooming period is variable depending on annual rainfall, but generally occurs from mid April to mid May, although it is known to bloom as early as mid March and as late as mid-June (CNPS 1977; Patterson *et al.* 1994; Tibor 2001). Inflorescences have separate/free involucre bracts/phyllaries (leaf-like structures beneath the flower head). Achenes (dry, one-seeded fruits) are less than 0.06 inch in length. The achenes of Burke's goldfields can be distinguished from those of other goldfields by its pappus (parachute like appendage that aids in seed dispersal), which has one long awn (bristle) with several short scales (Ornduff 1969; Ordnuff 1993). Individual Burke's goldfields plants may exhibit some geographic variation in morphology (McCarten 1985 as cited in CH2M Hill 1995; Patterson *et al.* 1994). Patterson *et al.* (1994) report robust specimens from the southern Santa Rosa Plain near the Laguna de Santa Rosa and variation in the number of awns from a Lake County population. Burke's goldfields can be distinguished from smooth goldfields (*Lasthenia glaberrima*) by the partly fused phyllaries of smooth goldfields' and its pappus (ring of scale-like or hair-like projections at the crown of an achene) of numerous narrowed or elliptical scales (Ordnuff 1993). The linear leaves without lobes and typically more than one awn distinguish common goldfields (*Lasthenia californica*) from Burke's goldfields (Ordnuff 1993).

Burke's goldfields grow in vernal pools and swales below 1640 feet (Ordnuff 1993). At the Manning Flat occurrence in Lake County, Burke's goldfields is found in a series of claypan vernal pools on volcanic ash soils (Service 1991; CNDDB 1998). At this location, the species is associated with common goldfields and few-flowered navarretia (*Navarretia leucocephala pauciflora*) (CNDDB 1998). In Sonoma County, the vernal pools containing Burke's goldfields are on nearly level to slightly sloping loams, clay loams, and clays. A clay layer or hardpan approximately two to three feet below the surface restricts downward movement of water (Service 1991). Huichica loam is the predominant soil series on which Burke's goldfields is found on the northern part of the Santa Rosa Plain (Patterson *et al.* 1994, CNDDB 1998). Huichica loam is a fine textured clay loam over buried dense clay and cemented layers (Patterson *et al.* 1994). More southerly Burke's goldfields sites likely occur on Wright loam or Clear Lake clay (Patterson *et al.* 1994; CNDDB 1998). Wright loam is a fine silty loam over buried dense clay and marine sediments. Clear Lake clay is hard dense clay from the surface to many feet thick (Patterson *et al.* 1994). Burke's goldfields sometimes occurs along with Sonoma sunshine and Sebastopol meadowfoam (*Limnanthes vinculans*). These three federally listed species are all associated with other plants that commonly grow in vernal pools on the Santa Rosa Plain, including Douglas' pogogyne (*Pogogyne douglasii* spp. *parviflora*), Lobb's aquatic buttercup (*Ranunculus lobbii*), smooth goldfields, California semaphore grass (*Pleuropogon californicus*), maroonspot downingia (*Downingia concolor*), and button-celery (*Eryngium sp.*) (CNDDB 1998).

The flowers of Burke's goldfields are self-incompatible (Ornduff 1966; Crawford and Ornduff 1989) and are believed to be insect-pollinated. Specific studies on pollinators of Burke's goldfields have not been conducted; however, evidence suggests that the same insects visit all outcrossed species of goldfields rather than concentrating on a particular species (Thorp 1976). Insects known to visit the flowers of *Lasthenia* spp. include butterflies (Lepidoptera), beetles (Coleoptera), flies (Diptera), true bugs (Hemiptera), bees, and wasps (Hymenoptera) (Thorp and Leong 1998), most of which are generalist pollinators. All of the specialist pollinators of goldfields are solitary bees (family Andrenidae) (Thorp 1990) that include two species in the subgenus *Diandrena* (*Andrena submoesta* and *A. puthua*) and five or six species in the subgenus *Hesperandrena* (*Andrena baeriae, A. duboisi, A. lativentris*, and two or three undescribed species) (Thorp and Leong 1998). The extent to which pollination of Burke's goldfields depends on host-specific bees or more generalist pollinators is not currently known.

No published information exists with respect to the seed life of Burke's goldfields. Circumstantial evidence suggests that Burke's goldfields has successfully germinated from seed in soil collected from a previously developed portion of the Westwind Business Park (Building F) when the soil was translocated and deposited in created seasonal wetlands (Wilcox *in litt.* 2000). As annual species, it is expected that Burke's goldfields will respond to environmental stochastic events, such as changes in vegetative composition, climate, and disturbance, by partial germination of its seed bank. Seed banks are of particular importance to annual plant species subject to uncertain or variable environmental conditions (Parker *et al.* 1989; Templeton and Levin 1979). Baskin and Baskin (1998) indicate that species (annuals) adapted to "risky environments" produce persistent seed banks to offset years of low reproductive success and to ensure the species can persist at a site without immigration. These characteristics can be attributed to Burke's goldfields. Considering the adaptations of these plants to a variable Mediterranean climate it is likely the seed of Burke's goldfields can persist as dormant embryos

for an undetermined number of years. Although formal studies of seed viability have not been conducted for this species, it is reasonable to expect their seed banks may persist for extended periods without germination until conditions are favorable; therefore some occurrences may persist undetected for a number of years. Furthermore, it is not unlikely that the individual fruits of Burke's goldfields may be predisposed to variable germination requirements as a strategy for survival.

According to Rice (1989) in some vegetative communities there is a distinct difference between above and belowground plant diversity and a census of aboveground flora may not accurately reflect the total number of species present at a site. Population sizes of California's vernal pool/swale annual plant species, including Burke's goldfields, may fluctuate substantially between very high numbers in some years to very small numbers, or even absence in other years because of varying environmental conditions. Therefore, extirpation, based on only a few surveys, cannot be assumed based only on absence of above-ground plants for some species. Furthermore, declines in population size over a few years may not necessarily indicate that habitat is unsuitable (Given 1994), merely that environmental conditions within a vernal pool or swale have not favored seed germination.

Burke's goldfields are endemic to the central California Coastal Range region and has been reported historically from Mendocino, Lake, and Sonoma counties (CNPS 1977; Patterson *et al.* 1994). The number of historic occurrences (noted as populations and sites in some references) is unclear and has been reported differently by various authors. For several decades, the only reported occurrence was the type locality in Mendocino County, reported in 1886. Ornduff (1969) noted *L. burkei* as known from "several populations" north of San Francisco Bay in the Coast Ranges. Later Ornduff (1976) reported the species was infrequently collected and was "restricted to a few populations." Waaland and Vilms (1989) surveyed 84 sites on the Santa Rosa Plain and noted 33 *L. burkei* occurrences and five additional sites where the species appeared to have been extirpated. CH2MHill (1995) noted 85 populations and cited Patterson *et al.* (1994) as the source. However, while Patterson *et al.* (1994) referenced 85 sites, they noted these sites comprised "approximately 18 biological populations." In 2006, genetic material was collected from 2 occurrences of *L. burkei* in Lake County and 13 in Sonoma County to evaluate the genetic relationship between the occurrences (Ayres and Sloop *in litt.* 2008). The California Natural Diversity Database (CNDDB) (2008) has 32 total occurrences (occurrences 1 – 34). Some CNDDB occurrences are comprised of multiple discreet polygons and may have been counted as separate populations at one time or another, for example occurrence 9 was combined with 7 and 20 was combined with 19. All references in this document to occurrence numbers are CNDDB occurrence number for that species.

The type locality of Burke's goldfields (occurrence 5) is the only known occurrence from Mendocino County, but has not been observed at this location for decades; however, its status is uncertain because the exact location of the site is unclear. Two occurrences are recorded from Lake County, one at Manning Flat (occurrence 6) and one at a winery on Highway 29 (occurrence 11) (Ornduff 1966; CNPS 1977, Patterson *et al.* 1994). Both Lake County occurrences were extant as of 2006 (Ayres and Sloop *in litt.* 2008). According to the CNDDB (2008) the occurrence at Manning Flat had more than 100 individuals in 1999, and an unspecified number in 2002, while the winery occurrence had an estimated 10,000 individuals in 2002. The remaining occurrences are from Sonoma County (CNDDB 2008). Within Sonoma

County, one occurrence is known from north of Healdsburg (Patterson *et al.* 1994; CNDDB 2008) near Lytton (occurrence 30). The last known population estimate of this occurrence was in 1990 with 300 plants observed (CNDDB 2008). Formerly well-represented (occurrences 4, 12, and 18) in the vicinity of Windsor, Burke's goldfields has now been nearly extirpated from the area (Patterson *et al.* 1994; CH2M Hill 1995); however, plants have been recently observed at one location (occurrence 12) (Ayres and Sloop *in litt.* 2008). On the Santa Rosa Plain, Burke's goldfields is distributed primarily in the northwestern and central areas with two additional occurrences south of Highway 12 near the Laguna de Santa Rosa (CH2M Hill 1995). The core of the current range of Burke's goldfields is in the Santa Rosa Plain. Of the 32 known occurrences of Burke's goldfields listed in the CNDDB, 28 are presumed to remain extant. Four historical occurrences are believed to be extirpated (occurrences 2-4 and 29), all of which are in Sonoma County. However, Ayres and Sloop (*in litt.* 2008) stated 20 populations were still extant. Of these 20, 11 are located in conservation banks and 9 are believed to be natural occurrences (C. Sloop Laguna de Santa Rosa Foundation, personal communication 2008). Four of the largest known occurrences are in Sonoma County (occurrences 10, 11, 24, and 25). The largest occurrence is along Alton Road (occurrence 25) and had between 300,000 and 1,500,000 plants in 2002 (CNDDB 2008).

1991 to 1998: Patterson *et al.* (1994) evaluated known Burke's goldfields sites on the Santa Rosa Plain, categorizing them as (1) in public ownership, (2) presumed extant and privately owned, and (3) extirpated or largely destroyed. Their data indicate that 33 percent of the acreage of known Santa Rosa Plain Burke's goldfields sites has been severely degraded or extirpated. As of 1998, the Service was aware of at least a dozen specific instances where ditching, draining, discing, or overgrazing occurred on parcels containing Burke's goldfields. In many cases, the number of plants at those sites declined after the disturbance took place. In addition, the Service was aware of at least four instances of unauthorized discing that triggered Corps enforcement actions for sites where Burke's goldfields grew. Because of typically small parcel size, development projects that have proceeded since listing, such as the Cobblestone and TMD Brown developments, have mitigated Burke's goldfields losses entirely off site. The few sites where plants were avoided in the course of development have failed to sustain viable populations (Service files).

The portion of Burke's goldfields' range that has been most severely affected is the northwestern portion of the Santa Rosa Plain. The majority of the known sites severely degraded or extirpated are in the Windsor area (Patterson *et al.*1994, CH2M Hill 1995). Two of the largest known populations in the county occurred in this area and were considered extirpated by Patterson *et al.* (1994). The extirpations were thought to have resulted from urban and commercial development or agricultural land use changes. For example, one CNDDB occurrence in the area contained 11 colonies in 1984; by 1993, only two were extant (CNDDB 1998). A second occurrence had more than 20 vernal pools in 1985, but by 1994, only one colony of Burke's goldfields was present (CNDDB 1998). This property once contained 50,000 plants, but after repeated discing only about 100 plants remain (Guggolz, pers. comm. 1998). Only a few stable Burke's goldfields sites still exist in the Windsor area, and these are threatened by development (Patterson *et al.* 1994). The City of Windsor has already developed, or designated development, on every Burke's goldfields site within their general planning area (Guggolz pers. comm. 1998).

Since listing in 1991, Burke's goldfields has continued to experience dramatic losses. The

Service used data from 1994 (Patterson *et al.* 1994) to examine how numbers of Burke's goldfields changed at particular sites between the time of listing and the most recent surveys that had been conducted after listing. A site, as defined by Patterson *et al.* (1994), may be all or part of a CNDDB occurrence. After listing, the number of sites with many individuals decreased, and the number with very few individuals increased. Fifteen of the 28 sites that we have both pre- and post-listing survey data for decreased in size after the species was listed. The percentage of sites with fewer than 10 individuals increased by 30 percent, and the percentage of sites with 10,000 to 100,000 individuals decreased by 7 percent. As of 1994, no sites were recorded with more than 100,000 plants. Data from Patterson *et al.* (1994) also indicate that between the time of listing and 1994, 12 different sites were extirpated or largely destroyed. The data indicate large populations of Burke's goldfields are diminishing and nearly half of the sites may have populations either extirpated or are highly vulnerable to extirpation due to small population numbers (less than 10 individuals) (calculated from Patterson *et al.* 1994; CH2M Hill 1995).

Approximately 15 percent of the acreage of Burke's goldfields sites on the Santa Rosa Plain had some preservation designation as of 1994 (calculated from data in Patterson *et al.* 1994). However, the species has not been observed at the Todd Road Preserve (the largest of the preservation sites), since 1987 (Patterson *et al.* 1994, CH2M Hill 1995). Excluding this site, the preserved acreage of Burke's goldfields sites is only 8 percent of the acreage known in 1994 (calculated from data in Patterson *et al.* 1994). Between 1994 and 1998, one preservation bank with Burke's goldfields had been established and was approved to sell credits for the species; however, only a small portion of the site supported Burke's goldfields.

1998 to present: The 1998 programmatic consultation for the listed plants was designed to allow up to 50 acres (20.23 ha) of low-quality seasonal wetlands to be filled and no more than 30 acres (12.14 ha) could be occupied (or presumed to be occupied) by the listed plant species. Of the 30 acres affected that were occupied or presumed occupied, no more than six acres would be on sites with known records of the listed plants. Affects to no more than six additional acres on sites with known records of listed plants may be authorized under the 1998 programmatic consultation at the Service's discretion, based upon the Service's evaluation of the significance of affects to the first six acres of known listed species habitat and/or upon substantial progress toward a comprehensive conservation program. Since 1998, less than 30 acres of low-quality seasonal wetlands were authorized to be filled under the 1998 programmatic consultation. Since 1998, several preservation banks have occurrences of Burke's goldfields, but not all are approved to sell credits for the species.

Burke's goldfields are threatened with habitat loss, fragmentation, and degradation throughout all or part of its range by factors including urbanization, agricultural land use changes, alterations in hydrology, wastewater irrigation, and erosion (CNPS 1977; Service 1991; Patterson *et al.* 1994; CH2M Hill 1995; CNDDB 1998). Since the time *L. burkei* was listed in 1991, the species has continued to experience dramatic loss. Patterson *et al.* (1994) evaluated known *L. burkei* sites on the Santa Rosa Plain. Their data indicated that 33 percent of the acreage of known Santa Rosa Plain *L. burkei* sites had been severely degraded or extirpated.

The Service used data from Patterson *et al.* (1994) to examine how numbers of *L. burkei* changed at particular sites between the time of listing and the most recent surveys. A site, as defined by Patterson *et al.* (1994), may be all or part of a CNDDB occurrence. After listing, the number of

sites with many individuals decreased, and the number with very few individuals increased. Fifteen of the 28 sites for which there is both pre- and post-listing data decreased in size after the species was listed. The percentage of sites with fewer than 10 individuals increased by 30 percent, and the percentage of sites with 10,000 to 100,000 individuals decreased by 7 percent. As of 1994, no sites were recorded with more than 100,000 plants. Data from Patterson *et al.* (1994) also indicate that between the time of listing and 1994, 12 different sites were extirpated or largely destroyed. The data indicate large populations of *L. burkei* are diminishing and nearly half of the sites may have populations either extirpated or are highly vulnerable to extirpation due to small population numbers (less than 10 individuals) (calculated from Patterson *et al.* 1994; CH2M Hill 1995).

The only known Mendocino County occurrence is presumably extirpated (CH2M Hill 1995). The Manning Flat occurrence, located on private land in Lake County, historically was the largest known occurrence of the species although it has been decreasing in recent years. The site is threatened by extensive gully erosion (CH2M Hill 1995; CNDDB 2008) as well as road improvements and herbicide use (CNDDB 2008). The second Lake County occurrence is on property owned by a winery. Recent reports suggest that some damage to this population has resulted from vineyard operations (Chan pers. comm. 1998). However, in the past the winery owners appeared willing to coordinate with the Service and the U.S. Army Corps of Engineers to avoid and/or minimize further damage to the site (Haley pers. comm. 1998). On the Santa Rosa Plain, many Burke's goldfields locations (entire or portions of entire occurrences) have been destroyed due to urbanization and conversion of land to row crops.

Urban Development and Conversion to Agriculture: The most severely impacted portion of the range of *Lasthenia burkei* has been the northwestern portion of the Santa Rosa Plain. The majority of the known sites severely degraded or extirpated are in the Windsor area (Patterson *et al.*1994, CH2M Hill 1995). Two of the largest known populations in Sonoma County occurred in this area and were considered extirpated by Patterson *et al.* (1994). The extirpations were thought to have resulted from urban and commercial development or agricultural land use changes. For example, one CNDDB occurrence in the area contained 11 colonies in 1984; by 1993, only two were extant (CNDDB 1998). A second occurrence had more than 20 vernal pools in 1985, but by 1994, only one colony of *L. burkei* was present (CNDDB 1998). This property once contained 50,000 plants, but after repeated disking only about 100 plants remain (Guggolz pers. comm. 1998). Only a few stable *L. burkei* sites still exist in the Windsor area, and these are threatened by development (Patterson *et al.* 1994). The City of Windsor has already developed, or designated development, on every *L. burkei* site within their general planning area (B. Guggolz, 1998 pers. comm.). Only a few stable *L. burkei* sites still exist in the Windsor area, and these are threatened by development (Patterson *et al.* 1994). Development in the Windsor area continues to impact the limited amount of remaining *L. burkei* habitat in this area (Chamberlin pers. comm. 2008).

The population of California is expected to increase to 58 million, almost double the 1990 State population, by 2040 (Field *et al.* 1999). Between 1994 and 2005, the Sacramento FWS office engaged in Section 7 consultations for projects with impacts to approximately 20,250 hectares (50,000 acres) of vernal pool habitat, including the loss of 10,125 hectares (25,000 acres) to residential, commercial, and industrial development (Service 2005c). The Cities of Santa Rosa, Cotati, and Rohnert Park assisted in the preparation of the Santa Rosa Plain Conservation

Strategy (2005) and identified the areas expected to be proposed for development by the year 2015. The threat of urban development to these species in the Santa Rosa Plain is expected to continue in the foreseeable future (Conservation Strategy Team 2005).

Alteration of Hydrology: Vernal pool plants are sensitive to changes in the timing and length period of vernal pool inundations (Bauder 2000). Alteration of the hydrological regime as a result of breaking the clay hard pan (e.g., disking or deep ripping) and draining the pools can change the composition of plant species by invasion of non-native upland species. Conversely, if water from urban or agricultural run-off continues to fill pools during spring and summer months, invasion by plant species adapted to permanent inundation can be expected. Disking appears to be a common activity for fire prevention. Some sites are disked in entirety and others only the perimeter (V. Griego. Service, personal observation, 2003 - 2007). Regular disking has resulted in "smearing" (flattening the landscape) and change the natural hydrology of the area. Some land owners purposefully changed the hydrology to 'get rid' of the listed plants (Chamberlin pers. comm. 2008b). In addition, the hydrology of the seasonal wetland habitat of these plants in many areas throughout the Santa Rosa Plain has been altered by human activity. This resulted in the loss of hydrologic connectivity to neighboring wetlands, to an extent that conditions may not be suitable for germination and flowering in many years. However, the plants can still persist in the seedbank and have been known to "reappear" once more appropriate hydrologic conditions are reestablished (Rosburg 2001; Kivilaan *et al.* 1981).

Changes to vernal pool habitat associated with residential development include facilitation of the introduction of non-native plants to vernal pool habitats (Service 2007). Non-native grasses occur commonly in vernal pool complexes and have become a threat to native vernal pool plants through their capacity to change pool hydrology and competition with native plants. Non-native grasses maintain dominance at pool edges, sequestering light and soil moisture, promoting thatch build-up, and shortening inundations periods. Although the mechanism responsible for the change in inundation is not documented, reduction in inundation period is thought to be due to increased evapo-transpiration at the vernal pools (Marty 2005).

Wastewater Irrigation: Wastewater irrigation is a recently established factor affecting vernal pools on the Santa Rosa Plain. This practice began in the 1970s and has continued which has resulted in changing seasonal wetland plant composition. While the native seasonal wetland species are adapted to a summer-dry Mediterranean climate, summer irrigation results in perennial wetland conditions that are intolerable by native seasonal wetland species (Patterson *et al.* 1994). A 1996 draft Environmental Impact Report (EIR) addressed a proposed long-term wastewater project that would dispose of wastewater from the Laguna Wastewater Treatment Plant by irrigating fields on the Santa Rosa Plain (City of Santa Rosa 1996). The draft EIR stated that wastewater irrigation would avoid impacts to sensitive biological resources. However, in February of 1998, the site supporting many-flowered navarretia had a sign stating wastewater was being used for irrigation on-site (Service 2007). Patterson *et al.* (1994) stated that the ongoing need to expand effluent irrigation acreage to keep pace with population growth will continue to jeopardize the existence of oak woodlands and vernal pools on the Santa Rosa Plain unless other, less sensitive lands are found for irrigation or other means of disposal are found. The City of Santa Rosa has recently developed an EIR to look at additional wastewater storage and irrigation in the Santa Rosa Plain. The City of Santa Rosa is pursuing agreements with other wastewater facilities (Sonoma County Water Agency and Town of Windsor) to share

irrigation and storage. The City of Santa Rosa is permitted to apply wastewater biosolids to lands within the Santa Rosa Plains. The California Regional Water Quality Control Board recently issued a renewed permit to Santa Rosa for wastewater discharges. The permit requires the City of Santa Rosa to study wastewater land application rates to ensure they are not over-irrigating. The permit recognized specific pollutants (including toxic pollutants) in the treated wastewater. The permit sets time schedules for these pollutants to be addressed prior to discharge to surface waters. Technically, the California Regional Water Quality Control Board regulations (Water Quality Control Plan for the North Coast Region) prohibit wastewater discharge to surface waters during the summer. The regulations however do not contemplate that wastewater would be used to irrigate vernal pools and other types of seasonal wetlands (Service 2007). Unchecked wastewater irrigation may alter the normal hydrology of vernal pools in the Santa Rosa Plain and adversely affect *B. bakeri, L. burkei*, and *L. vinculans*.

Off Highway Vehicles: The use of off highway vehicles continues to degrade some vernal pool habitat in the Santa Rosa Plain. For example, there is one location where motocross tracks were created for recreation. There was one incidence where a vehicle entered private property, drove through a population of Blennosperma bakeri, and became stuck. At another location, a locked gate was broken into at a California Department of Fish and Game Preserve that is protected for these species. It is reasonable to expect activities of this sort to increase as urban development and rural development continue to increase. The level of this threat is likely to be variable and is difficult to predict.

Sonoma Sunshine

Sonoma sunshine was federally listed as endangered on December 2, 1991 (Service 1991). No critical habitat has been designated for this species.

Sonoma sunshine is a small annual herb in the aster family. Plants are usually less than 11.8 inches tall with alternate, linear leaves (CNPS 1977; Ordnuff 1993). The stems are hollow and somewhat fleshy, varying from 0.08 to 0.24 inches in diameter. The lower leaves are entire, and the upper leaves have one to three lobes that are 0.4 to 1.2 inches deep (Ordnuff 1993). The yellow disk flowers have white pollen and stigmas, while the sterile ray flowers are yellow or sometimes white, with red stigmas. The lobe pattern of the leaves and the color of ray stigmas separate this species from others in the genus. Although the disk flowers in Sonoma sunshine have pistils, they do not produce achenes. However, each ray flower produces one tapered achenes 0.1 to 0.15 inches long with small rounded or conic protuberances (papillate) and 4 to 6 strongly angled edges (CNPS 1977, Ordnuff 1993). *Blennosperma bakeri* grows in vernal pools and wet grasslands below 100 meters (330 feet) (Hickman 1993). *Blennosperma bakeri* occurs in vernal pools on nearly level to slightly sloping loams, clay loams, and clays. The flowers of *B. bakeri* are self-incompatible, meaning that they can set seed only when fertilized by pollen from a different plant.

Sonoma sunshine grows in vernal pools and wet grasslands below 330 feet (Hickman 1993). In the Sonoma and Cotati valleys, Sonoma sunshine occurs in vernal pools on nearly level to slightly sloping loams, clay loams, and clays (Service 1991). The two concentrations of Sonoma sunshine on the Santa Rosa Plain occur on different soil types (Patterson *et al.* 1994). Sonoma sunshine likely grows on Huichica loam north of Highway 12 and on Wright loam and Clear

Lake clay south of Highway 12 (Patterson *et al.* 1994, CNDDB 1998). These soil series are briefly described in the discussion of Burke's goldfields habitat above.

Sonoma sunshine flowers from March to April. According to Thorp (1976) *Andrena blennospermatis* is the primary visitor to Sonoma sunshine and *Andrena layiae* is known to collect pollen from other species of *Blennosperma*. In addition, few generalist insects are associated with species of Blennosperma as compared to Lasthenia (Thorp 1976). The extent to which pollination of Sonoma sunshine depends on host-specific bees or more generalist pollinators is not currently known. Some generalist insects known to visit the flowers of Blennosperma include other bees (Halictidae and Megachilidae), flies (Syrphidae and Bombyliidae), and beetles (Dermestidae, Dasytidae, and Meloidae).

As noted above under Burke's goldfield, seed banks are believed to be of particular importance in annual species subject to uncertain or variable environmental conditions. As with Burke's goldfield, Sonoma sunshine fit these criteria, since they are annual species (Hickman 1993) living in an uncertain vernal pool environment (Holland and Jain 1977). In the absence of data to suggest otherwise, the presence of substantial seed banks for these species is a reasonable assumption.

For nearly 20 years, the only known occurrence (CNDDB occurrence 3) of Sonoma sunshine was the type locality first described in 1946 within the City of Sonoma, Sonoma County, California (Ornduff 1963). In 1963, a second occurrence (occurrence 2) was discovered a few miles south of the first (Ornduff 1963). Both of these first two occurrences were outside of the Santa Rosa Plain but within the Sonoma Valley. The first occurrence within the Santa Rosa Plan was discovered in 1974 (Patterson *et al.* 1994). On the Santa Rosa Plain the species ranges from near the community of Fulton in the north to Scenic Avenue between the Cities of Santa Rosa and Cotati in the south. Additionally, the species extends or extended from near Glen Ellen to near the junction of State Routes 116 and 121 in the Sonoma Valley.

As with *L. burkei*, the number of historical occurrences (populations and sites in some reports) of Sonoma sunshine has varied depending on author. Waaland and Vilms (1989) reported 30 extant sites with Sonoma sunshine and three extirpated sites. Patterson *et al.* (1994) estimated there were 60 historical populations on separate properties, but that many were hydraulically connected and less than 12 were biologically separate populations. The Service (1991) reported Sonoma sunshine from no more than 42 sites, 35 in the Cotati Valley (locally referred to as the Santa Rosa Plain) and 7 in the Sonoma Valley. The CNDDB (2008) lists 26 occurrences of Sonoma sunshine with three known to be extirpated (occurrences 2, 3, and 18) and one listed as possibly extirpated (occurrence 13). However, Ayres and Sloop (*in litt.* 2008) observed at least 35 plants at the Horn Mitigation bank, which may have encompassed part of occurrence 18. According to Sloop (C. Sloop Laguna de Santa Rosa Foundation, personal communication 2008) there are 23 extant Sonoma sunshine sites, although she was only able to sample 10 (Ayres and Sloop *in litt.* 2008). The Service is aware of four occurrences not listed in the CNDDB, two of which are in close proximity to existing occurrences 30 and 25 and may not be separate. The other two occurrences are not located near any known record and may represent previously undocumented occurrences. One is immediately northwest of the City of Windsor (Ayres and Sloop *in litt.* 2008) and the second is in the vicinity of the City of Shiloh. Of the 26 CNDDB occurrences, 22 are presumed to be extant with a majority occurring on the Santa Rosa Plain,

one occurring near the City of Glen Ellen (occurrence 5), and two south of the City of Sonoma (occurrence 16 and 22). In addition, Sonoma sunshine has been introduced to at least five sites including Alton Lane Mitigation Site, Slippery Rock Conservation Bank, Woodbridge Mitigation Site, Hazel Mitigation Bank, and Carinalli-Todd Mitigation Bank (V Griego pers. comm. 2008).

1991 to 1998: Patterson *et al.* (1994) estimated less than 12 biologically separate populations remain. Of the sites they examined, 17 percent (nearly one-third) had been extirpated, and 17 percent (nearly one-sixth) had not been confirmed recently. An additional 17 percent (one-sixth) were believed to be extant but threatened by development as of 1994 (Patterson *et al.* 1994). A site, as defined by Patterson *et al.* (1994), may be all or part of a CNDDB occurrence. At one CNDDB occurrence, 12 Sonoma sunshine colonies were observed in 1989. By 1993, only six remained (CNDDB 1998). The Service is aware of at least five specific Sonoma sunshine sites that have been developed or isolated by surrounding development or vineyards on the Santa Rosa Plain since the time of listing, including the Cobblestone and TMD Brown developments. Other sites have been used as wastewater irrigated pastures, damaged by off road vehicle (ORV) use, heavily grazed, or been subject to land conversion activities (CNDDB 1998, Service files). In addition, Sonoma sunshine is known from at least one of the Burke's goldfield sites mentioned above that were disced without authorization and resulted in enforcement actions being taken by the Corp's (Service files).

The Service used data from 1994 (Patterson *et al.* 1994) to examine how numbers of Sonoma sunshine changed at particular sites between the time of listing and the most recent surveys that had been conducted after listing. After listing, the number of sites with many individuals decreased, and the number with less than 10 individuals increased. The percentage of sites with fewer than 10 individuals increased by 15 percent between the time of listing and 1994.

Approximately 8 percent of the acreage of Sonoma sunshine sites known from the Santa Rosa Plain had some protection as of 1994 (calculated from data in Patterson *et al.* 1994). Of the 120 acres designated as preserve (excludes areas under conservation easement), the amount of habitat containing the species is estimated to be only 2 acres (Guggolz 1995 as cited in CH2M Hill 1995). Between 1994 and 1998, one preservation bank authorized to sell Sonoma sunshine credits had been established, but only 15 individual plants have been observed in recent surveys at the site (Waaland pers. comm. 1998).

1998 to present: The 1998 programmatic consultation was designed to allow up to 50 acres of low-quality seasonal wetlands to be filled and no more than 30 acres could be occupied (or presumed to be occupied) by the listed plant species. Of the 30 affected acres that are occupied or presumed occupied, no more than six acres would be on sites for which there are known records of the listed plants. Affects to no more than six additional acres on sites for which there are known records of listed plants may be authorized under the 1998 programmatic consultation at the Service's discretion, based upon the Service's evaluation of the significance of affects to the first six acres of known listed species habitat and / or upon substantial progress toward a comprehensive conservation program. Between the period of the 1998 programmatic consultation and the November 7, 2007 Programmatic BO, less than 30 acres of low-quality seasonal wetlands were authorized to be filled under the 1998 programmatic. At this time, it is unknown how many of the 30 acres filled were occupied with one or more of the listed plants. The low-quality seasonal wetlands were to be mitigated for with preservation and creation of

listed plant habitat as outlined in the 1998 programmatic.

Sonoma sunshine is threatened with habitat loss, fragmentation, and degradation throughout all or part of its range by urbanization, waste water irrigation, agricultural land use changes, and alterations in hydrology (Patterson *et al.* 1994; CH2M Hill 1995; CNDDB 2008). These threats are more fully explained above for Burke's goldfields. The type locality (occurrence 3) was extirpated in the 1980s by residential development and conversation of part of the site to vineyards (CNDDB 2008). Occurrence 2, was extirpated in 1986 by activities associated with a vineyard (CNDDB 2008). Occurrence 18, was extirpated as a result of several factors including mowing, disking, alteration in hydrology, and development (CNDDB 2008). A fourth occurrence (13) listed in the CNDDB as possibly extirpated is described as having no remaining suitable habitat as a result of the construction of a residential subdivision (CNDDB 2008) and no individual plants have been observed at this site since 1990. Of the presumed extant Sonoma Valley occurrences (16 and 22) one occurrence was largely destroyed in 1989, but new vernal pools were created and some plants were observed in 1995 (CNDDB 2008). Occurrence 5, in the Sonoma Valley Regional Park, while protected is not managed specifically for conservation (CNDDB 2008); this site had an estimated 25,000 plants in 1991 (CNDDB 2008) and at least 35 plants were present in 2006 (Ayres and Sloop *in litt.* 2008). Occurrences 7 and 8 are both irrigated by waste water (CNDDB 2008) and maybe suffering from invasion by non-native vegetation. A second Sonoma Valley locale is currently used as a pasture. A portion of the occurrence may have been disked, and the landowners of a second portion want to convert the locale to vineyard (Wilcox pers. comm. 1998). The third Sonoma Valley occurrence is in Sonoma Valley Regional Park, which is not managed for conservation (CNDDB 2008). On the Santa Rosa Plain, one locale has probably been extirpated by completion of a subdivision and one locale by major land alterations on the locale (CNDDB 2008). Of the presumed extant locales, some support severely degraded habitat, are threatened by development, or have not supported confirmed populations of Sonoma sunshine in recent years (CH2M Hill 1995; CNDDB 2008).

The Service used data from 1994 (Patterson *et al.* 1994) to examine how numbers of *B. bakeri* plants at particular sites changed between the time of listing and the most current surveys that had been performed after listing. After listing, the number of sites with many individuals decreased, and the number with less than 10 individuals increased and the percentage of sites with fewer than 10 individuals increased by 15 percent between the time of listing and 1994.

Sebastopol Meadowfoam

Sebastopol meadowfoam was federally listed as endangered on December 2, 1991 (Service 1991). No critical habitat has been designated for this species.

Sebastopol meadowfoam is a small multi-stemmed herb in the false meadowfoam family (Limnanthaceae). Plants are usually less than 11.8 inches in height with weak, somewhat fleshy, decumbent stems. Although the first leaves are narrow and undivided, leaves on the mature plant have three to five narrow unlobed leaflets with rounded tips along each side of a long stalk (petiole). The shape of the leaves distinguishes *L. vinculans* from other members of the *Limnanthes* genus. Small, bell or dish-shaped, white flowers appear April through May. The fragrant white flowers are born singly at the end of stems. The seeds of *L. vinculans* germinate

after the first significant rains in fall. Repeated drying and filling of pools in the spring favors development of large plants with many branches and long stems. This species grows in Northern Basalt Flow and Northern Hardpan vernal pools (Sawyer and Keeler-Wolf 1995), wet swales and meadows, on the banks of streams, and in artificial habitats such as ditches (Wainwright 1984; CNDDB 2008).

The seeds of Sebastopol meadowfoam germinate after the first significant rains in fall, although late initiation of rains may delay seed germination. Sebastopol meadowfoam plants grow slowly underwater during the winter, and growth rates increase as the pools dry. Repeated drying and filling of pools in the spring favors development of large plants with many branches and long stems. Sebastopol meadowfoam begins flowering as the pools dry, typically in March or April. The largest plants can produce 20 or more flowers. Flowering may continue as late as mid-June, although in most years the plants have set seed and died back by then (Patterson *et al.* 1994). Each plant can produce up to 100 nutlets (a small dry one-seeded fruit) (Patterson *et al.* 1994).

Nutlets of Sebastopol meadowfoam likely remain dormant in the soil, as they do for other species of *Limnanthes* (Patterson *et al.* 1994). One case presents strong circumstantial evidence for persistent, long-lived seed banks in this species. In the late 1980's and early 1990's, a site in Cotati remote from other Sebastopol meadowfoam colonies was surveyed for several years by independent qualified botanists. None of these botanists identified flowering populations of Sebastopol meadowfoam on the project site. Conditions of the pools on the site were highly degraded by wallowing hogs (*Sus scrofa*) and subsequent eutrophication of the pools. Following several years of negative surveys 12 plants of Sebastopol meadowfoam emerged simultaneously in one pool in the first year following removal of hogs. The population expanded rapidly to 60 plants the next year and was larger in subsequent years (Service 2007), all limited to one pool. Long-distance dispersal is an improbable explanation for the simultaneous emergence of multiple plants at one location, so seed banks are implicated in this case as well. This example also indicates that lack of Sebastopol meadowfoam during periods of adverse conditions (drought, heavy disturbance, etc.) does not necessarily mean the population is extirpated.

This species grows in Northern Basalt Flow and Northern Hardpan vernal pools (Sawyer and Keeler-Wolf 1995), wet swales and meadows, on the banks of streams, and in artificial habitats such as ditches (Wainwright 1984; CNDDB 2008). The surrounding plant communities range from oak savanna, grassland, and marsh in Sonoma County to riparian woodland in Napa County (CNDDB 2008). Sebastopol meadowfoam grows in both shallow and deep areas, but is most frequent in pools 10 to 20 inches (25 to 51 centimeters) deep (Patterson *et al.* 1994). The species is most abundant in the margin habitat at the edge of vernal pools or swales (Service 2007). Most confirmed occurrences of Sebastopol meadowfoam on the Santa Rosa Plain grow on Wright loam or Clear Lake clay soils (Patterson *et al.* 1994, CNDDB 2008). A few occurrences are on other soil types, including Pajaro clay loam, Cotati fine sandy loam, Haire clay loam (Patterson *et al.* 1994) and Blucher fine sandy loam (Wainwright 1984).

As with *L. burkei* and *B. bakeri* the number of historical occurrences (populations and sites in some reports) of Sebastopol meadowfoam have varied depending on author. Patterson *et al.* (1994) states that in 1980 populations of *L. vinculans* were known from 17 locations. By 1994, the species was known from 55 individually owned parcels, but the number of individual populations was estimated to be 10 (Patterson *et al.* 1994). According to the CNDDB (2008)

there are a total of 39 historical occurrences. In the past more occurrences were noted in the CNDDB, but many have since been combined into a single occurrence. Occurrence 5 includes 8, 32, and 41, occurrence 1 includes 4, 11, 19, 37, and 44, occurrence 12 includes 13, occurrence 21 includes 45, and occurrence 28 includes part of 18. Thirty-eight occurrences are known from Sonoma County and one occurrence (occurrence 39) in Napa County, at the Napa River Ecological Reserve. In Sonoma County, all but two occurrences were found in the central and southern portions of the Santa Rosa Plain. Occurrence 20 occurred at Atascadero Creek Marsh west of Sebastopol, and occurrence 40 in the vicinity of Knights Valley northeast of Windsor (CNDDB 2008).

The current condition of numerous Sebastopol meadowfoam occurrences is unclear, because many have not been visited in almost a decade. As indicated above, Patterson *et al.* (1994) estimated only 10 hydrologically separate populations of *L. vinculans*. A site, as defined by Patterson *et al.* (1994), may be all or part of a CNDDB occurrence. Of the 55 sites they examined, four sites (7 percent) were considered erroneous, 10 sites (18 percent) were extirpated, 10 sites (18 percent) were extant but threatened by development, and 20 sites (36 percent) were extant but may not have been large enough to qualify as good preserve lands (Patterson *et al.* 1994). Out of the 39 occurrences currently listed in the CNDDB four sites (10 percent) are identified as extirpated and two additional sites (5 percent) listed as possibly extirpated. In 2006, genetic samples were taken from 21 locations with *L. vinculans*, 20 on the Santa Rosa Plain and one (occurrence 39) from Napa County (Ayres and Sloop *in litt.* 2008). Of the 21 sites sampled, 13 correspond to extant CNDDB occurrences. One corresponded to occurrence 12, which was believed to be extirpated (CNDDB 2008) and one site was an entirely new occurrence.
1991 to 1998: Patterson *et al.* (1994) estimated only 10 hydrologically separate populations of Sebastopol meadowfoam exist. Of the sites they examined, nearly 10 percent were considered erroneous, 18 percent were extirpated, 18 percent were extant but threatened by development, and 36 percent were extant but may not be large enough to qualify as high-quality preserve lands (Patterson *et al.* 1994). A site, as defined by Patterson *et al.* (1994), may be all or part of a CNDDB occurrence. According to Service records, significant Sebastopol meadowfoam sites are within southwest Santa Rosa. Other sites have been extensively fragmented by development, leaving parts of larger vernal pool complexes interspersed with homes. Repeated discing and land conversion activities have damaged some sites as well (Service files).

Excluding easements, eight Sebastopol meadowfoam sites comprising approximately 170 acres were preserved as of 1994 (Patterson *et al.* 1994). However, only a small portion of this acreage is considered actual Sebastopol meadowfoam habitat (CH2M Hill 1995). These eight sites comprised approximately 11 percent of the acreage of Sebastopol meadowfoam sites known from the Santa Rosa Plain in 1994 (calculated from data in Patterson *et al.* 1994). Between 1994 and 1998, two preservation banks with Sebastopol meadowfoam had been established and were authorized to sell credits for this species.

1998 to present: The 1998 programmatic consultation was designed to allow up to 50 acres of low-quality seasonal wetlands to be filled and no more than 30 acres could be occupied (or presumed to be occupied) by the listed plant species. Of the 30 acres affected that were occupied or presumed occupied, no more than six acres would be on sites with known records of the listed plants. Affects to no more than six additional acres on sites with known records of listed plants may be authorized under the 1998 programmatic consultation at the Service's discretion, based

upon the Service's evaluation of the significance of affects to the first six acres of known listed species habitat and / or upon substantial progress toward a comprehensive conservation program. Between the period of the 1998 programmatic consultation and the November 7, 2007 Programmatic BO, less than 30 acres of low-quality seasonal wetlands were authorized to be filled under the 1998 programmatic. At this time, it is unknown how many of the 30 acres were occupied with one or more of the listed plants. The low-quality seasonal wetlands were to be mitigated for with preservation and creation of listed plant habitat as outlined in the 1998 programmatic.

Sebastopol meadowfoam is threatened with habitat loss, fragmentation, and degradation throughout all or part of its range by urbanization, waste water irrigation, agricultural land use changes, small population size, and alterations in hydrology (Patterson *et al.* 1994; CH2M Hill 1995; CNDDB 2008). These threats are more fully explained above for Burke's goldfields. As with Burke's goldfields and Sonoma sunshine, causes of habitat loss include agricultural conversion, urbanization, and road maintenance. Habitat degradation is caused by excessive grazing by livestock, alterations in hydrology, and competition from non-native species (in some cases, exacerbated by removal of grazing), off-highway vehicle use, and dumping (Service 1991; Patterson *et al.* 1994; CH2M Hill 1995; CNDDB 2008).

Preserves

As described in the Santa Rosa Plain Conservation Strategy, a "Preserve" includes mitigation and conservation banks and other mitigation and conservation sites. Parcels proposed for preservation under the Programmatic BO or Santa Rosa Plain Conservation Strategy Interim Mitigation Guidelines provide habitat for the California tiger salamander and/or listed plants. Preserve applications are evaluated by the Service and CDFG to determine its suitability. There are general and species specific Preserve criteria. General Preserve establishment guidance and evaluation criteria are:

1. The site must be preserved in perpetuity for the benefit of the affected species through dedication of fee title or a conservation easement to an appropriate resource management agency or organization.

2. The site must have a habitat enhancement plan with success criteria, if California tiger salamander and/or listed plant habitat is to be created, restored or established on the site.

3. The site must have a management and monitoring plan including management actions necessary to manage, enhance, and protect the resources protected and created on the site, and monitoring actions to determine the success of created or restored wetlands and the status of the protected resources and effectiveness of specified management actions.

4. The site must have a Service and CDFG – approved funding mechanism to assure long-term management and monitoring.

Species specific criteria for California tiger salamander are:

1. Be within the boundary of one of the Conservation Areas designated by the Conservation

Strategy, unless otherwise approved by the Service and CDFG.

2. Contain known, occupied California tiger salamander breeding, upland, or dispersal habitat; or represent potential California tiger salamander habitat. With respect to potential California tiger salamander habitat, the site must exhibit, in the judgment of the Service and CDFG, reasonable potential for habitat restoration or enhancement. Preserves must ultimately have the listed species present within a reasonable time frame.

3. Be free of excessive land surface features such as roads, parking lots, other hardened surfaces, buildings or other structures, or extensive hardscape that cause a significant portion of the site to be unsuitable as California tiger salamander habitat. Generally, for purposes of this criterion, no more than 15% of the land surface of any potential preserve site may include or be covered by such features unless it is to be restored as part of the preservation action.

4. Not isolated from other nearby California tiger salamander habitats (preserve or non-preserve) by incompatible land uses (e.g., hardscape) or other significant barriers to California tiger salamander movement and dispersal, such as Highway 101.

5. Not inhabited by fish and bullfrogs or other non-native predatory species, unless, in the judgment of the Service and CDFG, such species can be effectively removed or eradicated.

6. Not within the Laguna de Santa Rosa 100-year floodplain.

7. Exhibit no history or evidence of the presence (storage or use) of hazardous materials on the surface of the site unless proof of removal or remediation can be provided.

Species specific criteria for Burke's Goldfields, Sonoma sunshine, and Sebastopol meadowfoam are:

(1) Preservation of the listed plant species in appropriate locations within the Plain, as previously described in *Plant Mitigation and Establishment* section of the 2007 Programmatic.

(2) Contain known population(s) of listed plants or represent potential plant habitat. With respect to potential plant habitat, the site must exhibit, in the judgment of the Service and CDFG, reasonable potential for habitat restoration, and establishment of listed plant population(s).

(3) Be free of excessive land surface features such as roads, parking lots, other hardened surfaces, buildings or other structures, or extensive hardscape that cause a significant portion of the site to be unsuitable as plant habitat. Generally, for purposes of this criterion, no more than 15% of the land surface of any potential preserve site may include or be covered by such features unless it is to be restored as part of the preservation action.

(4) If establishing populations of Sebastopol meadowfoam, the location is to be located south

of Santa Rosa Creek. If establishing populations of Sonoma sunshine and/or Burke's goldfields, the location is to be north of the Laguna de Santa Rosa.

(5) Plant preserves should be a minimum of ten acres. Smaller plant preserves may be established to protect extant populations of Sonoma sunshine and Burke's goldfield, where the site characteristics would assure long-term viability or there is an opportunity to protect important population of these two species.

(6) From a management perspective, preserves should include the entire watershed of the pool(s) and swale(s) being protected, and the ratio of perimeter to area should be minimized.

(7) In general, establishment of plant population(s) should not occur in areas where preservation of any natural population(s) occur unless it can be demonstrated that no adverse effects would occur to the natural population(s) as a result of establishing plant populations.

Other required mitigation components include management plans, long-term endowments, and other necessary requirements, all of which must be complete and approved by the Service and CDFG. Preserve enhancement or management associated with permits and enforcement actions that are appended to the Programmatic BO will be provided individual take authorization. It is anticipated that ground work associated with enhancing a Preserve will generally have a net benefit to the California tiger salamander and/or listed plants and would not need to adhere to the mitigation ratios.

Recovery Actions

The Conservation Strategy was developed by a team of representatives (Conservation Strategy Team) from the Service, Corps, U.S. Environmental Protection Agency, California Department of Fish and Game, Sonoma County, local cities, North Coast Regional Water Quality Control Board, local governmental agencies, the Laguna de Santa Rosa Foundation, the environmental community, and the private landowner community.

The Conservation Strategy is limited to the Santa Rosa Plain which is located in central Sonoma County, bordered on the south and west by the Laguna de Santa Rosa, on the east by the foothills, and on the north by the Russian River.

The purpose of the Conservation Strategy is threefold: (1) to establish a long-term conservation program sufficient to compensate potential adverse effects of future development on the Santa Rosa Plain, and to conserve and contribute to the recovery of the California tiger salamander and a select group of listed plants (Sonoma sunshine, Burke's goldfields, Sebastopol meadowfoam, and many-flowered navarretia [*Navarretia leucocephala* ssp. *Plieantha*]) and the conservation of their sensitive habitat; (2) to accomplish the preceding in a fashion that protects stakeholders' (both public and private) land use interests, and (3) to support issuance of an authorization for incidental take of California tiger salamanders and listed plants that may occur in the course of carrying out a broad range of activities on the Santa Rosa Plain

The Conservation Strategy provides the biological basis for a permitting process for projects that are in the potential range of listed species on the Santa Rosa Plain. This is intended to provide consistency, timeliness and certainty for permitted activities. The Conservation Strategy study area is comprised of the potential California tiger salamander range and the listed plant range within the Santa Rosa Plain. The Conservation Strategy establishes interim and long-term mitigation requirements and designates conservation areas where compensation will occur. It describes how preserves will be established and managed. It also includes guidelines for translocation, management plans, adaptive management and funding.

The Service prepared the November 9, 2007, *Programmatic Biological Opinion for U.S. Army Corps of Engineers Permitted Projects that May Affect California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain, California,* which was based on the Conservation Strategy. The Service will also prepare a recovery plan for the Sonoma County Distinct Population Segment of the California tiger salamander and listed plants as required by the Act. The Conservation Strategy will be the foundation of the recovery plan.

Environmental Baseline

California Tiger Salamander

The Graton Rancheria Casino and Hotel Project site is located just inside the City of Rohnert Park western urban boundary. It generally bounded by highway 101 to the east, Wilfred Avenue to the north, Langner Avenue on the west, and Business Park to the south. There is open space and CTS habitat to the west and north and limited habitat remains to the east and south. CTS individuals are expected to be found at the project site and in all directions in suitable habitat.

Presence/absence surveys for California tiger salamanders were performed for the Northwest Specific Plan portion of the Wilfred Site by H.T. Harvey & Associates in 2003 and 2004. During the second season of surveys for CTS one gravid female CTS was found. The finding of a gravid female suggests that there is breeding habitat on or near the project site and other CTS individuals occupy this area. In addition, the site supports adequate dispersal and foraging habitat for CTS.

Wildlife Research Associates conducted a CTS Site Assessment of the southern portion of the Wilfred Site in 2004 as part of a survey of a larger area. This assessment determined that the area outside of the 100-year floodplain provides suitable upland habitat for CTS in the form of gopher burrows. Suitable aquatic habitat for larvae occurs in the drainage ditches to the north of the Wilfred Site on Primrose Avenue, where both CTS egg sacs and larvae were observed by the investigator (Trish Tatarian) and CTS adult(s) were observed adjacent to the intersection of Millbrae Avenue and highway 101 (Conservation Strategy Team 2005) approximately 0.66 miles northwest of the proposed casino project. Other observations of CTS include adult(s) approximately 0.4 miles south which have since been extirpated due to industrial development.

Land within the 100-year floodplain (a large portion of the southern area of the Wilfred Site) likely is not CTS habitat, but all other areas within the Wilfred Site is considered CTS habitat.

Burke's Goldfields, Sonoma Sunshine and Sebastopol Meadowfoam

CNDDB records indicate that Sonoma sunshine and Burke's goldfields historically occurred on the 432.7-acre site. Systematic surveys for rare plants have been conducted throughout a 432.7-acre study area. Surveys for listed plant species were conducted for most of the northern area of the Wilfred Site by Stromberg in 2001 and 2002 and North Fork Associates in 2004. Additional surveys of the northern area of the Wilfred Site were conducted by Ecosystems West Consulting Group in 2007 and 2008, surveys that included an approximately 4-acre area not included in the prior studies.

EcoSystems West Consulting Group botanists did not observe any federal or state-listed plant species during the fall 2003 and spring 2004 surveys. During the 2005 and 2007 surveys, EcoSystems West observed a population of Sonoma sunshine on the 432.7-acre site, within the mapped historic area of occurrence of the species. They also observed one naturally-occurring special-status species, Lobb's aquatic buttercup (*Ranunculus lobbii*) at four localities on the site in 2004. This species is listed on List 4 of the CNPS *Inventory* (Tibor 2001; CNPS 2003). The 2005 and 2007 surveys revealed the presence of additional colonies of Lobb's aquatic buttercup at the site. EcoSystems West did not observe Burke's goldfields on the site in either 2004, 2005 or 2007. CNDDB records indicate that Burke's goldfields historically occurred on the site, in approximately the same location as Sonoma sunshine. The CNDDB indicates that it is believed that Burke's goldfields was extirpated from the site sometime prior to 1994, although the cause of its extirpation is not known.

The historic occurrences of these species on the site are CNDDB Occurrence No. 20 of Sonoma sunshine and CNDDB Occurrence No. 29 of Burke's goldfields. The two occurrences are mapped by CNDDB as coinciding exactly. The portions of these occurrences in the study area are east of Stony Point Road along the site boundary, in an area now encompassing both the extreme southwest corner of the current irrigated pasture area and the extreme northwest corner of the uncultivated area to the south, containing seasonal pool and California annual grassland habitat. These areas are separated by a fence. Both occurrences are mapped as continuing west of Stony Point Road, outside the study area. Approximately half of each mapped occurrence area is within the study area.

According to the CNDDB records, Sonoma sunshine was first observed on the site in 1987 (approximately 100 plants), and it is unknown when Burke's goldfields was first observed on the site. The CNDDB records also indicate that Burke's goldfields was extirpated on the site by 1994, while Sonoma sunshine was extirpated by 1994 only west of Stony Point Road (i.e., outside the study area) but was still extant in 1994 east of the road, within the study area.

In 2005 and 2007 EcoSystems West observed Sonoma sunshine in the seasonal pool located near the western site boundary that straddles the fence line between irrigated pasture to the north and uncultivated land to the south. The species was observed only in the southern half of this pool. The northern half of this pool, north of the fence, has been completely altered by conversion to irrigated pasture, and no longer provides suitable habitat for Sonoma sunshine. In 2005 the botanists observed a small, concentrated colony of 5-10 plants of Sonoma sunshine in the south-central portion of this pool, more or less opposite the eastern side of a southward extension of the pool, and approximately 3-5 additional plants, somewhat more scattered, approximately 60-65

feet to the southeast. In 2007, although most individual plants were smaller than those observed in 2005, they were much more numerous. Approximately 75-150 plants were found in the pool in 2007, in four more or less discrete colonies, with the two largest containing 30-50 plants each. Associated species include the native species California semaphore grass, smooth lasthenia, Jepson's coyote-thistle, pale spike-rush, coast allocarya, Lobb's aquatic buttercup, and Douglas' pogogyne, and the non-native species pennyroyal and curly dock. The pool in which Sonoma sunshine was observed more or less coincides with the eastern portion of the mapped area of CNDDB Occurrence No. 20 of the species.

The Ecosystems West botanist had surveyed this same pool on April 1, 2004, and Sonoma sunshine was not found at the site. On that date, there was virtually no standing water in the pool, although the soil was wet in the lowest portions of the pool bed. Grazing and trampling by cattle could have removed flower heads of Sonoma sunshine relatively early in 2004, rendering the species essentially un-observable. Cattle were present on the site on April 1, 2004. Cattle were grazing the site on April 17, and, while Sonoma sunshine plants were still observable on that date, damage from cattle trampling was evident. Heavy impacts from grazing and trampling were evident on May 16, when Sonoma sunshine plants could not be found. The timing of evaporation of the standing water in this pool, and presumably the maximum depth of inundation, were also very different in 2005 and 2007, probably reflecting the fact that 2005 was a relatively wet season and 2007 was relatively dry. Only a small amount of standing water was present in the deepest parts of the pool bed on March 22, 2007, compared to the considerable standing water remaining on April 17, 2005. Additionally, Sonoma sunshine was not observed on March 30 or April 19, 2008. These observations suggest that this annual species may not appear every year at some occupied locations but have a persistent seed bank. This is also likely the case for Burke's goldfields.

In summary, 2004, 2005 and 2007 surveys documented a population of Sonoma sunshine along the northwestern border of the Wilfred Site just east of Stony Point Road, within an area noted in the California Natural Diversity Base as having historically supported a population of both Sonoma sunshine and Burke's goldfields. The extent of this population ranged from 15 Sonoma sunshine plants counted in 2005 to between 75 and 150 plants in 2007. The population of Sonoma sunshine and presumed extirpated Burke's goldfields may be influenced by management (e.g. grazing), non-native vegetation and/or fluctuations in wetland inundation from year to year. An additional 1.6 acres of suitable habitat for Sonoma sunshine, Burke's goldfields, and Sebastopol meadowfoam occurs in the northern 80- acre Wilfred Site. Burke's goldfields have not been observed during flowering period surveys conducted in 2004, 2005, 2007 and 2008.

Effects of the Proposed Action

California Tiger Salamander

As all areas that would be graded to support the gaming facility are located outside of the 100-year floodplain, impacts to upland and wetland habitat would occur throughout the development footprint of the facility. Development of the preferred alternative would result in direct impacts to 82.17 acres of CTS upland and wetland habitat and will result in the permanent loss of approximately 82.17 acres of upland and wetland features which supports dispersal, foraging,

and seasonal wetland habitat. One gravid female CTS was caught during past trapping efforts on the project site at APN 045-074-009 Graders, bulldozers and other heavy equipment are likely to injure, kill, harm, and harass any tiger salamander inhabiting the 82.17-acre project site during the earth moving activities, infrastructure improvements, building construction, landscaping, and replacement of the natural earth surface of the graded area with hardscape. Individual tiger salamanders inhabiting the project site could be crushed by construction activities that collapse their burrows or other suitable cover from environmental elements such as high air and surface temperatures. Individual tiger salamanders disturbed by construction activities onsite could attempt overland movements in an attempt to find alternative upland habitat. These individuals could be harassed, injured and killed by workers or vehicles during overland movements at the project site, or during attempts to find more suitable habitats on adjacent lands. Construction related activities are likely to cause disruption of surface movement, disruption or complete loss of reproduction, harassment from increased human activity, and permanent and temporary loss of shelter. The project site will become unavailable to dispersing tiger salamanders in the vicinity upon buildout.

The remainder of the Wilfred Site beyond the 82.17-acre CTS effect area would consist of approximately 170 acres that would include recycled water sprayfields, flood storage ponds, open space, biological habitat, and existing wetlands. Although use of habitat areas for the CTS as sprayfields could result in impacts to the species, all sprayfields for the preferred alternative are located within the 100 year floodplain areas not likely CTS habitat, therefore no direct or indirect effects to CTS in the 100 year floodplain.

CTS will benefit with the conservation in perpetuity of 86.85 acres of CTS habitat including a Service-approved resources management, performance monitoring, maintenance monitoring and compliance reporting, an adaptive management plan, and a funding mechanism to assure long-term management and monitoring. This includes mitigation at a 1:1 mitigation ratio for the 77.49 of 82.17 acres of impacts to CTS upland and wetland habitat within 1.3 miles from extant or extirpated breeding pools. Additional mitigation will be provided at a 2:1 mitigation ratio for the 4.68 of 82.17 acres of impacts to CTS upland and wetland habitat within 500 feet of adult occurrences (i.e. 9.36). The total CTS mitigation will be 86.85 acres (i.e. 77.49 + 9.36). This calculation of mitigation acreage was based on the proposed conservation measures in the April 4, 2008, NIGC letter to the Service. These proposed conservation measures are consistent with the interim mitigation guidelines described in the Santa Rosa Plain Conservation Strategy which is also adopted by local jurisdictions including the City of Rohnert Park and provide the best available guidance that will contribute to minimizing adverse effects to CTS and to the recovery of the species by conserving large contiguous blocks of occupied habitat.

Biological monitors would be present during construction of the project to remove any CTS encountered from the work area and relocate them to suitable habitat approved by the Service on a case by case basis if appropriate. This may reduce the direct or indirect injury or mortality if any individual CTS are encountered during construction of the project. Fencing of the project footprint and other protective measures proposed will likely reduce adverse effects to CTS and habitat from ground disturbance and increased human activity during construction.

Burke's Goldfields, Sonoma Sunshine and Sebastopol Meadowfoam

The preferred alternative would cause the permanent destruction to 1.60 acres of seasonal wetlands that provide suitable habitat for Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam. The applicant will compensate for the suitable habitat with conservation of 1.6 acres of occupied or established habitat, and conservation of an additional 0.8 acres of established habitat (2.4 acres total) through purchase of occupied and/or established habitat at a Service-approved habitat preserve/mitigation bank prior to groundbreaking at the project site. The establishment of an off-site mitigation preserve by the applicant, if chosen, will meet the following requirements and will be evaluated by the Service on a case-by-case basis: land dedication in fee title or conservation easement, third party management pursuant to a Service-approved resources management plan for conservation purposes, performance monitoring, maintenance monitoring and compliance reporting, an adaptive management plan, and a non-wasting endowment fund to assure long-term management and monitoring. Conservation, management, and monitoring of Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam population(s) and habitat will likely benefit these species by reducing the overall adverse effects of the proposed project.

The location where Sonoma sunshine and Burke's goldfields have been found on the Wilfred site will remain undeveloped under the preferred alternative. Implementation of a management plan that will be developed for approximately 170 acres of the 182-acre southern area of the Wilfred site will likely benefit the existing population of Sonoma sunshine by implementing non-native vegetation management to reduce competition with Sonoma sunshine. However the management would need to have careful oversight considering the adverse effects observed to the Sonoma sunshine population due to grazing (e.g. trampling and consumption of seed heads) as previously described in the environmental baseline section. Non-native vegetation management may also benefit Burke's goldfields by reducing competition from non-native vegetation and allow the seedbank to germinate. The plan will also include a monitoring plan to determine management plan success, the status of the protected resources, and effectiveness of specified management actions.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this Biological Opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Cumulative effects to the California tiger salamander include continuing and future conversion of suitable California tiger salamander breeding, foraging, sheltering, and dispersal habitat resulting from urban development. Additional urbanization can result in road widening and increased traffic on roads that bisect breeding and upland sites, thereby increasing road-kill while reducing in size and further fragmenting remaining habitats.

In addition, California tiger salamanders probably are exposed to a variety of pesticides and other chemicals throughout their range. California tiger salamanders also could die from starvation by the loss of their prey base. Hydrocarbon and other contamination from oil

production and road runoff; the application of numerous chemicals for roadside maintenance; urban/suburban landscape maintenance; and rodent and vector control programs may all have negative effects on California tiger salamander populations. In addition, California tiger salamanders may be harmed through collection by local residents.

A commonly used method to control mosquitoes, used in Sonoma County (Marin/Sonoma Mosquito and Vector Control District, internet website 2002), is the application of methoprene, which increases the level of juvenile hormone in insect larvae and disrupts the molting process. Lawrenz (1984) found that methoprene (Altosid SR 10) retarded the development of selected crustacea that had the same molting hormones (i.e., juvenile hormone) as insects, and anticipated that the same hormone may control metamorphosis in other arthropods. Because the success of many aquatic vertebrates relies on an abundance of invertebrates in temporary wetlands, any delay in insect growth could reduce the numbers and density of prey available (Lawrenz 1984).

Threats to Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam such as unauthorized fill of wetlands, urbanization, increases in non-native species, and expanded irrigation of pastures with recycled wastewater discharge, are likely to continue with concomitant adverse effects on these species resulting in additional habitat loss and degradation; increasingly isolated populations (exacerbating the disruption of gene flow patterns); and further reductions in the reproduction, numbers, and distribution of these species which will decrease their ability to respond to stochastic events.

Some activities that do not require a 404 permit could occur that may negatively impact the listed plant species, including excessive grazing and wastewater irrigation. On-going grazing on the Santa Rosa Plain appears to be occurring at a low enough level that it may actually benefit the species by controlling competitive, non-native plant species, but grazing could increase to a detrimental level in the future. The cessation of grazing might also have a negative effect on the species, since non-native competitors have invaded the species' habitat and grazing may currently play an essential role in controlling these competitors.

As described in the Conservation Strategy, urban and rural growth on the Santa Rosa Plain has taken place for over one hundred years, and for the past twenty years urban growth has encroached into areas inhabited by the California tiger salamander and the listed plants. The loss of seasonal wetlands caused by development on the Santa Rosa Plain has led to declines in the populations of California tiger salamander and the listed plants. Voters in the cities of Cotati, Rohnert Park, Santa Rosa, and Sebastopol, and the Town of Windsor have established urban growth boundaries for their communities. This is intended to accomplish the goal of city-centered growth, resulting in rural and agricultural land uses being maintained between the urbanized areas. Therefore, it can be reasonably expected that rural land uses will continue into the foreseeable future. There are also areas of publicly owned property and preserves located in the Santa Rosa Plain, which will further protect against development. Some of the areas within these urban growth boundaries, however, include lands inhabited by California tiger salamanders and the listed plant species. Agricultural practices have also disturbed seasonal wetlands, California tiger salamanders and listed plant habitat on the Santa Rosa Plain. Some agricultural practices, such as irrigated or grazed pasture, have protected habitat from intensive development.

The Conservation Strategy was designed to plan for future cumulative effects from federal and

non-federal actions to the California tiger salamander and listed plant habitat within the Santa Rosa Plain. The Conservation Strategy and the interim guidelines are intended to benefit the California tiger salamander and the listed plants by providing a consistent approach for mitigation vital to habitat preservation and the long-term conservation of the species. They are also intended to provide more certainty and efficiency in the project review process. The Conservation Strategy and the interim guidelines provide guidance to focus mitigation efforts on preventing further habitat fragmentation and to establish, to the maximum extent possible, a viable preserve system that will contribute to the long-term conservation and recovery of these listed species. Implementation of the interim mitigation guidelines by the local cities and Sonoma County is expected to reduce potential increases of these cumulative effects.

The global average temperature has risen by approximately 0.6 degrees centigrade during the 20th Century (International Panel on Climate Change 2001, 2007; Adger *et al* 2007). There is an international scientific consensus that most of the warming observed has been caused by human activities (International Panel on Climate Change 2001, 2007; Adger *et al.* 2007), and that it is "very likely" that it is largely due to increasing concentrations of greenhouse gases (carbon dioxide, methane, nitrous oxide, and others) in the global atmosphere from burning fossil fuels and other human activities (Cayan *et al.* 2005, EPA Global Warming webpage http://yosemite.epa.gov; Adger *et al.* 2007). Eleven of the twelve years between 1995 and 2006 rank among the twelve warmest years since global temperatures began in 1850 (Adger *et al.* 2007). The warming trend over the last fifty years is nearly twice that for the last 100 years (Adger *et al.* 2007). Looking forward, under a high emissions scenario, the International Panel on Climate Change estimates that global temperatures will rise another four degrees centigrade by the end of this Century; even under a low emissions growth scenario, the International Panel on Climate Change estimates that the global temperature will go up another 1.8 degrees centigrade (International Panel on Climate Change 2001). The increase in global average temperatures affects certain areas more than others. The western United States, in general, is experiencing more warming than the rest of the Nation, with the 11 western states averaging 1.7 degrees Fahrenheit warmer temperatures than this region's average over the 20th Century (Saunders *et al.* 2008). California, in particular, will suffer significant consequences as a result of global warming (California Climate Action Team 2006). In California, reduced snowpack will cause more winter flooding and summer drought, as well as higher temperatures in lakes and coastal areas. The incidence of wildfires in the Golden State also will increase and the amount of increase is highly dependent upon the extent of global warming. No less certain than the fact of global warming itself is the fact that global warming, unchecked, will harm biodiversity generally and cause the extinction of large numbers of species. If the global mean temperatures exceed a warming of two to three degrees centigrade above pre-industrial levels, twenty to thirty percent of plant and animal species will face an increasingly high risk of extinction (International Panel on Climate Change 2001, 2007). The mechanisms by which global warming may push already imperiled species closer or over the edge of extinction are multiple. Global warming increases the frequency of extreme weather events, such as heat waves, droughts, and storms (International Panel on Climate Change 2001, 2007; California Climate Action Team 2006; Lenihan *et al.* 2003). Extreme events, in turn may cause mass mortality of individuals and significantly contribute to determining which species will remain or occur in natural habitats. As the global climate warms, terrestrial habitats are moving northward and upward, but in the future, range contractions are more likely than simple northward or upslope shifts. Ongoing global climate change (Anonymous 2007; Inkley *et al.* 2004; Adger *et al.* 2007; Kanter 2007)

likely imperils the California red-legged frog, Callippe silverspot butterfly, and the resources necessary for its survival. Since climate change threatens to disrupt annual weather patterns, it may result in a loss of their habitats and/or prey, and/or increased numbers of their predators, parasites, and diseases. Where populations are isolated, a changing climate may result in local extinction, with range shifts precluded by lack of habitat.

Conclusion

After reviewing the current status of the California tiger salamander, Burke's goldfields, Sebastopol meadowfoam and Sonoma sunshine, the environmental baseline for the action area, the effects of the preferred alternative and cumulative effects, it is the Service's Biological Opinion that the casino and hotel development activities, as proposed, for the Graton Rancheria Casino and Hotel Project in Rohnert Park, Sonoma County, California, is not likely to jeopardize the continued existence of the California tiger salamander, Burke's goldfields, Sebastopol meadowfoam and Sonoma sunshine. We base this determination on the fact that the proposed action includes conservation measures to offset the adverse effects to these species consistent with the conservation measures in the 2007 Programmatic. The loss of upland foraging, dispersal, and seasonal wetland habitat at the project site will be minimized by the conservation and management of 86.85 acres of California tiger salamander and 2.4 acres of Burke's goldfields, Sonoma sunshine, and Sebastopol habitat at a Service-approved bank or other location which would follow the recommendations of the 2007 Programmatic and as described in conservation measures of the proposed action. Additionally, a management plan will be developed for approximately 170 acres of the 182-acre southern area of the Wilfred site for the benefit of these species. Critical habitat has not been designated for the California tiger salamander, Burke's goldfields, Sonoma sunshine, or Sebastopol meadowfoam; therefore none will be adversely modified.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this incidental take statement.
Sections 7(b)(4) and 7(o)(2) of the Act do not apply to listed plant species. However, protection of listed plants is provided to the extent that the Act requires a Federal permit for removal or reduction to possession of endangered and threatened plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, damage, or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any

violation of a State criminal trespass law.

The measures described below are non-discretionary, and must be implemented by the NIGC. If the NIGC (1) fails to require to adhere to the terms and conditions of the incidental take statement, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

The Service anticipates that incidental take of the California tiger salamander will be difficult to detect or quantify for the following reasons: the activity patterns of tiger salamanders makes the finding of a dead specimen unlikely, losses may be masked by annual fluctuations in numbers, and the species occurs in habitat that makes it difficult to detect. Due to the difficulty in quantifying the number of tiger salamanders that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of habitat that will be affected as a result of the action. Therefore, the Service estimates that the proposed action will result in the incidental take of all individuals of the Sonoma County Distinct Population Segment of the California tiger salamanders inhabiting 82.17 acres at the project site. Any incidental take is expected to be in the form of harm, harassment, injury, and mortality from habitat loss and modification, construction related disturbance, increase predation, reduced fitness, and by ongoing operation and use of the Graton Rancheria Casino and. However, the Service is also quantifying take of listed plant species based on the number of acres of seasonal wetland habitat providing suitable habitat for the species that will be affected as a result of the action. The Service estimates that the preferred alternative will result in permanent loss of 1.6 acres of suitable habitat for the listed species.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the effects of the Proposed Graton Rancheria Casino and Hotel Project on the California tiger salamander, Burke's goldfields, Sebastopol meadowfoam and Sonoma sunshine:

1. The applicant shall implement the conservation measures as described in the *Description of the Proposed Action* of this Biological Opinion.

2. The applicant shall minimize harm and harassment to the California tiger salamander during all phases of the preferred alternative.

3. The applicant shall ensure their compliance with this Biological Opinion.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the NIGC must ensure that the project developer complies with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. To implement Reasonable and Prudent Measures one (1) and two (2), the NIGC must ensure the following:

   a. Should the applicant choose to compensate with an individual conservation site (i.e. not with conservation bank credits), the applicant shall provide the Service a draft conservation plan to the Service including the items described in the *Status of the Species, Preserves,* section of this biological opinion. The applicant shall allow sufficient time for Service review of the draft conservation plan and implementation of the conservation plan.

   b. The conservation plan shall include a cost estimate to implement the habitat enhancement plan.

   c. The applicant shall provide financial assurances in the form of a Service-approved mechanism (e.g. letter of credit) for the full amount of the Service-approved habitat enhancement plan cost estimate and it shall be held by a Service-approved entity. The funding mechanism (e.g. letter of credit) will be returned according to a Service-approved schedule.

   d. The applicant shall minimize the potential for harm and harassment resulting from project-related activities by implementation of the *Conservation Measures* as described in the *Description of the Proposed Action* portion of this Biological Opinion.

2. To implement Reasonable and Prudent Measure three (3), the NIGC must ensure the following:

   a. The applicant shall comply with the *Conservation Measures* described in the *Description of the Proposed Action* portion and the Reporting Requirement portion of this Biological Opinion.

Reporting Requirements

The Service must be notified within twenty-four (24) hours of the finding of any injured or dead California tiger salamander, or any unanticipated damage to California tiger salamander, Burke's goldfields, Sebastopol meadowfoam or Sonoma sunshine habitat associated with the preferred alternative. Any injured California tiger salamander must be cared for by a licensed veterinarian or other qualified person such as a biological monitor; any dead individuals must be sealed in a Ziploc© bag with information regarding the location and incident, and place in a freezer located in a secure location for collection by Service law enforcement agents. Notification must include the date, time, and precise location of the specimen/incident, and any other pertinent information. The Service contact persons are Chris Nagano, Chief, Endangered Species Division of the Sacramento Fish and Wildlife Office at (916) 414-6648, and Dan Crum, Acting Resident Agent-in-Charge of the Service's Law Enforcement Division in Sacramento, California, at (916) 414-6660.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purpose of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and databases.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations. We propose the following conservation recommendations:

1. To the extent possible, assist the Service in implementing the conservation goals identified within the Santa Rosa Plain Conservation Strategy.

2. To the extent possible, develop and/or support an educational program focused on conservation of endangered species in the Santa Rosa Plain.

REINITIATION STATEMENT

This concludes formal consultation on the proposed Graton Rancheria Casino and Hotel Project outlined in the NIGC's request. As provided in 50 CFR § 402.16, reinitiating of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiating. In addition, should the proposed action not occur within ten years of the signature of this Biological Opinion, the Service shall be contacted to determine whether the effective time period of the Biological Opinion should be extended or formal consultation should be reinitiated.

If you have any questions regarding this Biological Opinion on the proposed Graton Rancheria Casino and Hotel Project, please contact Vincent Griego or Ryan Olah of my staff at (916) 414-6600.

Sincerely

Susan K. Moore
Field Supervisor

cc:
Jane Hicks, United States Army Corps of Engineers, San Francisco, California
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Scott Wilson, Greg Martinelli, California Department of Fish and Game, Yountville, California
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David Zweig, Analytical Environmental Services, Sacramento, California
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