



# United States Department of the Interior

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IN REPLY REFER TO:  
1-1-98-F-0053

July 17, 1998

Mr. Calvin Fong  
Chief, Regulatory Branch  
Department of the Army  
U.S. Army Engineer District,  
San Francisco District, Corps of Engineers  
333 Market Street  
San Francisco, California 94105-2197

**Subject:** Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects that May Affect Four Endangered Plant Species on the Santa Rosa Plain, California (File Number 22342N)

Dear Mr. Fong:

This is in response to your February 6, 1998, letter initiating formal consultation with the U.S. Fish and Wildlife Service (Service) for all Clean Water Act Section 404 permit activities that may affect federally listed plants on the Santa Rosa Plain, Sonoma County, California. Your request was received in our office on February 11, 1998. This document represents the Service's biological opinion regarding the effects on four federally listed endangered plant species, Sonoma sunshine (*Blennosperma bakeri*), Burke's goldfields (*Lasthenia burkei*), Sebastopol meadowfoam (*Limnanthes vinculans*), and many-flowered navarretia (*Navarretia leucocephala* ssp. *plieantha*), which would result from 404 permit issuance that is consistent with this programmatic consultation. This consultation document has been prepared pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act), and 50 CFR 402 of our interagency regulations governing section 7 of the Act.

The purpose of this programmatic consultation document is twofold:

- (1) to expedite formal consultations, on a project-by-project basis, for limited effects to listed species in "low-quality"<sup>1</sup> seasonal wetlands, under specifically defined circumstances; and

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<sup>1</sup> The term "low-quality" has specific meaning in the context of the Santa Rosa Plain Vernal Pool Ecosystem Preservation Program and does not denote biological value. For the purpose of this programmatic consultation, low-quality seasonal wetlands are those which score as low-quality under biological resource criteria outlined in the Army Corps of Engineers Habitat Quality Evaluation Procedure. (See also definition section of this programmatic consultation.)

(2) to outline a comprehensive conservation program that would address effects to the listed species resulting from 404 permit issuance for fill of seasonal wetlands throughout the Santa Rosa Plain.

Future projects meeting the conditions specified below, or that the Sacramento Fish and Wildlife Office (SFWO) of the Service has determined will have similar impacts, may be appended to this consultation document.

This biological opinion is based on information provided in 1) the Santa Rosa Plain Vernal Pool Ecosystem Preservation Plan (VPEPP) (CH2M Hill 1995); 2) the Seasonal Wetland Baseline Report for the Santa Rosa Plain, Sonoma County (Patterson *et al.* 1994); 3) the Public Notice of a General Permit for Fill of Vernal Pool and Seasonal Wetlands in the Santa Rosa Plain, dated September 3, 1997, from the U.S. Army Corps of Engineers (Corps); 4) a letter from the Service dated October 31, 1997, responding to the public notice; and 5) numerous meetings with the Corps and other members of the Vernal Pool Task Force as described in the Consultation History/Background section of this document, below. A complete administrative record of this consultation is on file at the Service's SFWO.

The Service will reevaluate the effectiveness of this programmatic consultation document on the Santa Rosa Plain vernal pool plant species at least every six (6) months to ensure that continued implementation will not result in effects to the listed species that would preclude their survival and recovery. This opinion may be modified during reevaluation if it is determined that projects allowed through the programmatic consultation could preclude the survival and recovery of the listed species.

### **Consultation History/Background**

Representatives of various regulatory and resource agencies (including the Service), local government entities, environmental groups, local developers, representatives of agriculture, and landowners formed the Vernal Pool Task Force in 1991. The Task Force was formed to address the concerns of the Santa Rosa community regarding issuance of permits for seasonal wetland fills, in light of the pending listing of three endangered plant species: Sonoma sunshine, Burke's goldfields, and Sebastopol meadowfoam. The study area for the task force was selected to include most of the ranges for these species, which are primarily restricted to the seasonal wetlands of the Santa Rosa Plain. Federal, State, and local agencies entered into a Memorandum of Understanding (MOU) to formally establish cooperative relationships for development of the Santa Rosa Plain Vernal Pool Preservation Program, a component of which is the VPEPP. The Task Force planned to complete the VPEPP in two phases, with the first phase focusing on planning and the second phase to involve implementation.

In 1995, the Task Force completed the VPEPP Phase I Final Report. The Phase I Report explains the program's history and outlines the goals and objectives for Phases 1 and 2 of the program. The report contains background information important in the Task Force planning efforts, including information on (1) the Santa Rosa Plain, its ecosystems, and its sensitive species; (2) historic, current, and planned land uses on the Santa Rosa Plain; (3) basic conservation and preserve design principles; and (4) data sources and procedures for entering

information into a Geographic Information System (GIS). Details of the regional planning effort undertaken by the Task Force are also presented in the report. These include (1) a map showing the areas potentially supporting the vernal pool ecosystem throughout the plain (approximately 35,333 acres, or 64 percent, of the study area); (2) applicable state and federal laws and regulations; (3) a process for evaluating vernal pool sites in terms of habitat quality, land use, acquisition feasibility, and restoration potential; (4) a habitat quality map for seasonal wetlands that had been so evaluated along with descriptions of 27 "high-quality"<sup>2</sup> sites; (5) discussions of land use compatibility with vernal pool conservation; (6) the potential roles of habitat restoration and enhancement; (7) general guidelines for management, maintenance, and monitoring of vernal pool preserves; (8) regulatory and non-regulatory tools that could be used for plan implementation; and (9) options for conservation and management, acquisition of interests, transferable development rights, and potential funding. The Phase I Report proposed a regulatory process, to be implemented during Phase 2, for streamlined project compliance with Federal and State laws, and with local land use policies and ordinances.

Chapter 9 of the Phase 1 Report lists the tasks expected to be completed during Phase 2 of the program. One of these tasks was for the local jurisdiction to apply for a General Permit (GP) under section 404 of the Clean Water Act for fills in "low-quality" seasonal wetlands of the Santa Rosa Plain. As recommended in the Phase 1 Report, the Cities of Santa Rosa, Cotati, and Rohnert Park, the Town of Windsor, and the County of Sonoma applied to the San Francisco Corps for a GP. A public notice, dated September 3, 1997, was circulated to solicit comments on the GP. The Service provided a letter, dated October 31, 1997, responding to the public notice with numerous recommendations, and stating that the Corps should initiate consultation pursuant to section 7 of the Act for Burke's goldfields, Sebastopol meadowfoam, Sonoma sunshine, and the California red-legged frog (*Rana aurora draytonii*). During subsequent informal consultation with the Corps, it was determined that initiation of formal consultation on the GP and issuance of the GP would be premature because of the lack of local procedures to administer the permit and ensure compliance. The Service and the Corps therefore agreed that a programmatic consultation for individual projects on the Santa Rosa Plain should be initiated instead. It was also determined that any potential effects to the red-legged frog would be addressed through individual consultation, when necessary, and that the programmatic consultation should address potential effects to the newly listed many-flowered navarretia. The Corps sent the Service a letter, dated February 6, 1998, and received February 11, 1998, requesting a formal programmatic consultation for all Clean Water Act permit activities on the Santa Rosa Plain that may affect Sonoma sunshine, Burke's goldfields, Sebastopol meadowfoam, and many-flowered navarretia (hereafter collectively called "the listed plants").

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<sup>2</sup> The term "high-quality" has specific meaning in the context of the Santa Rosa Plain Vernal Pool Ecosystem Preservation Program and does not denote biological value. For the purpose of this programmatic consultation, high-quality seasonal wetlands are those which exceed a specific score under biological resource criteria ranking outlined in the Army Corps of Engineers Habitat Quality Evaluation Procedure. (See also definition section of this programmatic consultation.)

## Definitions

For the purpose of this biological opinion, the following definitions will apply.

*Low-quality/High-Quality Seasonal Wetlands.* Seasonal wetlands will be ranked as "low" or "high" quality using the biological resources category of the Corps' Habitat Quality Evaluation procedure (HQE) manual. The HQE was developed to determine whether a site (1) qualifies for a streamlined permitting process or (2) requires an individual permit. The evaluation does not denote biological value. The Land Use and Acquisition Feasibility categories of the HQE will not be used in the ranking of seasonal wetlands for this programmatic.

*Direct Effect.* If any part of a vernal pool is filled or otherwise destroyed, the entire pool is directly affected.

*Indirect Effect.* Habitat indirectly affected includes all habitat supported by destroyed upland areas and swales, and all habitat otherwise damaged by loss of watershed, human intrusion, introduced species, and pollution caused by the project (see Effects of the Proposed Action, below). Where the reach of these effects cannot be determined definitively, all habitat within 250 feet of proposed development may be considered indirectly affected. If any habitat within a vernal pool complex is destroyed, all remaining habitat within the complex may potentially be indirectly affected.

*Vernal Pool Restoration.* Restoring areas that were historically vernal pools, but no longer support vernal pool species, to fully functional vernal pool habitat that supports viable populations of vernal pool indicator species (Larry Stromberg, 1998 *in litt.*).

*Vernal Pool Construction.* The establishment of fully functional vernal pool habitat, supporting viable populations of vernal pool indicator species, in an area that was historically upland habitat (L. Stromberg, 1998 *in litt.*).

## **BIOLOGICAL OPINION**

### **Description of the Proposed Action**

For the purpose of this biological opinion, the action area is the region known as the Santa Rosa Plain, as shown in Figure 1. This area includes 55,000 acres in Sonoma County, extending from Windsor to Cotati and from Santa Rosa to Sebastopol. The proposed actions are as follows: a) issuance of 404 permits to allow fill of up to 50 acres of low-quality seasonal wetlands during an interim period prior to establishment of a comprehensive conservation program for the Santa Rosa Plain; and b) issuance of 404 permits for fill of seasonal wetlands throughout the Santa Rosa Plain for all projects that are consistent with a comprehensive conservation program allowing for the long-term survival and recovery of the listed plant species addressed in this opinion. Projects within the action area that affect habitat for the listed plants may be processed under this programmatic consultation if they are consistent with either the interim program described in section A, below, or a comprehensive conservation program meeting the criteria described in section B, below. The Service anticipates the Corps could issue a General 404



Permit for fill of up to 50 acres of seasonal wetlands, incorporating permit conditions consistent with the interim measures described in this biological opinion. The Service expects once the 50-acre threshold for the interim program has been reached, consultation will not be reinitiated to increase the threshold unless significant progress has been made on the comprehensive conservation program.

#### **A. Interim Program for Low-Quality Habitat**

##### **1. Project qualifications and acreage limits**

During the interim period prior to the establishment of a comprehensive conservation program as described in section B, below, the following acreage limits and qualifications will be applied.

a. **Overall acreage limits.** The total amount of direct and indirect impact to low-quality seasonal wetlands filled during the interim period will not exceed 50 acres, no more than 30 acres of which would be occupied (or presumed to be occupied) by the listed plant species. Of the 30 impacted acres which are occupied or presumed occupied, no more than 6 acres would be on sites for which there are known records of the listed plants. Impacts to no more than 6 additional acres on sites for which there are known records of listed plants may be authorized under this opinion at the Service's discretion, based upon the Service's evaluation of the significance of impacts to the first 6 acres of known listed species habitat and/or upon substantial progress toward a comprehensive conservation program. Substantial progress may consist of actions such as 1) establishment of preservation and restoration mitigation banks within each mitigation unit defined below, 2) identification and protection of extant populations of Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam within each mitigation unit, 3) identification and protection of areas suitable for restoration within each mitigation unit, 4) establishment of restoration/construction standards, guidelines, success criteria, and contingency measures, 5) successful introduction of Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam in restored habitat within each mitigation unit, and/or 6) formal commitment to participate in development of a meaningful conservation planning program for the Santa Rosa Plain. The Service will determine when sufficient progress has been made to allow impacts to the additional 6 acres, or increments thereof, at sites for which there are known records for the listed plant species.

b. **Project acreage limits.** For each project, no more than 3 acres of seasonal wetlands will be affected, including both direct and indirect effects (see definition section, above). Interrelated and interdependent actions must be treated as a single project and cannot be "piece-mealed" to meet this requirement.

c. **Habitat quality.** Projects allowed under this consultation will not impact seasonal wetlands that rate as high-quality for biological resources according to the Corps HQE manual.

d. **Consistency with comprehensive planning.** No project will be allowed under this consultation if the Service has determined that the project will preclude long-term

planning options for the establishment of a regional preserve system that would allow for the survival and recovery of the listed plant species.

Projects that are not consistent with these conditions may be allowed under this interim program only as the Service deems appropriate. For example, a project that affects more than 3 acres of seasonal wetlands, but has effects similar in scope and nature to those analyzed in this biological opinion as determined by the Service, may be allowed under this program.

## 2. Mitigation

This section describes the mitigation requirements for impacts to seasonal wetlands allowed under this consultation for the interim program.

Determination of affected acreage. Affected acreage is based on direct and indirect effects (see Definitions, above) of the project on seasonal wetlands.

Listed species presence. A project applicant may choose whether to have the project site surveyed for listed plant species, consistent with established Service protocol (Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed Plants on the Santa Rosa Plain, Appendix A).

- a. If the applicant chooses not to survey, the Service will assume the listed species are present throughout the seasonal wetlands on-site.
- b. Because of the probable persistence of seed banks (see Status of the Species and Environmental Baseline), all seasonal wetlands on sites with any past record of listed species presence will be treated as currently occupied habitat, regardless of whether current surveys have detected the species on-site.
- c. If surveys have been conducted according to Service protocol and no listed plants have been found, the seasonal wetlands on-site will be treated as habitat. This programmatic consultation addresses effects and mitigation for this habitat type where the listed plants have not yet been observed because a persistent seed bank may be present even if the plants have not been detected, and because currently unoccupied but restorable habitat is believed to be important for the survival and recovery of the species covered in this biological opinion. (See also Status of the Species and Environmental Baseline.)

Components of mitigation. Project effects will be mitigated by both preservation and restoration/construction (see Definitions above) components. The preservation component may be fulfilled either by dedicating acreage within a Service-approved ecosystem preservation bank, or, based on Service evaluation of site-specific conservation values, preserving high-quality seasonal wetlands on the project site or on another non-bank site as approved by the Service. Habitat not ranked as high-quality may be evaluated for mitigation suitability on a case-by-case basis. Similarly, the restoration/construction component may be fulfilled by dedicating acreage

within a Service-approved habitat restoration/construction mitigation bank, or, based on Service evaluation of site-specific conservation values, restoring/constructing on the project site or on another non-bank site as approved by the Service. In cases where appropriate mitigation banks are unavailable, the Service may accept payment of in lieu fees for the preservation and/or restoration/construction components of mitigation. Mitigation ratios to be applied in particular cases are given in the key below and in Table 1. All mitigation sites and restoration/construction plans must be approved by the Service.

Habitat quality of mitigation site. Any seasonal wetlands to be preserved for mitigation purposes should be ranked as high-quality for biological resources, as determined using the Corps' HQE methodology. A site which is not ranked as high-quality for biological resources may in some cases be used for the preservation component of mitigation, if it is approved by the Service on a case-by-case basis, although a higher mitigation ratio may be required if lower quality mitigation habitat is used.

In-bank/Out-of-bank. When mitigation involves preservation within a mitigation bank, or land of comparable value, the required mitigation ratios are lower than when other lands are preserved. A site is considered to have value comparable to a mitigation bank if either (i) it is adjacent to a Service-approved mitigation bank or other large block of preserved habitat; or (ii) it consists of all or a portion of a site where at least 50 contiguous acres will be preserved for biological values in perpetuity.

Preservation in perpetuity. All the vernal pool habitat and supporting uplands to be preserved for mitigation purposes are to be protected in perpetuity by a Service-approved conservation easement or similarly protective covenants in the deed. The conservation easement on the mitigation land is to be recorded at the appropriate recording office prior to project impacts. The easement/deed, including a title report for the land area, must be reviewed and approved by the Service prior to recordation. A copy of the recorded easement/deed must be provided to the Service within 30 days after recordation. Standard examples of deed restrictions and conservation easements are available from the Service upon request.

Operation and maintenance. All mitigation sites will be operated and maintained in accordance with a site specific operation and maintenance plan approved by the Service. A site specific monitoring plan, approved by the Service, should also be implemented to provide information regarding the effectiveness of management practices, and to provide for adaptations to the management strategies if necessary.

Seed/soil collection. Permanent direct effects to sites where the listed plant species are currently found or have been known in the past must be further mitigated by collection of seed from the listed species and/or collection of soil, unless otherwise approved by the Service. Seed and/or soil will be stored under appropriate conditions until it can be used for restoration or reintroduction of endangered plant populations. Methods of collection and repositories for the seed and/or soil must be approved by the Service prior to any collecting activities.

Area-based mitigation. The action area is divided into the following mitigation units:

- a. northern unit: north of Airport Boulevard;
- b. central unit: between Airport Boulevard and Highway 12; and
- c. southern unit: south of Highway 12.

To assure impacts during the interim planning period do not preclude the ability of the long-term conservation program to protect and restore the listed plants throughout their respective ranges (see Status of the Species section, Status and Distribution), mitigation must take place within the unit where the impact occurs unless otherwise approved by the Service. Should future data fail to support the delineation of separate mitigation units, this approach may be modified.

Habitat ranking and mitigation ratios. All sites must be ranked according to the HQE manual. Once a site has been ranked and surveyed, mitigation requirements can be identified using the key below and Table 1 (page 9). Mitigation ratios identified below are to be read as acreage of mitigation: affected acreage (e.g., 2:1 = 2 acres of mitigation required for 1 acre affected). Affected acreage is based on direct and indirect effects of the project on listed plant species habitat. If endangered plant species have been observed or are assumed to be present at a site, all seasonal wetlands at that site are to be mitigated as if the species is present in them.

- 1a. If the site scores as high-quality for biological resources according to the HQE, the project cannot be appended to this opinion. An individual permit is required.
- 1b. If the site scores as low-quality for biological resources according to the HQE, go to #2.
  - 2a. If the wetlands on the site include no seasonal wetlands as defined in this biological opinion, apply for Corps nationwide permit or individual permit for any riparian or fresh water marsh wetlands.
  - 2b. If the wetlands on the site include seasonal wetlands, mitigate through restoration/construction and preservation.

Restoration/construction: Restore or construct seasonal wetlands at a mitigation ratio of 1:1 if the restoration/construction has been deemed successful by the Service prior to project impacts (with demonstrated functional vernal pool hydrology for at least 1 year), or at a ratio of 1.5:1 if the project proceeds before the hydrology of the restoration/construction site has been deemed successful.

Preservation: To determine preservation requirements, conduct appropriate surveys for the listed plants based on USFWS guidelines (Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed Plants on the Santa Rosa Plain, Appendix A), or assume the listed plants are present. Check for previously recorded occurrences of the listed species on the site. Go to #3.

- 3a. If surveys conducted according to Service protocol detect no listed plants, and there are no previously recorded occurrences of the listed plant species on-site, preserve high-quality seasonal wetlands at a mitigation ratio of 1:1 in a mitigation bank or site with comparable value (see discussion on In-bank/Out-of-bank, above), or at a ratio of 2:1 if the mitigation land is not within a bank or site of comparable value. (If mitigation land does not consist of high-quality seasonal wetlands, site suitability and ratios may be determined by the Service on a case-by-case basis.)
- 3b. If listed plant species covered in this biological opinion have been observed on the site, or no surveys have been conducted, preserve high-quality seasonal wetlands at a mitigation ratio of 2:1 in a mitigation bank or site with comparable value (see discussion on In-bank/Out-of-bank, above), or at a ratio of 3:1 if the mitigation land is not within a bank or site of comparable value. (If mitigation land does not consist of high-quality seasonal wetlands, site suitability and ratios may be determined by the Service on a case-by-case basis.)

**Table 1.** Mitigation ratios for impacts to listed plant species on the Santa Rosa Plain.

Impacts to:	In a Bank, or Comparable <sup>1</sup>		Other High-Quality Sites <sup>2</sup>	
	Preservation	Restoration/ Construction <sup>3</sup>	Preservation	Restoration/ Construction <sup>3</sup>
Effects to seasonal wetlands where surveys have been conducted and no listed plants have been observed	1:1	1.5:1 or 1:1	2:1	1.5:1 or 1:1
Effects to seasonal wetlands where listed plants have been observed, or are assumed to be present	2:1	1.5:1 or 1:1	3:1	1.5:1 or 1:1

Ratios are to be read as acreage of mitigation: affected acreage (e.g., 2:1 = 2 acres of mitigation required for 1 acre affected). Affected acreage is based on direct and indirect effects of the project on habitat where the listed species have been observed and on other suitable habitat.

<sup>1</sup> A mitigation site will be considered comparable in value to a bank if it is high-quality habitat that either: (i) is adjacent to a Service-approved mitigation bank or other large block of preserved habitat; or (ii) consists of all or part of at least 50 contiguous acres which will be preserved for biological values in perpetuity.

<sup>2</sup> All preservation land must consist of high-quality habitat unless otherwise approved by the Service.

<sup>3</sup> Mitigation will require restoration/construction at a 1.5:1 ratio for concurrent mitigation, or a 1:1 ratio if the restoration/construction has demonstrated successful hydrological conditions for at least 1 year.

3. Monitoring, interim loss restrictions, and remediation

To ensure incremental losses of habitat allowed by this biological opinion do not significantly hinder conservation of the ecosystem upon which the listed plants depend, the following measures will be taken:

- a. The Service and the Corps will implement a tracking system to ensure the total amount of habitat affected by projects allowed under this consultation does not exceed the acreage limits specified above (page 5);
- b. The Service and the Corps will reevaluate the effectiveness of this programmatic consultation document at least every six (6) months to ensure continued implementation will not result in effects on the listed species that would preclude their survival and recovery. This opinion may be modified to alleviate excessive effects on listed species or problems with the programmatic process; and
- c. The Service is preparing a draft of the Central Valley Vernal Pool Multiple Species Recovery Plan, which addresses recovery for multiple species including the four listed plant species on the Santa Rosa Plain. Pending completion of that plan, the Service will ensure no more than 30 acres of habitat where the species have been found or are presumed to be present are filled within the action area between the date of issuance of the biological opinion and completion of the draft recovery plan. When the draft recovery plan is completed, this biological opinion will be reevaluated to determine its consistency with the goals and objectives of the recovery plan. If necessary to assure the listed species will not be jeopardized, the biological opinion will be amended to be consistent with the recovery plan. A similar reevaluation will take place upon completion of the final recovery plan.

4. Procedure for reviewing projects to be included under the programmatic consultation during the interim planning period

The following process will be used when 404 permits are issued in accordance with this biological opinion. If a General Permit is issued by the Corps for all projects that are consistent with this biological opinion, the following process will be used for each project to be authorized under the General Permit.

- a. After reviewing the permit request and determining whether the project meets the conditions for coverage under the programmatic consultation, the Corps will forward to the Service all biological and other pertinent information, along with a letter requesting that the proposed project be appended to this biological opinion;
- b. The Service will review the proposed project to evaluate whether it meets the conditions necessary for coverage under the programmatic consultation, and determine appropriate mitigation;

- c. If the Service does not concur the project is appropriate for processing through the programmatic consultation, the Service will notify the Corps within 30 days of receipt of the information. The applicant may then seek an individual permit, or the Service, Corps, and project applicant may work together to identify project modifications that would conform to the programmatic consultation. If the Service concurs the project is appropriate for processing under the programmatic consultation, the Service will deliver to the Corps a letter specifying measures that will adequately mitigate for the impacts of the proposed project (note this could entail approval of the applicant's proposed mitigation). Also, the Service will designate a staff biologist to serve as the contact regarding the proposed project; and
- d. The Corps will forward the aforementioned letter to the applicant, approving the applicant's mitigation plan, or presenting the mitigation requirements and instructing the applicant to contact the Service's staff biologist for assistance in fulfilling the applicant's mitigation responsibilities.
- e. After agreeing to the project and its mitigation, the Service will provide the Corps with a letter stating the proposed project meets the requirements of the Act.

#### **B. Comprehensive Conservation Planning Program**

The goal of the comprehensive conservation planning program is to plan and establish a preserve system able to sustain viable populations of the listed plant species in perpetuity, to offset any loss of populations outside the preserve system. This program would achieve the goals and objectives outlined in Chapter 2 of the Phase 1 Report, and would fully implement Phase 2 of the VPEPP, but with a particular focus on providing assurances for the long-term survival and recovery of listed species on the Santa Rosa Plain. The following tasks must be completed to provide the Service with sufficient assurance that a preserve system will be established to offset any loss of the listed plants on the Santa Rosa Plain that would occur outside the preserve system:

##### **1. Identification of areas targeted for conservation**

The Phase 1 Report provides the results of habitat quality assessments for 32,383 acres on the Santa Rosa Plain, and identifies 27 "potential preserve sites." However, 22,365 acres (41 percent of the planning area) are designated on Figure 6-2 of the report as "unknown quality habitat." To plan effectively for the conservation of listed plant species on the Santa Rosa Plain, a thorough assessment must be completed which identifies the demographically or genetically significant populations of each listed species throughout the planning area. The existing database used for habitat evaluation should be updated based on environmental documentation that has become available since 1994. Overflights at peak flowering time for the listed plant species during years of high relative abundance would also significantly improve inventory of populations. The local governments should coordinate with the Service and California

Department of Fish and Game to determine the level of effort necessary for completing this regional habitat analysis.

Results of the planning-area-wide habitat evaluation should be used to determine which lands would be suitable for inclusion in a regional preserve system which:

- 1) include large, resilient core populations of each listed plant species;
- 2) include an array of smaller, peripheral populations to maximize genetic diversity and minimize potential effects of catastrophic events; 3) provides for experimental introduction of the listed plants; and 4) incorporates the preserve design principles described in Chapter 6 of the Phase 1 Report.

2. Local regulatory strategy

The local regulatory implementation strategies discussed in the Phase 1 Report should be set in motion so Phase 2 of the program may proceed. As described in section 8.2 of the Phase 1 Report, the local jurisdictions should revise or amend their land use policies, plans, and ordinances to establish mechanisms for preserve assembly. Each local jurisdiction should determine how their land use regulations must be modified to achieve the goals of the VPEPP.

3. Preserve design

A map should be prepared which identifies all areas that are already preserved in perpetuity, and areas that are expected to be preserved in the future through various mechanisms including local land use regulations. If "hard lines" delineating these areas cannot be drawn prior to preserve establishment, a "soft lined" approach may be used. This would entail 1) delineating a generalized target area within which preservation would occur, 2) designating a percentage or total acreage of habitat within the target area that would be preserved, and 3) developing criteria that would be applied to projects within the target area to result in establishment of a preserve system that achieves the designated amount of preservation in a biologically sound configuration.

4. Establishment of a vernal pool restoration program

The preserve system established through the conservation program should include areas suitable for restoration, and a plan should be prepared that identifies restoration areas and establishes restoration standards, guidelines, success criteria, and contingency measures. The need to accomplish this task was identified in Chapter 9 of the Phase 1 Report. The restoration plan should incorporate measures for experimental introduction of the listed species into restored pools and procedures for monitoring and evaluating the introduction efforts. The plan should also outline a process for adopting any newly discovered techniques resulting in successful species introduction into restored pools.



5. Establishment of a monitoring and adaptive management plan for the preserve system

A framework management and monitoring plan for the entire preserve system should be prepared, identifying measures to provide for the long-term viability of the listed species within the regionwide preserve system as a whole. The framework plan should emphasize monitoring methods designed with specific goals for providing information regarding overall management effectiveness, and should allow for management to continuously adapt to needs identified through monitoring (i.e., adaptive management). The framework plan should be consistent with section 7.1 of the VPEPP. Prior to establishment of the comprehensive plan, management and monitoring will be established for each mitigation site on a case-by-case basis. Once the comprehensive plan is complete, however, the management and monitoring for each site may need to be modified to be consistent with the framework management and monitoring plan. As each site is added to the preserve system after the comprehensive program is in place, a site-specific management and monitoring plan should be prepared that adopts the measures outlined in the framework plan and provides site-specific detail regarding management and monitoring. The site-specific plan should identify the party responsible for implementation of the management and monitoring.

6. Identification of the funding sources for habitat acquisition and management

At least some preserve establishment and management is expected to be provided through mitigation, habitat avoidance, and project design measures to be required through local ordinances modified to be consistent with the VPEPP. However, additional mechanisms and funding sources may be necessary to provide for adequate habitat preservation and management to avoid jeopardizing the listed plant species. If this is the case, the local jurisdictions should coordinate with Federal and State agencies to creatively explore mechanisms for funding, building, and maintaining a regional preserve system on the Santa Rosa Plain supporting viable populations of the listed species.

### Status of the Species

Descriptions of the Status of the Species below include Listing History, Description, Historical and Current Distribution, Habitat, Life History, Reasons for Decline and Threats to Survival, and Recovery. Within each section, the listed species are discussed in the following order: Burke's goldfields, Sonoma sunshine, Sebastopol meadowfoam, and many-flowered navarretia.

*Listing History.* Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam were proposed for Federal listing as endangered on June 6, 1990 (55 FR 23109) and were federally listed as endangered on December 2, 1991 (56 FR 61173). Many-flowered navarretia was proposed for federal listing as endangered on December 19, 1994 (59 FR 65311) and was

federally listed as endangered on June 18, 1997 (62 FR 34029). Critical habitat has not been designated for any of these four species.

*Description.* Burke's goldfields is an annual in the sunflower family (Asteraceae). Plants are less than 30 centimeters (cm) (11.8 inches (in)) tall (Hickman 1993) and usually branched (California Native Plant Society (CNPS) 1977a). Oppositely arranged leaves are less than 5 cm (2 in) long, linear, and usually pinnately lobed (feather-like, with two rows on opposite sides of an axis). Daisy-like flower-heads are yellow with separate involucre bracts (leaf-like structures beneath the flower head, phyllaries). Fruits of Burke's goldfields are achenes (dry, one-seeded fruits) less than 1.5 millimeters (mm) (0.06 in) long, crowned with one long awn (bristle) and numerous short scales (CNPS 1977a, Hickman 1993). 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 number of awns from a Lake County population. These differences in morphology along with the need to preserve Burke's goldfields throughout its range are part of the rationale for the area-based mitigation specified above (Mitigation section above). Burke's goldfields can be distinguished from smooth goldfields (*Lasthenia glaberrima*) because smooth goldfields has partly fused involucre bracts (phyllaries) and a pappus (ring of scale-like or hair-like projections at the crown of an achene) of numerous narrowed scales. The linear leaves without lobes distinguish common goldfields (*Lasthenia californica*) from Burke's goldfields (Hickman 1993).

Sonoma sunshine is an annual in the sunflower family (Asteraceae). Plants are less than 30 cm (11.8 in) tall with alternate, linear leaves (CNPS 1977b, Hickman 1993). The lower leaves are entire, and the upper leaves have one to three lobes that are 1 to 3 cm (0.4 to 1.2 in) deep (Hickman 1993). The daisy-like flower heads of Sonoma sunshine are yellow. The ray flowers (the flowers usually located on the edge of the inflorescence of members of the aster family) have dark red stigmas (female reproductive parts). The disk flowers (flowers in the center portion of an inflorescence of a member of the aster family) have white stigmas and white pollen but are otherwise yellow. Achenes are 3 to 4 mm (0.1 to 0.15 in) long with small rounded or conic protuberances (papillate) and 4 to 6 strongly angled edges (CNPS 1997b, Hickman 1993). Sonoma sunshine could be confused with common stickyseed (*Blennosperma nanum*); however, Sonoma sunshine has many fewer, much longer lobes on the leaves and is more robust (CNPS 1977b).

Sebastopol meadowfoam is an annual in the meadowfoam family (Limnanthaceae). Plants are less than 30 cm (11.8 in) tall with erect to spreading stems (decumbent). Mature plants have once pinnately-divided leaves with three to five leaflets (Hickman 1993). The shape of the mature leaves separates Sebastopol meadowfoam from other members of the genus. Showy white flowers are borne singly at the ends of stems (56 FR 61173), are wheel-like or bell-shaped, and have five, 12 to 18 mm (0.5 to 0.7 in) petals. The seed-like dry fruits are nutlets about 3 to 4 mm (0.1 to 0.15 in) in length (Hickman 1993).

Many-flowered navarretia is an annual in the phlox family (Polemoniaceae). Plants grow to a height of 1 to 3 cm (0.4 to 1.2 in) and are many-branched and spreading, forming a mat 2 to 6 cm (0.8 to 2.4 in) wide. Two to 4 cm (0.8 to 1.6 in) long leaves are entire and linear or have a few

widely-spaced linear lobes. Twenty to 50 pale blue flowers make up the inflorescence. Each inflorescence is subtended by leaf-like bracts that are one to two times the length of the flower head. The funnel-shaped corolla is 5 to 6 mm (0.20 to 0.24 in) long with unbranched veins (CNPS 1987, Hickman 1993). Many-flowered navarretia is distinguished from few-flowered navarretia (*Navarretia leucocephala* ssp. *pauciflora*) by its more numerous and multi-flowered heads (20 to 50 flowers versus 2 to 5), and by having three or more pairs of outer bracts with the bract lobes being forked or three-four branched from the base. It is distinguished from other *Navarretia* species in the region where it grows by its stature, degree of hairiness, or size, number, or lobing of floral parts (62 FR 34029).

**Historical and Current Distribution.** Burke's goldfields is endemic to the central Coastal Range region and has been reported historically from Mendocino, Lake, and Sonoma counties (CNPS 1977a, Patterson *et al.* 1994). The type locality of Burke's goldfields is the only known occurrence from Mendocino County and is possibly extirpated. Two California Natural Diversity Data Base (CNDDDB) occurrences are recorded from Lake County, at Manning Flat and at a winery on Highway 29. Both Lake County occurrences are presumed extant. The remaining 25 occurrences are from Sonoma County. Four of the Sonoma County occurrences are extirpated, and two are possibly extirpated (CNDDDB 1998). Within Sonoma County, one occurrence is known from north of Healdsburg (Patterson *et al.* 1994). 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).

Sonoma sunshine occurs only in Sonoma County. In the Cotati Valley, the species ranges from near the community of Fulton in the north to Scenic Avenue between 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 (56 FR 61173). Sonoma sunshine is currently known from 23 CNDDDB occurrences (CNDDDB 1998). Five occurrences are outside the Santa Rosa Plain in Sonoma Valley. Of these, two are extirpated. Eighteen occurrences of Sonoma sunshine are known from the Santa Rosa Plain. One is extirpated, one possibly extirpated and sixteen presumed extant (CNDDDB 1998). Occurrences of Sonoma sunshine are found in two concentrations on the Santa Rosa Plain, one north and one south of Airport Boulevard (CH2M Hill 1995, CNDDDB 1998).

Until 1992 when a small colony was found in Napa County, Sebastopol meadowfoam was thought to be a Sonoma County endemic (Patterson *et al.* 1994). The one Napa County occurrence is at Yountville Ecological Reserve, north of the Napa River (CNDDDB 1998). It has been suggested that this occurrence may be introduced (Skinner and Pavlik 1994). The remaining 36 occurrences of Sebastopol meadowfoam are in Sonoma County (CNDDDB 1998) where it ranges from near the community of Grafton, east to Santa Rosa, southeast to Scenic Avenue, and southwest to Cunningham (56 FR 61173). Three occurrences north of Grafton have not been relocated in the most recent surveys. Two Sonoma County occurrences are outside the Santa Rosa Plain, one at Atascadero Creek Marsh west of Sebastopol and one in the vicinity of Knights Valley northeast of Windsor (CNDDDB 1998). On the Santa Rosa Plain, Sebastopol meadowfoam is primarily distributed in the central and southern portion of the Plain (CH2M Hill 1995). Thirty of the 37 occurrences are presumed extant. Twenty-eight of these are on the Santa Rosa Plain (CNDDDB 1998).

Many-flowered navarretia is found in Lake and Sonoma counties (CNDDDB 1998). The species is historically known from eight locations. Two historical populations in Sonoma County are considered possibly extirpated and were hybrids between many-flowered navarretia and Baker's navarretia (*Navarretia leucocephala* ssp. *bakeri*). Only one location is known from the Santa Rosa Plain; the site is south of the City of Windsor (CH2M Hill 1995). Five extant populations are found in Lake County (A. Day, 1993 *in litt.*, 62 FR 34029).

*Habitat.* Burke's goldfields grows in vernal pools and wet meadows below 500 meters (m) (1640 feet (ft)) (Hickman 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 (56 FR 61173, CNDDDB 1998). At this location, the species is associated with common goldfields and few-flowered navarretia (CNDDDB 1998). In Sonoma County, the vernal pools containing Burke's goldfields form on nearly level to slightly sloping loams, clay loams, and clays. A clay layer or hardpan approximately 0.6 to 0.9 m (2 to 3 ft) below the surface restricts downward movement of water (56 FR 61173). North of the Santa Rosa Flood Control Channel, where much of the Burke's goldfields grows on the Santa Rosa Plain, Huichica loam is the predominant soil series (Patterson *et al.* 1994, CNDDDB 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, CNDDDB 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).

Sonoma sunshine grows in vernal pools and wet grasslands below 100 m (330 ft) (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, as described for Burke's goldfields above (56 FR 61173). 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, CNDDDB 1998). These soil series are briefly described in the discussion of Burke's goldfields habitat above. Soil differences are well known to be associated with genetic differentiation, even across short spatial distances (Linhart and Grant 1996). The presence of two concentrations of populations of Sonoma sunshine and their occurrence on different soil types is one basis for the area-based mitigation specified above (Mitigation section above).

Sebastopol meadowfoam grows in wet meadows and vernal pools (Hickman 1993, Skinner and Pavlik 1994). The one Napa County occurrence is in riparian woodland associated with dubious rush (*Juncus dubius*), pointed rush (*Juncus oxymiris*), plantain (*Plantago* sp.), prairie trefoil (*Lotus purshianus*), cutleaf geranium (*Geranium dissectum*), and Himalayan blackberry (*Rubus discolor*) (CNDDDB 1998). At the Sonoma County occurrence near Knights Valley, Sebastopol meadowfoam grows in a vernal wet grassland. Kenwood Marsh checkerbloom (*Sidalcea oregana* ssp. *valida*), also a federally-listed species, is found nearby in freshwater wetland at this site. On the Santa Rosa Plain, Sebastopol meadowfoam occurs in vernal pools on nearly level to slightly sloping loams, clay loams, and clays, as described above (56 FR 61173). Most confirmed occurrences of Sebastopol meadowfoam on the Santa Rosa Plain are south of the

Santa Rosa Flood Control Channel and they are likely growing on Wright loam or Clear Lake clay, as described above (Patterson *et al.* 1994, CNDDDB 1998).

Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam are all associated with other plants that commonly grow in vernal pools on the Santa Rosa Plain. These include Douglas' pogogyne (*Pogogyne douglasii* ssp. *parviflora*), Lobb's aquatic buttercup (*Ranunculus lobbii*), smooth goldfields, California semaphore grass (*Pleuropogon californicus*), maroonspot downingia (*Downingia concolor*), and button-celery (*Eryngium* sp.) (CNDDDB 1998).

Many-flowered navarretia is found in moist habitats in volcanic ash vernal pool systems (CH2M Hill 1995). This unique type of pool has a substrate of volcanic ash or rubble with an underlying clay hardpan. The surrounding vegetation may consist of yellow pine (*Pinus ponderosa*), black oak (*Quercus kelloggii*), Douglas-fir (*Pseudotsuga menziesii*), and madrone (*Arbutus cuspidata*). Close associates include other vernal pool plants such as Vasey's coyote-thistle (*Eryngium vaseyi*), cuspidate or toothed downingia (*Downingia cuspidata*), Boggs Lake hedge-hyssop (*Gratiola heterosepala*), and slender Orcutt grass (*Orcuttia tenuis*) (CNPS 1987).

*Life History.* Like many vernal pool plants (Zedler 1990), Burke's goldfields, Sonoma sunshine, Sebastopol meadowfoam, and many-flowered navarretia are annual herbs (Hickman 1993, Skinner and Pavlik 1994). Burke's goldfields usually flowers from April to June, Sonoma sunshine from March to April, Sebastopol meadowfoam from April to May, and many-flowered navarretia from May to June (Skinner and Pavlik 1994). Burke's goldfields is known to be obligately outcrossing (Crawford and Ornduff 1989), but breeding system information is lacking for the other species. Some species of *Limnanthes* and *Blennosperma* are pollinated by bees specific to particular species. For example, meadowfoam species may be pollinated by specialist andrenid bees (principally *Andrena limnanthes*) which forage within very limited areas of their host flowers (Thorp 1990). The extent to which pollination of the species covered in this biological opinion depends on host-specific or more generalist pollinators is currently unknown.

Seed banks are thought to be of particular importance in annual species subject to uncertain or variable environmental conditions (Cohen 1966, 1967; Parker *et al.* 1989; Templeton and Levin 1979). The four plants covered in this programmatic fit these criteria; 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.

Natural soil seed banks of the listed plant species have not been specifically examined. However, there is one example providing circumstantial evidence for persistent seed banks in Sebastopol meadowfoam. The Bennett site, remote from other Sebastopol meadowfoam colonies, lacked flowering populations of this species for several years. Conditions were highly degraded during this period by wallowing of hogs. The first year after removal of hogs in the mid-1990s, a small population (12 plants) of Sebastopol meadowfoam emerged at the site. The population expanded rapidly over several years (P. Baye, 1998 *in litt.*). Seed banks are the likely source of the Sebastopol meadowfoam that emerged because long-distance dispersal is an improbable explanation for the simultaneous emergence of multiple plants at one site.

For species that develop substantial seed banks, a census of plants growing above ground may not accurately estimate the number of plants at the site (Rice 1989, Given 1994). Population sizes of short-lived species may fluctuate widely from very high numbers in some years to very small numbers, or even absence, in other years. Therefore, total extirpation should not be assumed when above ground plants are not observed at a site. Further, declines in population size may not necessarily indicate that habitat is unsuitable (Given 1994).

*Reasons for Decline and Threats to Survival.* Burke's goldfields is threatened throughout all or part of its range by factors including urbanization, agricultural land use changes, alterations in hydrology, and erosion (CNPS 1977a, 56 FR 61173, Patterson *et al.* 1994, CH2M Hill 1995, CNDDDB 1998). The only known Mendocino County occurrence is presumably extirpated (CH2M Hill 1995). The Manning Flat occurrence in Lake County is the largest known occurrence of the species and is threatened by extensive gully erosion that is destroying the habitat (CH2M Hill 1995, CNDDDB 1998). The second Lake County occurrence is on property owned by a winery. Recent reports suggest that some damage to the occurrence has resulted from vineyard operations (R. Chan, University of California, Berkeley, 1998 *in litt.*). However, the winery owners appear willing to work with the Service and the Corps to avoid and/or minimize further damage to the site (CDFG, 1998 *in litt.*, N. Haley, U.S. Army Corps of Engineers, 1998 pers. comm.). Within the Santa Rosa Plain, many Burke's goldfields locations have been extirpated due to urbanization and conversion of land to row crops. Formerly well-represented in the vicinity of Windsor on the Plain, Burke's goldfields has now been nearly extirpated from the area (Patterson *et al.* 1994, CH2M Hill 1995). Threats to the Santa Rosa Plain portion of the species are discussed in more detail in the Environmental Baseline section.

Like Burke's goldfields, Sonoma sunshine is threatened throughout all or part of its range by factors including urbanization, agricultural land use changes, and alterations in hydrology (56 FR 61173, Patterson *et al.* 1994, CH2M Hill 1995, CNDDDB 1998). In the Sonoma Valley, two of five known occurrences have been extirpated. One was extirpated by habitat destruction in 1986, and the area is now a vineyard. At the second site, most habitat was destroyed by grading for homesites in 1980; the remainder was converted to vineyard or overtaken by weeds (CNBBD 1998). Of the presumed extant Sonoma Valley occurrences, one has been largely developed. A small lot was retained by CDFG when the development took place, but Sonoma sunshine disappeared on the lot after the subdivision was developed (Service files). A second Sonoma Valley occurrence is currently pasture. A portion of the occurrence may have been recently disced, and the landowners of a second portion want to convert the site to vineyard (C. Wilcox, 1998, pers. comm.; Service files). The third Sonoma Valley occurrence is in Sonoma Valley Regional Park, a park which is apparently not managed for conservation (CNDDDB 1998). On the Santa Rosa Plain, one occurrence has probably been extirpated by completion of a subdivision and one by major alterations of the land at the site (CNDDDB 1998). Of the presumed extant sites, a number support severely degraded habitat, are threatened by development, or have not supported confirmed populations of Sonoma sunshine in recent years (CH2M Hill 1995, CNDDDB 1998). Threats to the Santa Rosa Plain portion of the species are discussed in more detail in the Environmental Baseline section.

Like Burke's goldfields and Sonoma sunshine, Sebastopol meadowfoam is threatened throughout all or part of its range by factors including urbanization, agricultural land use

changes, and alterations in hydrology (56 FR 61173, Patterson *et al.* 1994, CH2M Hill 1995, CNDDDB 1998). The one Napa County occurrence is within a California Department of Fish and Game ecological reserve but may be threatened by invasion of Himalayan blackberry (CNDDDB 1998). In Sonoma County, outside the Santa Rosa Plain, one occurrence was possibly extirpated in 1974, and the second is on private land where bordering properties have largely been converted to vineyard. The most recent available information suggests that the property with Sebastopol meadowfoam is grazed (CNDDDB 1998). Thirty-four CNDDDB occurrences of Sebastopol meadowfoam are on the Santa Rosa Plain. Two of these are extirpated, one by conversion to a turf farm in 1991. Four more occurrences are possibly extirpated (CNDDDB 1998). A number of the remaining locations on the Santa Rosa Plain have been severely degraded; many of the extant colonies are small and severely threatened (CH2M Hill 1995). Threats to the Santa Rosa Plain portion of the species are discussed in more detail in the Environmental Baseline section.

Because it is endemic to volcanic ash substrate vernal pools, many-flowered navarretia has an extremely limited distribution (McCarten 1985). Urbanization, invasion of exotics, and off-highway vehicle use have contributed to the decline of the species (62 FR 34029). One of the historic occurrences in Sonoma County, east of the City of Santa Rosa at Ledson Marsh (Bennett Mountain Lake), was severely affected by horseback riders, wild pigs, and a *Eucalyptus* eradication program (CH2M Hill 1995). The one extant population of many-flowered navarretia that is known from within the action area is addressed in the Environmental Baseline section.

The four species addressed in this biological opinion were listed as endangered primarily because of the loss and degradation of habitat throughout their ranges. Since their listing, seasonal wetland habitat has continued to decline throughout the species' ranges.

**Recovery.** Protection and adaptive management of known sites or populations is of high priority for recovery of the listed plant species on the Santa Rosa Plain. However, because much of the habitat for the listed plant species on the Santa Rosa Plain has been lost, and the remainder is highly fragmented (as further described in the Environmental Baseline section below), preservation alone will be insufficient to ensure long-term survival and recovery of the listed species. Long-term survival and recovery will only be achievable if substantial wetland restoration is completed, followed by reintroduction of self-sustaining, viable populations of the listed plants. Some large sites with proportionately small wetland acreage may be highly suitable, or even essential, for recovery of the listed species. In the absence of a full suite of reserves, including large reserves based on both preservation and restoration, there is potential for significant loss of opportunity to restore wetlands and recover the species. Because maintenance of restorable seasonal wetland habitat and habitat suitable for reintroduction will be necessary for long-term survival and recovery of the listed plant species on the Santa Rosa Plain, this programmatic opinion addresses effects to restorable seasonal wetlands and suitable unoccupied habitat, in addition to currently or formerly occupied habitat. During the interim program, mitigation is required for all impacts to seasonal wetlands, and impacts to seasonal wetlands are limited to 50 acres. Regional conservation planning is expected to identify all suitable and restorable habitat that will be protected to assure long-term survival and recovery of the listed plant species.

## Environmental Baseline

Prior to human settlement, it is believed the Santa Rosa Plain supported a vast network of seasonally wet swales and scattered pools within a matrix of grassland and oak savanna. The low-gradient terrain with underlying dense clay soil horizons and high clay soil surfaces, ample winter precipitation, and dry summer climate on the Santa Rosa Plain predisposed this area to the development of seasonal wetlands. The natural landscape historically consisted of numerous shallow depressions that would pond water during the rainy season (vernal pools), often connected by narrow swales. Much of the vernal pool ecosystem has since been lost or degraded through agricultural activities and development projects (Patterson *et al.* 1994, CH2M Hill 1995). The Santa Rosa Plain is believed to have historically supported approximately 7,000 acres of seasonal wetlands, an estimated 84 percent of which had been lost due to land conversion as of 1994. The approximately 1,000 acres of seasonal wetlands that remained on the Santa Rosa Plain in 1994 were composed of both vernal pools (ponded) and swales (non-ponded) in roughly equal proportions, and the swales had largely been invaded by exotic species, therefore it is believed the actual amount of vernal pool acreage had been reduced to less than a few hundred acres (Patterson *et al.*, 1994). Because the vernal pool ecosystem was once extensive over the Santa Rosa Plain, it is not difficult to find parcels on which vernal pools have been "smeared" into the landscape, resulting in degraded seasonal wetlands that may still retain the necessary qualities for supporting one or more of the listed plant species but may require considerable restoration to ensure long-term species viability (Patterson *et al.* 1994, CH2M Hill 1995).

The loss of seasonal wetland habitat on the Santa Rosa Plain has largely resulted from urban and agricultural conversion (Patterson *et al.* 1994, CH2M Hill 1995, CNDDDB 1998). Of 28,000 acres of the Santa Rosa Plain studied by Waaland *et al.* (1990 as cited in Patterson *et al.* 1994), 12,000 acres had been converted to urban, cropland, orchard or vineyard uses. The conversion most severely affected oak woodland/savanna-vernal pool habitat.

In addition, seasonal wetlands on the Santa Rosa Plain have been heavily impacted through stream channelization, filling and draining of wetlands, livestock grazing, and irrigation (Patterson *et al.* 1994, CH2M Hill 1995, Keeler-Wolf *et al.* 1997, CNDDDB 1998). Each of these impacts is discussed briefly below.

Stream channelization for flood control, such as of Roseland and Colgan Creeks, has involved excavation through vernal pool terrain causing interruption of hydrological connections and filling of wetlands with dredge spoils. Pools have also been filled and drained for mosquito abatement and to create dry ground for livestock. Air photo analyses and reconnaissance surveys have revealed incidences of unauthorized low level backyard filling throughout the action area (Patterson *et al.* 1994).

Livestock grazing is another factor with historic and ongoing effects on the listed plant species of the Santa Rosa Plain. While light grazing may benefit habitat by reducing thatch and minimizing competitive grasses (this has been demonstrated to be an effective strategy for Burke's goldfields), heavier grazing can result in injurious trampling, direct plant consumption,



local soil compaction, and detrimental effects resulting from the excessive contribution of manure (Patterson *et al.* 1994, 56 FR 61173).

Wastewater irrigation is a recently established factor affecting vernal pools on the Santa Rosa Plain. This practice began in the 1970s and 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. The draft EIR stated that wastewater irrigation would avoid impacts to sensitive biological resources (City of Santa Rosa and U.S. Army Corps of Engineers 1996). However, in February of 1998, the site supporting many-flowered navarretia had a sign stating wastewater was being used for irrigation on-site (Ellen Berryman, 1998 pers. obs.). Patterson *et al.* (1994) state, "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" (page 47).

#### Burke's goldfields

Burke's goldfields was listed as endangered on December 2, 1991 (56 FR 61173), largely because of present and threatened destruction and modification of its habitat. 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. The Service is 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 these sites declined after the disturbance took place. In addition, the Service is aware of at least four instances of unauthorized discing that have triggered Corps enforcement actions for sites where Burke's goldfields grows. Because of typically small parcel size, development projects that have proceeded since listing, such as Cobblestone and TMD Brown, 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 most severely impacted portion of the range of Burke's goldfields has been the northwestern portion of the 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 CNDDDB occurrence in the area contained 11 colonies in 1984; by 1993, only two were extant (CNDDDB 1998). A second occurrence had more than 20 vernal pools in 1985, but by 1994, only one colony of Burke's goldfields was present (CNDDDB 1998). This property once contained 50,000 plants, but after repeated discing only about 100 plants remain (B. Guggolz, CNPS, 1998 pers. comm.). 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 (B. Guggolz, 1998 pers. comm.).

Since the time Burke's goldfields was listed in 1991, the species has continued to experience dramatic loss. The Service used data from 1994 (Patterson *et al.* 1994) to examine how numbers of Burke's goldfields plants 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 CNDDDB occurrence. Figure 2 shows data compiled for sites surveyed both before and after listing. 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 we have both pre- and post-listing surveys decreased in size after the species was listed (Figure 2, significantly more sites decreased than expected due to chance alone,  $p < 0.02$ , sign test). 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).

Only about 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 since 1987 at Todd Road Preserve, the largest of the preservation sites (Patterson *et al.* 1994, CH2M Hill 1995). Excluding this site, the preserved acreage of Burke's goldfields sites is only 8 percent of acreage known in 1994 (calculated from data in Patterson *et al.* 1994). Since 1994, one preservation bank with Burke's goldfields has been established, but only a small portion of the site supports Burke's goldfields (Exhibit A, MOA for Wright Preservation Bank, 1997).

### Sonoma sunshine

Sonoma sunshine was listed as endangered on December 2, 1991 (56 FR 61173), primarily because of present and threatened destruction and modification of its habitat. Patterson *et al.* (1994) estimated less than 12 biologically separate populations remain. Of the sites they examined, nearly one-third had been extirpated, and nearly one-sixth had not been confirmed recently. An additional 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 CNDDDB occurrence. At one CNDDDB occurrence, 12 Sonoma sunshine colonies were observed in 1989. By 1993, only six remained (CNDDDB 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 Cobblestone and TMD Brown. Other sites have been used as wastewater irrigated pastures, damaged by ORV use, heavily grazed, or been subject to land conversion activities (CNDDDB

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 that triggered Corps enforcement actions (Service files).

The Service used data from 1994 (Patterson *et al.* 1994) to examine how numbers of Sonoma sunshine plants at particular sites changed between the time of listing and the most current surveys that had been performed after listing. Figure 3 shows data compiled for sites surveyed both before and 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). Since 1994, one preservation bank with Sonoma sunshine has been established, but only 15 individual plants have been observed in recent surveys at the site (M. Waaland, 1998 pers. comm.).

#### Sebastopol meadowfoam

Sebastopol meadowfoam was listed as endangered on December 2, 1991 (56 FR 61173) primarily because of present and threatened destruction and modification of its habitat. 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 CNDDDB occurrence. According to Service records, significant Sebastopol meadowfoam sites are within the southwest Santa Rosa annexation area. 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). Since 1994, two preservation banks with Sebastopol meadowfoam have been established (MOA for Wright Preservation Bank 1997, MOA for Southwest Santa Rosa Vernal Pool Preservation Bank 1997).

#### Many-flowered navarretia

Many-flowered navarretia is found in only one location on the Santa Rosa Plain (CH2M Hill 1995, CNDDDB 1998). Habitat at the site has been heavily disturbed due to sheep grazing

(M. Waaland, 1988 *in litt.*) and may be threatened by wastewater irrigation (E. Berryman, 1998 pers. obs., see above). No populations of many-flowered navarretia are protected in Sonoma County (Patterson *et al.* 1994). The species was listed as endangered on June 18, 1997 (62 FR 34029) because habitat loss and degradation were found to imperil the species.

### Summary

More than 84 percent of the once extensive vernal pool ecosystem on the Santa Rosa Plain has been lost. Numerous sites supporting the listed species covered in this programmatic have been destroyed or severely degraded by urbanization and other land conversion activities. The remaining habitat is highly fragmented, and the majority of sites known to support the listed species are small (less than 15 acres) (calculated from data of Patterson *et al.* 1994). The past and present impacts to listed plant species habitat on the Santa Rosa Plain are summarized in the following passage:

- Virtually all of the land and all of the wetlands in the study area have been at least moderately altered by past or ongoing land uses, and large sections of the plain's overall habitat landscape have been completely converted to cropland or other intensive non-wetland use. With severe depletion of overall habitat acreage and pervasive degradation, even the remnant habitats no longer represent more than a fraction of what they once did as part of the regional ecosystem ...current efforts must recognize the meager remaining universe within which any planned conservation/preservation efforts must take place.

Patterson *et al.* 1994, p. 49

## **Effects of the Proposed Action**

### **A. Interim Program for Low-quality Habitat**

As described in the Status of the Species and Environmental Baseline, above, habitat for the listed plant species has been severely impacted on the Santa Rosa Plain as a result of urban and agricultural development. These species, which are naturally rare, narrow endemics, have become extremely vulnerable due to decreases in population size, habitat fragmentation, and chronic habitat degradation. The long-term survival and recovery of these species requires the establishment of a viable regional preserve system that includes restoration of degraded habitat to enhance overall population size and viability.

Prior to establishment and implementation of a comprehensive conservation plan, 404 permitting authorized under this programmatic consultation is expected to result in direct and indirect impacts to 50 acres of low-quality seasonal wetlands, 30 of which may be occupied (or assumed occupied) by the listed plants. These impacts will further reduce the size and numbers of the listed plant populations, and could reduce the extent of the range for each of the listed plant species on the Santa Rosa Plain. Projects authorized under this consultation are also likely to

result in fragmentation and edge effects to existing habitat. The loss of low-quality seasonal wetlands where the listed plants have not been found is expected to reduce opportunities for habitat restoration and enhancement of listed plant populations, thereby potentially affecting the species' long-term survival and recovery.

Impacts to seasonal wetlands, both in habitat currently suitable for the listed plant species and in restorable habitat, will be limited and mitigated to allow for the species' long-term survival and recovery. Direct and indirect impacts to the 30 acres of seasonal wetlands where the listed species have been observed, or where they are assumed to be present, will be mitigated through 2:1 to 3:1 preservation and 1:1 to 1.5:1 restoration/construction. Direct and indirect impacts to potential habitat where adequate surveys have been conducted and the listed species have not been observed will be mitigated through 1:1 to 2:1 preservation and 1:1 to 1.5:1 restoration/construction. The mitigation land will be preserved and managed in perpetuity.

Impacts to seasonal wetlands allowed under this programmatic consultation could result in loss of habitat where the plant species have not been detected for a number of years, but where viable seed banks persist on-site. However, these impacts will be addressed through the programmatic consultation by requiring compensation for seasonal wetland impacts even when plants have not been detected on-site. Any habitat with historic records of the species will be compensated in the same manner as habitat known to be currently occupied.

Fill of seasonal wetlands authorized under this consultation could result in disproportionate impacts within some portions of the action area. This could result in the reduction in extent of a species range and a loss of genetic variability. To minimize geographically disproportionate impacts, the action area is divided into three geographic units, and impacts within each unit must be mitigated within the same unit. This area-based mitigation will provide for habitat preservation throughout the ranges of the listed species in the planning area. Since each species is concentrated in different geographic units, area-based mitigation is also expected to maximize the opportunity to mitigate in-kind for each species.

The loss of 50 acres of low-quality seasonal wetlands is not likely to jeopardize the continued existence of Burke's goldfields, Sebastopol meadowfoam, Sonoma sunshine, or many-flowered navarretia in the wild, because this habitat loss will be offset through preservation of existing higher quality habitat and restoration/construction of additional habitat, and the impacts will be re-evaluated twice annually to determine whether this strategy should be modified. Through the tracking of project impacts over time, periodic reevaluation of the biological opinion, and modification of the opinion if it is determined the permitted actions may cumulatively jeopardize the species, effects will be further minimized at local and regional levels. The comprehensive review of the baseline (the number and location of acres destroyed within each county and success rate of restoration efforts) that will be conducted at the end of each six-month period will limit the extent of impacts that occur as a result of the program's implementation. During these reviews it may be determined that habitat destruction can continue with the same or otherwise necessary mitigation processes in place, or that further destruction in specific areas will jeopardize listed species. Once the 50-acre threshold for the interim program has been reached, the Service does not expect to reinitiate consultation and increase the threshold until a comprehensive conservation planning program is in place.

## B. Comprehensive Conservation Planning Program

The comprehensive conservation planning program outlined in this programmatic consultation would establish an adaptively managed regional preserve system for the listed plant species, while allowing for impacts to seasonal wetlands outside the preserve system. This program would incorporate the goals and objectives of Phase 2 of the VPEPP, resulting in an adaptively managed preserve system that would 1) include large, resilient core populations of the species; 2) include an array of smaller, peripheral populations to maximize genetic diversity and minimize potential effects of catastrophic outbreaks of herbivorous insects or pathogenic fungi that may sweep through larger populations; 3) provide for experimental introduction of the listed plants with the goal of establishing a sufficient number of stable populations that will offset loss occurring outside the preserve system; and 4) be adaptively managed to provide for the long-term survival of the species. The issuance of any 404 permits in the context of such a program would not jeopardize the continued existence of the listed plant species because the program would be designed to provide for the species' long-term survival and recovery.

### **Cumulative Effects**

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

Because the listed plants occur in seasonal wetlands, many of the activities expected to affect the species will be reviewed under this programmatic consultation or individual section 7 consultations as a result of the Federal nexus provided by section 404 of the Federal Water Pollution Control Act, as amended (i.e., Clean Water Act). Some activities that do not require a 404 permit could occur that would 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. The impacts to vernal pools on the Santa Rosa Plain resulting from wastewater irrigation are expected to continue increasing. The Sub-regional Sewage Treatment System requires at least 100 additional acres of land on the Santa Rosa Plain annually to meet the demand for wastewater disposal. On-going urban growth in Windsor as of 1994 was expected to add pressure to the Windsor Water District to expand reclaimed water irrigation to at least 1,000 acres in the northern portion of the action area (Patterson *et. al* 1994). The long-term conservation plan to be developed as a component of this programmatic consultation is intended to result in establishment of a regional preserve system that will be managed to maintain the long-term viability of the listed plant species, which is expected to significantly reduce these cumulative effects.

## **Conclusion**

After reviewing the current status of the species, the environmental baseline for the action areas, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that projects which meet the qualifications for this programmatic consultation are not likely to jeopardize the continued existence of the Burke's goldfields, Sebastopol meadowfoam, Sonoma sunshine, or many-flowered navarretia. No critical habitat has been designated for these species, therefore, none will be affected.

## **INCIDENTAL TAKE STATEMENT**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, 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 the incidental take of 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 plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or 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.

## **CONSERVATION RECOMMENDATIONS**

Section 7 (a) (1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's 7(a)(1) responsibilities for these species.

1. As the Central Valley Vernal Pool Multiple Species Recovery Plan is developed, the Corps should assist the Service in its implementation for listed plant species on the Santa Rosa Plain.

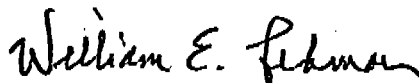
2. The Corps should work with the Service to encourage the local jurisdictions of the Santa Rosa Plain to participate in the interim and long-term program outlined in this consultation, and in assisting the local jurisdictions through the interim and long-term planning processes.

### REINITIATION NOTICE--CLOSING STATEMENT

This concludes formal consultation on the actions described in this opinion. As provided in 50 CFR §402.16, reinitiation 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) 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; (2) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this opinion; or (3) a new species is listed or critical habitat is 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 reinitiation. In addition, if the Corps discovers that the conditions of the permit have not been followed, the Corps should review its responsibilities under section 7 of the Act and reinitiate formal consultation with the Service. We appreciate the cooperation of the Corps throughout this consultation process.

If you have any questions regarding this biological opinion, please contact Diane Elam, Ellen Berryman, or Jan Knight of my staff at (916) 979-2120.

Sincerely,



*for* David L. Harlow  
Acting Field Supervisor

Enclosures (Appendix A)

cc: AES, Portland, OR  
CESAC, Regulatory Branch  
EPA, Suzanne Marr  
CDFG, Region 3



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## APPENDIX A

### Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed Plants on the Santa Rosa Plain

(modified from the September 23, 1996 Service Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants)

These guidelines describe protocols for conducting botanical surveys for federally listed plant species on the Santa Rosa Plain. They also describe minimum standards for reporting results of the surveys. The federally listed plant species occurring on the Santa Rosa Plain are Sonoma sunshine (*Blennosperma bakeri*), Burke's goldfields (*Lasthenia burkei*), Sebastopol meadowfoam (*Limnanthes vinculans*), and many-flowered navarretia (*Navarretia leucocephala* ssp. *plieantha*). The Service will use, in part, the information outlined below in determining whether the project under consideration may affect these plants, and in determining the direct, indirect, and cumulative effects.

Field inventories should be conducted by a qualified botanist in a manner that will locate listed species that may be present. With the exception of developed agricultural lands, the entire project area should be surveyed. Acceptable survey protocols are as follows:

1. A minimum of three visits must be made to the project site during the growing season. Site visits must correspond to times when at least one of the four Santa Rosa Plain listed plant species is accurately identifiable on a local reference site. Reference sites used must be acceptable to the Service. Site visits must span a period during which all four of the listed plants have been observed (not necessarily at the same time) and are identifiable on reference sites during a specific growing season. More visits to the site or the adjacent area may be needed to determine when each species is blooming in a given year. Inventories will include all potential habitats at the project site.
2. A minimum of two years of negative survey data performed according to the specifications in #1 is necessary to substantiate a negative finding for future permitting actions. For cases in which negative survey data do not conform to the standards outlined in these guidelines, the Service will make the assumption that all four listed plant species are present on the project site.
3. List every species observed and compile a comprehensive list of vascular plants for the entire project site. Vascular plants need to be identified to a taxonomic level which allows rarity to be determined.

4. Survey documentation must include:
  - a. identification of reference sites visited, which listed species were observed, phenological stage of the listed species observed, and similarity of physiographic control between reference sites and surveyed sites (general water depth, extent of pooling, etc.)
  - b. a description of the biological setting at the project site, including plant community, topography, soils, potential habitat of target species, and environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species
  - c. a map of project location showing scale, orientation, project boundaries, parcel size, and map quadrangle name
  - d. survey dates and survey methodology(ies)
  - e. a comprehensive list of all vascular plants occurring on the project site for each habitat type, to characterize and document site quality
  - f. a description of current and historical land uses of the habitat(s) and degree of project site alteration
  - g. a description of the presence of listed species off-site on adjacent parcels, if known
  - h. an assessment of the biological significance or ecological quality of the project site in a local and regional context
5. If listed species is (are) found on the project site, report results that additionally include:
  - a. a map showing the distribution of the listed species distribution relative to the proposed project
  - b. a description of the direction and integrity of flow of surface hydrology. If listed species is (are) affected by adjacent off-site hydrological influences, describe these factors.
  - c. the listed species phenology and microhabitat, an estimate of the number of individuals of each listed species per unit area; identify areas of high, medium and low density of listed species over the project site, and provide acres of occupied habitat of listed species. Investigators should provide color slides, photos or color copies of photos of listed species or representative habitats to support information or descriptions contained in reports.
  - d. the degree of impact(s), if any, of the proposed project as it relates to the potential unoccupied habitat of listed species.

6. Document findings of target species by completing California Native Species Field Survey Form(s) and submit form(s) to the Natural Diversity Data Base. Documentation of determinations and/or voucher specimens may be useful in cases of taxonomic ambiguities, habitat or range extensions.
7. Report as an addendum to the original survey, any change in abundance and distribution of listed plants in subsequent years. Project sites with inventories older than 3 years from the current date of project proposal submission will likely need additional survey. Investigators need to assess whether an additional survey(s) is (are) needed.
8. Guidance from California Department of Fish and Game (CDFG) regarding plant and plant community surveys can be found in Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities, 1984. Please contact the CDFG Regional Office for questions regarding the CDFG guidelines and for assistance in determining any applicable State regulatory requirements.

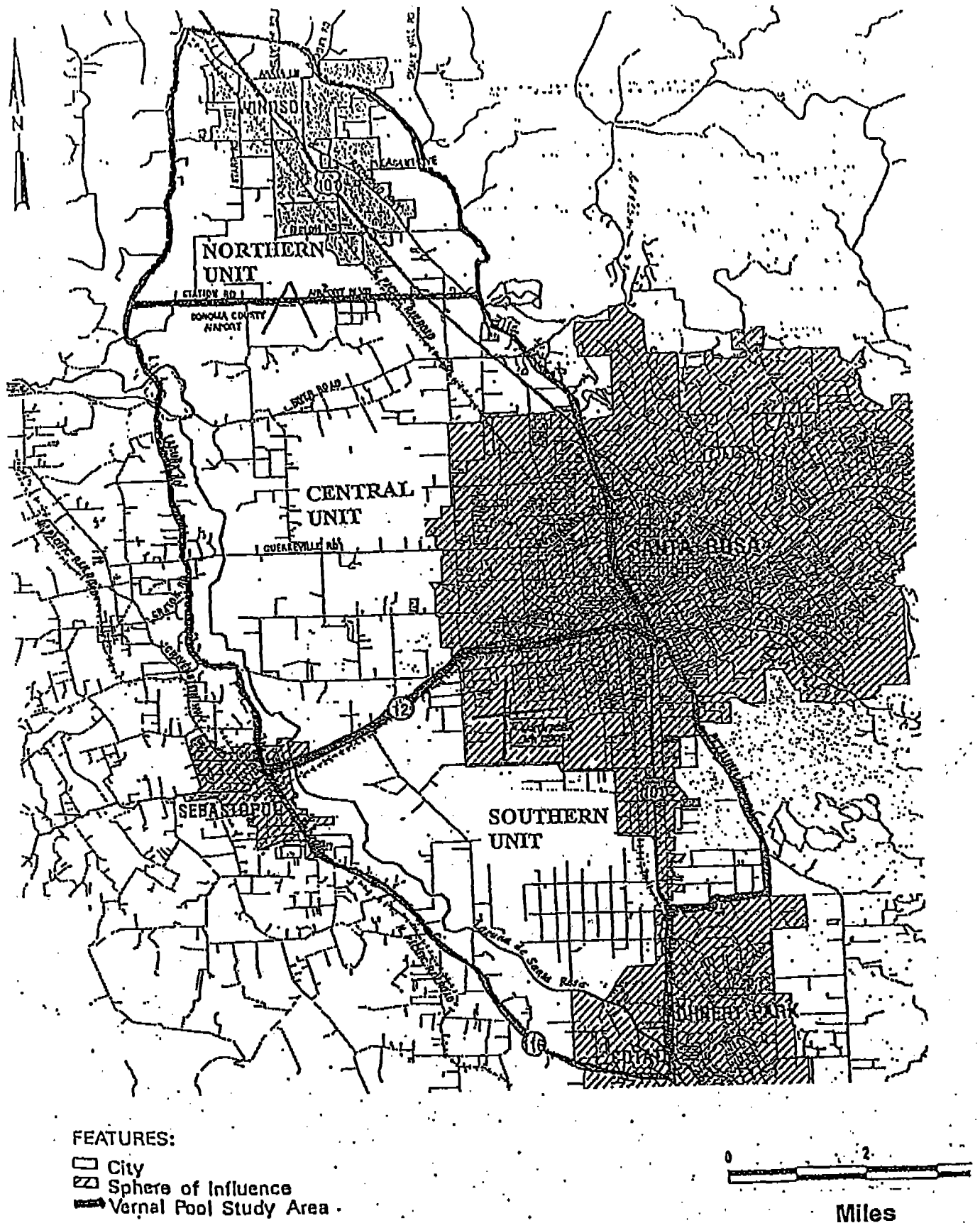


Figure 1: Santa Rosa Plain programmatic biological opinion action area and mitigation units.

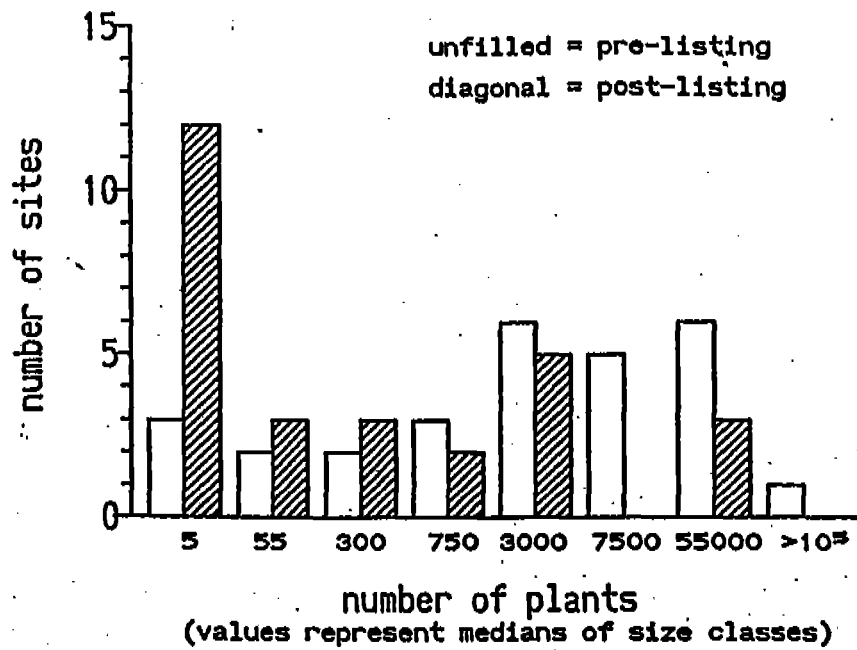


Figure 2: Number of Burke's goldfields individuals at sites surveyed both pre- and post-listing

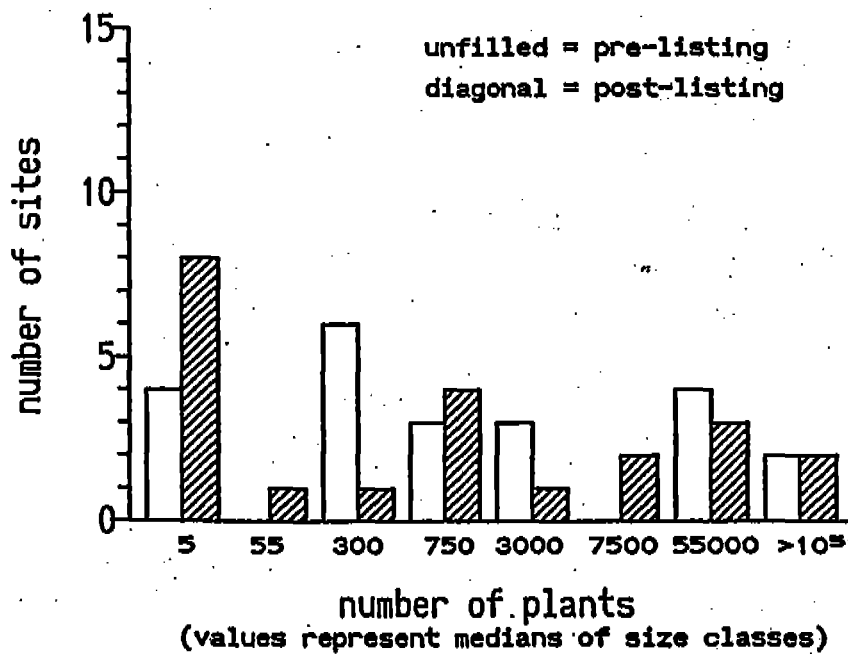


Figure 3: Number of Sonoma sunshine individuals at sites surveyed both pre- and post-listing





# 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:  
81420-2008-F-0261

NOV 9 2007

Ms. Jane Hicks  
Regulatory Branch Chief  
San Francisco District  
U.S. Army Corps of Engineers  
1455 Market Street  
San Francisco, California 94103-1398

Subject: Programmatic Biological Opinion (Programmatic) for U.S. Army Corps of Engineers (Corps) Permitted Projects that May Affect California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain, California (Corps File Number 223420N)

Dear Ms. Hicks:

This is in response to your November 1, 2007, request to re-initiate formal consultation with the U.S. Fish and Wildlife Service (Service) for permits, enforcement actions and mitigation banks that are under the Corps jurisdiction. This document represents the Service's biological opinion on the effects of the action on the endangered Sonoma County Distinct Population Segment of the California tiger salamander (*Ambystoma californiense*), Burke's goldfields (*Lasthenia burkei*), Sonoma sunshine (*Blechnosperma bakeri*) and Sebastopol meadowfoam (*Limnanthes vinculans*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

This biological opinion is based on information provided by the following facts, communications and documents:

1. The November 1, 2007 letter from the Corps re-initiating formal consultation;
2. The December 1, 2005 Santa Rosa Plain Conservation Strategy;
3. The May 16, 2006 Interim Mitigation Guidelines authored by the Service and CDFG ([http://www.fws.gov/sacramento/es/santa\\_rosa\\_conservation.html](http://www.fws.gov/sacramento/es/santa_rosa_conservation.html));
4. References cited in this Biological Opinion; and
5. Other information available to the Service.



## Consultation History/Background

The Santa Rosa Plain is located in central Sonoma County and is characterized by vernal pools, seasonal wetlands, and associated grassland habitat, which support – among other flora and fauna – the endangered California tiger salamander and four endangered plant species: Burke's goldfields, Sonoma sunshine, Sebastopol meadowfoam, and many-flowered navarretia (*Navarretia leucocephala* ssp. *plieantha*) (listed plants). These listed plants grow only in vernal pools; the California tiger salamander uses seasonal wetlands and vernal pools for breeding and metamorphosis, and the surrounding uplands for dispersal, feeding, growth, maturation and maintenance of the juvenile and adult population (upland habitat). The distribution of Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam is confined almost entirely to the Santa Rosa Plain. Many-flowered navarretia occurs mostly outside the Santa Rosa Plain, but its only Sonoma County population is present on the Santa Rosa Plain.

Urbanization and agricultural development on the Santa Rosa Plain has encroached into areas inhabited by the California tiger salamander and the listed plants discussed above. The loss of seasonal wetlands caused by development on the Santa Rosa Plain has led to declines in the populations of the listed plants and the California tiger salamander. Voters in the cities of Cotati, Rohnert Park, Santa Rosa, and Sebastopol, and the Town of Windsor have established urban growth boundaries (UGBs) 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 acreages of publicly owned property and preserves located in the Santa Rosa Plain, which will further contribute to conservation. Some of the areas within these UGBs, however, include lands inhabited by California tiger salamander and the listed plant species. Some agricultural practices have also disturbed and modified seasonal wetlands, California tiger salamander and listed plant habitat on the Santa Rosa Plain. Some agricultural practices, such as irrigated or grazed pasture, retain some California tiger salamander habitat value compared to more intensive development.

Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam were federally listed as endangered on December 2, 1991. The many-flowered navarretia was listed on June 18, 1997. These plants are also listed as endangered by the State of California. A Programmatic Biological Opinion covering the four listed plants was issued on July 17, 1998. On July 22, 2002, the Service listed the Sonoma County distinct population segment of the California tiger salamander as endangered under an emergency basis. The final rule was issued on March 19, 2003. The Service listed the species as threatened throughout its range on August 4, 2004, including the former Sonoma County distinct population segment (Federal Register 69:47211-47248). The listing of the California tiger salamander has caused a level of uncertainty for local jurisdictions, landowners, and developers about how the listing would affect their activities. Private and local public interests met with the Service to discuss possible cooperative approaches to protecting the species, while allowing planned land uses to occur within the range of the animal. The result of these discussions was the formation of the Santa Rosa Plain Conservation Strategy Team (Team). The Team included the following members: Service, CDFG, Corps, Environmental Protection Agency, North Coast Regional Water Quality Control Board, local governments, the Laguna de Santa Rosa Foundation, the environmental community, and the private landowner community. It was agreed that the Team would develop a conservation strategy for the Santa

Rosa Plain that conserves and enhances the habitat for the California tiger salamander and the listed plants, while considering the need for development pursuant to the general plans of the local jurisdictions. The Team held its first meeting on March 30, 2004, and continued to meet through August 2005, to prepare a Draft Santa Rosa Plain Conservation Strategy. The Team held a public meeting on September 12, 2005, and received numerous comments on the draft through September 16, 2005. In addition, the Draft Santa Rosa Plain Conservation Strategy was peer reviewed. The Team reviewed and considered all comments received, made modifications to the Draft Santa Rosa Plain Conservation Strategy where appropriate, and produced the Final Santa Rosa Plain Conservation Strategy (Conservation Strategy).

The Sonoma County distinct population segment for the California tiger salamander was reinstated and re-designated as endangered by court order on August 19, 2005. On December 14, 2005, the Service made a final determination to not designate critical habitat for the Sonoma County distinct population segment of the California tiger salamander. The Service analyzed whether the benefits of designating critical habitat were outweighed by the benefits of not designating critical habitat. It was determined that the interim conservation strategies and measures being implemented by those local governing agencies with land use authority over the area outweighed the benefits of listing critical habitat at this time. The California tiger salamander is not listed under the California Endangered Species Act at this time. It is currently a state species of special concern.

#### Conservation Areas

The Conservation Strategy identifies areas within the Santa Rosa Plain that should be conserved to benefit both the California tiger salamander and listed plants. Designation of an individual property as being within a conservation area does not change that property's land use designation or zoning, or otherwise restrict the use of that property. In addition, a property in a conservation area is not automatically suitable for listed species conservation.

The purpose of the conservation areas is to insure that preservation occurs throughout the distribution of the species. The designation of conservation areas is based upon the following factors: 1) known distribution of the California tiger salamander; 2) the presence of suitable California tiger salamander habitat; 3) presence of large blocks of natural or restorable land; 4) proximity to existing Preserves; and 5) known location of the listed plants. The designation of conservation areas also generally attempted to avoid future development areas established by UGBs and city general plans. Areas which are in the Laguna de Santa Rosa floodplain, areas above approximately 300 feet in elevation and characterized by oak woodland, or are adjacent to or surrounded by significant urban areas, generally have been excluded from the boundaries of the conservation areas, however these areas may still require mitigation if endangered species are adversely affected. The Southwest Santa Rosa Preserve System is within the urban growth boundary of the City of Santa Rosa.

The conservation area boundaries identify areas where mitigation for project-related impacts to the listed species should be directed. The listed plants also occur in the identified conservation areas, with the exception of the southwest Cotati and southeast Cotati Conservation Areas. However, the many-flowered navarettia is only known from one site in the Santa Rosa Plain.

Figures 1 through 3 in the Conservation Strategy identify areas important for protection of the California tiger salamander and listed plants on the Santa Rosa Plain as well as other pertinent information. Figures 4 through 13 in the Conservation Strategy describe each conservation area in detail (Service web page: [http://www.fws.gov/sacramento/es/santa\\_rosa\\_conservation.html](http://www.fws.gov/sacramento/es/santa_rosa_conservation.html)). Some lands within the conservation areas are excluded based on existing development and on their small size or on other factors that would make them unsuitable for conservation of listed species. Complete descriptions of the conservation areas are in the Conservation Strategy.

## **Introduction**

The Conservation Strategy is the biological framework upon which this Programmatic is based. However, because the local agencies with interested stakeholders are currently developing mechanisms to implement the Conservation Strategy, this Programmatic will be based on the interim mitigation ratios described in the Conservation Strategy and described later in this opinion. This Programmatic will replace the July 17, 1998 programmatic biological opinion (Service, 1998) prepared for the listed plants. This Programmatic may be amended or a new one may be written after an Implementation Plan for the Conservation Strategy is completed by the local jurisdictions.

This Programmatic is issued to the Corps for permits, enforcement actions or mitigation banks (Project(s)) that are under their jurisdiction. Projects that are appended to this Programmatic will be provided individual take authorization. This Programmatic will not cover the many-flowered navarretia because of its limited distribution. Also, projects that will impact occupied sites supporting Burke's goldfields and Sonoma sunshine, where surveys have documented 2,000 plants or greater in any year in the past 10 years may not be appended to this Programmatic, but will be evaluated on a case by case basis. The number for 2,000 plants was derived from comments provided by numerous technical experts and the Service's review of projects impacting plant populations. This Programmatic will expedite the process for project approval provided all information listed in the next section is provided by the project applicants. This Programmatic provides the framework for mitigation, conservation, translocation, and appropriate minimization measures. The Service and CDFG will track Project impacts, mitigation and other pertinent information.

### Procedures for Appending Projects to the Programmatic Biological Opinion

The following information is required from the applicant and will be used by the Corps along with the California tiger salamander and Plant Designation Map (Enclosure 1) and Plant Mitigation Location Map (Enclosure 2) to evaluate whether a Project can be appended to this Programmatic:

- 1) Corps Permit Application including Assessors Parcel Number(s), UTM coordinates, and street address of the Project;
- 2) Corps-verified jurisdictional determination;
- 3) Biological Assessment including Service survey protocols (Survey protocols:

[http://www.fws.gov/sacramento/es/santa\\_rosa\\_conservation.html](http://www.fws.gov/sacramento/es/santa_rosa_conservation.html)) results, if needed, and proposed mitigation consistent with the ratios in this Programmatic;

4) Listed plant occurrence information on the Project and mitigation sites from the CDFG California Natural Diversity Database (<http://www.dfg.ca.gov/biogeodata/cnddb/>) and the 1994 report, *Seasonal Wetland Baseline Report for the Santa Rosa Plain, Sonoma County* ([http://www.fws.gov/sacramento/es/Santa\\_Rosa\\_strategy\\_COE\\_programmatic\\_BO.htm](http://www.fws.gov/sacramento/es/Santa_Rosa_strategy_COE_programmatic_BO.htm)) (Patterson *et al.* , 1994); and

5) Mitigation proposal including acres and location, credit sale receipt and any other pertinent information. If the proposed mitigation is a new Preserve, then the Preserve Establishment and Evaluation Criteria (Enclosure 3) will be used by the Applicants to provide the preliminary determination for Preserve selection.

The Corps will make one of the following determinations of effect for a project by reviewing Enclosure 1, Enclosure 2 and other information provided by the applicant and will take the identified action:

- No effect. No consultation with the Service is required for areas on Enclosure 1 identified as “No Effect”.
- May affect listed plants, but would not likely affect California tiger salamander. Consult with the Service for concurrence for areas on Enclosure 1 identified as “May affect listed plants, but would not likely affect California tiger salamander”. The Corps will forward to the Service all biological and other pertinent information and a letter requesting that the proposed Project to be appended to this Programmatic.
- May affect listed plants and would likely affect California tiger salamander. Consult with the Service for concurrence for areas on Enclosure 1 and Enclosure 2 identified as “May affect listed plants and would likely affect California tiger salamander”. The Corps will forward to the Service all biological and other pertinent information and a letter requesting that the proposed Project to be appended to this Programmatic.
- May affect California tiger salamander, but no effect to listed plants. Consult with the Service for concurrence for areas on Enclosure 1 and identified as “May affect California tiger salamander, but no effect to listed plants”. The Corps will forward to the Service all biological and other pertinent information and a letter requesting that the proposed project to be appended to this Programmatic.

The Service will review the proposed Project to evaluate whether it is appropriate to append the Project to this Programmatic based on the level of impacts, avoidance, minimization and mitigation measures. The Service may determine some projects require separate Section 7 consultation and will not be appended to this Programmatic. If the Service does not concur the project is appropriate to be appended to this Programmatic, the Service will notify the Corps in writing. Applicants who have had consultation initiated by the Corps prior to the date of this Programmatic may continue with that consultation or may request their Project be appended to this Programmatic.

## BIOLOGICAL OPINION

### Description of the Proposed Action

The proposed action is appending Projects to this Programmatic that are consistent with the Conservation Strategy and that the Service has determined to be appropriate for being appended to this Programmatic. For the purpose of this Programmatic, the action area is shown in Enclosure 1 as the "Santa Rosa Plain Conservation Strategy Study Area" (Study Area).

As stated above, Project sites where surveys have documented 2,000 plants or greater of Burke's goldfield or Sonoma sunshine in any year in the past 10 years may not be appended to this Programmatic. These sites may require an individual formal consultation. Certain linear projects as defined in the Conservation Strategy may be covered under this Programmatic if they follow the ratios described in this Programmatic. In addition, Projects in the Southwest Santa Rosa Preserve System (Conservation Strategy Team, 2005) will be evaluated individually and may not adhere to the ratios if the individual Project mitigation includes preserving corridors as described and shown on Figure 3 and Figure 12 in the Conservation Strategy. The corridors may not need to be exactly as depicted on Figure 3 and 12, but must provide similar or greater function as the Conservation Strategy intended.

### Preserves

A "Preserve" includes mitigation and conservation banks and other mitigation and conservation sites. Parcels proposed for preservation under this Programmatic provide habitat for the California tiger salamander and/or listed plants. The Service and CDFG will evaluate the Applicant's proposed Preserve to determine its suitability. Preserve establishment guidance and evaluation criteria is provided in Enclosure 3. 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 this Programmatic 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.

To meet the biological goals and objectives as described in the Conservation Strategy, the following measures will be applied:

- 1) Preserves must ultimately have the listed species present and within a reasonable timeframe.
- 2) There will be at least one California tiger salamander breeding pool for every 20 acres of Preserves unless otherwise determined by the Service and CDFG;
- 3) Each Preserve will have at least one created or existing California tiger salamander breeding site, as defined in the Conservation Strategy, or the presence of listed plants;

- 4) Generally, seasonal wetlands will not exceed 30-35% of a Preserve;
- 5) Generally, pool size of individual pools will be under 0.25 acres and
- 6) Site specific design plans will be reviewed and approved by the Service and CDFG.

### Mitigation

Mitigation ratios for the California tiger salamander were determined by considering the likely impacts to the species and its habitat. Adult California tiger salamanders have been observed up to 1.3 miles from breeding sites (S. Sweet, 1998). The graduated ratios were developed using an estimate of the amount of habitat needed to meet the required conservation goal based on the expected impacts of development projected to occur on the Santa Rosa Plain from 2005 through 2015. The graduated ratios were based on the proximity to known California tiger salamander breeding habitat and adult occurrences. These ratios will be used until the Conservation Strategy is implemented by the local jurisdictions. The expected impact areas and conservation areas were mapped by using existing land use plans, aerial photography, expert knowledge of the areas, and data on California tiger salamander and listed plants from the California Natural Diversity Database (CNDDDB) and local experts.

Mitigation requirements will apply to the entire Project area, however, the mitigation requirement for Projects on parcels with existing hardscape will be removed from the calculation. Hardscape may include parking lots, compacted gravel surfaces, buildings, or other structures. In some cases, hardscape may provide some recognizable benefit to the species. Where the hardscape currently functions as a movement corridor between existing and/or proposed preserve habitat, measures must be included in the design of future development to maintain this function. For each Project, the Service and CDFG will determine if hardscape provides benefit to the species and if any mitigation is required.

Mitigation ratios and the Conservation Strategy are dependent on current information on both California tiger salamander distribution and development that is currently proposed. Reinitiation of this Programmatic may be required if the land use changes or if new information is discovered regarding the distribution of tiger salamander or listed plants within the Study Area. If new breeding sites or occurrences are found in the Study Area, then Enclosure 1 would be revised accordingly. Enclosure 1 will be updated at least annually by the Service and CDFG and will be provided to the Corps and posted on the Service's web page.

Mitigation for California tiger salamander or listed plants must be achieved at a Preserve which could include purchasing appropriate credits at a Service-approved bank or another type of Preserve as described above.

### California tiger salamander Mitigation Ratios

The following ratios for required area of mitigation to area of impact will be used for this Programmatic:

Mitigation of 3:1 – For projects that are within 500 feet of a known breeding site.

Mitigation of 2:1 – For projects that are greater than 500 feet and within 2,200 feet of a known breeding site, and for projects beyond 2,200 feet from a known breeding site, but within 500 feet of an adult occurrence.

Mitigation of 1:1 – For projects that are greater than 2,200 feet and within 1.3 miles of a known breeding site.

Mitigation of 0.2:1 – For projects that are greater than 1.3 miles from a known breeding site and greater than 500 feet from an adult occurrence, but excluding the “No Effect” areas shown on Enclosure 1.

### California Tiger Salamander Minimization Measures

Projects and other activities will incorporate measures to minimize their potential direct and indirect effects on the California tiger salamander. Minimization measures may vary based on environmental factors and site location as determined by the Service and CDFG. No mitigation or conservation bank may receive translocated California tiger salamanders until all the bank’s credits have been sold (See Enclosure 4 for translocation guidance). The following activities will require measures to minimize take for California tiger salamander:

- (1) An activity that impacts a California tiger salamander breeding site:

Prior to construction, salamanders will be collected and translocated (See Enclosure 4) to an appropriate breeding site as identified by the Service and CDFG.

- (2) An activity that impacts California tiger salamander upland habitat:

Prior to construction, fencing will be installed to exclude California tiger salamander from entering the project site. Fences with ramps may be required to allow any California tiger salamander onsite to move into an adjacent habitat offsite. In these instances translocation may occur and would be determined on a case-by-case basis.

- (3) An activity where wetlands are being established for listed plants, California tiger salamander breeding or for wetland mitigation that has an effect on California tiger salamander:

Prior to construction, fencing will be installed to exclude California tiger salamanders from entering the site.

The following minimization measures will be implemented unless otherwise waived by the Service in writing:

- 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



California tiger salamanders 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 day, 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 California tiger salamander. California tiger salamanders will be removed by the biological monitor and translocated as described in Enclosure 4 or as directed by the Service.
- d.) An erosion and sediment control plan will be implemented to prevent impacts of wetland restoration and construction on habitat outside the work areas.
- e.) Access routes, number and size of staging areas, 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.
- f.) All foods and food-related trash items will be enclosed in sealed trash containers at the end of each day, and removed from the site every three days.
- g.) No pets will be allowed on the project site.
- 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 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.

### Plant Mitigation and Establishment

Seasonal wetlands within the range of the listed plants on the Santa Rosa Plain are considered suitable habitat for the listed plants (See Enclosure 5). If surveys conducted following Service protocols ([http://www.fws.gov/sacramento/es/santa\\_rosa\\_conservation.html](http://www.fws.gov/sacramento/es/santa_rosa_conservation.html)) document listed plants on a site, or if the site had listed plants in the past, then the site is considered occupied.

If surveys have been conducted according to Service protocols and no listed plants have been found, the seasonal wetlands on-site will be treated as suitable habitat. This Programmatic addresses effects and mitigation for this habitat type where the listed plants have not yet been observed because a persistent seed bank may be present even if the plants have not been detected.

Plant establishment is defined as the introduction of listed plant seeds, inoculum or seed bank to a Preserve resulting in the persistence of the species on the site and having met the success criteria. Success criteria for plant establishment is available on the Service’s web page at [http://www.fws.gov/sacramento/es/santa\\_rosa\\_conservation.html](http://www.fws.gov/sacramento/es/santa_rosa_conservation.html). Establishing plant populations may require translocation of seed, inoculum or other plant material, or a change of land management. Guidelines for plant translocation are described in Enclosure 4.

Plant Mitigation Ratios

Mitigation for adverse effects to occupied or suitable habitat for listed plants is calculated by the impacted acres of seasonal wetlands. The following table provides the mitigation ratios for the listed plants.

**Table 1: Mitigation Ratios for the Listed Plants**

<b>Impact to:</b>	<b>Occupied Habitat Compensation</b>	<b>Suitable Habitat Compensation</b>
Burke’s goldfields  OR  Sonoma sunshine	3:1 occupied or established habitat (any combination) with success criteria met <u>prior</u> to groundbreaking at project site	1:1 occupied or established habitat (any combination) with success criteria met <u>prior</u> to groundbreaking at project site  AND  0.5:1 established habitat with success criteria met <u>prior</u> to groundbreaking at project site
Sebastopol meadowfoam	2:1 occupied or established habitat (any combination) with success criteria met <u>prior</u> to groundbreaking at project site	1:1 occupied or established habitat (any combination) with success criteria met <u>prior</u> to groundbreaking at project site  AND  0.5:1 established habitat with success criteria met <u>prior</u> to groundbreaking at project site

The distribution of the three listed plants does not completely overlap. Sebastopol meadowfoam is generally found south of Santa Rosa Creek. Therefore, Sebastopol meadowfoam cannot be established north of Santa Rosa Creek. Burke’s goldfields and Sonoma sunshine cannot be established south of the Laguna de Santa Rosa (Enclosure 2).

Preserves for listed plants may be located north of Highway 116 and within the Santa Rosa Plain study area to the north near Windsor (North Area and South Area) as depicted in Enclosure 2.

For impact sites with suitable habitat north of Santa Rosa Creek, the Preserve must support Burke's goldfields and/or Sonoma sunshine and must be in the North Area or South Area.

For impact sites with suitable habitat south of Santa Rosa Creek, the Preserve must support Sebastopol meadowfoam, Burke's goldfields, and/or Sonoma sunshine and must be in the North Area or South Area.

For impacts to occupied habitat supporting Burke's goldfields, Sonoma sunshine and/or Sebastopol meadowfoam, the wetlands at a Preserve must support the impacted species and must be in the North Area or South Area.

#### Minimization and Mitigation Measures For Plants Required Prior to Ground Disturbance

Ground disturbance at a project site may begin when the following criteria are deemed completed by the Service and CDFG:

- 1) Seed/soil collection and salvage at the project site has been completed at sites that have been determined by the Service and CDFG as being occupied by one or more of the listed plants (Enclosure 4);
- 2) The applicant has completed one of the following: a) purchased appropriate plant credits at a Service and CDFG approved bank; or b) conserved occupied and established plant habitat at a location and number of acres approved by the Service and CDFG. The conserved land must also have a Service and CDFG – approved management plan and non-wasting endowment fund. Mitigation sites proposed under option b will be evaluated on a case by case basis.

A single project that needs to preserve habitat for both listed plants and the California tiger salamander may mitigate at a single location, if a preserve meets the mitigation requirements for all the impacted listed species.

#### **Action Area**

The action area is shown on Enclosure 1 as the Santa Rosa Plain Conservation Strategy Study Area. The action area for this Programmatic includes the geographic range of the Sonoma County Distinct population of California tiger salamander and the listed plants.

#### **Status of the Species**

Descriptions of the Status of the Species below include *Listing History, Historical and Current Distribution, Description, Habitat and Life History, Reasons for Decline and Threats to Survival, and Recovery Actions.*

### California Tiger Salamander

*Listing History.* The Sonoma County Distinct Population Segment of the California tiger salamander was emergency listed as endangered on July 22, 2002 (67 FR 47726). The salamander was listed as endangered on March 19, 2003 (68 FR 13497). The California tiger salamander was listed as threatened on August 4, 2004 (69 FR 47212). 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 (70 FR 44301). 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, (70 FR 74138), we made a final determination to designate and exclude approximately 17,418 acres (7,049 hectares) 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.

*Historical and Current Distribution.* 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 (1188.7 meters) in the coast ranges and to approximately 1,600 feet (487.7 meters) 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 (72 kilometers). 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). We have no evidence of natural interchange of individuals between the Sonoma County population and other California tiger salamander

populations.

Sonoma County Distinct Population Segment of the California tiger salamander inhabits low-elevation (below 500 feet [152 meters]) 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).

*Description.* 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; males tend to be larger than females. The coloration of the California tiger salamander is white or yellowish markings against black. As adults, California tiger salamanders tend to have the creamy yellow to white spotting on the sides with much less on the dorsal surface of the animal, whereas other tiger salamander species have brighter yellow spotting that is heaviest on the dorsal surface. The larvae have yellowish gray bodies, broad flat 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 (1.14 to 1.42 centimeters) (Petranka 1998).

*Habitat and Life History.* The California tiger salamander has an obligate biphasic life cycle (Shaffer *et al.* 2004). Although the larvae salamanders develop in the 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). 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). Because they spend most of their lives underground, California tiger salamanders are rarely encountered, even in areas where they are abundant.

California tiger salamanders may also use landscape features such as leaf litter or desiccation cracks in the soil for upland refugia. Burrows often harbor camel crickets and other invertebrates that provide likely prey for California tiger salamanders. Underground refugia also provides protection from the sun and wind associated with the dry California climate that can cause excessive drying of amphibian skin. Although California tiger salamanders are members of a family of "burrowing" salamanders, they are not known to create their own burrows. This may be due to the hardness of soils in the California ecosystems in which they are found. Tiger salamanders typically use the burrows of ground squirrels and gophers (Loredo *et al.* 1996; Trenham 1998a). However, Dave Cook (Sonoma County Water Agency, personal communication with the Service, 2001) found that pocket gopher burrows are most often used by California tiger salamanders in Sonoma County. California tiger salamanders depend on persistent small mammal activity to create, maintain, and sustain sufficient underground refugia. Burrows are short lived without continued small mammal activity and typically collapse within approximately 18 months (Loredo *et al.* 1996).

Upland burrows inhabited by California tiger salamanders have often been referred to as

“estivation” sites. However, “estivation” implies a state of inactivity, while most evidence suggests that California tiger salamanders remain active in their underground dwellings. A recent study has found that California tiger salamanders move, feed, and remain active in their burrows (Van Hattem 2004). Because California tiger salamanders arrive at breeding ponds in good condition and are heavier when entering the pond than when leaving, researchers have long inferred that California tiger salamanders are feeding while underground. Recent direct observations have confirmed this (Trenham 2001; van Hattem 2004). 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, 1989; 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, the California tiger salamander utilized vernal pools, but the animals also currently breed in livestock stockpools. 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). 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 larvae typically hatch within 10 to 24 days after eggs are laid (Storer 1925). 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. The larvae are totally aquatic. 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*), Western spadefoot toads (*Spea hammondi*), 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, they 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). 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 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, Feaver (1971) found that only 11 of 30 pools sampled supported larval California tiger salamanders, and 5 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 that California tiger salamanders prefer 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. However, they 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. Dispersal and migration 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 ponds or pools 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 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.

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 adult California tiger salamanders. A trapping study conducted in Solano County during winter of 2002/2003 found that juveniles used upland habitats further from breeding ponds than adults (Trenham and Shaffer, 2005). More juvenile salamanders were captured at distances of 328, 656, and 1,312 feet from a breeding pond 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 juvenile salamanders could be found within 2,099 feet of the pond, with the remaining 5 percent being found at even greater distances. Results from the 2003-04 trapping efforts detected juvenile 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. Based on radio-tracked adults, there is 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*), bullfrogs (*Rana catesbeiana*), mosquito fish (*Gambusia affinis*), and crayfish (*Procrampus species*).

*Reasons for Decline and Threats to Survival.* The California tiger salamanders are 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 California tiger salamanders, 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; disease; various chemical contaminants; road-crossing mortality; and certain unrestrictive mosquito and rodent control operations.

### Burke's Goldfields

*Listing History.* Burke's goldfields was federally listed as endangered on December 2, 1991 (56 FR 61173). No critical habitat has been designated for this species.

*Description.* Burke's goldfields is an annual herb in the aster family (Asteraceae). Plants are typically less than 11.8 inches (30 centimeters) in height (Hickman 1993) and usually branched (California Native Plant Society (CNPS) 1977). Leaves are opposite, less than two inches (5 centimeters) in length, and pinnately lobed. Yellow, daisy-like inflorescences with separate involucre bracts (leaf-like structures beneath the flower head) appear from approximately April through June (Skinner and Pavlik 1994). Fruits are achenes (dry, one-seeded fruits) less than 0.06 inch (1.5 millimeters) in length. The fruits of Burke's goldfields can be distinguished from those of other goldfields by the presence of one long awn (bristle and numerous short scales) (Hickman 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*) because smooth goldfields have partly fused involucre bracts and a pappus (ring of scale-like or hair-like projections at the crown of an achene) of numerous narrowed scales. The linear leaves without lobes distinguish common goldfields (*Lasthenia californica*) from Burke's goldfields (Hickman 1993).

*Historical and Current Distribution.* Burke's goldfields is 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 type locality of Burke's goldfields is the only known occurrence from Mendocino County and is possibly extirpated. Two California Natural Diversity Database (CNDDDB) occurrences are recorded from Lake County, at Manning Flat and at a winery on Highway 29. Both Lake County occurrences are presumed extant. The remaining occurrences are from Sonoma County (CNDDDB 1998). Within Sonoma County, one occurrence is known from north of Healdsburg (Patterson et al. 1994). 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.

*Habitat.* Burke's goldfields grow in vernal pools and swales below 500 meters (m) (Hickman 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 (56 FR 61173, CNDDDB 1998). At this location, the species is associated with common goldfields and few-flowered navarretia (*Navarretia leucocephala pauciflora*) (CNDDDB 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 (0.6 to 0.9 meters) below the surface restricts downward movement of water (56 FR 61173). 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, CNDDDB 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, CNDDDB 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.*) (CNDDDB 1998).

*Life History.* The flowers of Burke's goldfields are self-incompatible (Ornduff 1966, Crawford and Ornduff 1989) and insect-pollinated. Seed banks are of particular importance to annual plant species which are subject to uncertain or variable environmental conditions (Cohen 1966, 1967; Parker et al. 1989; Templeton and Levin 1979). Burke's goldfields fit this criterion; it is an annual species living in California's highly variable Mediterranean climate.

No information exists with respect to the seed life of Burke's goldfields. Circumstantial evidence suggests that Burke's goldfields 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 (C. Wilcox, CDFG, 2000 in litt.). As annual species, it is expected that Burke's goldfields and Sonoma sunshine will respond to environmental stochastic events, such as changes in vegetative composition, climate, and disturbance, by partial germination of its seed bank. 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. Therefore, it is likely that populations of these species may persist undetected for a period of years until conditions are favorable to allow germination. Although formal studies of seed viability have not been conducted for these species, it is reasonable to expect their seed banks may persist for extended periods without germination. 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.

For species that develop long-lived seed banks, a census of plants growing above ground may not accurately reflect the total number of plants at the site (Rice 1989, Given 1994). 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, total extirpation cannot be assumed when above-ground plants of these species are not observed at a site. 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.

*Reasons for Decline and Threats to Survival.* Burke's goldfields is 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, and erosion (CNPS 1977, 56 FR 61173, Patterson et al. 1994, CH2M Hill 1995, CNDDDB 1998). The only known Mendocino County occurrence is presumably extirpated (CH2M Hill 1995). The Manning Flat occurrence, located on private land in Lake County, is the largest known occurrence of the species and is threatened by extensive gully erosion that is destroying the habitat (CH2M Hill 1995, CNDDDB 1998). 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 (R. Chan, University of California, Berkeley, 1998 in litt.). However, in the past the winery owners appeared willing to coordinate with the Service and the U.S. Army Corps of Engineers (Corps) to avoid and/or minimize further damage to the site (N. Haley, Corps, 1998 pers. comm.). On the Santa Rosa Plain, many Burke's goldfields locations have been extirpated due to urbanization and conversion of land to row crops. Formerly well-represented in the vicinity of Windsor, Burke's goldfields has now been nearly extirpated from the area (Patterson et al. 1994, CH2M Hill 1995).

Of the 48 known records of Burke's goldfields, 26 are presumed to remain extant, with a majority found on the Santa Rosa Plain. Four populations occur outside of the Santa Rosa Plain, of which only two populations, one in northern Healdsburg and one at the Ployes winery, are extant.

### Sonoma Sunshine

*Listing History.* Sonoma sunshine was federally listed as endangered on December 2, 1991 (56 FR 61173). No critical habitat has been designated for this species.

*Description.* Sonoma sunshine is an annual plant in the aster family. Plants are less than 11.8 inches (30 centimeters) tall with alternate, linear leaves (CNPS 1977, Hickman 1993). The lower leaves are entire, and the upper leaves have one to three lobes that are 0.4 to 1.2 inches (1 to 3 centimeters) deep (Hickman 1993). The daisy-like flower heads of Sonoma sunshine are yellow. The ray flowers have dark red stigmas. The disk flowers have white stigmas and white pollen but are otherwise yellow. Achenes are 0.1 to 0.15 inches (3 to 4 millimeters) long with small rounded or conic proturbences (papillate) and 4 to 6 strongly angled edges (CNPS 1977, Hickman 1993). Sonoma sunshine could be confused with common stickseed (*Blennosperma nanum*); however, Sonoma sunshine has longer and fewer lobes on the leaves and is more robust (CNPS 1977).

*Historical and Current Distribution.* Sonoma sunshine occurs only in Sonoma County. In the

Cotati Valley, the species ranges from near the community of Fulton in the north to Scenic Avenue between 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. During 2001, two new natural populations were identified north and south of the City of Santa Rosa, increasing the number of previously identified CNDDDB occurrences from 26 to 28. Of the 28 occurrences, 21 are presumed to be extant with a majority occurring on the Santa Rosa Plain and one occurring in Glen Ellen. In addition, Sonoma sunshine has been introduced to at least one site on Alton Lane during mitigation activities. Seven populations within or near the City of Santa Rosa have been extirpated.

*Habitat.* Sonoma sunshine grows in vernal pools and wet grasslands below 100 m (330 ft) (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, as described for Burke's goldfields (56 FR 61173). 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, CNDDDB 1998). These soil series are briefly described in the discussion of Burke's goldfields habitat above.

*Life History.* Sonoma sunshine flowers from March to April. The flowers of Sonoma sunshine are self-incompatible, meaning that they can set seed only when fertilized by pollen from a different plant. The extent to which pollination of the species covered in this Programmatic depends on host-specific or more generalist pollinators is currently unknown.

Seed banks are thought to be of particular importance in annual species subject to uncertain or variable environmental conditions (Cohen 1966, 1967; Parker *et al.* 1989; Templeton and Levin 1979). The Sonoma sunshine also fit these criteria; 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.

*Reasons for Decline and Threats to Survival.* Sonoma sunshine is threatened with habitat loss, fragmentation, and degradation throughout all or part of its range by factors including urbanization, agricultural land use changes, and alterations in hydrology (Patterson et al. 1994, CH2M Hill 1995, CNDDDB 1998). In the Sonoma Valley, two of five known occurrences have been extirpated. One was extirpated by habitat destruction in 1986, and the area is now a vineyard. At the second site, most habitat was destroyed by grading for home sites in 1980; the remainder was converted to vineyard or overtaken by weeds (CNDDDB 1998). Of the presumed extant Sonoma Valley occurrences, one locality has been largely developed. A small area was retained by CDFG when the development took place, but Sonoma sunshine has not been recorded from this area since the subdivision was developed (Service files). A second Sonoma Valley locale is currently pasture. A portion of the occurrence may have been disced, and the landowners of a second portion want to convert the locale to vineyard (C. Wilcox, 1998, pers. comm., Service files). The third Sonoma Valley occurrence is in Sonoma Valley Regional Park, which is not managed for conservation (CNDDDB 1998). 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 (CNDDDB 1998). 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, CNDDDB 1998).

### Sebastopol Meadowfoam

*Listing History.* Sebastopol meadowfoam was federally listed as endangered on December 2, 1991 (56 FR 61173). No critical habitat has been designated for this species.

*Description.* Sebastopol meadowfoam is an annual herb with weak, somewhat fleshy, decumbent stems up to 11.8 inches (30 centimeters) long. The seedlings are unusual among *Limnanthes* species in that they have entire leaves. Leaves of mature plants are up to 3.9 inches (10 centimeters) long and have 3 to 5 leaflets that are narrow and unlobed with rounded tips. The leaves are borne on long petioles; petiole length, like stem length, appears to be promoted by submergence. Sebastopol meadowfoam has fragrant, white flowers that are borne in the leaf axils during April and May. The flowers are bell-shaped or dish-shaped, with petals 0.47 to 0.71 inch (12 to 18 millimeters) long. The sepals are shorter than the petals. The petals turn outward as the nutlets mature. The nutlets are dark brown, 0.12 to 0.16 inch (3 to 4 millimeters) long, and covered with knobby pinkish tubercles (Patterson et al. 1994).

*Historical and Current Distribution.* Historically, Sebastopol meadowfoam was known from 40 occurrences in 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 the second (#40) occurred in the vicinity of Knights Valley northeast of Windsor (CNDDDB 2001).

The current condition of numerous Sebastopol meadowfoam occurrences is unclear, because many have not been visited in over 5 years. The southern cluster of occurrences extends 3 miles (5 kilometers) from Stoney Point Road west to the Laguna de Santa Rosa, and is bounded by Occidental Road to the north and Cotati to the south. The central cluster stretches 1.5 miles (2.41 kilometers) on either side of Fulton Road extending northwards from Occidental Road to River Road. Patterson et al. (1994) estimated that the Santa Rosa Plain occurrences represent only 10 hydrologically separate populations of Sebastopol meadowfoam. At least one occurrence (#21) has been extirpated from the Santa Rosa Plain (CNDDDB 2002). Recent field surveys found that all three occurrences outside of the Santa Rosa Plain have probably been extirpated (CNDDDB 2002).

*Life History.* 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 (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 (Geoff Monk, personal communication), 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; CNDDDB 2002). The surrounding plant communities range from oak savanna, grassland, and marsh in Sonoma County to riparian woodland in Napa County (CNDDDB 2002). 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 (Pavlik et al. 2000, 2001). Most confirmed occurrences of Sebastopol meadowfoam on the Santa Rosa Plain grow on Wright loam or Clear Lake clay soils (Patterson et al. 1994, CNDDDB 2002). 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).

*Reasons for Decline and Threats to Survival.* Like Burke's goldfields and Sonoma sunshine, Sebastopol meadowfoam has been and continues to be threatened by habitat loss, habitat degradation, and small population size. 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 (56 FR 61173, Patterson et al. 1994, CH2M Hill 1995, CNDDDB 2002).

### Recovery Actions

As discussed in the Background section of this Programmatic, the Conservation Strategy was developed by the Team. 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) 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 that may occur in the course of carrying out a broad range of activities on the Santa Rosa Plain. The Conservation Strategy will not preserve the species unless implemented by the appropriate agencies. 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 mitigation will occur. It describes how preserves will be established and managed. It also includes guidelines for translocation, management plans, adaptive management and funding. Finally, the document describes the implementation planning process.

The County of Sonoma, the Cities of Santa Rosa, Cotati, Rohnert Park, the Town of Windsor, Service, and CDFG have commenced a process to develop a plan for implementing the Conservation Strategy. An implementation committee has been formed that is comprised of elected and staff representatives of the local jurisdictions and representatives of the agricultural, development, and environmental communities. Staff representatives from the Service and CDFG provide technical assistance to the implementation committee. The implementation plan is expected to provide a mechanism for applying the Conservation Strategy to cover public and private projects, agricultural activities, and residential and commercial development.

The Service and CDFG are implementing interim mitigation guidelines (Service and CDFG, 2006 *in litt.*) for Federal and non-federal actions. This Programmatic has integrated many of the guidelines in the Conservation Strategy and interim mitigation guidelines in the Description of the Proposed Action.

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; however, it does not preclude the obligation of the Service to develop a recovery plan.

### **Environmental Baseline**

Prior to human settlement, it is believed the Santa Rosa Plain supported a vast network of seasonally wet swales and scattered pools within a matrix of grassland and oak savanna. The low-gradient terrain with underlying dense clay soil horizons and high clay soil surfaces, ample winter precipitation, and dry summer climate on the Santa Rosa Plain predisposed this area to the development of seasonal wetlands. The natural landscape historically consisted of numerous shallow depressions that would pond water during the rainy season (vernal pools), often connected by narrow swales. Much of the vernal pool ecosystem has since been lost or degraded through agricultural activities and development projects (Patterson *et al.* 1994, CH2M Hill 1995). The Santa Rosa Plain is believed to have historically supported approximately 7,000 acres of seasonal wetlands, an estimated 84 percent of which had been lost due to land conversion as of 1994. The approximately 1,000 acres of seasonal wetlands that remained on the Santa Rosa Plain in 1994 were composed of both vernal pools (ponded) and swales (non-ponded) in roughly

equal proportions, and the swales had largely been invaded by exotic species, therefore it is believed the actual amount of vernal pool acreage had been reduced to less than a few hundred acres (Patterson *et al.*, 1994). Because the vernal pool ecosystem was once extensive over the Santa Rosa Plain, it is not difficult to find parcels on which vernal pools have been "smeared" into the landscape, resulting in degraded seasonal wetlands that may still retain the necessary qualities for supporting one or more of the listed plant species but may require considerable restoration to ensure long-term species viability (Patterson *et al.* 1994, CH2M Hill 1995).

The loss of seasonal wetland habitat on the Santa Rosa Plain has largely resulted from urban and agricultural conversion (Patterson *et al.* 1994, CH2M Hill 1995, CNDDDB 1998). Of 28,000 acres of the Santa Rosa Plain studied by Waaland *et al.* (1990 as cited in Patterson *et al.* 1994), 12,000 acres had been converted to urban, cropland, orchard or vineyard uses. The conversion most severely affected oak woodland/savanna-vernal pool habitat.

In addition, seasonal wetlands on the Santa Rosa Plain have been heavily impacted through stream channelization, filling and draining of wetlands, livestock grazing, and irrigation (Patterson *et al.* 1994, CH2M Hill 1995, Keeler-Wolf *et al.* 1997, CNDDDB 1998). Each of these impacts is discussed briefly below.

Stream channelization for flood control, such as of Roseland and Colgan Creeks, has involved excavation through vernal pool terrain causing interruption of hydrological connections and filling of wetlands with dredge spoils. Pools have also been filled and drained for mosquito abatement and to create dry ground for livestock. Air photo analyses and reconnaissance surveys have revealed incidences of unauthorized low level backyard filling throughout the action area (Patterson *et al.* 1994).

Livestock grazing is another factor with historic and ongoing effects on the listed plant species of the Santa Rosa Plain. While light grazing may benefit habitat by reducing thatch and minimizing competitive grasses (this has been demonstrated to be an effective strategy for Burke's goldfields), heavier grazing can result in injurious trampling, direct plant consumption, local soil compaction, and detrimental effects resulting from the excessive contribution of manure (Patterson *et al.* 1994, 56 FR 61173).

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. The draft EIR stated that wastewater irrigation would avoid impacts to sensitive biological resources (City of Santa Rosa and U.S. Army Corps of Engineers 1996). However, in February of 1998, the site supporting many-flowered navarretia had a sign stating wastewater was being used for irrigation on-site (Ellen Berryman, 1998 pers. obs.). Patterson *et al.* (1994) state, "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 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 RWQCB 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 RWQCB 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 (J. Short, 2007 pers. comm.).

### Burke's goldfields

*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 Cobblestone and TMD Brown, 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 most severely impacted portion of the range of Burke's goldfields has been the northwestern portion of the 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 CNDDDB occurrence in the area contained 11 colonies in 1984; by 1993, only two were extant (CNDDDB 1998). A second occurrence had more than 20 vernal pools in 1985, but by 1994, only one colony of Burke's goldfields was present (CNDDDB 1998). This property once contained 50,000 plants, but after repeated discing only about 100 plants remain (B. Guggolz, CNPS, 1998 pers. comm.). 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 (B. Guggolz, 1998 pers. comm.). 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 (B. Guggolz, 1998 pers. comm.).

Since the time Burke's goldfields was listed in 1991, the species has continued to experience dramatic loss. The Service used data from 1994 (Patterson *et al.* 1994) to examine how numbers of Burke's goldfields plants 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 CNDDDB 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 we have both pre- and post-listing surveys 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).

Only about 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 since 1987 at Todd Road Preserve, the largest of the preservation sites (Patterson *et al.* 1994, CH2M Hill 1995). Excluding this site, the preserved acreage of Burke's goldfields sites is only 8 percent of acreage known in 1994 (calculated from data in Patterson *et al.* 1994). Since 1994, one preservation bank with Burke's goldfields has been established, but only a small portion of the site supports Burke's goldfields (Exhibit A, MOA for Wright Preservation Bank, 1997).

*1998 to present.* The 1998 programmatic consultation for the listed plants 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 impacted acres which are occupied or presumed occupied, no more than 6 acres would be on sites for which there are known records of the listed plants. Impacts to no more than 6 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 impacts to the first 6 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 date of this Programmatic, 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 impacted wetland 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.

### Sonoma sunshine

*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 CNDDDB occurrence. At one CNDDDB occurrence, 12 Sonoma sunshine colonies were observed in 1989. By 1993, only six remained (CNDDDB 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 Cobblestone and TMD Brown. Other sites have been used as wastewater irrigated pastures, damaged by ORV use, heavily grazed, or been subject to land conversion activities (CNDDDB 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 that triggered Corps enforcement actions (Service files).

The Service used data from 1994 (Patterson *et al.* 1994) to examine how numbers of Sonoma sunshine 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. 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). Since 1994, one preservation bank with Sonoma sunshine has been established, but only 15 individual plants have been observed in recent surveys at the site (M. Waaland, 1998 pers. comm.).

*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 impacted acres which are occupied or presumed occupied, no more than 6 acres would be on sites for which there are known records of the listed plants. Impacts to no more than 6 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 impacts to the first 6 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 date of this Programmatic, 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 impacted wetland 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

*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 CNDDDB 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). Since 1994, two preservation banks with Sebastopol meadowfoam have been established (MOA for Wright Preservation Bank 1997, MOA for Southwest Santa Rosa Vernal Pool Preservation Bank 1997).

*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 impacted acres which are occupied or presumed occupied, no more than 6 acres would be on sites for which there are known records of the listed plants. Impacts to no more than 6 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 impacts to the first 6 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 date of this Programmatic, 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 impacted wetland 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.

### California Tiger Salamander

*2001 to present.* 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 (prior to this biological opinion), there have been 21 biological opinions (*i.e.*, section 7 formal consultations) authorizing incidental take to all individuals inhabiting 493.222 acres of California tiger salamander habitat since the emergency listing on July 22, 2002. Three of these 21 biological opinions address adverse and beneficial effects 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 populations. These three sites are known as the Hazel Mitigation Bank, Wright Preservation Bank and the Slippery Rock Conservation Bank. The temporary ground disturbance associated with these Banks includes approximately 149.06 acres; therefore there has

been 344.222 acres of permanent California tiger salamander habitat loss permitted by the Service through section 7 consultations. The other 18 biological opinions have integrated in their project proposals to conserve a total of 471.865 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 acres (187 hectares) of *pending* Preserves within conservation areas that are anticipated to be protected in perpetuity.

### **Effects of the Proposed Action**

The following effects analysis is based on the effects of Projects to the California tiger salamander, Sebastopol meadowfoam, Sonoma sunshine and Burke's goldfields. This may encompass all types of projects in which the Corps issues permits, conducts enforcement actions and/or development of mitigation banks. These effects are expected to be in the form of direct and indirect effects as a result of urbanization and agricultural development related Project(s) and to a lesser degree restoration and enhancement of habitat. Project(s) appended to this Programmatic must adhere to the mitigation and minimization measures described in the *Description of the Proposed Action*. Implementation of the mitigation and minimization measures may have some adverse effects but will likely have greater beneficial effects as a result of creation, restoration and enhancement of habitat for these species.

### California Tiger Salamander

The effects analysis for the California tiger salamander is primarily based on the location of the Project(s) impacts relative to a known individual salamander observation and/or breeding site(s). Those effects based on distance are differentiated and classified in Table 2 below and assumes the permanent or temporary loss of habitat. The interim mitigation guidelines do not differentiate between temporary and permanent effects. The interim mitigation guidelines are described on page 46 of the Conservation Strategy (Conservation Strategy Team, 2005), in a letter from the Service and CDFG to the Santa Rosa Plain Conservation Strategy Implementation Committee (Service and CDFG, 2006 *in litt.*) and in the *Description of the Proposed Action* of this Programmatic.

The majority of anticipated effects to the California tiger salamander will likely be within the urban growth boundaries of the Cities of Santa Rosa, Cotati and Rohnert Park (shaded red in Figure 3 of the Conservation Strategy). These estimated acres are based on a ten year timeframe from December 2005 to December 2015. Some smaller amount of California tiger salamander impacts may occur outside of the urban growth boundaries within the Study Area (Figure 3 of the Conservation Strategy) in the form of agricultural, rural residential and ministerial projects as defined by Sonoma County. In addition, the Town of Windsor supports approximately 137 acres of potential California tiger salamander that may be adversely affected and may require approximately 27.4 acres of mitigation (i.e.  $137 \text{ acres} \times 0.2 = 27.4$ ).

**Table 2. Predicted Tiger Salamander Habitat Loss Within City Urban Growth Boundaries**

	Santa Rosa (acres)	Cotati (acres)	Rhonert Park (acres)	Estimated Mitigation (acres)
0 - 500 feet of a California tiger salamander breeding occurrence	190.4	21	0	634.2
501 - 2200 feet of a California tiger salamander breeding site	761.4	132.2	13.9	1815
2201 feet - 1.3 miles of a known California tiger salamander breeding site	411.7	6.7	166.6	585
500 feet of a California tiger salamander non-breeding occurrence	177	43.3	22.3	485.2
<b>Total</b>	<b>1540.5</b>	<b>203.2</b>	<b>202.8</b>	<b>3519.4</b>

Anticipated permanent acreage loss of California tiger salamander habitat within city UBG's within a 10 year timeframe was compared with the acreage needed to conserve habitat and maintain viable populations within identified conservation areas. This comparison was used to calculate the ratio of mitigation for project impacts in order to meet conservation goals in the conservation areas. Additional analysis of the Conservation Strategy took into account several assumptions which in part, support justification for the interim mitigation ratios. These assumptions are summarized in the following paragraphs.

Development of the Conservation Strategy was based on the following assumptions about expected development in a ten-year time frame: 1) the effect of that development on the species, 2) how the Preserves would offset those effects and 3) the compatibility of existing land uses with California tiger salamander and listed species conservation. In addition, there are other factors that were used in developing the conservation areas:

- Existing agricultural and rural land uses outside the UGBs will not change appreciably
- Urban development within the UGBs may occur based on general plans of the municipalities
- Limited urban development may occur outside of the UGBs based on the Sonoma County General Plan
- Voter-approved UGBs will remain in place for at least 10 years and will likely continue into the foreseeable future
- Based on aerial photography and site visits, potential habitat for the California tiger salamander exists in locations where surveys have not been conducted
- Urban development will eliminate some California tiger salamander habitat
- Small Preserves in an urban environment are difficult to manage, and will not likely sustain viable California tiger salamander populations

The analysis performed in the Conservation Strategy was used to develop appropriate mitigation ratios and is anticipated to aid in conserving appropriate levels of habitat to support viable populations of California tiger salamanders in perpetuity. The mitigation and minimization measures as described in this Programmatic is expected to contribute to recovery of the California tiger salamander by preserving occupied, restored and created habitat. Adaptive management and monitoring which will be supported with endowment funds is expected to assist in the maintenance of viable populations.

#### Sebastopol Meadowfoam, Sonoma Sunshine and Burke's Goldfields

As described in the Status of the Species and Environmental Baseline, above, habitat for the listed plant species has been severely impacted on the Santa Rosa Plain as a result of urban and agricultural development. These species, which are naturally rare, narrow endemics, have become extremely vulnerable due to decreases in population size, habitat fragmentation, and chronic habitat degradation. The long-term survival and recovery of these species requires the establishment of a viable regional preserve system that includes restoration of degraded habitat to enhance overall population size and viability.

Projects such as 404 permitting authorized under this Programmatic is expected to result in direct and indirect impacts to seasonal wetlands which may be occupied (or assumed occupied) by the listed plants. These impacts will further reduce the size and numbers of the listed plant populations, and could reduce the extent of the range for each of the listed plant species on the Santa Rosa Plain. Projects authorized under this consultation are also likely to result in fragmentation and edge effects to existing habitat. The loss of seasonal wetlands where the listed plants have not been found is expected to reduce opportunities for habitat restoration and enhancement of listed plant populations, thereby potentially affecting the species long-term survival and recovery.

Restoration projects as result of Corps enforcement actions or mitigation banks authorized under this Programmatic are expected to benefit the listed plants by restoring their destroyed or altered habitat by establishing endangered plant populations. Impacts to seasonal wetlands, both in habitat currently suitable for the listed plant species and in restorable habitat, will be limited and mitigated to allow for the species long-term survival and recovery.

Impacts to seasonal wetlands allowed under this Programmatic could result in loss of habitat where the plant species have not been detected for a number of years, but where viable seed banks persist on-site. However, any habitat with historic records of the species will be mitigated for in the same manner as habitat known to be currently occupied. This mitigation is expected to reduce the level of impacts to important suitable and restorable sites with historic records of listed plants by preserving currently occupied or established sites.

Impacts to occupied Burke's goldfields and Sonoma sunshine habitat will be mitigated through 3:1 of occupied or established habitat (any combination) with success criteria met prior to groundbreaking. Impacts to suitable Burke's goldfields and Sonoma sunshine habitat will be mitigated with 1:1 occupied or established habitat (any combination) with success criteria met AND 0.5:1 of established habitat prior to groundbreaking. The mitigation land will be preserved

and managed in perpetuity.

Impacts to occupied Sebastopol meadowfoam habitat will be mitigated with 2:1 occupied or established habitat (any combination) with success criteria met prior to groundbreaking. Impacts to suitable Sebastopol meadowfoam habitat will be mitigated with 1:1 occupied or established habitat (any combination) with success criteria met AND 0.5:1 of established habitat prior to groundbreaking. The mitigation land will be preserved and managed in perpetuity.

Mitigation for impacts to occupied and suitable habitat will be in the form of preserving occupied sites or established sites with the same impacted species. The location of the mitigation may be anywhere within the North Area or South Area as depicted in Enclosure 2 as long as the site supports the target endangered plant(s). Sites with suitable habitat are sites that have not been observed to flower during botanical surveys but may have viable seeds in the soil and have additional biological, hydrological and topographic attributes as described in Enclosure 5, *Description of Suitable Habitat*. Mitigation of impacts to suitable habitat must support one of the target species based on the location of the impacts. The species that must be mitigated for will be determined by the location of the project impacts to the suitable habitat. As described in the *Environmental Baseline*, the majority of Burke's goldfields and Sonoma sunshine populations are north of Santa Rosa Creek and the majority of Sebastopol meadowfoam populations are south of Santa Rosa Creek. Therefore, impacts to suitable habitat north of Santa Rosa Creek (i.e. North Area) will mitigate with occupied or established Burke's goldfields or Sonoma sunshine. Impacts to suitable habitat south of Santa Rosa Creek (i.e. South Area) will mitigate with Burke's goldfields, Sonoma sunshine or Sebastopol meadowfoam. Mitigation of occupied and suitable habitat will minimize the effects to the listed plants by ensuring sites will actually support the species. Adaptive management plans and endowment funding will also increase the probability of the plant populations to be viable in the long term and will be protected in perpetuity.

Projects that will impact occupied sites supporting Burke's goldfields and Sonoma sunshine, where surveys have documented 2,000 plants or greater in any year in the past 10 years may not be appended to this Programmatic, but will be evaluated on a case by case basis. The number for 2,000 plants was derived from comments provided by numerous technical experts and the Service's review of projects impacting plant populations.

The most common method of project proponents mitigating for their impacts will be by purchasing mitigation credits at Service and CDFG – approved Preserves. These Preserves often have extant natural populations of the plants and/or established or restored populations and are located within their historical range.

### **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.

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 stated 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.

The County of Sonoma, the Cities of Santa Rosa, Cotati, Rohnert Park, the Town of Windsor, Service, and CDFG have commenced a process to develop a plan for implementing the Conservation Strategy. An implementation committee has been formed that is comprised of elected and staff representatives of the local jurisdictions, staff representatives of Service and CDFG, and representatives of the agricultural, development, and environmental communities. The implementation plan is expected to provide a mechanism for applying the Conservation Strategy to cover public and private projects, agricultural activities, and residential and commercial development. Eventual implementation of the Conservation Strategy by the local cities and Sonoma County is expected to reduce potential increases of these cumulative effects.

## **Conclusion**

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that projects which meet the qualifications for this Programmatic are not likely to jeopardize the continued existence of the California tiger salamander, Burke's goldfields, Sonoma sunshine or Sebastopol meadowfoam. This determination is based on the *Description of the Proposed Action*, Enclosures 3, 4 and 5 which provides numerous conservation measures that would be implemented to minimize adverse effects of Projects on the California tiger salamander and the three listed plants. Critical habitat has not been designated for these species, therefore, none will be affected.

## **CONSERVATION RECOMMENDATIONS**

Section 7 (a) (1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and

threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's 7(a)(1) responsibilities for these species.

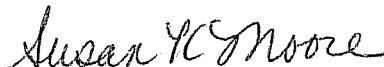
1. As the Santa Rosa Plain Recovery Plan is developed, the Corps should assist the Service in the implementation of the interim mitigation guidelines for projects on the Santa Rosa Plain.
2. The Corps should work with the Service to encourage the local jurisdictions of the Santa Rosa Plain to develop an implementation plan for the Conservation Strategy.
3. The Corps should work with the Service to identify grant opportunities to support restoration efforts, research, surveys and public outreach opportunities that aid in the recovery of the four species discussed in this Programmatic.

#### REINITIATION – CLOSING STATEMENT

This concludes formal consultation on the actions described in this opinion. As provided in 50 CFR §402.16, reinitiation 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) 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; (2) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this opinion; or (3) a new species is listed or critical habitat is designated that may be affected by the action. If the Corps discovers that the conditions of the permit have not been followed, the Corps should review its responsibilities under section 7 of the Act and reinitiate formal consultation with the Service. We appreciate the cooperation and active participation of the Corps throughout this consultation process.

If you have any questions regarding this biological opinion, please contact Vincent Griego, Ryan Olah or Cay Goude of my staff at the letterhead address or (916) 414-6625.

Sincerely,



Susan K. Moore  
Field Supervisor

cc: Chuck Regalia, City of Santa Rosa, California  
David Woltering, City of Cotati, California  
Rob Bendorff, City of Rohnert Part, California  
Pete Chamberlin, Town of Windsor, California  
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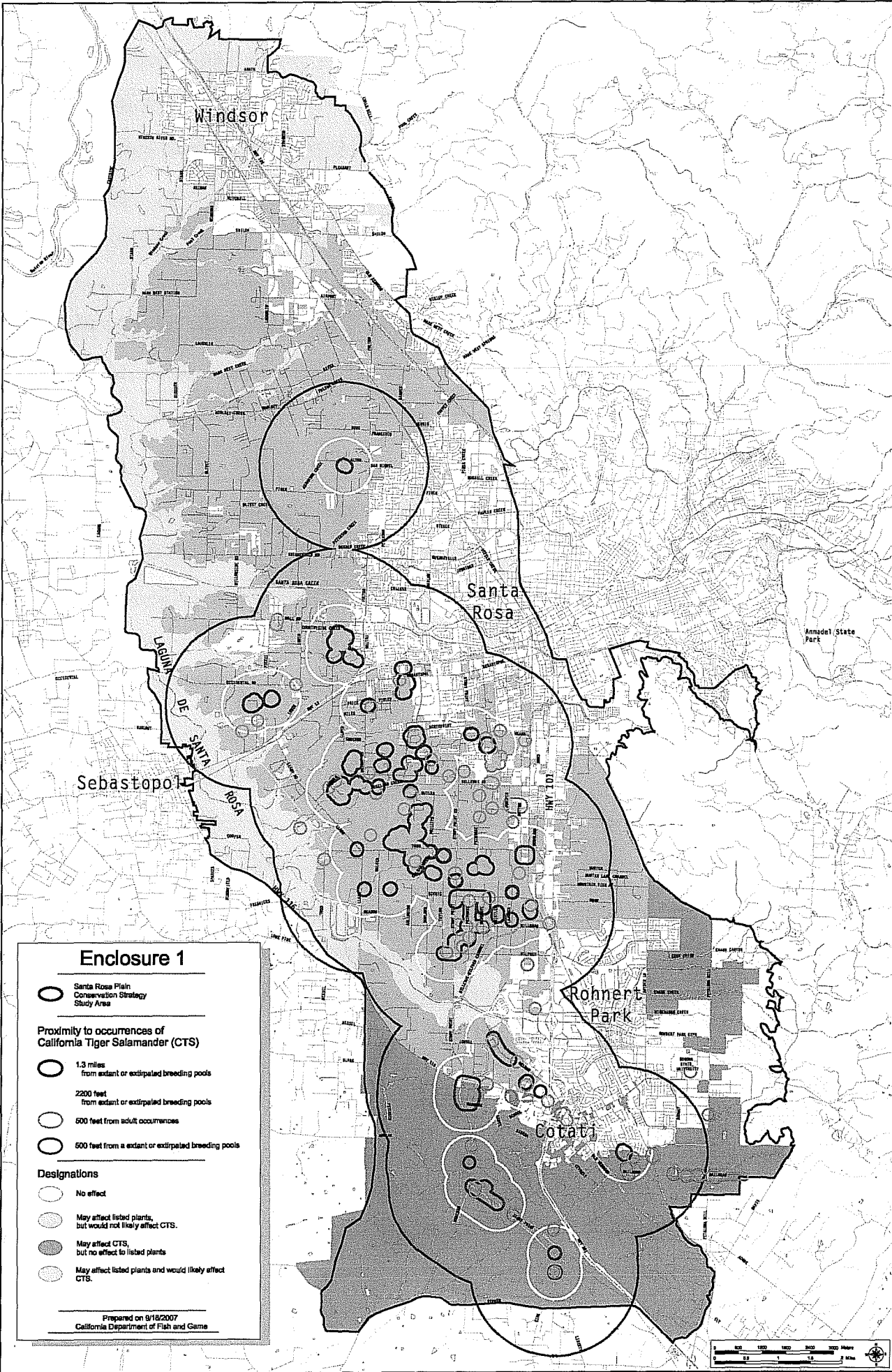
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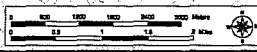
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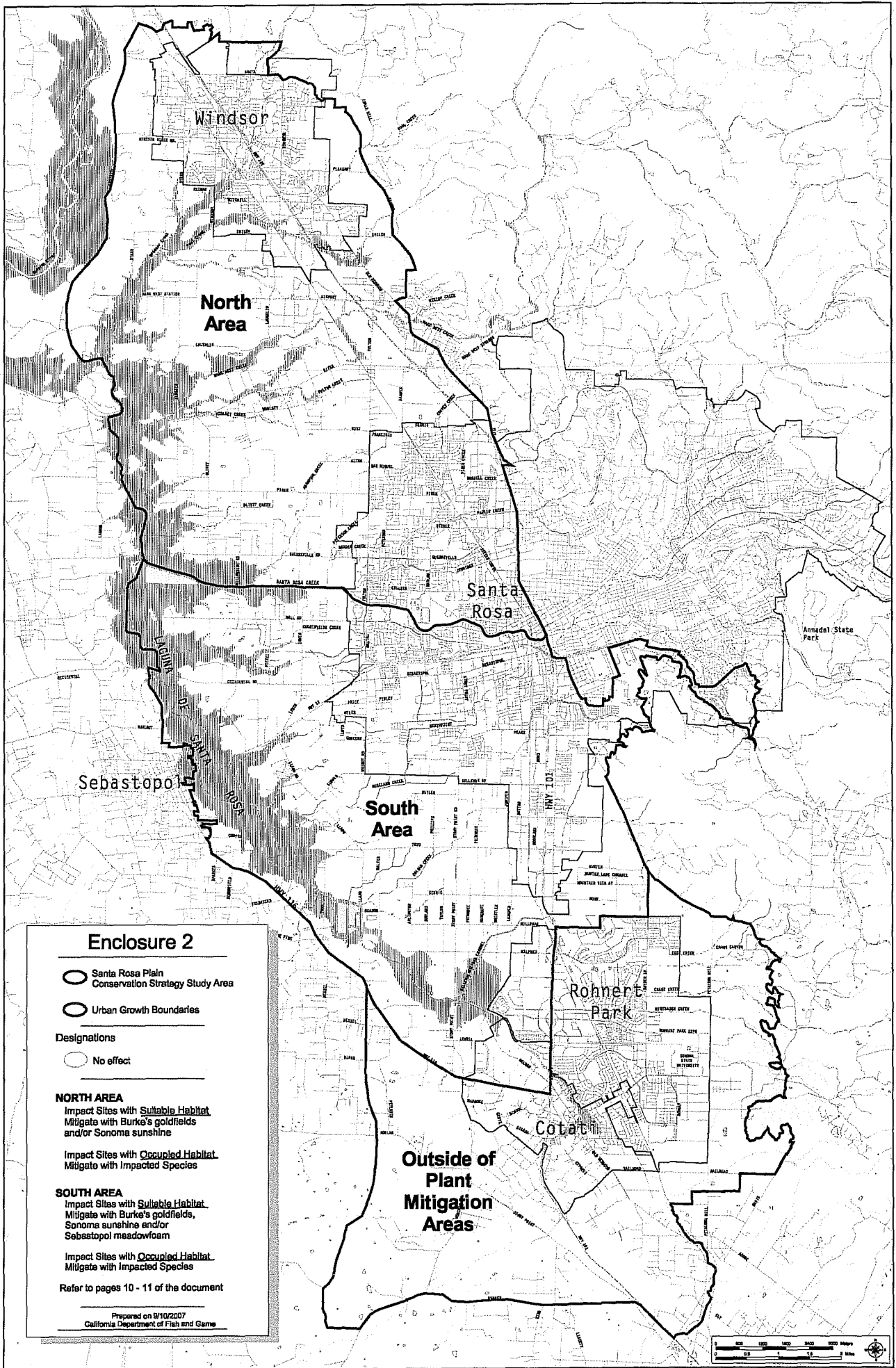


**Enclosure 1**

- Santa Rosa Plain Conservation Strategy Study Area
- Proximity to occurrences of California Tiger Salamander (CTS)**
- 1.3 miles from extant or extirpated breeding pools
  - 2200 feet from extant or extirpated breeding pools
  - 600 feet from adult occurrences
  - 600 feet from a extant or extirpated breeding pools
- Designations**
- No effect
  - May affect listed plants, but would not likely affect CTS.
  - May affect CTS, but no effect to listed plants
  - May affect listed plants and would likely affect CTS.

Prepared on 9/18/2007  
California Department of Fish and Game





**Enclosure 2**

- Santa Rosa Plain Conservation Strategy Study Area
- Urban Growth Boundaries

**Designations**

- No effect

**NORTH AREA**

Impact Sites with Suitable Habitat  
Mitigate with Burke's goldfields  
and/or Sonoma sunshine

Impact Sites with Occupied Habitat  
Mitigate with Impacted Species

**SOUTH AREA**

Impact Sites with Suitable Habitat  
Mitigate with Burke's goldfields,  
Sonoma sunshine and/or  
Sebastopol meadowfoam

Impact Sites with Occupied Habitat  
Mitigate with Impacted Species

Refer to pages 10 - 11 of the document

Prepared on 8/10/2007  
California Department of Fish and Game



### Enclosure 3 - Preserve Establishment and Evaluation Criteria

Preserves shall meet the following minimum requirements:

- 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.
- The site must have a habitat enhancement plan, if California tiger salamander and/or listed plant habitat is to be created, restored or established on the site.
- 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.
- The site must have a Service and CDFG – approved funding mechanism to assure long-term management and monitoring.

#### Preserve Evaluation Criteria

This Preserve Evaluation Criteria is used to determine if parcels proposed as Preserves provide suitable habitat for the California tiger salamander and/or listed plants. This describes the process for evaluating, and approving individual properties or parcels for preservation.

The preserve evaluation criteria will be used by the Service and CDFG in guiding both mitigation and mitigation bank development. These criteria are to aid and help expedite the selection of preserves.

To be considered acceptable as a preserve, a proposed property or properties must meet all the following criteria:

#### For California tiger salamander:

- (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.

For Burke's Goldfields, Sonoma sunshine, and Sebastopol meadowfoam

- (1) Preservation of the listed plant species in appropriate locations within the Plain, as previously described in *Plant Mitigation and Establishment* section of the *Description of the Proposed Action*.
- (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 (See Enclosure 2).
- (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.

## Enclosure 4 - Translocation

Listed plants and California tiger salamander adult, larvae and juveniles present within an area planned for development will be translocated by appropriate means as approved by the Service and CDFG. In all cases where translocation occurs, authorization must be given by the Service and CDFG.

Translocation would be undertaken for the following reasons:

- 1) Where salvage of species is required as a permit condition by the Service and CDFG when the removal of occupied habitat will occur (performance criteria and monitoring is required for the salvage and translocation) and/or;
- 2) To establish or enhance a new population or an existing population where all the conditions are present (including a management and monitoring program) to achieve success of the population. Such collections would be accomplished in a manner as to not adversely impact an existing population.

### California tiger salamander Translocation

The following guidelines apply to required California tiger salamander translocations.

- No mitigation or conservation bank may receive translocated California tiger salamanders until all the bank's credits have been sold and California tiger salamander credits will not be provided as a result of California tiger salamander translocation.
- California tiger salamanders will be translocated to receptor sites that are within the same conservation area as the donor site or, where this is not possible, to the nearest conservation area.
- California tiger salamanders will be translocated only to sites with suitable California tiger salamander breeding habitat.
- California tiger salamander larvae will not be translocated where resulting larval densities would exceed one per square meter.
- The costs of translocation will be the responsibility of the project proponent.
- Translocation will occur only to conservation areas and will not create any new mitigation obligations beyond what already exists.

### Plant Translocation

Prior to collection of seeds, approval of the Service and CDFG to address site-specific conditions is required.

### Collection at an impact site with occupied habitat

Collection of seeds shall occur from all occupied sites prior to development of the Project. Collection methodology must be approved by the Service and CDFG. The seeds must be translocated to a Service and CDFG--approved Preserve with successful establishment according to Service and CDFG – approved performance, management and monitoring criteria. If a suitable Preserve is not available to accept translocated seeds within one year, the seeds must be deposited at a Service and CDFG – approved seed storage facility for future translocation to a Preserve.

If a project proponent is attempting to establish plants at a mitigation site but is unsuccessful, then remediation would be necessary or an alternative site must be selected and must have successful establishment. If additional seeds are needed to reach performance criteria, they may be salvaged from a Service and CDFG – approved site and/or be obtained from a Service and CDFG – approved seed storage facility with prior written authorization from the Service.

### Collection at an impact site with suitable habitat

Collection of seeds may be warranted depending on site conditions including the native plant components.

### Collection at a Preserve

Collection is limited to a portion of the population that would not affect population viability. Generally not more than 5% of the plant population at a preserve could be collected. Seed and soil removal shall occur only when pools are dry.

The following guidelines apply to plant translocation:

1. The establishment location will be as close to the collection site as possible.
2. The establishment location must have suitable or occupied habitat.
3. Collect seeds after seeds have set or collect the seed bank after seeds have set and when there is no standing water.
4. Establishment will occur when seasonal wetlands are dry and before the rainy season begins.
5. Material will be used within 1 year. Seeds must be stored inside in a dry and cool place.
6. If seeds cannot be used within 1 year, the seeds must be submitted to a Service and CDFG – approved storage facility.



## **Enclosure 5 - Description of Suitable Habitat for Sebastopol Meadowfoam, Sonoma Sunshine and Burke's Goldfields**

Suitable habitat for the listed plant species can be characterized as having the following topographic, hydrologic, and geographic conditions.

### Topographic and Hydrologic Conditions

- A) One or more of the following topographic or hydrologic conditions must exist for the site to be considered suitable habitat:
1. The wetland contains surface (standing or flowing) water during the rainy season in a normal rainfall year for 7 or more consecutive days.
  2. The wetland has an outlet barrier (is a pool) or occurs in depressional terrain (i.e. is a swale or drainage feature).
- B) The following conditions indicate that a site is not suitable habitat:
1. The wetland occurs on sloping ground (not the slopes of a swale or pond) and is not a swale or swale-related drainage feature, such that no ponding or flooding occurs.
  2. The wetland is irrigated, and contains standing water of natural or artificial origin, and the soils are saturated, for more than 60 days between June 1 and October 1.

### Geographic Conditions

The site is located within the North Area or South Area as depicted in Enclosure 2.



## 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:**

81420-2008-F-0261-R001

**APR 13 2009**

Ms. Jane M. Hicks  
Chief, Regulatory Division  
(Attn.: Justin Yee)  
San Francisco District  
U.S. Army Corp of Engineers  
1455 Market Street  
San Francisco, California 94103-1398

**Subject:** Amendment to the Programmatic Biological Opinion (Programmatic) for U.S. Army Corps of Engineers (Corps) Permitted Projects that May Affect California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain, California (Corps file Number 223420N; Service File Number 81420-2008-F-0261)

Dear Ms. Hicks:

This document amends the U. S. Fish and Wildlife Service's (Service) November 9, 2007, *Programmatic Biological Opinion (Programmatic) for U.S. Army Corps of Engineers (Corps) Permitted Projects that May Affect California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain, California*. At issue are the effects of projects to the endangered Sonoma County Distinct Population Segment of the California tiger salamander (*Ambystoma californiense*), Burke's goldfields (*Lasthenia burkei*), Sonoma sunshine (*Blechnosperma bakeri*) and Sebastopol meadowfoam (*Limnanthes vinculans*). The Corps request for the amendment and clarification was received in our office on March 13, 2009. This amendment is provided in accordance with Section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act).

The Corps also requested confirmation that plant surveys are required in the biological assessments for projects that are in areas that may affect listed plants. The Programmatic states on page 4, Introduction, Number 3: "Biological Assessment including Service survey protocols (Survey protocols: [http://www.fws.gov/sacramento/es/santa\\_rosa\\_conservation.html](http://www.fws.gov/sacramento/es/santa_rosa_conservation.html)) results, if needed, and proposed mitigation consistent with the ratios in this Programmatic". We clarify this with the following:

1. Plant surveys are required if proposed projects are in areas that may affect listed plants;

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2. Plant surveys are not needed if the site does not support suitable habitat as defined in Enclosure 5. The definition of suitable habitat for the three plants is not the same definition in the December 1998, Final Training Manual to Evaluate Habitat Quality of Vernal Pool Ecosystem Sites in the Santa Rosa Plain. The suitable habitat definition in Enclosure 5 is tailored to the objectives of the plant conservation strategy outlined in the Programmatic.

This amended biological opinion is based on: (1) November 9, 2007, *Programmatic Biological Opinion (Programmatic) for U.S. Army Corps of Engineers (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) prepared by the U.S. Fish and Wildlife Service (Service); (2) the request for reinitiation received on March 13, 2009; and (3) revised Enclosure 1

The following changes are made to the November 9, 2007, biological opinion:

Change the bullets in number 5 on page 5 from:

- No effect. No consultation with the Service is required for areas on Enclosure 1 identified as “No Effect”.
- May affect listed plants, but would not likely affect California tiger salamander. Consult with the Service for concurrence for areas on Enclosure 1 identified as “May affect listed plants, but would not likely affect California tiger salamander”. The Corps will forward to the Service all biological and other pertinent information and a letter requesting that the proposed Project to be appended to this Programmatic.
- May affect listed plants and would likely affect California tiger salamander. Consult with the Service for concurrence for areas on Enclosure 1 and Enclosure 2 identified as “May affect listed plants and would likely affect California tiger salamander”. The Corps will forward to the Service all biological and other pertinent information and a letter requesting that the proposed Project to be appended to this Programmatic.
- May affect California tiger salamander, but no effect to listed plants. Consult with the Service for concurrence for areas on Enclosure 1 and identified as “May affect California tiger salamander, but no effect to listed plants”. The Corps will forward to the Service all biological and other pertinent information and a letter requesting that the proposed project to be appended to this Programmatic.

To:

- No effect. No consultation with the Service is required for areas on Enclosure 1 identified as “No Effect”.

- May adversely affect listed plants and would likely adversely affect California tiger salamander. Consult with the Service for concurrence for areas on Enclosure 1 and Enclosure 2 identified as “May adversely affect listed plants and would likely adversely affect CTS”. The Corps will forward to the Service all biological and other pertinent information and a letter requesting that the proposed Project to be appended to this Programmatic.
- May adversely affect listed plants and/or California tiger salamander. Consult with the Service for concurrence for areas on Enclosure 1 and Enclosure 2 identified as “May adversely affect listed plants and/or CTS”. The Corps will forward to the Service all biological and other pertinent information and a letter requesting that the proposed Project to be appended to this Programmatic.
- May adversely affect listed plants, but would not likely adversely affect California tiger salamander. Consult with the Service for concurrence for areas on Enclosure 1 identified as “May adversely affect listed plants, but would not likely adversely affect CTS”. The Corps will forward to the Service all biological and other pertinent information and a letter requesting that the proposed Project to be appended to this Programmatic.
- No effect to listed plants, but would likely adversely affect California tiger salamander. Consult with the Service for concurrence for areas on Enclosure 1 identified as “No effect to listed plants, but would likely adversely affect CTS”. The Corps will forward to the Service all biological and other pertinent information and a letter requesting that the proposed Project to be appended to this Programmatic.
- May adversely affect California tiger salamander, but no effect to listed plants. Consult with the Service for concurrence for areas on Enclosure 1 and identified as “May adversely affect California tiger salamander, but no effect to listed plants”. The Corps will forward to the Service all biological and other pertinent information and a letter requesting that the proposed project to be appended to this Programmatic.

This concludes the reinitiation of the formal consultation on the Programmatic. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (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 that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

Ms. Jane Hicks

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If you have any questions regarding this amendment to the biological opinion for Programmatic, please contact Vincent Griego or Ryan Olah of my staff via electronic mail at [Vincent\\_Griego@fws.gov](mailto:Vincent_Griego@fws.gov), [Ryan\\_Olah@fws.gov](mailto:Ryan_Olah@fws.gov), or telephone at (916) 414-6625.

Sincerely,



*fw* Susan K. Moore  
Field Supervisor

cc:

Stephanie Buss, Tracy Love, Scott Wilson, and Richard Fitzgerald, California Department of Fish and Game, Yountville, CA

Steven Bargsten, Regional Water Quality Control Board, Santa Rosa, CA

Eric Raffini, Environmental Protection Agency, San Francisco, CA

Chuck Regalia, City of Santa Rosa, CA

David Woltering, City of Cotati, CA

Rob Bendorff, City of Rohnert Part, CA

Pete Chamberlin, Town of Windsor, CA

Pete Parkinson, Sonoma County, CA



# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Sacramento Fish and Wildlife Office  
2800 Cottage Way, Suite W-2605  
Sacramento, California 95825-1846  
SFWO\_mail@fws.gov



In Reply Refer to:  
81420-2008-F-0261-R002

June 11, 2020

Regulatory Division Chief  
San Francisco District  
U. S. Army Corps of Engineers  
450 Golden Gate Avenue, 4<sup>th</sup> Floor, Suite 0134  
San Francisco, California 94102-3406  
Sahrye.E.Cohen@usace.army.mil  
CESPN-Regulatory-Info@usace.army.mil

Subject: Reinitiation of Formal Consultation on Issuance of Clean Water Act, Section 404 Permits by the U.S. Army Corps of Engineers (Corps) on the Santa Rosa Plain, Sonoma County, California

Dear Regulatory Division Chief:

This letter is in response to the U.S. Army Corps of Engineer's (Corps) April 21, 2017, request to reinitiate formal consultation with the U.S. Fish and Wildlife Service (Service) on the Issuance of Clean Water Act, Section 404 Permits on the Santa Rosa Plain, Sonoma County, California. Your request was received by the Service on April 26, 2017. At issue are the adverse effects on the endangered Sonoma County Distinct Population Segment (DPS) of the California tiger salamander (Sonoma County California tiger salamander) (*Ambystoma californiense*) and its critical habitat, Burke's goldfields (*Lasthenia burkei*), Sebastopol meadowfoam (*Limnanthes vincularis*), and Sonoma sunshine (*Blennosperma bakeri*). Critical habitat for the Sonoma County tiger salamander was not designated at the time of issuance of the November 9, 2007 Programmatic Biological Opinion. Critical habitat was designated on August 31, 2011, and you have requested reinitiation of the Programmatic Biological Opinion to analyze the effects of the proposed action on critical habitat for the Sonoma County California tiger salamander. This programmatic biological opinion was prepared under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

The federal actions on which we are consulting are the issuance of Clean Water Act, Section 404 Permits by the Corps for the fill of waters of the United States associated with projects in the Santa Rosa Plain. The following sources of information were used to develop this programmatic biological opinion: (1) the Designation of Critical Habitat for the Sonoma County California Tiger Salamander (Service 2011); (2) the Santa Rosa Plain Conservation Strategy (Conservation Strategy) (Conservation Strategy Team 2005); (3) the Interim Mitigation Guidelines authored by the Service and California Department of Fish and Wildlife (CDFW), dated May 16, 2006; (4) the *Programmatic Biological Opinion (Programmatic) for U.S. Army Corps of Engineers (Corps) Permitted Projects that May Affect California Tiger Salamander and Three Endangered Plant Species on the Santa Rosa Plain, California (Corps File Number 223420N)*, (2007 Programmatic Biological Opinion) dated November 9, 2007 (Service file number 81420-2008-F-0261) (Service 2007); (5) the *Recovery Plan for the Santa Rosa Plain* (Recovery Plan)

(Service 2016); (6) emails, phone conversations between representatives of the Service, the Corps, CDFW, and consulting biologists; and (7) other information available to the Service.

Projects anticipated to adversely affect occurrences of Burke's goldfields, Sebastopol meadowfoam, or Sonoma sunshine recorded in the California Natural Diversity Database (CNDDDB) do not qualify for coverage under this programmatic biological opinion and will need to have case specific biological analysis and separate biological opinion issued because appropriate conservation for loss or degradation of the sites is case specific. However, projects anticipated to adversely affect suitable habitat of Burke's goldfields, Sebastopol meadowfoam, or Sonoma sunshine are covered in this programmatic biological opinion.

### Consultation History

- July 17, 1998: The Service issued a programmatic biological opinion to the Corps for Clean Water Act, Section 404 permitting actions in the Santa Rosa Plain that addressed the effects of Corps permitting on the Sonoma sunshine, Sebastopol meadowfoam, Burke's goldfields, and the many-flower navarretia (*Navarretia leucocephala* ssp. *pliantha*) (Service file number 1-1-98-F-0053)(Service 1998).
- December 1, 2005: The federal listing of the Sonoma County California tiger salamander led to the development of a Conservation Strategy (Conservation Strategy Team 2005). The purpose of the Conservation Strategy for listed species in the Santa Rosa Plain was to coordinate development with the conservation needs of the species.
- November 9, 2007: The Service issued a new programmatic biological opinion to incorporate the Conservation Strategy (Conservation Strategy Team 2005) and the Sonoma County California tiger salamander, and removed the many-flower navarretia because of its limited distribution in the Santa Rosa Plain (Service 2007).
- April 13, 2009: The Service amended the 2007 programmatic biological opinion to clarify plant surveys are required if projects are in areas that may affect listed plants.
- April 26, 2017: The Corps requested to reinstate consultation to include critical habitat for the Sonoma County California tiger.

## INTRODUCTION

This programmatic biological opinion replaces the 2007 Programmatic Biological Opinion and is intended to streamline section 7 consultations for projects that implement the conservation measures herein. The Conservation Strategy, 2007 Programmatic Biological Opinion, Recovery Plan, and other information helped guide the conservation framework and conservation measures in this programmatic biological opinion. These documents are discussed in more detail in the *Status of the Species and Environmental Baseline* section.

The Corps and CDFW provided guidance and technical assistance in the preparation of this programmatic biological opinion. The California tiger salamander, Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine are also protected under the California Endangered Species Act (CESA), and separate authorization from the CDFW for impacts to these species may be needed. Please visit CDFW's CESA Permits webpage for more information (<https://www.wildlife.ca.gov/Conservation/CESA>). CDFW habitat impacts and compensation

requirements may differ from this document in order to fully mitigate the impacts under CESA. Integrating CDFW's permit conditions or recommendations can help the Corps and Service append projects to this Programmatic Biological Opinion. Providing CDFW's Incidental Take Permit, application, or other correspondence with CDFW regarding the project will aid in coordination and appending projects. If California tiger salamander or plant surveys are proposed, include CDFW's written approval of the survey methodology.

## **ADMINISTRATION OF THE PROGRAMMATIC BIOLOGICAL OPINION**

This programmatic biological opinion covers Clean Water Act, Section 404 permitting actions by the Corps that may affect the Sonoma County California tiger salamander and/or its critical habitat and Burke's goldfields, Sebastopol meadowfoam, or Sonoma sunshine in the Santa Rosa Plain. The Corps should refer to Figures 1-6 to help make an effect determination.

### **Initial Rollout**

The Corps will partner with the Service to provide an initial rollout of this programmatic biological opinion for staff of both agencies to ensure that the specifics of the programmatic biological opinion are considered at the onset of each project, and incorporated into all phases of permit process review, and that any constraints are resolved early on.

### **Corps Review**

The Corps can request that the Service append a project to this programmatic biological opinion after review of Figures 1-6 and providing the following information:

1. Corps permit application including the Applicant's full name, mailing address, electronic mail address, telephone number, Assessor's Parcel Number(s), Universal Transverse Mercator (UTM) coordinates or latitude and longitude, and street address of the project.
2. Corps-verified jurisdictional determination.
3. Biological Assessment including:
  - a. Proposed conservation consistent with the conservation framework in this programmatic biological opinion.
  - b. Anticipated effects to the species and critical habitat.
  - c. Description, quantity, and effects to the Sonoma County California tiger salamander upland and aquatic habitat and primary constituent elements for critical habitat.
  - d. Description, quantity, and effects to Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine wetland and pollinator habitats.
4. Survey report(s):
  - a. Plant surveys are required if proposed projects are in areas of suitable habitat for listed plants. Plant surveys are not needed if the site does not support suitable habitat.



- b. Sonoma County California tiger salamander surveys are not required. However, surveys may be requested by the Corps, Service, or Applicant on a case by case basis to assist planning for avoidance, minimization, and/or compensation measures. Coordination between all parties should occur prior to requesting a project to be appended to this programmatic biological opinion.
  - c. Survey guidelines and reporting requirements:  
<https://www.fws.gov/sacramento/es/Survey-Protocols-Guidelines>.
5. Compensation proposal including acres and location of the conservation bank, relocation or translocation plan (described under Minimization Measures), and any other pertinent information.
  6. Maps showing Sonoma County California tiger salamander breeding site(s) and occurrences, known listed plant occurrences, and conservation banks within a 2-mile radius of the project site. Maps of the project site, project boundary, project impacts, staging areas, species occurrences, and species habitat. Please provide Geographic Information System (GIS) shapefiles if possible. The preferred projection is Universal Transverse Mercator, Zone 10, North American Datum of 1983. Metadata must accompany the file(s) and be compliant with Federal Geographic Data Committee (FGDC) standards (<http://www.fgdc.gov>).

The Corps will determine whether a proposed project will adversely affect the Sonoma County California tiger salamander and/or its critical habitat, Burke's goldfields, Sebastopol meadowfoam, or Sonoma sunshine. Figures 1-6 and an interactive map (located at [www.fws.gov/sacramento/es/Consultation/Programmatic-Consultations](http://www.fws.gov/sacramento/es/Consultation/Programmatic-Consultations)) are intended to assist in the evaluation. The Corps will review and forward to the Service all biological and other pertinent information.

The Corps may request a project to be appended to this programmatic biological opinion if there are likely to be adverse effects to the Sonoma California tiger salamander and critical habitat or the three listed plants. The Corps should not request a project be appended to this programmatic biological opinion if there are anticipated effects to an occurrence of any of the three listed plants. The Service considers that one or more of the listed plants is adversely affected when suitable habitat (defined in the Conservation Framework section below) is lost or degraded by activities associated with a Corps' permit, including direct and indirect alteration of wetland hydrology. Projects that may be requested to be appended must include the minimization and conservation measures in the *Description of the Proposed Action* within this programmatic biological opinion.

- a. **Electronic Notification.** Once the Corps makes a determination that project inclusion under this Program is appropriate, the Corps will submit information to the Service at [CoastBayDivision@fws.gov](mailto:CoastBayDivision@fws.gov). The Service will determine if the information submitted by the Corps is complete within 15 working days and append the project within 30 working days. The information may be requested in hardcopy by the Service on a case-by-case basis.

## Reporting

### 1. Pre- and Post - Construction Compliance Reports

For each Corps action appended to this programmatic biological opinion, the Corps will submit a pre - and post-construction compliance report prepared by the Service-approved biologist to the

Sacramento Fish and Wildlife Office (SFWO).

- a. The pre-construction compliance report is due within 15 calendar days of scheduled staging and groundbreaking. This report will detail the status of minimization and conservation measures required prior to staging and ground breaking. The Service will confirm compliance or identify outstanding minimization and mitigation measures prior to staging or groundbreaking through electronic mail.
- b. The post-construction compliance report is due within 30 calendar days of the date of the completion of construction activity. This report will detail: (1) dates that construction occurred; (2) photo documentation of construction and applicable minimization measures; (3) pertinent information concerning the success of the project in meeting conservation measures and an explanation of failure to meet such measures, if any; (4) documentation of employee environmental education; (5) recommendations to improve minimization measures in future similar projects; and (6) other pertinent information. Refer to additional monitoring and reporting requirements in the Incidental Take Statement below.

## **2. Capture and Relocation Reporting**

For those components of the action that will require the capture and relocation of any listed species, the Corps via the applicant's Service-approved biologist(s) shall immediately contact the SFWO at (916) 414-6623 to report the action. If capture and relocation need to occur after normal working hours, the Corps shall contact the SFWO at the earliest possible opportunity the next working day.

## **3. Annual Report**

In order to monitor whether the amount or extent of incidental take anticipated from implementation of the project is approached or exceeded, the Corps shall adhere to the following reporting requirements. Should this anticipated amount or extent of incidental take be exceeded, the Corps must immediately reinstate formal consultation as per 50 CFR 402.16.

- c. For each project appended to this programmatic biological opinion that will result in habitat degradation or modification whereby incidental take in the form of harm is anticipated, the Corps via the applicant's Service-approved biologist(s) will provide prompt updates to the Service with an accounting of the total acreage of habitat impacted by the project appended to this programmatic biological opinion. The total acreage of habitat impacted by the project shall be compared to the acreage authorized in the Corps permit(s) and appendage to this programmatic biological opinion. The Corps will provide annual updates to the Service with an accounting of the total acreage of habitat impacted by the projects appended to this programmatic biological opinion.
- d. For each project appended to this programmatic biological opinion that may result in direct encounters between listed species and project workers and their equipment whereby incidental take in the form of harm, injury, or death is anticipated, the Corps via the applicant's Service-approved biologist(s) shall report the encounter(s) as described in the Description of the Proposed Action section. If encounter occurs after normal working hours, the Corps shall contact the SFWO at the earliest possible opportunity the next working day. When injured or killed individuals of the listed species are found, the Corps shall follow the steps outlined in the Salvage and Disposition of Individuals section below.

**Time Period**

This programmatic biological opinion is effective for a period of 10 (ten) calendar years from the date of its issuance and can be extended if deemed appropriate by both agencies. The Service will review this programmatic consultation, as appropriate, to ensure that its application is consistent with the minimization and conservation measures outlined in the *Description of the Proposed Action*.

**Revocation or Termination**

The Corps may end the Program at any time or reinitiate consultation if it determines the Program is not being implemented as intended. Similarly, USFWS may recommend reinitiation of this consultation if the Corps, or the permittees if applicable, fails to provide all applicable notification, reports, etc.

**CONSERVATION FRAMEWORK**

The minimization and conservation measures in this programmatic biological opinion are based on information from the 2005 Conservation Strategy, 2007 Programmatic Biological Opinion, and 2016 Recovery Plan.

**Sonoma County California Tiger Salamander.**

The conservation framework is carried over from the 2007 Programmatic Biological Opinion. However, number 2 below is a methodology tailored to new observations of Sonoma County California tiger salamanders.

1. The Conservation Framework is based on Preserve Goals in the Conservation Strategy (Conservation Strategy Team 2005, Table 1, page 6) in anticipation of the amount of habitat expected to be developed (primarily within the urban growth boundaries of the cities of Santa Rosa, Cotati, Rohnert Park, and Windsor).

**Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine.**

Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine seed banks can remain dormant in the soil for many years, in natural and disturbed habitats. Some CNDDDB occurrences have been considered extirpated but then subsequently plants have been observed several years later and are now considered extant (CNDDDB 2018). Endangered plant surveys in suitable habitat may not detect flowering plants during the 2 year survey protocol timeframe, although there can be a seedbank present. Suitable habitat includes: 1) wetland(s) containing surface water (standing or flowing) during the rainy season in a normal rainfall year for 7 or more consecutive days; or 2) wetland(s) that have an outlet barrier (i.e. is a pool) or occur in depressional terrain (i.e. is a swale or drainage feature); and 3) seasonal wetlands located within a Core or Management Area (Service 2007 and 2016). The conservation framework for Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine is the following.

1. Conservation for impacts to suitable habitat where a seed bank may be present is carried over from the 2007 Programmatic Biological Opinion and applies when the conservation occurs in the same Core Area (Recovery Plan 2016) as where the impacts occur. However, a higher ratio will apply when conservation is located in a different Core Area because the goal for recovery is to maintain the geographic distribution of the range of these species within

the Santa Rosa Plain (Figures 3 – 5). The applicable ratio will be as described in Table 3 herein.

## BIOLOGICAL OPINION

This programmatic biological opinion provides the framework for the Corps to meet its Endangered Species Act Section 7(a)(2) requirements for permitting projects that adversely affect Burke’s goldfields, Sebastopol meadowfoam, Sonoma sunshine, Sonoma County California tiger salamander and Sonoma County California tiger salamander critical habitat. It is intended to provide a mechanism for the Corps to permit projects that cause incidental take (i.e., Sonoma County California tiger salamander), and result in habitat loss, fragmentation, and degradation of habitat for Burke’s goldfields, Sebastopol meadowfoam, Sonoma sunshine, Sonoma County California tiger salamander, and Sonoma County California tiger salamander critical habitat. This in turn will allow the goals, objectives, and recovery criteria of the Recovery Plan to be achieved, and ensure that Sonoma California tiger salamander critical habitat will maintain its conservation value. After reviewing the proposed action with programmatic actions as proposed by the Corps, the Service has determined that the proposed actions presents a programmatic action, as defined in 50 CFR § 402.2.

### Description of the Proposed Action

The federal action on which we are consulting is the Corps’ issuance of Clean Water Act, Section 404 permits in the Santa Rosa Plain *Action Area* (Figure 1). These permits are issued for projects such as residential and commercial development projects, rural residential, road improvements, and other miscellaneous infrastructure and ground disturbing activities.

#### Fill of Wetlands and Modification/Loss of Adjacent Uplands

We expect the majority of projects will be within the urban growth boundaries of the Cities of Santa Rosa, Cotati and Rohnert Park (Table 1) (Conservation Strategy Team 2005). They will consist of filling wetlands and modifying and removing adjacent uplands to build homes, industrial units, roads, and infrastructure. Some smaller projects involving wetland fill and modification/loss of adjacent uplands may occur outside of the urban growth boundaries within the *Action Area* due to rural residential, road, and other miscellaneous projects within Sonoma County jurisdiction. The acreages in Table 1 below were developed with the assistance of staff from each city during the development of the Conservation Strategy.

**Table 1. Estimated Development Within City Urban Growth Boundaries**

	Santa Rosa (acres)	Cotati (acres)	Rohnert Park (acres)	Estimated Mitigation (acres)
0 - 500 feet of a California tiger salamander breeding occurrence	190.4	21	0	634.2
501 - 2200 feet of a California tiger salamander breeding site	761.4	132.2	13.9	1815
2201 feet - 1.3 miles of a known California tiger salamander breeding site	411.7	6.7	166.6	585
500 feet of a California tiger salamander non-breeding occurrence	177	43.3	22.3	485.2
<b>Total</b>	<b>1540.5</b>	<b>203.2</b>	<b>202.8</b>	<b>3519.4</b>

Anticipated permanent loss of Sonoma County California tiger salamander habitat within city urban growth boundaries was compared with the acreage needed to conserve habitat and maintain viable populations within identified Conservation Areas of the Conservation Strategy (Conservation Strategy Team 2005). This comparison was used to calculate the ratio of mitigation for project impacts in order to meet conservation goals (Conservation Strategy Team 2005). These estimates were anticipated to occur within a 10 year time period (i.e., 2005 - 2015) (Conservation Strategy Team 2005), however due to the economic downturn beginning around 2008, the estimated development did not occur as anticipated. It is difficult to know exactly when this build out will occur.

Suitable wetland habitat for Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine exists within the areas expected to be impacted by development in Table 1 but has not been quantified. The habitat is expected to be developed, fragmented, and degraded by activities associated with Corps permits. The amount of suitable wetland habitat that will be affected by a Corps permit action/proposed project will be determined on a project by project basis by the Corps.

#### Minimization Measures and Best Management Practices

Several of the minimization measures contained in the Conservation Strategy (Conservation Strategy Team. 2005) and in the 2007 Programmatic Biological Opinion (Service 2007) have been updated herein to reflect current knowledge and more effectively minimize adverse effects of project activities. Projects that qualify to be appended to this programmatic biological opinion must incorporate the following Conservation Measures as part of the Project Description. The Corps proposes to implement the following measures which can be modified or waived by the Service in writing on a case by case basis.

#### *Burke's Goldfields, Sebastopol Meadowfoam and Sonoma Sunshine*

1. Construction Worker Training. A qualified biological monitor will conduct a training session for all construction workers before work is started on the project. The training program is for all construction personnel including contractors and subcontractors. The training will include, at a minimum, a description of the Sonoma County California tiger salamander, and the applicable listed plant(s) and their habitat within the *Action Area*; an explanation of the species' status and protection under state and federal laws; the avoidance and minimization measures to be implemented to reduce loss of these species; and communication and work stoppage procedures in case a listed species is observed within the *Action Area*. A fact sheet conveying this information will be prepared and distributed to all construction personnel. The Applicant shall provide interpretation for non-English speaking workers.
2. Work Area. Access routes, number and size of staging areas, 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. Environmentally Sensitive Areas (ESA's) containing sensitive habitats adjacent to or within construction work areas for which physical disturbance is not allowed will be clearly delineated using high visibility orange fencing. The final project plans will depict all locations where ESA fencing will be installed and will provide installation specifications. The bid solicitation package will include special provisions and clearly describe acceptable fencing material and prohibited construction-related activities including vehicle operation, material and equipment storage, access roads and other surface-disturbing activities within ESAs. The ESA fencing will remain in place throughout the duration of the proposed action, while construction activities

are ongoing, and will be regularly inspected and fully maintained at all times. The orange fencing will be removed promptly after project completion.

3. Equipment. All equipment will be maintained such that there will be no leaks of automotive fluids such as gasoline, oils, or solvents. Spill response kits will be on hand and utilized immediately in the case of mechanical failures resulting in gasoline or oil spills.
4. Reduce Spread of Invasive Species. A qualified biologist shall ensure that the spread or introduction of invasive non-native plant species, via introduction by arriving vehicles, equipment, and other materials will be prevented, by thoroughly cleaning equipment and vehicles prior to start of use. Any new piece of equipment brought in, or any piece of equipment taken off site and then returned to the site, will also be washed. When practicable, invasive non-native plants in the project area shall be removed and properly disposed of in a manner that will not promote their spread. Invasive non-native plant species include those identified in the California Invasive Plant Council's (Cal-IPC) Inventory Database, accessible at: [www.cal-ipc.org/ip/inventory/index.php](http://www.cal-ipc.org/ip/inventory/index.php). Areas subject to invasive non-native weed removal or disturbance will be replanted with appropriate mix of fast-growing native species.
5. Hazardous Materials. 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.
6. Restoration Plan. Project areas temporarily disturbed by construction activities will be re-vegetated with locally-occurring native plants appropriate for the region and habitat communities on site. All temporarily affected areas shall be returned to original grade and contours to the maximum extent practicable and protected with proper erosion control materials. Seed from commercial nurseries will not be planted in vernal pools. A Restoration Plan with success criteria will be submitted to the Service for review and approval prior to ground disturbance.
7. Onsite Project Manager. The Corps through its Applicant will ensure the Onsite Project Manager or their designee will have full authority to implement and enforce all onsite Conservation Measures and Terms and Conditions of this programmatic biological opinion and appendage. The Onsite Foreman/Manager or their designee shall maintain a copy of this programmatic biological opinion and appendage onsite whenever construction is in progress. Their name(s) and telephone number(s) shall be provided to the Service at least 15 calendar days prior to groundbreaking at the project.
8. Biological Monitor Approval and Stop Work Authority. Qualified biological monitor(s) will possess a working wireless/mobile phone whose number will be provided to the Service prior to the start of construction and ground disturbance. The biological monitor(s) shall keep a copy of this programmatic biological opinion and appendage in his/her possession when onsite. Through the Onsite Project Manager or his/her designee, the biological monitor(s) shall be given the authority to communicate verbally, by telephone, email, or hardcopy with the applicant, project personnel, and any other person(s) at the project site or otherwise associated with the project to ensure that the Terms and Conditions of this programmatic biological opinion and appendage are met. The biological monitor(s) shall have oversight over implementation of the Terms and Conditions in this programmatic biological opinion and appendage, and shall have the authority to stop project activities if they determine any of the associated requirements are not being fulfilled. If the biological

monitor exercises this authority, the Service shall be notified by telephone and email within 24 hours. The Service contact is the Coast Bay Division Chief of the Endangered Species Program, Sacramento Fish and Wildlife Office at telephone number (916) 414-6623.

9. Stormwater Pollution Prevention Plan (SWPPP). A SWPPP will be prepared in full accordance with the State Water Resources Control Board, National Pollutant Discharge Elimination System Construction General Permit. The SWPPP will include Best Management Practices (BMPs) for controlling sediment, turbidity and the release of other pollutants into water courses during construction. The SWPPP will also include a rainy season erosion prevention and monitoring plan to ensure that surface runoff from the construction site meets Regional Water Quality Control Board (RWQCB) water quality standards and objectives for the Hydrologic Unit and Hydrologic Subunit in which the Project is located. The SWPPP is subject to the approval of the RWQCB prior to the start of work.

### **Sonoma County California Tiger Salamander**

Implementation of these minimization measures may vary based on environmental factors and site location as determined by the Service.

1. Wildlife Exclusion Fencing (WEF). Prior to the start of construction, WEF will be installed at the edge of the project footprint in all areas where Sonoma County California tiger salamanders could enter the construction area. WEF with exit ramps, funnels, and cover boards may be required for one full rainy season to allow any Sonoma County California tiger salamander onsite to move into an adjacent habitat offsite and will be determined on a case by case basis.

The location of the fencing shall be determined by the onsite project manager and the Service-approved biologist in cooperation with the Service prior to the start of staging or surface disturbing activities. A conceptual fencing plan shall be submitted to the Service for review and approval prior to WEF installation. The location, fencing materials, installation specifications, and monitoring and repair criteria shall be approved by the Service prior to start of construction. The applicant shall include the WEF specifications on the final project plans. The applicant shall include the WEF specifications including installation and maintenance criteria in the bid solicitation package special provisions. The WEF shall remain in place throughout the duration of the project and shall be inspected weekly and fully maintained. Repairs to the WEF shall be made within 24 hours of discovery. Upon project completion the WEF shall be completely removed, the area cleaned of debris and trash, and returned to natural conditions.

An exception to the foregoing fencing measure is that for work sites where the duration of work activities is very short (e.g., 3 days or less) and during the dry season. If installation will result in more ground disturbance than project activities, then the boundaries and access areas and sensitive habitats may be staked and flagged by the biological monitor prior to disturbance and species monitoring would occur during all project activities at that site.

2. Relocation Plan. The Corps through its Applicant shall prepare and submit a Relocation Plan for the Service's written approval. The Relocation Plan shall be consistent with the Guidelines for the relocation of California tiger salamanders (*Ambystoma californiense*) (Shaffer et. al. 2008). The Relocation Plan shall contain the name(s) of the Service-approved biologist(s) to relocate Sonoma County California tiger salamanders, method of relocation (if

different than number 3 below), a map, and description of the proposed release site(s) and burrow(s), and written permission from the landowner to use their land as a relocation site. At various times, a conservation bank may be a desired location to relocate Sonoma County California tiger salamanders from a salvage site; however no conservation bank may receive relocated Sonoma County California tiger salamanders until all the bank's credits have been sold to prevent interfering with their performance criteria and credit release schedule.

3. Protocol for Species Observation, Handling, and Relocation. Only Service-approved biologists shall participate in activities associated with the capture, handling, relocation, and monitoring of Sonoma County California tiger salamanders. If a Sonoma County California tiger salamander is encountered, work activities within 50 feet of the individual shall cease immediately and the Onsite Project Manager and Service-approved biologist shall be notified. Based on the professional judgment of the Service-approved biologist, if project activities can be conducted without harming or injuring the individual(s), it may be left at the location of discovery and monitored by the Service-approved biologist. All project personnel shall be notified of the finding and at no time shall work occur within 50 feet of the Sonoma County California tiger salamander without a Service-approved biologist present. If relocation of the species to another site has been approved by the Service and CDFW prior to the start of the Project, the following steps shall be followed:
  - a. Prior to handling and relocation, the Service-approved biologist will take precautions to prevent introduction of amphibian diseases in accordance with the *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander* (Service 2003). Disinfecting equipment and clothing is especially important when biologists are coming to the *Action Area* to handle amphibians after working in other aquatic habitats. Sonoma County California tiger salamanders shall also be handled and assessed according to the *Restraint and Handling of Live Amphibians* (USGS National Wildlife Health Center 2001).
  - b. Sonoma County California tiger salamanders shall be captured by hand, dipnet, or other Service-approved methodology, transported, relocated and released as soon as practicable the same day of capture. Individuals should be relocated to areas with one or more potential breeding pools and an active burrow system (unless otherwise with written approved by the Service). The Service shall be notified within 24 hours of all capture, handling, and relocation efforts.
  - c. If an injured Sonoma County California tiger salamander is encountered and the Service-approved biologist determines the injury is minor or healing and the salamander is likely to survive, the salamander shall be released as soon as possible, in accordance with the Service-approved Relocation Plan. The relocated Sonoma County California tiger salamander shall be monitored until it is determined that it is not threatened by predators or other dangers.
  - d. If the Service-approved biologist determines that the Sonoma County California tiger salamander has serious injuries as a result of project-related activities the Service-approved biologist shall immediately take it to a licensed veterinarian, the Sonoma County Wildlife Rescue, or another Service-approved facility. If taken into captivity the individual shall remain in captivity and not be released into the wild unless it has been kept in quarantine and the release is authorized by the Service. The Applicant shall bear any costs associated with the care or treatment of such injured individuals.



The circumstances of the injury, the procedure followed and the final disposition of the injured animal shall be documented in a written incident report.

- e. Notification to the Service of an injured or dead Sonoma County California tiger salamander in the *Action Area* will be made within 2 calendar days of the finding. Written notification to the Service shall include the following information: the species, number of animals taken or injured, sex (if known), date, time, location of the incident or of the finding of a dead or injured animal, how the individual was taken, photographs of the specific animal, the names of the persons who observe the take and/or found the animal, and any other pertinent information. Dead specimens will be preserved, as appropriate, and held in a secure location until instructions are received from the Service regarding the disposition of the specimen.
4. **Biological Monitors.** Qualified biological monitor(s) will be on site each day during all earth moving activities. The biological monitor(s) shall conduct clearance surveys at the beginning of each day and regularly throughout the workday when construction activities are occurring that may displace, injure, or kill Sonoma County California tiger salamanders through contact with workers, vehicles, and equipment. All aquatic and upland habitat including refugia habitat such as small woody debris, refuse, burrow entries, etc., shall be duly inspected. Where feasible and only on a case-by-case basis, rodent burrows and other ground openings suspected to contain Sonoma County California tiger salamanders that would be destroyed from project activities may be carefully excavated with hand tools. Pre-soaking the area prior to ground disturbance may also increase emergence of the species for translocation. The Service will consider the implementation of specific project activities without the oversight of an on-site biological monitor on a case-by-case basis.

Before the start of work each day, the biological monitor will check for animals under all 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 Sonoma County California tiger salamanders. Sonoma County California tiger salamanders will be removed by the biological monitor and relocated according to the Relocation Plan. To prevent inadvertent entrapment of animals during construction, all excavated, steep-walled holes or trenches more than 6 inches deep will be covered with plywood (or similar materials) that leave no entry gaps at the close of each working day or provided with one or more escape ramps constructed of earth fill or wooden planks. The Service-approved biologist shall inspect all holes and trenches at the beginning of each workday and before such holes or trenches are filled. All replacement pipes, culverts, or similar structures stored in the project footprint overnight will be inspected before they are subsequently moved, capped, and/or buried.

5. **Biological Monitoring Records.** The biological monitor(s) shall maintain monitoring records that include: (1) the beginning and ending time of each day's monitoring effort; (2) a statement identifying the listed species encountered, including the time and location of the observation; (3) the time the specimen was identified and by whom and its condition; (4) the capture and release locations of each individual; (5) photographs and measurements (snout to vent and total length) of each individual; and (6) a description of any actions taken. The biological monitor(s) shall maintain complete records in their possession while conducting monitoring activities and shall immediately provide records to the Service upon request. All monitoring records shall be provided to the Service within 30 days of the completion of monitoring work.

6. Work Windows. Ground disturbance will be conducted between April 15 and October 15, of any given year, depending on the level of rainfall and/or site conditions. However, grading and other disturbance in pools and ponds, if unavoidable, shall be conducted only when dry, typically between July 15 and October 15. Work within a pool or wetland may begin prior to July 15 if the pool or wetland has been dry for a minimum of 30 days prior to initiating work. Any work in pools and wetlands that are holding water shall be subject to approval of the Service. If work must continue when rain is forecast (greater than 40 percent chance of rain), a Service-approved biologist(s) shall survey the Project site before construction begins each day rain is forecast. If rain exceeds 0.5 inches during a 24-hour period, work shall cease until National Weather Service forecasts no further rain. This restriction is not applicable for areas within 1.3 miles of potential or known Sonoma County California tiger salamander breeding sites once the Applicant encircles the site with Wildlife Exclusion Fencing.
7. Proper Use of Erosion Control Materials. Plastic or synthetic monofilament netting will not be used in order to prevent Sonoma County California tiger salamanders from becoming entangled, trapped, or injured. This includes products that use photodegradable or biodegradable synthetic netting, which can take several months to decompose. Acceptable materials include natural fibers such as jute, coconut, twine or other similar fibers. Following site restoration, any materials left behind as part of the restoration, such as straw wattles, should not impede movement of this species.
8. Wildlife Passage Improvement. When constructing a road improvement, wherever possible, the Corps through the Applicant will enhance or construct wildlife passage for the Sonoma County California tiger salamander across roads, highways, or other anthropogenic barriers. This includes upland culverts, tunnels, and other crossings designed specifically for wildlife movement, as well as making accommodations in curbs, median barriers, and other impediments to terrestrial wildlife movement at locations most likely to provide a net benefit to wildlife.
9. Vegetation Removal. A Service-approved biologist will be present during all vegetation clearing and grubbing activities. Grasses and weedy vegetation should be mowed to a height no greater than 6 inches prior to ground-disturbing activities. All cleared vegetation will be removed from the project footprint to prevent attracting animals to the project site. Prior to vegetation removal, the Service-approved biologist shall thoroughly survey the area for Sonoma County California tiger salamanders. Once the qualified biologist has thoroughly surveyed the area, clearing and grubbing may continue without further restrictions on equipment; however, the qualified biologist shall remain onsite to monitor for Sonoma County California tiger salamanders until all clearing and grubbing activities are complete.
10. Nighttime Activities. Construction and ground disturbance will occur only during daytime hours, and will cease no less than 30 minutes before sunset and will not begin again prior to no less than 30 minutes after sunrise. Night lighting of Environmental Sensitive Areas should be avoided.
11. Avoidance of Entrainment. If a water body (e.g., pond or ditch) is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh smaller than 5 millimeters and intake placed within a perforated bucket or other method to attenuate suction to prevent Sonoma County California tiger salamander larvae from entering the pump system. Pumped water shall be stored in a manner that does not degrade water quality and then upon completion released back into the water body, or at an appropriate location in

a manner that does not cause erosion. No rewatering of the water body is necessary if sufficient surface or subsurface flow exists to fill it within a few days, or if work is completed during the time of year the water body would have dried naturally, or for predator control purposes. To avoid effects to eggs and larvae, work within breeding ponds should be conducted between August 31 and October 31, or when the pools have been dry at least 30 days. When working in breeding ponds, this measure is to be implemented after implementing the required Relocation Plan described in number 2 above.

12. Reduce Non-Native Aquatic Predators/Competitors. A qualified individual shall permanently remove, from within the project area, any individuals of non-native species, such as bullfrogs, crayfish, and centrarchid fishes, to the maximum extent possible. The Applicant shall have the responsibility to ensure that these activities are in compliance with the California Fish and Game Code. For long-term management of aquatic breeding habitat, avoid converting seasonal breeding aquatic habitat to perennial aquatic breeding habitat, to avoid colonization by predators and non-native tiger salamanders or hybrids. Creation of new perennial water bodies in the vicinity of Sonoma County California tiger salamander shall also be avoided.
13. Trash. All foods and food-related trash items will be enclosed in sealed trash containers at the end of each day, and removed from the site every three days.
14. Agency Access. If verbally requested before, during, or upon completion of ground disturbance and construction activities, the Applicant will ensure the Service can immediately and without delay, access and inspect the project site for compliance with the project description, Conservation Measures, and reasonable and prudent measures of this programmatic biological opinion and appendage, and to evaluate project effects to the Sonoma County California tiger salamander and its habitat.

#### MEETING CONSERVATION NEEDS OF LISTED SPECIES

The conservation framework in this programmatic biological opinion utilizes information from the 2005 Conservation Strategy, 2007 Programmatic Biological Opinion, and 2016 Recovery Plan. Projects that can be appended to this programmatic biological opinion will meet the following conservation goals prior to beginning project activities and ground disturbance.

#### ***Sonoma County California tiger salamander***

The conservation strategy for the Sonoma California tiger salamander is carried over from the 2007 Programmatic Biological Opinion. The approach is based on ensuring that issuance of Corps permits does not preclude achieving the acreage goals in the Conservation Strategy which is generally based on a comparison of the amount of habitat expected to be developed (primarily within the urban growth boundaries of the cities of Santa Rosa, Cotati, Rohnert Park, and Windsor) and the Sonoma County California tiger salamander Preserve Goals (Conservation Strategy Team 2005, Table 1, page 19) within the defined Conservation Areas.

Development projects that can be appended to this programmatic biological opinion will provide the following to be consistent with the conservation framework for the Sonoma County California tiger salamander:

1. Mitigation Ratios. Conservation to offset adverse effects to Sonoma County California tiger salamander habitat will be in accordance to Table 2 and Figure 1. The mitigation ratios are

expressed as acres to be conserved to acres of impact. Ratios apply to the entire area subject to direct and indirect effects. Project sites that fall within more than one ratio will mitigate at the higher ratio in most cases, unless other conservation measures provide equal or greater conservation value. An interactive map is available to search by address or assessor parcel number ([fws.gov/sacramento/es/Consultation/Programmatic-Consultations/](http://fws.gov/sacramento/es/Consultation/Programmatic-Consultations/)).

**Table 2. Mitigation Ratios for the Sonoma County California Tiger Salamander**

Mitigation Ratio	Sonoma County California tiger salamander
3:1	Project sites that are within 500 feet of a breeding site.
2:1	<ul style="list-style-type: none"> <li>• Project sites that are greater than 500 feet and within 2,200 feet of a breeding site.</li> <li>• Project sites beyond 2,200 feet from a breeding site, but within 500 feet of a non-breeding occurrence.</li> </ul>
1:1	Project sites that are greater than 2,200 feet and within 6,864 feet (1.3 miles) of a breeding site.
0.2:1	Project sites that are greater than 6,864 feet (1.3) miles from a breeding site and greater than 500 feet from a non-breeding occurrence.

2. Conservation Bank Credits. Conservation for the Sonoma County California tiger salamander can be achieved by purchasing credits at a Service-approved conservation bank.
3. Conservation Bank Location. The selection of sites for mitigation will be consistent with the Recovery Plan as follows:
  - a. For impacts to Sonoma County California tiger salamander located in a Core Area, conservation will be within the same Core Area as first priority in order to maintain the current geographic, elevational, and ecological distribution (Service 2016). Conservation at a different Core Area or Management Area can be considered on a case by case basis as a second option but must be coordinated and approved by the Corps and Service.
  - b. For impacts to Sonoma County California tiger salamander located in a Management Area, conservation may be implemented within the same Management Area or the nearest Core Area.

### **Sonoma sunshine, Sebastopol meadowfoam, and Burke's goldfields**

Conservation for Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine under this programmatic biological opinion is similar to the 2007 Programmatic Biological Opinion with one substantial change. This revised programmatic biological opinion does not cover projects that adversely affect CNDDDB occurrences (Figures 3 – 5). However, this programmatic biological opinion covers adverse effects to suitable habitat where a seed bank is likely to be present. Suitable habitat includes: 1) wetland(s) containing surface water (standing or flowing) during the rainy season in a normal rainfall year for 7 or more consecutive days; 2) wetland(s) that have an outlet barrier (i.e., is a pool) or occurs in depressional terrain (i.e., is a swale or drainage feature); and 3) seasonal wetlands located within a Core or Management Area (Service 2007 and 2016).

Development projects that can be appended to this programmatic biological opinion will offset adverse effects to listed plant suitable habitat and will implement the following conservation measures:

1. Mitigation Ratios. Conservation for direct and indirect impacts to suitable habitat will be in accordance with Table 3. The ratios are expressed as acres of conservation to acres of impact.

**Table 3. Mitigation Ratios for the Listed Plants**

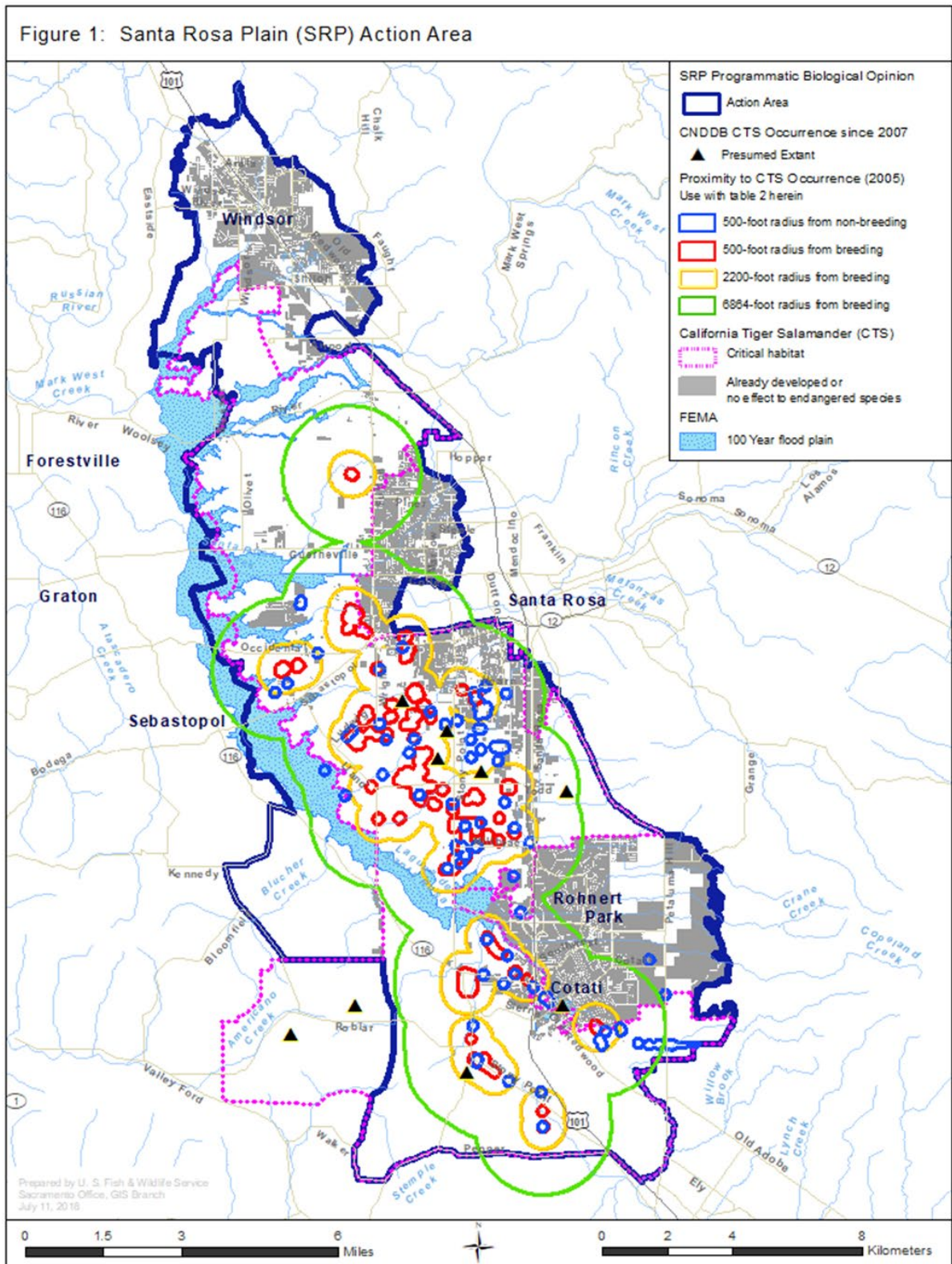
Burke's goldfields, Sebastopol meadowfoam and Sonoma sunshine	Mitigation ratio Same Core Area as Impacts	Mitigation ratio Different Core Area as Impacts
Impacts to suitable habitat	1.5 : 1	3 : 1

2. Conservation Bank Credits. Mitigation for Burke's goldfields, Sebastopol meadowfoam, or Sonoma sunshine can be achieved by purchasing credits at a Service-approved conservation bank.
3. Determining Which Species to Conserve. The plant species to be conserved will be determined as described below.
  - a. Proximity to a Species Occurrence: Suitable habitat will be conserved for the species that occurs nearest to the project site based on CNDDDB occurrences (Figures 3 – 5). For example, project sites near the Town of Windsor have numerous occurrences of Burke's goldfields. Therefore, Burke's goldfields would be the species chosen for conservation.
  - b. Multiple Species Occurrences Within a Core Area: Conservation for impacts to suitable habitat located within the Core Area of more than one listed plant species must be equally apportioned between those listed plant species (e.g., If there will be 1 acre of impacts to suitable habitat located in Sonoma sunshine and Burke's goldfields Core Areas, then 0.5 acre of Sonoma sunshine and 0.5 acre of Burke's goldfields will be subject to conservation goals in Table 3). This latter conservation strategy equalizes conservation to best meet the conservation needs of the species as outlined in the Recovery Plan.
4. Conservation Bank Location. The selection of sites for conservation will be consistent with conservation objectives for each species in the Recovery Plan as follows:
  - a. Project Sites in a Core Area: For impacts to suitable listed plant habitat located in a Core Area, conservation will be within the same Core Area as first priority in order to maintain the current geographic, elevational, and ecological distribution (Service 2016). Conservation in a different Recovery Plan Core or Management area can be considered on a case by case basis as a second option but must be coordinated with and approved by the Corps and Service.
  - b. Project Sites in a Management Area: For impacts to suitable listed plant habitat located in a Management Area, conservation may be implemented within the same Management Area or the nearest Core Area.

### 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." For this programmatic

biological opinion, the *Action Area* includes an area of 66,899 acres on the Santa Rosa Plain as shown in Figure 1.



### **Analytical Framework for the Jeopardy Determination**

Section 7(a)(2) of the Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. “Jeopardize the continued existence of” means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion considers the effects of the proposed federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) the *Status of the Species*, which describes the current rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the current condition of the species in the *Action Area* without the consequences to the listed species caused by the proposed action, the factors responsible for that condition, and the relationship of the *Action Area* to the survival and recovery of the species; (3) the *Effects of the Action*, which determines all consequences to listed species that are caused by the proposed federal action; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-federal activities in the *Action Area* on the species. The *Effects of the Action* and *Cumulative Effects* are added to the *Environmental Baseline* and in light of the status of the species, the Service formulates its opinion as to whether the proposed action is likely to jeopardize the continued existence of the listed species.

### **Analytical Framework for the Adverse Modification Determination**

Section 7(a)(2) of the Act requires that federal agencies insure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. A final rule revising the regulatory definition of “destruction or adverse modification” (DAM) was published on August 27, 2019 (84 FR 44976). The final rule became effective on October 28, 2019. The revised definition states:

“*Destruction or adverse modification* means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species”.

The DAM analysis in this biological opinion relies on four components: (1) the *Status of Critical Habitat*, which describes the current rangewide condition of the critical habitat in terms of the key components (i.e., essential habitat features, primary constituent elements, or physical and biological features) that provide for the conservation of the listed species, the factors responsible for that condition, and the intended value of the critical habitat overall for the conservation/recovery of the listed species; (2) the *Environmental Baseline*, which analyzes the current condition of the critical habitat in the *Action Area*, without the consequences to designated critical habitat caused by proposed action, the factors responsible for that condition, and the value of the critical habitat in the *Action Area* for the conservation/recovery of the listed species; (3) the *Effects of the Action*, which determines all consequences to designated critical habitat that are caused by the proposed federal action on the key components of critical habitat that provide for the conservation of the listed species, and how those impacts are likely to influence the conservation value of the affected critical habitat; and (4) *Cumulative Effects*, which evaluate the effects of future non-federal activities that are reasonably certain to occur in the *Action Area* on the key components of critical habitat that provide for the conservation of the listed species and how those impacts are likely to influence the conservation value of the affected critical habitat.



The *Effects of the Action* and *Cumulative Effects* are added to the *Environmental Baseline* and in light of the status of critical habitat, the Service formulates its opinion as to whether the action is likely to destroy or adversely modify designated critical habitat. The Service's opinion evaluates whether the action is likely to impair or preclude the capacity of critical habitat in the *Action Area* to serve its intended conservation function to an extent that appreciably diminishes the rangewide value of critical habitat for the conservation of the listed species. The key to making that finding is understanding the value (i.e., the role) of the critical habitat in the *Action Area* for the conservation/recovery of the listed species based on the *Environmental Baseline* analysis.

### **Status of the Species and Environmental Baseline**

*Environmental baseline* refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

#### **Sonoma County California Tiger Salamander; Burke's Goldfields; Sebastopol Meadowfoam; and Sonoma Sunshine**

Additional information on the status of these species beyond the *Action Area* covered in this document can be found in the Recovery Plan (Service 2016).

The *Action Area* is located in central Sonoma County, California, within the Santa Rosa Plain sub-basin of the Santa Rosa Valley and the Petaluma Valley. Prior to human settlement, it is believed the Santa Rosa Plain supported a vast network of seasonally wet swales and scattered pools within a matrix of grassland and oak savanna. The low-gradient terrain with underlying dense clay soil horizons and high clay soil surfaces, ample winter precipitation, and dry summer climate on the Santa Rosa Plain predisposed this area to the development of seasonal wetlands. The natural landscape historically consisted of numerous shallow depressions that would pond water during the rainy season (vernal pools), often connected by narrow swales. Much of the vernal pool ecosystem has since been lost or degraded through agricultural activities and development projects (Patterson et al. 1994, CH2M Hill 1995). The Santa Rosa Plain is believed to have historically supported approximately 7,000 acres of seasonal wetlands, an estimated 84 percent of which had been lost due to land conversion as of 1994. The approximately 1,000 acres of seasonal wetlands that remained on the Santa Rosa Plain in 1994 were composed of both vernal pools (ponded) and swales (non-ponded) in roughly equal proportions, and the swales had largely been invaded by exotic species, therefore it is believed the actual amount of vernal pool acreage had been reduced to less than a few hundred acres (Patterson et al., 1994). Because the vernal pool ecosystem was once extensive over the Santa Rosa Plain, it is not difficult to find parcels on which vernal pools have been smeared into the landscape, resulting in degraded seasonal wetlands that may still retain the necessary qualities for supporting one or more of the listed plant species but may require considerable restoration to ensure long-term species viability (Patterson et al. 1994, CH2M Hill 1995).

The loss of seasonal wetland habitat on the Santa Rosa Plain has largely resulted from urban and agricultural conversion (Patterson et al. 1994, CH2M Hill 1995, CNDDDB 1998). Of



28,000 acres of the Santa Rosa Plain studied by Waaland et al. (1990 as cited in Patterson et al. 1994), 12,000 acres had been converted to urban, cropland, orchard or vineyard uses. The conversion most severely affected oak woodland/savanna-vernal pool habitat.

During the past 40 years, the Santa Rosa Plain has changed from a primarily rural residential/agricultural area with large expanses of open space to a more urbanized and intensely agricultural area with less open space (Service 2016). Vernal pool habitat on the Santa Rosa Plain now occurs as often degraded remnants in a matrix of agriculture, development, and fragmented remains of valley oak woodland, grassland, and persistent wetland vegetation, and is vulnerable to invasion by non-native plants (City of Santa Rosa 2014). An undetermined amount of land use conversions and intensive and routine agricultural practices are not reviewed for environmental compliance under the federal permitting process. It is expected that some new intensive agriculture including vineyard, row crops, cannabis grows, recycled water spray irrigation, and their infrastructure will occur within the Action Area.

The Association of Bay Area Governments (ABAG) predicts that between 2010 and 2040 the nine-county San Francisco Bay Area region is projected to add 2.1 million people and 660,000 homes. During that time, the human population in Sonoma County, one of the Bay Area counties, is projected to increase by 24 percent and housing will increase by 16 percent, with 82 percent of the County's projected growth occurring within the jurisdictions in the Santa Rosa Plain, largely within urban growth boundaries of Cotati, Rohnert Park, Santa Rosa, and Windsor (ABAG 2013). Areas within the defined urban growth boundaries include lands currently inhabited by Sonoma County California tiger salamander, Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine. Urban growth continues to imperil the Sonoma County California tiger salamander and the three listed plant species with ongoing habitat loss and fragmentation.

Intensive and less intensive agriculture uses occur within the *Action Area*. Some of the intensive agriculture includes vineyards, row crops, orchards, dairies, and recycled water spray irrigation. There are approximately 6,571 acres of vineyards in the *Action Area* (Sonoma Veg Map 2013). Conversion of pastures to vineyards is a current threat to all four species (Service 2016). Vineyard project applicants within the Santa Rosa Plain are expected to develop biological assessments for review by Sonoma County environmental staff. Sonoma County was a partner in preparing the Conservation Strategy (2005) and are expected to conserve these species accordingly. The Sonoma County environmental review for vineyard and orchard development expanded in 2014 with the requirement that projects have a biological assessment completed and mitigate impacts to endangered species as well as sensitive aquatic habitats such as streams, wetlands and vernal pools (Sonoma County 2016).

Land uses within the *Action Area* are expected to continue to include urban, rural residential, intensive agriculture, endangered species compatible agriculture, transportation, and conservation. Conservation lands for Sonoma County California tiger salamander, Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam, have been established on the Santa Rosa Plain since the plants were federally listed as endangered in 1991 and Sonoma County California tiger salamander in 2002. All are protected and have funding mechanisms such as endowment funds for the perpetual management of the habitat to ensure the survival of the listed species present. The conservation lands summarized in Table 4 of the Recovery Plan (Service 2016) are fairly small and interspersed with rural residential, vineyards, and other agriculture land uses. The majority are less than 50 acres in size (77 percent).

Voters in local municipalities have established urban growth boundaries for their communities. This is intended to accomplish the goal of city-centered growth, resulting in continuation of rural and agricultural land uses between the urbanized areas (Conservation Strategy Team 2005). Areas within

the defined urban growth boundaries include lands currently inhabited by Sonoma County California tiger salamander, Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam. This urban growth continues to threaten occurrences of these listed species. Many of the parcels in the urban growth boundaries are small, have degraded uplands and wetlands, and are fragmented by development.

While it is reasonable to expect that rural land uses will continue into the foreseeable future outside of the urban growth areas, the nature of such use has bearing on habitat quality for the Sonoma County California tiger salamander, Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam. While past and ongoing agricultural practices have disturbed seasonal wetlands on the Santa Rosa Plain, certain agricultural practices, such as grazed pasture, have protected habitat from intensive development and are compatible with persistence of these listed species.

A recovered species is one that no longer meets the Act's definition of threatened or endangered due to amelioration of threats. Because the main cause of the decline and the main current threat to all species in this biological opinion is the loss and degradation of habitat in the Santa Rosa Plain, previous conservation efforts including the Santa Rosa Vernal Pool Ecological Reserve System, Santa Rosa Plain Conservation Strategy, Programmatic Biological Opinions, Conservation Banks and Permittee Responsible Mitigation (Preserves), and the Recovery Plan focused upon ameliorating this threat. The Santa Rosa Plain is vital to the recovery of the Sonoma County California tiger salamander, Burke's goldfields, Sonoma sunshine, and Sebastopol meadowfoam where the majority of the CNDDDB occurrences are found throughout their range.

The Conservation Strategy (2005) and Programmatic Biological Opinion (Service 2007) identified conservation measures to avoid, minimize, and compensate for adverse effects at project sites and guide the conservation of individuals, seedbank, and habitat. Preserves have been established within Conservation Areas identified in the Conservation Strategy and have contributed to the conservation of contiguous blocks of habitat.

The current understanding of the recovery needs of these species is that recovery is possible only through preserving high-quality habitat that provides essential connectivity, reduces fragmentation, and sufficiently buffers against encroaching development (Service 2016). The Santa Rosa Plain is essential to the survival and recovery of the Sonoma County California tiger salamander, Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine because it is where the majority of the current and historic range of each species exists. Conserving these species in the Santa Rosa Plain is necessary to maintain their geographic range to achieve recovery. The Recovery Plan (Service 2016) identifies actions to reduce the threats to these four species and ensure their long-term viability in the wild and allow for their removal from the list of threatened and endangered species.

Recovery Plan goals for these species are to:

1. Restore habitat conditions to sustain viable populations;
2. Maintain the current geographic, elevational, and ecological distribution;
3. Maintain the genetic structure and diversity of existing populations;
4. Protect and manage sufficient habitat to ensure that these species are able to adapt to unforeseen or unknown threats, such as climate change;
5. Re-introduce individuals to successfully establish new populations in historically occupied areas within the current distribution;

6. Minimize the effects of extant or potential threats;
7. Monitor species population trends across multiple years (and varied climatic conditions) to determine whether populations are sustainable; and
8. Manage occurrences on a case-by-case basis, with an emphasis on protections for identified Core Areas.

### **Sonoma County California tiger salamander**

Much of the research on the biology and ecology of the California tiger salamander is from the Central DPS which is the same species as the Sonoma DPS but is separated geographically. Information presented herein is used interchangeably when life history, ecology, and biology may be shared between the Central DPS and Sonoma County DPS.

**Description:** 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; males tend to be larger than females. The coloration of the California tiger salamander is white or yellowish markings against black. As adults, California tiger salamanders tend to have the creamy yellow to white spotting on the sides with much less on the dorsal surface of the animal, whereas other tiger salamander species have brighter yellow spotting that is heaviest on the dorsal surface. The 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 (1.14 to 1.42 centimeters) (Petranka 1998).

**Taxonomy:** California tiger salamanders are endemic to the Santa Rosa Plain, the San Joaquin-Sacramento River valleys and bordering foothills, and the coastal valleys of Central California south to Santa Barbara. All California tiger salamanders are federally listed; however, they are listed as three unique entities: the Sonoma County DPS of California tiger salamander, the Santa Barbara DPS of California tiger salamander, and Central DPS of California tiger salamander. In our final listing rule, we determined that the Sonoma population of California tiger salamander is a DPS, as it is geographically isolated and genetically unique from the Santa Barbara and Central DPSs (Service 2003).

**Habitat:** The Sonoma County California tiger salamander inhabits vernal pools and seasonal ponds, associated grassland, and oak savannah plant communities (Service 2003). Sonoma County California tiger salamanders spend the majority of their lives underground in small mammal burrows in uplands, while ephemeral wetlands play a critical role because they are necessary for breeding.

California tiger salamanders depend on persistent small mammal (e.g., pocket gopher) activity to create, maintain, and sustain sufficient underground refugia (Loredo et al. 1996). These underground burrow systems are critical during the drier months of the year, though juveniles and adults use them throughout the year to grow and survive (Loredo et al. 1996; Pittman 2005; Seymour and Westphal 1994; Shaffer et al. 1993). California tiger salamanders may also use landscape features such as leaf litter or desiccation cracks in the soil for upland refugia. Such underground refugia provide protection from the sun and wind associated with a dry California climate, which can otherwise desiccate (dry out) and kill amphibians in upland terrain.

Because they spend most of their lives underground, California tiger salamanders are rarely encountered, even in areas where they are abundant. Most evidence suggests that California tiger salamanders move, feed, and remain active in their underground dwellings (Trenham 2001;

Semonsen 1998; Van Hattem 2004). Adult California tiger salamanders are rarely seen except during nocturnal breeding migrations, which begin with the first seasonal rains, usually in November or December (Barry and Shaffer 1994).

Although historical breeding habitat for California tiger salamanders is natural vernal pools and ponds, they also use modified ephemeral or permanent ponds and manmade features such as constructed ponds or livestock ponds. This species is not known to breed in streams, rivers, or other flowing aquatic habitats (Cook et al. 2005). However, breeding individuals have been reported in roadside ditches in areas that contain seasonal wetlands. California tiger salamanders are sometimes found within permanent ponds; however these occupied permanent ponds do not typically have predatory fish or breeding bullfrog populations (Fisher and Shaffer 1996). Vernal pools and ephemeral ponds have been observed to better support larger populations than perennial wetlands, indicating that they provide higher-quality breeding habitat (Riley et al. 2003; Wang et al. 2011). Wang et al. (2011) studied Central California tiger salamander populations in both vernal pools and more permanent livestock ponds, and found that salamanders breeding in natural vernal pools had higher reproductive success and overall abundance than those breeding in livestock ponds. The absence of predatory fish species and non-native predators (e.g., bullfrogs) within the breeding pools plays a significant role in the reproductive success, as larvae are vulnerable to the predation (Shaffer et al. 1993). If these predator populations persist in the same habitat, they outcompete and prey upon salamander eggs and larvae. Thus, optimum breeding habitat holds water long enough to allow metamorphosis of salamanders from the larval stage into the air breathing juvenile lifestage (which takes at least three months every year), but not so long as to allow bullfrogs or non-native fish species to breed or survive (Petranka 1998). In Sonoma County, the available data suggest that most extant populations consist of relatively small numbers of breeding adults in the range of a few, to a few dozen pairs and populations that number above 100 breeding individuals are rare (CDFG 2010).

It is not evident whether the origin of the pool matters for habitat selection. Cook et al. (2005) studied Sonoma County California tiger salamander larvae capture rates and occupancy, and found that breeding activity was similar between constructed and natural vernal pools. Cook et al. (2005) did find that the probability of detecting Sonoma County California tiger salamander breeding activity was positively associated with pool depth, as years with higher annual rainfall amounts resulted in higher numbers of larvae. In drought years, ponds may not form at all, and the adults cannot breed (Barry and Shaffer 1994). Typically, breeding pools have moderate to high levels of turbidity. California tiger salamanders rarely use ponds with clear water (Bobzien and DiDonato 2007). The turbidity may help larvae and adults avoid predators.

In addition to both upland and aquatic habitat that is essential to the Sonoma County California tiger salamander, maintaining connectivity between these two types of habitat is important for the long-term viability of the Sonoma County California tiger salamander. Connectivity can be maintained when there are large areas of upland habitat that contain multiple breeding wetlands within dispersal distance of each other.

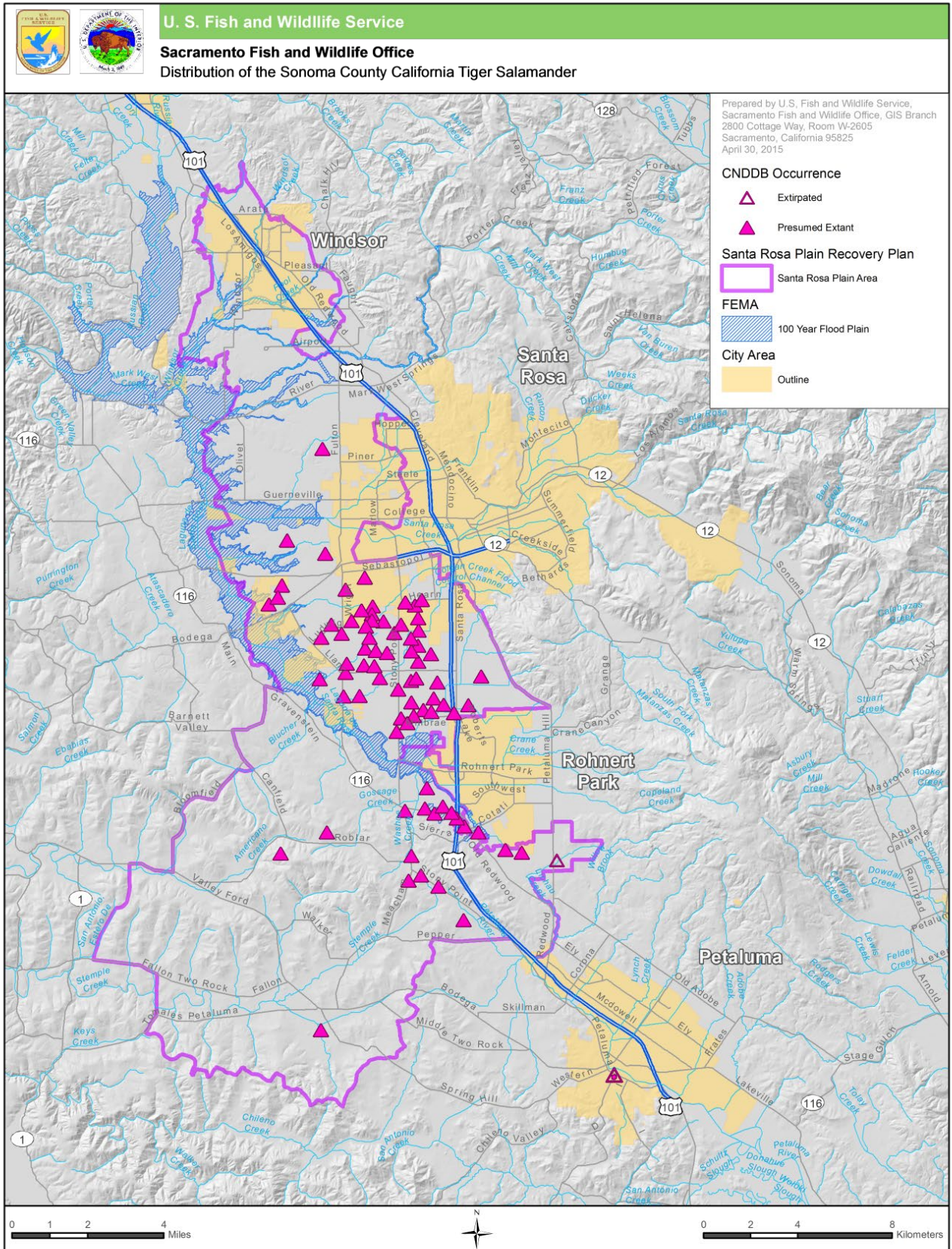
Their home range ideally contains multiple breeding wetlands, which are necessary for the California tiger salamander to persist. If a local population becomes extinct due to unfavorable conditions, having connectivity between ponds is important to ensure that recolonization occurs at individual pond sites (Shaffer et al. 1993).

*Distribution.* The Sonoma County DPS is widely separated geographically from the closest Central DPS populations, which are located in Contra Costa, Yolo, and Solano counties. The Central DPS is separated from the Sonoma County DPS by the Coast Range, Napa River, and the Carquinez Straits, at a minimum distance of approximately 45 miles. No CNDDB occurrences of the Sonoma County

California tiger salamander exist in the intervening areas (CNDDDB 2018). We have no evidence of natural interchange of individuals between the Sonoma County population and other California tiger salamander populations. The distribution is generally between Windsor and Petaluma (Figure 2).



Figure 2: Sonoma California Tiger Salamander Distribution



Within the *Action Area*, there is approximately 36,822 acres of low to high quality habitat (Figure 1) and the current core range of Sonoma County California tiger salamander encompasses approximately 18,000-20,000 acres of fragmented habitat (D. Cook, in literature, 2009). This distribution has been curtailed by urbanization, vineyard conversion, roads, and other development primarily in two areas in recent times: the Santa Rosa Air Center area (southwest Santa Rosa) where observations have decreased since the early 1990s; and in the south Cotati area, where salamanders were once commonly observed in the late 1980s to early 1990s (D. Cook, in literature, 2009).

The Recovery Plan delineated Core Areas and Management Areas. Core areas comprise the heart of the species historical (and current) range and represent central blocks of contiguously occupied habitat that functions to allow for dispersal, genetic interchange between populations, and metapopulation dynamics. Management Areas are occupied habitat peripheral to the species' core range (the Core Areas). However, the extent of the range is unknown due to poor survey coverage in peripheral areas. The delineation of Core Areas and Management Areas was based on known species ranges (based on CNDDDB and Adopt Vernal Pool data), projections of potential species' range based on known habitat characteristics within adjacent areas (habitat in need of additional survey), or areas with the necessary conditions for potential restoration opportunities (Service 2016). Delineations have been made by geographic designators such as roads, creeks, or conservation area boundaries from the Strategy (Service 2016).

Threats: Threats to the Sonoma County California tiger salamander discussed in detail in the Recovery Plan are numerous and include the following (Service 2016):

1. Habitat Destruction and Loss
2. Habitat Alteration
3. Climate Change
4. Disease
5. Predation
6. Mortality from Road Crossings
7. Contaminants
8. Mosquito Control (Abatement)
9. Hybridization with Non-native Tiger Salamanders
10. Small Population Size

At the time of listing, we determined that the primary cause for the decline of the Sonoma County California tiger salamander was loss, degradation, and fragmentation of habitat as the result of urbanization (Service 2003). We still consider habitat loss and fragmentation to be the primary threat to the Sonoma County California tiger salamander (Service 2016).

Habitat Loss: It is estimated that, by 1990, 25 percent of the 28,000-acre range of the Sonoma County California tiger salamander within the Santa Rosa Plain had been converted to subdivisions, ranchettes, golf courses, and commercial buildings, while an additional 17 percent of this area had been converted to agricultural uses (Waaland *et al.* 1990). At the time of listing, five known breeding

sites had been destroyed in the previous 2 years (Service 2003). There were eight known remaining breeding sites distributed in the City of Santa Rosa and immediate associated unincorporated areas, an area approximately 8 km (5 mi) long by 6 km (4 mi) wide. At listing, we determined that all eight of these breeding sites were threatened by urbanization (Service 2003). A few new breeding sites have been discovered at the north end of Duer Road, within the Horn-Hunter Management Area of the Recovery Plan and southwest of Cotati within parts of the Americano Creek and Steple Creek watersheds (Service 2016). However, the latter is not included as part of the *Action Area*. An undetermined amount of land use conversions and intensive and routine agricultural practices are not reviewed for environmental compliance under the federal permitting process. It is expected that some new intensive agriculture including vineyard, row crops, cannabis grows, recycled water spray irrigation, and their infrastructure will occur within the Action Area.

*Preserves:* Since the Sonoma County California tiger salamander was listed, several Preserves have been established to offer credits or serve as compensation for the destruction or degradation of habitat. All are protected by conservation easements or owned by CDFW and have funding mechanisms for the perpetual management of the habitat. A summary of the majority of the sites is provided in the Recovery Plan (Service 2016).

### ***Burke's Goldfields, Sebastopol Meadowfoam and Sonoma Sunshine***

*Threats:* Threats to Burke's goldfields, Sonoma sunshine and Sebastopol meadowfoam discussed in detail in the Recovery Plan are numerous and include the following (Service 2016):

1. Urban development.
2. Conversion of habitat to incompatible agricultural uses.
3. Alteration of hydrology.
4. Encroachment of non-native plants.
5. Incompatible grazing levels and build-up of thatch.
6. Over-collection of seed and inoculum (soil containing seeds, plant parts, etc.) from extant locations for the purpose establishing additional new populations of the listed plants in Preserves.
7. Loss of genetic diversity and mixing from disrupted gene flow from habitat fragmentation and from inter-mixing gene pools as a result of moving seeds around the Santa Rosa Plain (Sloop *et al.* 2012b).
8. Reduction or loss of species-specific pollinators which could result in reduced seed production (Sloop *et al.* 2012b).
9. Increased potential for random or unpredictable extirpations of occurrences as a result of their isolation and already small size (Gilpin and Soule 1986, Patterson *et al.* 1994, CNDDDB 2018).
10. Climate change that may result in overall warmer temperatures with greater unpredictability in rainfall (Field *et al.* 1999, Cayan *et al.* 2005, IPCC 2013).



**Management:** Cattle grazing may be an effective tool for maintaining species diversity and managing non-native plants (Hayes and Holl, 2003, Skaer *et al.*, 2013). Many native seasonal wetland plants are small and require an open environment to successfully germinate and reproduce; they compete for soil moisture and light resources with non-native grasses (Marty 2005). Cattle selectively forage on grasses which results in a more open canopy (Weiss 1999). However, since the time of listing, livestock grazing has been removed at many locations and cessation of cattle grazing has been found to exacerbate the negative effects of invasive nonnative plants on vernal pool inundation period. Where grazing has been removed, areas of bare soil can be quickly occupied by nonnative, invasive plants and develop layers of grass thatch that displace and inhibit germination of many vernal pool annual plants (Marty 2005). The CDFW is re-establishing appropriate grazing practices on some CDFW - owned Preserves to reduce thatch build-up and nonnative competitors to the three listed plants (e.g., Todd Road Unit Ecological Preserve).

**Preserves:** Since Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine were listed, several Preserves have been established to offer credits or serve as compensation for the destruction or degradation of habitat. All are protected by conservation easements or owned by CDFW and have funding mechanisms for the perpetual management of the habitat. A summary of the majority of the sites is provided in the Recovery Plan (Service 2016).

### **Burke's Goldfields**

**Description:** Burke's goldfields is an annual herb that is typically less than 30 cm (11.8 in) tall (Ornduff 1993). It has hairy stems, which may be simple or branched. The narrow, opposite leaves are no more than 8 cm (3.1 in) long and may be lobed or not. From April to June, the end of each branch bears one daisy-like flower head approximately 1.5 cm (0.6 in) across. The fruits are achenes (dry, one-seeded fruits) less than 1.5 mm (0.06 in) in length. The fruits of Burke's goldfields can be distinguished from those of other goldfields by the presence of one long awn (bristle and numerous short scales) (Ornduff 1993). Individual Burke's goldfields plants may exhibit some geographic variation in morphology (McCarten 1985, Patterson *et al.* 1994).

**Taxonomy:** Ornduff (1966) published a comprehensive study of the genus *Lasthenia*, Burke's goldfields was then recognized as a distinct species and the name *Lasthenia burkei* was accepted widely. Continuing research indicated that Burke's goldfields, Fremont's goldfields, and Contra Costa goldfields (*Lasthenia conjugens*) form a closely related species group (Ornduff 1969b, Crawford and Ornduff 1989). However, Burke's goldfields was found to be genetically distinct from Fremont's and Contra Costa goldfields (Crawford and Ornduff 1989). *Lasthenia burkei* and its relatives are members of the aster family (Asteraceae).

**Habitat:** Burke's goldfields grows in vernal pools and wet meadows generally below 500 m (984 ft) (Chan and Ornduff 2012). 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 0.6 to 0.9 m (2 to 3 ft) 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 Plain (Patterson *et al.* 1994). 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). 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).

The primary habitats of Burke's goldfields are shallow vernal pools and wet swales within valley grassland and oak woodland habitats (CNDDDB 2018). On the Plain, Burke's goldfields grows in the

bottoms of pools ranging from less than 25 cm (10 in) in depth to 50 cm (20 in) (Patterson 1990, Patterson *et al.* 1994, Patterson *in litt.* 2000). Burke's goldfields grows in naturally-occurring pools that range in surface area from approximately 2 square m (21.5 square ft) to 0.3 ha (0.75 ac (Patterson *in litt.* 2000). Most of the vernal pools where Burke's goldfields grows are loosely classified as northern vernal pools (Keeler-Wolf *et al.* 1998), but the Manning Flat occurrence in Lake County is in a northern volcanic ash flow vernal pool (Sawyer and Keeler-Wolf 1995). Burke's goldfields also has been observed occasionally in artificially-created depressions such as drainage ditches and in disturbed sites such as orchards and disked fields (Patterson 1990, Patterson *et al.* 1994) that formerly supported vernal pools.

Burke's goldfields grows at a wide range of elevations, which vary by region. The lowest-elevation occurrences are found between 27 and 46 m (90 to 150 ft.) on the Plain, and in the Alexander Valley, where it occurs at 52 m (170 ft.). The Ukiah occurrence is intermediate in elevation at 188 m (620 ft.). The Lake County occurrences are at the highest elevations, with one at 427 m (1,400 ft.) and the Manning Flat occurrence at 579 m (1,900 ft.) (CNDDDB 2018).

Reproduction and Ecology. Burke's goldfields is an annual. Burke's goldfields typically germinates in autumn following heavy rains, although late initiation of rains may delay seedling emergence (Ornduff 1969b). Plants that establish in autumn under natural conditions may tolerate prolonged submergence, but do not begin rapid stem growth until vernal pools and swales dry down during late winter or early spring (Ornduff 1969b, Patterson *et al.* 1994). Flowering occurs any time between late-March and mid-June, although the typical flowering period is from mid-April to mid-May (Greene 1886, Ornduff 1966, Ornduff 1977b, Patterson *et al.* 1994); early dry and warm conditions favor early flowering. Seed set, maturation, and dispersal may occur from late-April to June, and may be prolonged by late rains or cool temperatures. Plants usually become senescent by early summer unless late-spring rains prolong reproduction (Patterson *et al.* 1994). Seed dispersal mechanisms are not known. Pappus awns (needle-like appendages attached to the achene) may assist in windborne seed dispersal. Other seed dispersal mechanisms may include water or wildlife.

The flowers of Burke's goldfields are predominantly pollinated by outcrossing but they are capable of self-pollination (Sloop *et al.* 2012c). They are thought to be insect pollinated rather than wind-pollinated. Insects known to visit the flowers of the genus *Lasthenia* include butterflies, beetles, flies, true bugs, bees, and wasps (Thorp and Leong 1998). Most of these insects are generalist pollinators. All of the specialist pollinators of *Lasthenia* spp. are solitary bees (Thorp and Leong 1998). Gilmore, Sloop and Rank (2012) conducted a pollinator study of Burke's goldfields and found that although the solitary bee (*Andrena submoesta*) specializes on Burke's goldfields and is apparently dependent on it as a food source, the plant may not rely on *A. submoesta* for pollination (Gilmore *et al.* 2012). The Bombyliid fly (also called a bee fly), *Conophorus cristatus*, was found to be the dominant visitor of Burke's goldfields and may be its primary pollinator. Bee flies lay eggs near ground-nesting bees. Bee fly larvae are, depending on species, parasites of larvae of solitary bees and wasps, beetles, moths, grasshoppers, and other flies (Black *et al.* 2009). Syrphid flies (members of several genera in the family Syrphidae (hover flies) were also found to be an important part of the pollinator community for Burke's goldfields (Gilmore *et al.* 2012). Syrphid fly primary habitats are those with flowering plants, leaf litter, and soil within grasslands, rangelands, and meadows with limited tilling. Specifically, adult primary habitat are places with flowering plants. Overwintering larvae, pupae, and adults are found in leaf litter and soil and the larvae are generalist predators that feed on aphids (Hopwood *et al.* 2016). A variety of habitats including uplands, grasslands, and wetlands in the Santa Rosa Plain that support a diverse pollinator population and other flowering species for pollinators to visit are necessary for Burke's goldfields long term persistence.

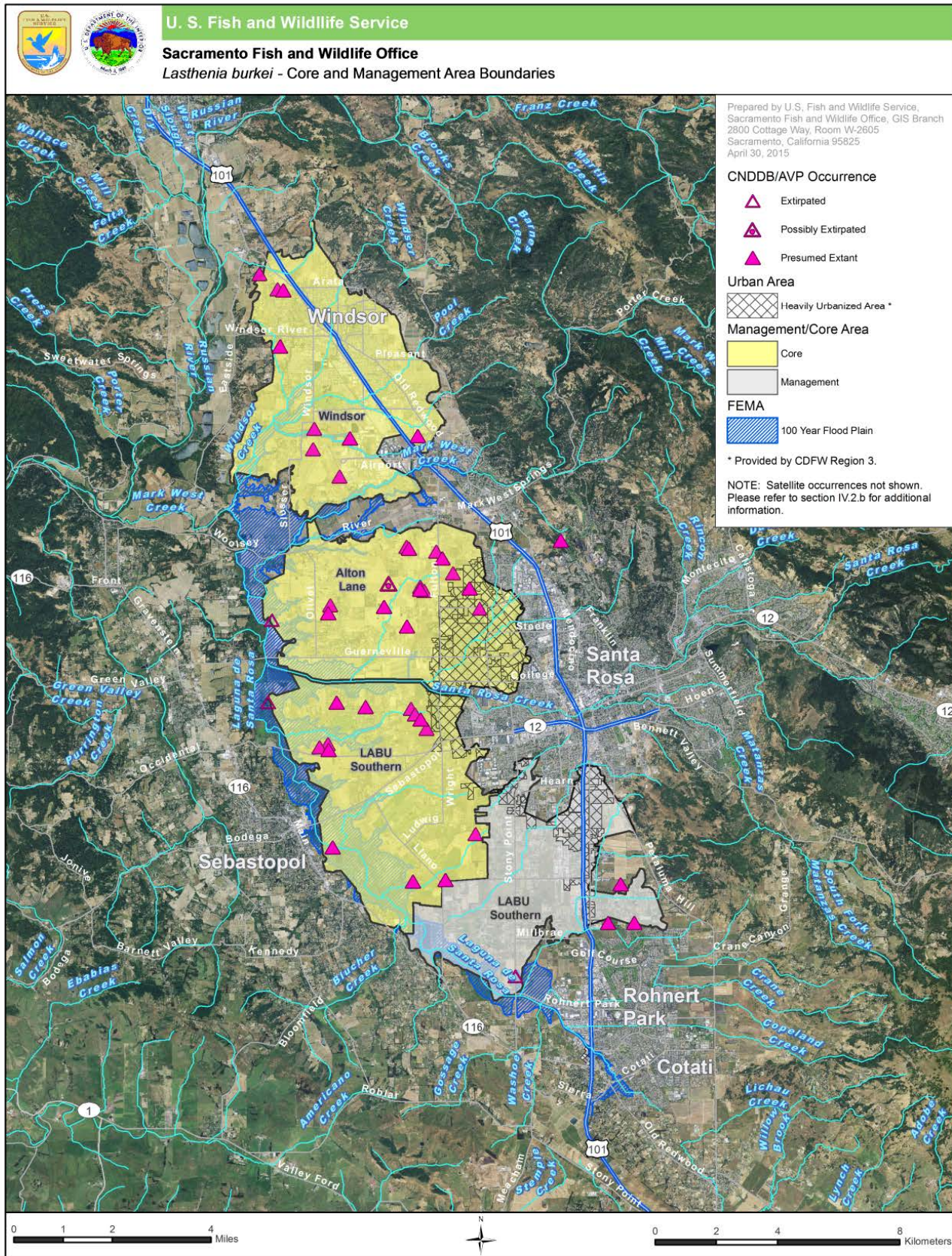
Both the ray and disk flowers of all goldfields species produce achenes, increasing the potential for seed production per head. However, the reproductive output of individual plants is highly variable, depending on plant density and vigor, and probably on pollinator behavior as well. Each flower head can produce as many as 35 achenes, and the number of flower heads per plant can range from 1 to more than 20 (Patterson et al. 1994). Annual survival rates and other demographic parameters have not been investigated.

Burke's goldfields has also likely adapted to "risky environments" by producing a persistent seed bank. Some occurrences have reappeared after no plants were evident for 2 years, suggesting that viable seeds remained in the soil during that period (Patterson 1990).

*Distribution:* The core of the current range of Burke's goldfields is in the *Action Area* north of the community of Windsor to east of the city of Sebastopol with three occurrences south of Highway 12. The most current information from CNDDDB, from survey data collected by the Adopt-a-Vernal Pool program, and from species experts is shown on Figure 3.



Figure 3: Burke's Goldfields Distribution





Most occurrences have been subjected to substantial loss or alteration of habitat (Service 2016) and are much smaller in area and numbers of plants than in the past (CNDDDB 2018). Burke's goldfields occurrences continue to become increasingly fragmented in the area of the Town of Windsor and are now nearly extirpated from that area (P. Chamberlin pers. comm. 2008). It is unknown to what extent occurrences have been lost entirely due to development or other human-caused ground-disturbing activities because they were lost prior to being documented.

Occurrence sizes for Burke's goldfields and other vernal pool annuals are difficult to document by numbers of plants because they fluctuate greatly from year to year. The particular conditions that contribute to large occurrences in certain years are not well understood. Most Burke's goldfields occurrences contain a few hundreds or thousands of plants (CNDDDB 2018). The largest known occurrences are at the Alton Lane Vernal Pool Preserve (Occurrence 25), with approximately 1.4 million plants in 2013; at the Wright Preservation Bank (Occurrence 28) where the occurrence has ranged from approximately 5.3 million to 1 million over the past 5 years; Slippery Rock Conservation Bank (Occurrence 28), where the occurrence has ranged from 15,059 in 2007 to over 3.1 million in 2015, and the occurrence east of Fulton Road near Piner Road (Occurrence 19), where the occurrence has ranged between 350 plants in 1998 to 18.5 million plants in 2009; 24,860 were found at this site in 2012 (CNDDDB 2018).

Burke's goldfields growing at Alton Lane, Alton North Conservation Bank, Hale Mitigation Bank, Horn Mitigation Bank Phases 2 and 3, Slippery Rock Conservation Bank, Proposed Windmill mitigation site (former proposed Horn Mitigation Bank Phase 5), Woodbridge Preserve, and Wright Preservation Bank are introduced from other sites on the Santa Rosa Plain into restored vernal pool habitat. These efforts have increased the distribution in the Santa Rosa Plain or perhaps re-established the plants in those locations. A study is underway to gather genetic information and perform controlled transplant experiments to provide information to inform future decisions about seed translocation that will both preserve remaining genetic variation within Burke's goldfields while maximizing the success of populations that are introduced into created habitat (Emery 2016)

### **Sebastopol Meadowfoam**

*Description:* Sebastopol meadowfoam is an annual herb of the false meadowfoam family (Limnanthaceae) with weak, somewhat fleshy, decumbent stems up to 30 cm (11.8 in) long (stems grow longest when the plant is submerged while actively growing). The seedlings are unusual among Limnantes species in that they have entire leaves. Leaves of mature plants are up to 10 cm (3.9 in) long and have 3 to 5 leaflets that are narrow and unlobed with rounded tips. Although the first leaves are narrow and undivided, leaves on the mature plant have three to five undivided leaflets along each side of a long stalk (petiole). The length of the petiole also appears to be promoted by submergence. The shape of the leaves distinguishes Sebastopol meadowfoam from other members of the Limnantes genus by having entire leaves as opposed to lobed leaves.

Sebastopol meadowfoam has fragrant, white flowers during April and May. The flowers are borne in the leaf axils (upper angle between leaf and stem), are bell- or dish shaped, with petals 12 to 18 mm (0.47 to 0.71 in) long. The sepals (green outermost whorl of flower parts that enclose the bud) are shorter than the petals, which turn outward as the nutlets (small, dry nuts) mature. The nutlets are dark brown, 3 to 4 mm (0.12 to 0.16 in) long, and covered with knobby pinkish tubercles (small wartlike projections) (Ornduff 1969a, Brown and Jain 1977, Hauptli et al. 1978, Wainwright 1984, Patterson et al. 1994, Ornduff and Morin 2012). The seeds of Sebastopol meadowfoam 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.

Taxonomy: The earliest collection of Sebastopol meadowfoam was made in 1946 “between Bodega and Petaluma, south of Sebastopol” but this record most likely represents a site near Sebastopol (Wainwright 1984). The species was described in 1969 by Ornduff (1969a). The type locality for Sebastopol meadowfoam is Todd Road, just west of the intersection with Llano Road, which is near Sebastopol in Sonoma County (Ornduff 1969a).

Habitat: Sebastopol meadowfoam 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; CNDDDB 2018). Sebastopol meadowfoam grows in both shallow and deep areas, but is most frequent in pools 25 to 51 cm (10 to 20 in) deep (Patterson et al. 1994). The species is most abundant in the margin habitat at the edge of vernal pools or swales (Pavlik et al. 2000, 2001). Most confirmed occurrences of Sebastopol meadowfoam on the Santa Rosa Plain grow on Wright loam or Clear Lake clay soils (Patterson et al. 1994, CNDDDB 20018). 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).

The surrounding plant communities range from oak savanna, grassland, and marsh in Sonoma County to riparian woodland in Napa County (CNDDDB 2018). Sebastopol meadowfoam occurs at elevations of 15 to 41 m (50 to 135 ft) throughout most of its range, including Napa County. The Knights Valley occurrence, in Sonoma County, was at 116 m (380 ft) (CNDDDB 2018).

Reproduction and Ecology: According to Patterson *et al.* (1994), 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. Each plant can produce up to 100 nutlets.

Nutlets of Sebastopol meadowfoam likely remain dormant in the soil, as has been noted in other species of *Limnanthes* (Patterson et al. 1994). For example, in the late 1980s and early 1990s, a site in Cotati remote from other Sebastopol meadowfoam occurrences was surveyed for several years by independent qualified botanists. None of these botanists identified flowering occurrences 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 (over enrichment by nutrients) 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.

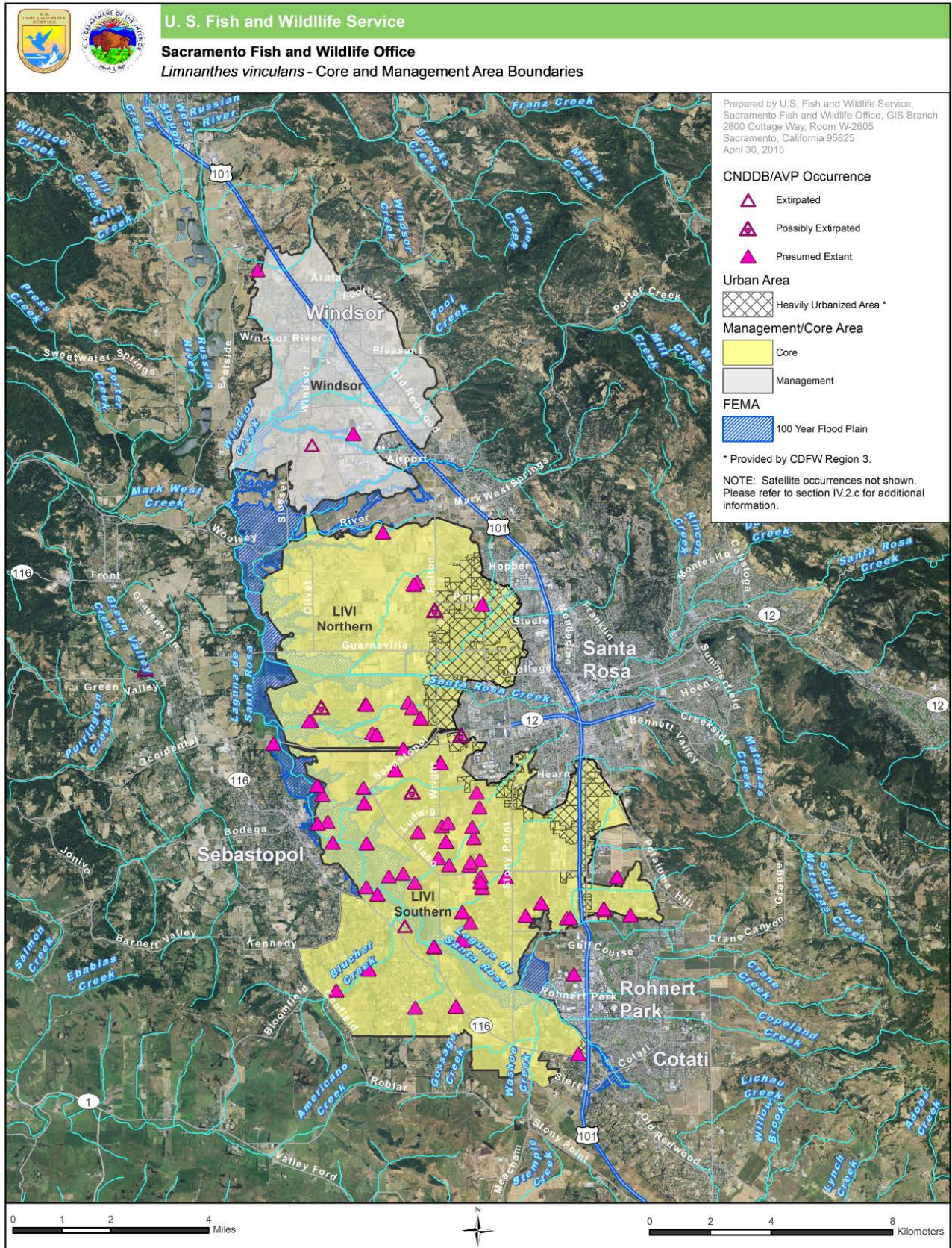
A study by Gilmore et al. (2012) found that Sebastopol meadowfoam was visited most frequently by Bombyliid flies in the genus *Conophorus*. Bee flies lay eggs near ground-nesting bees. Bee fly larvae are, depending on species, parasites of larvae of solitary bees and wasps, beetles, moths, grasshoppers, and other flies (Black et al. 2009). Two species of *Limnanthes* specialist bees, *Panurginus occidentalis* and *Andrena pulverea* (*A. limnanthis* in older literature), pollinate Sebastopol meadowfoam. *Andrena pulverea* survives drought years, when few meadowfoams reach flowering, by remaining inactive for 2 years or more (Thorp 1990). A variety of habitats including uplands, grasslands, and wetlands in the Santa Rosa Plain that support a diverse pollinator population and other flowering species for pollinators to visit are necessary for Sebastopol meadowfoam long term persistence.

Jain (1984) determined that the rate at which Sebastopol meadowfoam flowers were fertilized by pollen from other Sebastopol meadowfoam flowers rather than self-pollination (outcrossing rate) was 10 to 50 percent. Mechanisms for dispersal of nutlets in this species have not been studied. Likely dispersal agents include water (Wainwright 1984), birds, and livestock (Jain 1978). Jain (1978) studied dispersal of nutlets similar to those of Sebastopol meadowfoam in two species of meadowfoam, *L. bakeri* (Baker's meadowfoam) and *L. striata* (striped meadowfoam). Nutlets of *L. bakeri* did not disperse beyond the point where they were placed. Nutlets of *L. striata* moved a short distance within the same pool where they were placed but did not disperse to other pools (Hauptli *et al.* 1978, Jain 1978).

*Distribution:* The current status of numerous Sebastopol meadowfoam occurrences is unknown; however, the most current information for this species in the Recovery Plan (Service 2016) indicates that there are 33 occurrences of Sebastopol meadowfoam that are presumed extant on the Santa Rosa Plain of which at least 3 have been introduced and 5 occurrences that are extirpated or possibly extirpated (Figure 4).



Figure 4: Sebastopol Meadowfoam Distribution





Although many occurrences have been surveyed in recent years, several others have not been visited in over 20 years in part due to lack of access to the sites. Occurrences are distributed throughout the Santa Rosa Plain, but most are south of Santa Rosa Creek. As with the two other listed plants species, occurrences of Sebastopol meadowfoam can vary greatly in area and numbers of plants from year to year. In summary, Sebastopol meadowfoam inhabits the *Action Area* based on the recent observations, the biology and ecology of the species, and the presence of suitable habitat.

### **Sonoma Sunshine**

**Description:** Sonoma sunshine plants are less than 30 centimeters (cm) (11.8 inches (in)) tall with alternate, linear leaves (Ornduff 1977a, Baldwin 2012). The leaves have smooth margins and are 5.1 to 15.2 cm (2.0 to 6.0 in) long with zero to five lobes (Baldwin 2012).

From March to May, the plants have a butter-yellow, daisy-like flower head at the tip of each branch. Each flower head is less than 1.5 cm (0.6 in) across. The 6 to 15 outer petals are 5 to 7 millimeters (mm) (0.20 to 0.28 in) long. Occasionally the flowers may be white instead of yellow. The pollen is white.

The flowers produce tapered achenes (dry, one-seeded fruits) that are 3 to 4 mm (0.12 to 0.16 in) long and have 4 to 6 sharp angles along the sides. The achenes are covered with tiny bumps and become slimy when wet giving the species one of its common names, “Baker’s sticky seed” (Ornduff 1963, Munz and Keck 1968, Ornduff 1977a, Baldwin 2012).

**Taxonomy:** Sonoma sunshine is an annual plant in the aster family. It has been known by the scientific name Sonoma sunshine (Heiser) since it was first described by Heiser (1947). Two other species are recognized in the genus *Blennosperma*; *B. nanum* (dwarf blennosperma) grows in California and *B. chilense* (Chilean blennosperma) occurs in Chile (Baldwin 2012).

**Habitat:** Sonoma sunshine grows in vernal pools, the grassy margins of swales (shallow channels that connect vernal pools), and seasonally wet grasslands at elevations ranging from 21 to 43 m (70 to 140 ft) on the Santa Rosa Plain (Baldwin 2012, CNDDDB 2018). The vernal pools supporting Sonoma sunshine are of two types: northern hardpan (Sawyer and Keeler-Wolf 1995) and an unclassified type loosely referred to as northern vernal pools (Keeler-Wolf et al. 1998). On the Santa Rosa Plain, vernal pools and swales are found within valley oak woodlands and north coastal prairie grasslands (CH2M Hill 1995). Sonoma sunshine typically grows in shallow vernal pools, 30 to 50 cm (12 to 20 in) deep, and in swales (Patterson 1991, Patterson et al. 1994, CNDDDB 2018). It may occur in swale bottoms, but more commonly grows near the upper edges (margins) or high-water lines of vernal pools. This pattern could be due to competition or dispersal patterns. This species typically is more abundant in portions of vernal pools and swales which lack dense cover of nonnative plants, matted leaf litter, or algal mats.

Throughout its range, Sonoma sunshine occurs in vernal pools on nearly level to slightly sloping loams, clay loams, and clays. A clay or hardpan layer typically occurs 0.6 to 0.9 m (2 to 3 ft) below the surface and restricts downward movement of water (Service 1991). The two disjunct groupings of Sonoma sunshine occurrences on the Santa Rosa Plain occur on different soil types (Patterson et al. 1994). Sonoma sunshine primarily grows on Huichica loam north of Highway 12 and on Wright loam and Clear Lake clay south of Highway 12 (Patterson et al. 1994). Huichica loam is a fine-textured clay loam over buried, dense clay and cemented layers. Wright loam is a fine silty loam over buried, dense clay and marine sediments. Clear Lake clay is hard, dense clay extending downwards from the surface (Patterson et al. 1994).

*Reproduction and Ecology:* Sonoma sunshine is an annual; its entire life cycle from seed germination to seed set is completed in a single growing season. In nature, Sonoma sunshine seeds germinate in the fall following heavy rains, and the plants can grow even when submerged (Patterson *et al.* 1994). The specific conditions that trigger seed germination in nature are not known, but Sonoma sunshine seeds can germinate in as little as 3 days after wetting in the greenhouse. Seeds that were collected on the Santa Rosa Plain in 1989 and 1990, and maintained in cold storage, germinated readily when they were covered with a thin layer of soil and moistened (Mistretta *in litt.* 1991). A large percentage of seed (78 percent to 98 percent) germinated in such tests. This species usually blooms before other vernal pool plants such as *Limnanthes* spp. (meadowfoam), *Downingia* spp. (downingia), and *Lasthenia* spp. (goldfields) (Thorp and Leong 1998).

Sonoma sunshine typically flowers in March and April (Munz and Keck 1968, Ornduff 1977a) but has been observed in flower as early as December (Ashley and Waaland 1990) and as late as mid-May (Patterson *et al.* 1994). The achenes probably mature by early summer (May and June) as adult plants die, as is true for the closely related dwarf blennosperma (*B. nanum*) (Ornduff 1963). Dispersal mechanisms for the achenes have not been studied.

Like many other plants native to vernal wetlands, Sonoma sunshine likely forms a persistent soil seed bank. Small populations of Sonoma sunshine (those with fewer than 500 adult plants) are likely to remain dormant in the seed bank, and therefore undetected, during years of unfavorable conditions. For example, an occurrence located 5 miles south of El Verano in Sonoma Valley was considered to be extirpated in 2008; however, plants were observed at the site in 2011 and the occurrence is now considered extant (CNDDB 2018). Therefore, caution should be used before declaring that an occurrence of this species has been extirpated. The longevity of dormant Sonoma sunshine seeds is not known. In a seedbank study of Sonoma sunshine and Sebastopol meadowfoam by Sloop and Brown (2012a), Sonoma sunshine seed was found from the soil surface to a depth of 7.6 cm (3 in).

A pollinator study by Gilmore *et al.* (2012) showed that Sonoma sunshine has a diverse pollinator community due to the higher number of generalist native bees visiting the plants. A diverse pollinator community benefits a plant species by reducing the risk of insufficient pollination and seed set as a result of pollinator loss (Gilmore *in litt.*, 2014). The most abundant native pollinator of Sonoma sunshine was the solitary bee, *Andrena blennospermatis*. Solitary bees are mostly native bees that do not form colonies. Each female bee constructs its own nest most commonly in tunnels in the ground. Other pollinators that visited Sonoma sunshine included *Apis mellifera* (European honeybee), four species of generalist native bees, and syrphid flies. In the vernal pools that supported Sonoma sunshine, solitary bees were more abundant in natural vernal pools than in created pools (Gilmore *et al.* 2012). Syrphid flies (members of several genera in the family Syrphidae (hover flies) were also found to be an important part of the pollinator community for Sonoma sunshine (Gilmore *et al.* 2012). Syrphid fly primary habitats are those with flowering plants, leaf litter, and soil within grasslands, rangelands, and meadows with limited tilling. Specifically, adult primary habitat are places with flowering plants. Overwintering larvae, pupae, and adults are found in leaf litter and soil and the larvae are generalist predators that feed on aphids (Hopwood *et al.* 2016). A variety of habitats including uplands, grasslands, and wetlands in the Santa Rosa Plain that support a diverse pollinator population and other flowering species for pollinators to visit are necessary for Sonoma sunshine long term persistence.

Only certain aspects of the demography of Sonoma sunshine have been studied. The total number of achenes produced per plant varies because the number of flower heads is not consistent. Under dry conditions, or in dense populations, Sonoma sunshine may bear only a single flower head per plant (Patterson *et al.* 1994), thus producing a maximum of 15 achenes. However, when pools dry

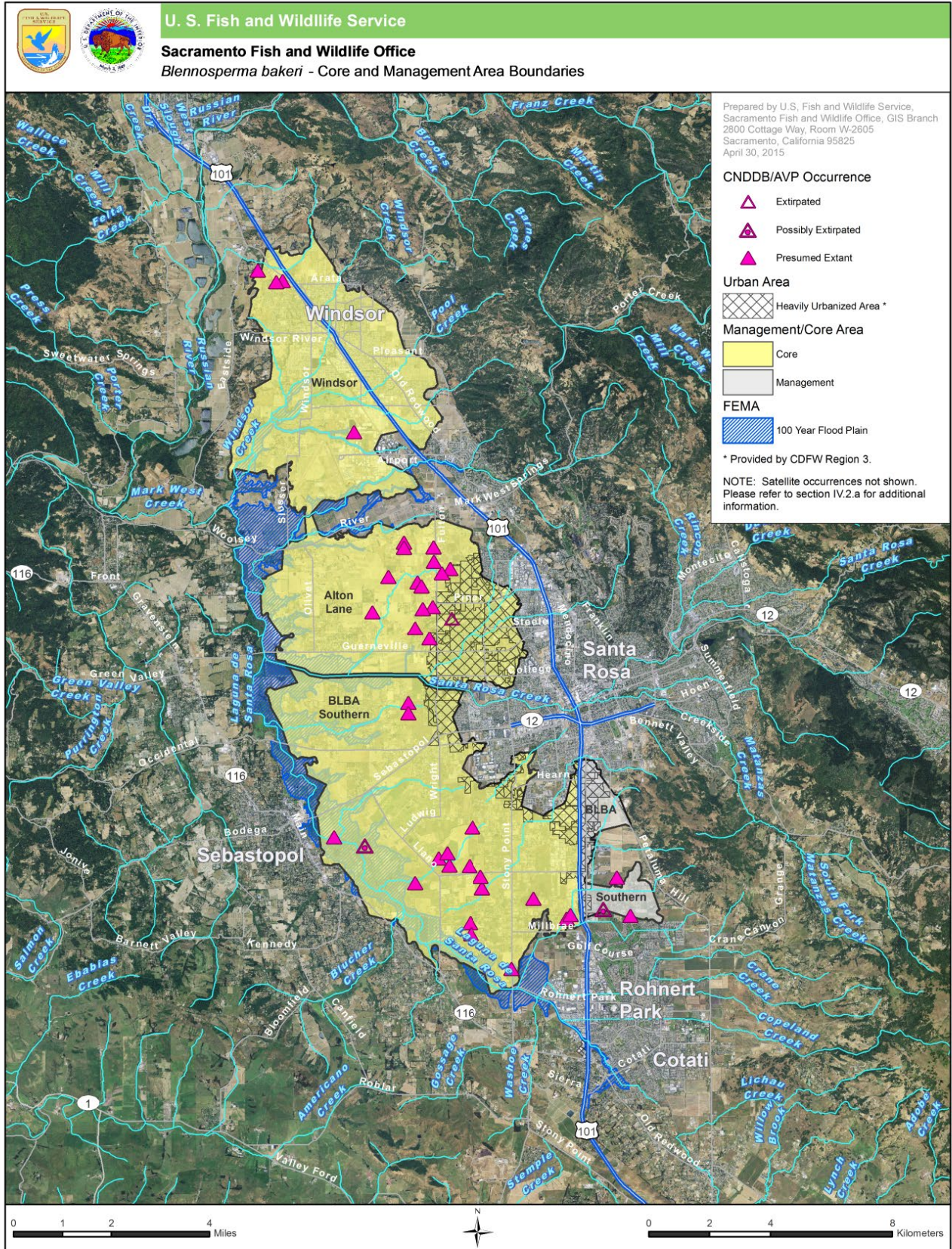
and fill repeatedly in a single growing season, each plant may produce as many as 20 flower heads (Patterson *et al.* 1994), with potential for 300 achenes per plant. Seed dispersal mechanisms are not known.

As an annual species, it is expected that Sonoma sunshine will respond to stochastic environmental events, such as changes in vegetative composition, climate, and disturbance, by partial germination of its seed bank. Baskin and Baskin (1998) indicate that species that are 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. Considering the adaptations of these plants to a variable Mediterranean climate, it is likely that the seed of Sonoma sunshine can persist in the seed bank for an undetermined number of years. Although formal studies of seed viability have not been conducted for this species, it is reasonable to expect its seed bank may persist for extended periods without germination until conditions are favorable to allow germination. Seeds of this species have been stored artificially for up to 6 years with little loss of viability, but those stored for 10 or more years have not germinated (Patterson *in litt.* 2000). The maximum duration of viable seed in the soil is not known, however, smaller seeds, such as those produced by Sonoma sunshine, tend to withstand longer periods of dormancy than larger seeds (Service 2016).

*Distribution:* Sonoma sunshine occurs only in Sonoma County with the majority on the Santa Rosa Plain. In the Santa Rosa Plain, the species ranges from near the community of Windsor in the north to Rohnert Park in the south. Sonoma sunshine has been introduced to at least 12 sites during mitigation activities or to establish conservation banks within the historical range of the species. The most current occurrence information for this species in the Recovery Plan (Service 2016) indicates the presence of 18 extant occurrences and five extirpated or possibly extirpated occurrences (Figure 5).



Figure 5: Sonoma Sunshine





Some occurrences have been fragmented into multiple locations. Populations exhibit extreme fluctuations in size among years, often varying by one or two orders of magnitude (CNDDDB 2018). Individual occurrence sizes ranged over time from fewer than 100 plants to more than 1.5 million plants (CNDDDB 2018). Collection of annual abundance data has been sporadic; therefore, determination of population trends is difficult.

### **Status and Environmental Baseline of Sonoma California Tiger Salamander Critical Habitat**

The Service published a notice in the Federal Register to propose critical habitat for the Sonoma County California tiger salamander DPS (Service 2009). On August 31, 2011, approximately 47,383 acres were designated as critical habitat (Service 2011). Approximately 252 acres of Graton Rancheria trust lands were excluded based on the benefits of a finalized management plan that provides for the long-term protection of Sonoma California tiger salamander habitat. Approximately 42,041 acres of designated critical habitat are within the *Action Area* (Figure 1).

Critical habitat is defined in Section 3 of the Act as: (1) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (a) essential to the conservation of the species and (b) that may require special management considerations or protection and; (2) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. In determining which areas to designate as critical habitat, the Service considers those physical and biological features that are essential to a species' conservation and that may require special management considerations or protection (50 CFR 424.12(b)). The Service is required to list the known PCEs together with the critical habitat description. Such physical and biological features include, but are not limited to, the following: (1) space for individual and population growth, and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, rearing of offspring, or dispersal and; (5) generally, habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

Based on the above needs and our current knowledge of the life history, biology, and ecology of the species, and the habitat requirements for sustaining the essential life-history functions of the species, the Service determined that the following PCEs are essential to the conservation of the Sonoma County California tiger salamander:

- PCE 1: standing bodies of fresh water (including natural and manmade (e.g., stock) ponds, vernal pools and other ephemeral or permanent water bodies that typically support inundation during winter/early spring and hold water for a minimum of 12 consecutive weeks in a year of average rainfall);
- PCE 2: upland habitats adjacent and accessible to and from breeding ponds that contain small mammal burrows or other underground refugia that Sonoma County California tiger salamanders depend upon for food, shelter, and protection from the elements and predation; and
- PCE 3: accessible upland dispersal habitat between occupied locations that allow for movement between such sites.

A single unit was designated as critical habitat for the Sonoma County California tiger salamander (Service 2011). The Santa Rosa Plains Unit is located in Central Sonoma County and contains approximately 47,383 acres, which includes 745 acres of state lands, 744 acres of city lands, 498 acres of county lands, 9 acres of individually owned tribal trust land, and 45,387 acres of private lands. No federal lands were included in this unit. The unit is partially bordered on the west by the generalized eastern boundary of the 100-year Laguna de Santa Rosa floodplain, on the southwest by Hensley Road, on the south by Pepper Road (northwest of Petaluma), on the east generally by and near Petaluma Hill Road or by the urban centers of Santa Rosa and Rohnert Park, and on the north by the Town of Windsor. A segment of the 100-year floodplain that is located between the Stony Point Conservation Area (near Wilfred Avenue) and the Northwest Cotati Conservation Area (near Nahmens Road) is included within the final designation to prevent fragmentation of the northern and southern breeding concentrations within the unit, by allowing for potential dispersal and genetic exchange. Designated critical habitat excludes the urbanized centers of Santa Rosa, Bennett Valley, Rohnert Park, and Cotati. These urban centers consist almost exclusively of hardened, developed landscapes. The remnant natural habitat within these areas is limited to small, isolated parcels within a matrix of urban development. These areas are not included in the final rule because developed areas (lands covered by buildings, pavement, and other structures) lack the physical or biological features essential to the conservation of the species, according to section 3(5)(A) of the Act. We also do not consider the remnant open space within these city centers as essential for the conservation of the Sonoma County California tiger salamander. However some of these areas have been left inside the critical habitat boundaries shown on the maps of the final rule due to the mapping, but have been excluded by text in the final rule, and are not designated as critical habitat. This includes approximately 636 acres east of Stony Point Road and following the urban growth boundary east along Bellevue Avenue and south along Juniper Avenue to the intersection of Scenic Avenue and Highway 101.

The recovery role of critical habitat in the *Action Area* includes opportunities for providing suitable aquatic and upland habitat that supports one or more life stages of the Sonoma County California tiger salamander. With the designation of critical habitat, the Service intends to conserve the geographic areas containing the physical and biological features that are essential to the conservation of the species, through the identification of the appropriate quantity and spatial arrangement of the PCEs sufficient to support the life-history functions of the species. Not all life-history functions require all the PCEs and not all areas designated as critical habitat will contain all the PCEs. Refer to the final designation of critical habitat for Sonoma County California tiger salamander for additional information.

The *Action Area* includes the Santa Rosa Plains Unit for the Sonoma DPS of the California tiger salamander. The critical habitat unit was known to be occupied by Sonoma County California tiger salamanders at the time of listing. This unit is currently occupied by, and contains the following aquatic and associated upland features that are essential for the conservation of the species: vernal pool complexes and manmade ponds that are currently known to support breeding Sonoma County California tiger salamanders (PCE 1), upland habitats with underground refugia (PCE 2), and upland dispersal habitat allowing movement between occupied sites (PCE 3). Some areas already have anthropogenic stressors associated with intensive agricultural uses such as vineyards, urban and rural development, or disking for fire prevention. Approximately 1,418 acres of Preserves exist within designated critical habitat.

**Effects of the Action**

Adverse effects to the Sonoma County California tiger salamander and its critical habitat, and to Burke's goldfields, Sebastopol meadowfoam and Sonoma sunshine are expected to be caused primarily from urbanization related projects such as developing homes, industrial units, roads, and infrastructure. Project(s) appended to this programmatic biological opinion must adhere to the conservation measures described in the *Description of the Action* and are anticipated to protect and conserve the Sonoma County California tiger salamander, Burke's goldfields, Sebastopol meadowfoam and Sonoma sunshine.

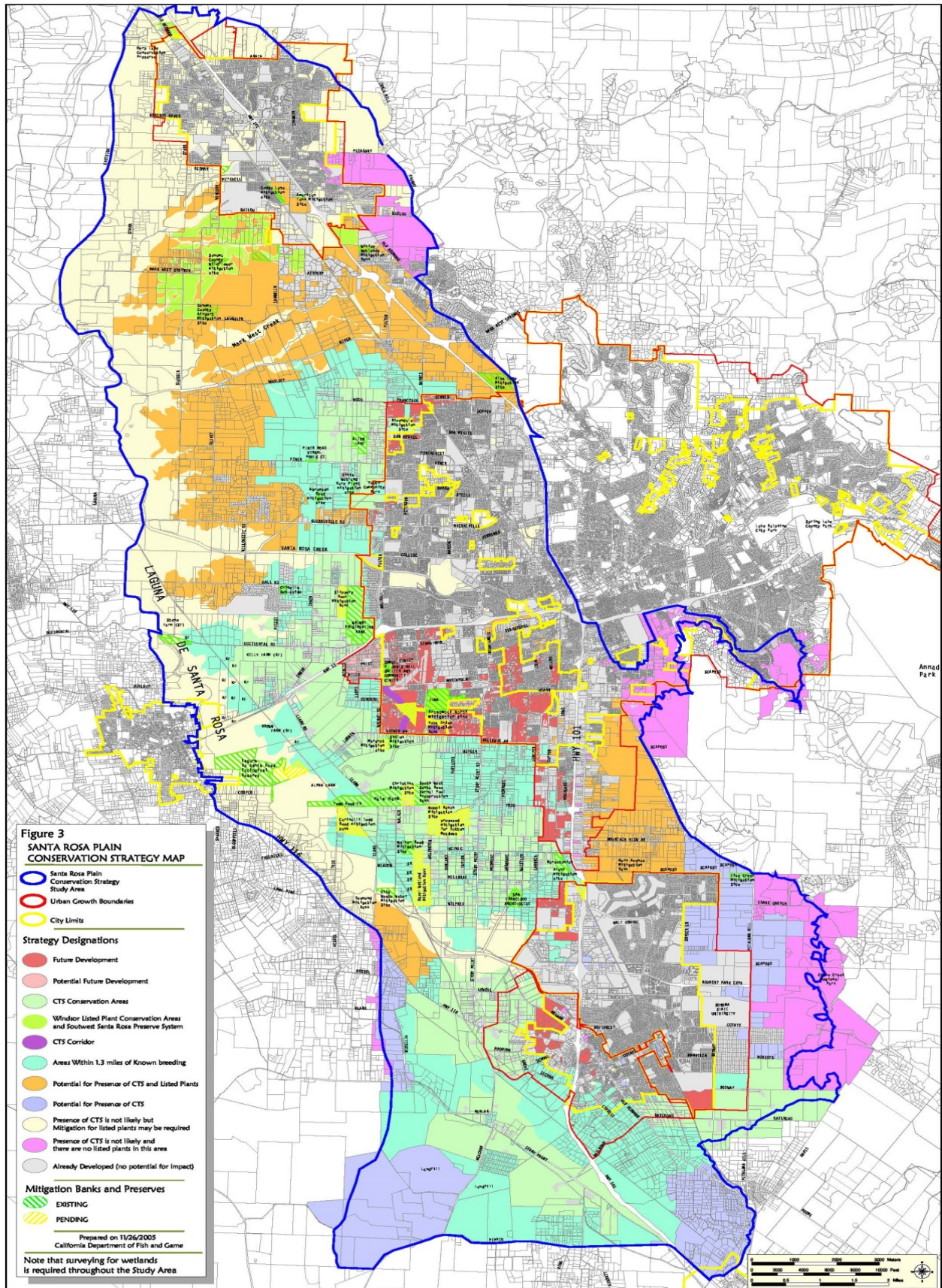
**Effects to Sonoma County California Tiger Salamander**

*Effects of the action* are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

Sonoma County California tiger salamanders within the Action Area of each project appended to this biological opinion will be subject to injury and death due to project activities. The majority of projects that adversely affect Sonoma County California tiger salamander and its habitat will likely be within the urban growth boundaries of the Cities of Santa Rosa, Cotati and Rohnert Park (Table 1 and Figure 6) (Conservation Strategy Team 2005). Some smaller projects may occur outside of the urban growth boundaries (Figure 6) within the Action Area due to rural residential, road, and other miscellaneous projects within Sonoma County jurisdiction. The area in which Sonoma County California tiger salamanders will be subject to injury and death is approximately 1,541 acres in Santa Rosa, 203 acres in Cotati, 203 acres in Rohnert Park, and 27 acres in the Town of Windsor.



Figure 6: Santa Rosa Plain Conservation Strategy Map





### Injury and Mortality of Individuals

*Ground Disturbance and Construction:* Ground disturbance and construction activities associated with developing homes, industrial units, roads, and infrastructure will cause temporary and permanent loss of water bodies utilized by the species for breeding and maturation of larvae to metamorphs capable of living in the uplands, and also cause a loss of upland habitat used for dispersal, refugia, and foraging. Sonoma County California tiger salamanders that are using small mammal burrows or cracks in the soil within the construction footprint of the proposed action, are likely to be injured or killed during grading and ground compaction activities as burrows are crushed or as inhabitants of burrows are entombed or crushed. Sonoma County California tiger salamanders may be killed or injured from inadvertent trampling by workers and operation of construction equipment during construction activities. Construction activities will cause noise and vibration and will disturb Sonoma County California tiger salamanders causing them to leave their upland refugia and increase their exposure to desiccation and predation. Sonoma County California tiger salamanders will on occasion become trapped in open excavations or construction trenches, making them vulnerable to desiccation, starvation, and predation. While these effects are reasonably likely, they will be minimized by the conservation measures described in the *Minimization Measures and Best Management Practices* section above.

*Roads:* After initial ground disturbance for widening or building new roads, injury and mortality will occur when Sonoma County California tiger salamander attempt to cross new or widened roads during dispersal and migration in the fall and winter. Injury and mortality is expected to increase as a result of increased traffic. Road widening, new roads, or the placement of curbs at road edges, and constructed barriers within medians and along roadways which impede salamander movement will cause individuals more vulnerable to being run over by a vehicle (D. Cook, in literature, 2009). Injury and mortality of Sonoma California tiger salamander on roads in the Santa Rosa Plain is well documented (Cook 2008). Wildlife passages constructed as a minimization measure for some authorized projects will provide for movement of Sonoma County California tiger salamanders across roads, highways, or other anthropogenic barriers and will allow individuals to disperse into upland refugia and breeding habitat preventing road strikes (Cook 2008, Baine et. al. 2017).

*Exposure to Contaminants:* The construction of buildings and roadways, as well as the repair and use of roadways can expose Sonoma County California tiger salamanders to chemical contaminants. Substances used in road building materials or to recondition roads can drift or wash off into nearby habitat. Vehicles may leak hazardous substances such as motor oil and antifreeze. Sonoma California tiger salamanders may come into contact with these substances while migrating. Sonoma California tiger salamanders will absorb these contaminants through their skin, causing sickness and death, reducing fitness for the local population. Implementation of conservation measures related to managing stormwater runoff, fueling, storage of hazardous materials; having a spill containment plan in place; and informing project personnel of the importance of these measures, will reduce the potential for adverse effects from contaminants.

### Habitat Loss, Degradation and Fragmentation

*Ground Disturbance and Construction:* Ground disturbance and construction activities associated with developing homes, industrial units, roads, and infrastructure in the Santa Rosa Plain will fill in, modify, and degrade wetlands causing permanent losses of wetlands utilized by the species for breeding and maturation of larvae to metamorphs. Grading within uplands and subsequent construction of homes, industrial units, roads, and infrastructure will cause a loss of upland habitat used for dispersal, refugia, and foraging. Much of the permitted housing development projects in recent years have been within the urban growth boundary of Santa Rosa and we expect a similar

trend in the next 5 to 10 years. Development will likely be a combination of infill projects causing a varied mix of habitat loss, degradation and fragmentation as the area within the urban growth boundary becomes built out. Sonoma County California tiger salamander habitat loss is estimated at approximately 1,541 acres in Santa Rosa, 203 acres in Cotati, 203 acres in Rohnert Park, 27 acres in the Town of Windsor in an area that has various levels of fragmented and isolated habitat. Some projects causing habitat loss may be authorized to occur outside of the urban growth boundaries and are not expected to compromise contiguous land with Sonoma County California tiger salamander wetland and upland habitat.

*Homes, Industrial Units, Roads, and Infrastructure:* Habitat fragmentation is an effect of habitat loss and occurs when remaining populations are isolated because the links between habitat patches have been destroyed. Habitat fragmentation also plays a role in reducing Sonoma County California tiger salamander abundances. California tiger salamanders require a large amount of barrier-free landscape for successful migration (Shaffer *et al.* 1993; Loredó *et al.* 1996). Urbanization can create permanent barriers that can isolate California tiger salamanders and prevent them from moving to new breeding habitat, or prevent them from returning to their breeding ponds or underground burrow sites. Roads and highways also create permanent physical obstacles and increase habitat fragmentation (Service 2003).

Permitted homes, industrial units, roads, and infrastructure will form barriers between habitats preventing Sonoma County California tiger salamander individuals from dispersing and migrating successfully to breeding wetlands. The effect will likely reduce breeding success in isolated breeding sites and prevent recolonization of those breeding sites from migrating salamanders. This will drive local populations to extinction and may happen within a short amount of time. One example is the Southwest Community Park breeding pool that is now surrounded by housing development and separated from uplands within dispersal distance. These factors can quickly drive a local population to extinction (Service 2016). Large, contiguous vernal pool complexes containing multiple breeding ponds are ideal to ensure that recolonization occurs at individual pond sites (Shaffer *et al.* 1993). We expect most of the wetland and upland habitat loss and fragmentation to be within the urban growth boundaries where the species is not likely to have viable populations in a long time period; however, some projects may occur outside of the urban growth boundaries.

Wildlife passages constructed as a minimization measure will provide for safer movement of Sonoma County California tiger salamanders across roads, highways, or other anthropogenic barriers. Although the method is experimental to date and adapted to the topography and other infrastructure constraints, they will allow individuals to disperse between upland and breeding habitat that would otherwise succumb to vehicle strikes (Cook 2008, Baine *et al.* 2017). Improved movement of Sonoma County California tiger salamanders in some places will reduce the risk for local extirpation and allow for recolonization of habitat where breeding pools may only produce progeny in above average rainfall years.

Applicants for projects that will be appended to this programmatic biological opinion will purchase credits from conservation banks to minimize the effects of their projects. Conservation banks contain vernal pools, upland, and dispersal habitat. We expect using conservation banks to protect listed species and their habitat to have beneficial effects to the Sonoma County California tiger salamander. Conservation banks are protected with conservation easements, management plans, and endowments to protect and manage Sonoma County California tiger salamanders and their habitat in perpetuity. Conservation banks help establish essential connectivity, reduce fragmentation, and buffer against encroaching development. The wetland and upland habitat at conservation banks are protected and managed in perpetuity, eliminating many threats to the species. Conservation will improve protection for the Sonoma County California tiger salamander and habitats, improve

habitat quality, maintain or increase breeding and population size, increase extent of contiguous habitat, and increase connectivity between occupied areas. Implementation of management plans at Conservation Banks will ensure conservation values are maintained to provide optimal habitat conditions for the Sonoma County California tiger salamander over time as environmental conditions vary. Conservation banks are located in the Santa Rosa Plain and will help maintain the current geographic, elevational, and ecological distribution of the Sonoma County California tiger salamander, all goals of the Recovery Plan. Up to 3,519 acres of conservation banks will be protected in perpetuity within Sonoma County California tiger salamander habitat if full build out occurs within the urban growth boundaries as summarized in Table 1.

### **Effects to Critical Habitat for the Sonoma County California Tiger Salamander**

The *Action Area* encompasses 41,045 acres (42,041 acres minus 636 acres) of Sonoma County California tiger salamander designated critical habitat. Approximately 636 acres in the urban growth boundary of Southwest Santa Rosa are not designated critical habitat as described in the *Status and Environmental Baseline of Sonoma California Tiger Salamander Critical Habitat* section above.

Implementation of development projects appended to this programmatic biological opinion will destroy, alter, fragment, and degrade up to 1,912 acres of designated Sonoma County California tiger salamander critical habitat within the *Action Area* comprised of a combination of PCE 1, PCE 2, and PCE 3. Therefore, approximately 39,133 acres of the 41,045 designated critical habitat within the *Action Area* will not be affected by projects appended to this programmatic biological opinion.

Sonoma County California tiger salamanders require both aquatic and terrestrial environments and migrate between the two habitat types. Grading and construction of homes, industrial units, roads, and infrastructure will fill, destroy, and modify vernal pools and manmade ponds that support breeding Sonoma California tiger salamanders (PCE1). The function of breeding habitat will be lost and unavailable to salamanders migrating in search of breeding habitat during the rainy season when wetlands typically fill up with rainwater. Grading land and constructing homes, industrial units, roads, and infrastructure will modify and remove upland habitats with underground salamander refugia (PCE 2) and upland habitat allowing salamander movement between occupied sites (PCE 3). New homes, industrial units, roads, and infrastructure will create new barriers to movement of Sonoma California tiger salamanders between these aquatic and terrestrial habitats. Isolation and fragmentation of the aquatic and upland habitats will reduce the recovery role of critical habitat that normally support the life stages of the Sonoma County California tiger salamander.

These adverse effects to critical habitat functions will primarily occur within the urban growth boundaries of Cotati, Rohnert Park, Santa Rosa, and Windsor where the habitat is currently more fragmented and subject to various anthropogenic stressors associated with residential and commercial activities. The development impacts associated primarily with houses and commercial buildings are likely to reduce the function and conservation value of the affected critical habitat by removing up to 1,912 acres of PCE's 1, 2, and 3. Some small development projects outside of the urban growth boundaries within Sonoma County may be appended to this programmatic biological opinion. Some of these areas already have anthropogenic stressors associated with intensive agricultural uses such as vineyards, rural development, or disking used in agriculture. Additional similar new activities may be appended to this programmatic biological opinion during the 10 (ten) year timeframe of this programmatic biological opinion. The conservation value of critical habitat will remain largely intact in the remaining 39,133 acres where the landscape is much more contiguous with open space, rural and pasture land, and conservation banks.

Similar to development projects that will potentially be appended to this programmatic biological opinion, approximately up to 3,519 acres of conservation banks will be established and protected in perpetuity within designated critical habitat of the Sonoma County California tiger salamander. These areas will have a combination of created, restored, or preserved aquatic breeding (PCE 1), upland refugia (PCE 2), and upland dispersal (PCE 3) habitat within land that is much more contiguous than the land within the urban growth boundaries of Cotati, Rohnert Park, Santa Rosa, and Windsor. Sonoma County California tiger salamander Preserves will contain vernal pools, upland refugia, and upland dispersal habitat to sustain populations of this species. The conservation banks will ensure preservation, enhancement, and management of the primary constituent elements. These conservation banks will assist in conserving contiguous habitat and linkages to other conserved areas for the Sonoma County California tiger salamander. The conservation will be in areas with reduced land use conflicts where the species can persist. These conservation banks are likely to enhance the conservation value of critical habitat in a highly beneficial manner by protecting critical habitat from any future development or incompatible activities. The protected critical habitat will be managed to benefit populations of the Sonoma County California tiger salamander. The location of new conservation banks will be strategically located adjacent or as close as possible to existing conservation banks to have the most impactful positive value to critical habitat as possible.

### **Effects to Burke's Goldfields, Sebastopol Meadowfoam, and Sonoma Sunshine**

We expect the majority of projects to be within the urban growth boundaries of the Cities of Santa Rosa, Cotati and Rohnert Park (Figure 6) (Conservation Strategy Team 2005). They will consist of filling wetlands with suitable habitat and modifying or removing adjacent uplands to build homes, industrial units, roads, and infrastructure. Some smaller projects involving wetland fill and modification/loss of adjacent uplands may occur outside of the urban growth boundaries (Figure 6) within the *Action Area* due to rural residential, road, and other miscellaneous projects within Sonoma County jurisdiction.

#### *Fill of Wetlands and Modification/Loss of Adjacent Uplands*

Development projects will permanently fill Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine suitable habitat with soil, concrete, pavement and buildings resulting in a decrease in numbers, reproduction potential, and distribution of these species. The destruction or ground disturbance of surrounding uplands will destroy or remove habitat for pollinator species that nest in the ground. This effect could result in reduced seed production of Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine to other occupied wetlands within pollinator's dispersal distance.

We expect projects analyzed under this programmatic biological opinion may cause additional fragmentation and edge effects such as disking land to remove vegetation for fire prevention and off-road vehicle use. Disking can move soil into wetlands and make them shallower especially after repeated treatments. Fragmentation can make it more difficult for pollinators to find flowering plants or adversely affect hydrology between pools as further discussed below.

#### *Alteration of Hydrology*

Grading and ground disturbance to build homes, industrial facilities, and other structures will cut off or alter hydrology of nearby wetlands that may have a seed bank (whether increasing or decreasing). Disking can also change natural wetland hydrology. These types of disturbances can have cascading effects on the habitat and species because vernal pool plants are sensitive to variations in the timing and duration of vernal pool inundations (Bauder 2000). Repeated drying and filling of pools in the

spring favors development of Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine. It is expected that disruption of connectivity between pools and destruction of hardpan will reduce pool inundation capabilities making the habitat unsuitable for seed germination and development. These effects are expected to occur where projects sites have wetland complexes that continue onto adjacent parcels.

It is also expected that created berms, walls, homes, and altered hydrology will in some cases cause seasonal wetlands to fill for extended periods of time during spring and summer months, which is typically not favorable to these vernal pool species. Extended inundation conditions will be favorable to plant species adapted to longer inundation periods and outcompete annual vernal pool plants.

Fill of Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine suitable habitat will occur within an area of approximately 1,541 acres in Santa Rosa, 203 acres in Cotati, 203 acres in Rohnert Park, and 27 acres in the Town of Windsor (Table 1). The amount of wetlands with suitable habitat will be assessed and determined on a project-by-project site basis.

### *Conservation Measures*

Applicants will purchase credits from conservation banks to minimize the effects of their projects. We expect using conservation banks to protect listed species and their habitat to have net beneficial effects for all these listed plant species. Conservation banks are protected with conservation easements, management plans, and endowments to protect and manage Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine and their habitat in perpetuity. The conservation banks have habitat of sufficient size with wetland habitat and uplands suitable for pollinators, provide connectivity to other Preserves and reduce the current threat of fragmentation. Conservation banks protect Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine and will provide future opportunities for replication. Implementation of management plans at Conservation Banks will ensure conservation values are maintained to provide optimal habitat conditions for Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine over time as environmental conditions vary. Conservation banks are located in the Santa Rosa Plain and will help maintain the current geographic, elevational, and ecological distribution of these species, all goals of the Recovery Plan.

### **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* are considered in this programmatic biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section; they require separate consultation pursuant to Section 7 of the Act. Seasonal wetlands are extensive in the Santa Rosa Plain and receives around 30 inches of rain during the rainy season. Most projects are likely to require a Corps permit and thus will have a federal nexus for consultation under Section 7 of the Act. However, an undetermined amount of future land use conversions and intensive and routine agricultural practices frequently are not reviewed for environmental compliance under the federal permitting process. It is expected that some new intensive agriculture including vineyard, row crops, cannabis grows, recycled water spray irrigation, and their infrastructure will occur within the *Action Area*. These activities are reasonably certain to occur in the future because they are ongoing.

### **Cumulative Effects to Sonoma County California Tiger Salamander**

Cumulative effects to the Sonoma County California tiger salamander include conversion of breeding, foraging, sheltering, and dispersal habitat to human land uses such as vineyard, row crops, and cannabis grows. Approximately 40 acres of habitat have been adversely affected by cannabis activities over the last few years. Some methods to convert habitat may include clearing, grubbing, plowing, disking, or tilling with mechanical equipment. The mechanical equipment and soil movement and compaction will injure and kill adults and juveniles taking refuge underground such as in gopher burrows, other rodent holes, or soil desiccation cracks. The loss of enough individuals in an area will cause local extirpation depending on the ability for surviving individuals to disperse overland to breeding habitat and reproduce. The loss of any breeding habitat can have a significant effect on a population depending on the availability of other accessible breeding habitat for migrating adults in search of breeding habitat.

These intensive agriculture activities, their infrastructure and land management in the uplands or non-jurisdictional Corps wetlands will indirectly affect Sonoma California tiger salamanders. They will (1) reduce and fragment Sonoma California tiger salamander habitat; (2) interfere with the ability of salamanders to travel the distances necessary to reach breeding or upland habitat while rain or moisture conditions are suitable; (3) remove and reduce breeding habitat; (4) expose animals to potentially toxic levels of fertilizers, pesticides, fungicides, and herbicides; (5) reduce small mammal and their burrows that provide shelter; and (6) increase Sonoma County California tiger salamanders' susceptibility to predators and human activities.

Because the majority of existing vineyards are within the Alton Lane Management Area, we expect most new vineyards will occur within the Alton Lane Management Area. Sonoma California tiger salamanders have not been studied to determine the extent that individuals or populations persist in or near vineyards in the Santa Rosa Plain. Conversion of rural lands to vineyards can include creating permanent wetlands that are more suitable for bullfrogs, fish, and the eastern tiger salamander. If populations of these aquatic non-native species become established, they will negatively affect the Sonoma County California tiger salamander through predation and hybridization with the non-native eastern tiger salamander. Hybridization between the eastern tiger salamander is of great concern and can contaminate the native gene pool if eastern tiger salamanders reach populations in any of the Core Areas.

Recycled water spray irrigation is also anticipated to increase to some extent within breeding, foraging, sheltering, and dispersal habitat. This activity will modify the behavior of California tiger salamanders by spraying water in the dry summer months. The extent of the effects are not well understood and has not been studied, however, Sonoma County California tiger salamanders have been observed above ground in the uplands after the application of spraying for dust control when wetlands were being created at an established conservation bank. This will make individuals susceptible to desiccation, predation, or anthropogenic stressors if tiger salamanders emerge from their refugia during the hot summer months.

### **Cumulative Effects to Sonoma County California Tiger Salamander Critical Habitat**

Cumulative effects to the Sonoma County California tiger salamander critical habitat include conversion of the PCE's 1, 2, and 3 to human land uses such as vineyard, row crops, and cannabis grows. Some methods to convert critical habitat may include clearing, grubbing, plowing, disking, or tilling with mechanical equipment. Conversion to these intensive agricultural uses will also destroy critical habitat where supporting structures and infrastructure are built. Since these effects will occur

absent of a federal nexus, we expect most of the effects to occur to PCE's 2 and 3. However, illegal cannabis grows are reasonably certain to adversely affect PCE 1, 2, and 3.

Because the majority of existing vineyards are within the Alton Lane Management Area, we expect most new vineyards will occur primarily within the Alton Lane Management Area.

Cannabis grows have been observed in most areas of the Santa Rosa Plain but are more frequently within the Llano Crescent – Stony Point Core Recovery Area of the Santa Rosa Plain Recovery Plan. Therefore, we expect the majority of future cannabis grows to occur within this area, although they will also likely continue to occur throughout the *Action Area*. We expect that a combination of education and enforcement efforts from the local and state jurisdictions will reduce the amount and frequency of adverse effects from cannabis grows.

### **Cumulative Effects to Burke's goldfields, Sebastopol meadowfoam and Sonoma sunshine**

Cumulative effects to Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine include conversion of suitable habitat and pollinator habitat to human land uses such as vineyard, row crops, and cannabis grows. Some methods to convert suitable habitat may include clearing, grubbing, plowing, disking, or tilling with mechanical equipment. The mechanical equipment and soil movement and compaction will modify or destroy suitable habitat and pollinator habitat. Plowing, disking, or tilling in areas where there is a seed bank will distribute seed at varying depths in the soil. Seed buried in deeper soil will either not germinate as readily or at all; however research is needed to better understand the depth and soil conditions these species can tolerate.

Recycled water spray irrigation is also anticipated to continue within suitable habitat and pollinator habitat. This activity will modify the normal hydroperiod and create conditions more favorable to non-native vegetation that outcompete these endangered plants. 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).

## **Conclusion**

### **Sonoma County California tiger salamander, Burke's goldfields, Sebastopol meadowfoam and Sonoma sunshine**

After reviewing the current status of the Sonoma County California tiger salamander, Burke's goldfields, Sebastopol meadowfoam and Sonoma sunshine, the environmental baseline for the *Action Area*, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that projects which meet the qualifications for this programmatic biological opinion are not likely to jeopardize the continued existence of these listed species. The Service reached this conclusion because the project-related effects to the species, when added to the environmental baseline and analyzed in consideration of all potential cumulative effects, will not rise to the level of precluding recovery or reducing the likelihood of survival of the species based on the following: (1) Numerous conservation measures will be implemented to minimize adverse effects to the Sonoma County California tiger salamander, Burke's goldfields, Sebastopol meadowfoam and Sonoma sunshine; (2) the conservation banks are protected with conservation easements and include implementation of management plans that ensure conservation values will be maintained and provide optimal habitat conditions for Sonoma County California tiger salamander, Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine; (3) purchase of credits at conservation banks for Burke's goldfields, Sebastopol meadowfoam, and Sonoma sunshine suitable habitat will protect and manage native and established occurrences providing future opportunities for

replication which is important for recovery; and (4) implementing the conservation ensures more occupied habitat will be conserved than affected and we expect that the amount protected will ensure that issuance of Corps permits does not preclude the ability to meet the preservation goals in the Conservation Strategy and ensure these species will persist and maintain their current geographic distribution and maintain or increase reproduction and numbers.

### **Sonoma California Tiger Salamander Critical Habitat**

After reviewing the current status of designated critical habitat for the Sonoma County California tiger salamander, the environmental baseline for the *Action Area*, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that projects which meet the qualifications for this programmatic biological opinion are not likely to destroy or adversely modify designated critical habitat. The Service reached this conclusion because the project-related effects to the designated critical habitat, when added to the environmental baseline and analyzed in consideration of all potential cumulative effects, will not rise to the level of precluding the function of the Sonoma County California tiger salamander critical habitat to serve its intended conservation role for the species based on the following: (1) Approximately 40,129 acres of the 42,041 designated critical habitat within the *Action Area* will remain after 1,912 acres of designated critical habitat will be destroyed, altered, degraded, or further fragmented; and (2) up to 3,519 acres of designated critical habitat will be protected in perpetuity and managed to benefit the Sonoma County California tiger salamander habitat. The effects to Sonoma County California tiger salamander critical habitat are not expected to appreciably diminish the value of the critical habitat or prevent it from sustaining its role in the conservation of the Sonoma County California tiger salamander.

### **PROGRAMMATIC INCIDENTAL TAKE STATEMENT**

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by FWS regulations at 50 CFR 17.3 as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the same regulations as an act which actually kills or injures wildlife. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior 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 the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps via the applicant must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].



Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage of such plants on areas under federal jurisdiction, or the destruction of endangered plants on non-federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law.

### **Amount or Extent of Take**

#### *Sonoma County California tiger salamander*

The specific amount or extent of incidental take of the Sonoma County California tiger salamander is unquantifiable at this time because this consultation has analyzed the proposed action at a programmatic level. The Corps will submit individual projects to the Service for specific review and analysis by the Service. If appropriate, incidental take will be authorized upon appendage of the specific project to this programmatic biological opinion. No exemption from section 9 of the Act is granted in this programmatic biological opinion.

### **Effect of the Take**

No incidental take is authorized by this programmatic biological opinion for the Sonoma County California tiger salamander.

### **Reasonable and Prudent Measures**

1. The Corps shall request appropriate specific projects permit actions that may adversely affect the Sonoma County California tiger salamander be appended to this programmatic biological opinion.
2. The Corps shall minimize adverse effects to the Sonoma County California tiger salamander by authorizing the permittee to implement the project description as described with the additional terms and conditions below.

### **Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must ensure compliance with the following term and condition, which implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

1. The following Term and Condition implements Reasonable and Prudent Measure One (1):
  - a. The Corps shall ensure each project permit action submitted for appendage to this programmatic biological opinion meets the conditions and requirements in the project description of this document.
2. The following Term and Condition implements Reasonable and Prudent Measure two (2):
  - a. The Corps shall include full implementation and adherence to the conservation measures as a condition of any permit issued for appended projects.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of programmatic incidental take that might otherwise result from the

proposed action. If, during the course of a project appended to this programmatic biological opinion, the level of incidental take described for the Sonoma County California tiger salamander is exceeded, such incidental take represents new information requiring review of the project, and, if appropriate, reinitiation of programmatic consultation and review of the reasonable and prudent measures provided. The Corps must provide an explanation of the causes of the take as soon as possible and review with the Service the need for possible review of the project, or modification of the reasonable and prudent measures.

#### Monitoring and Reporting Requirements:

In order to monitor whether the amount or extent of incidental take anticipated from implementation of the project is approached or exceeded, the Corps shall adhere to the following reporting requirements. Should this anticipated amount or extent of incidental take be exceeded, the Corps must immediately reinitiate formal consultation as per 50 CFR 402.16.

- a. For each project appended to this programmatic biological opinion that will result in habitat degradation or modification whereby incidental take in the form of harm is anticipated, the Corps via the applicant's Service-approved biologist(s) will provide prompt updates to the Service with an accounting of the total acreage of habitat impacted by the project appended to this programmatic biological opinion. The total acreage of habitat impacted by the project shall be compared to the acreage authorized in the Corps permit(s) and appendage to this programmatic biological opinion. The Corps will provide annual updates to the Service with an accounting of the total acreage of habitat impacted by the projects appended to this programmatic biological opinion.
- b. For each project appended to this programmatic biological opinion that may result in direct encounters between listed species and project workers and their equipment whereby incidental take in the form of harm, injury, or death is anticipated, the Corps via the applicant's Service-approved biologist(s) shall report the encounter(s) as described in the *Description of the Proposed Action* section. If encounter occurs after normal working hours, the Corps shall contact the SFWO at the earliest possible opportunity the next working day. When injured or killed individuals of the listed species are found, the Corps shall follow the steps outlined in the Salvage and Disposition of Individuals section below.
- c. For those components of the action that will require the capture and relocation of any listed species, the Corps via the applicant's Service-approved biologist(s) shall immediately contact the SFWO at (916) 414-6623 to report the action. If capture and relocation need to occur after normal working hours, the Corps shall contact the SFWO at the earliest possible opportunity the next working day.
- d. For each project appended to this programmatic biological opinion, the Corps shall provide pre- and post- construction compliance reports as described in the *Administration of the Programmatic Biological Opinion* section of this programmatic biological opinion.

#### Salvage and Disposition of Individuals:

Injured Sonoma County California tiger salamanders must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Notification must include the date, time, and precise location of the individual/incident clearly indicated on a USGS 7.5 minute quadrangle and other maps at a finer scale, as requested by the Service, and any other pertinent information. Dead individuals of any of these listed animal must be sealed in a zip-lock® plastic bag

containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site. The Service contact persons are Ryan Olah, (916) 414-6623, (ryan\_olah@fws.gov) or Vincent Griego, (916) 414-6493, (vincent\_griego@fws.gov).

### **CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

1. Assist the Service in implementing recovery actions identified within the most current Recovery Plan for the Santa Rosa Plain.
2. Report sightings of all listed and sensitive species to the CNDDDB. A copy of the reporting form and a topographic map clearly marked with the location of the species observed also should be provided to the Service.

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.

### **REINITIATION—CLOSING STATEMENT**

This concludes formal consultation on the actions described in this programmatic biological opinion within the Santa Rosa Plain, Sonoma County, California. As provided in 50 CFR §402.16(a), reinitiation of consultation is required and shall be requested by the federal agency or by the Service where discretionary federal involvement or control over the action has been retained or is authorized by law, and:

- 1) If the amount or extent of taking specified in the incidental take statement is exceeded;
- 2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
- 3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or written concurrence, or
- 4) If a new species is listed or critical habitat designated that may be affected by the identified action.

If you have any questions regarding this programmatic biological opinion, please contact Ryan Olah, Coast Bay Division Chief, ([ryan\\_olah@fws.gov](mailto:ryan_olah@fws.gov)), or at (916) 414-6623 or the letterhead address.

Sincerely,

A handwritten signature in blue ink, appearing to read "J. Norris", with a long horizontal flourish extending to the right.

Jennifer M. Norris, Ph.D.  
Field Supervisor

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