United States Department of the Interior

FISH AND WILDLIFE SERVICE
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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 (*Blemnosperma 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, 2007letter 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);
4. References cited in this Biological Opinion; and
5. Other information available to the Service.

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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). 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.

<u>Procedures for Appending Projects to the Programmatic Biological Opinion</u>

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) 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) (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 (CNDDB) 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) 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. 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

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

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

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, CNDDB 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, CNDDB 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 CNDDB 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, CNDDB 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, CNDDB 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 (CNDDB 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 (CNDDB 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 (CNDDB 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, CNDDB 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 (CNDDB 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 (CNDDB 2002). Recent field surveys found that all three occurrences outside of the Santa Rosa Plain have probably been extirpated (CNDDB 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; CNDDB 2002). The surrounding plant communities range from oak savanna, grassland, and marsh in Sonoma County to riparian woodland in Napa County (CNDDB 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, CNDDB 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, CNDDB 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, CNDDB 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, CNDDB 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 CNDDB occurrence in the area contained 11 colonies in 1984; by 1993, only two were extant (CNDDB 1998). A second occurrence had more than 20 vernal pools in 1985, but by 1994, only one colony of Burke's goldfields was present (CNDDB 1998). This property once contained 50,000 plants, but after repeated discing only about 100 plants remain (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 CNDDB occurrence. After listing, the number of sites with many individuals decreased, and the number with very few individuals increased. Fifteen of the 28 sites for which 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.

<u>Sonoma sunshine</u>

1991 to 1998. Patterson *et al.* (1994) estimated less than 12 biologically separate populations

remain. Of the sites they examined, 17 percent (nearly one-third) had been extirpated, and 17 percent (nearly one-sixth) had not been confirmed recently. An additional 17 percent (one-sixth) were believed to be extant but threatened by development as of 1994 (Patterson *et al.* 1994). A site, as defined by Patterson *et al.* (1994), may be all or part of a CNDDB occurrence. At one CNDDB occurrence, 12 Sonoma sunshine colonies were observed in 1989. By 1993, only six remained (CNDDB 1998). The Service is aware of at least five specific Sonoma sunshine sites that have been developed or isolated by surrounding development or vineyards on the Santa Rosa Plain since the time of listing, including 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 (CNDDB 1998, Service files). In addition, Sonoma sunshine is known from at least one of the Burke's goldfield sites mentioned above that were disced without authorization and 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.

<u>Sebastopol Meadowfoam</u>

1991 to 1998. Patterson *et al.* (1994) estimated only 10 hydrologically separate populations of

Sebastopol meadowfoam exist. Of the sites they examined, nearly 10 percent were considered erroneous, 18 percent were extirpated, 18 percent were extant but threatened by development, and 36 percent were extant but may not be large enough to qualify as high-quality preserve lands (Patterson *et al.* 1994). A site, as defined by Patterson *et al.* (1994), may be all or part of a CNDDB occurrence. According to Service records, significant Sebastopol meadowfoam sites are within southwest Santa Rosa. Other sites have been extensively fragmented by development, leaving parts of larger vernal pool complexes interspersed with homes. Repeated discing and land conversion activities have damaged some sites as well (Service files).

Excluding easements, eight Sebastopol meadowfoam sites comprising approximately 170 acres were preserved as of 1994 (Patterson *et al.* 1994). However, only a small portion of this acreage is considered actual Sebastopol meadowfoam habitat (CH2M Hill 1995). These eight sites comprised approximately 11 percent of the acreage of Sebatopol 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.

CaliforniaTiger 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 acres x 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**
Total	**1540.5**	**203.2**	**202.8**	**3519.4**

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 meadowfaom 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

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
Pete Parkinson, Sonoma County, California
Scott Wilson, CDFG, Yountville, California
Liam Davis, CDFG, Yountville, California
Stephen Bargsten, RWQCB, Santa Rosa, California
Michael Monroe, EPA, San Francisco, California

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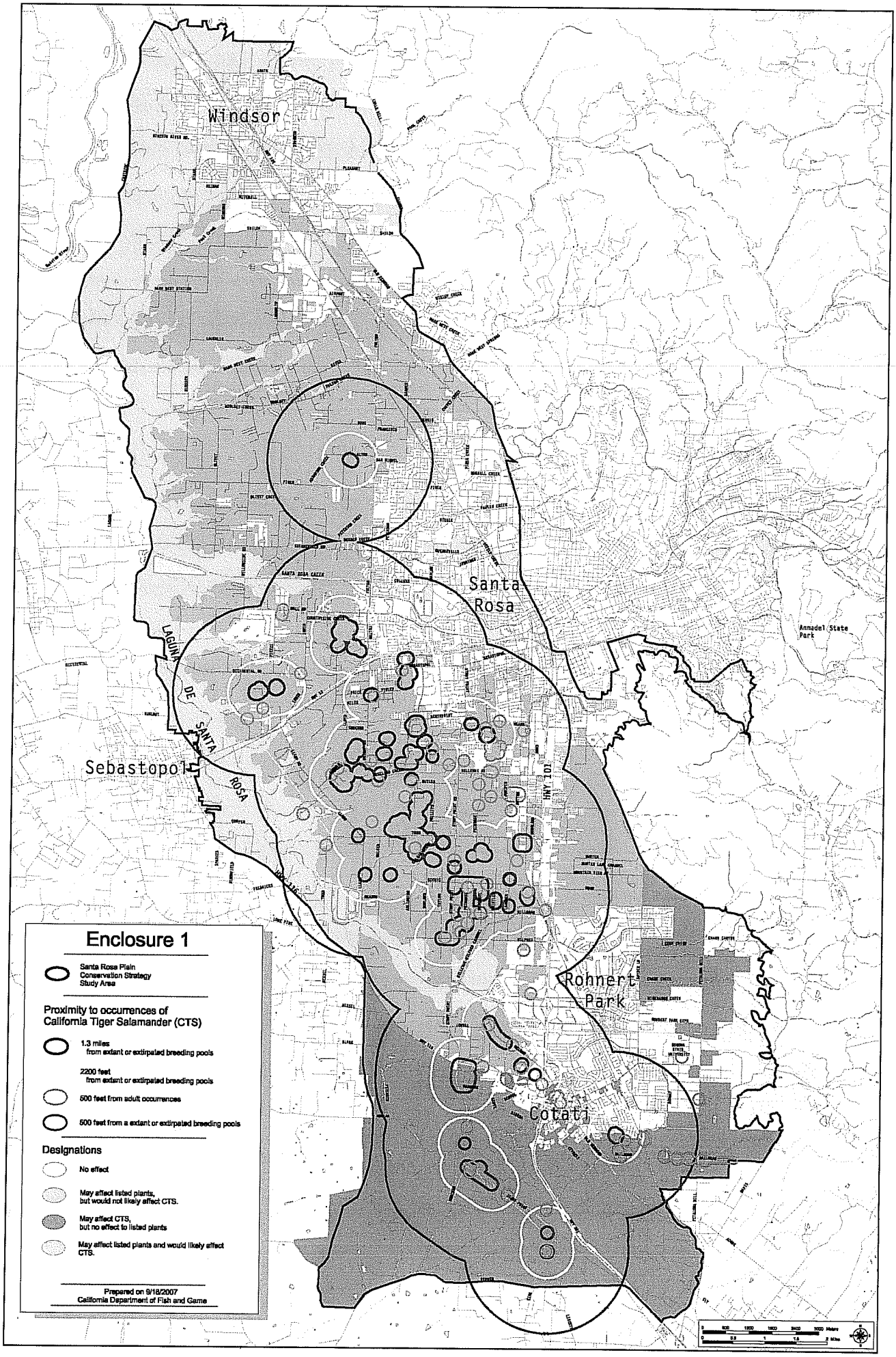
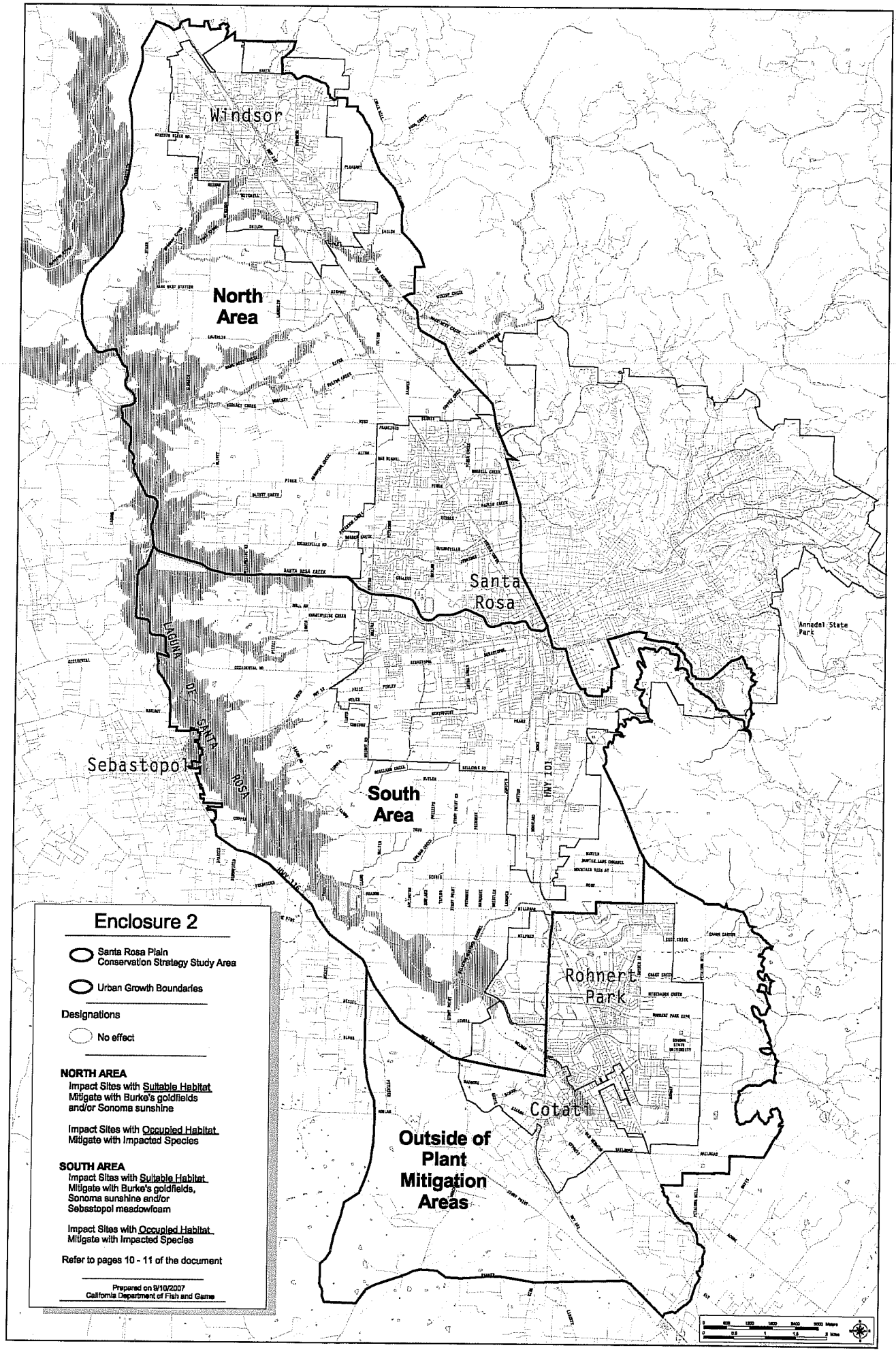

Windsor
Santa Rosa
Sebastopol
Rohnert Park
Cotati
Annadel State Park
LAGUNA DE SANTA ROSA
HWY 101
Enclosure 1
Santa Rosa Plain Conservation Strategy Study Area
Proximity to occurrences of California Tiger Salamander (CTS)
1.3 miles from extant or extirpated breeding pools
2200 feet from extant or extirpated breeding pools
500 feet from adult occurrences
500 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


Windsor
North Area
Santa Rosa
Annadel State Park
Sebastopol
South Area
Rohnert Park
Cotati
Outside of Plant Mitigation Areas
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 9/10/2007
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 to 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 Califoria 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 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.