



Diablo Firesafe Council

Best Management Practices Guidebook for Hazardous Fuel Treatments in Contra Costa County

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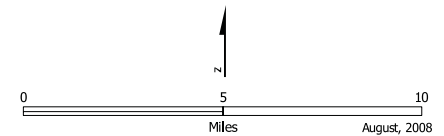
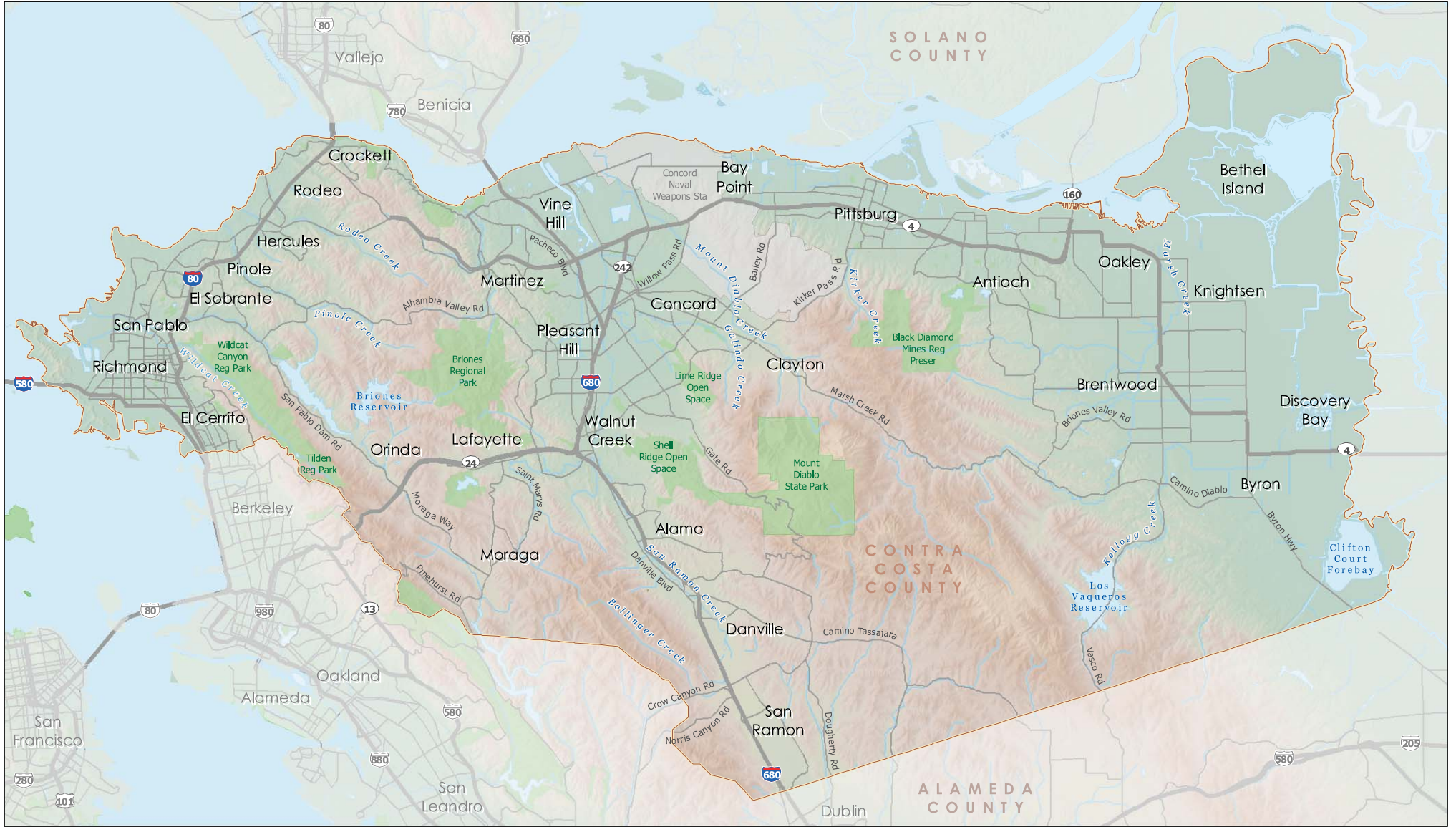
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Contra Costa County Overview



Introduction

Maintaining a Healthy Place for People, Plants & Wildlife in Contra Costa County

Setting

Contra Costa County provides a unique landscape for people and natural resources. Over one million people call the 19 incorporated cities or unincorporated communities within the 802 square mile boundary home. Our communities vary from urban and suburban to rural settings, many bordering natural areas (Community Wildland Interface) or surrounded by landscaped vegetation.

The western and northern shore areas of the County are highly industrialized, while the interior sections contain suburban / residential and commercial areas interspersed with agricultural and livestock grazing lands along with parklands and undeveloped areas. In addition to our community resources, the County harbors an abundance of vegetative, aquatic, biotic, and agricultural resources. There are 13 major watersheds and sub-watersheds, with over 1300 miles of creeks and drainages. The vegetation communities of the County include several broadly defined types: native and non-native forests and woodlands, shrublands, grasslands, riparian forests, and wetlands (influenced by freshwater and salt water). These vegetation communities provide habitat for common plants and animals as well as many that are considered to be rare or sensitive. Federal, state, and local laws overseen and implemented by agency representatives help to protect and manage these resources in the County, including several species protected by the federal government under the Endangered Species Act.

Wildfire Risk

Factors such as topography, climate, and vegetation contribute to the risk of catastrophic fire in the County. While catastrophic fires occur relatively infrequently,





fire incidents driven by extreme wind conditions are difficult to extinguish or contain and can result in damage or loss of life, property, critical infrastructure, and natural resources. Reduction of fuels, or vegetation that can feed a fire, and protection of individual homes by implementing fire-safe practices, such as maintaining defensible space and addressing structural ignitability, are important to reducing these risks and resulting damage. A Community Wildfire Prevention Plan is being prepared for the County to prioritize and describe these actions in detail.

Guidebook Goal

The goal of this guidebook is to familiarize land managers, homeowners, and communities with the hazardous fuel treatment types that are best suited for their landscapes and provide guidelines for protecting sensitive species and their habitats during implementation. These guidelines take the form of Best Management Practices or BMP's that are designed to help the user prepare and comply with federal natural resource laws. A federal nexus may not apply to your treatment activities (project), in which case the BMP's outlined in this guidebook can be implemented to avoid impacts. It is recommended that you confirm with the US Fish and Wildlife Service that you are in compliance with the Endangered Species Act and Migratory Bird Treaty Act. although if your project has a federal nexus, the agency must make the determination that your project is in compliance. As discussed further in Chapter Three, many larger scale or complex projects are not addressed within the scope of this guidebook and will require additional planning, coordinating, and potentially permitting with regulatory agencies.

When using this guidebook, it is important to bear in mind that for every situation encountered, there may be more than one appropriate approach to hazardous fuel treatment and various management practices that can be employed to protect sensitive natural resources. Simply changing the timing of a treatment or altering its intensity may make the difference in protecting a species during a critical part of its life cycle or within an important natural habitat. Flexibility and understanding are important, since the intent of any best management practice is to aid in improving the health of our valuable community and natural resources.

Managing Fire Risk

Fire Fuel Modification

The effect of fuel modification is to reduce the ignitability, rate of spread, and fire intensity (or heat output). This results in fewer, smaller, and less damaging fires. Specific techniques, equipment requirements, advantages, and additional considerations such as timing, limiting factors, and Best Management Practices (BMPs) are described for each of the following fuel reduction methods: hand labor, mechanical treatment, chemical treatment, prescribed burning, and grazing. This section is intended as an introduction and brief comparison of methods. The following chapter provides guidance regarding the most appropriate treatment type for your work zone and habitat type as well as BMPs for federally protected species and their habitats.

Altering or managing fuels (both structural and vegetative) helps to reduce the risk of fire hazard to our homes, infrastructure, and communities. Fuels modification is aimed at changing the fuels to calm a fire via altering the volume, size-class distribution, arrangement, moisture, or chemical content of the fuels on the site. Typically, vegetative fuel modification is done immediately around structures, by roadways, and in areas of potential extreme fire behavior. Treatment zones addressed in this guidebook are defined as follows:

1. From the Home: 0-30', 30-100'
2. Critical Infrastructure: 0-300'
3. Emergency Access Roads: 0-30', 30-100'
4. Community Protection: 100-300'
5. Community Wildland Interface: within 1.5 mile area around community

In Contra Costa County, most fuel modification is done within 100 feet of structures and roads. Limited, targeted fuel treatments take place in the Community Wildland Interface.



Home set in the wildland interface (top), fire fighters reduce fuel loading with a prescribed burn (bottom)

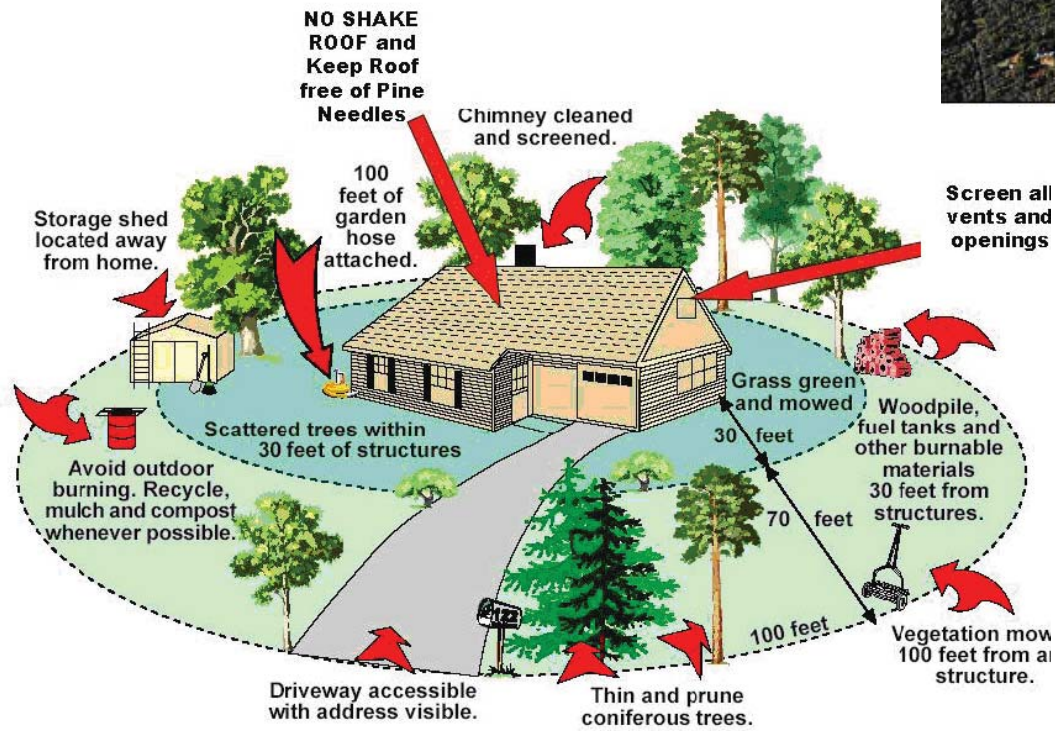


Diagram of the treatment zones surrounding a residence

Hazardous Fuel Treatments

Hand Labor

Hand labor treatments involve pruning, cutting or removal of trees, shrubs, and grasses by hand or using hand-held equipment; other hand labor methods involve bark pulling, removing dead wood and litter, mulching, and establishing new fire-resistant or low-risk plants. Fuel management treatments that use hand labor are typically used for spot application on small areas or areas with difficult access, where heavy equipment move-in costs may be high, or areas with sensitive environmental concerns. Hand labor may be dangerous for workers when use of sharp tools are required on steep and/or slippery terrain, or where poisonous plants are abundant. Hand labor is most commonly used by residents to reduce fire hazard on private lands and by publicly-funded crews (e.g., East Bay Conservation Corps, California Conservation Corps, California Department of Corrections and Rehabilitation crews).

Hand labor generates debris when pulling, pruning, and cutting vegetation. This debris is not always removed from the site due to the additional cost of removal and disposal. When neither hauling nor burning are feasible for debris removal and the resulting fuel load is acceptable, materials can be re-cut to reduce their size and scattered or packed in depressions away from tree canopies. Hand tools include shovels, Pulaski hoes, McLeod fire tools, weed whips (potentially using different blades according to materials being treated) and “weed wrenches” (tools that pull both shrub and root system out), chain saws, hand saws, machetes, pruning shears, and loppers. Chippers are often used in conjunction with hand labor to process cut materials into mulch for onsite disposal.

The actions, tools, advantages, and additional considerations for the various hand labor techniques are compared in the following table.



Hand labor treatment

Technique	Action	Tools	Advantages	Additional Considerations
Cutting Line, Creating Fire Breaks	Create strips of bare soil through cutting at the soil surface or grubbing out plants	Hoeing and grubbing out plant tops	Used to install control lines for prescribed burns where mechanical equipment cannot be used	
Weed Whipping	Reduce the height of the fuel, without creating areas of bare soil, as the vegetation is not completely removed	Hand-held tool (often gas-powered) that cuts grass and very small shrubs with a plastic line or cutting blade	Often the only type of "mowing" treatment possible in steep wooded areas or landscaped slopes	
Chaparral/ Scrub Branch Removal	Masticate or chop off chaparral branches and break apart brittle materials that can act as ladder fuels	Machetes, chainsaws, and other instruments	Fallen branches and material cut from chaparral can be further broken into compact mulch and distributed across the site or removed for disposal	
Hand-Pulling	Weeds pulled three years in a row will be generally controlled in an area because of the repeated deletion of propagules from the site	Pull weeds by hand	Offers the greatest amount of control among hand labor techniques, but is also very time-intensive	Most weeds pulled can be left onsite as mulch; however larger weeds, such as French broom, should be removed. To limit the spread of seeds, care should be taken to bag weeds securely if viable seeds are present
Vista Pruning	Remove under-story shrubs, small trees, and small lower limbs of trees to a height of 8-10 feet to create a vertical separation between surface fuels and the tree canopy overhead	Pole saws, loppers, and hand-held chainsaws	Vista pruning lowers ignitability, decreases available fuel, decreases the potential for spotting, and reduces heat output from under-story fires, which in turn reduces the potential for fires to move from the ground to the tree crown	Certified arborist recommended
Mosaic Thinning & Drip-line Thinning	In Mosaic thinning, tree "clumps" alternately thinned to varying degrees to create a mosaic of plantings. Drip-line thinning -remove shrubs and smaller trees within the drip lines of overhead trees.	Hand-held chain saw, pole saw, or loppers	Because the material removed during these operations typically consists of smaller trees and shrubs that result in larger debris sizes, chipping or offsite hauling is usually required.	For fuel reduction where retained trees are variably distributed throughout the treatment area; rather than removing saplings, shrubs, and grasses evenly across an area
Black Plastic Coverage	Plastic fixed to the top and sides of a cut stump to prevent photosynthesis, which in turn prevents new sprouts from forming	Five-milimeter or thicker plastic, rocks, stakes, nails or staples	As an alternative to herbicide application, securing black plastic over cut or treated tree stumps can prevent sprouting	Black plastic can also be placed over surface areas to prevent germination of weeds although groundcover growth is prevented as well
Mulch Application	Application of mulch, such as wood chips from pruning operations	Protective masks and gloves should be worn in distributing wood chips because fungus is typically present	Can slow the growth of grasses, shrubs, and saplings for up to one full season and acts as an effective temporary fuel reduction method	In the event of a wildfire mulches burn slowly and produce low flame lengths but burn for a long time in any one place. This condition transfers considerable heat into the soil and can have longer-term detrimental effects to the area as a result

Table 1. Hand labor techniques for fuel reduction around the home

Mechanical

Mechanical treatment involves cutting grasses and removing weeds, shrubs, and trees up to 24 inches in diameter through the use of a tractor or other machinery, including such operations as grading, mowing, disking, and crushing.

Heavy machinery is often used where terrain and the presence of numerous trees do not prohibit travel. Heavy machinery can be used where shrubby vegetation is quite dense. Generally, using heavy machinery for mechanical treatment is faster than hand labor and relatively inexpensive. There is, however, limited control over which plants are cut during mowing, grinding or disking operations; but machines can be guided around isolated areas of concern. Additionally, collateral impacts to small vegetation can also occur when machinery operates on top of these plants. Heavy machinery can also create excessive disturbances to surface soils when the ground is soft, leaving ruts and exposed soil.

This technique can be used almost any time of year when the top soil is dry, but is faster when done in the summer or fall when brush is brittle and grass has cured. Because mechanical treatment methods almost always utilize equipment with metal blades, combustion engines, and corollary fuels, they should be used with special precautions during high fire danger periods as the machines themselves (and metal blades striking rocks) can inadvertently start fires. Also, vehicles and equipment undercarriages should be cleaned prior to removal from the work site to reduce the risk of transferring unwanted material, disease (such as sudden oak death), or seeds to other areas.

Mechanical treatments need to be selected according to a site's topography, access, vegetation type, and potential for negative environmental impacts. This technique requires supervision and specialized training to ensure the desired results and minimize negative impacts. Several agencies own specialized equipment and have staff trained in its operation. Chippers, mowers, brush cutters, grinders, roller-cutters, feller-bunchers, tub grinders, hauling trucks, and yarders with a grappling hook are all types of equipment that can be specified for mechanical treatment techniques, as needed.

Specific techniques, which are compared in the table below, can break apart or cut up vegetation into small pieces, tear up and bury the resulting debris, or remove plants entirely and pile the debris for burning or removal.



Mechanical treatment: Mowing

Technique	Action	Tools	Advantages	Additional Considerations
Grading	Maintain fire trails through wildlands, creating a strip of land absent of fuel	Tractor with an attached blade can effectively produce a firebreak 8 to 12 feet wide with one to two passes of the vehicle	Produces easy access for vehicles	Disturbs water drainage patterns where the side banks of the graded land interrupt cross-slope water travel, and may also accelerate water travel inside the graded lane. Can result in excellent establishment sites for weed species.
Mowing	Cut herbaceous and woody vegetation above the ground, often along roadways and, using hand-powered mowers, around homes	Mowers on wheeled tractors or other equipment, or straight-edged cutter bar mowers, or flails. Mowers may be walk-behind equipment.	Reduces fuel height which in turn reduces the flame length and possibly the rate of spread of a grass fire. Using a tractor-based mower approximately 5 acres per day can be mowed, depending on surface topography and slope of the site. A walk-behind mower can cut approximately 2 acres per day.	Mowing at the appropriate time to a height of approximately 4 inches minimizes weed and brush encroachment and reduces the amount of manual work needed to maintain the site
Discing	Plant material is cut and mixed with surface soil to create a barrier of discontinuous fuel and bare earth to stop fire spread	Tractor with disk attachment area 15 feet wide in a single pass	Performed annually once grass has cured so that grass will not grow back that season. Typically reach 2 acres per day. Effective barrier to surface fire spread.	It creates an ideal disturbed area with prime growing conditions for weeds and distribution of their seeds. Surface erosion can be significant in areas prone to this process.
Mechanical Cutting, Crushing, or Removal of Dead Material Only	Cut or crush shrubs and trees into small pieces that are scattered across the ground to act as mulch	Tractor with a variety of attachments or blade. Masticating equipment installed on Bobcats, wheeled or crawler-type tractors, excavators, or other specialized vehicles.	Equipment that carry large loads, can effectively remove large volumes of dead material, often with large pieces of material still intact. Particularly applicable in areas of dense trees or in burned areas.	The soil surface is disturbed slightly where the tractor travels and where some shrubs are uprooted; however, the surface is not scraped.
Chipping or Mulching	Used subsequent to other removal techniques and reduces the size of materials by passing them through a series of high-speed blades	Grinder	Small-sized materials produced may be removed from the site or redistributed as mulch. Natural compaction of this layer presents a fuel structure that is less likely to ignite.	Mulch layers should be kept to less than 4 inches deep

Table 2. Mechanical treatments for fuel reduction

Chemical Treatment

Using herbicides to control invasive plant species that exacerbate wildfire risk is an efficient and cost-effective method when used as part of an Integrated Pest Management (IPM) program and in combination with other treatment measures (e.g., mowing, burning and hand removal). Based on ongoing tests and studies of other plant control methods conducted from 2005 through 2008, the Marin Municipal Water District (MMWD) has determined that none of the other available alternatives are as effective in killing weeds as chemical treatments.

Chemical treatments, which most often include the use of herbicides to kill plants or prevent their growth, are typically considered only when in concert with other types of fuel reduction treatments. Application of herbicides immediately following some other treatment method whereby plants are cut or broken inhibits the damaged plants from sprouting again. Herbicides can also be used to kill herbaceous plants in exposed areas, such as roadside grass and weeds, and are typically applied while the grasses and weeds are still actively growing. Application following another treatment method in which plants are trimmed or shortened can increase the effectiveness of the chemical treatment.

Herbicides do not remove any vegetation from an area's fuel load. The dead plant matter continues to exist at the site and could continue to be a fire hazard if not collected and disposed. Health, safety and environmental concerns have limited the widespread use of chemicals over the past 20 years, and repeated use of chemicals is not preferred due to the prevalence of unwanted species building resistance to herbicides. Foliar treatments are generally not applied within seven days of significant rain because the herbicide may be washed off before it is effective, and not on windy days because of concerns for spray drift. Additionally, concerns regarding water quality and other potential environmental impacts that may occur with prolonged use of and exposure to herbicides and other chemical applications further limit their frequent or widespread use as a treatment.

Application of herbicides and other chemicals is typically performed by hand, and can



Mechanical treatment (top) and chemical treatment (bottom)

Technique	Action	Tools	Advantages	Additional Considerations
Overstory Removal	Includes removing trees from a forest stand to break up the stand's overstory and removal <i>(see the following three yarding methods)</i>	Tractors, yarders and log trucks, hand-held chainsaws or feller-bunchers	Quick treatment for area where fuel break needs to be established, along roadside clearance, or where an invasive or otherwise exotic species is removed to restore the natural ecosystem	Potential for windthrow or release of weeds/brush resulting from overstory removal. Not selective in tree removal and additional treatment needed to remove debris
Tractor Based Yarding	Pull logs off steeper slopes to a landing area to be reduced to debris and distributed, or sorted, stacked, and hauled away as logs or chips	Tractor with a grappling hook or chains attached to back of tractor	Best suited for flatter areas that are less likely to be impacted by erosion and sedimentation that can occur from such practices quick method for large areas. Can be most inexpensive yarding system.	Can leave significant scars where chains and logs drag along the ground, or where tractor turns, increasing the danger of erosion and requiring additional treatment to fill ground surfaces and BMPs Skidding trails must be identified to minimize damage to ground surfaces.
Cable Yarding	Picks up and suspends parts or all of logs off steeper slopes to a landing area to be reduced to debris and distributed, or sorted, stacked, and hauled away as logs or chips	Yarder used should have drums and an interlock system, a tower, and should include a mechanical slack pulling carriage	Excellent choice for tree removal where slopes are steep (greater than 35%). By locating equipment on flat, stable areas above steep slopes, erosion is limited and fewer long-term scars are likely to result.	Skidding trails must be identified to minimize damage to ground surfaces. There may be spots requiring post-treatment follow-up to fill in cuts and gouges in the ground surface to prevent potential erosion.
Helicopter Yarding	Lift and remove trees from forest stands, carrying to an open landing area where logs can be loaded onto trucks and hauled offsite	Helicopters with cables	Very high-production system allows for increased selectivity of targeted materials as ground-based crews select which trees are removed. Works well on areas with significant slopes.	Helicopter yarding requires very large landing areas and equipment and personnel costs can be expensive; there is also resulting noise pollution

Table 2 Cont'd.: Mechanical treatments for fuel reduction

include sponging, spraying, or dusting chemicals onto unwanted plants. Hand application provides flexibility in application and is ideally suited for small treatment areas. Roadside application of herbicides may employ a boom affixed to or towed behind a vehicle. Herbicide application requires specific storage, training and licensing to ensure proper and safe use, handling, and storage. Only personnel with the appropriate license are allowed to use chemicals to treat vegetation. Herbicide application is also only applied per a prescription prepared by a Pesticide Advisor licensed in that county. Personal protection equipment is essential to limit personnel exposure to chemicals, and includes long pants and long-sleeved shirts, gloves, safety goggles, hard hats, sturdy boots, face masks and, in some instances, respirators.

Prescribed Burning

Prescribed burning reintroduces fire into the ecosystem as a more naturally-occurring treatment and can closely approximate the forces that have shaped the natural vegetation. Controlled burns reduce the volume of fuel through combustion; fires are conducted under specific regulations when conditions permit both adequate combustion and proper control. This technique can be used to burn piles of cut brush (pile burns), or over a designated prepared area (broadcast burn) and is the only treatment method that both reduces seeds of non-native weeds and promotes germination of native seeds. Both broadcast and pile burning are often used in conjunction with hand labor and mechanical treatment methods as a means of removing excess debris, or in advance of an herbicide treatment to enhance the effectiveness of the application.

Prescribed burning can be a cost-effective way to quickly reduce the large volume of woody material that remains after other fuel reduction operations. A broadcast burn produces more uniform removal and minimizes areas of great burn intensity. Alternatively, tractors or hand crews can create piles of material on flat or gently-sloping ground that can be burned during very wet conditions, although the volume of fuel in the piles can produce localized heat which tends to sterilize the ground under the burned areas. Broadcast burning may occur throughout the year; however, it is usually conducted during late spring when the ground is still wet or during fall or winter after plants have completed their yearly growth cycle and their moisture content has declined. Spring burns are preferred by some fire staff to ensure a greater measure of public safety; however, there may be impacts to animal and plant reproduction activities. Fall burns are more closely aligned with the natural fire cycle found in California. Piles of vegetation may be burned anytime after the vegetation has dried. “Cool” burn prescriptions, using techniques such as backfiring, chevron burning, and flank firing, as well as timing the fires during periods of high humidity and high fuel moisture content, would be expected to result in partial removal of understory or groundcover vegetation. The existing groundcover vegetation would be partially retained in a mosaic in forest and shrub communities.

Prescribed burns must be conducted by trained fire protection personnel only. Utilizing personnel and equipment from neighboring fire districts provides the added benefit of joint training under controlled rather than emergency conditions. If the landowner



Prescribed burn in a woodland area

wishes to benefit from cost-sharing aspects of CalFire's Vegetation Management Program, CalFire must conduct the prescribed burn. Timing is critical to the use of this treatment method because of variances in weather conditions as well as wildlife and botanical considerations. Fuel moisture content must be determined to assess if the targeted area is safe to burn, and periods of increased wildlife and botanical activity need to be avoided to limit potential negative impacts to these resources. There are typically more permissive burn days available in the spring and early summer when there is a greater chance of atmospheric conditions conducive to smoke dilution and dispersion.

Prescribed burning requires the development and approval of a prescription or burn plan, which is typically developed by the local fire protection district in consideration of fuel reduction requirements, local weather conditions, and available resources for fire management. Some landowners have an active prescribed burning program in which it conducts burns using its personnel and equipment with support and cooperation from other fire protection agencies. There are several steps that must be completed prior to initiating a prescribed burn:

1. Develop a Burn Plan or Prescriptions
2. Obtain a Burn Permit from the Bay Area Air Quality Management District
3. Pre-Burn Site Preparation
4. Burn Notification
5. Post Burn Follow-up and Evaluation

Grazing

This treatment method involves using grazing animals to consume vegetation to reduce the amount or density of fuels and is most effective in grasslands (cattle or sheep) or shrublands (goats). Historically, cattle have grazed the East Bay Hills, although goats are also now often used for fuel management. Goats can be used to create and maintain a fuelbreak. While sheep and cattle do not effectively create fuelbreaks, they can be used to maintain these features by shortening grasses and shrubs and removing vegetation debris, and can be used to do the same to the understory of tree stands. This method is particularly effective where the plants are palatable to the animals selected. As a fuel reduction technique, grazing does not need to be conducted each year if the intent is to control shrubs or maintain understory fuels. If the intent is to reduce grassland fuels in highly ignitable locations, grazing should be used annually.



Prescribed burn near an access road

Grazing can be a relatively inexpensive treatment method and can even generate revenue when cattle grazing is contracted for large areas. Goat grazing typically requires a subsidy to be cost-effective, and sheep grazing is typically a cost-neutral treatment technique for the lease holder. Control of livestock movements and prevention of the impacts of overgrazing, including increased erosion from groundcover loss, is critical for successful use of this treatment method. Using professional herders or portable fences may be an alternative to fixed fencing where the treatment is ephemeral. Additional controls are also needed for protection of selected plant materials and riparian zones, and to prevent erosion or other undesirable environmental impacts.

In addition to the benefits of livestock grazing to reduce small diameter fuels and discourage invasion of grasslands by coyote brush, livestock grazing has been found to be beneficial for native grassland and wildflower restoration, weed management, and wildlife management (including protected species). Livestock exclusion tends to convert grasslands to a dominance of tall non-native annual grasses such as soft chess, ripgut brome, and wild oats. Annual ryegrass commonly becomes a problem grass when not grazed, building up particularly thick thatch layers. This grass is also becoming more abundant in grassland habitats subject to excessive nitrogen deposition associated with air pollution plumes near highways and downwind of urban and industrial areas. Grazing or other removal of plant material reduces the accumulation of dead matter in the dry seasons and increases nutrient cycling. Opening up the herbaceous canopy increases light penetration and limited disruption of the soil surface by ungulate hooves allows for improved soil-seed contact which, in turn, increases seed germination and seedling establishment. It also enhances habitat for wildlife which prefer short grasses, such as ground squirrels, and provides aestivation burrows for amphibians such as the California red-legged frog and California tiger salamander, which are both listed as threatened species. The reduction of thatch may also help movement of these amphibians from aquatic to upland habitat. Appropriately-timed grazing or other methods of vegetation removal can also be used to promote increases in native perennial grass populations and to reduce the proportion of nonnative annual grasses.

Although the concept of grazing is the same regardless of which type of animal is used, how each animal type conducts its grazing varies significantly. As a result, not all animals will be ideally suited for grazing treatments in all areas.



Grazing goats



What You Should Know About Federal Regulations

The following pages briefly describe the federal regulations that protect sensitive biological and cultural resources in our County. This guidebook aims to help users prepare and comply with these laws when carrying out small scale hazardous fuel treatments. **If you think you may affect a listed species or its habitat, despite the use of BMPs in this guidebook, you must consult with USFWS or NMFS (See Chapter 3).**

Federal Endangered Species Act

- Establishes a broad framework to save species from extinction.
- Requires the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) to list species as Threatened or Endangered, and to designate Critical Habitat and develop Recovery Plans for those listed species.
- Threatened species are those experiencing serious threats that may eventually lead to extinction, but the situation is not critical yet.
- Endangered species are those on the brink of extinction.
- Prohibits anyone from “taking” (i.e. harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect) an Endangered animal species. “Harm” also includes significant habitat modification or degradation which kills or injures species by significantly impairing essential behavioral patterns like breeding, feeding or sheltering.
- Prohibits removal or damage of Endangered plant species on federal lands or anywhere else if in knowing violation of state law.

Why Save Endangered Species?

Wildlife and plants “are of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people” (Endangered Species Act).

California has 309 federally listed species.

101 million acres in California are designated Critical Habitat.

47 species have designated Critical Habitat in California.

Contra Costa County has 30 federally listed species and 1 species proposed for listing.



The Swainson's hawk migrates from the Central Valley to Argentina (top) while the tri-colored blackbird winters as far away as Baja California

Migratory Bird Treaty Act

- Was enacted to put an end to the commercial trade of birds and their feathers.
- Prohibits killing, possessing, or trading migratory birds.
- Applies to whole birds, parts of birds, bird nests and eggs.
- Applies to many common bird species and private land.
- Does not provide protection of habitat of migratory birds, but does prohibit the destruction of bird nests in active use without a permit from USFWS (See Chapter 3).
- It is easy to implement measures to avoid active nests and avoid the need for a permit.

Protection of Birds

More than 800 migratory birds are listed under the Migratory Bird Treaty Act.

The Eagle Protection Act also protects bald and golden eagles.

National Historic Preservation Act

- Intended to preserve historic and archaeological sites in the U.S.
- Requires the National Park Service to maintain a National Register of Historic Places that identifies districts, sites, buildings, structures and objects worthy of preservation.
- Properties on the list are not automatically protected from damage or destruction, but federally-funded (or permitted) projects that will impact sites listed, or eligible for listing, must complete the “Section 106 Review Process” to minimize potential harm and damage to listed properties (See Chapter 3 for a discussion of the permitting process if you are receiving federal funding or a federal permit for your project).

Why Care About Cultural Resources?

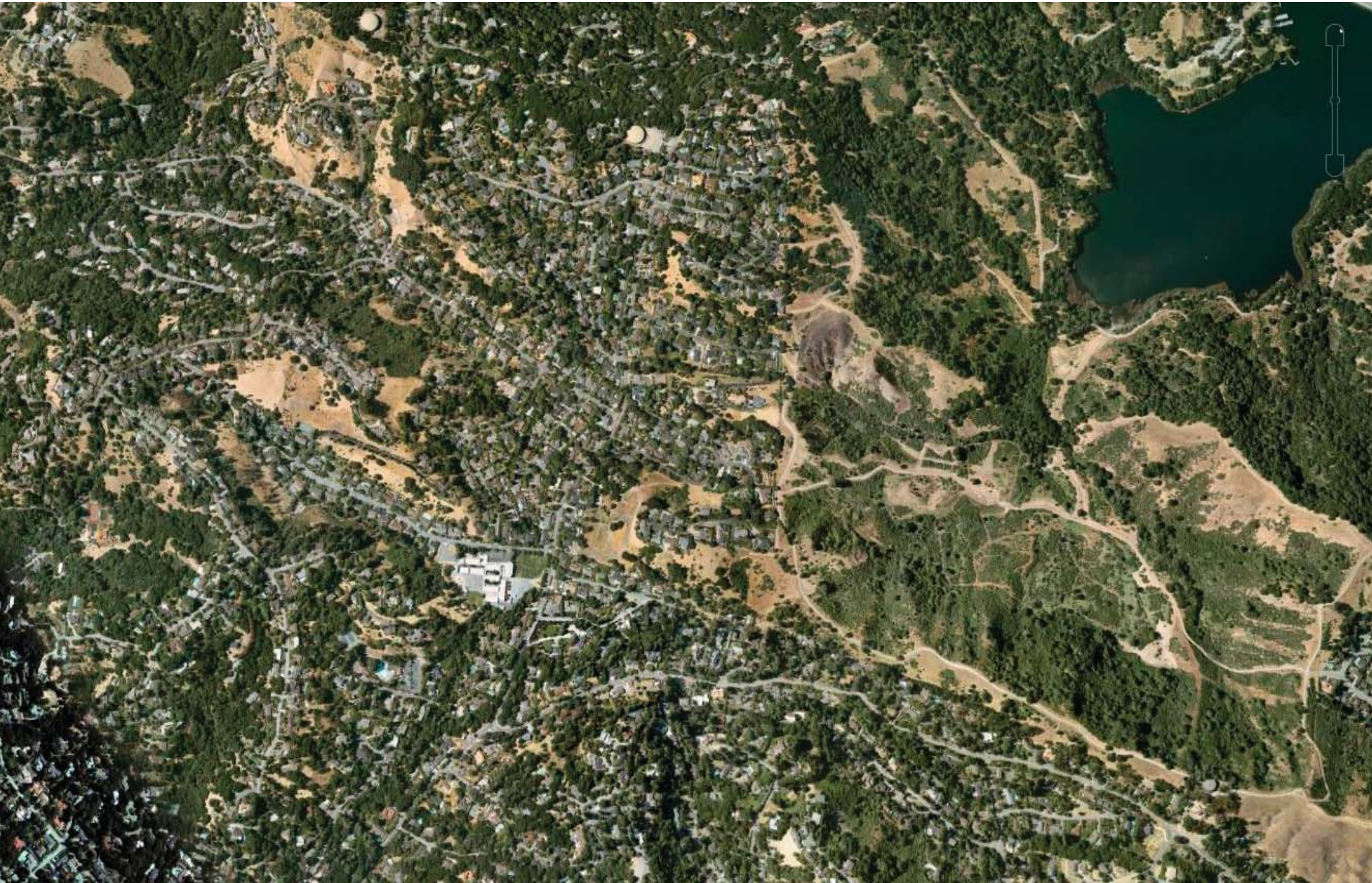
“Historical and cultural foundations of the Nation should be preserved as a living part of our community life and development in order to give a sense of orientation to the American people” (National Historic Preservation Act).

Different cultural resources:

- Prehistoric: pre-1770
- Historic Buildings: Greater than 30 years eligible for evaluation
- Historic Period/Era: after 1770



*John Marsh House in Brentwood: Present day (top),
circa 1860 (bottom)*



Aerial view of Orinda Hills and Lafayette Reservoir: The residential and natural communities are intertwined

Who Lives in My Backyard?

The diverse habitat types of Contra Costa County support hundreds of species of plants and animals. Large open spaces provide places for foraging, shelter, breeding, and movement. Many plant and wildlife species are able to fulfill functions necessary for survival in small habitat patches dispersed among our communities. Lands at the community wildland interface are typically inhabited by a diverse assemblage of flora and fauna. Although it may seem unlikely that there are sensitive species living in the hills or creek behind your backyard, they may very well be present. The survey efforts of many local biologists for these species are tracked by California Department of Fish and Game (see Species Map Atlas in Chapter 4).

Many of the sensitive species in our County have persisted due to their ability to use habitats that have been altered by humans. Federally protected amphibians, California tiger salamanders and California red-legged frogs, commonly breed in stock ponds and troughs created for watering cattle on the grassland covered hills and valleys of the County. Similarly, the Swainson's hawk, a federally protected migratory bird, often nests in planted trees for windbreaks adjacent to houses in agricultural areas. This species winters as far away as Argentina and nests in our community. Given the extensive mosaic of natural and residential areas that comprises Contra Costa County, the existence of humans and nature has become intertwined. In fact, if you look closely, it is likely that you will find birds singing, foraging, and nesting in your very own backyard.

The following few pages will introduce to you the federally protected species that call Contra Costa County home. Range maps have been included to show the extent of the County in which these species have potential to occur by specific habitat type. The definition of each habitat type is further addressed in Chapter 2. These maps can be used as a guideline to determine which Best Management Practices (BMPs) are recommended for your hazardous fuel treatment project.





Alameda Whipsnake

Alameda Whipsnake

Masticophis lateralis euryxanthus

Federally Threatened

Up to 4 feet long • Sooty black or dark brown back with yellow-orange stripe on each side • Orange belly • Fast, slender-necked with a broad head

Inhabit rocky areas in chaparral & nearby grasslands, oak savanna & woodland • Winter underground • Active from spring to fall



Antioch Dunes Evening Primrose

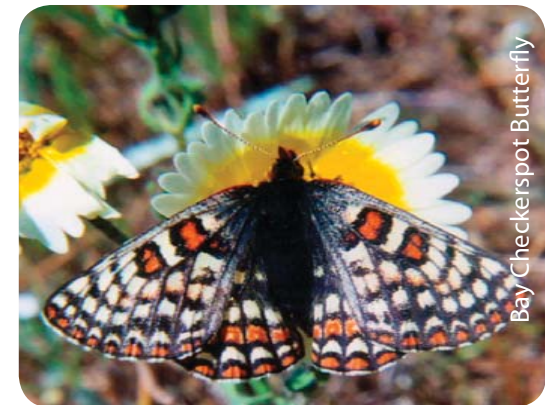
Antioch Dunes Evening Primrose

Oenothera deltooides ssp. howellii

Federally Endangered

Perennial • Up to 2.5 feet tall • Coarse, drooping stems • White flowers with yellow stamens about 1.5 inches wide

Found in sandy bluffs and dunes • Bloom from March to September • Occur near the confluence of the Sacramento and San Joaquin Rivers



Bay Checkerspot Butterfly

Bay Checkerspot Butterfly

Euphydryas editha bayensis

Federally Threatened

About 2-inch wingspan • Upper wing surface with black bands along veins & bright red, yellow & white spots

Found in native grasslands with serpentine soils where their host plant, dwarf plantain, grows • Historically found in native grasslands throughout the San Francisco Bay Area

Federally Protected Species



California Clapper Rail

Rallus longirostris obsoletus

Federally Endangered
Hen-like bird up to 19 inches long • Grey-brown upper parts, cinnamon breast & white tail feathers • Long, orange bill • Make loud clapping sound

Inhabit tidal salt marshes of San Francisco Bay with pickleweed, cordgrass & gumplant • Breed from mid-March to July • Feed on mussels, clams, worms & fish



California Least Tern

Sternula antillarum browni

Federally Endangered
Up to 9 inches long • 20-inch wingspan • Short forked tail, slender wings, large bill • Black head & mask with white forehead • High-pitched call

Found along the Pacific coast from San Francisco to Baja California • Nest on sandy beaches & estuaries near shallow water • Feed on small fish



California Red-legged Frog

Rana draytonii

Federally Threatened
Up to 5 inches long • Prominent side folds on back • Buff to olive-brown backs with irregular black splotches • Often with red legs but not reliable for identification

Found in ponds, streams & creeks with vegetation • Also in grasslands & woodlands within 300 feet of water • Summer in burrows & moist leaf litter



California Seablite *Suaeda californica*

Federally Endangered

Shrub to 2.5 feet tall • Mound-like form • Green, succulent, lance-shaped leaves

Found along the margins of coastal salt marshes & swamps • Bloom from late summer to fall • Potential to occur in northern & western Contra Costa County



California Tiger Salamander *Ambystoma californiense*

Federally Threatened

Up to 10 inches long • Stocky-bodied amphibian with a broad, round snout & small eyes • Black with yellow or cream spots

Inhabit rodent burrows in grasslands & open woodlands • Breed in ponds, creeks & vernal pools • Feed on earthworms, snails, insects & fish



Callippe Silverspot Butterfly *Speyeria callippe callippe*

Federally Endangered

Wingspan up to 2 inches • Mostly orange, tan & brown upper wing surface • Silvery scales on lower wing surface

Inhabit grasslands where their host plant, Johnny-jump-up, grows • Found near San Bruno mountain & west of 680 in Contra Costa County

Federally Protected Species



Contra Costa Goldfields

Contra Costa Goldfields

Lasthenia conjugens

Federally Endangered

Annual herb • Up to 1 foot high • Small, yellow flowers in sunflower family (about ¼ inch wide) • Opposite leaves

Found in vernal pools within open grassy areas • Bloom from March to June • Potential to occur throughout Contra Costa County



Contra Costa Wallflower

Contra Costa Wallflower

Erysimum capitatum var. *gustatum*

Federally Endangered

Biennial herb • Up to 2.5 feet tall • Woody base • Yellow or yellow-orange flowers up to 1 inch long • Narrow, lance-shaped leaves

Found in dunes along the San Joaquin River east of Antioch • Bloom from March to July • Potential to occur at Antioch Dunes National Wildlife Refuge



Giant Garter Snake

Giant Garter Snake

Thamnophis gigas

Federally Threatened

Up to 6.5 ft long • Brown or olive above • Two alternating rows of small dark spots between stripes on each side

Occurs primarily in wetland areas (sloughs, streams, ditches, etc.) • Uses rodent burrows for shelter & wintering • Feeds on fish, tadpoles & frogs • Emerges from burrows to breed & forage in April



Lange's Metalmark Butterfly

Apodemia mormo langei

Federally Endangered

Small butterfly with a wingspan up to 1.5 inches • Wings are orange at their base, black to brown toward their tips & covered with small white spots

Inhabit sandy areas where their host plant, naked buckwheat, grows • Now found only in the Antioch Dunes National Wildlife Refuge



Large-Flowered Fiddleneck

Amsinckia grandiflora

Federally Endangered

Annual • Up to 2 feet tall • Red-orange, tubular flowers (1/2 to 2 inches) in fiddlehead-shaped display • Green, hairy leaves & stems

Found in woodlands and grasslands on north-facing slopes • Blooms from March to May • Three remaining populations identified



Longhorn Fairy Shrimp

Branchinecta longiantenna

Federally Endangered

About 1 inch long • Delicate, transparent body • Swim upside-down

Inhabit seasonal grassy pools & sandstone depressions • Hatch, grow & lay eggs after winter rains • Eggs remain in dried pools during summer • Found in the eastern portion of the Central Coast Range • Feed on algae, bacteria & protozoa

Federally Protected Species



Pallid Manzanita

Arctostaphylos pallida

Federally Threatened
Shrub • Up to 13 feet tall • Rough gray or reddish bark • Oval to triangular leaves about 1.5 inches long and 1 inch wide • Many white, urn-shaped flowers

Found in maritime chaparral habitat and coastal scrub with other Manzanita species • Blooms from December to March



Salt-Marsh Harvest Mouse

Reithrodontomys raviventris

Federally Endangered
Small rodent up to 3 inches • Rich brown to orange-brown with cinnamon to whitish belly • Long, thick tail

Inhabit tidal marshes with pickleweed • Forage in nearby grasslands • Active at night • Found in and around San Francisco Bay



San Bruno Elfin Butterfly

Callophrys mossii bayensis

Federally Endangered
Small, brownish butterfly with a 1-inch wingspan • Males: grayish brown upper wing surface • Females: light brown to tan upper wing surface with dark borders

Inhabit rocky outcrops & cliffs in coastal scrub where their host plant, stonecrop, grows • Found near San Bruno mountain and Mount Diablo



San Joaquin Kit Fox

San Joaquin Kit Fox

Vulpes macrotis mutica

Federally Endangered
Small (up to 20 inches long), light buff or gray fox with a white belly • Weigh about 5 pounds • Very large ears

Inhabit grasslands • Found in the Central Valley • Active at night • Use underground dens • Feed on mice, rabbits & small mammals



Santa Cruz Tarplant

Santa Cruz Tarplant

Holocarpha macradenia

Federally Threatened
Annual herb • Up to 1.5 feet tall • Yellow flowers in the sunflower family (about ½ inch) • Upper leaves rolled-under and bristly

Found along grassy coastal terraces & valley/foothill grasslands • Bloom in the summer



Soft Bird's-Beak

Soft Bird's-Beak

Cordylanthus mollis ssp. *mollis*

Federally Endangered
Annual herb • About 1 foot tall • Grayish-green, hairy, lance-shaped leaves • White or yellowish-white flowers

Found in saltgrass/pickleweed marshes near tidal areas • Occur in San Pablo Bay and Suisun Bay area • Bloom from July to September

Federally Protected Species



Swainson's Hawk

Buteo swainsoni

Federally Protected Migratory Bird
Up to 19" long & with a wingspan up to 51" • Dark brown plumage with a brown chest, pale belly & white throat patch

Found in open habitats • Return to the Central Valley (Feb. - Sept.) & winter in Mexico & South America • Nest in large trees • Feed on small mammals (breeding season) & insects (non-breeding season)



Tricolored Blackbird

Agelaius tricolor

Federally Protected Migratory Bird
Medium-sized bird (4.5-10" long) • Sharply-pointed bill • Males: black with red & white shoulder patches • Females: black with grey streaks & small red shoulder patch

Found in marshy habitats in summer, open habitats at other times of year • Socialize in dense colonies • Eat insects, grains, snails & small clams



Vernal Pool Fairy Shrimp

Branchinecta lynchi

Federally Threatened
Up to 1 inch long • Delicate, transparent body • Swim upside-down

Inhabit seasonal pools & mud-bottomed depressions in grasslands • Hatch, grow & lay eggs after winter rains • Eggs remain in dried pools during summer • Found in the Central Valley • Feed on algae, bacteria & protozoa

Federally Protected Species



Vernal Pool Tadpole Shrimp

Lepidurus packardii

Federally Endangered

Up to 4 inches long • Broad, shield-shaped shell • Narrow trunk & long tail • Crawl along pond bottoms

Inhabit seasonal pools & mud-bottomed depressions in grasslands • Hatch, grow & lay eggs after winter rains • Eggs remain in dried pools during summer • Feed on dead plants & animals & invertebrates



Valley Elderberry Longhorn Beetle

Desmocerus californicus dimorphus

Federally Threatened

About 1/2 inch long • Long tube-like bodies • Long antennae • Males: red forewings with dark green spots • Females: dark metallic forewings and red edges

Found on elderberry bushes along rivers and streams • Adults active from March to June • Found in the California Central Valley



Western Burrowing Owl

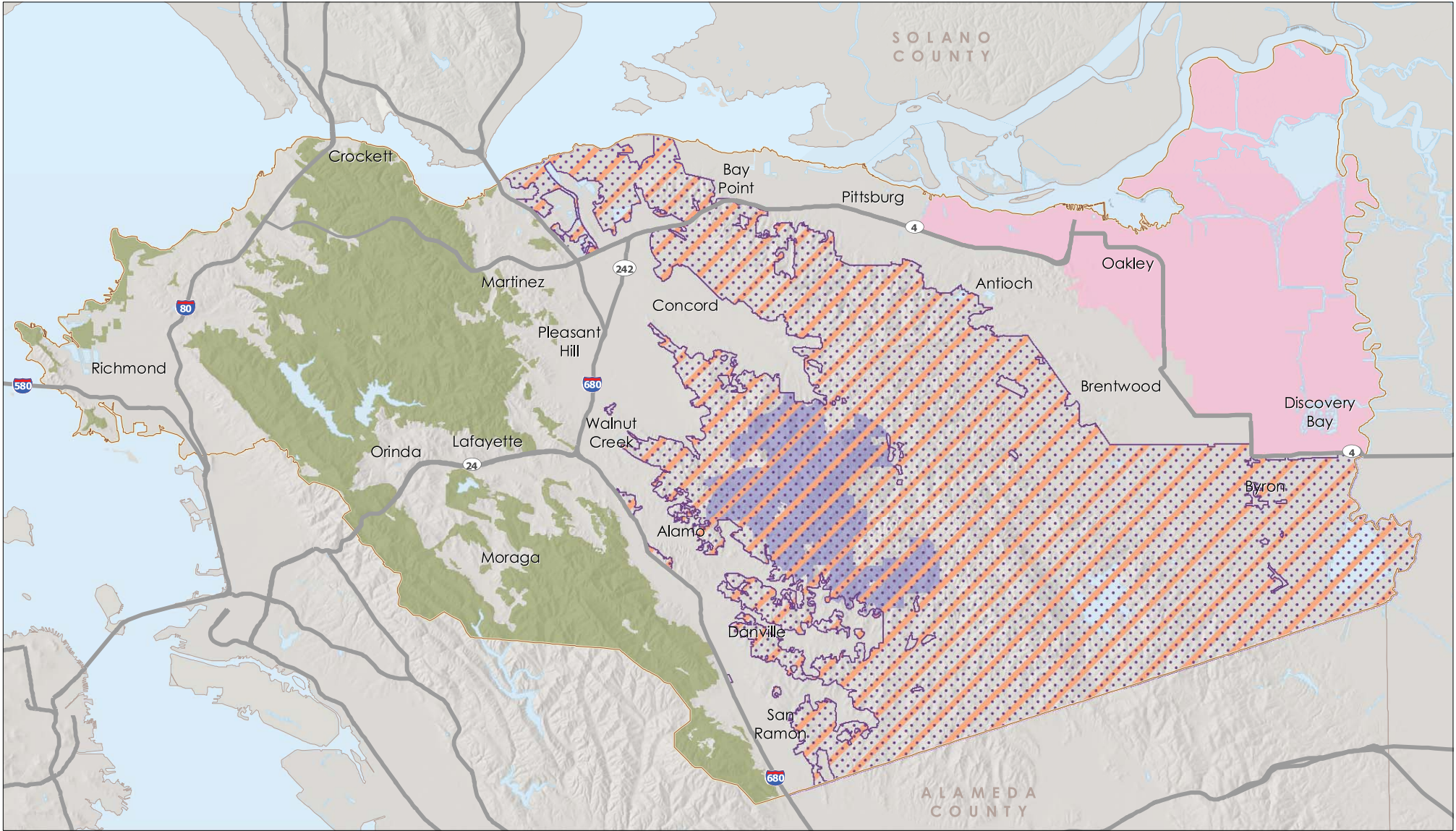
Athene cunicularia

Federally Protected Migratory Bird

Up to 9.5" tall & with a wingspan up to 21" • Brown with white spotting, white throat, yellow eyes, long legs & arched white eyebrow

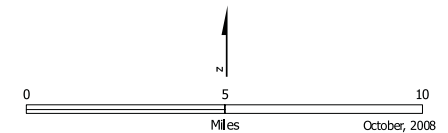
Found in open landscapes • Active around sunrise & sunset • Use ground squirrel burrows • Perch in or near burrows & on fence posts

Grassland and Oak Savannah Species Ranges

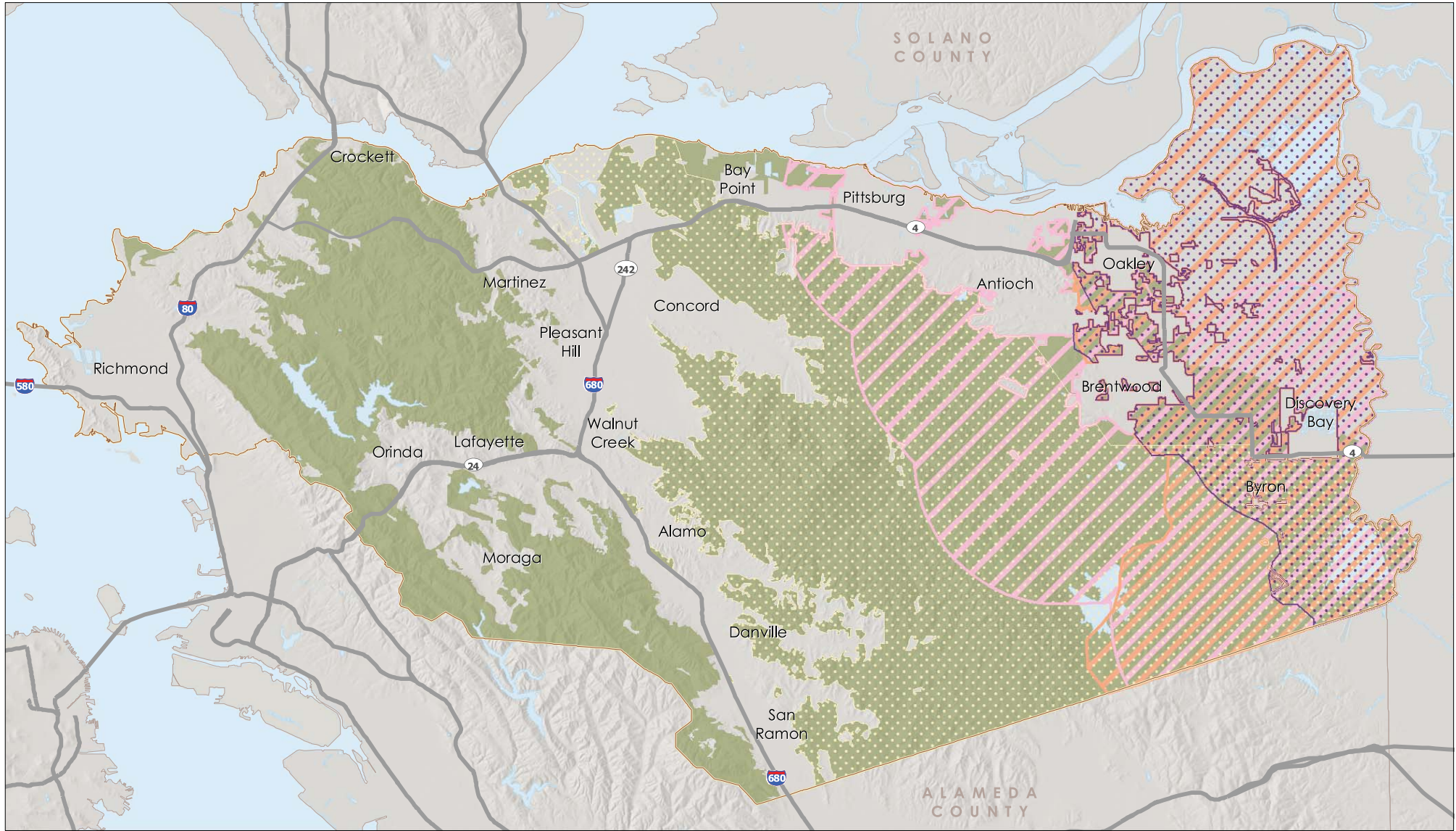


Grassland Species

- Bay Checkerspot Butterfly
- Callippe Silverspot Butterfly
- California Tiger Salamander
- Lange's Metalmark Butterfly
- San Joaquin Kit Fox

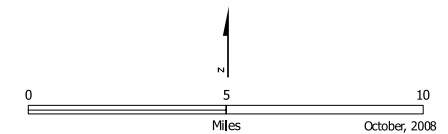


Aquatic Species Ranges

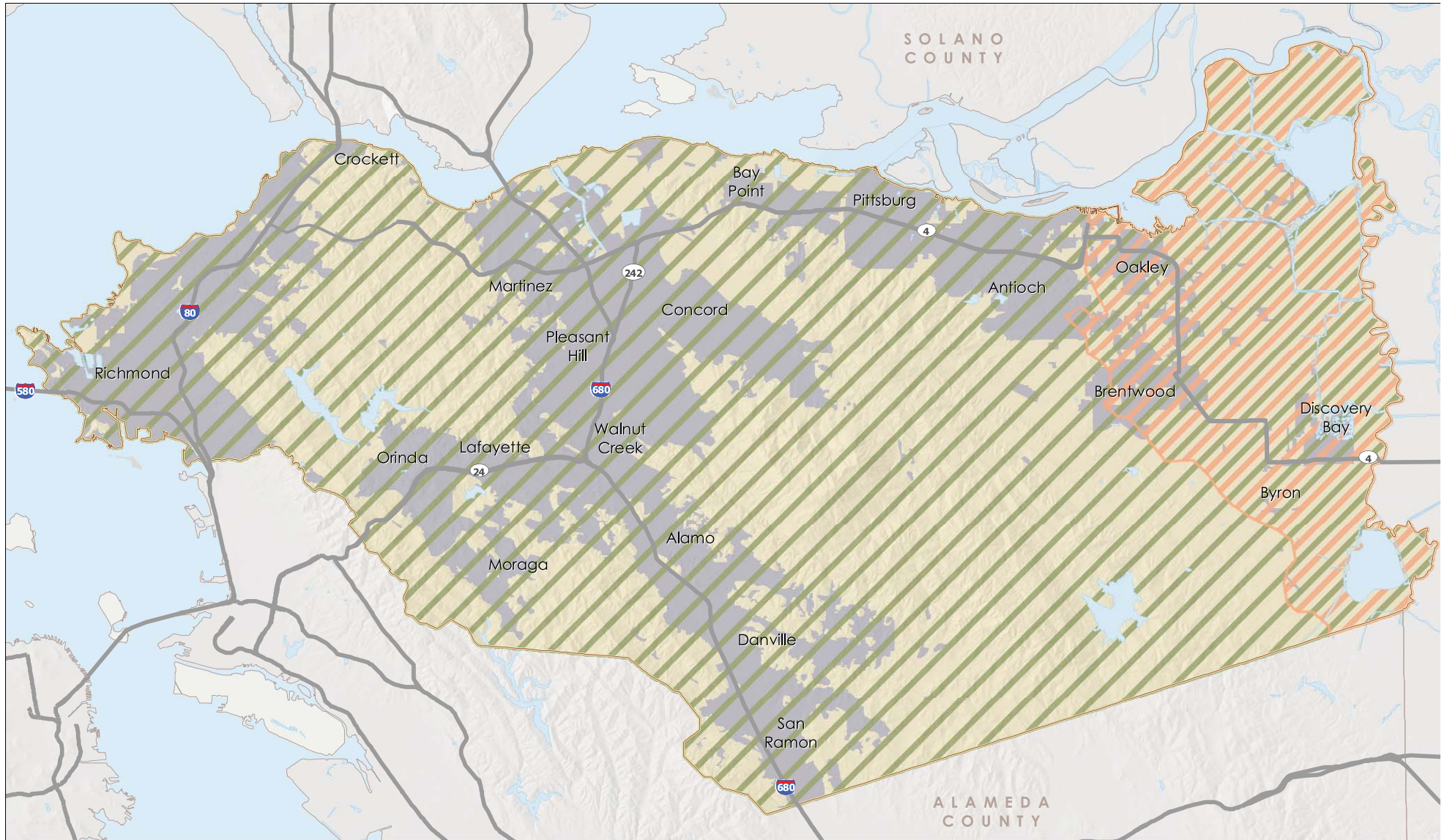


Aquatic Species

- California Red-Legged Frog
- California Tiger Salamander
- Giant Garter Snake
- Valley Elderberry Longhorn Beetle
- Longhorn Fairy Shrimp, Tadpole Shrimp & Vernal Pool Fairy Shrimp

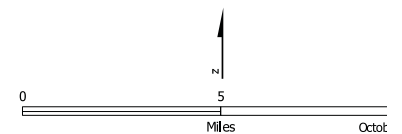


Migratory Bird Ranges

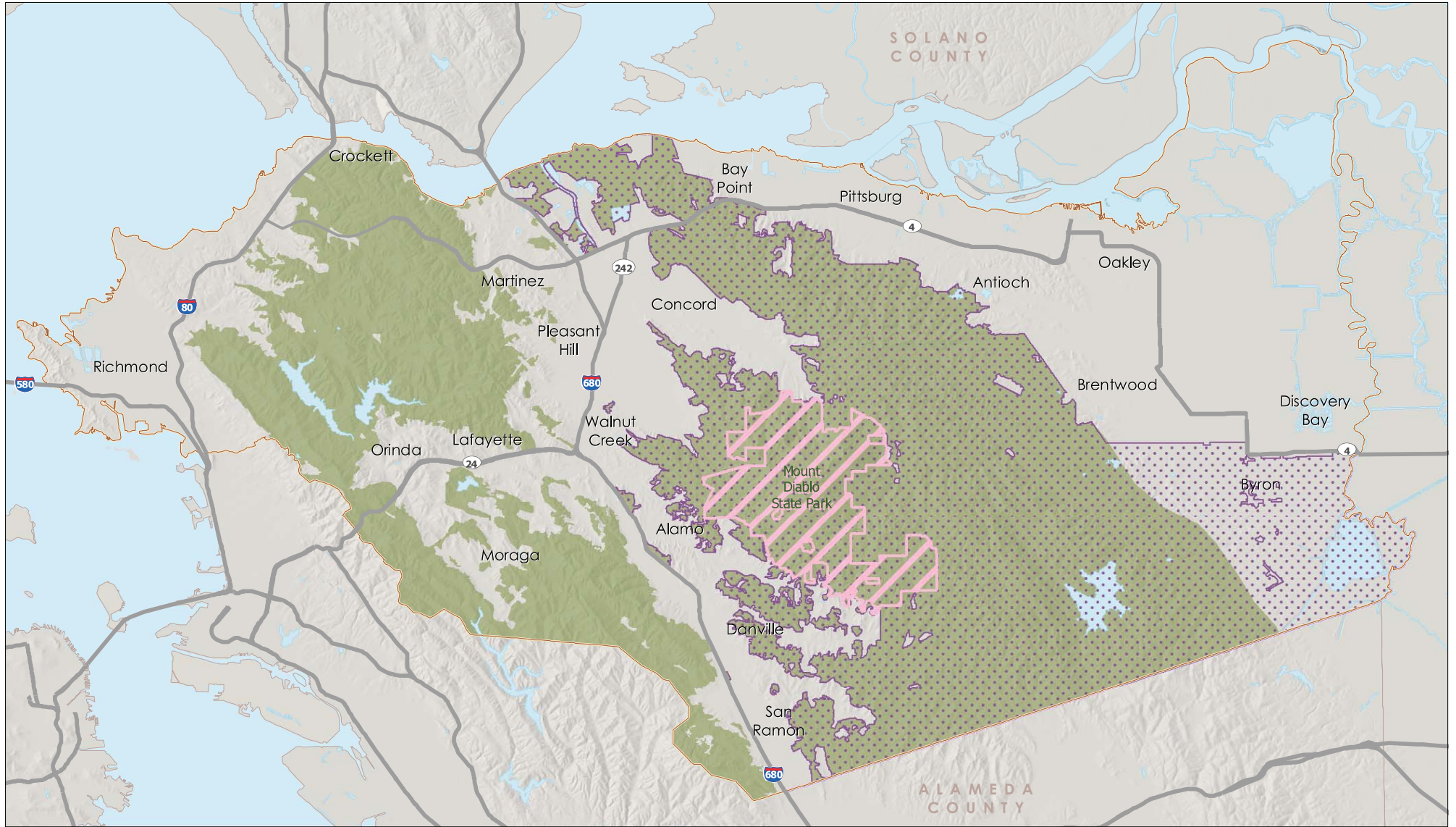


Migratory Bird Species




- Burrowing Owl**
Burrowing owls may occur throughout Contra Costa County, except the most urban areas.
- Other Migratory Birds**
Migratory birds may occur throughout Contra Costa County, including urban areas.
- Urban Areas**
- Swainson's Hawk**

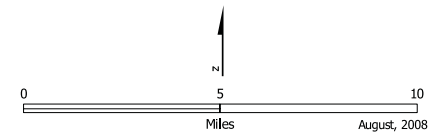


Scrub Species Ranges

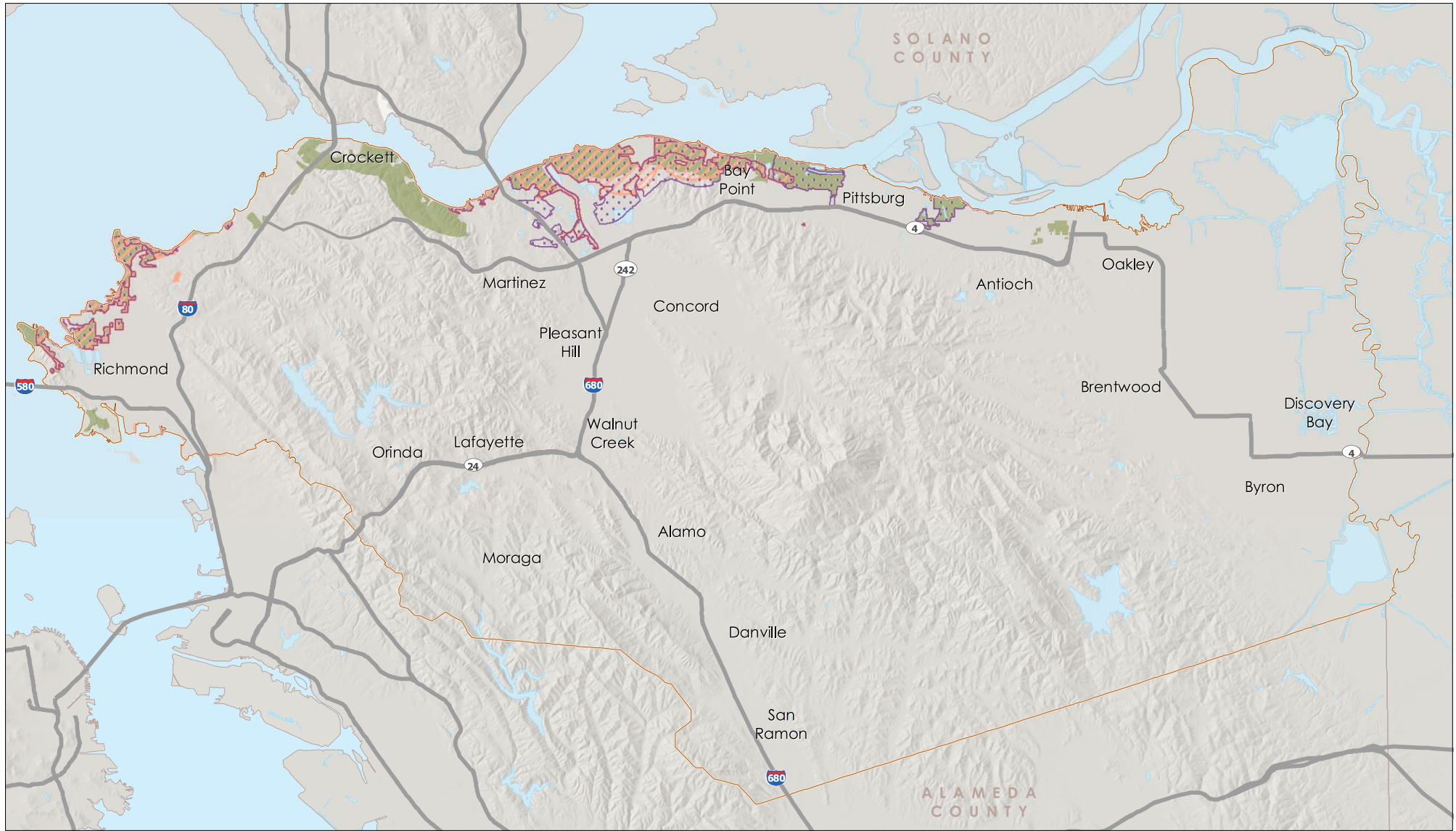


Scrub Species

-  Alameda Whipsnake
-  San Bruno Elfin Butterfly
-  San Joaquin Kit Fox

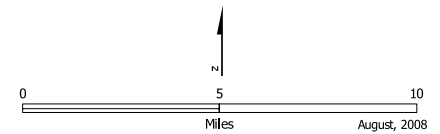


Salt Marsh Species Ranges



Salt Marsh Species

- California Clapper Rail
- Salt Marsh Harvest Mouse
- California Least Tern



How Does This Guidebook Work?

STEP 1

Identify Treatment & Project Area with BMP treatment guide

STEP 2

Identify potential funding sources for the project

PRIVATE FUNDING?

AGENCY FUNDING?

STEP 3

Use BMP guide to determine if listed wildlife (listed plants not applicable if no federal nexus) are present or likely to occur in your project area?

Use BMP guide to determine regulatory/permitting requirements & timelines. Work with funding agency or identified permitting/regulatory agency to determine if listed wildlife or plants are in the project area.

YES: Listed wildlife are in the project area - can you scope your project with BMP measures to avoid impacts?

NO: Listed wildlife are not likely in the project area - move ahead with your project but consider BMP's if there are any concerns.

YES: Species are present or likely to occur in the project area. Can BMP's avoid project impacts to species?

NO: Species not present in the area. Wait for agency letter clearing project to go ahead.

YES: Project can be scoped to avoid impacts. Move ahead with project.

NO: Consider another project altering project area. If project is implemented and federally protect wildlife are harassed, harmed or killed, you will be in violation of the ESA and MBTA. Work with your partners and or fire safe council to determine project options and feasibility before discontinuing fuel reduction efforts.

YES: Use BMP guide and work with funding/regulatory agency to avoid impacts to species. Once clearance letter is received, go ahead with project.

NO: Work with funding/regulatory agency to acquire a permit/clearance (consider timeline and funding). Proceed with ESA Section 7 or aquire permit to move ahead with project.

OR

Consider a different project that meets project, funding, and regulatory concerns.

This guidebook is intended to inform project design and provide recommendations for avoidance of protected resources; however it is not a compliance document. It is recommended that you confirm your project approach with the USFWS before moving forward.





Chapter 2: Habitats in Contra Costa County

As discussed in the previous chapter, Contra Costa County is characterized by a variety of habitat types that you may be working in or near, which support a diverse assemblage of plants and animals. Vegetation communities and wildlife habitats are often divided into detailed classifications as part of biological inventories; however broader categories can be used when discussing hazardous fuel treatment types and associated Best Management Practices (BMP's). The fundamental habitats can be distinguished based on some key characteristics of the vegetation as depicted in the provided images.

- Grassland – dominated by herbaceous (non-woody) grass species, low in stature with new growth every spring
- Woodland – characterized by tree overstory which may have a closed or semi-closed canopy
- Scrub – dense or scattered assemblage of shrubs, which are woody plants distinguished from trees by multiple stems and lower height (usually less than 15-20 feet tall)
- Oak savanna – open grasslands with widely scattered oak trees
- Landscaped/Ornamental – planted areas around homes, businesses, and other developed areas; typically non-native trees and shrubs, although native species are increasing used
- Aquatic – vegetation primarily influenced by the presence of water the entire (perennial) or a portion (ephemeral) of the year; numerous habitat types supporting distinct vegetation and wildlife species, usually not targeted for hazardous fuel treatments



Habitats: Grassland (opposite), Woodland (top) & Scrub (bottom)



Habitats: Oak savanna (top) & ornamental (bottom)

- Riparian – hydrophilic (water-loving) vegetation associated with creeks, streams, or drainages (intermittent or continually running water)
- Pond/lake - inland depression or dammed/bermed river, creek, or drainage containing standing water; often characterized by hydrophilic vegetation along perimeter
- Freshwater marsh – relatively shallow water containing low concentrations of dissolved salts and other total dissolved solids (less than 0.5 parts per thousand dissolved salts); typically characterized by herbaceous hydrophilic vegetation which may take various growth forms such as emergent or floating-leaved
- Seasonal wetland/vernal pools – pools or depressions that retain water in spring but dry up in summer, typically characterized by hydrophilic forbs and grasses
- Salt marsh – influenced by tidal action, salty or brackish water, and dominated by halophytic (salt tolerant) herbaceous plants

What are the most suitable vegetation management treatments for my habitat type?

The frequency and type of management employed depends upon the vegetation in the area. Grassland fires are typically less damaging than fires in other cover types, however it is important that grasslands be maintained to effectively minimize fire risk. Shrubs, such as coyote bush and poison oak, burn hotter than grasses, making fires in brush more difficult to suppress. Unless controlled, shrubs can invade both grasslands and oak woodlands. Shrub encroachment into oak woodlands can jeopardize the oaks because shrubs can generate enough heat to consume the oak canopy and kill the surrounding trees. Grasses, which grow rapidly, must be managed more often than the slower growing shrubs. Similarly, shrubs must be managed more frequently than oaks. In contrast to grasslands, regeneration and fuel accumulation in oak woodlands is slow and only requires treatment approximately every ten years.

It is also important to consider the extent of the area when selecting a fuel management program. Some treatments, such as prescribed burning, are appropriate only in large, open spaces. Other management options, such as the use of skilled labor or re-

vegetation, are only cost-effective in small areas, such as in fields less than 40 acres in size. Small area treatments can be executed with a greater degree of refinement than those in more extensive areas.

A combination of techniques is often used to reduce fire hazard in a particular area. In order of decreasing effectiveness, the following approaches may be taken to minimize fire resistance to control:

1. Reduce the total amount of fuels to burn;
2. Arrange the horizontal and vertical spacing of vegetation so that the fire cannot spread;
3. Reduce the flammability of fuels by increasing moisture in the current vegetation or by changing to a less flammable vegetation type.

As identified in the previous chapter, the primary vegetation management treatment types include:

- Hand Thinning
- Mechanical Treatments
- Chemical Treatments
- Prescribed Burning
- Grazing

The effectiveness and suitability of these treatment types and specific techniques within the different habitats found in Contra Costa County vary depending on vegetation structure and habitat sensitivity. Hand thinning and grazing treatments are suitable for all habitat types, while the use of mechanical and chemical treatments and prescribed burns should be avoided to the extent possible in riparian and aquatic habitats due to concerns regarding water quality, soil erosion and temperature. Prescribed fires can reduce vegetative cover, which can increase water temperature and drastically alter aquatic systems. If done carelessly, prescribed fire can accelerate soil erosion, increase runoff of precipitation or alter vegetation composition and structure, reducing the value of riparian zones for wildlife and recreation. The tables below can be used to determine which treatment types and specific techniques are appropriate for the habitat type in which you are working. More specific guidelines regarding these techniques should be reviewed before determining the best treatment for your needs. Additional resources are provided in



Aquatic habitats: salt marsh (top) & riparian (bottom)

Hand Thinning Technique	Cutting Line, Creating Fire Breaks	Weed Whipping	Chaparral Branch Removal	Hand-Pulling	Vista Pruning	Mosaic Thinning and Drip-line Thinning	Black Plastic Coverage	Mulch Application
Grassland	X	X					X	X
Oak Woodland	X			X	X	X		X
Oak Savanna	X	X		X		X		X
Chaparral	X		X					X
Landscaped		X	X	X	X	X	X	X

Table 3: Suitable hand thinning techniques for each habitat type

Mechanical Technique	Grading	Mowing	Discing	Overstory Removal	Tractor Based Yarding	Cable Yarding	Helicopter Yarding	Mechanical Cutting, Crushing, or Removal of Dead Material Only	Chipping or Mulching
Grassland	X	X	X						
Oak Woodland	X							X	X
Oak Savanna	X	X	X						
Chaparral/scrub	X							X	X
Landscaped	X	X		X					X
Aquatic/Riparian								X*	

*removal of dead material only – but this is to be done by hand

Table 4: Suitable mechanical techniques for each habitat type

Vegetation Management Techniques for Each Habitat

Chemical Technique	Boom-based sprayer	Hand-held Sprayer	Sponge Applicator
Grassland	X	X	X
Oak Woodland		X	X
Oak Savanna	X	X	X
Chaparral/scrub		X	X
Landscaped		X	X
Aquatic/Riparian	X*	no	no

*only if the chemical is approved for aquatic use

Table 5: Suitable chemical techniques for each habitat type



Prescribed Burning Techniques	Broadcast burning	Pile burning
Grassland	X	no
Oak Woodland	X	X
Oak Savanna	X	X
Chaparral	X	no
Landscaped	no	no
Aquatic/Riparian	no	no

Table 6: Suitable prescribed burning techniques for each habitat type

Grazing Techniques	Cattle	Goats	Sheep	Horses
Grassland	X		X	X
Oak Woodland	no	X	no	no
Oak Savanna	X	X	X	X
Chaparral/scrub		X		
Landscaped	no	X		X
Aquatic/Riparian	no	X	no	no

Table 7: Suitable grazing techniques for each habitat type

Hand Thinning Technique	Cutting Line, Creating Fire Breaks	Weed Whipping	Chaparral/Scrub Branch Removal	Hand-Pulling	Vista Pruning	Mosaic Thinning and Drip-line Thinning	Black Plastic Coverage	Mulch Application
From the Home: 0-30', 30-100'	X	X	X	X	X	X	X	X
Critical Infrastructure: 0-300'			X		X	X	X	X
Emergency Access Roads: 0-30', 30-100'		X			X	X	X	X
Community Protection: 100-300'					X	X		

Table 8: Suitable hand thinning techniques for each treatment zone

Mechanical Technique	Grading	Mowing	Discing	Overstory Removal	Tractor Based Yarding	Cable Yarding	Helicopter Yarding	Mechanical Cutting, Crushing, or Removal of Dead Material Only	Chipping or Mulching
From the Home: 0-30', 30-100'		X		X				X	X
Critical Infrastructure: 0-300'			X	X				X	X
Emergency Access Roads: 0-30', 30-100'	X	X	X	X				X	X

Table 9: Suitable mechanical techniques for each treatment zone

Vegetation Management Techniques for Each Treatment Zone

Hazard fuel treatments are often linked to the fuel management zones. Each zone may have specific actions (and post-treatment condition) associated with them, based on the distance from the structure or road, or the purpose of the treatment. Treatments nearest structures are more stringent, and more attention to detail is required because it is intended to increase individual structure survival. However, treatments further away from structures may be more broad-brush, with an associated goal of reducing fire intensity to aid containment before it reaches the community. Because of the different locations and specific post-treatment conditions in the different treatment zones, a different combination of treatment methods is appropriate in each zone as identified in the tables in this section.

Chemical Technique	Boom-based sprayer	Hand-held Sprayer	Sponge Applicator
From the Home: 0-30', 30-100'	no	X	X
Critical Infrastructure: 0-300'		X	X
Emergency Access Roads			
0-30'	X	X	X
30-100'	no	X	X
Community Protection: 100-300'	no	X	X
Community Wildland Interface: within 1.5 mile area around community	unlikely	no	X

Table 10: Suitable chemical techniques for each treatment zone

Grazing as a Fuel Reduction Technique	Cattle	Goats	Sheep	Horses
From the Home:				
0-30'	no			
30-100'	X	X	X	
Critical Infrastructure: 0-300'	X	X	X	X
Emergency Access Roads				
0-30'		X		
30-100'		X		
0-100'	X	X	X	X
Community Protection: 100-300'	X	X	X	X

Table 11: Suitable grazing techniques for each treatment zone

Prescribed Burning Techniques	Broadcast burning	Pile burning
From the Home: 0-30', 30-100'	never	never
Critical Infrastructure: 0-300'		X
Emergency Access Roads		
0-30'	X	
30-100'	no	X
0-100'	X	X
Community Protection: 100-300'	X	X
Community Wildland Interface: within 1.5 mile area around community	X	X

Table 12: Suitable prescribed burning techniques for each treatment zone



Vegetation Management Techniques & Federally Protected Species

After determining your habitat type based on the information provided above, refer to the species range maps on pages 33-37 to determine if one or more federally protected species are present or have potential to occur in your treatment area. If so, apply the BMPs for specific fuel treatment techniques as outlined in the tables and graphics below which are organized by habitat type. Depending on your project, you may find that it is appropriate to modify the fuel treatment technique or timing to avoid additional costs associated with species surveys or other avoidance measures that are recommended for activities in certain areas. General BMP guidelines that may apply to your project regardless of habitat type are also provided.

General Best Management Practices (BMPs)

- Avoid growth or use of invasive plant species. They do not provide for a firewise landscaping and provide very poor habitat conditions for many native plant and wildlife species.
- When possible, utilize native plants within a firewise planting scheme instead of an “irrigated” planting zone. Native plants provide food for butterflies and birds. Research has shown that unnaturally irrigated vegetation zones attract non-native plants and insects which are a threat to native and special status species.
 - See the S.A.F.E. Landscapes in the WUI guide from the UC Cooperative Extension Los Angeles County for some fire-safe landscaping guidance or go to the California Native Plant Society’s website to learn more about native plants.
- Avoid damaging/destroying ground burrows, holes and tunnels which provide shelter for many small animals (snakes, lizards, toads, rodents, squirrels) before, during and after a wildfire.
- Bird nest boxes and a variety of bird feeders (seeds, nectar, fruits, suet) can



California clapper rail



California red-legged frogs

provide shelter and food for birds which may lose or have reduced habitat after fuel reduction projects or a fire.

- When utilizing grazing practices, avoid overgrazing of understory and ground vegetation which may cause wildlife and watershed impacts.
- Projects within the WUI zone should consider strategic treatments which provide effective fuels treatment while protecting/avoiding impacts to wildlife travel corridors and retain some cover/shelter islands, large snags and large downed woody materials.
- Properly contain and remove trash items from the work site daily.
- Vehicles should observe a 15-mph speed limit except on City or County roads, and State and Federal highways.
- Use only native plant seeds or stocks for erosion control, unless otherwise approved by a permitting agency. The introduction of exotic plant species should be avoided to the maximum extent possible. Prevent the spread of weeds by regularly cleaning equipment, vehicles, footwear, and tires.
- Use only coconut coir matting or tackified hydroseeding compounds instead of plastic monofilament netting for erosion control to avoid wildlife entanglement or entrapment.
- Limit the number of access routes, staging areas, and the total area of the treatment activities to the minimum necessary to achieve the treatment goal.
- Only use fire-retardant and suppressant chemicals in an emergency (i.e. escaped fire) situation. If they are necessary, liberally dilute with water once safe to do so.



Western Burrowing Owl



California Tiger Salamander

Federally-Listed Plants

If using federal funding or obtaining other federal authorizations for project activities, then listed plants may be a concern. Review the species occurrence maps in Chapter 4 to determine which federally listed plants may occur in your project area. If there is a listed plant occurrence in the vicinity, consider incorporating the following avoidance measures into your project scope:

- Plan the time and funding to contract a USFWS approved botanist to survey for plants and determine if they are present in your project area

- If they do occur in the project area, most treatment activities should avoid the plant population based on the biologist's assessment (i.e. some listed plant species are tolerant of fire and moderate grazing levels); debris piles should not be placed and chip/vegetation materials should not be scattered within a 20-foot fenced/flagged radius of the plants

Vegetation Debris Piles (within 100 foot zone)

To avoid species use of piles and thus potential impact with disturbing the piles for chipping, removal or burning, the following BMPs are recommended:

- Place vegetation materials (debris pile) away from natural areas/vegetation (birds, reptiles, small mammals and amphibians may use for shelter if easy to access)
- Place away from ponds, wetlands and riparian areas (amphibians may use as shelter if easy to access)
- Construct piles with smaller pieces on the bottom and larger pieces on top to help compact and lesson tunnel/shelter affect.
- Try to dispose/remove piles within a week of creation to avoid species residence.
- Use snake-proof drift fencing around piles to prevent access. Do not use plastic mono-filament netting (erosion control netting) or similar material because frogs and snakes may become entangled in it.
- Do not use large equipment to move piles. Gather and move materials manually, and or with packs and wheel barrels.

Vegetation Debris Piles (within community and or WUI zone)

To avoid species and habitat impacts, the following BMPs are recommended:

- Depending on the number of potential vegetation/debris piles consider utilizing the aforementioned measures but also leave a few piles in strategic locations where they will not pose a fire threat. In which case, the piles would preferably be located near a natural area and or water and would remain permanently.



Nesting bird



Host plant for San Bruno elfin butterfly

Grasslands & Oak Savanna BMPs

General Guidelines for Treatments in or near Grasslands & Oak Savanna

- Conduct a Pre-Treatment Nesting Bird Survey when working between February & August in Grasslands & between December 15 & August in Oak Savanna for all treatments except grazing
- In areas with Burrowing Owl & San Joaquin Kit Fox (see map on page 33), hand thinning & grazing preferred. Conduct a Pre-Treatment Survey & implement Best Management Practices for mechanical & prescribed burn treatments (see page 53 & below)

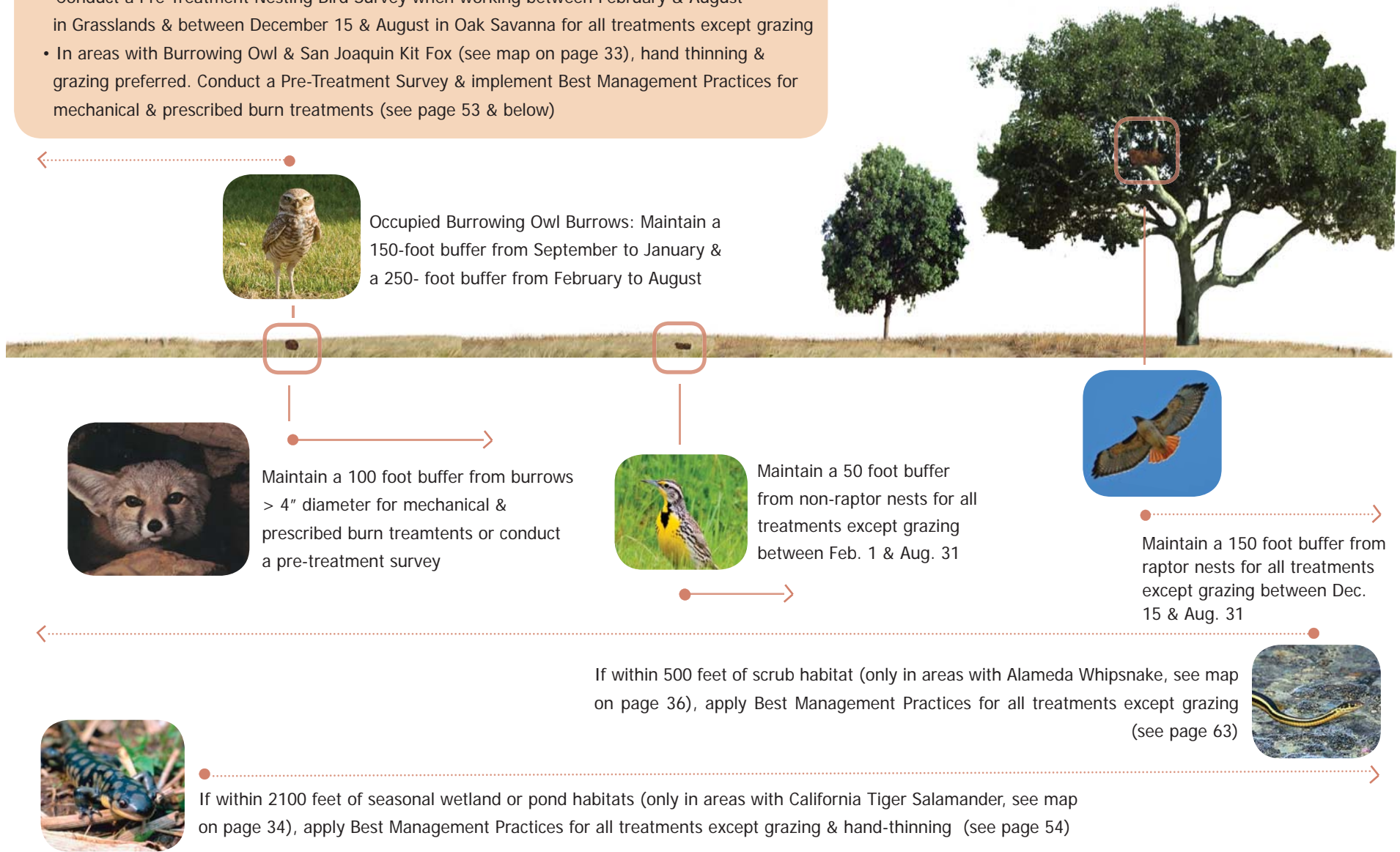


Figure 1. Best Management Practices for Hazardous Fuel Treatments in or near Grasslands and Oak Savanna

Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking, grading)	Chemical	Prescribed Burn
Burrowing Owl	None	None	<ol style="list-style-type: none"> 1. Avoid deep ripping to maintain ground squirrel and other small mammal colonies 2. Conduct pre-treatment survey for burrows and sign of burrowing owl 3. If occupied burrows are present, maintain non-disturbance buffer of: 250 feet from February 1 to August 31 (breeding season) or 150 feet September from 1 to January 31 4. Clearly mark buffer zone and conduct worker awareness training 5. Alternatively, if work will occur outside of the breeding season passive relocation may be conducted by a qualified biologist with CDFG and local agency approval 	<ol style="list-style-type: none"> 1. Conduct pre-treatment survey for burrows and sign of burrowing owl 2. If occupied burrows are present, do not apply treatment within 50 feet 3. Clearly mark buffer zone and conduct worker awareness training 4. Alternatively, if work will occur outside of the breeding season passive relocation may be conducted by a qualified biologist with CDFG and local agency approval 	<ol style="list-style-type: none"> 1. Avoid deep burning to maintain ground squirrel and other small mammal colonies 2. Conduct pre-treatment survey for burrows and sign of burrowing owl 3. If occupied burrows are present, maintain non-disturbance buffer of: 250 feet from February 1 to August 31 (breeding season) or 150 feet September from 1 to January 31 4. Clearly mark buffer zone and conduct worker awareness training 5. Alternatively, if work will occur outside of the breeding season passive relocation may be conducted by a qualified biologist with CDFG and local agency approval
San Joaquin Kit Fox	None	None	<ol style="list-style-type: none"> 1. Avoid deep ripping to maintain ground squirrel and other small mammal colonies 2. Conduct pre-treatment survey for potential dens (burrows > 4" in diameter for the length of your arm) 3. If potential dens are present, maintain non-disturbance buffer of 100 feet 4. Clearly mark buffer zone and conduct worker awareness training 5. Alternatively, a den survey can be conducted by a qualified biologist to determine presence or absence of kit fox 	<ol style="list-style-type: none"> 1. Conduct pre-treatment survey for potential dens (burrows > 4" in diameter for the length of your arm) 2. If potential dens are present, do not apply treatment within 50 feet 3. Clearly mark buffer zone and conduct worker awareness training 4. Alternatively, a den survey can be conducted by a qualified biologist to determine presence or absence of kit fox 	<ol style="list-style-type: none"> 1. Avoid deep burning to maintain ground squirrel and other small mammal colonies 2. Conduct pre-treatment survey for potential dens (burrows > 4" in diameter for the length of your arm) 3. If potential dens are present, maintain non-disturbance buffer of 100 feet 4. Clearly mark buffer zone and conduct worker awareness training 5. Alternatively, a den survey can be conducted by a qualified biologist to determine presence or absence of kit fox

Table 13 . Best Management Practices for Federally Protected Species by Vegetation Management Techniques in Grassland & Oak Savanna Habitats

Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking, grading)	Chemical	Prescribed Burn
California Tiger Salamander	None	None	<ol style="list-style-type: none"> 1. Implement treatments during daylight hours 2. Avoid deep ripping to maintain ground squirrel and other small mammal colonies 3. Avoid discing, grading, excavation or any other subsurface disturbance of grasslands or oak savanna within 2,100 feet of ponds or seasonal wetlands that provide potential breeding habitat. Consult a qualified biologist to conduct a habitat assessment if unknown. 4. Check stationary equipment for salamanders prior to moving 5. Conduct worker awareness training 6. If an injured salamander is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for capture and treatment <p>If subsurface disturbance of grasslands or oak savanna within 2,100 feet of potential aquatic habitat is necessary, implement the following practices/procedures and consult the USFWS:</p> <ol style="list-style-type: none"> 1. Apply treatment in late summer, before fall rains (August-October) when adults and metamorphs have left ponds and are settled in underground refugia 2. Have personnel trained in the identification of California tiger salamander and their habitat conduct a pre-treatment survey of the area and monitoring of the treatment activities 	<ol style="list-style-type: none"> 1. Implement treatments during daylight hours 2. Avoid application within 2,100 feet of ponds or seasonal wetlands that provide potential breeding habitat. Consult a qualified biologist to conduct a habitat assessment if unknown. 3. Conduct worker awareness training 4. If an injured salamander is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for capture and treatment <p>If chemical treatment of grasslands or oak savanna within 2,100 feet of potential aquatic habitat is necessary, implement the following practices/procedures and consult the USFWS:</p> <ol style="list-style-type: none"> 1. Apply treatment in late summer, before fall rains (August-October) when adults and metamorphs have left ponds and are settled in underground refugia 2. Have personnel trained in the identification of California tiger salamander and their habitat conduct a pre-treatment survey of the area 	<ol style="list-style-type: none"> 1. Implement treatments during daylight hours 2. Avoid deep burning to maintain ground squirrel and other small mammal colonies 3. Avoid prescribed burns in grasslands or oak savanna within 2,100 feet of ponds or seasonal wetlands that provide potential breeding habitat. Consult a qualified biologist to conduct a habitat assessment if unknown. 4. Check stationary equipment for salamanders prior to moving 5. Conduct worker awareness training 6. If an injured salamander is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for capture and treatment <p>If prescribed burning of grasslands or oak savanna within 2,100 feet of potential aquatic habitat is necessary, implement the following practices/procedures and consult the USFWS:</p> <ol style="list-style-type: none"> 1. Apply treatment in late summer, before fall rains (August-October) when adults and metamorphs have left ponds and are settled in underground refugia 2. Have personnel trained in the identification of California tiger salamander and their habitat conduct a pre-treatment survey of the area and monitoring of the treatment activities

Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking, grading)	Chemical	Prescribed Burn
Nesting birds	<ol style="list-style-type: none"> 1. If conducting work between February and August in grasslands or between December 15 and August in oak savanna, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests 2. If active non-raptor nests are present, maintain a 50 foot non-disturbance buffer zone 3. If active raptor nests are present, maintain a 150 foot non-disturbance buffer zone 4. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 5. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 6. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for treatment 	Avoid over grazing	<ol style="list-style-type: none"> 1. If conducting work between February and August in grasslands or between December 15 and August in oak savanna, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests 2. If active non-raptor nests are present, maintain a 50 foot non-disturbance buffer zone 3. If active raptor nests are present, maintain a 150 foot non-disturbance buffer zone 4. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 5. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 6. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for treatment 	<ol style="list-style-type: none"> 1. If conducting work between February and August in grasslands or between December 15 and August in oak savanna, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests 2. If active non-raptor nests are present, maintain a 50 foot non-disturbance buffer zone 3. If active raptor nests are present, maintain a 150 foot non-disturbance buffer zone 4. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 5. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 6. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for treatment 	<ol style="list-style-type: none"> 1. If conducting work between February and August in grasslands or between December 15 and August in oak savanna, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests 2. If active non-raptor nests are present, maintain a 50 foot non-disturbance buffer zone 3. If active raptor nests are present, maintain a 150 foot non-disturbance buffer zone 4. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 5. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 6. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for treatment

Table 13 Cont'd (Above and Opposite). Best Management Practices for Federally Protected Species by Vegetation Management Techniques in Grassland & Oak Savanna Habitats

Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking)	Chemical	Prescribed Burn
Bay Checkerspot Butterfly	<ul style="list-style-type: none"> Have a qualified biologist conduct a pre-treatment survey of serpentine areas for the species host plants - dwarf plantain (<i>Plantago erecta</i>), purple owl's clover (<i>Castilleja densiflora</i>), and exserted paintbrush (<i>Castilleja exserta</i>) If present, avoid disturbance to host plants by delineating boundary of population and clearly marking it as a non-disturbance area Conduct worker awareness training 	Avoid over grazing	<ul style="list-style-type: none"> Have a qualified biologist conduct a pre-treatment survey of serpentine areas for the species host plants - dwarf plantain (<i>Plantago erecta</i>), purple owl's clover (<i>Castilleja densiflora</i>), and exserted paintbrush (<i>Castilleja exserta</i>) If present, avoid disturbance to host plants by delineating boundary of population and clearly marking it as a non-disturbance area Conduct worker awareness training 	<ul style="list-style-type: none"> Have a qualified biologist conduct a pre-treatment survey of serpentine areas for the species host plants - dwarf plantain (<i>Plantago erecta</i>), purple owl's clover (<i>Castilleja densiflora</i>), and exserted paintbrush (<i>Castilleja exserta</i>) If present, avoid application within 100 feet of host plants by delineating boundary of population and clearly marking a non-disturbance buffer area Conduct worker awareness training 	<ul style="list-style-type: none"> Have a qualified biologist conduct a pre-treatment survey of serpentine areas for the species host plants - dwarf plantain (<i>Plantago erecta</i>), purple owl's clover (<i>Castilleja densiflora</i>), and exserted paintbrush (<i>Castilleja exserta</i>) If present, avoid burning of host plants by delineating boundary of population and clearly marking it as a non-disturbance area. Use fire breaks or other appropriate means to protect the area from burning. Conduct worker awareness training
Callipe Silverspot Butterfly	<ul style="list-style-type: none"> Have a qualified biologist conduct a pre-treatment survey of grassland areas for the species host plant - Johnny-jump-up (<i>Viola pedunculata</i>) If present, avoid disturbance to host plants by delineating boundary of population and clearly marking it as a non-disturbance area Conduct worker awareness training 	Avoid over grazing	<ul style="list-style-type: none"> Have a qualified biologist conduct a pre-treatment survey of grassland areas for the species host plant - Johnny-jump-up (<i>Viola pedunculata</i>) If present, avoid disturbance to host plants by delineating boundary of population and clearly marking it as a non-disturbance area Conduct worker awareness training 	<ul style="list-style-type: none"> Have a qualified biologist conduct a pre-treatment survey of grassland areas for the species host plant - Johnny-jump-up (<i>Viola pedunculata</i>) If present, avoid application within 100 feet of host plants by delineating boundary of population and clearly marking a non-disturbance buffer area Conduct worker awareness training 	<ul style="list-style-type: none"> Have a qualified biologist conduct a pre-treatment survey of grassland areas for the species host plant - Johnny-jump-up (<i>Viola pedunculata</i>) If present, avoid burning of host plants by delineating boundary of population and clearly marking it as a non-disturbance area. Use fire breaks or other appropriate means to protect the area from burning. Conduct worker awareness training
Lange's Metalmark Butterfly	<ul style="list-style-type: none"> Have a qualified biologist conduct a pre-treatment survey of sandy areas for the species host plant - naked buckwheat (<i>Eriogonum nudum</i> spp. <i>auriculatum</i>) If present, avoid disturbance to host plants by delineating boundary of population and clearly marking it as a non-disturbance area Conduct worker awareness training 	Avoid over grazing	<ul style="list-style-type: none"> Have a qualified biologist conduct a pre-treatment survey of sandy areas for the species host plant - naked buckwheat (<i>Eriogonum nudum</i> spp. <i>auriculatum</i>) If present, avoid disturbance to host plants by delineating boundary of population and clearly marking it as a non-disturbance area Conduct worker awareness training 	<ul style="list-style-type: none"> Have a qualified biologist conduct a pre-treatment survey of sandy areas for the species host plant - naked buckwheat (<i>Eriogonum nudum</i> spp. <i>auriculatum</i>) If present, avoid application within 100 feet of host plants by delineating boundary of population and clearly marking a non-disturbance buffer area Conduct worker awareness training 	<ul style="list-style-type: none"> Have a qualified biologist conduct a pre-treatment survey of sandy areas for the species host plant - naked buckwheat (<i>Eriogonum nudum</i> spp. <i>auriculatum</i>) If present, avoid burning of host plants by delineating boundary of population and clearly marking it as a non-disturbance area. Use fire breaks or other appropriate means to protect the area from burning. Conduct worker awareness training

Table 13 Cont'd. Best Management Practices for Federally Protected Species by Vegetation Management Techniques in Grassland & Oak Savanna Habitats

Woodlands BMPs

General Guidelines for Treatments in or near Woodlands

- Conduct a Pre-Treatment Survey Nesting Bird Survey when working between December 15 & August 31 for all treatments except grazing

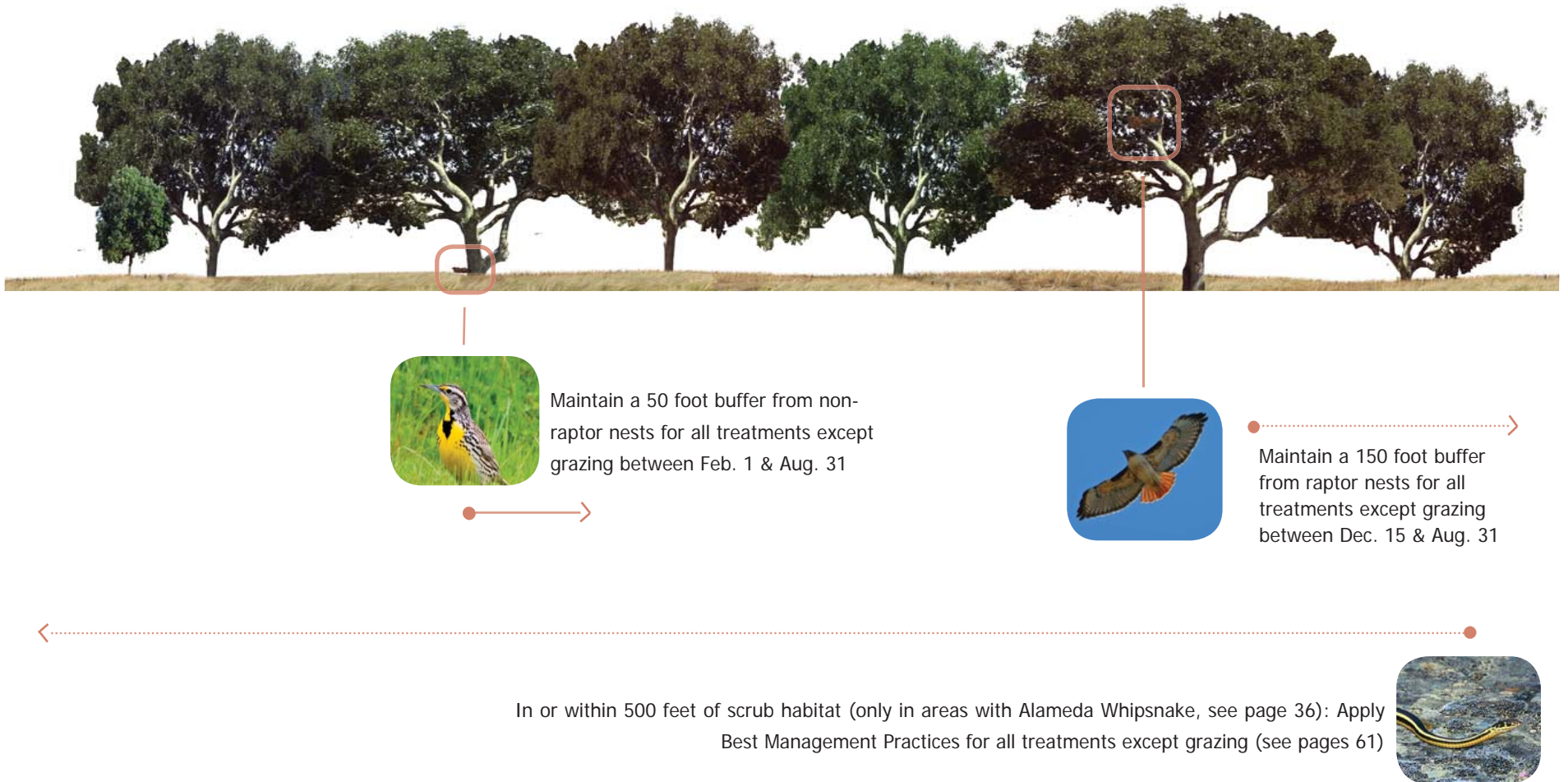


Figure 2. Best Management Practices for Hazardous Fuel Treatments in or near Woodlands

Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking, grading)	Chemical	Prescribed Burn
Nesting birds	<ol style="list-style-type: none"> 1. If conducting work between December 15 and August 31 in woodlands, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment 2. If active non-raptor nests are present, maintain a 50 foot non-disturbance buffer zone 3. If active raptor nests are present, maintain a 150 foot non-disturbance buffer zone 4. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 5. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 6. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for treatment 	<p>Avoid over grazing</p> <p>Use browse cages to protect oak saplings from grazers</p>	<ol style="list-style-type: none"> 1. If conducting work between December 15 and August 31 in woodlands, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment 2. If active non-raptor nests are present, maintain a 50 foot non-disturbance buffer zone 3. If active raptor nests are present, maintain a 150 foot non-disturbance buffer zone 4. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 5. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 6. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for treatment 	<ol style="list-style-type: none"> 1. If conducting work between December 15 and August 31 in woodlands, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment 2. If active non-raptor nests are present, maintain a 50 foot non-disturbance buffer zone 3. If active raptor nests are present, maintain a 150 foot non-disturbance buffer zone 4. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 5. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 6. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for treatment 	<ol style="list-style-type: none"> 1. If conducting work between December 15 and August 31 in woodlands, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment 2. If active non-raptor nests are present, maintain a 50 foot non-disturbance buffer zone 3. If active raptor nests are present, maintain a 150 foot non-disturbance buffer zone 4. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 5. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 6. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for treatment



Woodland Habitat

Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking, grading)	Chemical	Prescribed Burn
Swainson's hawk	If treatment will occur within Swainson's hawk range (see map page 35) see landscaped/ ornamental BMP table.	None	If treatment will occur within Swainson's hawk range (see map page 35) see landscaped/ ornamental BMP table.	If treatment will occur within Swainson's hawk range (see map page 35) see landscaped/ ornamental BMP table.	If treatment will occur within Swainson's hawk range (see map page 35) see landscaped/ ornamental BMP table.
Alameda whipsnake	If treatment will occur within 500 feet of scrub habitat see scrub BMP table.	None	If treatment will occur within 500 feet of scrub habitat see scrub BMP table.	If treatment will occur within 500 feet of scrub habitat see scrub BMP table.	If treatment will occur within 500 feet of scrub habitat see scrub BMP table.
California tiger salamander	If treatment will occur within 2,100 feet of breeding habitat see grassland and oak savannah BMP table.	None	If treatment will occur within 2,100 feet of breeding habitat see grassland and oak savannah BMP table.	If treatment will occur within 2,100 feet of breeding habitat see grassland and oak savannah BMP table.	If treatment will occur within 2,100 feet of breeding habitat see grassland and oak savannah BMP table.

Table 14 (Above and Opposite). Best Management Practices for Federally Protected Species by Vegetation Management Techniques in Woodland Habitats

Scrub Habitat BMPs

General Guidelines for Treatments in or near Scrub Habitats

- Conduct a Pre-Treatment Nesting Bird Survey when working between February 1 & August 31 for all treatments except grazing
- In areas with Alameda Whipsnake & San Joaquin Kit Fox (see map on page 36): Hand thinning & grazing preferred
- Additional Best Management Practices found on pages 61-63.



In areas with San Joaquin Kit Fox (see map on page 36): Maintain a 100 foot buffer from burrows > 4" diameter for mechanical & prescribed burn treatments or conduct a pre-treatment survey



Maintain a 50 foot buffer from non-raptor nests for all treatments except grazing between February 1 & August 31



In or within 500 feet of scrub habitat (only in areas within the range of Alameda Whipsnake, see page 36):

- Apply Best Management Practices (see page 63)
- Conduct mechanical & prescribed burn treatments between November 1 & March 15
- Maintain at least 25% scrub canopy cover for all treatments

Figure 3. Best Management Practices for Hazardous Fuel Treatments in or near Scrub Habitat

Scrub Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking)	Chemical	Prescribed Burn
San Joaquin Kit Fox	None	None	<ol style="list-style-type: none"> 1. Avoid deep ripping to maintain ground squirrel and other small mammal colonies 2. Conduct pre-treatment survey for potential dens (burrows > 4" in diameter for the length of your arm) 3. If potential dens are present, maintain non-disturbance buffer of 100 feet 4. Clearly mark buffer zone and conduct worker awareness training 5. Alternatively, a den survey can be conducted by a qualified biologist to determine presence or absence of kit fox 	<ol style="list-style-type: none"> 1. Conduct pre-treatment survey for potential dens (burrows > 4" in diameter for the length of your arm) 2. If potential dens are present, do not apply treatment within 50 feet 3. Clearly mark buffer zone and conduct worker awareness training 4. Alternatively, a den survey can be conducted by a qualified biologist to determine presence or absence of kit fox 	<ol style="list-style-type: none"> 1. Avoid deep burning to maintain ground squirrel and other small mammal colonies 2. Conduct pre-treatment survey for potential dens (burrows > 4" in diameter for the length of your arm) 3. If potential dens are present, maintain non-disturbance buffer of 100 feet 4. Clearly mark buffer zone and conduct worker awareness training 5. Alternatively, a den survey can be conducted by a qualified biologist to determine presence or absence of kit fox
California Tiger Salamander	None	None	If treatment will occur within 2,100 feet of breeding habitat see grassland and oak savannah BMP table.	If treatment will occur within 2,100 feet of breeding habitat see grassland and oak savannah BMP table.	If treatment will occur within 2,100 feet of breeding habitat see grassland and oak savannah BMP table.
San Bruno Elfin Butterfly	<p>Have a qualified biologist conduct a pre-treatment survey of grassland and scrub areas for the species host plant stonecrop (<i>Sedum spathulifolium</i>).</p> <p>If present, avoid disturbance to host plants by delineating boundary of population and clearly marking it as a non-disturbance area</p> <p>Conduct worker awareness training</p>	Avoid over grazing	<p>Have a qualified biologist conduct a pre-treatment survey of grassland and scrub areas for the species host plant stonecrop (<i>Sedum spathulifolium</i>).</p> <p>If present, avoid disturbance to host plants by delineating boundary of population and clearly marking it as a non-disturbance area</p> <p>Conduct worker awareness training</p>	<p>Have a qualified biologist conduct a pre-treatment survey of grassland and scrub areas for the species host plant stonecrop (<i>Sedum spathulifolium</i>).</p> <p>If present, avoid disturbance to host plants by delineating boundary of population and clearly marking it as a non-disturbance area</p> <p>Conduct worker awareness training</p>	<p>Have a qualified biologist conduct a pre-treatment survey of grassland and scrub areas for the species host plant stonecrop (<i>Sedum spathulifolium</i>).</p> <p>If present, avoid disturbance to host plants by delineating boundary of population and clearly marking it as a non-disturbance area</p> <p>Conduct worker awareness training</p>

Table 15. Best Management Practices for Federally Protected Species by Vegetation Management Techniques in Scrub Habitats

Scrub Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking, grading)	Chemical	Prescribed Burn
Nesting birds	<ol style="list-style-type: none"> 1. If conducting work between February 1 and August 31, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment 2. If active nests are present, maintain a 50 foot non-disturbance buffer zone 3. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 4. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 5. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for treatment 	Avoid over grazing	<ol style="list-style-type: none"> 1. If conducting work between February 1 and August 31, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment 2. If active nests are present, maintain a 50 foot non-disturbance buffer zone 3. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 4. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 5. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for treatment 	<ol style="list-style-type: none"> 1. If conducting work between February 1 and August 31, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment 2. If active nests are present, maintain a 50 foot non-disturbance buffer zone 3. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 4. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 5. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for treatment 	<ol style="list-style-type: none"> 1. If conducting work between February 1 and August 31, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment 2. If active nests are present, maintain a 50 foot non-disturbance buffer zone 3. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 4. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 5. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for treatment

Scrub Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking)	Chemical	Prescribed Burn
Alameda Whipsnake	<ol style="list-style-type: none"> 1. Conduct worker awareness training for vegetation management crews 2. Maintain a shrub canopy cover of at least 25% 3. Maintain rock outcroppings 4. Protect rock outcroppings from vehicles with orange construction fencing 5. Check stationary equipment or vehicles for snakes prior to moving 6. If an injured snake is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for capture and treatment 	Avoid over grazing	<ol style="list-style-type: none"> 1. Consult the USFWS regarding project approach 2. Apply treatment in the fall and winter months (November 1-March 15) when snakes are not active 3. Have personnel trained in the identification of Alameda whipsnakes and their habitat conduct a pre-treatment survey of the area and monitoring of the treatment activities 4. Conduct worker awareness training for vegetation management crews 5. Maintain a shrub canopy cover of at least 25% 6. Maintain rock outcroppings 7. Protect rock outcroppings from vehicles with orange construction fencing 8. Check stationary equipment or vehicles for snakes prior to moving 9. If an injured snake is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for capture and treatment 	<ol style="list-style-type: none"> 1. Consult the USFWS regarding project approach 2. Apply treatment in the fall and winter months (November 1-March 15) when snakes are not active 3. Have personnel trained in the identification of Alameda whipsnakes and their habitat conduct a pre-treatment survey of the area and monitoring of the treatment activities 4. Conduct worker awareness training for vegetation management crews 5. Maintain a shrub canopy cover of at least 25% 6. Maintain rock outcroppings 7. Protect rock outcroppings from vehicles with orange construction fencing 8. Check stationary equipment or vehicles for snakes prior to moving 9. If an injured snake is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for capture and treatment 	<ol style="list-style-type: none"> 1. Consult the USFWS regarding project approach 2. Apply treatment in the fall and winter months (November 1-March 15) when snakes are not active 3. Have personnel trained in the identification of Alameda whipsnakes and their habitat conduct a pre-treatment survey of the area and monitoring of the treatment activities 4. Conduct worker awareness training for vegetation management crews 5. Maintain a shrub canopy cover of at least 25% 6. Maintain rock outcroppings 7. Protect rock outcroppings from vehicles with orange construction fencing and from fire with perimeter control lines 8. Check stationary equipment or vehicles for snakes prior to moving 9. If an injured snake is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for capture and treatment

Table 15 (Above and Opposite). Best Management Practices for Federally Protected Species by Vegetation Management Techniques in Scrub Habitats

Landscaped/Ornamental BMPs

General Guidelines for Treatments in Landscaped Areas

- Conduct a Pre-Treatment Survey Nesting Bird Survey when working between December 15 & August 31 if trees are to be trimmed or removed & between February 1 & August 31 for other vegetation for all treatments except grazing
- Avoid the use of invasive plants. They do not provide a firewise landscaping & provide poor habitat for native plants & wildlife
- Use native plants in a firewise planting scheme instead of an irrigated planting scheme. Native plants support butterflies & birds. Some irrigated schemes attract non-native plants & insects that can threaten native species.
- Avoid overgrazing of understory & ground vegetation that may cause wildlife & watershed impacts



→ Maintain a 25 foot buffer from non-raptor nests for all treatments except grazing & hand thinning between Feb 1 & Aug. 31. Avoid the nest & supporting vegetation.



→ Maintain a 100 foot buffer from raptor nests for all treatments except grazing & hand thinning between Dec. 1 & Aug. 31. Avoid the nest & supporting vegetation.



Your Landscaped Home is Better with Bees

- Bees are a critical part of natural environments, pollinating fruits, vegetables & wildflowers
- While bee populations are declining worldwide, urban areas can provide important habitat for bees
- Go native: Bees, especially native bees, are more attracted to native plants than exotics. Many hybrid ornamentals have reduced rewards (pollen & nectar) due to an emphasis on showy flowers

Figure 4. Best Management Practices for Hazardous Fuel Treatments in or near Landscaped/Ornamental Areas

Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking, grading)	Chemical
Nesting birds	<ol style="list-style-type: none"> 1. If trees are to be trimmed or removed between December 15 and August 31 or other vegetation is to be removed or thinned between February 1 and August 31, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment 2. If active non-raptor nests are present, maintain a 25 foot non-disturbance buffer zone 3. If active raptor nests are present, maintain a 100 foot non-disturbance buffer zone 4. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 5. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 6. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for treatment 	Avoid over grazing	<ol style="list-style-type: none"> 1. If trees are to be trimmed or removed between December 15 and August 31 or other vegetation is to be removed or thinned between February 1 and August 31, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment 2. If active non-raptor nests are present, maintain a 25 foot non-disturbance buffer zone 3. If active raptor nests are present, maintain a 100 foot non-disturbance buffer zone 4. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 5. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 6. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for treatment 	<ol style="list-style-type: none"> 1. If treatment is to occur in an area with trees between December 15 and August 31 or in areas with shrubs or herbaceous vegetation between February 1 and August 31, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment 2. If active non-raptor nests are present, maintain a 25 foot non-disturbance buffer zone 3. If active raptor nests are present, maintain a 100 foot non-disturbance buffer zone 4. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 5. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 6. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Appendix D for treatment

Table 16. Best Management Practices for Federally Protected Species by Vegetation Management Techniques in Landscaped/Ornamental Habitats

Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking, grading)	Chemical
Swainson's hawk	<ol style="list-style-type: none"> 1. If treatment will occur within Swainson's hawk range (see map page 35) during the nesting season March 15-September 15, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment according to accepted protocols for Swainson's hawk 2. A 1,000 foot non-disturbance buffer is considered appropriate to protect Swainson's hawk nests in Contra Costa County from project activities. 3. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. A smaller non-disturbance buffer is likely appropriate for most hand thinning techniques. 4. Coordination with CDFG is recommended if a Swainson's hawk nest is present in the vicinity of your project area to determine the appropriate buffer zone based on the project scope and duration. 5. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 6. Removal of Swainson's hawk nest trees should be avoided. Pruning of such trees should be overseen by a qualified biologist. The USFWS and CDFG should be consulted before nest tree removal if it cannot be avoided. 	None	<ol style="list-style-type: none"> 1. If treatment will occur within Swainson's hawk range (see map page 35) during the nesting season March 15-September 15, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment according to accepted protocols for Swainson's hawk 2. A 1,000 foot non-disturbance buffer is considered appropriate to protect Swainson's hawk nests in Contra Costa County from project activities. 3. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. A smaller non-disturbance buffer may be appropriate for some mechanical treatment techniques. 4. Coordination with CDFG is recommended if a Swainson's hawk nest is present in the vicinity of your project area to determine the appropriate buffer zone based on the project scope and duration. 5. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 6. Removal of Swainson's hawk nest trees should be avoided. Pruning of such trees should be overseen by a qualified biologist. The USFWS and CDFG should be consulted before nest tree removal if it cannot be avoided. 	<ol style="list-style-type: none"> 1. If treatment will occur within Swainson's hawk range (see map page 35) during the nesting season March 15-September 15, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment according to accepted protocols for Swainson's hawk 2. A 1,000 foot non-disturbance buffer is considered appropriate to protect Swainson's hawk nests in Contra Costa County from project activities. 3. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. A smaller non-disturbance buffer is likely appropriate for most chemical treatment techniques. 4. Coordination with CDFG is recommended if a Swainson's hawk nest is present in the vicinity of your project area to determine the appropriate buffer zone based on the project scope and duration. 5. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 6. Removal of Swainson's hawk nest trees should be avoided. Pruning of such trees should be overseen by a qualified biologist. The USFWS and CDFG should be consulted before nest tree removal if it cannot be avoided.

Table 16. Best Management Practices for Federally Protected Species by Vegetation Management Techniques in Landscaped/Ornamental Habitats

Aquatic Habitat BMPs

Maintain a 150 foot buffer from raptor nests for all treatments except grazing between Dec. 15 & Aug. 31



Maintain a 50 foot buffer from non-raptor nests for all treatments except grazing between Feb. 1 & Aug. 31



General Guidelines for Treatments in or near Aquatic Habitats

- Clearly mark the boundary of aquatic areas with fencing, staking or flagging
- Conduct worker awareness training
- Regularly maintain vehicles to avoid fuel leaks. Capture any leaks & have containment & clean-up plans for fluid or hazardous materials spills
- Conduct a Pre-Treatment Survey Nesting Bird Survey when working between December 15 & August 31 (if trees are present) & between February 1 & August 31 (if no trees present) for all treatments except grazing



Within 50 feet of water: No chemical use. No dumping of litter, debris, or sidecasts

Within 100 feet of water: No vehicle or equipment fueling or maintenance. Park & drive vehicles only on existing roads. No hazardous materials

Within 200 feet of water (only in areas with Giant Garter Snake, see map on page 34): Hand thinning & grazing preferred. Mechanical & prescribed burns permitted between May 1 & October 1 with Best Management Practices (see page 69)

Within 300 feet of water (only in areas with California Red-legged Frog, see map on page 34): Hand thinning & grazing preferred. Mechanical & prescribed burns permitted between April 15 & October 15 with Best Management Practices (see page 69)

Within 2100 feet of seasonal wetlands & ponds (only in areas with California Tiger Salamander, see map on page 34): Hand thinning & grazing preferred. Avoid disking, grading, excavating & other subsurface disturbance (see page 70)



Figure 5. Best Management Practices for Hazardous Fuel Treatments in or near Aquatic Habitats (Riparian, Freshwater Marsh, Seasonal Wetlands & Ponds)

Chemical	Chemical treatments are generally not recommended for aquatic habitats. Therefore it is recommended that a licensed applicator is employed and that they avoid use of chemical treatments within 50 feet of aquatic habitats.		
Prescribed Burn	Prescribed burn treatments are not recommended for aquatic habitats. If fire-retardant and suppressant chemicals are necessary for a prescribed burn treatment nearby, avoid applying chemicals directly to aquatic habitats. See BMP's under Mechanical treatments below for prescribed burn treatments adjacent to aquatic habitats.		
Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking, grading)
General BMP's	<ol style="list-style-type: none"> 1. Confirm using Chapter 3 and by consulting the appropriate agency the need for a permit to conduct vegetation removal activities. In-channel work will likely require a federal permit and additional avoidance measures for fisheries. 2. Avoid dumping of litter, debris, or sidecasts into aquatic habitats 3. Drive vehicles or equipment within established crossings Routes and boundaries should be clearly marked and be located outside of wetland and riparian areas. 4. Avoid staging equipment or parking vehicles in aquatic habitats 5. Clearly mark the boundary of aquatic habitats that are to be avoided with brightly colored fencing, staking, or flagging for work crew avoidance 6. Conduct worker awareness training for vegetation management crews regarding aquatic habitats 7. Conduct fueling and maintenance of vehicles 100 feet from aquatic habitats. Regularly maintain equipment to avoid fluid leaks. Capture any leaks in containers until equipment is moved to a repair location. Store hazardous materials more than 100 feet away from aquatic habitats. Have containment and clean up plans in place for immediate clean up of fluid or hazardous materials spills. 	<p>Avoid overgrazing</p> <p>To the extent feasible, fence off portions of aquatic habitats to prevent trampling and excessive grazing of aquatic and riparian vegetation which can lead to increased water temperatures, bank erosion, and loss of wildlife habitat</p>	<ol style="list-style-type: none"> 1. Confirm using Chapter 3 and by consulting the appropriate agency the need for a permit to conduct project activities. In-channel work will likely require a federal permit and additional avoidance measures for fisheries. 2. Establish silt fencing on the perimeter of aquatic habitats for adjacent mechanical treatments that involve ground disturbance to prevent sediment from entering water bodies 3. Avoid dumping of litter, debris, or sidecasts into aquatic habitats 4. Drive vehicles or equipment within established crossings Routes and boundaries should be clearly marked and be located outside of wetland and riparian areas. 5. Avoid staging equipment or parking vehicles in aquatic habitats 6. Clearly mark the boundary of aquatic habitats that are to be avoided with brightly colored fencing, staking, or flagging for work crew avoidance 7. Conduct worker awareness training for vegetation management crews regarding aquatic habitats 8. Conduct fueling and maintenance of vehicles 100 feet from aquatic habitats. Regularly maintain equipment to avoid fluid leaks. Capture any leaks in containers until equipment is moved to a repair location. Store hazardous materials more than 100 feet away from aquatic habitats. Have containment and clean up plans in place for immediate clean up of fluid or hazardous materials spills.
Valley elderberry longhorn beetle	<ol style="list-style-type: none"> 1. Conduct a pre-treatment survey to identify elderberry shrubs within the treatment area 2. Avoid removal and damage of elderberry shrubs during treatment activities 3. Clearly mark the shrubs with brightly colored flagging for work crew avoidance 4. Conduct worker awareness training for vegetation management crews 	See general grazing BMP's above	<ol style="list-style-type: none"> 1. Conduct a pre-treatment survey to identify elderberry shrubs within the treatment area 2. Avoid removal and damage of elderberry shrubs by maintaining a 100 foot non-disturbance buffer during treatment activities 3. Clearly mark the shrubs and non-disturbance buffer with brightly colored flagging for work crew avoidance 4. Conduct worker awareness training for vegetation management crews

Table 17 (Above and Opposite). Best Management Practices for Federally Protected Species by Vegetation Management Techniques in Aquatic Habitats

Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking, grading)
Vernal pool fairy shrimp, longhorn fairy shrimp, and tadpole shrimp	<ol style="list-style-type: none"> 1. Avoid potential vernal pool species habitats by maintaining a 250 foot non-disturbance buffer of seasonal wetlands and vernal pools during treatment activities 2. Clearly mark the non-disturbance buffer with brightly colored flagging for work crew avoidance 3. Conduct worker awareness training for vegetation management crews 4. Alternatively, have a qualified biologist conduct a pre-treatment survey to identify presence or absence of vernal pool species within the treatment area 5. Consult the USFWS regarding any treatment activities within 250 feet of potential habitat for these species. 	None	<ol style="list-style-type: none"> 1. Avoid potential vernal pool species habitats by maintaining a 250 foot non-disturbance buffer of seasonal wetlands and vernal pools during treatment activities 2. Clearly mark the non-disturbance buffer with brightly colored flagging for work crew avoidance 3. Conduct worker awareness training for vegetation management crews 4. Alternatively, have a qualified biologist conduct a pre-treatment survey to identify presence or absence of vernal pool species within the treatment area 5. Consult the USFWS regarding any treatment activities within 250 feet of potential habitat for these species.
California red-legged frog	<ol style="list-style-type: none"> 1. Within 300 feet of stream courses and ponds it is best to conduct work between April 15 and October 15 when California red-legged frogs are not breeding. It is recommended that you consult the USFWS before proceeding with work in these habitats. 2. Conduct worker awareness training for vegetation management crews 3. Check stationary equipment or vehicles for frogs prior to moving 4. If an injured frog is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Chapter 4 for capture and treatment 	See general grazing BMP's above	<p>It is strongly recommended that you consult the USFWS before proceeding with mechanical treatments within 300 feet of stream courses and ponds that provide potential habitat for California red-legged frogs. Consult a qualified biologist to conduct a habitat assessment if unknown.</p> <ol style="list-style-type: none"> 1. Apply treatment in the dry season (April 15-October 15) when frog movements are more restricted 2. Delineate the boundary of riparian corridors and ponds by orange construction fencing and maintain all general aquatic BMP's above 3. Have personnel trained in the identification of California red-legged frog and their habitat conduct a pre-treatment survey of the area and monitoring of the treatment activities 4. Have personnel trained in the identification of California red-legged frog and their habitat conduct monitoring of any in-water treatment activities 5. Conduct worker awareness training for vegetation management crews 6. Check stationary equipment or vehicles for frogs prior to moving 7. If an injured frog is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Chapter 4 for capture and treatment
Giant garter snake	<ol style="list-style-type: none"> 1. Within 200 feet of rivers, sloughs, drainage and irrigation ditches it is best to conduct work between May 1 and October 1 when giant garter snakes are active. It is recommended that you consult the USFWS before proceeding with work in these habitats. 2. Conduct worker awareness training for vegetation management crews 3. Check stationary equipment or vehicles for snakes prior to moving 4. If an injured snake is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Chapter 4 for capture and treatment 	See general grazing BMP's above	<p>It is strongly recommended that you consult the USFWS before proceeding with mechanical treatments within 200 feet of rivers, sloughs, drainage and irrigation ditches that provide potential habitat for giant garter snakes. Consult a qualified biologist to conduct a habitat assessment if unknown.</p> <ol style="list-style-type: none"> 1. Apply treatment in the spring and summer months (May 1-October 1) when snakes are active and spending most of their time in aquatic habitats 2. Have personnel trained in the identification of giant garter snakes and their habitat conduct a pre-treatment survey of the area 3. Have personnel trained in the identification of giant garter snakes and their habitat conduct monitoring of any in-water treatment activities 4. Conduct worker awareness training for vegetation management crews 5. Check stationary equipment or vehicles for snakes prior to moving 6. If an injured snake is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Chapter 4 for capture and treatment

Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking, grading)
California Tiger Salamander	<p>For hand treatment activities in ponds or seasonal wetlands that provide potential breeding habitat, it is recommended that you consult the USFWS before proceeding.</p> <ol style="list-style-type: none"> 1. Avoid the California tiger salamander breeding and larval development season (November through July). Alternatively, have a qualified biologist conduct a pre-treatment survey. Consult a qualified biologist to conduct a habitat assessment if unknown. 2. Implement treatments during daylight hours 3. Check stationary equipment for salamanders prior to moving 4. Conduct worker awareness training 5. If an injured salamander is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Chapter 4 for capture and treatment 	None	<p>Mechanical treatment activities are not recommended in ponds or seasonal wetlands that provide potential breeding habitat and it is strongly recommended that you consult the USFWS before proceeding. Consult a qualified biologist to conduct a habitat assessment if unknown.</p> <p>If discing, grading, excavation or any other subsurface disturbance of upland habitats within 2,100 feet of ponds or seasonal wetlands that provide potential breeding habitat is necessary, see the grassland and oak savannah BMP table.</p>
Nesting birds	<ol style="list-style-type: none"> 1. If conducting work between February 1 and August 31 in areas dominated by herbaceous or shrubby vegetation or between December 15 and August 31 in areas with trees, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment 2. If active non-raptor nests are present, maintain a 50 foot non-disturbance buffer zone 3. If active raptor nests are present, maintain a 150 foot non-disturbance buffer zone 4. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 5. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 6. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Chapter 4 for treatment 	<p>Avoid over grazing</p> <p>Use browse cages to protect tree saplings from grazers</p>	<ol style="list-style-type: none"> 1. If conducting work between February 1 and August 31 in areas dominated by herbaceous or shrubby vegetation or between December 15 and August 31 in areas with trees, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment 2. If active non-raptor nests are present, maintain a 50 foot non-disturbance buffer zone 3. If active raptor nests are present, maintain a 150 foot non-disturbance buffer zone 4. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 5. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 6. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Chapter 4 for treatment
Swainson's hawk	<p>If treatment will occur within Swainson's hawk range (see map page 35) and trees are present see landscaped/ornamental BMP table.</p>	None	<p>If treatment will occur within Swainson's hawk range (see map page 35) and trees are present see landscaped/ornamental BMP table.</p>

Table 17. Best Management Practices for Federally Protected Species by Vegetation Management Techniques in Aquatic Habitats

Salt Marsh Habitat BMPs



Treatments in or near salt marshes warrant Best Management Practices (see pages 72-74) to protect inhabitants such as California Clapper Rail & California Seablite

General Guidelines For Treatments in or near Salt Marsh Habitats

- Clearly mark the boundary of salt marshes with fencing, staking or flagging
- Conduct worker awareness training
- Regularly maintain vehicles to avoid fuel leaks. Capture any leaks & have containment & clean-up plans for fluid or hazardous materials spills
- Conduct a Pre-Treatment Nesting Bird Survey when working between February 1 & August 31 for all treatments except grazing

Maintain a 50 foot buffer from non-raptor nests for all treatments except grazing between Feb. 1 & Aug. 31



Within 50 feet of water: No chemical use. No dumping of litter, debris, or sidecasts

Within 100 feet of water: No vehicle or equipment fueling or maintenance. Park & drive vehicles only on existing roads. No hazardous materials

Within 10 feet of salt marsh: Hand thinning & grazing preferred. Apply additional Best Management Practices for mechanical & prescribed burn treatments (see pages 72-74).

Within 100 feet of salt/brackish marsh (only in areas with Salt Marsh Harvest Mouse, see map on page 37): Grazing is the only recommended treatment unless Best Management Practices are implemented (see page 73).



Figure 5. Best Management Practices for Hazardous Fuel Treatments in or near Salt Marsh Habitats

Chemical	Chemical treatments are generally not recommended for salt marsh habitats. Therefore it is recommended that a licensed applicator is employed and that they avoid use of chemical treatments within 50 feet of aquatic habitats.		
Prescribed Burn	Prescribed burn treatments are not recommended for salt marsh habitats. If fire-retardant and suppressant chemicals are necessary for a prescribed burn treatment nearby, avoid applying chemicals directly to aquatic habitats. See BMP's under Mechanical treatments below for prescribed burn treatments adjacent to aquatic habitats.		
Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking, grading)
General BMP's	<p>Confirm using Chapter 3 and by consulting the appropriate agency the need for a permit to conduct vegetation removal activities. In-water work will likely require a federal permit and additional avoidance measures for fisheries.</p> <ol style="list-style-type: none"> 1. Avoid dumping of litter, debris, or sidecasts into aquatic habitats 2. Drive vehicles or equipment within established crossings Routes and boundaries should be clearly marked and be located outside of wetland and riparian areas. 3. Avoid staging equipment or parking vehicles in aquatic habitats 4. Clearly mark the boundary of aquatic habitats that are to be avoided with brightly colored fencing, staking, or flagging for work crew avoidance 5. Conduct worker awareness training for vegetation management crews regarding aquatic habitats 6. Conduct fueling and maintenance of vehicles 100 feet from aquatic habitats. Regularly maintain equipment to avoid fluid leaks. Capture any leaks in containers until equipment is moved to a repair location. Store hazardous materials more than 100 feet away from aquatic habitats. Have containment and clean up plans in place for immediate clean up of fluid or hazardous materials spills. 	<p>Avoid overgrazing</p> <p>To the extent feasible, fence off portions of aquatic habitats to prevent trampling and excessive grazing of marsh vegetation which can lead to increased water temperatures, bank erosion, and loss of wildlife habitat</p>	<p>Confirm using Chapter 3 and by consulting the appropriate agency the need for a permit to conduct project activities. In-water work will likely require a federal permit and additional avoidance measures for fisheries.</p> <ol style="list-style-type: none"> 1. Establish silt fencing on the perimeter of aquatic habitats for adjacent mechanical treatments that involve ground disturbance to prevent sediment from entering water bodies 2. Avoid dumping of litter, debris, or sidecasts into aquatic habitats 3. Drive vehicles or equipment within established crossings Routes and boundaries should be clearly marked and be located outside of wetland and riparian areas. 4. Avoid staging equipment or parking vehicles in aquatic habitats 5. Clearly mark the boundary of aquatic habitats that are to be avoided with brightly colored fencing, staking, or flagging for work crew avoidance 6. Conduct worker awareness training for vegetation management crews regarding aquatic habitats 7. Conduct fueling and maintenance of vehicles 100 feet from aquatic habitats. Regularly maintain equipment to avoid fluid leaks. Capture any leaks in containers until equipment is moved to a repair location. Store hazardous materials more than 100 feet away from aquatic habitats. Have containment and clean up plans in place for immediate clean up of fluid or hazardous materials spills.

Table 18 (Above and Opposite). Best Management Practices for Federally Protected Species by Vegetation Management Techniques in Salt Marsh Habitats

Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking, grading)
Salt marsh harvest mouse	<p>It is strongly recommended that you consult the USFWS before proceeding with treatments within 100 feet of salt and brackish marsh areas that provide potential habitat for salt marsh harvest mice. Consult a qualified biologist to conduct a habitat assessment if unknown.</p> <ol style="list-style-type: none"> 1. Have personnel trained in the identification of harvest mice and their habitat conduct a pre-treatment survey of the area and establish animal exclusion fencing around treatment areas after mice are confirmed absent 2. Have personnel trained in the identification of harvest mice and their habitat conduct monitoring of any in-water treatment activities 3. Conduct worker awareness training for vegetation management crews 4. Check stationary equipment or vehicles for mice prior to moving 5. If an injured mouse is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Chapter 4 for capture and treatment 	<p>See general BMP's above</p>	<p>It is strongly recommended that you consult the USFWS before proceeding with treatments within 100 feet of salt and brackish marsh areas that provide potential habitat for salt marsh harvest mice. Consult a qualified biologist to conduct a habitat assessment if unknown.</p> <ol style="list-style-type: none"> 1. Have personnel trained in the identification of harvest mice and their habitat conduct a pre-treatment survey of the area and establish animal exclusion fencing around treatment areas after mice are confirmed absent 2. Have personnel trained in the identification of harvest mice and their habitat conduct monitoring of any in-water treatment activities 3. Conduct worker awareness training for vegetation management crews 4. Check stationary equipment or vehicles for mice prior to moving 5. If an injured mouse is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Chapter 4 for capture and treatment
California least tern	<ol style="list-style-type: none"> 1. In areas that provide potential habitat for California least tern avoid conducting work during the nesting season (March 1 to July 31). Consult a qualified biologist to conduct a habitat assessment if unknown. 2. If work must be conducted during this time consult the USFWS before proceeding 3. Have a qualified biologist conduct a pre-treatment survey of the treatment area 4. Maintain a minimum 500 foot non-disturbance buffer zone of terns and their nests 5. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 6. Have a qualified biologist monitor treatment activities 	<p>None</p>	<p>Mechanical treatments are not recommended in areas that provide potential nesting habitat for California least terns and it is strongly recommended that you consult the USFWS before proceeding. Consult a qualified biologist to conduct a habitat assessment if unknown.</p>

Species	Hand Thinning	Grazing	Mechanical (i.e. mowing, disking, grading)
Nesting birds (except clapper rail and least tern)	<ol style="list-style-type: none"> 1. If conducting work between February 1 and August 31, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment 2. If active non-raptor nests are present, maintain a 50 foot non-disturbance buffer zone 3. If active raptor nests are present (i.e. northern harrier or short-eared owl), maintain a 150 foot non-disturbance buffer zone 4. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 5. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 6. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Chapter 4 for treatment 	Avoid over grazing	<ol style="list-style-type: none"> 1. If conducting work between February 1 and August 31, have personnel trained in the identification of birds and their nesting habits conduct a pre-treatment survey for active bird nests within 15 days prior to treatment 2. If active non-raptor nests are present, maintain a 50 foot non-disturbance buffer zone 3. If active raptor nests are present (i.e. northern harrier or short-eared owl), maintain a 150 foot non-disturbance buffer zone 4. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 5. Buffer distances may be adjusted if work is not within line of sight of the nest, will be of short duration, involves low noise levels, will not produce vibrations, and nest monitoring by personnel trained in raptor or nesting bird behavioral observations are conducted during treatment activities. Coordination with CDFG is recommended if non-disturbance buffers are adjusted. 6. If an injured bird is found call the USFWS and the nearest cooperating wildlife rehabilitation center identified in Chapter 4 for treatment
California clapper rail	<ol style="list-style-type: none"> 1. In areas that provide potential habitat for California clapper rails (salt or brackish marsh with tall emergent vegetation) avoid conducting work during the nesting season (March 1 to July 31). Consult a qualified biologist to conduct a habitat assessment if unknown. 2. If work must be conducted during this time consult the USFWS before proceeding 3. Have a qualified biologist conduct a pre-treatment survey of the treatment area 4. Maintain a minimum 300 foot non-disturbance buffer zone of clapper rails and their nests 5. Clearly mark buffer zone and conduct worker awareness training to avoid nest disturbance 6. Have a qualified biologist monitor treatment activities 	See general BMP's above	Mechanical treatments are not recommended in areas that provide potential habitat for California clapper rails (salt or brackish marsh with tall emergent vegetation) and it is strongly recommended that you consult the USFWS before proceeding. Consult a qualified biologist to conduct a habitat assessment if unknown.

Table 18. Best Management Practices for Federally Protected Species by Vegetation Management Techniques in Salt Marsh Habitats





Chapter 3: Additional Regulatory Guidelines

Purpose

Fire management project proponents are typically required to obtain environmental regulatory permits when the proposed project will affect a stream, river, lake, or tidal waters; riparian habitat and/or wetlands adjacent to streams and rivers; other habitat that can be used by sensitive species; and/or those species themselves.

The purpose of this chapter is assist project proponents in determining which permits they may need when doing certain types of work. For those of you who think you may need a permit from a federal or state agency, this chapter provides a brief summary of the process, timelines for obtaining permits, and additional contact information. You are encouraged to contact regulatory agencies early on in the project planning process to determine if your project requires a permit. This information is only relevant if your project is federally funded or you will be conducting the following types of activities¹:

- Disturbing habitat that may be used by federally protected species that cannot be avoided with implementation of BMPs in this guidebook.
- Removing riparian or other aquatic vegetation.
- Placing materials or a structure in a creek, stream, or aquatic habitat, for example, placing a culvert for a fire road that crosses a stream.
- Removing invasive species, applying chemical control on invasive species, or conducting other restoration activities within a riparian area, creek, stream, or aquatic habitat.
- Placing temporary structures across creeks, streams, or aquatic habitat to access a fire management area.

This chapter is intended to be used by proponents of larger fire management projects (eg. public land managers, fire management groups, coordinated resource management plan organizations, cities, counties, or other public agencies, etc.). However, the chapter will also be useful for private landowners and other resource management organizations within the Contra Costa County area.

Disclaimers

This chapter discusses regulatory permits as they apply to the Contra Costa County area only. While certain permits are issued by federal agencies, and the general process for applying for those permits is uniform throughout the United States, each regional district of these federal regulatory agencies also enforces regional conditions and permit requirements with some individual

¹ Please note that this is not a complete list of activities that might trigger the need for a permit

variations. The same can be said of the regional districts of state regulatory agencies regarding their issuance of statewide permit programs.

This chapter only covers federal and state regulatory permits for biological resources such as protected species and water resources, except for water quality permits such as the National Pollution Discharge Elimination System Permit from RWQCB and other stormwater related permits. Local permits (e.g., permits from local flood districts, reclamation districts, local and municipal governments, etc.) are not covered in this permit guide due to the number of local agencies and the breadth of permits required by those agencies within the Contra Costa County area. This permit guide should not be interpreted as all-inclusive for all regulatory requirements. If your project has a federal nexus (funding or permit), the federal agency must determine compliance with federal laws such as the Endangered Species Act and the Migratory Bird Treaty Act.

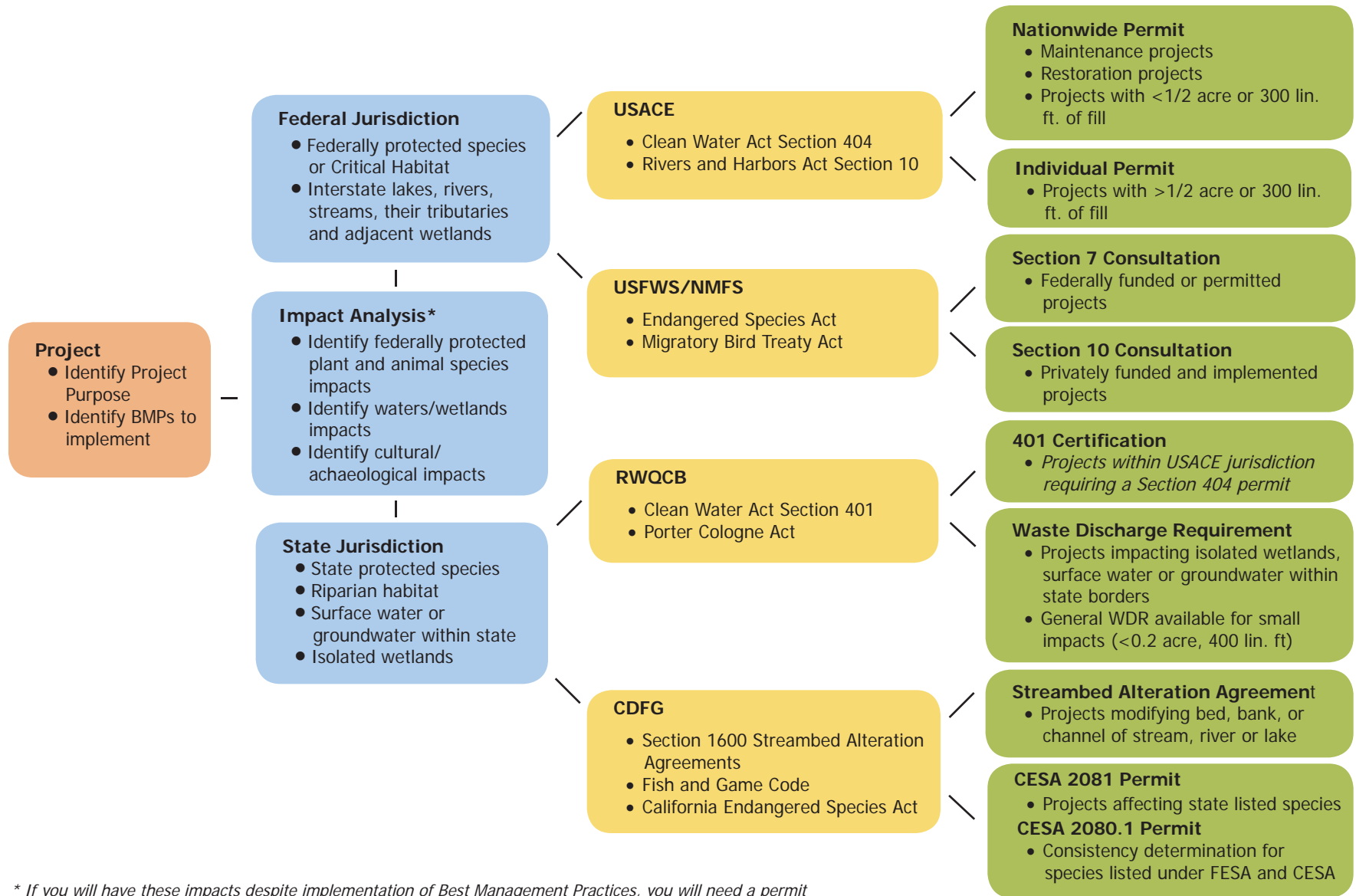
How to Use This Chapter

To assist you in identifying your permitting needs, this chapter first presents an overview flowchart of the permitting process and identifies the triggers for regulatory review and permits. Second, this chapter presents a matrix of typical **Project Action Types** for project proponents who know the type of work they would like to conduct. This matrix lists common project actions undertaken by fire management proponents that would take place within the bed, bank, channel or floodways of streams, rivers and other regulated aquatic resources, or within habitat potentially used by federally protected species. Using this matrix, project proponents can select the project actions they intend to conduct, which will lead them to the types of regulatory permits typically associated with the project actions as identified in the final column of the matrix.

Third, this chapter presents a graphic of **Site Types** for project proponents who know generally where they would like to work, but do not know what type of project actions they will conduct or what permits to acquire. Using this graphic, select the area you wish to work within to see which permits would apply to the area you chose. Fourth, once you determine the permit you need based on **Action Type** or **Site Type**, go to the page with a detailed description of that **Permit Type**. The **Permit Type** pages are also for project proponents who have an idea of the type of permit they need, but are unsure of the process and steps required to apply for the permit. These pages present flowcharts of the permit process, identify key items needed for a permit application package, and provide additional contact information. Finally, this chapter presents an **estimated timeline** for completion of the permitting process. Please note that many terms are defined in the glossary in Chapter 4.



Permitting Overview Flowchart



* If you will have these impacts despite implementation of Best Management Practices, you will need a permit

Project Action Types

Project Type	Typical Actions	Regulatory Trigger	Permit Type Required
Mechanical Labor	Grading, mowing, disking, grubbing, crushing, or other use of heavy machinery to maintain vegetation, remove dead materials, or construct firebreaks, trails, or access roads	If a Section 404 Permit is required	Section 401 Water Quality Certification (RWQCB)
		If mechanical equipment will be used to remove riparian vegetation within the riparian zone of a stream	Waste Discharge Requirement (RWQCB) and Streambed Alteration Agreement (CDFG)
		If these activities will result in discharge of waste, dredging, or placement of any substance that is liquid, solid, or gaseous into surface waters, groundwater, or isolated wetlands	Waste Discharge Requirement (RWQCB)
		If these activities will: <ul style="list-style-type: none"> • Result in construction of a trail or road that will substantially divert or obstruct the flow of a river, stream or lake; • Require use of mechanical equipment that will change the bed, channel or bank of a river, stream or lake; or • Deposit debris, waste or other materials where it can pass into a river, stream or lake 	Streambed Alteration Agreement (CDFG)
		If these activities will occur within grassland, chaparral, woodlands or other habitat used by federally protected terrestrial plant, animal, or freshwater aquatic species	Consultation under FESA with USFWS
		If these activities will occur within or near tidal, marine, or aquatic habitats used by federally protected anadromous fish or marine species	Consultation under FESA with NMFS
		If these activities will occur in habitat used by state protected species	Consultation under CESA with CDFG
		If these activities will occur near active nesting birds	Compliance with MBTA and CDFG Fish and Game Code

Table 19. Permit information for Mechanical Labor

Project Type	Typical Actions	Regulatory Trigger	Permit Type Required
Vegetation Management	Vegetation removal, pruning, limbing using hand labor, mechanical equipment, or chemical treatments	If these activities will result in placement of dead materials, debris, waste, tree limbs, wood chips, etc. within lakes, rivers, streams, their tributaries or adjacent wetlands.	Section 404 Permit (USACE)
		If a Section 404 Permit is required	Section 401 Water Quality Certification (RWQCB)
		If mechanical equipment will be used to remove, prune or chemically treat riparian vegetation within the riparian zone of a stream	Waste Discharge Requirement (RWQCB) and Streambed Alteration Agreement (CDFG)
		If these activities will result in discharge of waste, dredging (such as dragging fallen logs), or placement of any substance that is liquid (such as chemical treatments), solid, or gaseous into surface waters, groundwater, or isolated wetlands	Waste Discharge Requirement (RWQCB)
		If these activities will: <ul style="list-style-type: none"> Require use of mechanical equipment that will change the bed, channel or bank of a river, stream or lake; or Deposit debris, waste or other materials where it can pass into a river, stream or lake 	Streambed Alteration Agreement (CDFG)
		If these activities will occur within grassland, chaparral, woodlands or other habitat used by federally protected terrestrial plant, animal, or freshwater aquatic species	Consultation under FESA with USFWS
		If these activities will occur within or near tidal, marine, or aquatic habitats used by federally protected anadromous fish or marine species	Consultation under FESA with NMFS
		If these activities will occur in habitat used by state protected species	Consultation under CESA with CDFG
		If these activities will occur near active nesting birds	Compliance with MBTA and CDFG Fish and Game Code

Table 20. Permit information for Vegetation Management

Project Type	Typical Actions	Regulatory Trigger	Permit Type Required
Chemical Treatment	Use of herbicides to kill plants or prevent their growth	If chemicals will be discharged, or result in placement of any substance that is liquid, solid, or gaseous into surface waters, groundwater, or isolated wetlands	Waste Discharge Requirement (RWQCB)
		If these activities will result in deposit of chemicals, debris, waste or other materials where it can pass into a river, stream or lake	Streambed Alteration Agreement (CDFG)
		If these activities will occur within grassland, chaparral, woodlands or other habitat used by federally protected terrestrial plant, animal, or freshwater aquatic species	Consultation under FESA with USFWS
		If these activities will occur within or near tidal, marine, or aquatic habitats used by federally protected anadromous fish or marine species	Consultation under FESA with NMFS
		If these activities will occur in habitat used by state protected species	Consultation under CESA with CDFG
		If these activities will occur near active nesting birds	Compliance with MBTA and CDFG Fish and Game Code

Table 21. Permit information for Chemical Treatments

Project Type	Typical Actions	Regulatory Trigger	Permit Type Required
Prescribed Burning	Controlled burns to reduce volume of fuel and used to burn piles of cut brush or over a designated prepared area	If these activities will require construction of a firebreak that will <ul style="list-style-type: none"> Result in placement of fill materials (eg. soil, rock, stabilization materials, or mechanical equipment), even if temporary, Result in discharge through grading, excavation or dredging, or Within lakes, rivers, streams, their tributaries or adjacent wetlands.	Section 404 Permit (USACE)
		If a Section 404 Permit is required	Section 401 Water Quality Certification (RWQCB)
		If burns will occur within the riparian zone of a stream	Waste Discharge Requirement (RWQCB) and Streambed Alteration Agreement (CDFG)
		If these activities will require construction of a firebreak that result in discharge of waste, dredging, or placement of any substance that is liquid, solid, or gaseous into surface waters, groundwater, or isolated wetlands	Waste Discharge Requirement (RWQCB)
		If these activities will: <ul style="list-style-type: none"> Require use of mechanical equipment to create firebreaks that will change the bed, channel or bank of a river, stream or lake; or Deposit debris, waste or other materials where it can pass into a river, stream or lake 	Streambed Alteration Agreement (CDFG)
		If burns will occur within grassland, chaparral, woodlands or other habitat used by federally protected terrestrial plant, animal, or freshwater aquatic species	Consultation under FESA with USFWS
		If burns will occur in habitat used by state protected species	Consultation under CESA with CDFG
		If burns will occur near active nesting birds	Compliance with MBTA and CDFG Fish and Game Code

Table 22. Permit information for Prescribed Burning

Project Type	Typical Actions	Regulatory Trigger	Permit Type Required
Invasive Plant Removal	Removal of invasive plant species such as French broom, Arrundo and tamarisk	If invasive plants will be removed using heavy machinery, a flail mower, or masticator within lakes, rivers, streams, their tributaries or adjacent wetlands. If these activities will result in placement of dead materials, debris, waste, etc. within lakes, rivers, streams, their tributaries or adjacent wetlands.	Section 404 Permit (USACE)
		If a Section 404 Permit is required	Section 401 Water Quality Certification (RWQCB)
		If mechanical equipment will be used to remove, prune or chemically treat riparian vegetation, including invasive plants, within the riparian zone of a stream	Waste Discharge Requirement (RWQCB) and Streambed Alteration Agreement (CDFG)
		If these activities will result in discharge of pesticides, waste, dredging, or placement of any substance that is liquid, solid, or gaseous into surface waters, groundwater, or isolated wetlands	Waste Discharge Requirement (RWQCB)
		If these activities will: <ul style="list-style-type: none"> Require use of mechanical equipment that will change the bed, channel or bank of a river, stream or lake; or Deposit debris, waste or other materials where it can pass into a river, stream or lake 	Streambed Alteration Agreement (CDFG)
		If these activities will occur within grassland, chaparral, woodlands or other habitat used by federally protected terrestrial plant, animal, or freshwater aquatic species	Consultation under FESA with USFWS
		If these activities will occur within or near tidal, marine, or aquatic habitats used by federally protected anadromous fish or marine species	Consultation under FESA with NMFS
		If these activities will occur in habitat used by state protected species	Consultation under CESA with CDFG
		If these activities will occur near active nesting birds	Compliance with MBTA and CDFG Fish and Game Code

Table 23. Permit information for Invasive Plant Removal

Project Type	Typical Actions	Regulatory Trigger	Permit Type Required
Temporary Stream Crossing	Temporarily crossing a streambed or channel without permanent placement of materials or construction of permanent structures for access to fire management area	If these activities will: <ul style="list-style-type: none"> Result in placement of fill materials (eg. soil, rock, stabilization materials, or mechanical equipment), even if temporary, Result in discharge through grading, excavation or dredging, or Result in dewatering or construction of a dam, even if temporary, Within lakes, rivers, streams, their tributaries or adjacent wetlands.	Section 404 Permit (USACE)
		If a Section 404 Permit is required	Section 401 Water Quality Certification (RWQCB)
		If the stream in which these activities take place is subject to the ebb and flow of the tide (i.e. navigable waters) and structure will be placed in it	Section 10 Permit (USACE)
		If these activities will result in discharge of waste, dredging, or placement of any substance that is liquid, solid, or gaseous into surface waters, groundwater, or isolated wetlands	Waste Discharge Requirement (RWQCB)
		If these activities will: <ul style="list-style-type: none"> Result in construction of a crossing or cofferdam (even if temporary) that will substantially divert or obstruct the flow of a river, stream or lake; Require use of mechanical equipment that will change the bed, channel or bank of a river, stream or lake; or Deposit debris, waste or other materials where it can pass into a river, stream or lake 	Streambed Alteration Agreement (CDFG)
		If these activities will occur within grassland, chaparral, woodlands or other habitat used by federally protected terrestrial plant, animal, or freshwater aquatic species	Consultation under FESA with USFWS
		If these activities will occur within or near tidal, marine, or aquatic habitats used by federally protected anadromous fish or marine species	Consultation under FESA with NMFS
		If these activities will occur in habitat used by state protected species	Consultation under CESA with CDFG
If these activities will occur near active nesting birds	Compliance with MBTA and CDFG Fish and Game Code		

Table 24. Permit information for Temporary Stream Crossing

Project Type	Typical Actions	Regulatory Trigger	Permit Type Required
Permanent Stream Crossing	Construction of permanent structure or placement of permanent materials in a streambed or channel for construction of permanent fire road, trail, or access to fire management area	If these activities will: <ul style="list-style-type: none"> Result in placement of fill materials (eg. soil, rock, stabilization materials, or mechanical equipment), Result in discharge through grading, excavation or dredging, or Result in dewatering or construction of a dam, Within lakes, rivers, streams, their tributaries or adjacent wetlands.	Section 404 Permit (USACE)
		If a Section 404 Permit is required	Section 401 Water Quality Certification (RWQCB)
		If the stream in which these activities take place is subject to the ebb and flow of the tide (i.e. navigable waters) and structure will be placed in it	Section 10 Permit (USACE)
		If these activities will result in discharge of waste, dredging, or placement of any substance that is liquid, solid, or gaseous into surface waters, groundwater, or isolated wetlands	Waste Discharge Requirement (RWQCB)
		If these activities will: <ul style="list-style-type: none"> Result in construction of a crossing or cofferdam that will substantially divert or obstruct the flow of a river, stream or lake; Require use of mechanical equipment that will change the bed, channel or bank of a river, stream or lake; or Deposit debris, waste or other materials where it can pass into a river, stream or lake 	Streambed Alteration Agreement (CDFG)
		Even if these activities will not result in placement of a structure directly within a surface water, but will shade or cover riparian vegetation within a riparian zone of a stream	Waste Discharge Requirement (RWQCB) and Streambed Alteration Agreement (CDFG)
		If these activities will occur within grassland, chaparral, woodlands or other habitat used by federally protected terrestrial plant, animal, or freshwater aquatic species	Consultation under FESA with USFWS
		If these activities will occur within or near tidal, marine, or aquatic habitats used by federally protected anadromous fish or marine species	Consultation under FESA with NMFS
		If these activities will occur in habitat used by state protected species	Consultation under CESA with CDFG
If these activities will occur near active nesting birds	Compliance with MBTA and CDFG Fish and Game Code		

Table 25. Permit information for Permanent Stream Crossing

Site Type

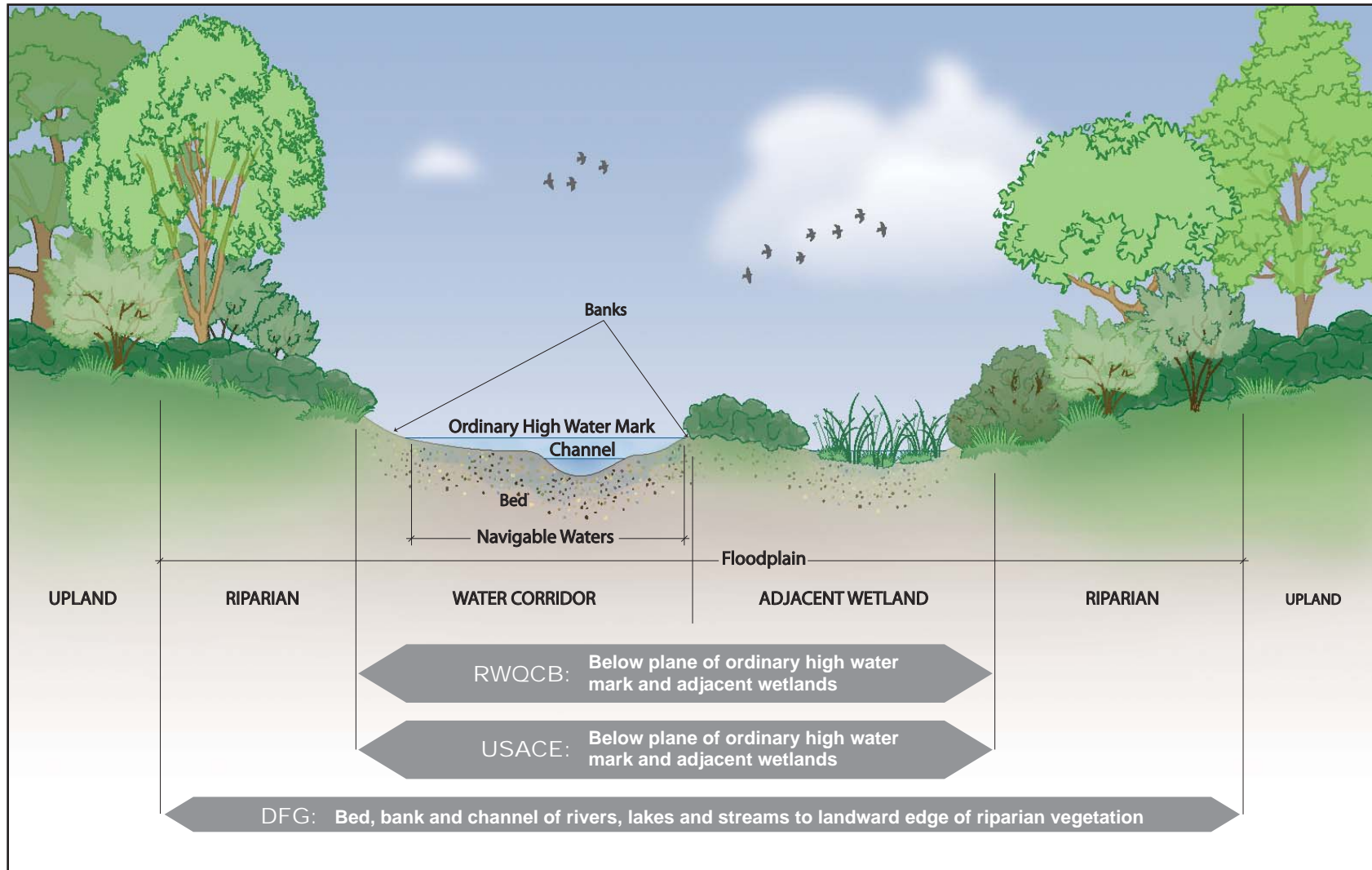


Figure 6. Diagram of jurisdictional boundaries based on project site location. The location of hazardous fuel treatments will help determine permit needs

Permit Types

U.S. Army Corps of Engineers Section 404 Permits

Defining USACE Jurisdiction

- Section 404 of the Clean Water Act regulates activities that result in the discharge of dredged or fill materials into navigable waters (waters of the United States) including adjacent wetlands.
- Waters of the United States are fully defined in the glossary, but generally include interstate lakes, rivers, streams, their tributaries and their adjacent wetlands.
- Wetlands are fully defined in the glossary, but generally include swamps, marshes, bogs, and similar areas. Isolated wetlands are excluded.
- Defining USACE jurisdiction can be very complicated, so it is recommended that you contact a wetland specialist or environmental consultant to conduct a wetland delineation and jurisdictional determination for you.



Permit Types

USACE has “pre-approved” Nationwide Permits (NWP) for activities that have minor impacts to USACE jurisdictional waters. See Chapter 4 for a table summary of the NWPs available. Some of the more common NWPs that may be used for fire management projects include:

- Permit No. 3 (Maintenance)
- Permit No. 27 (Aquatic Habitat Restoration, Establishment and Enhancement Activities)
- Permit No. 33 (Temporary Construction, Access, and Dewatering)

Although there are no acreage limits for maintenance and restoration projects, for all other project types, if the impacts to USACE jurisdictional waters will generally be greater than ½ acre or 300 linear feet, then an Individual Permit will be required. The Individual Permit process is lengthier, requiring an Alternatives Analysis and public review, so it is beneficial to try to avoid or reduce impacts to be able to obtain a Nationwide Permit.

Required Items for the Application Package

- Pre-construction Notification Form for Nationwide Permits
- Form 4345 and Section 404(b)(1) Alternatives Analysis for Individual Permits
- Complete project description (existing conditions, proposed activities, analysis of impacts, proposals for avoidance, minimization and/or mitigation)
- Conceptual engineering plans
- Wetland delineation with map
- Amount and type of discharge/fill into waters of the United States
- Cultural resources assessment, if available
- Biological Assessment, if available
- Mitigation and monitoring plan, or restoration/revegetation plan

Who Do I Contact?

West County

- <http://www.spn.usace.army.mil/regulatory/>
- Mark D'Avignon, South Branch Chief, (415) 503-6773, mark.r.d'avignon@usace.army.mil

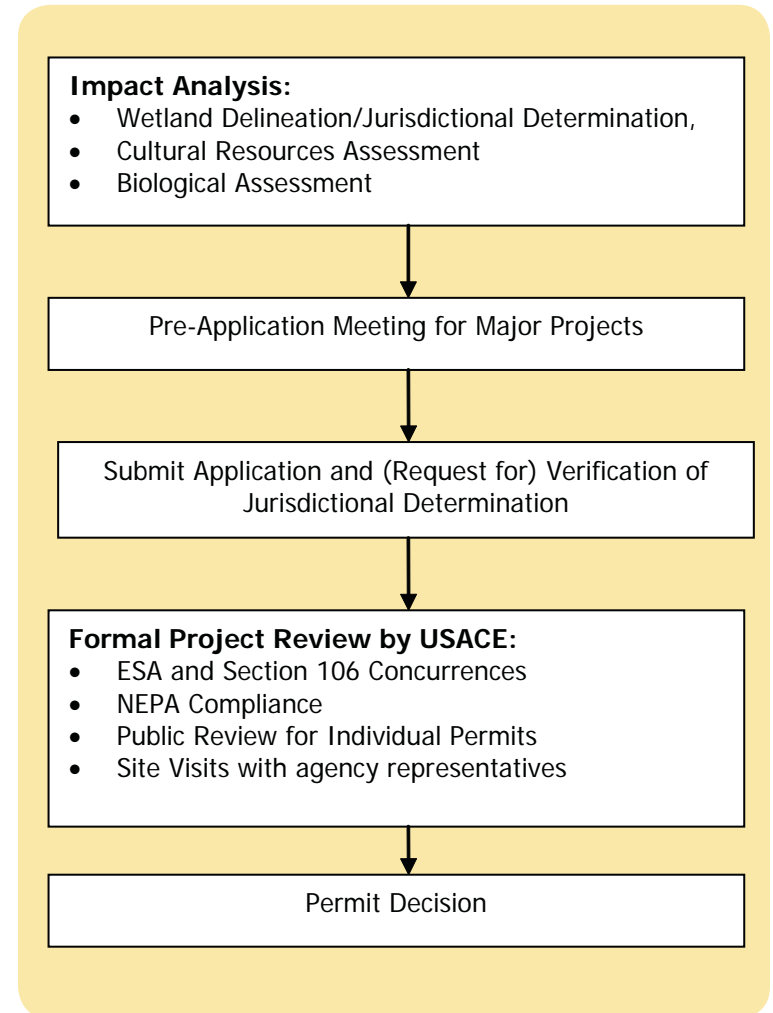
East County

- <http://www.spk.usace.army.mil/organizations/cespk-co/regulatory/>,
- William Guthrie, Office Chief, (916) 557-5269, William.H.Guthrie@usace.army.mil

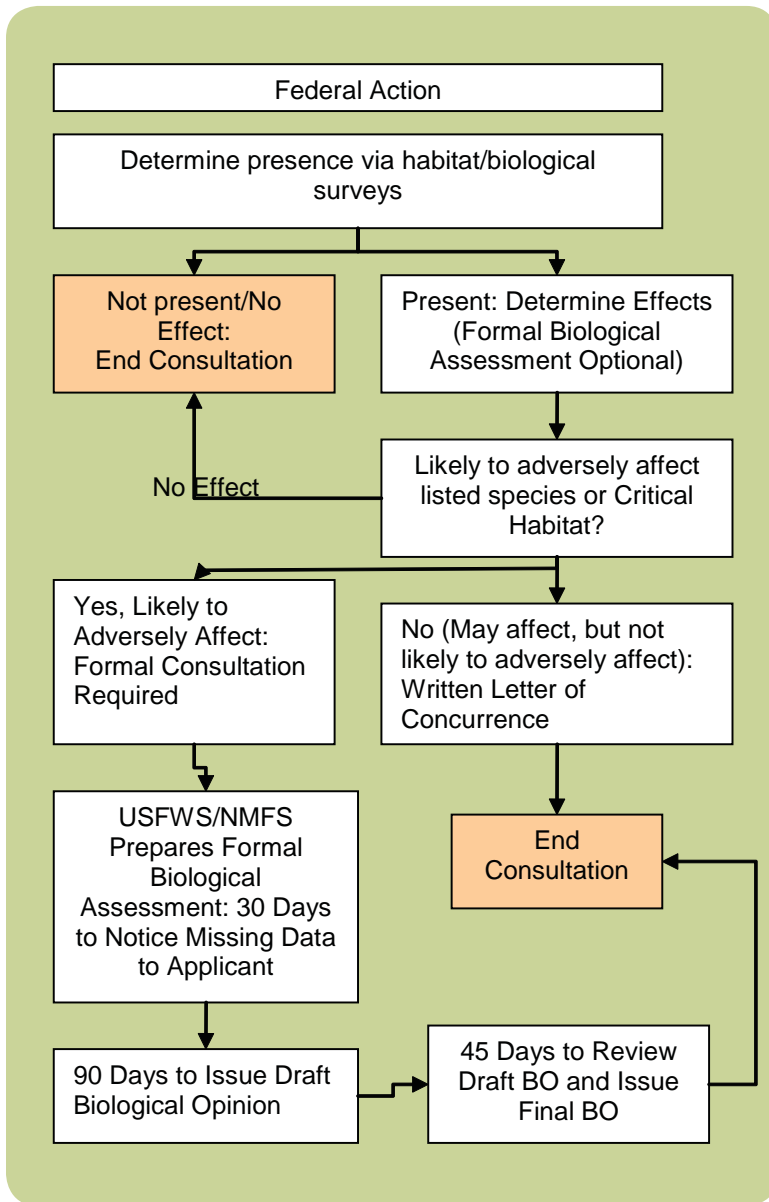
Federal Endangered Species Act Section 7 Consultation with U.S. Fish and Wildlife Service and/or National Marine Fisheries Service

Defining USFWS and NMFS Jurisdiction

- Activities subject to this type of permit include any federally funded or permitted activity that may adversely affect federally-listed species or Critical



Process for U.S. Army Corps of Engineers Section 404 Permits



Process for Federal Endangered Species Act Section 7 Consultation with U.S. Fish and Wildlife Service and/or National Marine Fisheries Service

Habitat. USFWS has jurisdiction over terrestrial wildlife, freshwater aquatic species, and plant species, and NMFS has jurisdiction over marine and anadromous aquatic species.

- To determine whether a project has the potential to adversely affect federally-listed species, speak to a professional biological consultant or USFWS biologist. You can also look for federally-listed species information in the other chapters of this guidebook.
- An incidental take permit from USFWS/NMFS is required when take of an endangered animal species may occur.
- Prohibits removal or damage of endangered plant species on federal lands or anywhere else if in knowing violation of federal law.

Permit Types

- No Effect, Technical Assistance Letter: This is available for projects that have been determined to have no effect on federally protected species or habitats, or when federally protected species or habitat are determined not present in the action area.
- May Affect, But Not Likely to Adversely Affect, Letter of Concurrence: This is available for projects that are determined to have a potential to affect federally protected species or habitat, but with implementation of avoidance and minimization measures, the project is not likely to adversely affect the species or habitat. The Services will issue a Letter of Concurrence stating the project may move forward with implementation of the measures.
- Likely to Adversely Affect, Biological Opinion and Incidental Take Permit: USFWS or NMFS will require a biological opinion and incidental take permit when it determines that a project is likely to adversely affect and listed species or habitat.

Required Items for the Application Package

- Complete project description (existing conditions, proposed activities, analysis of impacts, proposals for avoidance, minimization and/or mitigation)
- Description of action area
- Conceptual engineering plans
- Maps of species and habitats in project area
- Biological Assessment
- Impacts analysis: direct effects, indirect effects, cumulative effects

Who Do I Contact?

- USFWS: <http://www.fws.gov/sacramento/es/default.htm>
- Sacramento Fish and Wildlife Office, USFWS: (916) 414-6600
- NMFS: http://www.nmfs.noaa.gov/pr/permits/esa_permits.htm
- Santa Rosa Southwest Regional Office, NMFS: (707) 575-6050

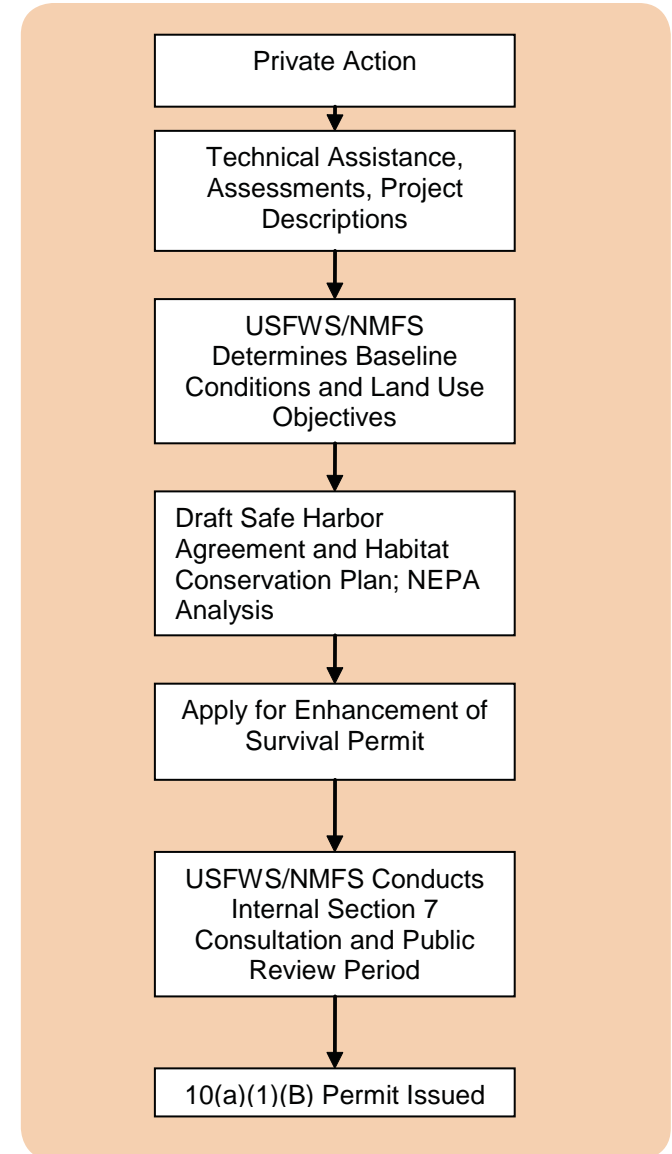
Federal Endangered Species Act Section 10 Consultation with U.S. Fish and Wildlife Service and/or National Marine Fisheries Service

Defining USFWS and NMFS Jurisdiction

- Activities subject to this type of permit include any private activity occurring on private land that may adversely affect federally-listed species or Critical Habitat. USFWS has jurisdiction over terrestrial wildlife, freshwater aquatic species, and plant species, and NMFS has jurisdiction over marine and anadromous aquatic species.
- To determine whether a project has the potential to adversely affect federally-listed species, speak to a professional biological consultant or USFWS biologist. You can also look for federally-listed species information in other chapters of this guidebook.
- The Section 10 process can be very lengthy and complicated. If it is possible to obtain federal funding or other federal approval for your project, it is advisable to do so to avoid the Section 10 process.

Permit Types

Prior to even applying for a permit, the Applicant will be required to work with USFWS/ NMFS to develop project descriptions, determine baseline conditions of the site, and develop land use objectives. The Section 10 process then requires the applicant to design a Habitat Conservation Plan (HCP) and provide a long-term commitment to species conservation. The no surprises clause assures the Applicant that if unforeseen circumstances arise, USFWS/NMFS will not require the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water or other natural resources beyond the level otherwise agreed to in the HCP without the consent of the Applicant and as long as the HCP conditions have been met. It is only after development of the HCP and the Safe Harbor Agreement that the Application finally applies for the Incidental Take Permit under Section 10, which is called the “Enhancement of Survival Permit.” A public review period can then occur USFWS and NMFS will then



Process for Federal Endangered Species Act Section 10 Consultation with U.S. Fish and Wildlife Service and/or National Marine Fisheries Service

conduct their own internal Section 7 Consultation process (see the Section 7 Consultation Process above) and a public review period. Upon completion, a 10(a)(1)(B) permit will be issued.

Required Items for the Application Package

- Complete project description (existing conditions, proposed activities, analysis of impacts, proposals for avoidance, minimization and/or mitigation)
- Proposed management activities and monitoring program of management practices
- Maps of species and habitats in project area
- Biological Assessment
- Impacts analysis: direct effects, indirect effects, cumulative effects
- Habitat Conservation Plan
- Enhancement of survival application form

Who Do I Contact?

- USFWS: <http://www.fws.gov/sacramento/es/default.htm>
- Sacramento Fish and Wildlife Office, USFWS: (916) 414-6600
- NMFS: http://www.nmfs.noaa.gov/pr/permits/esa_permits.htm
- Santa Rosa Southwest Regional Office, NMFS: (707) 575-6050

Regional Water Quality Control Board Section 401 Water Quality Certification and/or Waste Discharge Requirement

Defining RWQCB Jurisdiction

Section 401 Clean Water Act: Any applicant for a federal license or permit must obtain a certification from the State that any discharge will comply with Clean Water Act effluent limitations and State water quality standards. The most common project requiring 401 Certification is one that discharges dredge or fill materials in waters of the United States, (i.e. a project requiring a 404 permit).

Porter-Cologne Act: The Regional Boards regulate the discharge of waste that could affect the quality of waters of the State, defined broadly as any surface water or groundwater, including saline waters, within the boundaries of the State. This includes isolated wetlands and riparian zones.



Permit Types

- Section 401 Certification required for any 404 Permit
- Waste Discharge Requirement (WDR) under the Porter-Cologne Act
- General WDR for Dredged or Fill to Waters Deemed by USACE to be Outside Federal Jurisdiction is available for projects discharging less than 0.2 acre and/or under 400 linear feet of state waters (for fill/excavation) or less than 50 cubic yards (for dredging)

Required Items for the Application Package

- 401 Certification application form and/or Form 200 for WDRs
- Fee calculator form and check made out to RWQCB
- Complete project description (existing conditions, proposed activities, analysis of impacts, proposals for avoidance, minimization and/or mitigation)
- Conceptual engineering plans
- Wetland delineation with map
- Amount and type of discharge/fill into waters of the United States and Waters of the State
- Hydrological/geotechnical analysis, if available
- Biological Assessment, if available
- Notice of determination showing CEQA compliance
- Mitigation and monitoring plan, or restoration/revegetation plan

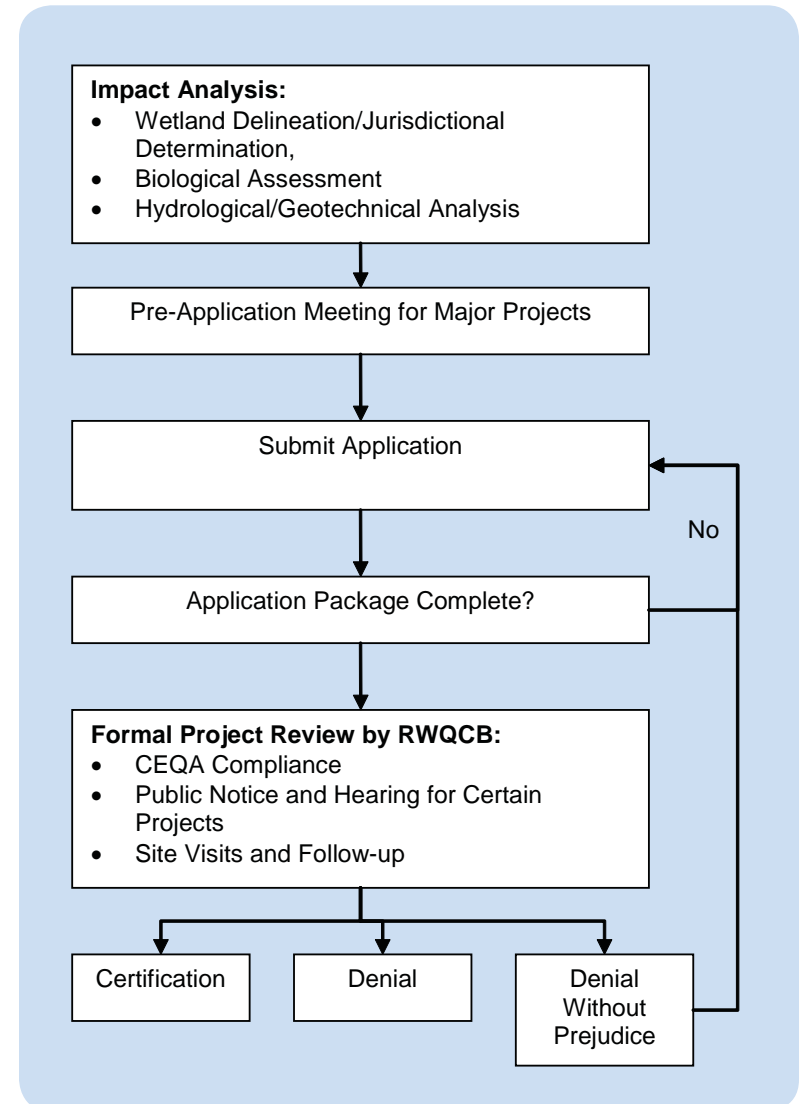
Who Do I Contact?

West County

- <http://www.waterboards.ca.gov/sanfranciscobay/>
- 401 Certification Program: <http://www.waterboards.ca.gov/sanfranciscobay/certs.shtml>
- Contra Costa County Contacts are Katie Hart, (510) 622-2356 and Matt Gaul, (510) 622-2381

East County

- <http://www.waterboards.ca.gov/centralvalley/>
- 401 Certification program: http://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_certification/index.shtml
- Contra Costa County Contacts are Pat Gillum, (916) 464-4709, pgillum@waterboards.ca.gov and Greg Vaughn at (916) 464-4742, gvaughn@waterboards.ca.gov



Process for the Regional Water Quality Control Board Section 401 Water Quality Certification and/or Waste Discharge Requirement Permits

California Department of Fish and Game Streambed Alteration Agreement

Defining CDFG Jurisdiction

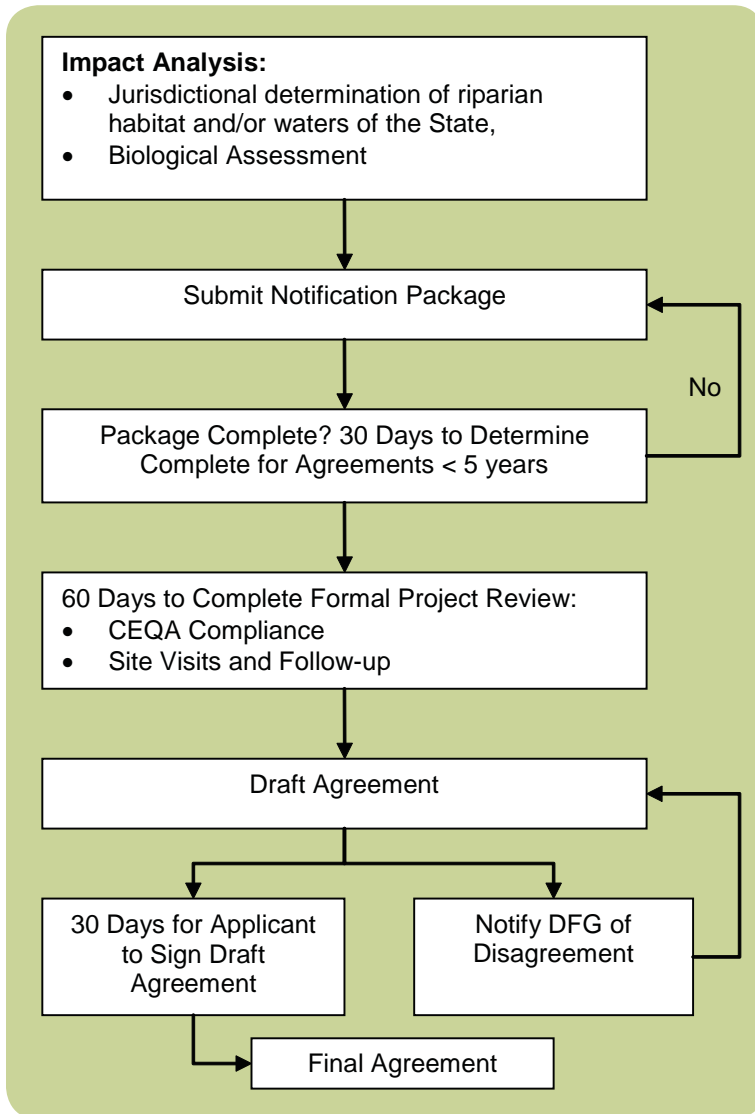
- Any person, state or local agency, or public utility must notify DFG before planning to:
 - Substantially obstruct or divert the natural flow of a river, stream, or lake; or
 - Substantially change or use any materials from the bed, channel, or bank of a river, stream, or lake; or
 - Deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake.
- DFG jurisdiction applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the state.

Permit Types

- Standard Agreement: Activities expected to take place within a 5-year timeframe.
- Standard Long-Term: Activities expected to continue past a 5-year timeframe.
- Master Agreement: An agreement for a duration longer than 5 years duration that is similar to a programmatic agreement. This agreement would cover a large, multi-phased project consisting of smaller specific projects for which detailed project plans are not prepared at the time of application for the permit.

Required Items for the Application Package

- Notification of Streambed Alteration Agreement Form
- Fee; Check made out to DFG
- Complete Project Description (existing conditions, proposed activities, analysis of impacts, proposals for avoidance, minimization and/or mitigation)
- Conceptual engineering plans
- Maps delineating DFG jurisdiction (riparian habitats and waters of the State) are useful
- Amount and type of impact to riparian area, including approximate number of trees removed (if applicable), and to waters of the State.



Process for the California Department of Fish and Game Streambed Alteration Agreement Permits

- Biological Resources Assessment with protected species included, if available
- Notice of determination showing CEQA compliance and copy of receipt of DFG filing fee
- Mitigation and monitoring plan, or restoration/revegetation plan

Who Do I Contact?

- <http://www.dfg.ca.gov/habcon/1600/>
- The Bay Delta Branch in Yountville, CA covers Contra Costa County
- Main Office: (707) 944-4005
- Lake or Streambed Alteration Program: (707) 944-5520

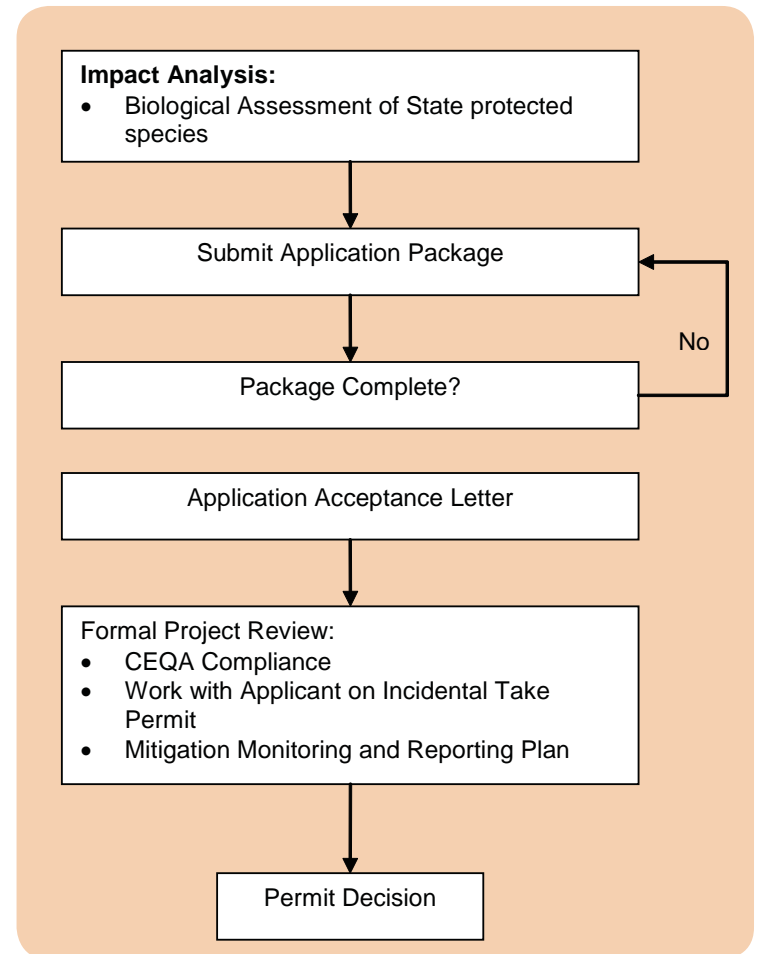
California Department of Fish and Game California Endangered Species Act Compliance

Defining CDFG Jurisdiction

- CESA prohibits take of any species determined to be an endangered or threatened species.
- Section 86 of the Fish and Game Code defines take as “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.”
- State endangered and threatened species lists are available on the DFG website (see below).

Permit Types

Section 2080.1 Consistency Determination: This permit is available when the project would affect species that are both federally and state listed (e.g., giant garter snake, winter-run and spring-run chinook salmon). In this case, you would submit a letter to DFG describing the project, species potentially affected, proposed avoidance and minimization measures for the species, a biological opinion or letter of concurrence from USFWS or NMFS (if available), and request concurrence that the project would not result in take of state listed species. Ultimately it is DFG’s responsibility to determine whether take of the species will occur or not. If DFG determines that take will not occur, their letter of concurrence will function as their CESA determination. If DFG determines that take will occur, then a consistency determination (pursuant to Fish and Game Code 2080.1) or application for a take



Process for the California Department of Fish and Game Endangered Species Act Compliance

permit (pursuant to Fish and Game Code 2081) will be required.

Incidental Take Permit (Section 2081): This permit is available when the project would affect species that are state listed only. Under this consultation, an incidental take permit from DFG (pursuant to Fish and Game Code Section 2081) would be required if the project may result in take of a state-listed species.

Required Items for the Application Package

- Complete project description (existing conditions, proposed activities, analysis of impacts, proposals for avoidance, minimization and/or mitigation)
- Conceptual engineering plans
- Species and habitat maps from the California Natural Diversity Database
- Biological/habitat assessment of state listed species
- Take analysis of impacts
- Proposed avoidance, minimization and mitigation measures with a monitoring plan and description of funding sources for mitigation
- Notice of determination showing CEQA compliance



The California clapper rail & California least tern are protected by the Migratory Bird Treat Act & the Federal Endangered Species Act

Who Do I Contact?

- http://www.dfg.ca.gov/habcon/cesa/incidental/cesa_policy_law.html
- Bay Delta Branch, Main Office: (707) 944-4005

Migratory Bird Treaty Act

USFWS Jurisdiction

Section 703¹ of the MBTA prohibits taking any migratory bird, part, nest or eggs. Take is defined as “to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities.” A take does not include habitat destruction or alteration, as long as there is not a direct taking of birds, nests, eggs, or parts thereof. Birds protected under the act include all common songbirds, waterfowl, shorebirds, hawks, owls, eagles, ravens, crows, native doves and pigeons, swifts, martins, swallows and others, including their body parts (feathers, plumes etc),

¹ The full text stipulates, “Unless and except as permitted by regulations made as hereinafter provided in this subchapter, it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird, any part, nest, or eggs of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof.”

nests, and eggs. A complete list of protected species is found at 50 CFR 10.13.

Activities related to fire management which are most likely to result in take of migratory birds include, but are not limited to, clearing or grubbing, tree pruning or limbing, prescribed burning, and vegetation removal in migratory bird nesting habitat during the nesting season when eggs or young are likely to be present. See the BMPs in Chapter 2 of this guidebook to avoid impacts to migratory birds. Removal of inactive nests of migratory birds should not be accomplished prior to consultation with a qualified biologist.

Permit Types

Incidental Take Permit: Projects that are likely to result in take of birds protected under the MBTA will require the issuance of take permits from the local FWS jurisdiction. A permit may be required for removal of inactive nests. Application for a take permit is made on FWS application form 3-200. Permits for take are issued in accordance with regulations at 50 CFR 21.

Depredation Permit: Depredation permits are issued to allow the take of migratory birds which are causing serious damage to public or private property, pose a health or safety hazard, or are damaging agricultural crops or wildlife. Should it be necessary to apply for a permit to kill a limited number of birds, documentation from their office that they have offered advice in the non-lethal control of birds is required as part of our application information. No permit is required merely to scare or herd depredate migratory birds other than endangered or threatened species or bald and golden eagles.

Who Do I Contact?

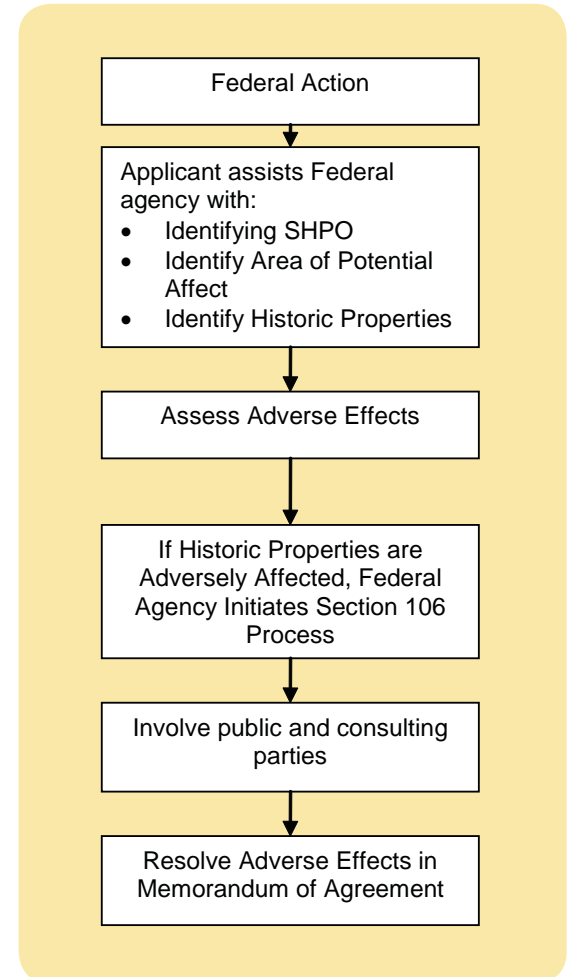
Please see: <http://www.fws.gov/pacific/migratorybirds/permits.htm> for more information on obtaining permits.

National Historic Preservation Act (Advisory Council on Historic Preservation and State Historic Preservation Office)

ACHP and SHPO Jurisdiction

The National Historic Preservation Act created the Advisory Council on Historic Preservation (ACHP), an independent Federal agency, which is authorized to review and comment on all actions licensed by the Federal government which will have an effect on properties listed in the National Register of Historic Places, or eligible for such listing.

Any project involving a federal action must seek ACHP comments and complete Section 106 review (16 U.S.C. 470(f)). The Federal agency involved in the proposed project or activity is



Process for the National Historic Preservation Act Permits

responsible for initiating and completing the review process. The agency must confer with the State Historic Preservation Officer (an official appointed in each State or territory to administer the National Historic Program) and the NHPA.

The National Register is an inventory of the United States' historic resources and is maintained by the National Park Service. The inventory includes buildings, structures, objects, sites, districts, and archeological resources. As mentioned above, Section 106 also encompasses significant properties which have not yet been listed, but are determined to be eligible for listing.

Permit Types

The agency consults to resolve adverse effects with the SHPO/THPO* and others, who may include Indian tribes and Native Hawaiian organizations, local governments, permit or license applicants, and members of the public. ACHP may participate in consultation when there are substantial impacts to important historic properties, when a case presents important questions of policy or interpretation, when there is a potential for procedural problems, or when there are issues of concern to Indian tribes or Native Hawaiian organizations.

Consultation usually results in a Memorandum of Agreement (MOA), which outlines agreed-upon measures that the agency will take to avoid, minimize, or mitigate the adverse effects. In some cases, the consulting parties may agree that no such measures are possible, but that the adverse effects must be accepted in the public interest.



Archeological resources are protected under the National Historic Preservation Act

Required Items for the Application Package

- Complete project description (existing conditions, proposed activities, analysis of impacts, proposals for avoidance, minimization and/or mitigation)
- Area of potential effect map
- Assessment of historic properties significance
- Apply criteria of adverse effect
- Proposed avoidance, minimization and mitigation measures

Who Do I Contact?

- ACHP: <http://www.achp.gov/nhpa.html>
- SHPOL <http://ohp.parks.ca.gov/>
- Contact: calshpo@parks.ca.gov or call 916-653-6624

Estimated timeline for permit issuance after application

Permit Type	Day 1 to 30	Day 31 to 60	Day 61 to 90	Day 91 to 120	Day 121 to 150	Day 151 to 180
§ 7 Consultation with U.S. Fish and Wildlife Service*			Consultation must be concluded within 90 days, unless an extension is granted (16 USC § 1536(b)(1)(A)).		USFWS has a maximum of 150 days to conclude consultation without obtaining consent of the permittee (16 USC § 1536(b)(1)(B)).	May extend the consultation past 150 days with the approval of the permittee. If an approval is obtained from the permittee, there is no maximum time limit, unless expressly stated in the approval (16 USC § 1536(b)(1)(B)).
California Endangered Species Act Incidental Take (CDFG is CEQA responsible agency)	CDFG has 30 days to conduct an initial review and to determine if the application is complete (14 CCR § 783.5).		CDFG has 90 days to process the application, unless an extension is granted. An extension may be granted up to 60 days (14 CCR § 783.5).		CDFG has an absolute maximum of 150 days to complete the application (14 CCR § 783.5(c)).	
California Endangered Species Act Incidental Take (CDFG is CEQA lead agency)	CDFG has 30 days for an initial review and to determine if the application is complete (14 CCR § 783.5).			CDFG has 120 days to process the application, unless an extension is granted. An extension may be granted for an additional 60 days (14 CCR § 783.5(d)).		CDFG has an absolute maximum of 180 days to complete application (14 CCR § 783.5(d)).
Consistency Determination (Fish and Game Code § 2080.1)	CDFG shall make a determination within 30 days whether a federal incidental take permit or federal incidental take statement is consistent with California Endangered Species Act (Fish and Game Code § 2080.1).					

*Section 10 Consultation does not have a statutory timeframe. It has been known to take 2-10 years to complete.

Permit Type	Day 1 to 30	Day 31 to 60	Day 61 to 90	Notes
Clean Water Act 404 Nationwide Permit	The district engineer must determine if the Pre-Construction Notification package is complete within 30 calendar date of the date of receipt and, as a general rule, will request additional information necessary to make the PCN complete only once.	If the district engineer has determined the notification complete and the Applicant has not received a notice to proceed within 45 calendar days, the project may move forward, unless Section 7 Consultation pursuant to the Federal ESA is required.		Issuance of a USACE Nationwide Permit is usually delayed because of the Section 7 Consultation process with USFWS or NMFS. However, USACE has instituted timelines for responding to USACE and NMFS (between 30 and 45 calendar days) in an attempt to speed the process.
Clean Water Act 404 Individual Permit	District Engineer has 15 days to determine if the application is complete and issue a public notice. Comment period for a public notice is usually between 15 and 30 days, unless an extension is granted for a maximum of 30 days (33 CFR § 325.2(a)(2)).	District Engineer has 60 days to make a determination for all applications, unless a time extension has been granted for the following reasons: need to conduct a site visit (30 day extension); comment period is extended (up to 30 days); case is referred to a higher authority; or additional information is needed to make a determination (application process is suspended) (33 CFR § 325.2(d)(3)(i)-(vi)).		Issuance of a USACE Individual Permit usually takes longer than the statutory timelines because USACE has to wait until USFWS/ NMFS completed the ESA process, SHPO completes the Section 106 NHPA process, and NEPA analysis is complete.
401 Water Quality Certification	RWQCB will determine if application package is complete.	RWQCB must issue a permit or grant a waiver within 60 days. RWQCB and District Engineer may reasonably require a period of time longer than 60 days, but cannot exceed 1 year (33 CFR § 325.2(b)(ii)).		Note: Issuance of a Section 401 Water Quality Certification usually takes longer than the statutory timelines because applications are often deemed incomplete, which re-starts the clock.
Waste Discharge Requirements	RWQCB has 30 days to review application for completeness and may request additional information from the permittee.	RWQCB determines whether to adopt WDRs, prohibit the discharge, or waive the WDRs. If WDRs should be issued, then RWQCB will propose WDRs and distribute them to persons and public agencies with known interest in the project for a minimum 30 day comment period.	RWQCB will then hold a public hearing with at least a 30 day public notification. Entire process generally takes about 3 months to complete.	
Lake and Streambed Alteration Agreement		CDFG must either issue a draft agreement to the permittee or make a determination that no agreement is required within 60 days (Fish and Game Code § 1602) unless an extension is requested.	After 60 days, an operation of law is in effect unless extension was granted. The permittee may proceed with the project without a Lake or Streambed Alteration Agreement, but the permittee is limited to the work described in the notification (Fish and Game Code § 1602).	This permit is usually the only one that is consistently “on-time” in terms of the statutory timeline requirements. However, extensions are often requested for larger, more complex projects.

Table 26: Estimated timeline for permit issuance after application submittal (continued)





Chapter 4: Additional Resources

The following chapter will provide additional resources that will better prepare you to perform vegetation management treatments around your home and within your community. This information supplements the information found in the previous three chapters and will enable you to better implement Best Management Practices while conducting hazardous fuel treatments in Contra Costa County. It is important to note that the recorded occurrence information, dates and localities, in Tables 27 and 28 is based on existing information in the California Natural Diversity Database and EDAW's internal species sightings for the County. Some of this information may be out of date as more recent sightings may not be reflected in the database. In many cases the absence of species information or sightings is often due to a lack of survey data, not necessarily the absence of the species. Therefore, the range maps on pages 33-37 should be utilized for species range assessments as opposed to the polygons on the maps provided in the Appendix. The USFWS may consider areas outside of the occurrence polygons in the map atlas to possibly contain populations of certain listed species. The Species Map Atlas Appendix is provided to the public agencies' and land managers that may utilize this guidebook. Private individuals and entities should contact the Diablo Firesafe Council or agencies they are working with to access this information as CNDDDB licensing agreements limit the public distribution of this sensitive information.

This section includes the following components:

- Detailed table of federally protected plants in Contra Costa County;
- Detailed table of federally protected wildlife in Contra Costa County;
- Detailed quick reference sheets for federally protected wildlife in Contra Costa County;
- Map Atlas of habitat ranges for federally protected species in Contra Costa County (Appendix provided to public agencies);
- Information for wildlife rehabilitation facilities in and around Contra Costa County and;
- Glossary of terms used in this Best Management Practices Guidebook for Hazardous Fuel Treatments in Contra Costa County.



Sheep Grazing

Scientific Name	Common Name	Federal Status ¹	State Status ¹	CNPS ¹	Comments	Habitat Affinities	Potential and Recorded Occurrences in Contra Costa County
<i>Holocarpha macradenia</i>	Santa Cruz tarplant	FT	CE	1B:3-3-3	June-October annual herb	Coastal prairie, valley/ foothill grassland, often on heavy clay soils.	Potential for occurrence in coastal prairie and valley/foothill grassland throughout Contra Costa County, especially west of 680. Occurrences recorded in Wildcat Canyon Regional Park, Pinole/Richmond area and in the vicinity of the San Pablo and Briones Reservoirs. The most recent occurrence recorded in Wildcat Canyon Regional Park in 2002.
<i>Lasthenia conjugens</i>	Contra Costa goldfields	FE	CEQA	1B.1	March-June annual herb	Mesic sites in valley/ foothill grassland, vernal pools.	Potential for occurrence in valley/foothill grassland and vernal pools throughout Contra Costa County. Occurrences recorded in Concord, Walnut Creek, and Antioch have been extirpated. The most recent occurrence recorded near Hercules in 2001.
<i>Amsinckia grandiflora</i>	large-flowered fiddleneck	FE	CE	1B.1	April-May annual herb	Cismontane woodland, valley/foothill grassland.	Potential for occurrence in cismontane woodland and valley/foothill grassland east of 680. Occurrences recorded in Black Diamond Mines Regional Preserve and Los Vaqueros. Most recent occurrence recorded in Black Diamond Mines Regional Preserve in 1996.
<i>Erysimum capitatum</i>	Contra Costa wallflower	FE	CE	1B.1	March-July perennial herb	Stabilized interior dunes	Potential for occurrence in the Antioch Sand Dunes. Occurrences recorded in Antioch Dunes and vicinity, most recently in 2001.

Table 27 (Above and Opposite). Habitat and occurrence information for federally protected plants in Contra Costa County

Federally Protected Plants in Contra Costa County

Scientific Name	Common Name	Federal Status ¹	State Status ¹	CNPS ¹	Comments	Habitat Affinities	Potential and Recorded Occurrences in Contra Costa County
<i>Suaeda californica</i>	California seablite	FE	CEQA	1B:3-3-3	July-October shrub (evergreen)	Coastal saltmarshes and swamps	Potential for occurrence in northern and western Contra Costa County. Occurrence recorded south of Richmond and has been extirpated.
<i>Arctostaphylos pallida</i>	pallid manzanita	FT	CE	1B:3-3-3	December-March evergreen shrub	Broadleaved upland forest, cismontane woodland, chaparral and coastal scrub, on siliceous shale, sandy and gravelly soils on uplifted Marine terraces.	Potential for occurrences on ridges west of 680. Occurrences recorded in Wildcat Canyon Regional Park and southwest Contra Costa County. Most recent occurrence south of Orinda in 2004.
<i>Oenothera deltoides</i>	Antioch Dunes evening-primrose	FE	CE	1B.1	March-September perennial herb	Remnant river bluffs and interior sand dunes.	Potential for occurrence in the Antioch San Dunes and vicinity. Occurrences recorded in Antioch/Oakley area, most recently in 2001.
<i>Cordylanthus mollis</i>	soft bird's-beak	FE	CR	1B:2	July-September annual herb (hemiparasite)	Coastal saltmarsh	Potential for occurrence in coastal salt marsh in northern and western Contra Costa County. Occurrences recorded in northern Contra Costa County from Martinez to Bay Point and west of Hercules. Most recent occurrence recorded in Suisun Bay in 2002.

¹ Status Codes

California Native Plant Society Designations (CNPS)

List 1: Plants of highest priority

List 1A: Plants presumed extinct in California

List 1B: Plants rare and endangered in California and elsewhere

California Dept. Of Fish And Game Designations (CDFG)

CE = Listed as Endangered by the State of California

CR = Listed as Rare by the State of California

CEQA= Taxa which are considered to meet the criteria for listing as Endangered, Threatened or Rare by the CDFG; impacts to taxa must be addressed in CEQA documents.

U.S. Fish and Wildlife Designations (USFWS)

FE = Listed as Endangered by the Federal Government

FT = Listed as Threatened by the Federal Government

Scientific Name	Common Name	Federal Status ¹	State Status ¹	Habitat Affinities	Potential and Recorded Occurrences in Contra Costa County
Amphibians					
<i>Ambystoma californiense</i>	California tiger salamander (Central Valley DPS)	FT	CSC	Breeds in temporary or semi-permanent pools such as farm and stock ponds, springs, creeks, and vernal pools. Seeks cover in rodent burrows in grasslands and oak woodlands, including grazed pastureland.	Potential for occurrence in grasslands and oak savanna east of 680. Occurrences primarily in southeastern Contra Costa County, the Antioch area, and open space areas in Concord/Pittsburg. Occurrences in developed areas of Western Walnut Creek and the Pacheco/Concord/Pittsburg area have been extirpated. Most recent occurrence recorded in Mount Diablo State Park in 2006.
<i>Rana (=aurora draytonii) draytonii</i>	California red-legged frog	FT	CSC	Prefers semi-permanent and permanent stream pools, ponds, and creeks with emergent and/or riparian vegetation. Will occupy upland areas during the wet winter months. Surrounding upland areas include grasslands and pasturelands.	Potential for occurrence throughout Contra Costa County, excluding the northeastern Central Valley/Delta area. Occurrences primarily in southeastern Contra Costa County. Other occurrences in southern Antioch, Hercules/ Rodeo, Briones Regional Park, the Moraga/Lafayette/ Orinda area, Pittsburg/Bay Point area, and Diablo/Blackhawk-Camino Tassajara. Most recent occurrence recorded in Orinda in 2007.
Birds					
<i>Buteo swainsoni</i>	Swainson's hawk (nesting only)	MBTA	ST	Nests in a variety of tree species often in or near riparian habitat. Forages in grasslands and agricultural fields. Highest nesting densities are in Yolo County. Relatively common throughout the lower Sacramento and San Joaquin Valleys from March - September. Winters in pampas of South America. Forages on small rodents during breeding season and insects during the non-breeding season.	Potential for nesting in trees in eastern Contra Costa County. Occurrences recorded east of 680, primarily in Brentwood/Antioch area. Most recent occurrence in Brentwood in 2007.

¹ Status Codes

U.S. Fish And Wildlife Designations (USFWS)

FE= Listed as Endangered by the Federal Government
 FT= Listed as Threatened by the Federal Government

California Dept. Of Fish And Game Designations (CDFG)

CE= Listed as Endangered by the State of California
 CT= Listed as Threatened by the State of California
 CSC = California Species of Special Concern
 CFP= Fully protected under the Cal. Fish and Game Code.

Federally Protected Wildlife in Contra Costa County

Scientific Name	Common Name	Federal Status ¹	State Status ¹	Habitat Affinities	Potential and Recorded Occurrences in Contra Costa County
<i>Laterallus jamaicensis coturniculus</i>	California black rail	MBTA	ST CFP	Secretive marsh bird found in damp areas with dense grass. Year-round resident in the greater Bay Area and more recently have been recorded from the Sierra Foothills. Inhabits tidal salt marshes, grassy marshes, stubble fields and wetlands. Nesting habitat is characterized by unfluctuating water levels with a depth of less than 3 cm and dense vegetative cover.	Potential for occurrence in tidal salt marshes in western and northern Contra Costa County. Occurrences recorded from San Pablo Bay to Suisun Bay. Most recent occurrence recorded on Brown's Island in 2006.
<i>Athene cunicularia hypugea</i>	Burrowing owl (burrow sites)	MBTA	CSC	Open, dry grasslands, deserts, prairies, farmland and scrublands with abundant active and abandoned mammal burrows. Occurs in lowlands throughout California. Uses ground squirrel burrows for nesting and shelter.	Potential for wintering and nesting in open grasslands, agricultural areas, and ruderal/disturbed habitats throughout Contra Costa County. Occupied burrows recorded primarily in Antioch/Oakley/Brentwood area. Other occupied burrows recorded south of Byron, San Ramon and vicinity, Pittsburg, and Walnut Creek. Most recent burrow occurrence recorded southeast of Antioch in 2007.
<i>Rallus longirostris obsoletus</i>	California clapper rail	FE	SE CFP	Inhabits tidal salt marshes of the greater San Francisco Bay, although some individuals use brackish marshes during the spring breeding season. Salt marsh species typically include pickleweed, cordgrass, and gumplant. It formerly occurred at Humboldt Bay in Humboldt County, Elkhorn Slough in Monterey County, and Morro Bay in San Luis Obispo County.	Potential for occurrence in saltmarshes in western Contra Costa County. Occurrences recorded in Richmond and northern Contra Costa County east of Martinez to the Concord Naval Weapons Station. Most recent occurrence recorded in Richmond in 2003.
<i>Sterna antillarum browni</i>	California least tern	FE	SE CFP	Nests on sandy beaches and sand dunes close to water. Have been found in human-created habitats such as airports, landfills, and sand-topped islands. Mixes freely with other terns. Nesting sites range from San Francisco Bay to Baja California.	Potential for occurrence in sand dunes and beaches in western and northern Contra Costa County. Occurrences recorded in Bay Point and west of Bay Point. Most recent occurrence recorded in Pittsburg in 1988.

Table 28 (Above and Opposite). Habitat and occurrence information for federally protected wildlife in Contra Costa County

Scientific Name	Common Name	Federal Status ¹	State Status ¹	Habitat Affinities	Potential and Recorded Occurrences in Contra Costa County
Invertebrates					
<i>Apodemia mormo langei</i>	Lange's metalmark butterfly	FE	None	Historically inhabited stabilized sand dunes along the southern bank of the Sacramento-San Joaquin River; today is found only at the Antioch Sand Dunes in Contra Costa County. Primary host plant is naked buckwheat (<i>Eriogonum nudum</i> var. <i>auriculatum</i>); other plants commonly found in association with the species are shrubby butterweed (<i>Senecio flacidus</i> var. <i>douglasii</i>), California matchweed (<i>Gutierrezia californica</i>), and silverbush lupine (<i>Lupinus albifrons</i>).	Potential for occurrence in sand dunes of northeastern Contra Costa County. Most recent occurrence recorded in the northern Pittsburg/Antioch area in 1999.
<i>Branchinecta longiantenna</i>	Longhorn fairy shrimp	FE	None	Inhabits clay and grass-bottomed vernal pools in grasslands, and pools in sandstone depressions that are typically filled by winter and spring rains. Known from disjunct populations along the eastern margin of the Central Coast Range from Contra Costa County south to San Luis Obispo County.	Potential for occurrence in grasslands of Central Contra Costa County east of 680 corridor communities. Most recent occurrence recorded in the Altamont area in 1994.
<i>Branchinecta lynchi</i>	Vernal pool fairy shrimp	FT	None	Inhabits vernal pools in grasslands in the Central Valley, Coast Ranges and South Coast mountains, specifically the Slanted Rocks Area, west of Byron Hot Springs, in Contra Costa County. Occur in small depressions in sandstone outcrops surrounded by foothill grasslands. Other common habitat is a swale, earth slump, or basalt-flow depression basin with a grassy or muddy bottom; found in unplowed grasslands. Occurrences are noted in the Central Valley, Coast Ranges, and South Coast mountains. Active between December and May.	Potential for occurrence in grasslands east of 680. Occurrences recorded in the Altamont area, northeastern Pittsburg, southern Antioch, Discovery Bay, and south of Brentwood. Most recent occurrence recorded near Byron Airport in 2006.

¹ Status Codes

U.S. Fish And Wildlife Designations (USFWS)

FE= Listed as Endangered by the Federal Government

FT= Listed as Threatened by the Federal Government

California Dept. Of Fish And Game Designations (CDFG)

CE= Listed as Endangered by the State of California

CT= Listed as Threatened by the State of California

CSC = California Species of Special Concern

CFP= Fully protected under the Cal. Fish and Game Code.

Scientific Name	Common Name	Federal Status ¹	State Status ¹	Habitat Affinities	Potential and Recorded Occurrences in Contra Costa County
<i>Callophrys (Incisalia) mossii bayensis</i>	San Bruno elfin butterfly	FE	None	Rocky outcrops and cliffs in coastal scrub, mainly in the vicinity of San Bruno Mountain, San Mateo County. The adult flight period is late February to mid-April, with the peak flight period occurring in March and early April. Colonies are located on steep, north-facing slopes within the fog belt. Eggs are laid in small clusters or strings on the upper or lower surface of the host plant, the stonecrop plant (<i>Sedum spathulifolium</i>).	Potential for occurrence in the rocky outcrops with the stonecrop plant in the Mount Diablo area. Most recent occurrence recorded in Mount Diablo State Park.
<i>Desmocerus californicus dimorphus</i>	Valley elderberry longhorn beetle	FT	None	Typically inhabits oak savanna and riparian forests in the Central Valley below 3,000 feet elevation. Requires elderberry (<i>Sambucus</i> spp.) as host plant for all stages of its life cycle.	Potential for occurrence in elderberry woodland and savanna and riparian areas in eastern Contra Costa County, including the Altamont area. No occurrences recorded in Contra Costa County but in neighboring counties, such as San Joaquin, Solano, Sacramento, Yolo, and Stanislaus.
<i>Euphydryas editha bayensis</i>	Bay checkerspot butterfly	FT	None	Restricted to native grasslands on outcrops Santa Clara and San Mateo Counties in California. Habitat exists on shallow, serpentine-derived or similar soils, which support the butterfly's larval food plant, California plantain (<i>Plantago erecta</i>) and nectar plants including desert-parsely (<i>Lomatium</i> spp.) and California goldfields (<i>Lasthenia californica</i>), among others.	Potential for occurrence in serpentine grasslands in the Oakland Hills, Mount Diablo area, and where there are supportive soils in southern Contra Costa County. Most recent occurrence recorded in Joaquin Miller Park in 1980 is extirpated.
<i>Lepidurus packardi</i>	Vernal pool tadpole shrimp	FE	None	Inhabits vernal pools in grassland habitats in the Central Valley between Shasta County and Merced County. Eggs hatch within a month of inundation; adults present until pools dry in the spring.	Potential for occurrence in grasslands east of 680 corridor communities. Most recent occurrence recorded south of Antioch in 2003.
<i>Speyeria callippe callippe</i>	Callippe silverspot butterfly	FE	None	Inhabits grasslands containing larval host plant johnny-jump-up (<i>Viola pedunculata</i>). Known from three locations, including San Bruno Mountain (on the San Francisco Peninsula), the Richmond area in Contra Costa County, Joaquin Miller Park in Alameda County, and in the vicinity of American Canyon, Solano County.	Potential for occurrence in grasslands with johnny-jump-up in Contra Costa County west of 680. Occurrences historically recorded in the Richmond area are likely extirpated.

Table 28 (Above and Opposite). Habitat and occurrence information for federally protected wildlife in Contra Costa County

Scientific Name	Common Name	Federal Status ¹	State Status ¹	Habitat Affinities	Potential and Recorded Occurrences in Contra Costa County
Mammals					
<i>Reithrodontomys raviventris</i>	Salt marsh harvest mouse	FE	SE CFP	Restricted to tidally influenced saline or brackish marshes with vegetative cover of San Francisco Bay and its tributaries. Habitat consists primarily of pickleweed. Does not burrow; builds loose nests. Requires high ground to escape high tides and floods.	Potential for occurrence in saltmarshes in northern and western Contra Costa County. Occurrences recorded in Richmond and northern Contra Costa County from Martinez to Antioch. Most recent occurrence recorded northeast of west Pittsburg in 2004.
<i>Vulpes macrotis mutica</i>	San Joaquin kit fox	FE	ST	Range includes dry annual grassland or grassy open stages with scattered shrubby vegetation. Requires loose-textured sandy soils for denning, and suitable prey base. Have been found in urban settings and in areas adjacent to tilled or fallow fields. The species does not occur west of 680 and populations are sparse within this portion of the range.	Potential for occurrence in grasslands of southeastern Contra Costa County (northwestern-most portion of the species' range). Occurrences recorded primarily in southeastern Contra Costa County. Some occurrences in Black Diamond Mines Regional Preserve and vicinity. Most recent occurrence west of Byron Hot Springs in 1996.
Reptiles					
<i>Masticophis lateralis euryxanthus</i>	Alameda whipsnake (striped racer)	FT	ST	Restricted to chaparral and coastal scrub of the Coast Ranges. Uses rock outcrops for refugia. Inhabits appropriate habitat on south, southwest- and southeast-facing slopes and ravines where the shrubs form a vegetative mosaic with grasses. Uses rodent burrows. Feeds on a number of items including fence lizards (<i>Sceloporus</i> spp.). Five disjunct populations remain in the San Francisco Bay Area: Tilden–Briones, Oakland–Las Trampas, Hayward–Pleasanton Ridge, Sunol–Cedar Mountain, and the Mount Diablo–Black Hills.	Potential for occurrence in the five population areas noted in "Habitat Affinities." Occurrences recorded in scrub habitats in southwestern Contra Costa County, Oakland Hills, Mount Diablo area, Briones Valley, Black Diamond Mines Regional Preserve, and Las Trampas areas. Most recent occurrence recorded in 2005.
<i>Thamnophis gigas</i>	Giant garter snake	FT	ST	Inhabits the edges of marshes, sloughs, ponds, small lakes, low gradient streams, and agricultural wetlands such as irrigation and drainage canals and rice fields. Requires high ground for basking and escape during winter flooding. Known in the Central Valley from Fresno north to the Sutter Buttes.	Potential for occurrence in aquatic habitats connected to the delta in eastern Contra Costa County. The agricultural habitats of the Central Valley found in eastern Contra Costa County are the westernmost portion of the species' range. Most recent occurrence recorded on Webb Tract in 2002. Many trapping studies in the Oakley area have resulted in negative findings for the species.

Table 28. Habitat and occurrence information for federally protected wildlife in Contra Costa County



Quick Reference Sheets for Wildlife in Contra Costa County

WESTERN BURROWING OWL

Athene cunicularia hypugaea

Status

Common name: Western Burrowing Owl

State status: Species of Special Concern; Federal Bird of Conservation Concern; Petitioned to be listed as an Endangered or Threatened species under the California Endangered Species Act
Federal status: None

Identification

- Burrowing owls stand at 9.5 inches in height, have a 21 inch wingspan and long legs and a short tail.
- They have a buffy mottled appearance of brown, grayish and yellowish buff to pale brown. Their wings and tail are barred; their eyes are yellow and they lack ear tufts. Their chests vary from barred in adults to buffy white in juveniles.
- They have white or pale eyebrows and a white chin used for defensive and courtship displays.
- Burrowing owls are mainly active during the early morning and late evening hours, but may be observed during the day standing above a burrow entrance or on a low perch nearby.
- Adults undergo a complete annual molt in August and September. These owls do not exhibit sexual dimorphism, although males have been described as being slightly heavier with a greater wingspan.
- Burrowing owls have several vocalizations including a raspy warning hiss (*kssh*). The male gives a nasal, high *coo-cooo* call, and the female answers with an *eep* or *kssh*. They also give a sharp husky *chuk* or barking series of *chuk* call, often with a rasping scream *kwee-ch-ch-ch-ch* or *chee-twikit-twik* (taken from Sibley's Guide to Birds 2000).



Habitat

- Burrowing owls typically inhabit flat, open areas characterized by dry vegetation that is characteristic of heavily grazed grasslands, low stature grasslands or desert vegetation, that also contain available burrows (Johnsgard 1988).
- In the West, burrowing owls occur in deserts, plains and open grasslands.
- They are associated with burrowing animals such as the prairie dog, ground squirrel, badger and some canids.
- Burrowing owls require existing burrows or artificial structures for denning as they are unable to dig burrows themselves.
- Burrows are used year-round and are an essential component to the life history of a burrowing owl.



Occupied burrow with whitewash, pellet, and feathers



Burrowing owl at burrows



Population Threats

- Loss of wintering and breeding habitat due to development and other land use changes
- Loss of preferred nesting habitat

Distribution

- Burrowing owls are generally resident in the southern U.S. but are migratory in the Great Basin and Great Plains.
- The winter range of this species includes the southern portions of the breeding range, especially Texas, southern Louisiana and Mississippi, and western Florida, and extends south through central Mexico and western Central America to western Panama (see Zarn 1974, taken from AOU 1957).
- In California, they occur in some of the desert and high desert habitats in southeastern and northeastern California.
- In addition, they occur in the Central Valley, Inner and Outer Coastal region, portions of the San Francisco Bay Area, southern California Coast, southern California to the Mexican Border and in the Imperial Valley.
- The greatest proportion of burrowing owls residing in California (excluding the southeastern and northeastern desert regions and areas in southern California between the coast and Imperial Valley along the Mexican Border) occurs in the Imperial Valley (based on a census of burrowing owls in California 1991-1993, Desante and Rehlen, Institute of Bird Populations, 1995).

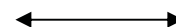
Natural History Summary

Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct

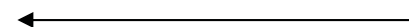
Birds begin courtship and burrow selection



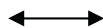
Egg laying and incubation occurs



Eggs hatch and juveniles fledge



Adults and juveniles become solitary and leave natal site



CALIFORNIA CLAPPER RAIL

Rallus longirostris obsoletus

Status

Common name: California clapper rail

State status: Endangered, listed 1971

Federal status: Endangered, listed 1970



Identification

- The California clapper rail is the largest of the western rail species (13- 17 inches long), and is indigenous to estuarine marshlands of the greater San Francisco Bay
- Has a hen-like appearance, a long, orange, slightly decurved bill, grey-brown upper parts, a cinnamon-buff colored breast, flanks criss-crossed by black and white bars, and conspicuous white undertail coverts (USFWS 1984)
- The males and females look almost identical, with males being slightly larger.
- The species most easily confused with clapper rail is Virginia rail (*Rallus limicola*). The Virginia rail is smaller than the clapper rail (7.5 inches long) and has characteristic gray cheeks lacking in the clapper rail

Habitat

In general, the California clapper rail occupies habitats containing the following features:

- marshes supporting an extensive system of tidal sloughs that provide direct tidal circulation throughout the site and ample vegetated mudflat edges for foraging
- extensive stands of Pacific cordgrass (or non-native *Spartina alterniflora* and hybrids) at lower marsh elevations
- high marsh cover consisting of tall stands of pickleweed, gumplant, and wrack for nesting and refuge from predators during high tides
- abundant invertebrate populations .
- Optimum foraging habitat consists of channel systems with shallow water and adjacent mudflats, with vegetation sparse enough to locate invertebrates but sufficiently dense and tall to provide cover and an escape route from predators

Population Threats

- Loss of habitat
- Habitat fragmentation
- Freshwater intrusion and resulting changes in vegetation composition
- Increased predation by non-native predators
- Environmental contaminants, particularly mercury
- Non-native invasive plants



California Clapper Rail 1995 ©Mike Danzenbak

Distribution

- The highest densities have typically been in south San Francisco Bay. Present-day tidal-marsh habitat in the bay is about 15 percent of historical acreage, and remaining habitat is extremely fragmented.
- Within the south San Francisco Bay, the species is found primarily in the larger, more highly channelized, remnant salt marshes including Bair and Greco Islands, and Palo Alto Baylands in San Mateo County; Dumbarton Point and Mowry marshes in Alameda County, and in scattered locations at creek mouths in Santa Clara County.
- Distribution along the central and northern portion of San Francisco Bay includes Corte Madera and Muzzi Marshes, Richardson Bay, Gallinas Creek, and Creekside Marsh in Marin County; Arrowhead and Elsie Romer Marshes in Oakland; Emeryville Crescent, and Inner Richmond Harbor.
- Scattered populations of California clapper rail also occur near creek mouths in northern Alameda and western Contra Costa counties

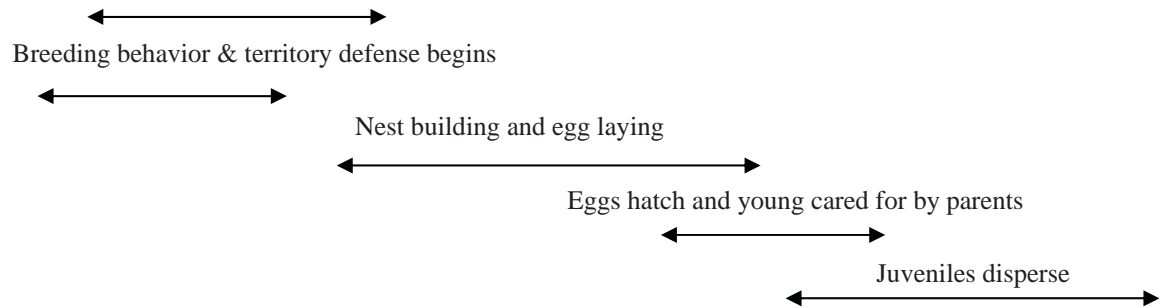


California clapper rail habitat

Natural History Summary

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Breeding season call-count survey period: Jan 15 to Mar 15 (usually extended to April 15).



California Tiger Salamander (CTS)

Ambystoma californiense

Status

Common name: California tiger salamander (Central Population)

State status: Species of Special Concern

Federal status: Threatened, August 4, 2004

Identification

- The California tiger salamander is a large terrestrial salamander reaching up to 8.2 inches (207 mm).
- Males are generally larger than females.
- The snout is rounded and broad and the snout vent length is about 3.6 in. (90 mm).
- Their backs and sides are black in color with white or pale yellow spots or bars.
- Their bellies vary from uniform white or pale yellow to a multicolored pattern of white or pale yellow and black.

Distribution

- The California tiger salamander is a terrestrial salamander that inhabits grasslands and oak savanna habitats in the valleys and low hills of central and Northern California (Storer 1925, Stebbins 2003, Barry and Shaffer 1994).
- California tiger salamanders have been recorded from all of the nine Bay Area counties at elevations ranging from approximately 10 to 3,500 feet above mean sea level (Shaffer and Fisher 1991).



Adult, Alameda County

Population Threats

- Loss of small vernal pools, especially the degradation of complexes of long lasting pools.
- Fragmentation of known breeding sites including migration barriers between upland aestivation sites and breeding ponds.
- Introduction of predatory fishes (including mosquito fish for mosquito control), bullfrogs and/or red swamp crayfish into pools used by the tiger salamander.
- Vehicular-related mortality especially during breeding migrations (see Barry and Shaffer 1994).
- Rodent control programs which lead to loss of aestivation habitats (Loredo et al, 1996).



California Tiger Salamander larvae



Habitat – Alameda County

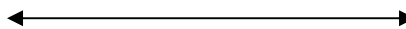
Habitat

- Adult California tiger salamanders spend most of their lives underground in small mammal burrows, most typically those of Beechey's (= California) ground squirrels (*Spermophilus beecheyi*), but also those of California voles (*Microtus californicus*) and pocket gophers (*Thomomys bottae*) and other small burrowing mammals (Loredo et al. 1996; Cook et al 2006).
- They are rarely seen except during nocturnal breeding migrations that begin with the first seasonal rains in November and December (Storer 1925, Barry and Shaffer 1994). Adults emerge from underground retreats to feed, court and breed during warm winter rains that typically persist through March. Adults may migrate long distances, up to a kilometer or more, to reach pools for breeding and egg laying (Jennings and Hayes 1994). Breeding sites are usually ephemeral ponds that fill during winter rains and dry down by mid-summer (Storer 1925).
- They require vernal pools, ponds (natural or man-made), or semi-permanent calm waters (where ponded water is present for a minimum of three to four months) for breeding and larval maturation, and adjacent upland areas that contain small mammal burrows or other suitable refugia for aestivation.
- California tiger salamanders will utilize permanent ponds but only if aquatic vertebrate predators such as bullfrogs (Anderson 1968) and fish (Barry and Shaffer 1994) are not present. They will use both occupied and unoccupied burrows but require an active population of burrowing small mammals to maintain the burrow (Loredo et al. 1996).

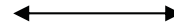
Natural History Summary

Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct

Adults move from aestivation areas to breeding ponds at night during warm rains. Males precede females.



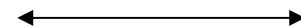
Egg laying occurs, adults leave pond. Females precede males.



Eggs hatch and larvae begin maturing into juveniles.



Juveniles leave drying pond for upland aestivation sites.



Salamanders aestivate in upland habitat for several years, until they are ready to mate.

GIANT GARTER SNAKE

Thamnophis gigas

Status

Common name: Giant garter snake

State status: Threatened, listed in 1971

Federal status: Threatened, listed 1993

Identification

- Giant garter snakes have numerous morphological variations ranging in color and pattern from dark olive brown/green and checkered with no dorsal striping, to faint striping that can range from yellow to orange with little or no checkered pattern
- They are distinguished from similar looking garter snakes by specific scale counts and measurements
- Generally have eight supralabial (upper lip) scales, the 6th being short than the 7th; the maximum number of dorsal scale rows is 23 or 2; males have 73-81 subcaudal scales, females have 65-73; the lateral stripe (when present) is confined to dorsal scales rows 2 and 3 (USFWS 1999)

Population Threats

- Loss of habitat throughout range due to urban expansion, changes in agricultural practices, and damage to wintering habitats due to intensive vegetation control
- Increased predation pressure from introduced species such as bullfrogs, feral cats, large mouth bass, and catfish
- Environmental contaminants



Photo: Glen Wylie (USGS)

Distribution

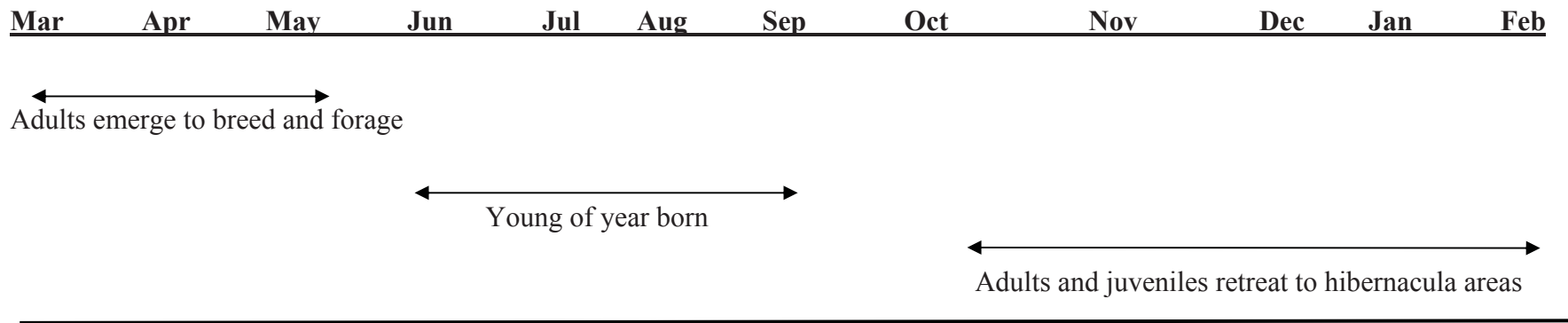
- The giant garter snake historically occurred throughout the Central Valley of California, from Kern County in the south to Butte County in the north, within the boundaries of the Coastal and Sierra Nevada ranges
- The current range is confined to the Sacramento Valley and isolated parts of the San Joaquin Valley, with scattered sightings in the Sacramento-San Joaquin Delta.
- Currently the highest densities are found in the Sacramento Valley within the American Basin, where the species persists largely in seasonally flooded agricultural fields, primarily rice, and irrigation ditches (CDFG 2000)



Habitat

- The giant garter snake inhabits wetland areas such as sloughs, low gradient streams and other waterways, ponds or small lakes, marshes, and agricultural wetlands including irrigation and drainage canals and rice fields, and the adjacent uplands
- Habitat components essential to the giant garter snake consist of:
 1. water during the snake's active period, (early spring through mid-fall) to provide a prey base and cover;
 2. emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat;
 3. upland habitat with burrows or crevices for basking, cover, and retreat sites;
 4. higher elevation uplands for cover and refuge from flood waters.
- USFWS guidelines for GGS habitat requirements assume 2.00 acres (0.81 hectares) of surrounding upland for every 1.00 acre (0.40 hectare) of aquatic habitat

Natural History Summary



ALAMEDA WHIPSNAKE

Masticophis lateralis euryxanthus

Status

Common name: Alameda whipsnake

State status: Threatened, listed in 1971

Federal status: Threatened, listed on December 5, 1997

Identification

- The Alameda whipsnake is a fast moving snake that is active during the day
- It has large eyes like its relatives and is also referred to as the "Alameda striped racer"
- The dorsal (top) side of the snake is sooty black
- The Alameda whipsnake is most easily distinguished from the chapparal whipsnake by the thickness of the orange stripes on its sides
- The ventral (bottom) portion of the snake transitions from orange-rufous at the front, to cream colored in the middle, to coral pink at the end onto the bottom of the tail



Population Threats

- Loss of habitat from human activities
- Alteration of suitable habitat through fire suppression and the resulting increased likelihood of catastrophic wildfires
- Habitat fragmentation from urban development and associated highway and road development which has led to genetic isolation of most populations

Distribution

- The Alameda whipsnake is restricted to the hills of Alameda, Contra Costa and northern Santa Clara counties within the San Francisco Bay region
- There are five remaining populations with little or no dispersal between them: Sobrante Ridge, Oakland Hills, Hayward Hills, Mount Diablo vicinity and the Black Hills, and Wauhab Ridge
- This regional restriction corresponds to the distribution of coastal scrub and chaparral within the area



Note slope characterized by scrub adjacent to woodlands



Coyote brush scrub habitat adjacent to access road

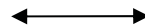
Habitat

- Primary habitats for Alameda whipsnake include coastal scrub and chaparral, with rock outcrops within approximately 0.5 miles
- Alameda whipsnakes frequently venture into adjacent habitats, including grassland, oak savanna, and occasionally oak-bay woodland
- Alameda whipsnakes have been found in association with a variety of shrub communities including diablan sage scrub, coyote bush scrub, and chamise chaparral
- Alameda whipsnakes exhibit a preference for open-canopy stands and habitats with woody debris and exposed rock outcrops because these habitats provide areas for basking (necessary to maintain body temperature), cover from predators, and an ample source of prey
- Rock outcrops can be an important feature of Alameda whipsnake habitat because they provide retreat opportunities for whipsnakes and support lizard populations. Lizards, especially the western fence lizard (*Sceloporus occidentalis*), appear to be the most important prey item of whipsnakes
- Overnight retreats and hibernacula (shelter used during the snake's dormancy period) include small mammal burrows created by deer mouse (*Peromyscus maniculatus*) and California vole (*Microtus californicus*). Other retreat areas include soil crevices, brush piles, woodpiles, and debris (*i.e.*, corrugated metal roofing boards, metal boxes).

Natural History Summary

Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb

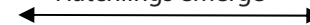
Adults emerge from hibernacula areas, with males emerging first



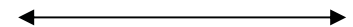
Courtship and mating occurs



Hatchlings emerge



Adults and juveniles retreat to hibernacula areas



California Red-legged Frog

Rana (=aurora draytonii) draytonii

Identification

- Largest native frog in Western United States (1.5-5 inches)
- Prominent lateral folds on the back
- Backs are buffy to olive brown with irregular black splotches with a light center
- Often with red legs but since other frogs have red legs, this is not a reliable identification characteristic

Distribution

- Locally abundant in the San Francisco Bay Area
- Populations recorded Contra Costa County, though not expected in the northeastern Central Valley/Delta portion

Population Threats

- Habitat loss due to such human activities as urbanization, agriculture, grazing, recreation, and water management
- Introduced predators, especially bullfrogs, crayfish, bass, and catfish
- Drought conditions
- Water and air contaminants, including herbicides, fertilizers, and industrial chemicals



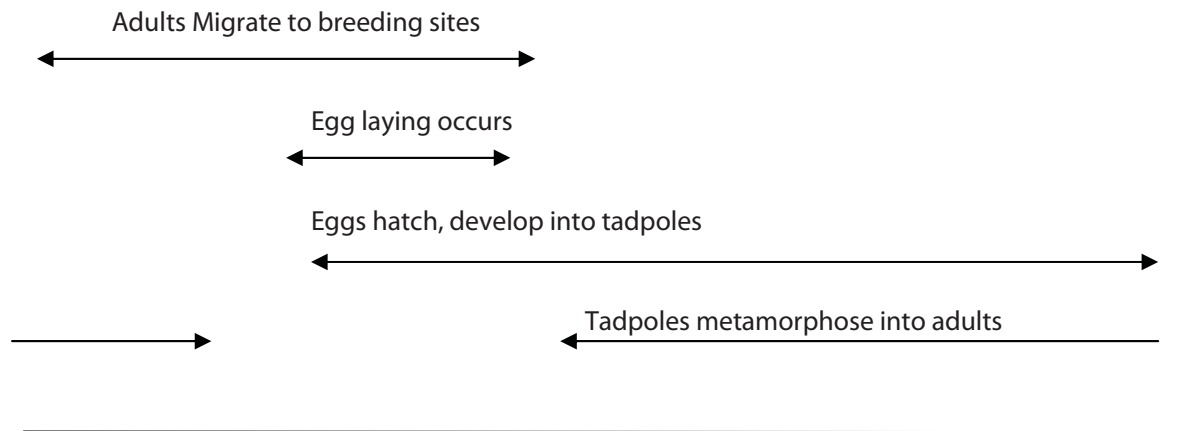


Distribution and Habitat

- Natural and human-made standing bodies of freshwater such as ponds, streams, wells, and stock ponds
- Along river corridors, and non-aquatic habitats such as grasslands and woodlands within 300 feet water.
- Summer in small mammal burrows and moist leaf litter

Natural History Summary

Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct



LEAST TERN

Sternula antillarum browni

Status

Common name: California least tern

State status:: Endangered and Fully-protected species

Federal status:: Endangered species



Identification

- Smallest tern in North America with a length of nine inches and a wing span of 20 inches
- Short forked tail, slender wings, and a relatively large bill that is yellow only in breeding plumage
- When in adult breeding plumage the least tern has a distinctive black head and mask with a white forehead
- Has distinctively rapid wing beats and the call is very high-pitched

Population Threats

- Habitat loss due to such human activities as urbanization and recreation
- Remaining nest sites used by the California least tern are highly disturbed, degraded, and fragmented
- High predation rates at nest sites due to native and non-native predators including red fox and feral cats
- California least tern colonies are vulnerable to environmental contamination

Habitat

- Nesting is on sandy beaches or created sites with sandy surfaces and little vegetation including airports, landfills and sand-topped islands
- Nests are successful only without disturbance from humans or predators; fencing is required
- Roosting habitat – pre-season nocturnal roosts and post-season dispersal sites where adults and fledglings congregate
- Foraging habitat – near shore ocean waters less than 60 feet deep and shallow estuaries and lagoons, usually within 2 miles of the breeding area

Distribution

- Majority of the population are found in southern California, with smaller populations in the San Francisco Bay and in Baja California
- In 2004, 6.2% of the population (i.e., 391 pairs) was in San Francisco Bay, with the vast majority of pairs at Alameda Point (379 pairs) and the remaining 12 pairs at a power plant in Pittsburg



Immature least tern



California least tern eggs

Natural History Summary

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

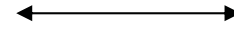
Arrive at nest sites



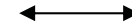
Nest building and egg laying (two waves)



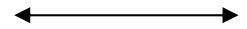
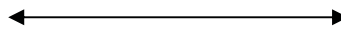
Eggs hatch and young cared for by parents



Fall migration – leave Calif. by end of Sept



Wintering grounds – Central and South America



California least tern chick



Adult least tern on nest

SALT MARSH HARVEST MOUSE

Reithrodontomys raviventris

Status

Common name: Salt Marsh Harvest Mouse

Scientific name: *Reithrodontomys raviventris*

Subspecies: Northern salt marsh harvest mouse (*R. raviventris halicoetes*)

Southern salt marsh harvest mouse (*R. raviventris raviventris*)

State status: Endangered

Federal status: Endangered

Identification

- The salt marsh harvest mouse is a small mouse measuring 69 to 75 mm in total body length and weighing 8 to 14 g (Shellhammer 2000).
- Salt marsh harvest mouse has rich brown to orange-brown dorsal coat coloration with abdomen coloration ranging from cinnamon (*R. r. raviventris*) to buffy white with T-shaped darker orange patterns from across the chest to the base of the tail (*R. r. halicoetes*) (Bias 2001).
- Tails are long, thick, and blunt tipped, usually with uniform coloration.
- This species also has a lateral groove on the upper incisor, distinguishing it from the house mouse, which has no groove but has a notched upper incisor.

Population Threats

- Habitat fragmentation
- Loss of habitat due to urbanization
- Land subsidence
- Widespread loss of the high marsh zone as a result of backfilling and levee creation
- Vegetation change due to fresh water intrusion and non-native plant invasions



Distribution

- The salt marsh harvest mouse is primarily a nocturnal rodent endemic to the San Francisco Bay and associated tributaries.
- It has been divided into two subspecies: the northern salt marsh harvest mouse (*R. raviventris halicoetes*), which occurs in Marin, Sonoma, Napa, Solano and Contra Costa Counties, and the southern salt marsh harvest mouse (*R. raviventris raviventris*), which occurs in Alameda, Santa Clara and San Mateo Counties and includes two disjunct populations at Corte Madera, Marin County and near Point San Pedro, Contra Costa County (Shellhammer 2000).

SAN JOAQUIN KIT FOX

Vulpes macrotis mutica

Status

Common name: San Joaquin Kit Fox

Scientific name: *Vulpes macrotis mutica*

State status: Threatened (1971)

Federal status: Endangered (1967)

Identification

- The kit fox [*Vulpes macrotis* (*Vulpes*, meaning “fox”; *makros*, meaning “large”; and *otos*, referring to the ear)] is one of nine species in the genus *Vulpes*, family Canidae, Order Carnivora.
- The San Joaquin kit fox (*V. m. mutica*), the smallest North American canid (member of the dog family, Canidae), is one of seven subspecies of kit fox and is considered the most genetically distinct (Mercurie *et al.* 1993).
- On average, adult males weigh approximately 2.3 kilograms (approximately 5 lbs.) and adult females weigh 2.1 kilograms (about 4.6 lbs.) (Morrell 1972).
- San Joaquin kit fox are noticeably smaller than any regionally sympatric canid species, in particular the coyote (*Canis latrans*), red fox (*V. vulpes*), and domestic dog (*C. familiaris*).
- The most distinguishing characteristics of San Joaquin kit fox are their slim body, exaggeratedly large ears, and their long, bushy tail that tapers off toward the tip.
- Their coat is characterized by guard hairs tipped in black, or doubly banded in a black-white-black pattern. As a result, their dorsal coloration ranges from a light grizzled- to a yellowish-gray, which fades to paler light buff to white from the sides down to the under parts.
- The tail is tipped black and the ears are tan or gray (McGrew 1979).

Population Threats

- The loss, degradation and fragmentation of natural habitat due to agricultural, industrial and urban development;
- Traffic-related mortality; and
- Pest control practices, including the use of pesticides and rodenticides.



© California Department of Fish and Game: CERES

Habitat

- San Joaquin kit foxes prefer habitats of open or low vegetation with loose soils. In the northern portion of their range, they occupy grazed grasslands and, to a lesser extent, valley oak woodlands.
- In the southern and central portion of the Central Valley, San Joaquin kit foxes are found in Valley sink scrub, Valley saltbrush scrub, Upper Sonoran subshrub scrub and annual grassland (USFWS 1998).
- San Joaquin kit fox are predominantly nocturnal; hunting and most other activities are restricted to after dark (Egoscue 1956).
- In their northern range, the San Joaquin kit fox prey predominantly upon California ground squirrels, but other prey types include preferred kangaroo rats, black-tailed hares, desert cottontails, deer mice, western harvest mice, Botta’s pocket gophers, loggerheaded shrikes, roadrunners, mourning doves, burrowing owls, meadowlarks, California quail, bird eggs, snakes, lizards, fish, grasshoppers, crickets, ants, scorpions, larva, and darkling beetles, as well as road kill.
- Scat analyses have also contained vegetable matter, including grasses, seeds and forbs (Morrell 1970, Morrell 1971).
- San Joaquin kit fox have been known to use an average of 12 dens a year, shifting their “suite” of dens by including new dens and abandoning old dens (Koopman *et al.* 1998).
- Den changes are more frequent in summer months, but become less common after individuals pair off and breed. While pups are being raised, den changes occur once or twice a month (Morrell 1971).
- Dens usually have more than one entrance; Egoscue (1962) noted anywhere from two to seven, although three and four-entrance dens were most common.



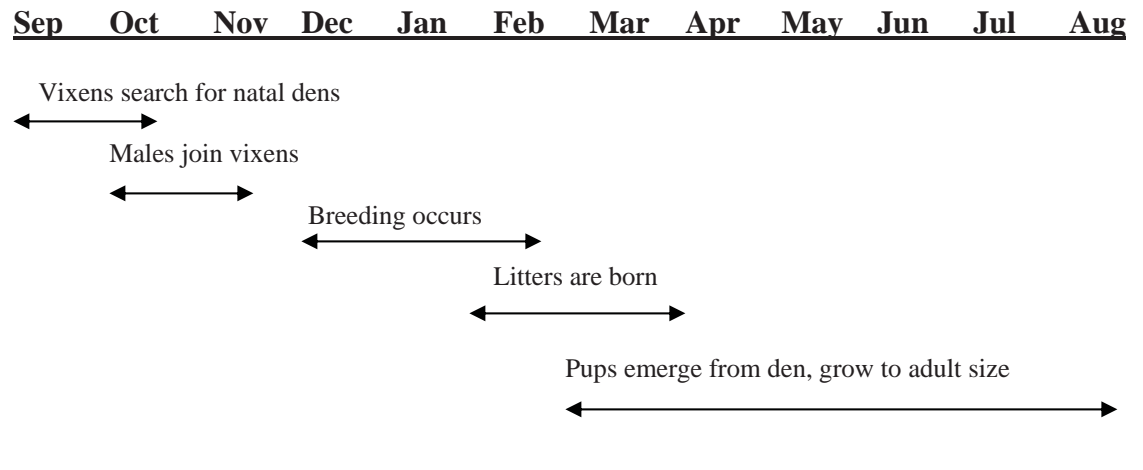
Kit fox: Note exaggeratedly large ears, and black-tipped bushy tail. (Dr Lloyd Glenn Ingles © 1999)



Distribution

- Historically, the San Joaquin kit fox occurred extensively throughout California's Central Valley and parts of the Salinas and Santa Clara valleys.
- San Joaquin kit fox currently inhabit some areas of suitable habitat on the San Joaquin Valley floor, and in the surrounding foothills of the coastal ranges, Sierra Nevada, and Tehachapi Mountains, from southern Kern County north to Contra Costa, Alameda, and San Joaquin Counties on the west, and near La Grange, Stanislaus County on the east side of the Valley.
- They also inhabit some of the larger scattered islands of natural land on the Valley floor in Kern, Tulare, Kings, Fresno, Madera, and Merced Counties (taken from the *Recovery Plan for Upland Species of the San Joaquin Valley*; USFWS 1998).
- Detection of San Joaquin kit fox in the past decade in the Black Diamond Mines East Bay Regional Park have extended the San Joaquin kit fox range farther north than earlier descriptions.
- San Joaquin kit fox have also been detected in Round Valley and in areas near Frick Lake in the early 1990's.

Natural History Summary (Not specific to populations throughout their northern range)



VERNAL POOL BRANCHIOPODS

(Fairy Shrimp and Tadpole Shrimp)

Common name	Scientific Name	State Status	Federal Status
Conservancy fairy shrimp	<i>Branchinecta conservatio</i>	None	Endangered, 1994
Longhorn fairy shrimp	<i>Branchinecta longiantenna</i>	None	Endangered, 1994
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	None	Threatened, 1994
Vernal fool tadpole shrimp	<i>Lepidurus packardi</i>	None	Endangered, 1994



© Richard Manuel / www.osfimages.com
male fairy shrimp

Identification - Fairy Shrimp

- Generally small, approximately half an inch in length or smaller.
- Light in color, sometimes transparent.
- Males with long antennae protruding from the head.
- Swim upside down by beating numerous leaf-like appendages lining their body.

Identification - Tadpole Shrimp

- Broad, shield-like carapace and narrow trunk with a long tail.
- Up to two inches in length.
- Flat plate between cerci at tip of tail.
- Generally crawl along the bottom of pools.

Habitat

- Vernal pools: Shallow depressions which fill with winter rains and evaporate by the spring.



tadpole shrimp



vernal pool habitat

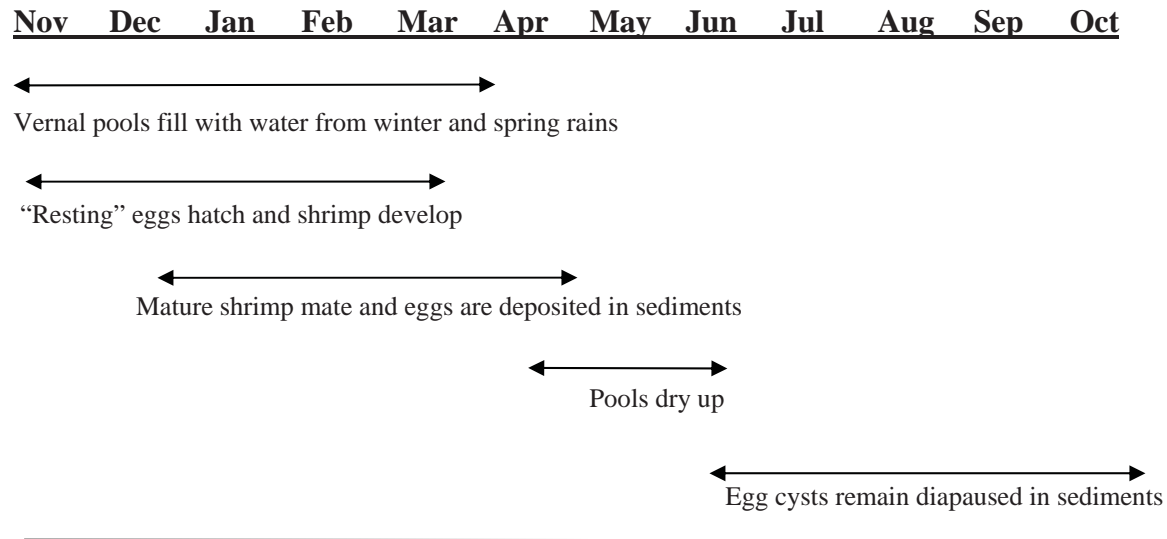
Population Threats

- Habitat destruction as land is converted for urban and agricultural development.
- Random extinction because populations are small and isolated from one another.

Distribution

- Fairy shrimp and tadpole shrimp are found in open grassland habitats throughout California, particularly in the Central Valley.
- Areas with clay, hardpan, and other impermeable surfaces where water will remain pooled and not percolate into the ground.

Natural History Summary



SWAINSON'S HAWK

Buteo swainsoni

Status

Scientific name: *Buteo swainsoni*

State status: Threatened, since 1983

Federal status: None

Identification

- Swainson's hawks can be distinguished in the air by the large dark trailing edge of the wing with wings tapering noticeably at the tip often referred to as a "negative wing pattern".
- Sexes are similar with short, dark, hooked beak.
- Length is approximately 18 inches with a wingspan of 49 inches.
- Light morph adult: Gray-brown head, white chin patch, reddish breast, white belly and underwing coverts, dark flight feathers with faint barring, dark brown back and upperwing, gray tail, dark above and pale below, barred with narrow dark bars.
- Dark morph adult: Dark brown head, back and upperwing, underwing coverts often quite rufous, flight feathers dark with barring, but paler than underwing coverts, deep reddish brown breast with brownish barring below, pale undertail coverts.

Population Threats

- Loss of preferred nesting habitat in mature riparian forest
- Loss or adverse modification of high-quality foraging habitat to development or conversion to incompatible crop types
- High mortality due to pesticide use on migration route and wintering areas



Distribution

- The Swainson's hawk (*Buteo swainsoni*), occurs in open habitats throughout much of the western United States, Canada, and northern Mexico.
- Swainson's hawks breed in North America and winter in the open grassland areas of southern South America (pampas) as well as parts of Mexico.
- In the Central Valley, Swainson's hawks arrive at nesting areas in late February and early March, 4-6 weeks earlier than they arrive at nesting sites in northeastern California.
- They begin to depart for wintering areas in early September.

Wildlife Rehabilitation Facilities

Lindsey Wildlife Museum

1931 First Avenue
Walnut Creek, CA 94597
(925) 935-1978
www.wildlife-museum.org

Yggdrasil Urban Wildlife

7036 Balsam Way
Oakland, CA 94611
(510) 421-9897
<http://yuwr.org>

Rescued Orphan Mammal Program

San Francisco
(415) 221-3498
www.sfromp.org

Wildlife Center of Silicon Valley

3027 Penitencia Creek Road
San Jose, CA 95132
(408)929-9453
www.wcsv.org

Injured & Orphaned Wildlife

San Jose
(408) 559-7379



Additional Fuel Treatment by Habitat Type BMPs

The purpose of section is to guide required activities to achieve a suitable level of fire safety in an environmentally sensitive manner, balancing fire protection needs with the protection of soil resources (by minimizing erosion), habitat and aesthetic values. The specific fuel management is to maintain vegetation that will sustain an average two-foot flame length within 30 feet from the structure's exterior, and to minimize the ability of a fire to burn in a tree's canopy, and provide for safe access and egress.

This goal is achieved through actions in five zones, of varying actions and distances from the structure, based on existing vegetation and terrain in around the structure. In each zone, the distance is constrained by the distance to the property boundary; in no case does this fuel management plan authorize the landowner to take fuel management actions beyond the property boundary. Each zone has a unique set of standards by which compliance will be gauged. The proposed standards are consistent with the regulations 4291:

1. Non-combustible Zone for five ft;
2. Landscaping Zone per Landscaping Plans;
3. Oak/Shrub Fuel Management Zone for varying width of 150 ft;
4. Chaparral Fuel Management Zone for varying width of 200 feet, and
5. Driveway Zone for 10 feet from both sides of pavement edge.

General Fuel Management Best Practices

Ways to minimize the environmental impacts of fuel management have been incorporated into this plan. The (staff specific agency) is available to meet and work with the crew contracted by the Lot owner to conduct the fuel management work required. The following are general fuel management best practices:

- **Timing:** Fuel management actions should be timed to avoid breeding birds in the spring, elevated fire conditions in the summer and erosion-related issues during the rainy season. The (specific agency) is available to consult on timing.
 - Prune oaks from November to April to avoid attracting pests.
 - It is best to mow annual grasses within 70-ft of structures before they set seed each year (early to mid spring).
 - A second mowing treatment may be necessary after grasses cure in early summer (mid-June) to maintain the desired four-inch height. This does not apply to areas beyond 70 feet from structures
 - Under normal circumstances cutting of native grass and wildflowers will be delayed until after seed set, provided they do not form a means of rapidly transmitting fire to any structure. Determination of seed set will be performed by the (specific agency).
 - Discing is not recommended because of concerns for accelerated erosion and potential for invasion by alien pest plants.
 - The area to be mowed should be surveyed for ground-nesting birds. If found, the immediate area of the nest need not be mowed until nesting is complete, provided it does not form a means of rapidly transmitting fire to any structure

- Chaparral cut the previous year generally does not need to be treated the following year.
- Vegetation disposal: Any removed fuels from the other fuel management zones, whether green or dead, may either be chipped and spread within the fuel management zone in such a way as to not increase the fire hazard. If they are not chipped they must be hauled from the site. In no case can cut materials be left within 30 ft of the structure.
- Bare earth will not be exposed in over 50% of the site and no one bare patch will be larger than 15 square feet. Native seed is to be broadcast by hand on the exposed patches before the end of the day if exposure occurs during the wet season. If bare earth is uncovered, seed application should occur shortly after October 1 of that year.
- Haul routes for removal of debris should be designated and repaired upon completion of the operation. Repair would ensure ground is covered and water is dispersed.
- Large dead material, such old logs, may remain on the site if isolated from kindling-sized dead branches, or placed at least 100 ft away from the structure and away from under any tree canopy. The dead material will need to be distributed or removed when it rots to the point where it crumbles when kicked.

1. Non-Combustible Zone

The area immediately next to the structure to five-feet from the structure will need to be non-combustible in nature (i.e. hardscaping or landscaping such as lawn, succulents, and non-woody plants).

—

2. Landscaping Zone per Landscaping Plans

Landscaping often introduces more shrubby material in to the fuel complex nearest the structures. It is crucial the landscape plant material be kept adequately watered and dead material removed. Conditions that imitate those in the treated Oak/shrub Woodland Fuel Management Zone are advantageous for fire safety. When shrubs are located under trees (as illustrated above), shrubs need to be maintained at a height of less than 2.5 ft. to be consistent with the Oak/shrub Woodland Fuel Management Zone.

3. Annual Grass Fuel Management Zone for a Width of 100 ft

Mow grass for 30 ft - keep at 4 inches

Mow annual grasses once/year from 30-70 ft from structures

Because annual grasses grow, die and dry each year, these grasses will need regularly scheduled annual attention.

Recommended fuel management actions for grasslands within Homelands and Openlands.—

- Within 70-ft from the structure, grasslands should be mowed and maintained at a height of four inches to reduce its ability to carry fire.
- Repeated mowing may be necessary after grasses cure in early summer (mid-June) to maintain the desired four-inch height.

4. Oak/shrub Woodland Fuel Management Zone for a Width of 150 ft

The goal of the following treatment is to convert the existing vegetation type into an oak woodland with an understory consisting of grass, herb or other low-growing fire resistant plant. This may include short manzanita shrubs (less than 2.5 ft height) with no dead material. Once this conversion is stable, little fuel management may be necessary and the width to which actions must be taken may be reduced.

Recommended fuel management actions within Oak Woodland

Treatment actions for understory annual grasses in Oak Woodlands — An understory of ferns and low shrubs can be expected to persist if mulch is not deeper than one inch. Regardless, grass under trees that are located from 30 to 150 feet from the structure will be mowed and maintained at a height of four inches. This action will reduce the capacity of the grassland to carry fire.

Grass will be also mowed from 6 ft outside the dripline of trees. Grass in the 30-150 ft width that is not under trees need not be mowed. This mowing will reduce the possibility that fire could spread into the tree crowns.

Treatment actions for trees in the Oak Woodlands —Trees shall be pruned to provide clearance of three times (3X) the height of the understory plants or eight feet, which ever is higher (see Figure "1"). Limbs that are smaller than three inches in diameter are to be pruned up to eight feet off the ground. Remove all dead branches smaller than three inches in diameter. Do not remove limbs greater than three inches in diameter. Trees less than 24 feet in height should be pruned up from the ground for a length of one-third the height. Once initial pruning is accomplished, this treatment is likely to be needed infrequently – on a 3 to 5-year interval. This treatment will reduce the possibility fire can spread into the tree crowns.

Treatment actions for woody understory vegetation within the Oak/shrub woodland —The goal for understory vegetation management is to both establish and maintain vertical separation so that fire is unlikely to climb into the tree crowns. It is not desirable to remove all understory vegetation; plants under trees should generally be shorter than 18 inches in height (and grass within 30 ft of a structure will be shorter than 4 inches). For example, manzanita sprouts that grow under the oaks will need to be kept to an 18-inch height; this may be accomplished by cutting them to the ground periodically or trimmed to slightly lower than 19 inches.

In the openings between trees shrubs may remain with a six-foot separation from tree canopy edge. In these shrub patches, a mosaic of shrubby patches shall be developed to accomplish the fire protection, habitat protection and aesthetic goals:

1. All dead material should be removed from shrubs to remain.
2. In the vicinity of young oaks, patches of shrubby vegetation will be no closer than two times (2X) the shrub or patch height or a minimum of six feet, which ever is greater (see Figure "2"), and
3. In open areas (without trees) shrubs or shrubby patches will not be closer than two times (2X) the height of the patch (see Figure "3").

Treatment of shrubs in the open—preferentially remove chamise

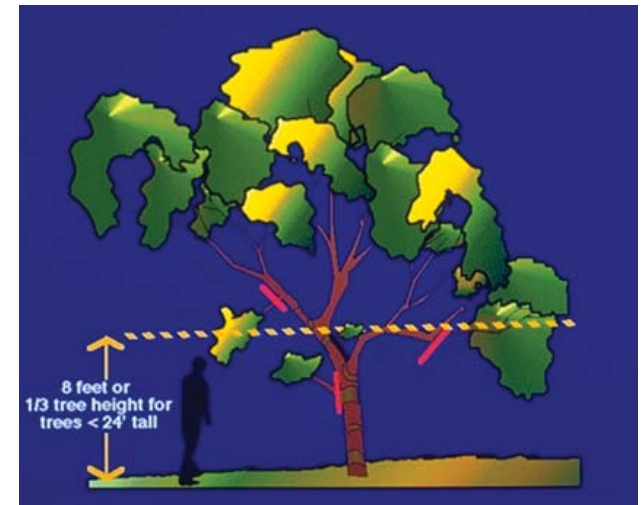


Figure 7 - Prune branches to a height of 8 ft above the ground. In young trees, prune branches on the lower one-third of the height of the tree. Do not disturb or thin the tree canopy. This promotes growth in the understory, which is more easily ignited.

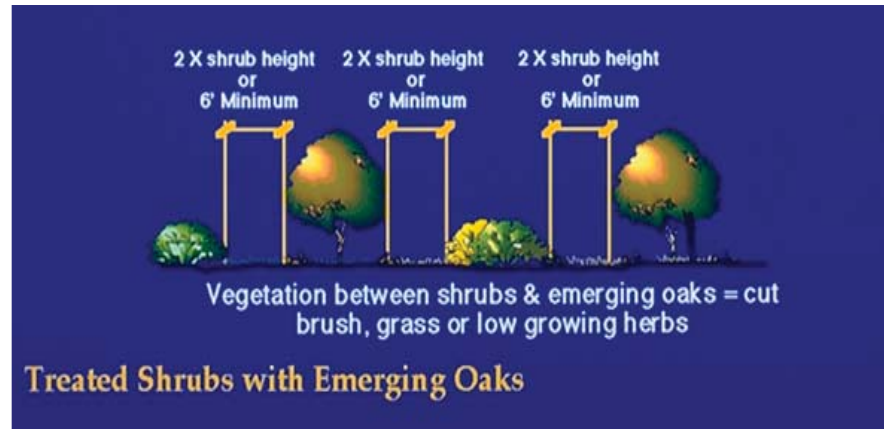


Figure 8 Spacing of shrubs around young oaks.

- *Treatment actions for chamise* — Remove chamise under tree canopies. Where chamise is found outside of tree canopies, it may be retained in islands if other species are not present. Cut chamise to a 2-foot height, retaining all live side branches. Chamise is an effective crown sprouter and will respond with a flush of green growth if burned or mechanically topped.
- *Treatment actions for plant species other than chamise*—Oaks, manzanita, coffeeberry, California sage brush and other species of interest should be left for interest and diversity where it occurs outside any tree canopy.

The slope and density of this habitat type, will determine whether the treatment must be conducted by hand crews or with machinery. If machinery is used to cut the material, the cuttings and/or chips must remain on the site as cover for a depth not to exceed one inch.

4. Chaparral

The fire behavior produced by chaparral plants and the steep slopes on which they grow requires a fuel management zone of 200 ft from combustible structures. In general this is comprised of a width of 150 – 200 ft from any combustible structure. The goal of management in this vegetation type is to create shrubs of short stature and youth with no dead material comprise a relatively fire-safe fuel type. Shrubs should grow to a maximum of 2.5 ft height before being re-treated (approximately 5 year intervals).

The following treatments are recommended:

- A. Leave all specimens of oaks and other trees within the 200 ft fuel management zone. This will result in an uneven edge on the northern boundary of the manzanita stand, with pathways leading to trees further downhill. More shrubs will be removed around trees to the southwest of the main structure such that the boundary of the shrubs will be pushed further downhill. Shrubs should be removed for the following distance to promote tree growth per Figure 3:
 - 3 feet from tree crown edge when the tree is shorter than 6 feet height

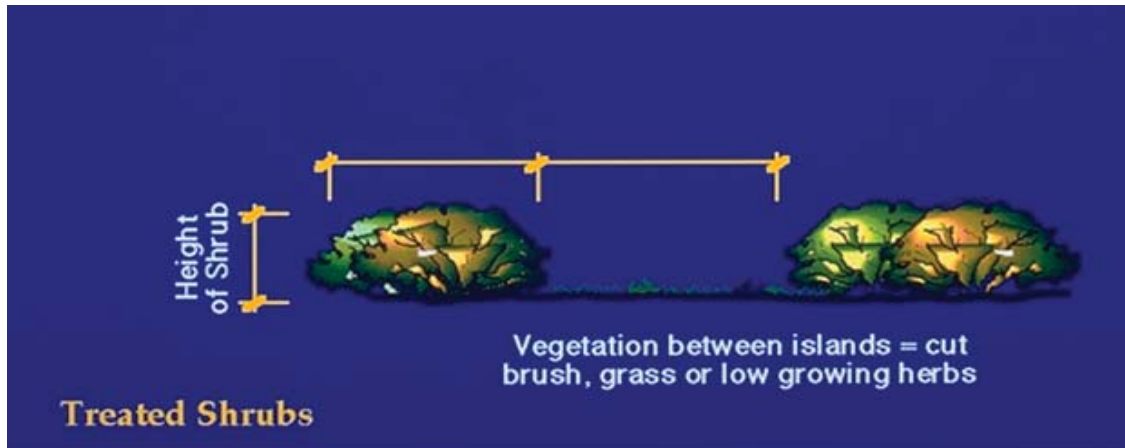


Figure 9. Shrub island spacing. Design groups of plants small enough to provide horizontal separation between groups. This allows proper maintenance and helps slow the spread of fire. Each shrub or group of plants should measure no wider than two times its height, or less than 120 sq.ft. (or 6 ft x 20 ft). The space between groups should be greater than three times the height of the shrubs, or at least a 12 ft. distance

- 6 feet from tree crown edge when the tree is taller than 6 feet height
- B. As oak trees expand on the chaparral site, there will be a potential for reduced shrub removal.
- C. Cut all shrubs at the root crown for a distance of 200 ft. The slope and density of this habitat type will determine whether the treatment must be conducted by hand crews or with machinery. If machinery is used to cut the material, the cuttings and/or chips must remain on the site as cover for a depth not to exceed one inch. If hand labor is used, haul sites will be designated and covered with chips or straw prior to October 15 of that same year.
- D. The shrubs will re-grow quickly through sprouts. Some wildflowers will also grow between the shrubs, but the site should be monitored for invasive weeds that might become established. The Santa Lucia Conservancy will gladly assist in the field to determine plant material that should be retained, removed or modified.
- E. Remove all chamise within the fuel within the 200 ft fuel management zone. The Santa Lucia Conservancy will gladly assist in the field to determine plant material that should be retained, removed or modified.

5. Driveway Fuel Management Zone

Grass must be mowed for 15 feet from both sides of pavement edge in the Driveway Fuel Management Zone (as in the protocol for the Oak/Shrub Woodland Fuel Management Zone) and a vertical clearance of 13.5 feet must be maintained. The Driveway Fuel Management Zone is entirely encompassed within the other fuel management zones so no additional fuel management is required except to prune trees extending over the driveway 13.5 feet from ground.

Glossary

Action area – Pursuant to the Federal Endangered Species Act, the action area is generally larger than the defined project area in that it includes all areas where both direct and indirect impacts will occur. Direct impacts are generally restricted to the project area where there will be construction activities or placement of structures. Indirect impacts could include area where construction activities are not necessarily occurring, for example, erosion from the project indirectly impacts downstream or downhill habitat.

Active nests- Any nest that is currently being built or tended by a pair of adult birds.

Adjacent Wetland – wetlands that are located next to a water channel and are hydrologically influenced by the water channel. These wetlands can receive water from the water channel and/or water in the wetlands can flow into the water channel. These wetlands are within a very close proximity to the water channel as opposed to non-adjacent wetlands where hydrologic connectivity is from runoff.

Bed, channel, or bank of stream – The bed of a stream is the bottom surface of the stream. The channel of a stream is the area between the banks. The banks of a stream are the landward limit of water in the stream at the ordinary high water mark.

Biological Assessment – a document (prepared by the project proponent) that describes potential effects of a project on federally or state listed species. The biological assessment contains information required by the U.S. Fish and Wildlife Service to make an effects determination under Section 7 or Section 10 of the Endangered Species Act.

Biological Opinion – a document prepared by the U.S. Fish and Wildlife Service that presents their effects determination for federally listed species. The Biological Opinion will provide measures to avoid and minimize effects to a species and discuss compensatory mitigation options. Issuance of a Biological Opinion by the U.S. Fish and Wildlife Service typically concludes formal consultation under Section 7 of the Endangered Species Act.

Critical habitat – (1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the resource agency determines that the area itself is essential for conservation.

Critical Habitat- Areas within a listed species' current range that contain features that are essential to that species' conservation as designated by the US Fish and Wildlife Service.



Discharge – the act of placing materials into waters of the United States.

Discharge of dredged materials – the use of mechanized earth-moving equipment to conduct land clearing, ditching, channelization, in-stream mining, or other earth-moving activity in waters of the United States that result in the placement of the dredged material in waters of the United States.

Discharge of fill materials – the placement of fill materials (i.e., soil, sand, clay, rock, plastics, construction debris, wood chips, overburden from mining or other excavation, etc.) into waters of the United States such that the fill replaces any portion of a water of the United States with dry land or changes the bottom elevation of a water of the United States.

Erosion control- The practice for preventing or controlling wind or water erosion in agriculture or other earth-disturbing project and vegetation removal, usually involving the creation of some sort of physical barrier to absorb some of the energy of the wind or water that is causing the erosion.

Exotic Plant Species- A plant species that has been or are being introduced into places other than their historical or documented range by humans.

Federal action - Federal actions include, but are not limited to, construction, rehabilitation, and repair projects, demolition, licenses, permits (e.g., Clean Water Act §404 permits), loans, loan guarantees, grants, and Federal property transfers.

Federally protected terrestrial plant, wildlife, and fish species – species that are designated by the U.S. Fish and Wildlife Service and National Marine Fisheries Service as endangered and threatened, or proposed for, or a candidate for evaluation for listing under the Endangered Species Act.

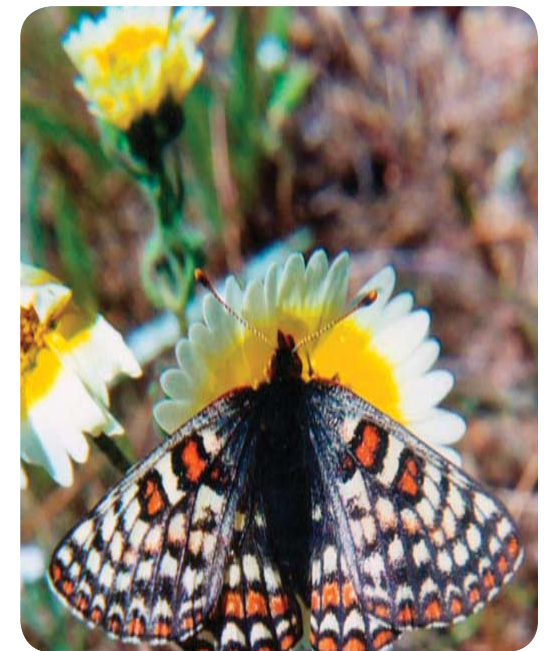
Fill materials – See Discharge of fill materials.

Harm - an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding, or sheltering.

Incidental Take Permit (Federal) – a permit issued by the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service that allows for take of a federally listed species so long as the take is incidental to the proposed action.

Incidental Take Permit (State) – a permit issued by the California Department of Fish and Game that allows for take of a state listed species so long as the take is incidental to the proposed action.

Isolated wetlands – wetlands that are not connected or adjacent to navigable waters or non-navigable tributaries of navigable waters.



Jurisdictional delineation of waters of the United States, including wetlands – a determination of the boundaries of waters of the United States, including wetlands, performed by trained wetland ecologists using methods outlined in the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual.

Native Plant Species- A plant that develops, occurs naturally, or has existed for many years in an area.

Navigable waters – waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination of navigability, once made, applies laterally over the entire surface of the waterbody, and is not extinguished by later actions or events which impede or destroy navigable capacity.

Oak woodland- A plant community found throughout California. The dominant trees in this region are oaks.

Ordinary high water mark (OHWM) – the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter or debris, or other appropriate means that consider the characteristics of the surrounding areas.

Pond Berm- A narrow shelf, path, or ledge typically at the top or bottom of a slope.

Raptor nest- A nursery wherein a bird of prey lays its eggs and cares for nestlings. This might be a collection of sticks and debris, a cavity in a tree, a divot scraped into the dirt, or a ledge on a cliff. It might also be an underground burrow.

Riparian areas– Areas adjacent to the banks of streams or rivers that contain vegetation that is distinct from upland species.

Riparian zone – the zone between the banks of a stream or river and the landward edge of riparian vegetation.

Rock outcroppings- The part of a rock formation that appears above the surface of the surrounding land.

Section 106 of the National Historic Preservation Act – Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their undertakings on historic properties (and cultural resources) and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties.

Section 404(b)(1) – Section 404(b)(1) of the Clean Water Act requires that “Guidelines” be applied for each project requesting a Section 404 permit. These Guidelines set the standard by which all Section 404 permits requests are evaluated. The fundamental precept of the Guidelines is that discharges of dredged or fill material into waters of the United States, including wetlands, should not occur unless it can be demonstrated that such discharges, either individually or cumulatively, will not



result in unacceptable adverse effects on the aquatic ecosystem. The Guidelines specifically require that “no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.” (40 CFR 230.10[a]). Applicants for a Section 404 permit must prepare an “Alternatives Analysis” that discusses practicable alternatives to the proposed discharge (project).

Section 7 consultation – Consultation, pursuant to Section 7 of the federal Endangered Species Act, between a federal agency and the U.S. Fish and Wildlife Service or National Marine Fisheries Service. Section 7 consultation occurs when an applicant requests a permit or other type of authorization from a federal agency. If the project has the potential to adversely affect federally listed species, the federal agency must enter into consultation with the U.S. Fish and Wildlife Service or National Marine Fisheries Service. Examples are Section 7 consultation between the U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service or National Marine Fisheries Service, U.S. Environmental Protection Agency and U.S. Fish and Wildlife Service or National Marine Fisheries Service, and even U.S. Fish and Wildlife Service with National Marine Fisheries Service or vice versa.

State protected plant or wildlife species – species that are designated by the California Department of Fish and Game as endangered and threatened, or proposed for, or a candidate for evaluation for listing under the California Endangered Species Act

Take (Federal ESA) – To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct.

Take (State ESA) – To hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill. Note: This definition is less stringent than the Federal ESA in that it does not include the term “harm.”

USACE jurisdictional wetlands – wetlands that are subject to regulation by the U.S. Army Corps of Engineers based on adjacency to navigable waters of the United States or non-navigable tributaries to waters of the United States, or wetlands that are proven to have a “significant nexus” to waters of the United States.

Vegetation- The plant life that occupies a given area or particular region.

Waste materials – materials such as storm water runoff, waste water, other effluent, building materials, paint, petroleum products, pesticides, etc.

Waters of the state – all surface water or groundwater, including saline waters, within the boundaries of the state of California.

Waters of the United States – All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including:



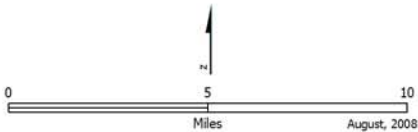
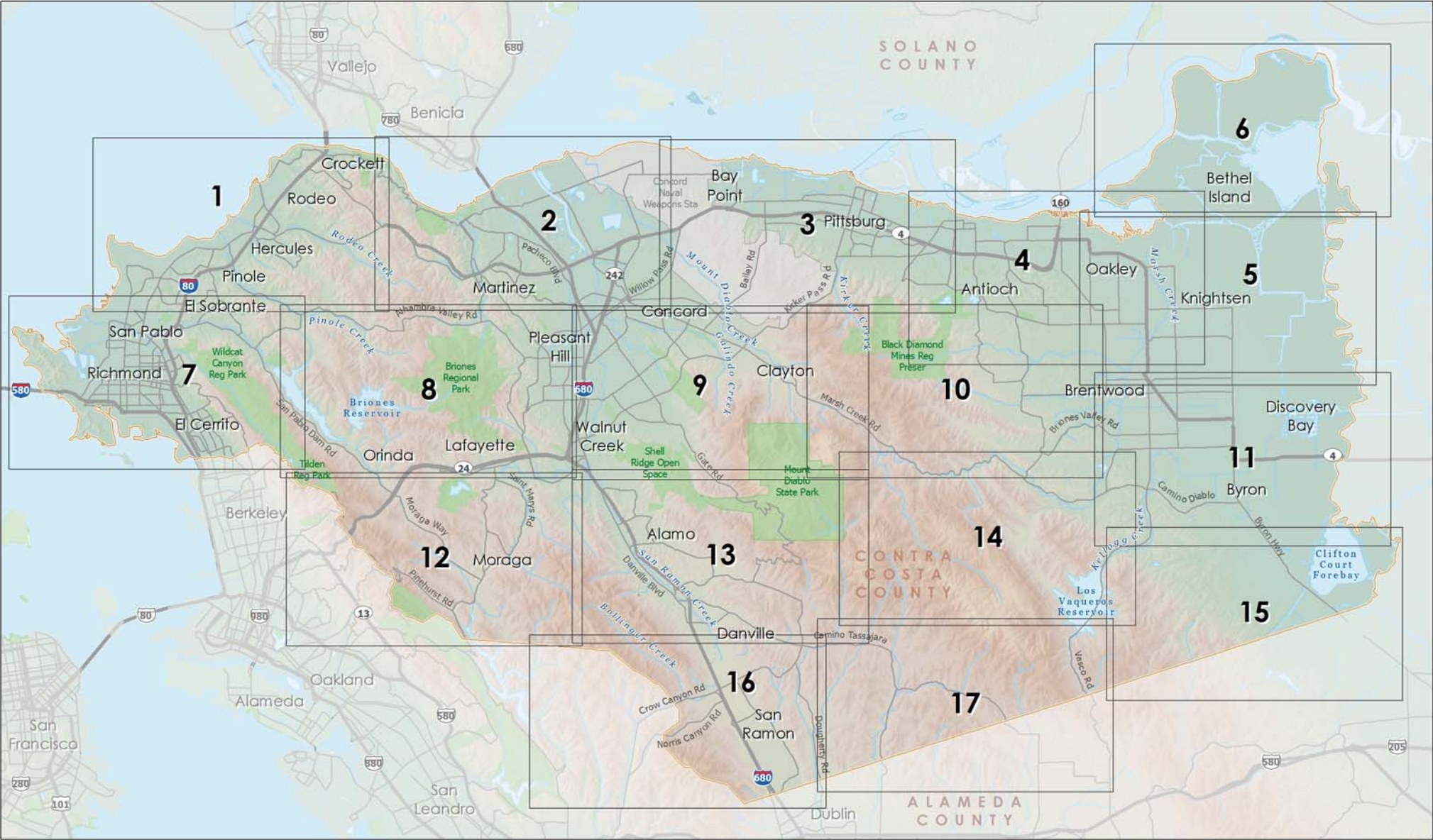
- all waters which are subject to the ebb and flow of the tide (navigable waters);
- All interstate waters including interstate wetlands;
- All other waters such as intrastate lakes, rivers, streams, wetlands, natural ponds, etc. that the use, degradation, or destruction of which could affect interstate or foreign commerce (where commerce can be from recreation, sales of fish or shellfish, use for industrial purposes, etc.);
- The territorial sea;
- Tributaries of all waters mentioned above; and
- Wetlands adjacent to Waters of the U.S.

Wetland- Land that is transitional between terrestrial and aquatic systems. They are lowland areas, such as a marsh or swamp that are saturated with moisture.

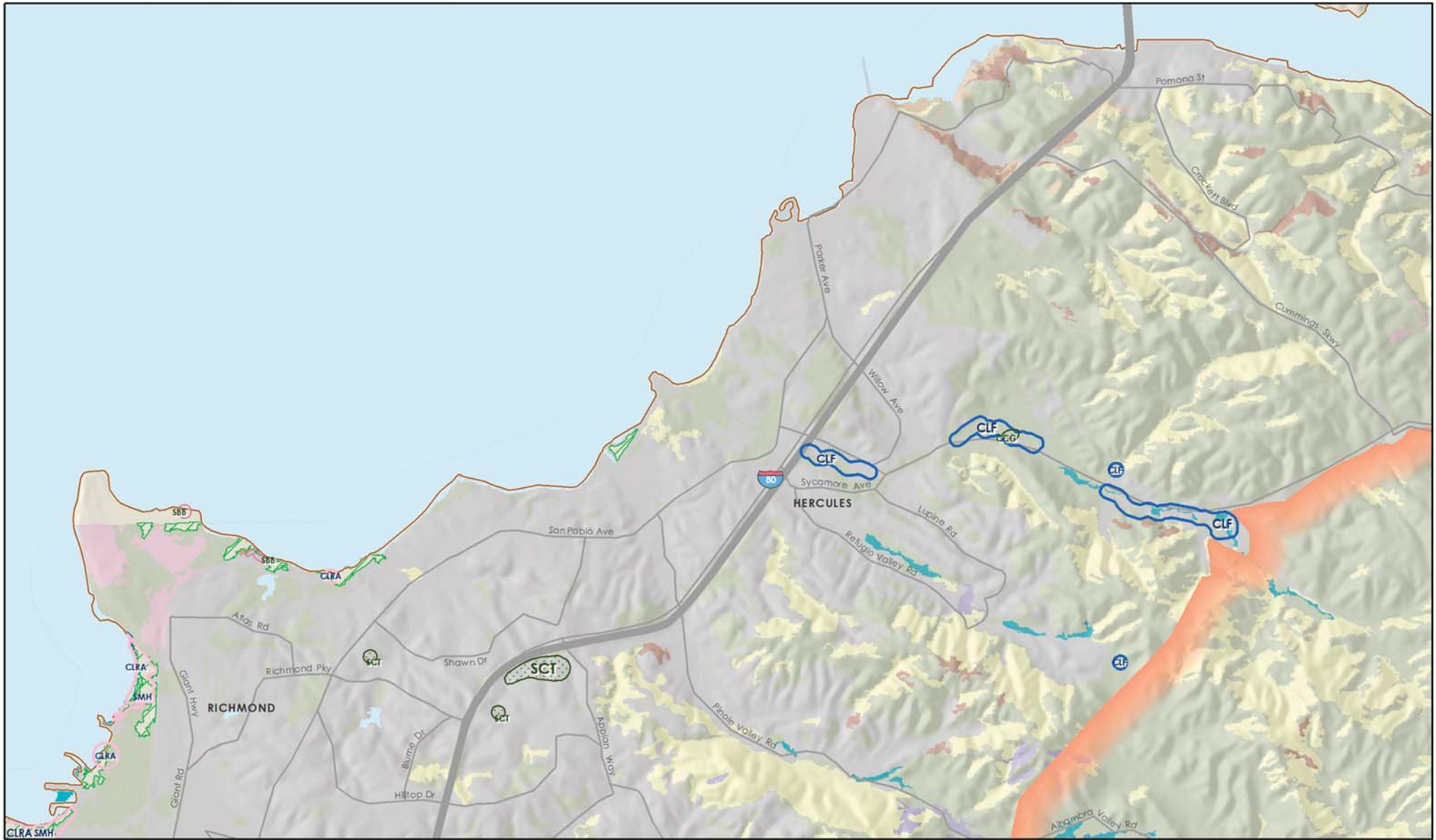


Appendix: Species Map Atlas

Index Map of Federally Regulated Biological Resources in Contra Costa County



Federally Regulated Biological Resources in Contra Costa County



CNDDB Animals: grouped by vegetation community

XYZ Animal Species Code

- | | | |
|--|--|--|
| Freshwater Marsh & Riparian | Grasslands | Salt Marsh |
| CLF California red-legged frog | BCB Bay checkerspot butterfly | CLRA California clapper rail |
| GGG giant garter snake | BUOW burrowing owl | SMH salt-marsh harvest mouse |
| SWHA Swainson's hawk | CTS California tiger salamander | |
| TCBB tricolored blackbird | SEB San Bruno elfin butterfly | Sand Dunes |
| | SJKF San Joaquin kit fox | LETE California least tern |
| | VFS vernal pool fairy shrimp | Scrub & Woodland |
| | VTS vernal pool tadpole shrimp | AWS Alameda whipsnake |

Critical Habitat

- | | | |
|---|--|--|
| Alameda Whipsnake | Red Legged Frog | Vernal Pool |
|---|--|--|

CNDDB Plants: grouped by vegetation community

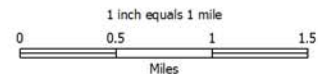
XYZ Plant Species Code

- | | |
|--|---|
| Grasslands | Sand Dunes |
| CCG Contra Costa goldfields | ADE Antioch Dunes evening-primrose |
| LFF large-flowered fiddleneck | CCW Contra Costa wallflower |
| SCT Santa Cruz tarplant | |
| Salt Marsh | Scrub & Woodland |
| CS California seablite | PM pallid manzanita |
| SBB soft bird's-beak | |

Vegetation Data

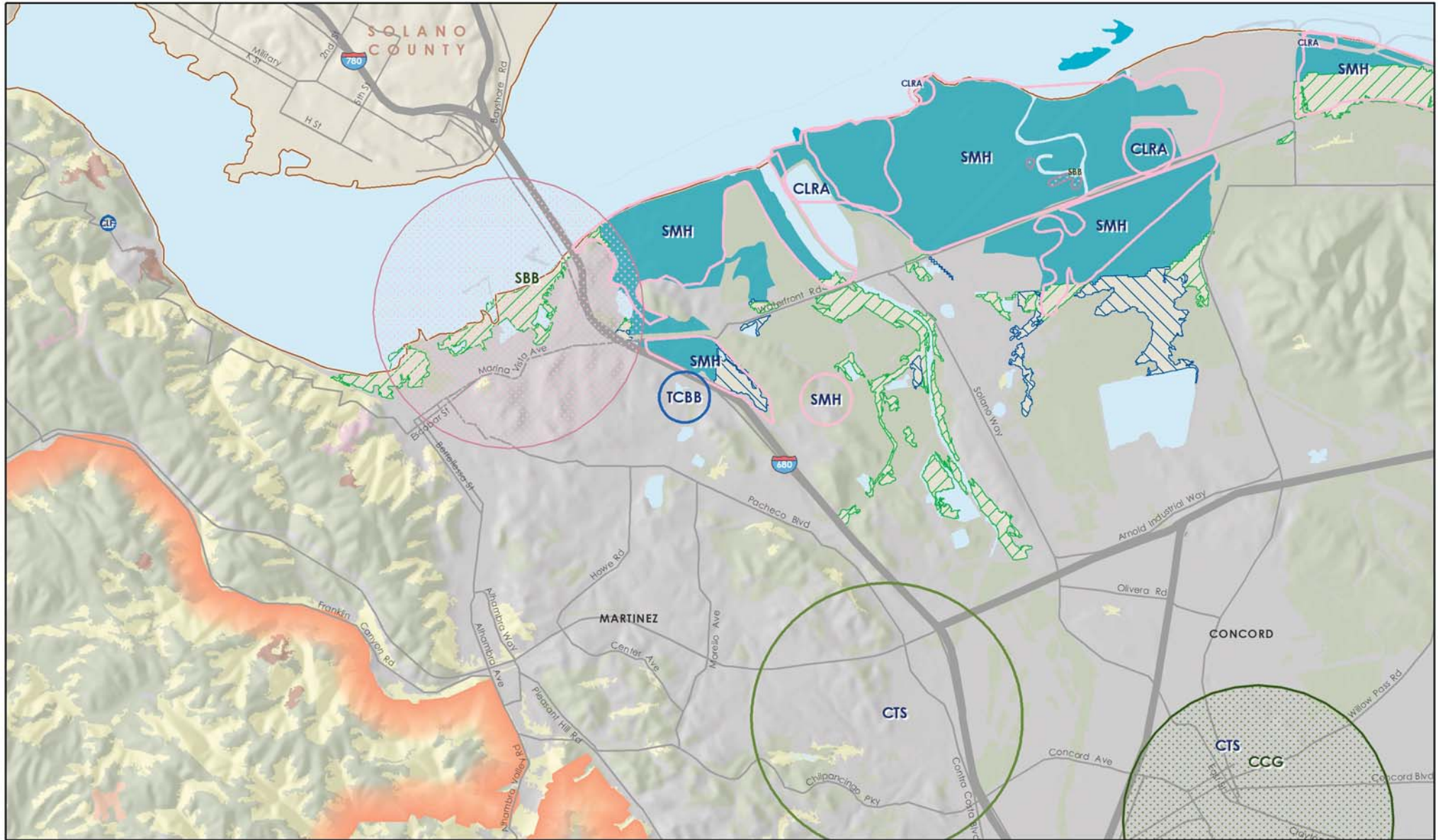
- | | | |
|--|---|--|
| Agriculture-Crops | Eucalyptus | Freshwater Emergent Wetland |
| Annual Grass | Oak Woodland | Saline Emergent Wetland |
| Chapparral | Montane Forest | |
| Coastal Scrub | Riparian | |
| Coniferous Forest | Urban | |

Vegetation: LCMP, Vegetation Data (2005)
California Department of Forestry and Fire Protection & USFS, DWR (1995)



Species: CNDDB, June 2008; Critical Habitat: USFWS

Federally Regulated Biological Resources in Contra Costa County



CNDDB Animals: grouped by vegetation community

XYZ Animal Species Code

- | | | |
|--|--|--|
| Freshwater Marsh & Riparian | Grasslands | Salt Marsh |
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| | VTS vernal pool tadpole shrimp | AWS Alameda whipsnake |

Critical Habitat

- | | | |
|---|--|--|
| Alameda Whipsnake | Red Legged Frog | Vernal Pool |
|---|--|--|

CNDDB Plants: grouped by vegetation community

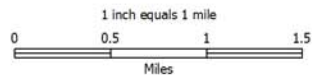
XYZ Plant Species Code

- | | |
|--|---|
| Grasslands | Sand Dunes |
| CCG Contra Costa goldfields | ADE Antioch Dunes evening-primrose |
| LFF large-flowered fiddleneck | CCW Contra Costa wallflower |
| SCT Santa Cruz tarplant | |
| Salt Marsh | Scrub & Woodland |
| CS California seablite | PM pallid manzanita |
| SBB soft bird's-beak | |

Vegetation Data

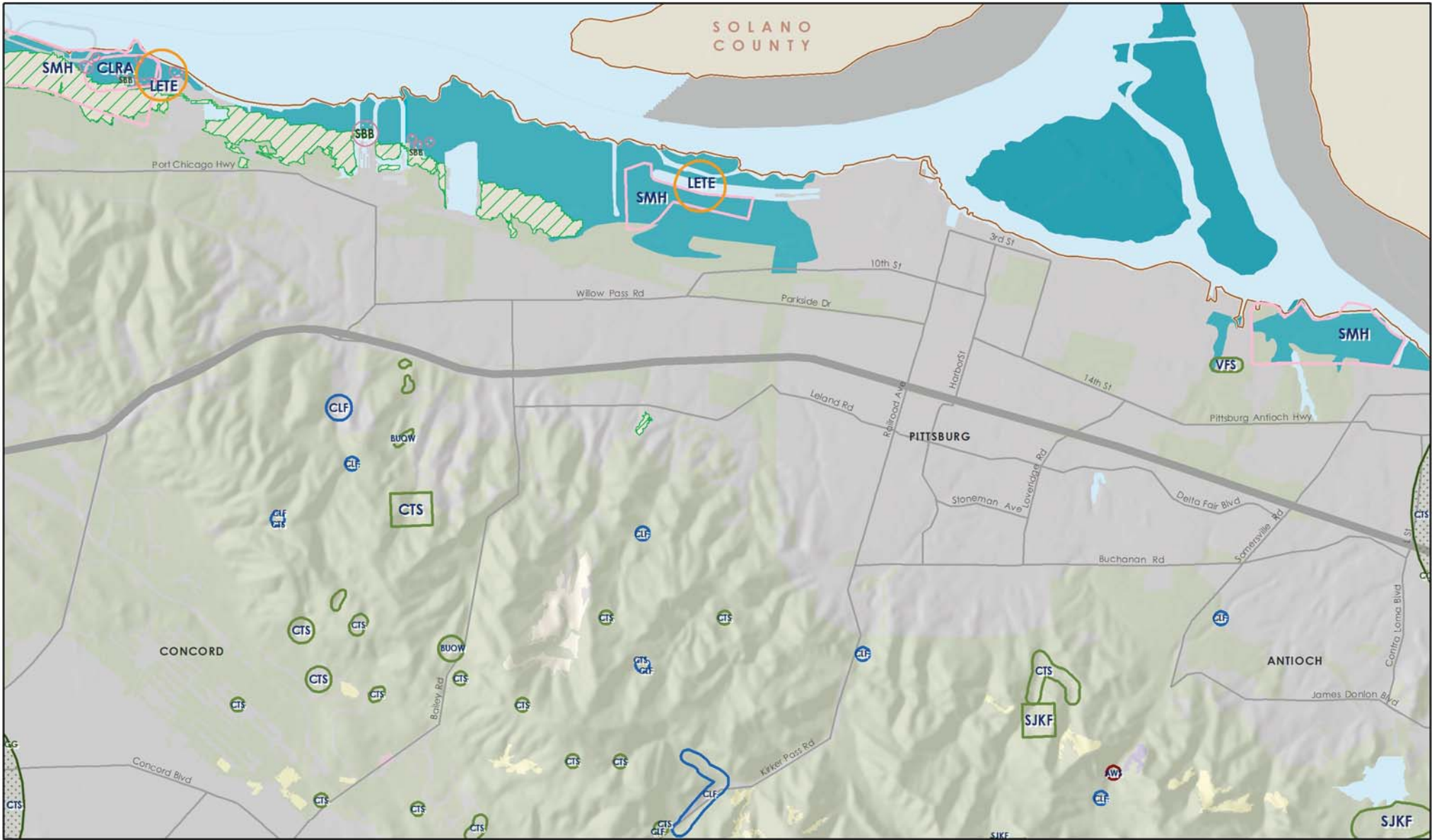
- | | | |
|--|---|--|
| Agriculture-Crops | Eucalyptus | Freshwater Emergent Wetland |
| Annual Grass | Oak Woodland | Saline Emergent Wetland |
| Chapparral | Montane Forest | |
| Coastal Scrub | Riparian | |
| Coniferous Forest | Urban | |

Vegetation: LCMP, Vegetation Data (2005)
California Department of Forestry and Fire Protection & USFS, DWR (1995)



Species: CNDDB, June 2008; Critical Habitat: USFWS

Federally Regulated Biological Resources in Contra Costa County



CNDDB Animals: grouped by vegetation community

XYZ Animal Species Code

- | | | |
|--|--|--|
| Freshwater Marsh & Riparian | Grasslands | Salt Marsh |
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| TCBB tricolored blackbird | SEB San Bruno elfin butterfly | Sand Dunes |
| | SJKF San Joaquin kit fox | LETE California least tern |
| | VFS vernal pool fairy shrimp | Scrub & Woodland |
| | VTS vernal pool tadpole shrimp | AWS Alameda whipsnake |

Critical Habitat

- | | | |
|---|--|--|
| Alameda Whipsnake | Red Legged Frog | Vernal Pool |
|---|--|--|

CNDDB Plants: grouped by vegetation community

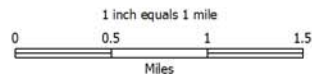
XYZ Plant Species Code

- | | |
|--|---|
| Grasslands | Sand Dunes |
| CCG Contra Costa goldfields | ADE Antioch Dunes evening-primrose |
| LFF large-flowered fiddleneck | CCW Contra Costa wallflower |
| SCT Santa Cruz tarplant | |
| Salt Marsh | Scrub & Woodland |
| CS California seablite | PM pallid manzanita |
| SBB soft bird's-beak | |

Vegetation Data

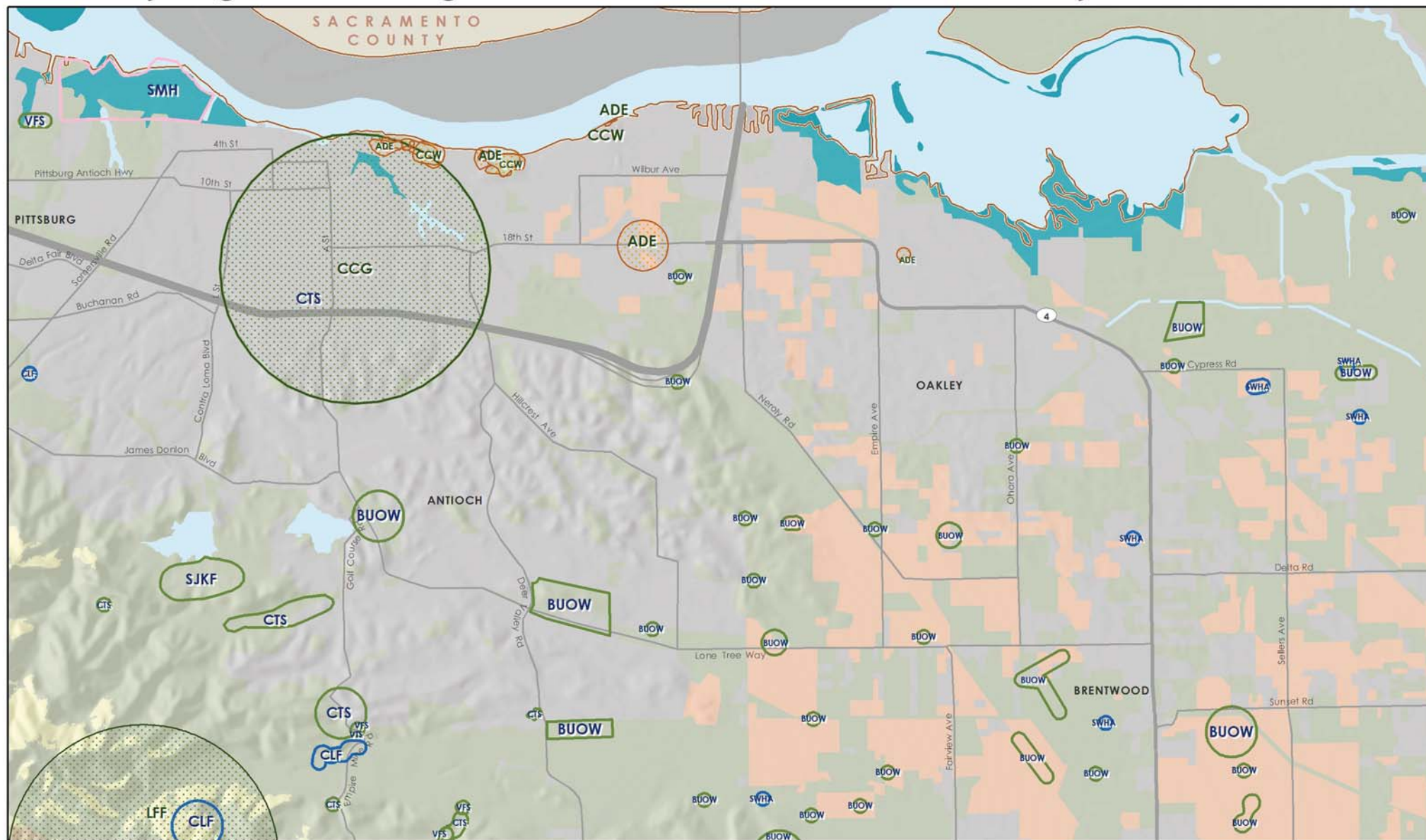
- | | | |
|--|---|--|
| Agriculture-Crops | Eucalyptus | Freshwater Emergent Wetland |
| Annual Grass | Oak Woodland | Saline Emergent Wetland |
| Chapparral | Montane Forest | |
| Coastal Scrub | Riparian | |
| Coniferous Forest | Urban | |

Vegetation: LCMMP, Vegetation Data (2005)
California Department of Forestry and Fire Protection & USFS, DWR (1995)



Species: CNDDB, June 2008; Critical Habitat: USFWS

Federally Regulated Biological Resources in Contra Costa County



CNDDDB Animals: grouped by vegetation community

XYZ Animal Species Code

 Freshwater Marsh & Riparian

- CLF California red-legged frog
- GGG giant garter snake
- SWHA Swainson's hawk
- TCBB tricolored blackbird

 Grasslands

- BCB Bay checkerspot butterfly
- BUOW burrowing owl
- CTS California tiger salamander
- SEB San Bruno elfin butterfly
- SJKF San Joaquin kit fox
- VFS vernal pool fairy shrimp
- VTS vernal pool tadpole shrimp

 Salt Marsh

- CLRA California clapper rail
- SMH salt-marsh harvest mouse

 Sand Dunes

- LETE California least tern

 Scrub & Woodland

- AWS Alameda whipsnake

Critical Habitat

- Alameda Whipsnake
- Red Legged Frog
- Vernal Pool

CNDDDB Plants: grouped by vegetation community

XYZ Plant Species Code

 Grasslands

- CCG Contra Costa goldfields
- LFF large-flowered fiddleneck
- SCT Santa Cruz tarplant

 Salt Marsh

- CS California seablite
- SBB soft bird's-beak

 Sand Dunes

- ADE Antioch Dunes evening-primrose
- CCW Contra Costa wallflower

 Scrub & Woodland

- PM pallid manzanita

Species: CNDDDB, June 2008; Critical Habitat: USFWS

Vegetation Data

 Agriculture-Crops

 Annual Grass

 Chapparral

 Coastal Scrub

 Coniferous Forest

 Eucalyptus

 Oak Woodland

 Montane Forest

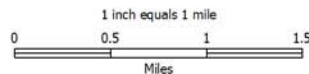
 Riparian

 Urban

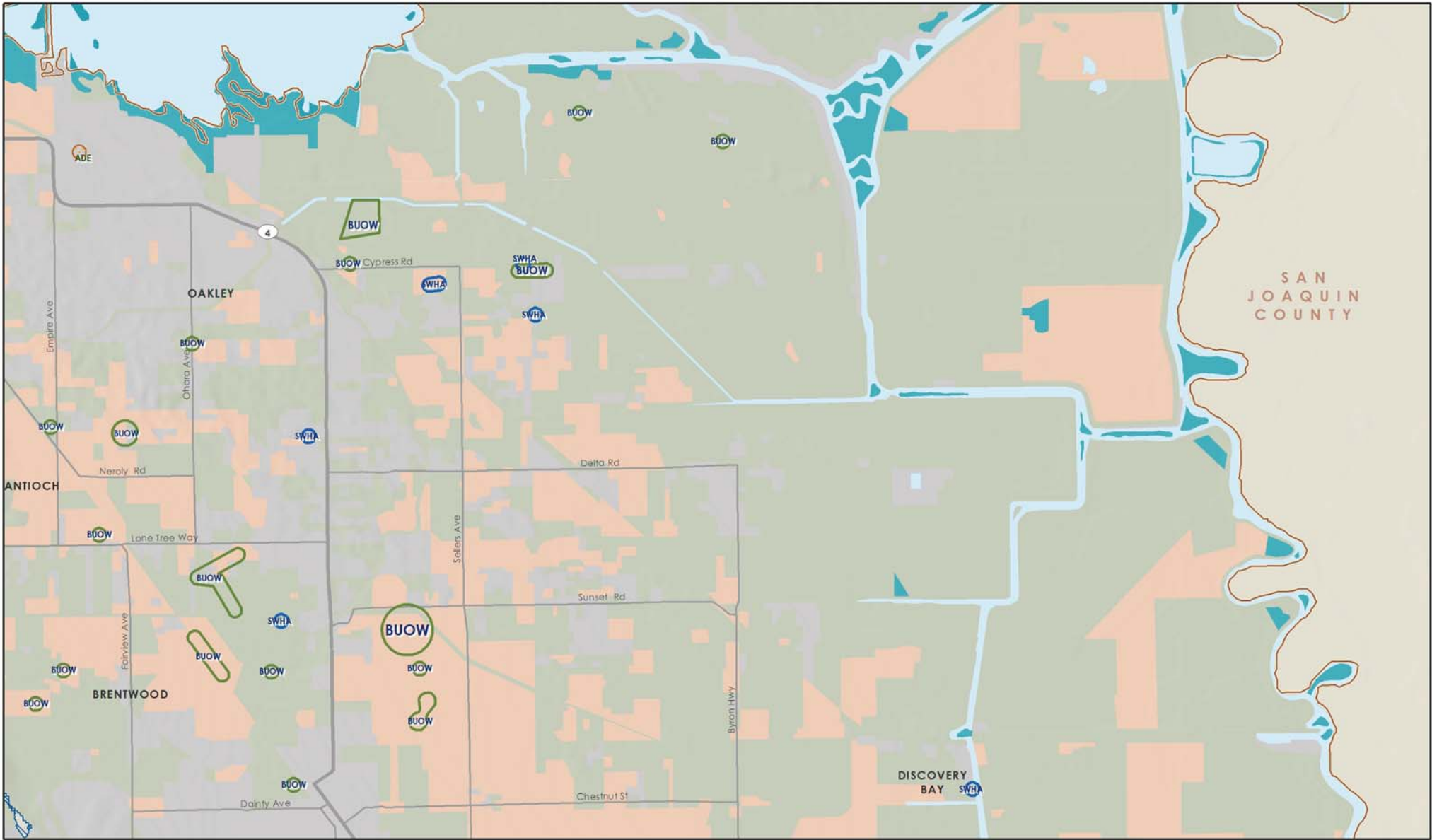
 Freshwater Emergent Wetland

 Saline Emergent Wetland

Vegetation: LCMP, Vegetation Data (2005)
California Department of Forestry and Fire
Protection & USFS, DWR (1995)



Federally Regulated Biological Resources in Contra Costa County



CNDDDB Animals: grouped by vegetation community

XYZ Animal Species Code

- | | | |
|--|--|--|
| Freshwater Marsh & Riparian | Grasslands | Salt Marsh |
| CLF California red-legged frog | BCB Bay checkerspot butterfly | CLRA California clapper rail |
| GGG giant garter snake | BUOW burrowing owl | SMH salt-marsh harvest mouse |
| SWHA Swainson's hawk | CTS California tiger salamander | |
| TCBB tricolored blackbird | SEB San Bruno elfin butterfly | Sand Dunes |
| | SJKF San Joaquin kit fox | LETE California least tern |
| | VFS vernal pool fairy shrimp | Scrub & Woodland |
| | VTS vernal pool tadpole shrimp | AWS Alameda whipsnake |

Critical Habitat

- | | | |
|---|--|--|
| Alameda Whipsnake | Red Legged Frog | Vernal Pool |
|---|--|--|

CNDDDB Plants: grouped by vegetation community

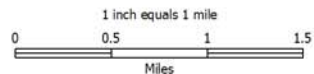
XYZ Plant Species Code

- | | |
|--|---|
| Grasslands | Sand Dunes |
| CCG Contra Costa goldfields | ADE Antioch Dunes evening-primrose |
| LFF large-flowered fiddleneck | CCW Contra Costa wallflower |
| SCT Santa Cruz tarplant | |
| Salt Marsh | Scrub & Woodland |
| CS California seablite | PM pallid manzanita |
| SBB soft bird's-beak | |

Species: CNDDDB, June 2008; Critical Habitat: USFWS

Vegetation Data

- | | | |
|--|---|--|
| Agriculture-Crops | Eucalyptus | Freshwater Emergent Wetland |
| Annual Grass | Oak Woodland | Saline Emergent Wetland |
| Chapparral | Montane Forest | |
| Coastal Scrub | Riparian | |
| Coniferous Forest | Urban | |



Vegetation: LCMP, Vegetation Data (2005)
California Department of Forestry and Fire Protection & USFS, DWR (1995)



Federally Regulated Biological Resources in Contra Costa County



CNDDB Animals: grouped by vegetation community

XYZ Animal Species Code

- | | | |
|---|---|--|
| Freshwater Marsh & Riparian | Grasslands | Salt Marsh |
| CLF California red-legged frog
GGS giant garter snake
SWHA Swainson's hawk
TCBB tricolored blackbird | BCB Bay checkerspot butterfly
BUOW burrowing owl
CTS California tiger salamander
SEB San Bruno elfin butterfly
SJKF San Joaquin kit fox
VFS vernal pool fairy shrimp
VTS vernal pool tadpole shrimp | CLRA California clapper rail
SMH salt-marsh harvest mouse |
| | Sand Dunes | Scrub & Woodland |
| | LETE California least tern | AWS Alameda whipsnake |

Critical Habitat

- | | | |
|---|--|--|
| Alameda Whipsnake | Red Legged Frog | Vernal Pool |
|---|--|--|

CNDDB Plants: grouped by vegetation community

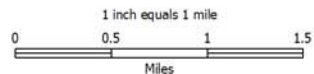
XYZ Plant Species Code

- | | |
|---|---|
| Grasslands | Sand Dunes |
| CCG Contra Costa goldfields
LFF large-flowered fiddleneck
SCT Santa Cruz tarplant | ADE Antioch Dunes evening-primrose
CCW Contra Costa wallflower |
| Salt Marsh | Scrub & Woodland |
| CS California seablite
SBB soft bird's-beak | PM pallid manzanita |

Species: CNDDB, June 2008; Critical Habitat: USFWS

Vegetation Data

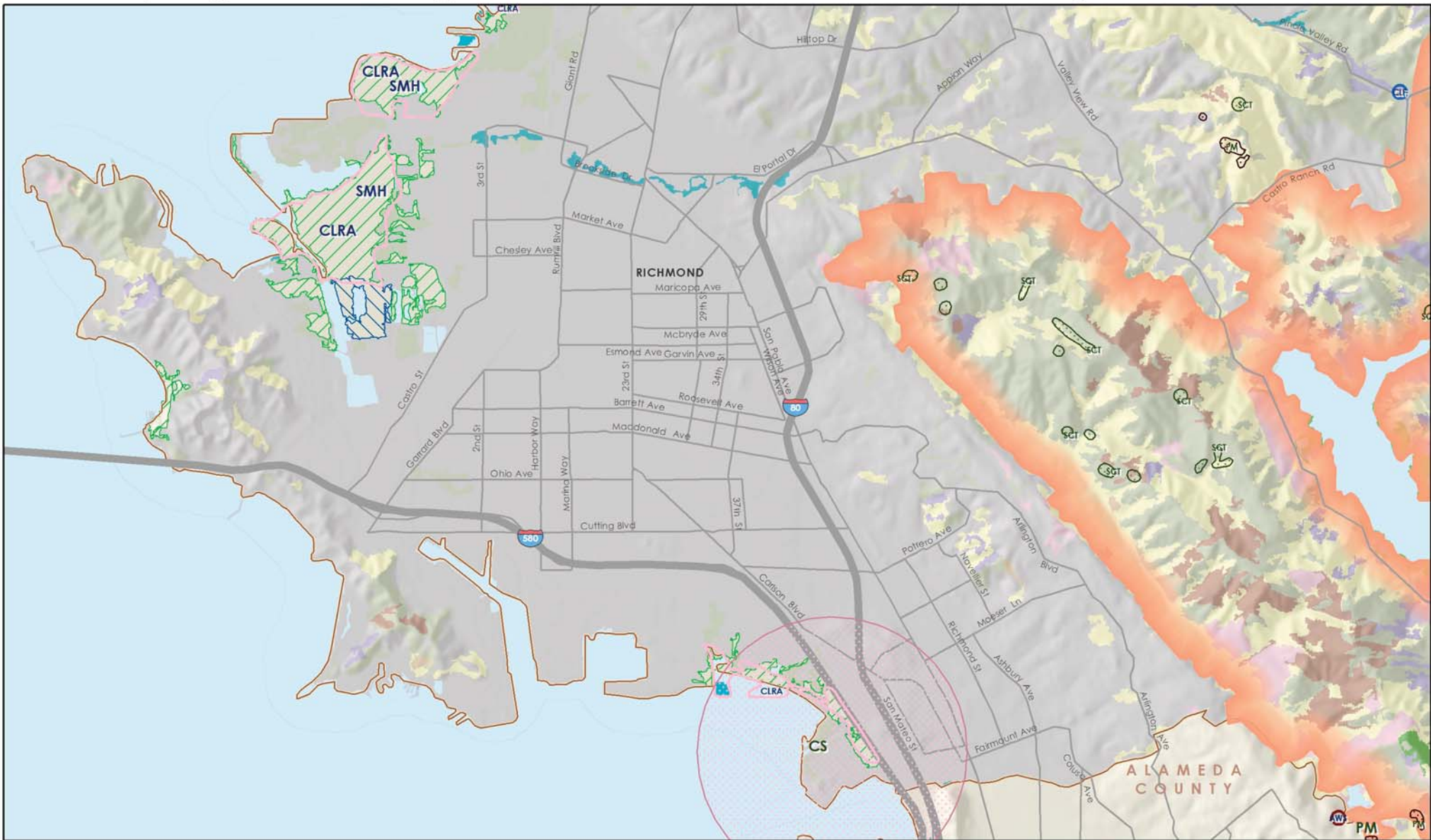
- | | | |
|--|--|--|
| Agriculture-Crops | Eucalyptus | Freshwater Emergent Wetland |
| Annual Grass | Oak Woodland | Saline Emergent Wetland |
| Chapparal | Montane Forest | |
| Coastal Scrub | Riparian | |
| Coniferous Forest | Urban | |



Vegetation: LCMP, Vegetation Data (2005)
California Department of Forestry and Fire Protection & USFS, DWR (1995)



Federally Regulated Biological Resources in Contra Costa County



CNDDDB Animals: grouped by vegetation community

XYZ Animal Species Code

- | | | |
|--------------------------------|---------------------------------|------------------------------|
| Freshwater Marsh & Riparian | Grasslands | Salt Marsh |
| CLF California red-legged frog | BCB Bay checkerspot butterfly | CLRA California clapper rail |
| GGS giant garter snake | BUOW burrowing owl | SMH salt-marsh harvest mouse |
| SWHA Swainson's hawk | CTS California tiger salamander | |
| TCBB tricolored blackbird | SEB San Bruno elfin butterfly | Sand Dunes |
| | SJKF San Joaquin kit fox | LETE California least tern |
| | VFS vernal pool fairy shrimp | Scrub & Woodland |
| | VTS vernal pool tadpole shrimp | AWS Alameda whipsnake |

Critical Habitat

- | | | |
|-------------------|-----------------|-------------|
| Alameda Whipsnake | Red Legged Frog | Vernal Pool |
|-------------------|-----------------|-------------|

CNDDDB Plants: grouped by vegetation community

XYZ Plant Species Code

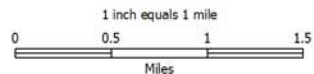
- | | |
|-------------------------------|------------------------------------|
| Grasslands | Sand Dunes |
| CCG Contra Costa goldfields | ADE Antioch Dunes evening-primrose |
| LFF large-flowered fiddleneck | CCW Contra Costa wallflower |
| SCT Santa Cruz tarplant | |
| Salt Marsh | Scrub & Woodland |
| CS California seabite | PM pallid manzanita |
| SBB soft bird's-beak | |

Species: CNDDDB, June 2008; Critical Habitat: USFWS

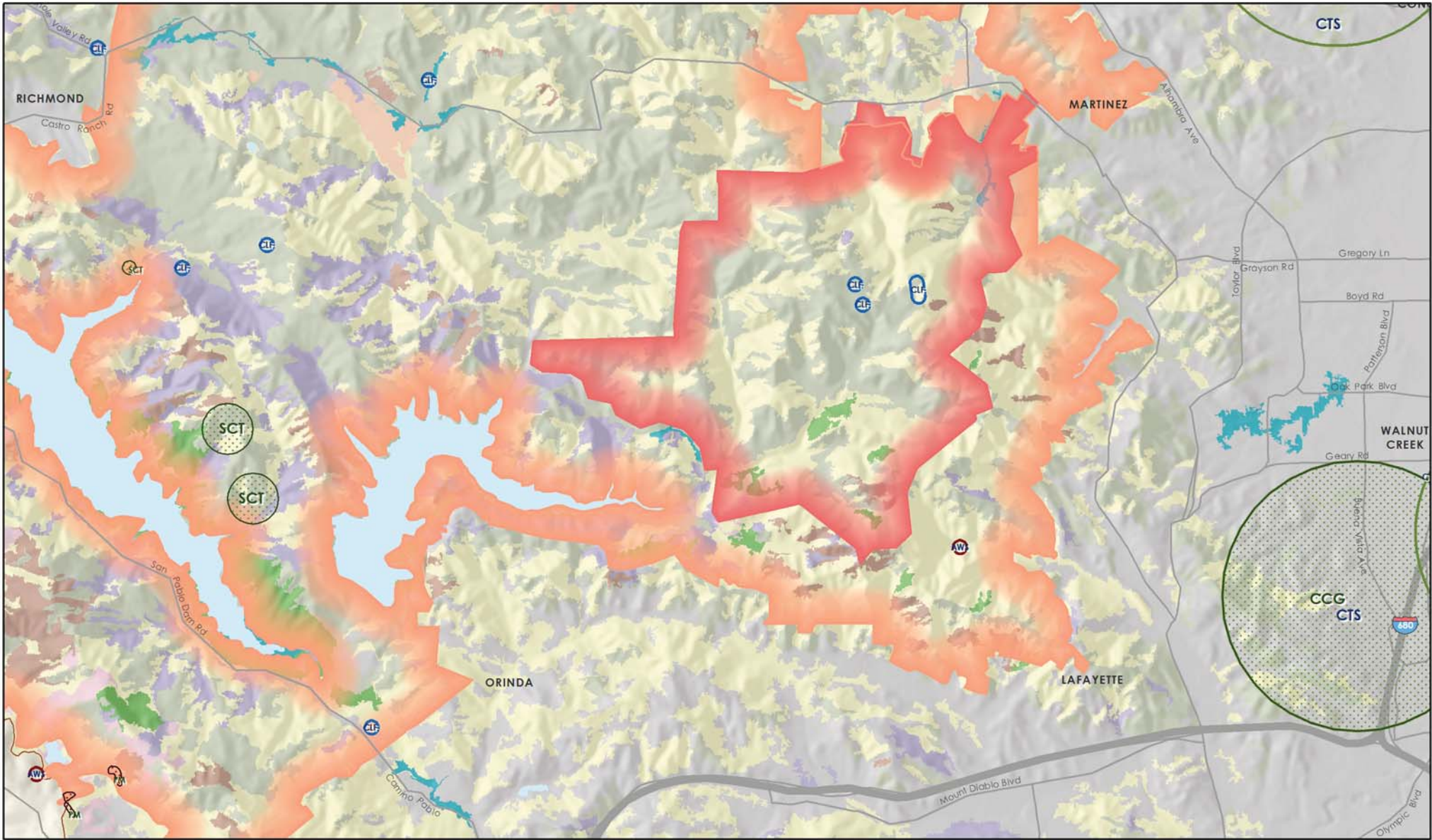
Vegetation Data

- | | | |
|-------------------|----------------|-----------------------------|
| Agriculture-Crops | Eucalyptus | Freshwater Emergent Wetland |
| Annual Grass | Oak Woodland | Saline Emergent Wetland |
| Chapparral | Montane Forest | |
| Coastal Scrub | Riparian | |
| Coniferous Forest | Urban | |

Vegetation: LCMP, Vegetation Data (2005)
California Department of Forestry and Fire Protection & USFS, DWR (1995)



Federally Regulated Biological Resources in Contra Costa County



CNDBB Animals: grouped by vegetation community

XYZ Animal Species Code

- | | | |
|--------------------------------|---------------------------------|------------------------------|
| Freshwater Marsh & Riparian | Grasslands | Salt Marsh |
| CLF California red-legged frog | BCB Bay checkerspot butterfly | CLRA California clapper rail |
| GGG giant garter snake | BUOW burrowing owl | SMH salt-marsh harvest mouse |
| SWHA Swainson's hawk | CTS California tiger salamander | |
| TCBB tricolored blackbird | SEB San Bruno elfin butterfly | Sand Dunes |
| | SJKF San Joaquin kit fox | LETE California least tern |
| | VFS vernal pool fairy shrimp | Scrub & Woodland |
| | VTS vernal pool tadpole shrimp | AWS Alameda whipsnake |

Critical Habitat

- | | | |
|-------------------|-----------------|-------------|
| Alameda Whipsnake | Red Legged Frog | Vernal Pool |
|-------------------|-----------------|-------------|

CNDBB Plants: grouped by vegetation community

XYZ Plant Species Code

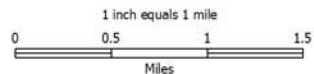
- | | |
|-------------------------------|------------------------------------|
| Grasslands | Sand Dunes |
| CCG Contra Costa goldfields | ADE Antioch Dunes evening-primrose |
| LFF large-flowered fiddleneck | CCW Contra Costa wallflower |
| SCT Santa Cruz tarplant | |
| Salt Marsh | Scrub & Woodland |
| CS California seablite | PM pallid manzanita |
| SBB soft bird's-beak | |

Species: CNDBB, June 2008; Critical Habitat: USFWS

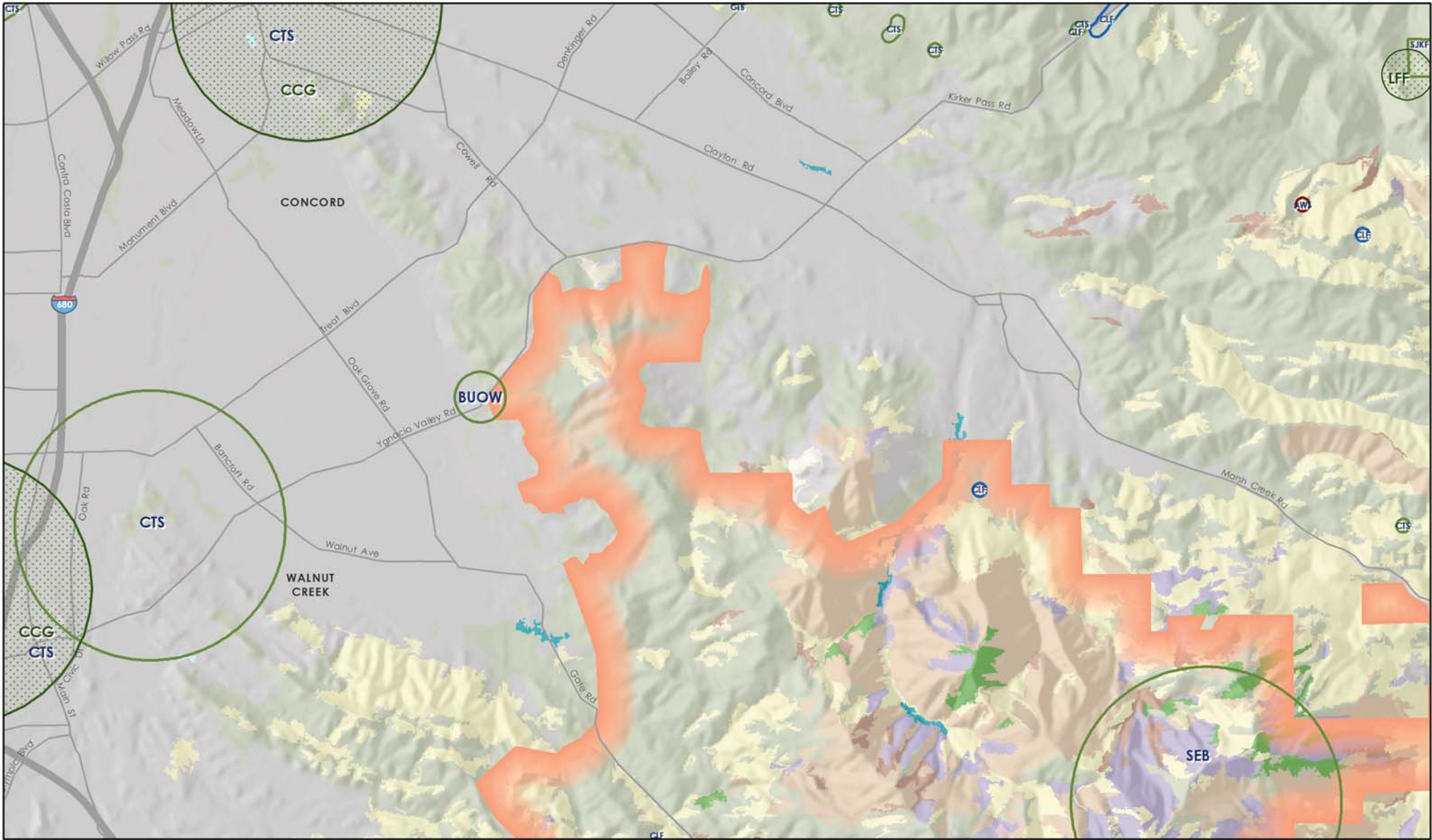
Vegetation Data

- | | | |
|-------------------|----------------|-----------------------------|
| Agriculture-Crops | Eucalyptus | Freshwater Emergent Wetland |
| Annual Grass | Oak Woodland | Saline Emergent Wetland |
| Chapparral | Montane Forest | |
| Coastal Scrub | Riparian | |
| Coniferous Forest | Urban | |

Vegetation: LCMP, Vegetation Data (2005)
California Department of Forestry and Fire Protection & USFS, DWR (1995)



Federally Regulated Biological Resources in Contra Costa County



CNDDB Animals: grouped by vegetation community

XYZ Animal Species Code

Freshwater Marsh & Riparian	Grasslands	Salt Marsh
CLF California red-legged frog	BCB Bay checkerspot butterfly	CLRA California clapper rail
GGG giant garter snake	BUOW burrowing owl	SMH salt-marsh harvest mouse
SWHA Swainson's hawk	CTS California tiger salamander	
TCBB tricolored blackbird	SEB San Bruno elfin butterfly	Sand Dunes
	SJKF San Joaquin kit fox	LETE California least tern
	VFS vernal pool fairy shrimp	Scrub & Woodland
	VTS vernal pool tadpole shrimp	AWS Alameda whipsnake

Critical Habitat

Alameda Whipsnake	Red Legged Frog	Vernal Pool
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CNDDB Plants: grouped by vegetation community

XYZ Plant Species Code

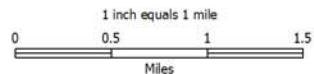
Grasslands	Sand Dunes
CCG Contra Costa goldfields	ADE Antioch Dunes evening-primrose
LFF large-flowered fiddleneck	CCW Contra Costa wallflower
SCT Santa Cruz tarplant	
Salt Marsh	Scrub & Woodland
CS California seablite	PM pallid manzanita
SBB soft bird's-beak	

Species: CNDDB, June 2008; Critical Habitat: USFWS

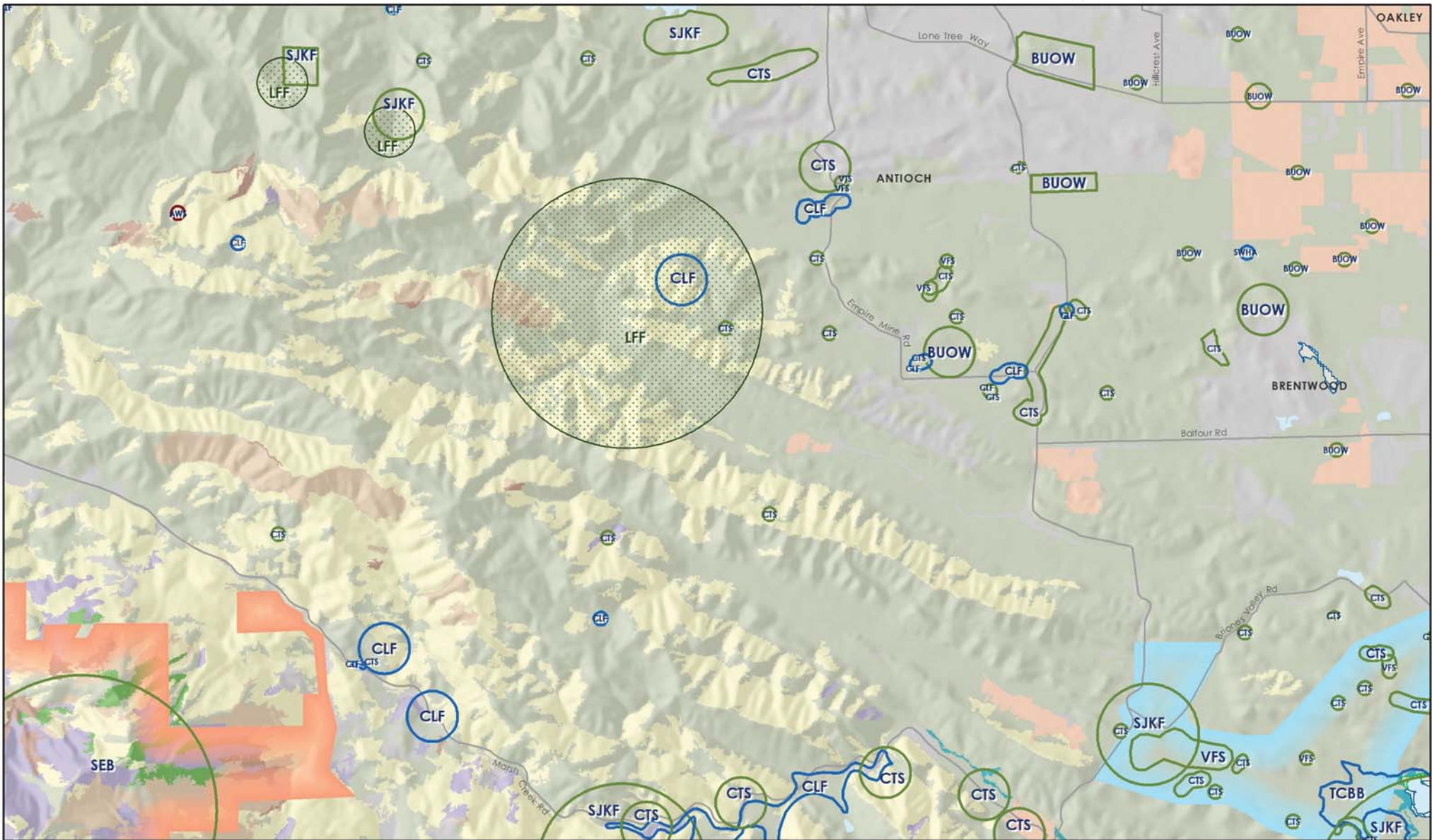
Vegetation Data

Agriculture-Crops	Eucalyptus	Freshwater Emergent Wetland
Annual Grass	Oak Woodland	Saline Emergent Wetland
Chapparral	Montane Forest	
Coastal Scrub	Riparian	
Coniferous Forest	Urban	

Vegetation: LCMP, Vegetation Data (2005)
California Department of Forestry and Fire Protection & USFS, DWR (1995)



Federally Regulated Biological Resources in Contra Costa County



CNDDB Animals: grouped by vegetation community

XYZ Animal Species Code

- | | | |
|--------------------------------|---------------------------------|------------------------------|
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| TCBB tricolored blackbird | SEB San Bruno elfin butterfly | LETE California least tern |
| | SJKF San Joaquin kit fox | Scrub & Woodland |
| | VFS vernal pool fairy shrimp | AWS Alameda whipsnake |
| | VTS vernal pool tadpole shrimp | |

Critical Habitat

- | | | |
|-------------------|-----------------|-------------|
| Alameda Whipsnake | Red Legged Frog | Vernal Pool |
|-------------------|-----------------|-------------|

CNDDB Plants: grouped by vegetation community

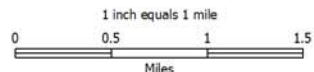
XYZ Plant Species Code

- | | |
|-------------------------------|------------------------------------|
| Grasslands | Sand Dunes |
| CCG Contra Costa goldfields | ADE Antioch Dunes evening-primrose |
| LFF large-flowered fiddleneck | CCW Contra Costa wallflower |
| SCT Santa Cruz tarplant | |
| Salt Marsh | Scrub & Woodland |
| CS California seabite | PM pallid manzanita |
| SBB soft bird's-beak | |

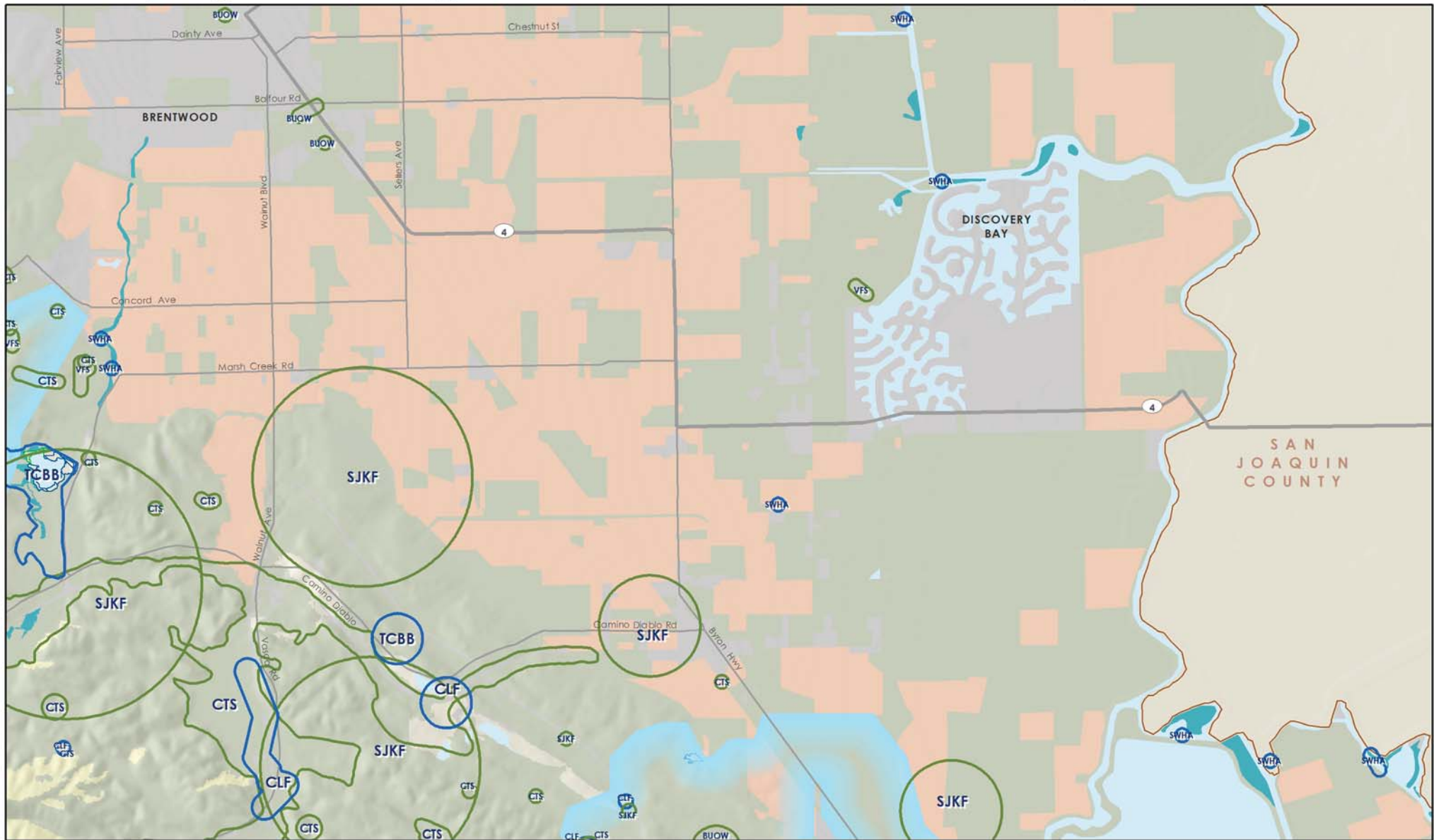
Vegetation Data

- | | | |
|-------------------|----------------|-----------------------------|
| Agriculture-Crops | Eucalyptus | Freshwater Emergent Wetland |
| Annual Grass | Oak Woodland | Saline Emergent Wetland |
| Chapparral | Montane Forest | |
| Coastal Scrub | Riparian | |
| Coniferous Forest | Urban | |

Vegetation: LCMP, Vegetation Data (2005)
California Department of Forestry and Fire
Protection & USFS, DWR (1995)



Federally Regulated Biological Resources in Contra Costa County



CNDBB Animals: grouped by vegetation community

XYZ Animal Species Code

- | | | |
|--|--|--|
| Freshwater Marsh & Riparian | Grasslands | Salt Marsh |
| CLF California red-legged frog | BCB Bay checkerspot butterfly | CLRA California clapper rail |
| GGG giant garter snake | BUOW burrowing owl | SMH salt-marsh harvest mouse |
| SWHA Swainson's hawk | CTS California tiger salamander | |
| TCBB tricolored blackbird | SEB San Bruno elfin butterfly | Sand Dunes |
| | SJKF San Joaquin kit fox | LETE California least tern |
| | VFS vernal pool fairy shrimp | Scrub & Woodland |
| | VTS vernal pool tadpole shrimp | AWS Alameda whipsnake |

Critical Habitat

- | | | |
|---|--|--|
| Alameda Whipsnake | Red Legged Frog | Vernal Pool |
|---|--|--|

CNDBB Plants: grouped by vegetation community

XYZ Plant Species Code

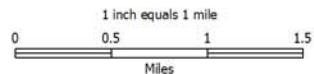
- | | |
|--|---|
| Grasslands | Sand Dunes |
| CCG Contra Costa goldfields | ADE Antioch Dunes evening-primrose |
| LFF large-flowered fiddleneck | CCW Contra Costa wallflower |
| SCT Santa Cruz tarplant | |
| Salt Marsh | Scrub & Woodland |
| CS California seablite | PM pallid manzanita |
| SBB soft bird's-beak | |

Species: CNDBB, June 2008; Critical Habitat: USFWS

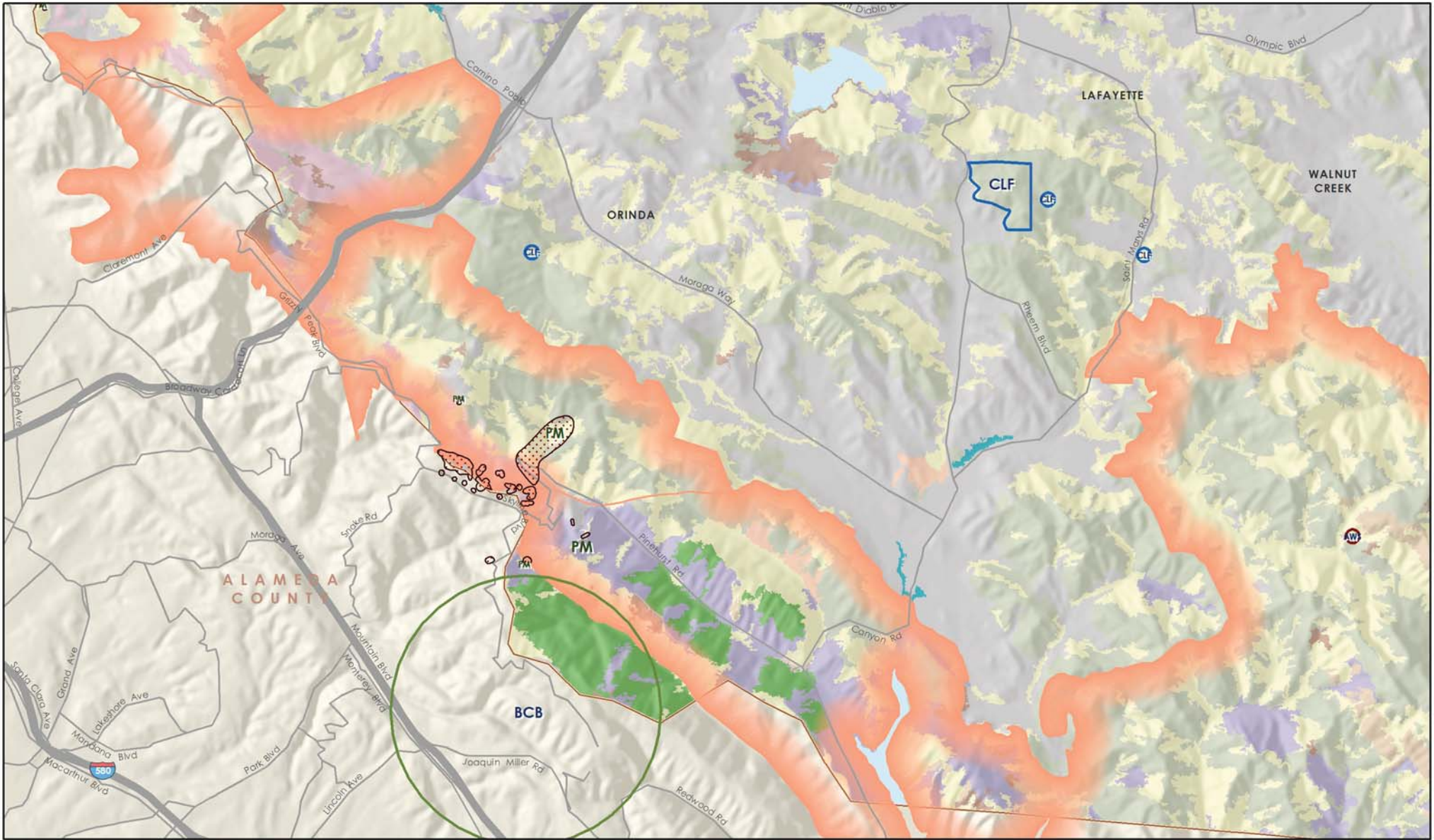
Vegetation Data

- | | | |
|--|---|--|
| Agriculture-Crops | Eucalyptus | Freshwater Emergent Wetland |
| Annual Grass | Oak Woodland | Saline Emergent Wetland |
| Chapparral | Montane Forest | |
| Coastal Scrub | Riparian | |
| Coniferous Forest | Urban | |

Vegetation: LCMP, Vegetation Data (2005)
California Department of Forestry and Fire
Protection & USFS, DWR (1995)



Federally Regulated Biological Resources in Contra Costa County



CNDDB Animals: grouped by vegetation community

XYZ Animal Species Code

- | | | |
|--------------------------------|---------------------------------|------------------------------|
| Freshwater Marsh & Riparian | Grasslands | Salt Marsh |
| CLF California red-legged frog | BCB Bay checkerspot butterfly | CLRA California clapper rail |
| GGG giant garter snake | BUOW burrowing owl | SMH salt-marsh harvest mouse |
| SWHA Swainson's hawk | CTS California tiger salamander | |
| TCBB tricolored blackbird | SEB San Bruno elfin butterfly | Sand Dunes |
| | SJF San Joaquin kit fox | LETE California least tern |
| | VFS vernal pool fairy shrimp | Scrub & Woodland |
| | VTS vernal pool tadpole shrimp | AWS Alameda whipsnake |

Critical Habitat

- | | | |
|-------------------|-----------------|-------------|
| Alameda Whipsnake | Red Legged Frog | Vernal Pool |
|-------------------|-----------------|-------------|

CNDDB Plants: grouped by vegetation community

XYZ Plant Species Code

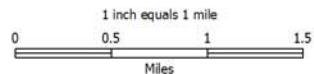
- | | |
|-------------------------------|------------------------------------|
| Grasslands | Sand Dunes |
| BCG Contra Costa goldfields | ADE Antioch Dunes evening-primrose |
| LFF large-flowered fiddleneck | CCW Contra Costa wallflower |
| SCT Santa Cruz tarplant | |
| Salt Marsh | Scrub & Woodland |
| CS California seablite | PM pallid manzanita |
| SBB soft bird's-beak | |

Species: CNDDB, June 2008; Critical Habitat: USFWS

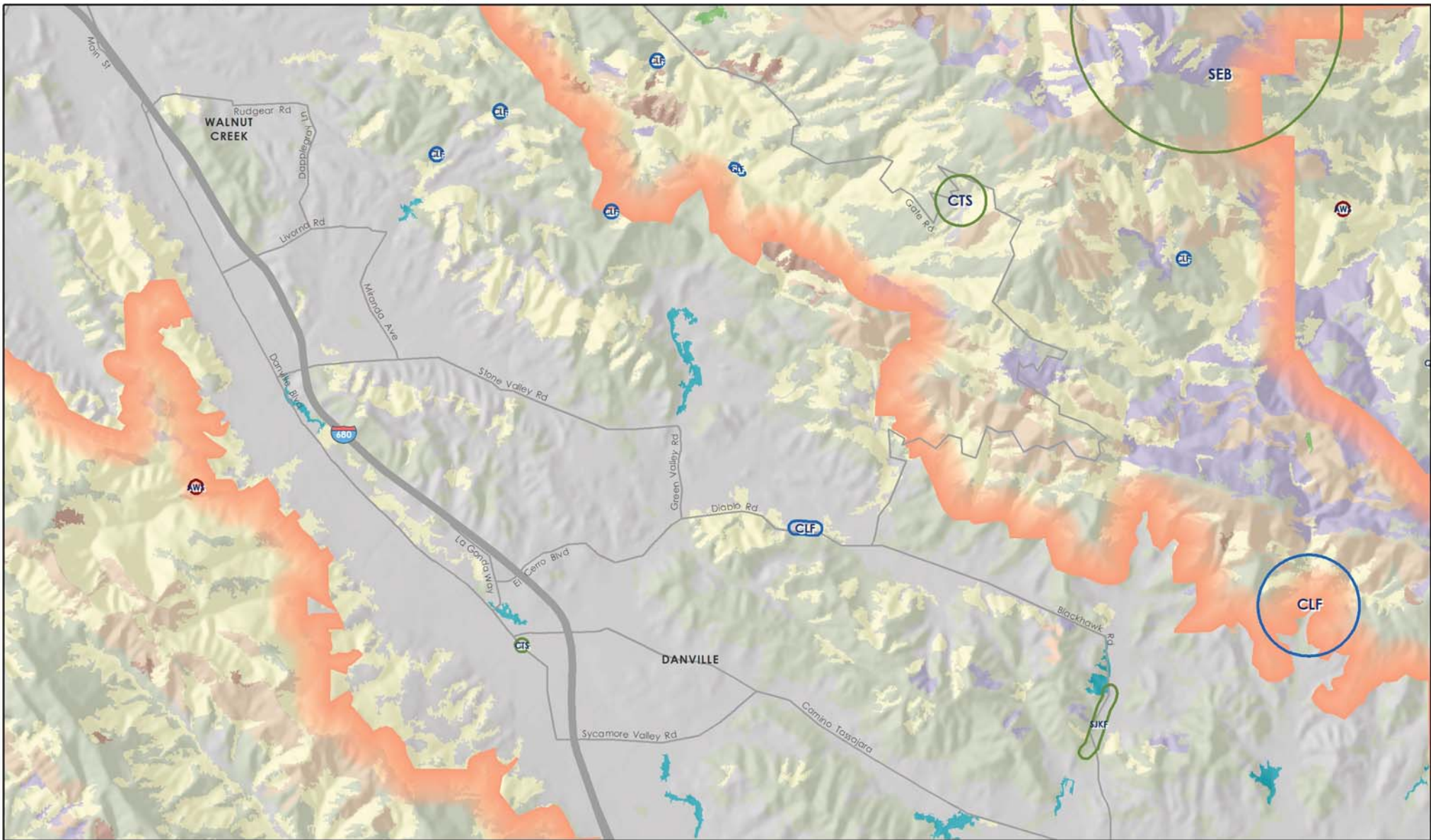
Vegetation Data

- | | | |
|-------------------|----------------|-----------------------------|
| Agriculture-Crops | Eucalyptus | Freshwater Emergent Wetland |
| Annual Grass | Oak Woodland | Saline Emergent Wetland |
| Chapparral | Montane Forest | |
| Coastal Scrub | Riparian | |
| Coniferous Forest | Urban | |

Vegetation: LCMP, Vegetation Data (2005)
California Department of Forestry and Fire Protection & USFS, DWR (1995)



Federally Regulated Biological Resources in Contra Costa County



CNDDDB Animals: grouped by vegetation community

XYZ Animal Species Code

 Freshwater Marsh & Riparian

 Grasslands

 Salt Marsh

- CLF California red-legged frog
- GGSS giant garter snake
- SWHA Swainson's hawk
- TCBB tricolored blackbird

- BCB Bay checkerspot butterfly
- BUOW burrowing owl
- CTS California tiger salamander
- SEB San Bruno elfin butterfly
- SJKF San Joaquin kit fox
- VFS vernal pool fairy shrimp
- VTS vernal pool tadpole shrimp

- CLRA California clapper rail
- SMH salt-marsh harvest mouse

 Sand Dunes

 Scrub & Woodland

- LETE California least tern
- AWS Alameda whipsnake

Critical Habitat

- Alameda Whipsnake
- Red Legged Frog
- Vernal Pool

CNDDDB Plants: grouped by vegetation community

XYZ Plant Species Code

 Grasslands

- CCG Contra Costa goldfields
- LFF large-flowered fiddleneck
- SCT Santa Cruz tarplant

 Salt Marsh

- CS California seablite
- SBB soft bird's-beak

 Sand Dunes

- ADE Antioch Dunes evening-primrose
- CCW Contra Costa wallflower

 Scrub & Woodland

- PM pallid manzanita

Species: CNDDDB, June 2008; Critical Habitat: USFWS

Vegetation Data

 Agriculture-Crops

 Annual Grass

 Chapparral

 Coastal Scrub

 Coniferous Forest

 Urban

 Eucalyptus

 Oak Woodland

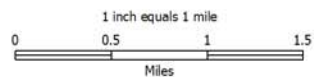
 Montane Forest

 Riparian

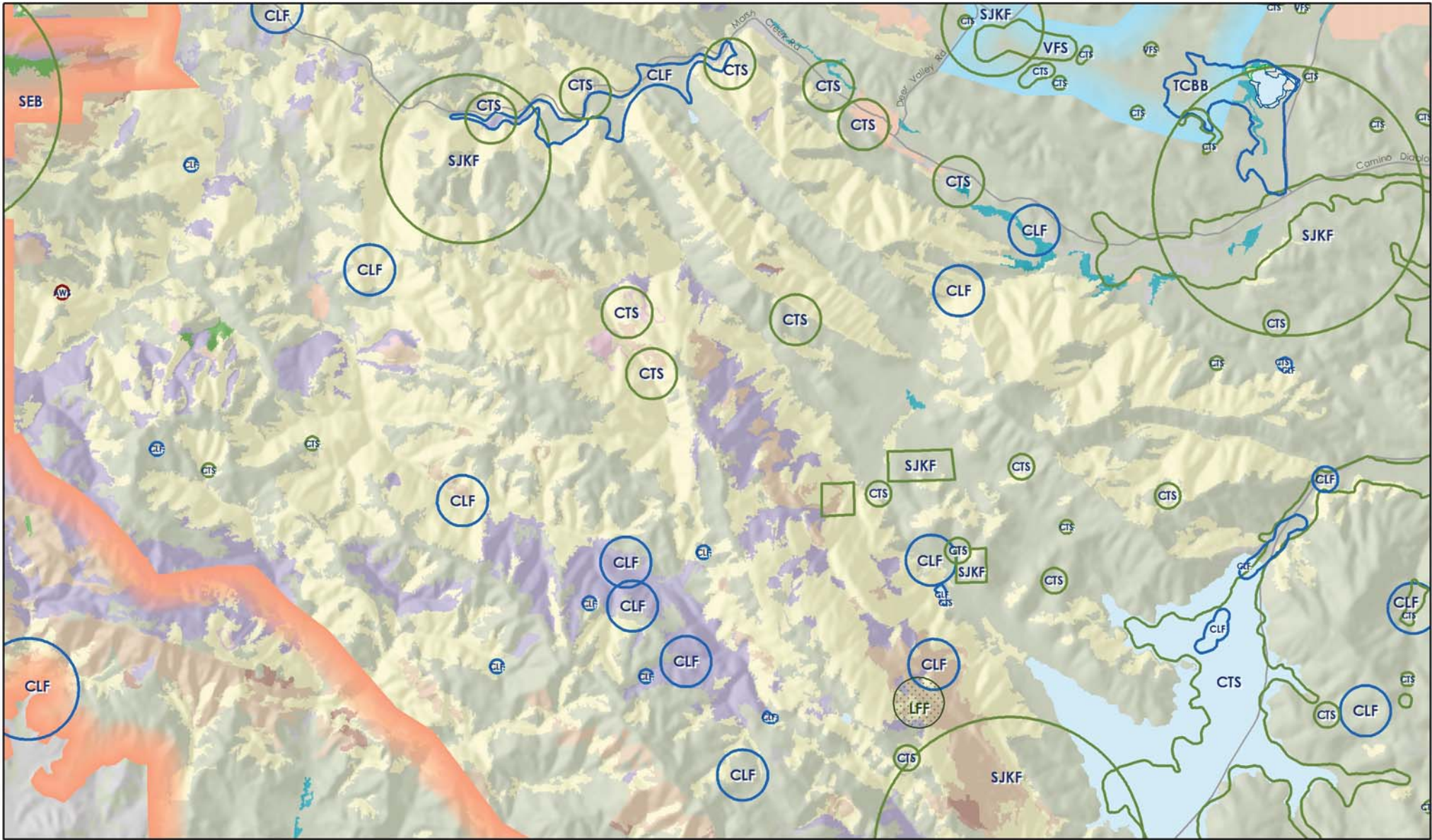
 Freshwater Emergent Wetland

 Saline Emergent Wetland

Vegetation: LCMP, Vegetation Data (2005)
California Department of Forestry and Fire
Protection & USFS, DWR (1995)



Federally Regulated Biological Resources in Contra Costa County



CNDDB Animals: grouped by vegetation community

XYZ Animal Species Code

- | | | |
|--|--|--|
| Freshwater Marsh & Riparian | Grasslands | Salt Marsh |
| CLF California red-legged frog | BCB Bay checkerspot butterfly | CLRA California clapper rail |
| GGS giant garter snake | BUOW burrowing owl | SMH salt-marsh harvest mouse |
| SWHA Swainson's hawk | CTS California tiger salamander | |
| TCBB tricolored blackbird | SEB San Bruno elfin butterfly | Sand Dunes |
| | SJKF San Joaquin kit fox | LETE California least tern |
| | VFS vernal pool fairy shrimp | Scrub & Woodland |
| | VTS vernal pool tadpole shrimp | AWS Alameda whipsnake |

Critical Habitat

- | | | |
|---|--|--|
| Alameda Whipsnake | Red Legged Frog | Vernal Pool |
|---|--|--|

CNDDB Plants: grouped by vegetation community

XYZ Plant Species Code

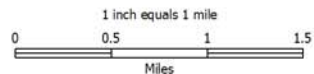
- | | |
|--|---|
| Grasslands | Sand Dunes |
| CCG Contra Costa goldfields | ADE Antioch Dunes evening-primrose |
| LFF large-flowered fiddleneck | CCW Contra Costa wallflower |
| SCT Santa Cruz tarplant | |
| Salt Marsh | Scrub & Woodland |
| CS California seablite | PM pallid manzanita |
| SBB soft bird's-beak | |

Species: CNDDB, June 2008; Critical Habitat: USFWS

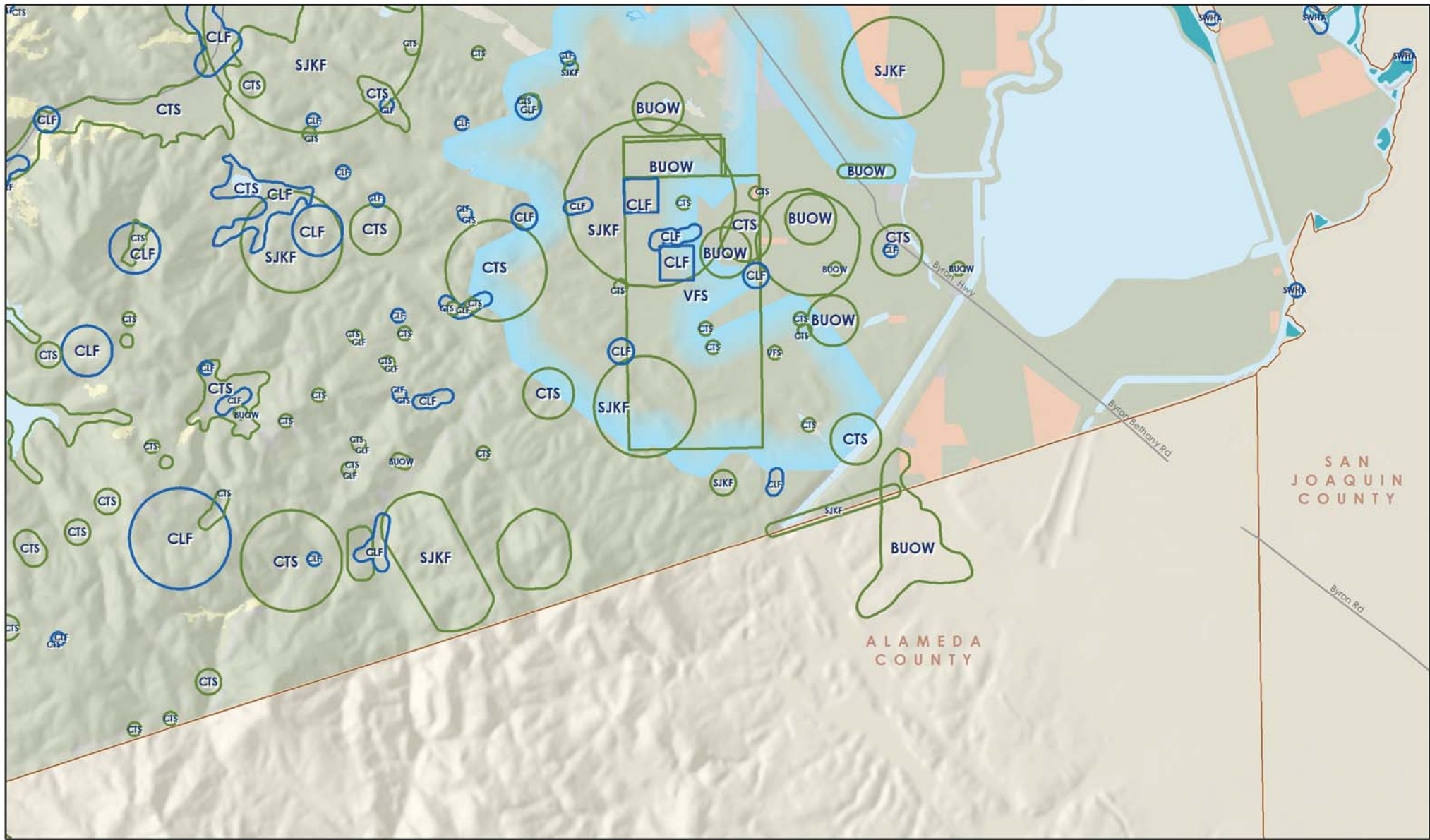
Vegetation Data

- | | | |
|--|---|--|
| Agriculture-Crops | Eucalyptus | Freshwater Emergent Wetland |
| Annual Grass | Oak Woodland | Saline Emergent Wetland |
| Chapparral | Montane Forest | |
| Coastal Scrub | Riparian | |
| Coniferous Forest | Urban | |

Vegetation: LCMP, Vegetation Data (2005)
California Department of Forestry and Fire Protection & USFS, DWR (1995)



Federally Regulated Biological Resources in Contra Costa County



CNDDB Animals: grouped by vegetation community

XYZ Animal Species Code

- | | | |
|--|--|--|
| Freshwater Marsh & Riparian | Grasslands | Salt Marsh |
| CLF California red-legged frog | BCB Bay checkerspot butterfly | CLRA California clapper rail |
| GGG giant garter snake | BUOW burrowing owl | SMH salt-marsh harvest mouse |
| SWHA Swainson's hawk | CTS California tiger salamander | |
| TCBB tricolored blackbird | SEB San Bruno elfin butterfly | Sand Dunes |
| | SJKF San Joaquin kit fox | LETE California least tern |
| | VFS vernal pool fairy shrimp | Scrub & Woodland |
| | VTS vernal pool tadpole shrimp | AWS Alameda whipsnake |

Critical Habitat

- | | | |
|---|--|--|
| Alameda Whipsnake | Red Legged Frog | Vernal Pool |
|---|--|--|

CNDDB Plants: grouped by vegetation community

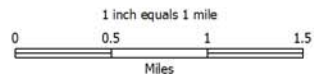
XYZ Plant Species Code

- | | |
|--|---|
| Grasslands | Sand Dunes |
| CCG Contra Costa goldfields | ADE Antioch Dunes evening-primrose |
| LFF large-flowered fiddleneck | CCW Contra Costa wallflower |
| SCT Santa Cruz tarplant | |
| Salt Marsh | Scrub & Woodland |
| CS California seablite | PM pallid manzanita |
| SBB soft bird's-beak | |

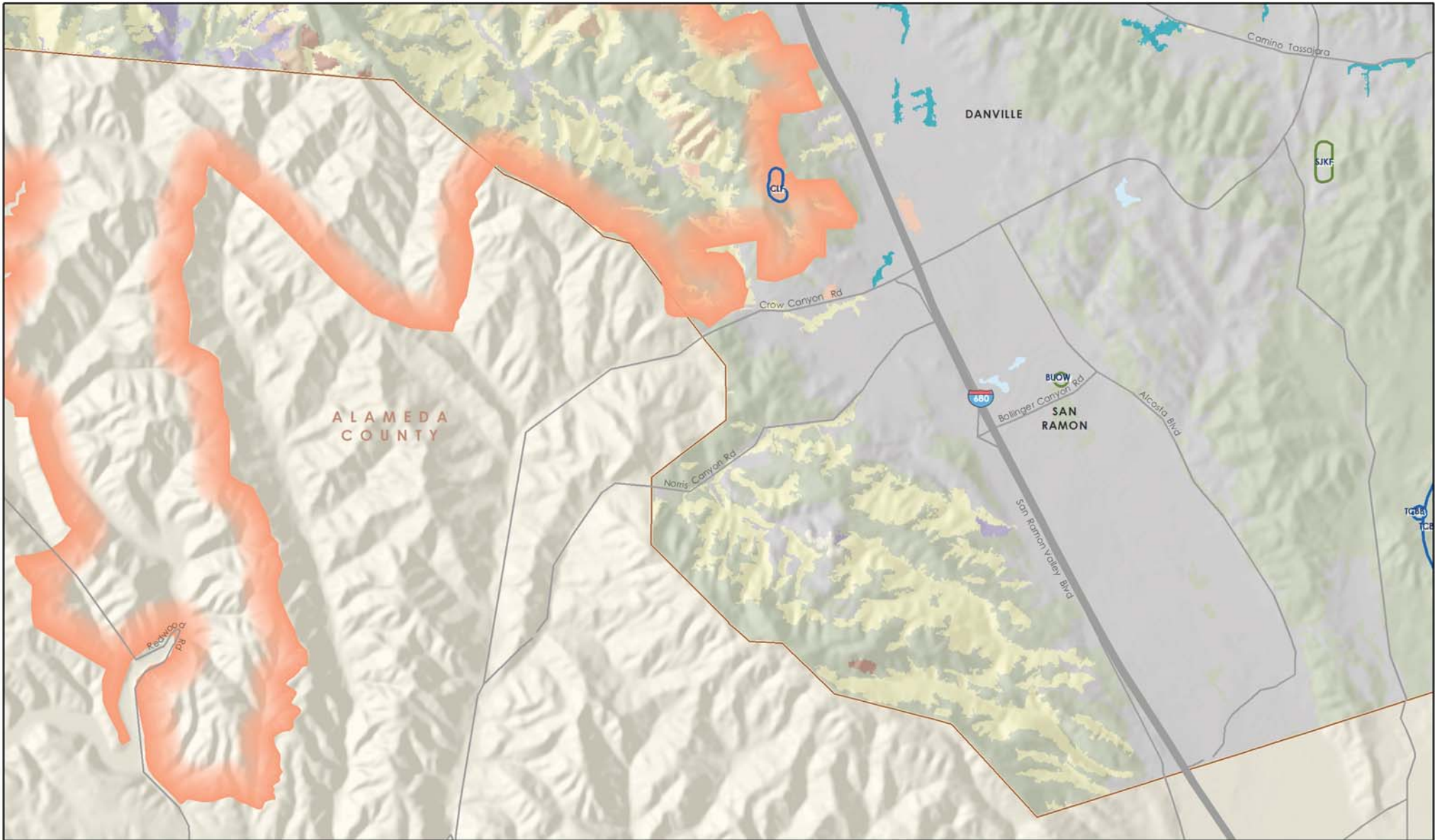
Vegetation Data

- | | | |
|--|---|--|
| Agriculture-Crops | Eucalyptus | Freshwater Emergent Wetland |
| Annual Grass | Oak Woodland | Saline Emergent Wetland |
| Chapparral | Montane Forest | |
| Coastal Scrub | Riparian | |
| Coniferous Forest | Urban | |

Vegetation: LCMMP, Vegetation Data (2005)
California Department of Forestry and Fire Protection & USFS, DWR (1995)



Federally Regulated Biological Resources in Contra Costa County



CNDDB Animals: grouped by vegetation community

XYZ Animal Species Code

Freshwater Marsh & Riparian

Grasslands

Salt Marsh

- CLF California red-legged frog
- GGG giant garter snake
- SWHA Swainson's hawk
- TCBB tricolored blackbird

- BCB Bay checkerspot butterfly
- BUOW burrowing owl
- CTS California tiger salamander
- SEB San Bruno elfin butterfly
- SJKF San Joaquin kit fox
- VFS vernal pool fairy shrimp
- VTS vernal pool tadpole shrimp

- CLRA California clapper rail
- SMH salt-marsh harvest mouse

Sand Dunes

LETE California least tern

Scrub & Woodland

AWS Alameda whipsnake

Critical Habitat

- Alameda Whipsnake
- Red Legged Frog
- Vernal Pool

CNDDB Plants: grouped by vegetation community

XYZ Plant Species Code

Grasslands

Sand Dunes

- CCG Contra Costa goldfields
- LFF large-flowered fiddleneck
- SCT Santa Cruz tarplant

- ADE Antioch Dunes evening-primrose
- CCW Contra Costa wallflower

Salt Marsh

- CS California seablite
- SBB soft bird's-beak

Scrub & Woodland

PM pallid manzanita

Species: CNDDB, June 2008; Critical Habitat: USFWS

Vegetation Data

Agriculture-Crops

Annual Grass

Chapparral

Coastal Scrub

Coniferous Forest

Eucalyptus

Oak Woodland

Montane Forest

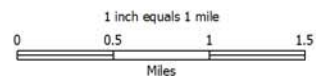
Riparian

Urban

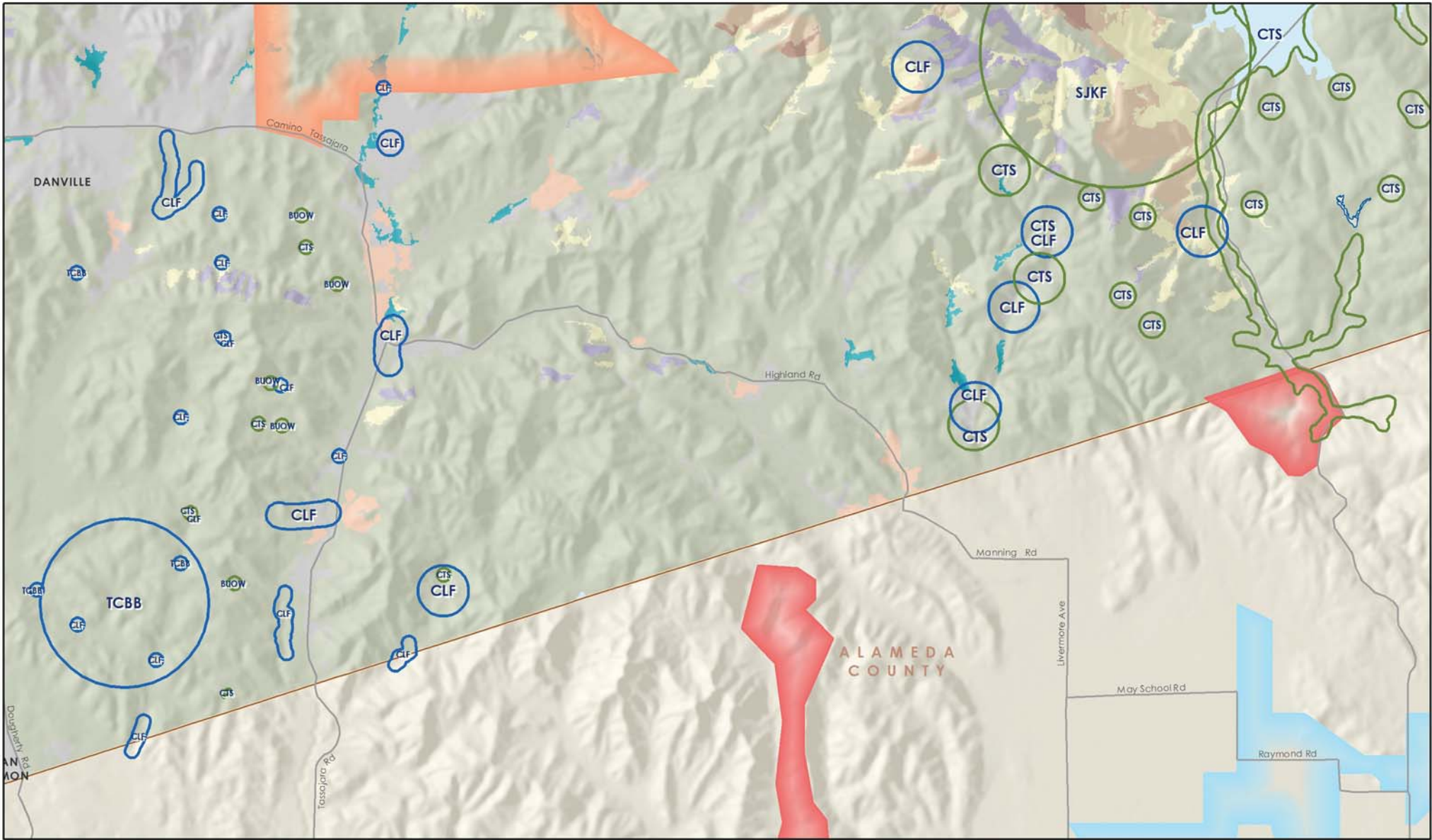
Freshwater Emergent Wetland

Saline Emergent Wetland

Vegetation: LCMP, Vegetation Data (2005)
California Department of Forestry and Fire
Protection & USFS, DWR (1995)



Federally Regulated Biological Resources in Contra Costa County



CNDDB Animals: grouped by vegetation community

XYZ Animal Species Code

 Freshwater Marsh & Riparian	 Grasslands	 Salt Marsh
CLF California red-legged frog	BCB Bay checkerspot butterfly	CLRA California clapper rail
GGG giant garter snake	BUOW burrowing owl	SMH salt-marsh harvest mouse
SWHA Swainson's hawk	CTS California tiger salamander	
TCBB tricolored blackbird	SEB San Bruno elfin butterfly	 Sand Dunes
	SJKF San Joaquin kit fox	LETE California least tern
	VFS vernal pool fairy shrimp	 Scrub & Woodland
	VTS vernal pool tadpole shrimp	AWS Alameda whipsnake

Critical Habitat

- Alameda Whipsnake
- Red Legged Frog
- Vernal Pool

CNDDB Plants: grouped by vegetation community

XYZ Plant Species Code

 Grasslands	 Sand Dunes
CCG Contra Costa goldfields	ADE Antioch Dunes evening-primrose
LFF large-flowered fiddleneck	CCW Contra Costa wallflower
SCT Santa Cruz tarplant	
 Salt Marsh	 Scrub & Woodland
CS California seablite	PM pallid manzanita
SBB soft bird's-beak	

Species: CNDDB, June 2008; Critical Habitat: USFWS

Vegetation Data

 Agriculture-Crops	 Eucalyptus	 Freshwater Emergent Wetland
 Annual Grass	 Oak Woodland	 Saline Emergent Wetland
 Chapparral	 Montane Forest	
 Coastal Scrub	 Riparian	
 Coniferous Forest	 Urban	

Vegetation: LCMP, Vegetation Data (2005)
California Department of Forestry and Fire Protection & USFS, DWR (1995)

