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## 5 Biological Resources – Terrestrial

Chapter 5 evaluates the potential impacts of the Program alternatives on terrestrial resources. Results of the evaluation are provided at the programmatic level. Section 5.1, Environmental Setting, presents an overview of the environmental settings and contains federal regulations, state regulations, and local ordinances and regulations that are applicable to the Program. Section 5.2, Environmental Impacts and Mitigation Measures, presents the following:

- > Environmental concerns and evaluation criteria: A discussion of whether the Program alternatives would cause any potentially significant impacts to terrestrial resources and addressing concerns from the public scoping
- > Discussion of methods and assumptions, including findings from Appendix B, Ecological and Human Health Assessment Report
- > Discussion of the potential impacts of the Program alternatives, and recommendations for mitigation, if required, for those impacts
- > Cumulative impacts summary
- > A summary of estimated environmental impacts to terrestrial resources

Aquatic resources are addressed in Chapter 4.

### 5.1 Environmental Setting

The Program Area is defined as the Service Area in Alameda County and the four surrounding counties of Contra Costa, San Joaquin, Stanislaus, and Santa Clara. The Program Area is impacted by pests that must be controlled to assure the health and quality of life for residents and recreationists. Control activities provided in areas adjacent to the Districts' Service Area are upon request of the adjacent jurisdictions to protect the health and safety of residents in adjacent jurisdictions. Actions that would be taken outside of the District's Service Area are the same types of actions undertaken within the District's Service Area and in similar types of habitats or sites.

Section 5.1.1 identifies the ecoregion provinces in the District's Program Area, Section 5.1.2 describes the special status terrestrial species that have the potential to occur within the Program Area, Section 5.1.3 provides an overview of federal, state, and local ordinances and regulations pertinent to these resources that are applicable to the Program. Section 5.1.4 identifies the Habitat Conservation Plans (HCPs) and Natural Community Conservation Plans (NCCPs) in the Program Area.

Background information on hazards, toxicity, and exposure is provided in Section 5.2.2.2.

#### 5.1.1 Terrestrial Resources within the Program Area

The District Service Area is located in Alameda County. The District Program Area addressed in this report also includes the four surrounding counties: Contra Costa, Santa Clara, San Joaquin, and Stanislaus. This area encompasses a range of terrestrial habitats and a diverse array of wildlife and plants. Fish, amphibian and aquatic reptile species are included as aquatic species and discussed in Section 4. The zoogeographic provinces are described in Appendix A, Biological Resources Technical Report.

To facilitate the evaluation of impacts and impact avoidance measures by habitat type, a consistent set of habitat types was developed for terrestrial areas (Table 5-1). Terrestrial habitat types were based on those developed as part of the San Francisco Bay Area Upland Habitat Goals Project (Bay Area Open

Space Council 2011). The aquatic and wetland habitats defined in Section 4 are also discussed in this section to address potential impacts to terrestrial species found in association with those aquatic habitats.

**Table 5-1 Terrestrial Habitat Types**

Habitat	Description
Coniferous Forests	Forests dominated by cone-bearing trees with needles including pines, firs and redwoods
Deciduous Forest	Forests dominated by trees that drop leaves annually including buckeyes, oaks (including live oaks) and maples
Shrublands	Dense to moderate stands of coyote brush, ceanothus, poison oak, sage, sagebrush, chamise and diverse other shrubs with grassy openings
Grasslands	Grasslands dominated by annual grasses, with varying amounts of native perennials
Serpentine	Shrublands or grasslands on serpentine rock
Coastal Dunes	Sandy soils with some active sand movement supporting low stands of diverse native perennials and beach grass
Treeholes	Cavities in branches and trunks of live trees or snags that can provide habitat for a variety of species

Source: Goals Project 1999

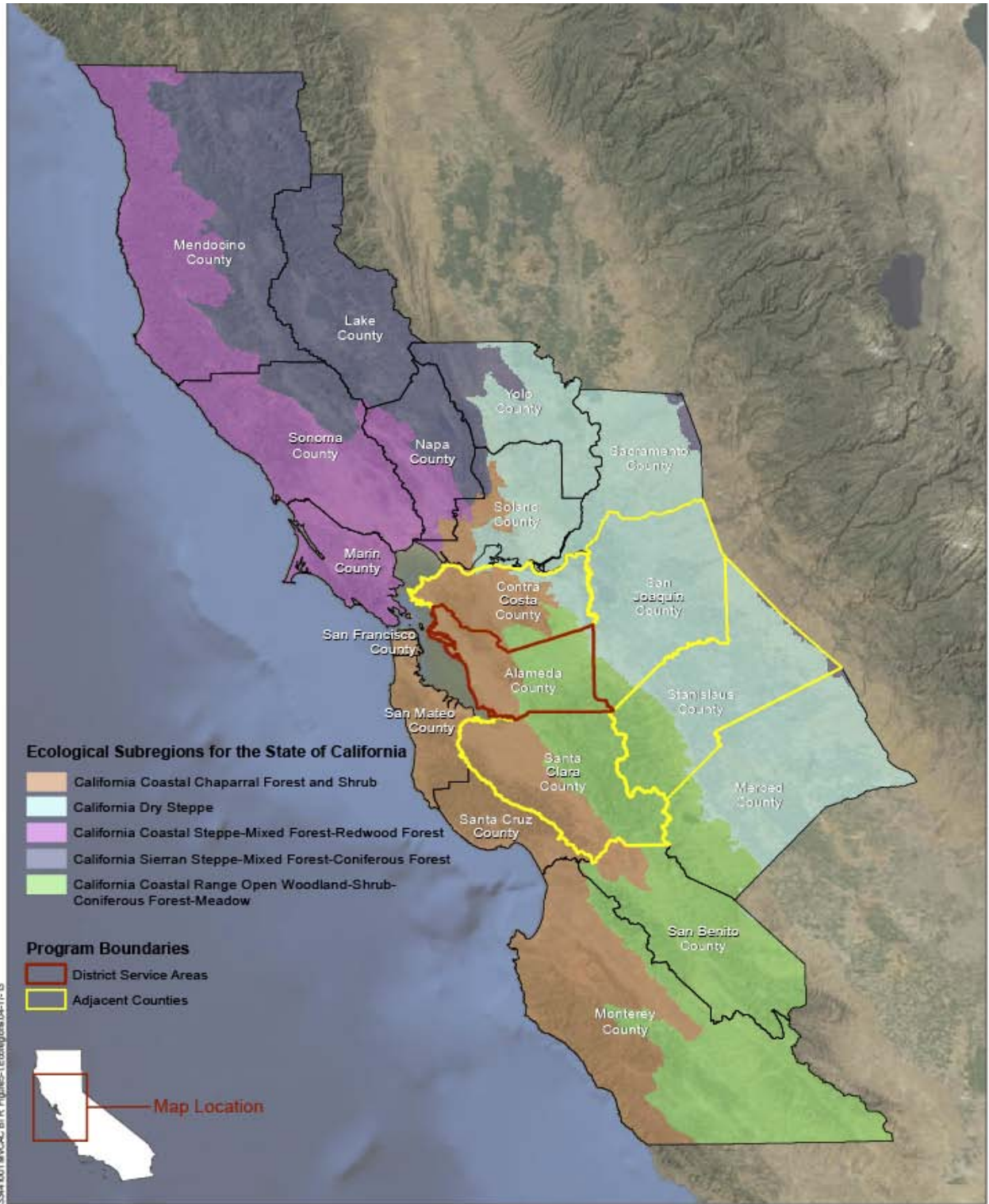
The ecoregion provinces (McNab and Avers 1996) have been used to describe the areas where the Program activities and treatments would be implemented and are shown on Figure 5-1. The ecoregion provinces are described in Appendix A, Biological Resources Technical Report.

Control activities may also be provided in areas adjacent to the District’s Service Area upon request of the adjacent jurisdictions to protect the health and safety of residents in adjacent jurisdictions. Actions that would be taken outside of the District’s Service Areas are the same types of actions undertaken within the Service Area and in similar types of habitats or sites.

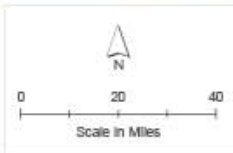
Each of these habitat types may be affected by one or more of the Program alternatives, as indicated in Table 5.2. The Program alternatives are described in Chapter 2, and the BMPs that would be applied to avoid and minimize potential impacts to these habitat types are provided in Table 5-3.

**Table 5-2 Terrestrial Habitat Types Potentially Affected by Each Program Alternative**

	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control
Coniferous Forest	X		X		X
Deciduous Forest	X		X		X
Shrublands	X		X		X
Grasslands	X		X		X
Serpentine	X		X		X
Coastal Dunes	X		X		X
Treeholes	X	X	X		X



3344001 MVCAG BTR Figures-1 Ecoregions 04-17-13



Source: US Forest Service, Pacific Southwest Region, Ecological Subregions for the State of California

INTEGRATED MOSQUITO & VECTOR MANAGEMENT PROGRAM

**Ecoregions in Program Area**

Figure 5-1

**Figure 5-1 Terrestrial Ecoregion Provinces**

Figure 5-1      BACK

### **5.1.2 Special Status Species**

A number of special status species are found in the Program Area and vicinity. Special status species are those that are listed as endangered, threatened, or candidate species under the federal Endangered Species Act, endangered or threatened under the California Endangered Species Act, or listed as species of special concern by the state. Brief life-history descriptions for special status species as well as their presence or absence within Program Areas are presented in Table 4-3 (California Natural Diversity Database Occurrences Plant Species in Alameda County Mosquito Abatement District and its Adjacent Program Areas) and in Table 4-4 (California Natural Diversity Database Occurrences Animal Species in Alameda County Mosquito Abatement District and its Adjacent Program Areas) which also shows the habitat types these species are likely to use. All species were included in these tables in Chapter 4, to conserve space, as a number of species occur in both wetland and upland habitat types.

### **5.1.3 Regulatory Environment**

The regulatory setting includes the federal, state, and local laws, statues, and regulations pertinent to the Program Area and vicinity and the terrestrial resources residing therein. These laws include the following:

#### **5.1.3.1 *Federal***

##### **5.1.3.1.1 Endangered Species Act of 1973 (16 USC §1531 et seq.; 50 CFR Parts 17 and 222)**

This law includes provisions for protection and management of species that are federally listed as threatened or endangered and designated critical habitat for these species. This law prohibits “take” of federally listed species, except as authorized under an incidental take permit or incidental take statement. The USFWS is the administering agency for this authority for freshwater species. The NMFS is the administering agency for anadromous species.

##### **5.1.3.1.2 Migratory Bird Treaty Act (16 USC §§703-711; 50 CFR Subchapter B)**

This law includes provisions for protection of migratory birds, including basic prohibitions against any taking not authorized by federal regulation. The administering agency is the USFWS.

##### **5.1.3.1.3 Bald and Golden Eagles Protection Act (16 USC §668; 50 CFR Part 22)**

This act makes it illegal to import, export, take (which includes molest or disturb<sup>10</sup>), sell, purchase, or barter any bald eagle or golden eagle or part thereof. The golden eagle, however, is accorded somewhat lighter protection under this act than the bald eagle. The administering agency is the USFWS.

##### **5.1.3.1.4 Clean Water Act of 1977 [33 USC §§1251-1376; 30 CFR §330.5 (a)(26)]**

These sections provide for the protection of wetlands. The administering agency for the above authority is the USACE.

##### **5.1.3.1.5 Executive Order 11990, Protection of Wetlands (May 24, 1977)**

This order provides for the protection of wetlands. The administering agency for the above authority is the USACE.

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<sup>10</sup> “Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.”

#### **5.1.3.1.6 Federal Insecticide, Fungicide, and Rodenticide Act**

FIFRA defines a pesticide as “any substance intended for preventing, destroying, repelling, or mitigating any pest.” FIFRA requires USEPA registration of pesticides prior to their distribution for use in the US, sets registration criteria (testing guidelines), and mandates that pesticides perform their intended functions without causing unreasonable adverse effects on people and the environment when used according to USEPA-approved label directions. FIFRA defines an “unreasonable adverse effect on the environment” as “(1) any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of the pesticide, or (2) a human dietary risk from residues that result from a use of a pesticide in or on any food inconsistent with the standard under Section 408 of the Federal Food, Drug, and Cosmetic Act (21 USC 346a).”

FIFRA regulates only the active ingredients of pesticides, not inert ingredients, which manufacturers are not required to reveal. However, toxicity studies conducted under FIFRA are required to evaluate the active ingredient and the entire product formulation, through which any potential additive or synergistic effects of inert ingredients are established.

#### **5.1.3.2 State**

##### **5.1.3.2.1 Porter-Cologne Water Quality Control Act of 1970**

This law provides the SWRCB and the nine RWQCBs with authority to establish Water Quality Control Plans (Basin Plans) that are reviewed and revised periodically. The SWRCB and the RWQCBs carry out the federal CWA, including the NPDES permitting process for point source discharges and the CWA Section 303 water quality standards program. The administering agencies are the SWRCB and the RWQCBs.

##### **5.1.3.2.2 California Fish and Game Code §1600 et seq.**

This law provides for protection and conservation of fish and wildlife resources with respect to any project that may substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake. The administering agency is the CDFW.

##### **5.1.3.2.3 California Endangered Species Act of 1984 (California Fish and Game Code §§2050 2098)**

This law provides for the protection and management of species and subspecies listed by the State of California as endangered or threatened, or designated as candidates for such listing. They are listed at 14 CCR Section 670.5. This law prohibits “take” of state-listed or candidate species, except as otherwise authorized by the Fish and Game Code. (The term “take” is defined by Section 86 of the Fish and Game Code as “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.” This definition is different in some respects from the definition of “take” under the Federal Endangered Species Act.) The administering agency is the CDFW.

##### **5.1.3.2.4 California Fish and Game Code §3503**

This law prohibits take, possession, or needless destruction of any bird egg or nest, except as otherwise provided by the Fish and Game Code or regulation made pursuant thereto. The administering agency is the CDFW.

##### **5.1.3.2.5 California Fish and Game Code §3503.5**

This law prohibits take, possession, or destruction of any bird of prey (birds in the order of Falconiformes or Strigiformes), except as otherwise provided by the Fish and Game Code or regulation adopted pursuant thereto. The administering agency is the CDFW.



**5.1.3.2.6 California Fish and Game Code §§3511, 4700, and 5050**

These laws prohibit take or possession of birds, mammals, and reptiles listed as “fully protected,” except as provided by the Fish and Game Code. The administering agency is the CDFW.

**5.1.3.2.7 California Fish and Game Code §5650**

This law protects water quality from substances or materials deleterious to fish, plant life, or bird life. It prohibits such substances or materials from being placed in waters or places where they can pass into waters of the state, except as authorized pursuant to, and in compliance with, the terms and conditions of permits or authorizations of the SWRCB or a RWQCB such as a waste discharge requirement issued pursuant to California Water Code Section 13263, a waiver issued pursuant to Water Code Section 13269(a), or permit pursuant to Water Code Section 13160. The administering agency for Fish and Game Code Section 5650 is the CDFW.

**5.1.3.2.8 Natural Community Conservation Planning Act (California Fish and Game Code §§2800 to 2835)**

This law provides for the development of NCCPs to provide for regional or area wide protection and perpetuation of natural wildlife diversity, while allowing compatible and appropriate development and growth. The administering agency is the CDFW.

**5.1.3.2.9 Native Plant Protection Act; California Fish and Game Code §1900 et seq.**

This law provides for the preservation, protection, and enhancement of endangered or rare native plants of the state. The Native Plant Protection Act allows for the designation of endangered and rare native plant species and states that no person shall take any native plant, or any part or product thereof that the commission has determined to be an endangered native plant or rare native plant, except as otherwise provided in the act. The administering agency is the CDFW.

**5.1.3.2.10 California Food and Agricultural Code, §§12976 and 12981**

This code states that no pesticide application should be made or continued when a reasonable possibility exists of damage to nontarget crops, animals, or other public or private property. The administering agency for the above authority is the CDPR.

**5.1.3.2.11 California Food and Agricultural Code, §29102**

This code provides for the protection of bees from pesticide use through notification of beekeepers and the establishment of citrus bee protection areas. Prohibited applications to citrus within a citrus/bee protection area include any pesticide toxic to bees, except those exempted in a subsequent subsection during a citrus bloom period, unless the need for control of lepidoptera larvae or citrus thrips has been established by written recommendation of a representative of the University of California, Agricultural Extension Service, or a licensed agricultural pest control adviser. The recommendation should state either that the citrus planting does not meet the citrus bloom period criteria, or why alternatives less hazardous to bees would not be effective. The administering agency for the above authority is the CDPR.

**5.1.3.2.12 Stipulated Injunction and Order, Protection of California Red-Legged Frog from Pesticides**

On October 20, 2006, the US District Court for the Northern District of California imposed no-use buffer zones around California red-legged frog upland and aquatic habitats for certain pesticides. This injunction and order will remain in effect for each pesticide listed in the injunction until the USEPA goes through formal 7(A)(2) consultation with the USFWS on each of the 66 active ingredients, and the USFWS issues a Biological Opinion including a “not likely to adversely affect” statement for the pesticides. Under the injunction and order, no-use buffer zones of 60 feet for ground applications and 200 feet for aerial applications apply from the edge of the following California red-legged frog habitats as defined by the

USFWS and the Center for Biological Diversity: Aquatic Feature, Aquatic Breeding Habitat, Nonbreeding Aquatic Habitat, and Upland Habitat. These habitats are found in 33 counties of California.

Of the 66 pesticides listed in the injunction, the District may employ methoprene, permethrin, and naled for mosquito control. Methoprene is used for larval mosquito control. Permethrin and naled may be used for adult mosquito control. However, mosquito control programs are exempt. Specifically, for applications of a pesticide for purposes of public health mosquito control under a program administered by a public entity, the injunction does not apply. The District may use the following herbicides listed in the injunction: glyphosate, imazapyr, and triclopyr. Where used for vegetation management for control of mosquito-breeding habitat, the injunction would not apply. If these herbicides were to be used for invasive species management to assist other agencies or landowners, then the injunction generally applies until such time that the material has been reviewed by USEPA and USFWS determines that it does not apply or the following “exceptions for invasive species and noxious weed programs” can be met:

- a. You are applying a pesticide for purposes of controlling state-designated invasive species and noxious weeds under a program administered by a public entity; and
- b. You do not apply the pesticide within 15 feet of aquatic breeding critical habitat or non-breeding aquatic critical habitat within critical habitat areas, or within 15 feet of aquatic features within non-critical habitat sections subject to the injunction; and
- c. Application is limited to localized spot treatment using hand-held devices; and
- d. Precipitation is not occurring or forecast to occur within 24 hours; and
- e. You are a certified applicator or working under the direct supervision of a certified applicator; and
- f. If using triclopyr, you are using only the amine formulations. (USEPA 2014a).

### **5.1.3.3 Local**

Local governing bodies may pass ordinances that regulate or restrict pesticide use within their jurisdictional areas. However, these restrictions do not apply to state operations and would not be applicable to treatments proposed by the District under the Program because California state law preempts local regulation and restriction of pesticide use. The Municipal Regional Stormwater NPDES Permit (NPDES Permit No. CAS612008), which regulates stormwater discharges from municipalities and local agencies in Alameda, Contra Costa, and Santa Clara Counties, requires all cities to adopt an Integrated Pest Management (IPM) ordinance or policy (Provision C.9) (SFBRWQCB 2009). The District already operates an IPM program for the management of mosquitoes and mosquito-borne diseases. The District will work with the local entities and property owners to implement best management practices for the protection of public health. However, if the California Department of Public Health declares a public health emergency and requires the assistance of the District, then pesticides may be used within local jurisdictions including those with local restrictions on pesticide use.

Concerning local ordinances and policies to protect biological resources, Alameda County and its cities maintain general plans for development and protection of lands within their jurisdictions. The general plans address the protection and enhancement of natural resources including plant, wildlife and fish habitat and special status species with broad goals and more specific policies to implement those goals. Some jurisdictions have tree ordinances that are focused on the preservation of significant or heritage trees, street trees, and other trees along public rights-of-way. The County of Alameda and City of Hayward discussions below are examples of the local policies affecting biological resources.

#### **5.1.3.3.1 County of Alameda General Plan**

The County's General Plan contains countywide elements as well as three area plans, Eden Area, Castro Valley Area, and East County Area Plans. The plans serve as a broad framework for planning the future of Alameda County; they are the official policy statement of the County Board of Supervisors to guide physical, economic, and environmental growth. The plans serves as a guide for the establishment of

programs and legislation dealing with the preservation and enhancement of agricultural open space, preserves, residential-canyon open space, and connecting open space corridors in the county. The objective of the general plans conservation element is to provide economic and environmental information critical to the development of resources, land use, and the preservation of environmental balance. The following Conservation Element Goals and Objectives are most relevant to biological resources evaluated in this PEIR:

> Vegetative and Wildlife Resources (Alameda County Community Development Agency 1994a)

Goal: To protect and enhance wildlife habitats and natural vegetation areas in Alameda County.

Objectives:

1. To identify areas of critical or sensitive concern for wildlife and vegetation.
2. To maintain and, if necessary, restore deteriorating environments to a level of diversity appropriate in this area of California.
3. To identify the principles of resource management as criteria for resource evaluation.
4. To educate government, business and citizens to conserve and protect wildlife resources.

> Natural Resources Within Open Space Areas Should be Permanently Protected

Within open space areas, either publicly or privately owned, removal of mature trees should not be permitted without the permission of the local authority. Alteration of streambeds or bodies of water and adjacent vegetation should be permitted only as a means of erosion or flood control, as permitted by the adopted plans of regional or local jurisdictions, and in such a manner to enhance water courses, scenic shoreline and marshlands within the county (Alameda County Community Development Agency 1994b).

> Biological Resources (Alameda County Community Development Agency 2000)

Goal: To preserve a variety of plant communities and wildlife habitat.

Policies:

Policy 124: The County shall encourage the maintenance of biological diversity in East County by including a variety of plant communities and animal habitats in areas designated for open space.

Policy 125: The County shall encourage preservation of areas known to support special status species.

Policy 126: The County shall encourage no net loss of riparian and seasonal wetlands.

Policy 127: The County shall encourage the preservation of East County's oak woodland plant communities.

Policy 129: The County shall protect existing riparian woodland habitat present along the Arroyo Mocho, Arroyo Del Valle, Arroyo Las Positas, Arroyo de la Laguna; and Alamo, Tassajara, and Alameda Creeks.

Policy 130: The County shall preserve an open space corridor connecting the Bird's Beak Preserve with lands designated "Resource Management." This open space corridor shall vary in width between 50 and 150 feet.

Policy 132: The County shall designate a zone of approximately 200 yards around the perimeter of the defined Bird's Beak Preserve in North Livermore as a Special Management Area. Within this zone, all proposed land uses and project designs shall be evaluated regarding their potential to effect the viability of the Springtown valley sink scrub habitat, and mitigation shall be incorporated into the approval of detailed development plans within this 200 yard zone to avoid the impact. Mitigation may

take the form of clustering development to avoid sensitive areas, management practices, land swap with the FCC Monitoring Station, or other appropriate measures.

#### **5.1.3.3.2 City of Hayward**

The City of Hayward General Plan: "Looking Forward 2040" (approved on July 1, 2014) includes Part 3.5, Natural Resources which establishes goals and policies to protect and enhance the natural resources within the Hayward Planning Area (Hayward Planning Division 2014). Its Goal NR-1 is: Protect, enhance, and restore sensitive biological resources, native habitat, and vegetation communities that support wildlife species so they can be sustained and remain viable. Specific policies seek to protect special status species and their habitat, protect riparian habitat; protect native plant and wildlife habitat; and restore culvert or channelized creeks. Policy NR-1.4 requires the City to review all future waterway improvement projects (e.g., flood control, dredging, private development) as well as all projects that are within 100 feet of the waterway, to ensure that they protect and minimize effects on the riparian and aquatic habitats. For implementation of this policy, the City is required to review and modify as necessary existing regulations for the conservation and management of marsh, wetland, riparian, wildlife and plant habitats, to ensure consistency with the General Plan.

Part 3.6 of the City of Hayward General Plan addresses Hazards. Goal Haz-6 is: Protect people and environmental resources from contaminated hazardous material sites and minimize risks associated with the use, storage, transport, and disposal of hazardous materials. Some of the efforts to accomplish this goal include the implementation of Hazardous Materials Release Response Plans, California Accidental Release Prevention Program, Above-ground Petroleum Storage Act Program, site investigations, and land use buffer zones.

#### **5.1.4 Habitat Conservation Plans and Natural Community Conservation Plans**

HCPs are planning documents required as part of an application by a nonfederal entity for incidental take of a species listed under the federal Endangered Species Act as part of their proposed activities. An HCP describes the proposed action(s), and anticipated effects on the individuals and populations of listed species. It also describes how impacts will be minimized and mitigated. An HCP also can include protections for species that are candidates for listing or are proposed for listing. The USFWS or NOAA Fisheries review the HCP, when reviewing a project. If they approve a project, they will issue an incidental take permit for the project actions, which provides for take of these species based on the actions provided for in the HCP, as well as additional measures that they might include.

The California legislature first passed the California Natural Community Conservation Planning Act in 1991, then updated and superseded it in 2003. The primary objective of the NCCP program is to conserve natural communities at the ecosystem level, while accommodating compatible land use. It focuses on the long-term stability of wildlife and habitat and seeks to avoid controversy and delays associated with species listings.

A number of HCPs and NCCPs are in effect or under development within the Program Area. See Table 4-5 in Section 4.1.4, which was developed through review of information available on the USFWS and CDFW's websites. The District is not signatory to these HCPs or NCCPs, but will comply with the provisions of these documents, when their activities occur within the boundaries of an existing HCP or NCCP or those that may be developed during the Program lifetime. The District's activities have little overlap with the activities covered under these HCPs, as detailed in Section 4.1.4.

## **5.2 Environmental Impacts and Mitigation Measures**

This section identifies the environmental issues and concerns associated with the Program Alternatives and presents the significance criteria used to evaluate the likely impacts of the various Program alternatives on terrestrial resources under CEQA. The significance criteria establish thresholds to

determine whether an impact rises to a level that is biologically significant. The environmental issues describe the mechanisms by which such impacts might occur.

### **5.2.1 Evaluation Concerns and Criteria**

The Program alternatives are implemented as part of an IMMP as described in Section 2.3. The IMMP uses alternative nonchemical and chemical treatments in sequential manner to minimize potential environmental impacts evaluating each treatment site and situation and implementing the least harmful technique that is applicable for that situation. Treatments with higher potential risk to the environment are only implemented when treatments with lower potential risk are ineffective or cannot be applied to that site. This approach minimizes the overall Program risk, but environmental concerns relating to different alternatives remain. As discussed previously in this PEIR, the Program Area is distributed across the District and adjacent counties rather than in a single particular location. Effects to terrestrial organisms could result from direct take associated with work in natural environments. Indirect effects would be associated with disturbing organisms from preferred habitat or reproductive sites or the physical alteration of terrestrial habitats. Toxicological effects could result from post-application contamination of soils or vegetation leading to ingestion of pesticide chemicals or reduction in habitat/cover. Additionally, organisms may come into direct dermal contact with pesticides.

#### **5.2.1.1 Environmental Concerns**

The Program alternatives have the potential to affect terrestrial resources directly by affecting physical habitat and through acute or chronic toxicity to nontarget organisms. Habitat alterations such as removal or reduction of habitat and vegetative cover may also indirectly result in impacts to the ranges and abundance of prey animals. Exposure of nontarget organisms can result in acute or chronic toxicity, depending on the concentrations encountered. Additionally, indirect exposure may occur via ingestion of contaminated prey animals, bioaccumulation of chemicals, or biotransformation of pesticide active ingredients to different compounds.

The following key issues associated with potential indirect impacts to nontarget receptors, including known terrestrial resources, are derived from the public scoping, comments made during other District activities, and historical questions raised by individuals include the following which are addressed in the impact analyses contained herein:

- > Discuss potential impacts on insect pollinators/bees from chemicals in treatment applications.
- > Describe the effects of all chemicals that are used and/or proposed for use on wildlife and natural ecosystems, including insect prey, birds, mammals, fish, vegetation and site topography. The loss of prey for birds is a particular concern. Also, consider unwanted effects of the “inactive” portion of the pesticides. What effects will the carrier portion of the chemicals have on the environment?
- > Discuss the potential impact of *Bacillus sphaericus* (Bs)/*Bacillus thuringiensis israelensis* (Bti) products on native species.
- > Describe the role of mosquitoes within the food chain, and subsequent impacts if they were removed in terms of amphibians, birds, reptiles, fish and insects. This issue is also addressed in Section 6.2.
- > Concern that pesticides can also kill the natural predators of mosquitoes, which may have difficulty in recovery from pesticides.
- > Concern that pesticide efficacy attenuation and possible long-term resistance is an issue for all chemically based mosquito control programs. It is addressed by the use of different control methods and different agents over time where possible. BMP and IMM techniques are designed to identify these issues early and modify applications as appropriate and feasible.

- > Note that the Program Area includes potential habitat for several California and federally threatened and other sensitive plant and wildlife species and, as such, comprehensive biological studies should be implemented.
- > Coordinate with CDFW, CNDDDB (CDFG 2012), USFWS, and USFWS' Information, Planning, and Conservation planning tool to identify special status plant or wildlife species. If impacts are found to be significant, the PEIR should identify adequate mitigation measures to reduce impacts to lower levels.
- > A primary concern is the environmental impact on natural resources in terms of vegetation removal, soil erosion, and possible wildlife impact.
- > Ensure mosquito abatement staff minimizes impact to tidal marsh and vernal pool habitats (especially during breeding season). Restrict operation of vehicles to levees and existing roads, and avoid vernal pool plants during blooming season (March–June).
- > Concern for spread of invasive weeds, erosion, and sedimentation.
- > The PEIR should include a detailed description and complete assessment of the surveillance impacts (current and future, direct and indirect) on habitats (including endangered, threatened, and locally unique species and sensitive habitats) and on species (sensitive fish, wildlife, or plants).
- > The PEIR should include a detailed description and complete assessment of the biological control impacts (current and future, direct and indirect) on habitats (including endangered, threatened, and locally unique species and sensitive habitats) and on species (sensitive fish, wildlife, or plants).
- > The PEIR should include a detailed description and complete assessment of the chemical control impacts (current and future, direct and indirect) on habitats (including endangered, threatened, and locally unique species and sensitive habitats) and on species (sensitive fish, wildlife, or plants).

### **5.2.1.2 Significance Criteria**

Significance criteria were developed based on applicable regulations and management policies, a review of the available information, including the HCPs and NCCPs associated with each area, and the professional judgment of the authors.

The CEQA Guidelines include several criteria for determining whether a potentially significant impact exists to biological resources in the CEQA Appendix G, Environmental Checklist, Section IV. Those that could apply to the Proposed Program as thresholds of significance for biological resources have been used in the following evaluation. Impacts were considered significant if they would:

- > Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW, USFWS, or USFS.
- > Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS.
- > Have a substantial adverse effect on federally protected wetlands as defined by CWA Section 404, (including but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- > Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.
- > Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

- > Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

## **5.2.2 Evaluation Methods and Assumptions**

### **5.2.2.1 General Effects**

Impacts are evaluated with regard to desired special status terrestrial species, using the criteria described above. Potential impacts were assessed using available information on the types of control and treatment as described in Chapter 2, Program Description, and assuming that all applicable BMPs as described in Chapter 2, Table 2-6, (based on *Best Management Practices for Mosquito Control in California* [CDPH 2010b]), the Statewide General NPDES Permit for Biological and Residual Pesticide Discharges to Waters of the US from Spray Applications (SWRCB Water Quality Order No. 2011-0004-DWQ; NPDES No. CAG 990007; Spray Applications Permit) and District-specific BMPs, as indicated in the PAPs and Aquatic Weed Control Permits (APAPs), and in Tables 2-6 and 5-3, are implemented. This assessment considers the physical and biological connections between treatment areas and terrestrial ecosystems. This information was evaluated in the context of the Program alternatives and the existing environment under baseline conditions in the Program Area as described in Section 5.1.1.

District-specific BMPs can be found in Table 2-6. The detailed BMPs described in Table 2-6 (and associated with the habitat types they would be applied, to in Table 5-3 listed below) can be placed into several categories. These categories include:

1. *Agency Communication* includes periodic discussion with resource agencies, refuge managers and other land managers about activities to be implemented. This category will include an annual work plan that may be part of any permits, obtaining any required permits, periodic check-in calls, and other calls as needed, when unanticipated circumstances arise.
2. *Environmental Training* includes environmental awareness training provided to all field staff regarding environmental resource issues, recognition and documentation of sensitive environmental resources in the field, and BMPs to avoid or minimize impacts to those resources. This category includes both general training, training to avoid or eliminate the spread of weeds, and species or habitat specific training provided to District staff by USFWS, CDFW, or other appropriately trained persons approved by these agencies.
3. *Pretreatment Screening* involves a pretreatment, in-office assessment of treatment locations for environmentally sensitive resources to determine appropriate treatment, access routes and other BMPs to be applied for that location. This category may include a pretreatment site visit to confirm information used in the screening.
4. *Disturbance Minimization* includes:
  - a. avoiding environmentally sensitive areas as much as practical,
  - b. using existing access routes where ever possible, whether on foot or in a vehicle
  - c. minimizing use of offroad vehicles as much as possible, and driving slowly when they are used
  - d. being observant and working carefully to avoid or minimize disturbance
  - e. using hand tools rather than mechanized tools as much as practical for all vegetation clearing (including clearing of access ways) or physical control treatments
5. *Habitat or Species-specific BMPs* includes BMPs targeted to a specific habitat type or species (e.g., tidal marshes or California tiger salamander). These BMPs include measures specific to those habitat types or species including diurnal or seasonal limitations on specific project activities,

specific controls on the types of activities or how they are carried out. Specific measures are those documented in Tables 2-6 and 5-3.

6. *Alternative-specific BMPs* relate specifically to the implementation of a particular treatment (Physical Control, Vegetation Management, Chemical Control). These may overlap many of the BMPs described above, but also include alternative-specific measures to protect environmental resources, based the type of activity to be conducted (e.g., protection of soil surface, minimization of turbidity under the Physical Control Alternative or adherence to label directions, treating only during periods with acceptable weather conditions, and employing appropriate buffers for Chemical Control).

These categories are not inclusive of all the BMPs in Table 5-3, nor are they intended to replace those more specific BMPs. These categories are provided to facilitate the discussion of the impact evaluations through the end of this chapter. Table 5-3 lists all of the BMPs for Program implementation by alternative and habitat types that are relevant to biological resources. In practical terms, the District treats terrestrial areas with the same care and sensitivity to plants and wildlife that it does for aquatic and wetland habitats.

Impact determinations follow the analysis for each Program alternative and cover the following issues derived from the CEQA significance criteria (Section 4.2.1.2):

- > Impacts to special status species
- > Impacts to riparian habitats or other sensitive natural communities
- > Impacts to federally protected wetlands
- > Impacts to movement of native resident or migratory fish or wildlife species
- > Impacts to local policies
- > Conflicts with provisions of HCP, NCCP, or other approved habitat conservation plan

The potential effects of the treatment alternatives would vary depending on the specific treatment applied, the size and location of the treated area, the type of habitat treated, and the timing and frequency of treatment. Small treatment areas or less frequent applications of a treatment would generally be expected to result in lesser effects than the same treatment applied over a larger area or more frequently.

The potential impacts of the nonchemical alternatives are based on the type and location of habitats treated and the magnitude and frequency of treatment. The potential impacts of the chemical alternatives were evaluated based on the magnitude and duration of the treatments and the toxicity and application information presented in Chapter 6, Ecological Health, and Appendix B, Ecological and Human Health Risk Assessment. The evaluation of all alternatives considered the life histories of the different listed fish and amphibian species and ecological interactions including impacts to the aquatic food chain.

This evaluation does not incorporate any assumptions about which alternative treatment strategy or strategies would be applied in any given area. Therefore, each treatment alternative is considered as a stand-alone option, although the Program may include multiple alternative treatments within a given area (e.g., physical controls followed by larvicide application). This evaluation assumes that all chemical treatments would be made in accordance with label instructions and guidance provided by the USEPA and CDPR.

Assumptions related to the analysis of hazards, toxicity, and exposure for chemical treatment methods are explained below, including the definition of key terms. The ecological food-web concept is explained as well, and it is addressed primarily in Section 6.1.1.1, *Toxicity and Exposure*.



### **5.2.2.2 Pesticide and Herbicide Effects**

Pesticides the District uses or may potentially use were investigated to provide a preliminary assessment of the potential impacts to nontarget ecological receptors. An ecological health assessment was the principal method used to evaluate concerns associated with the Program alternatives (discussed in detail in Appendix B). A comprehensive literature review of published toxicity and fate and transport information was conducted. In addition, the District supplied information specific to pesticide and herbicide products used in the Program Area to support the potential exposure and toxicity assessment, including:

- > Pesticides the District uses or proposes to use in the future
- > Pesticide label requirements
- > Types of application sites (e.g., habitat types)
- > Application procedures
- > Frequency of applications
- > Total amount used per treatment for each application site, based on seasonal uses
- > Physicochemical properties of the pesticides/active ingredients
- > Pesticide target (mosquito) efficacy
- > Reported adverse effects (e.g., reproductive, developmental, carcinogenic).

The pesticide application scenarios that result in reasonable efficacy with minimal unwanted estimated risk are preferred and are the basis of IPM approaches and BMPs the District employs. BMPs are described in Section 2.9 and associated with habitat types in which they would be applied in Table 5-3. Each of the pesticides and herbicides identified as warranting further evaluation in Appendix B (as a subset of all pesticides and herbicides in use) are known to exhibit at least one parameter that appears to have a significant role in the resulting potential or perceived risk.

**Table 5-3 Alameda County Mosquito Abatement District BMPs to Avoid / Minimize Environmental Impacts by Alternative**

Best Management Practice (BMP)	Alternative					Upland Habitats							Aquatic and Wetland Habitats								
	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Coniferous Forest	Deciduous Forest	Shrublands	Grasslands	Serpentine	Coastal Dunes	Tree Holes	Tidal Marsh and channels	Lagoon	Creeks and Rivers	Ponds and Lakes	Seasonal Wetlands (includes Vernal Pools)	Freshwater Marsh/Seeps	Riparian Corridor	Artificial Containers, Temporary Standing Waters and Artificial Ponds	Water and Wastewater Management Facilities
<b>A. General BMPs</b>																					
1. District staff has had long standing and continues to have cooperative, collaborative relationships with federal, state, and local agencies. The District regularly communicates with agencies regarding the District's operations and/or the necessity and opportunity for increased access for surveillance, source reduction, habitat enhancement, and the presence of special status species and wildlife. The District often participates in and contributes to interagency projects. The District will continue to foster these relationships, communication, and collaboration.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
2. In particular, District staff will regularly communicate with resource agency staff regarding mosquito management operations, habitat, and flora and fauna in sensitive habitats. Such communications will include wildlife studies and occurrences of sensitive species in areas that may be subject to mosquito management activities.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
3. When walking or using small equipment in marshes, riparian corridors, or other sensitive habitats, existing trails, levees and access roads will be used whenever possible to minimize or avoid impacts to species of concern and sensitive habitats. Specific care will be taken when walking and performing surveillance in the vicinity of natural and manmade ditches or sloughs or in the vicinity of tidal marsh habitat.	√	√	√	*	√								√	√	√	√	√	√			
4. District staff has received training from USFWS and CDFW biologists regarding endangered species, endangered species habitat, and wildlife/wildlife habitat recognition and avoidance measures. District supervisory staff frequently engages staff on these subjects. For example, District staff has become familiar with Ridgway's Rail call recordings to invoke avoidance measures if these calls are heard in the field. District staff is trained to be observant, proceed carefully, and practice avoidance measures if needed when accessing areas that may serve as bird nesting habitat (e.g., watch for flushing birds that may indicate a nest is nearby). Emphasis will be placed on species and habitats of concern where mosquito management activities might occur (e.g., SMHM, RR, special status plants, vernal pools, tidal marsh, etc.). These training sessions will be included as a part of the required safety training records that are kept by mosquito control agencies.	√	√	√	*	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
5. Conduct worker environmental awareness training for all treatment field crews and contractors for special status species and sensitive natural communities that a qualified person (e.g., District biologist) determines to have the potential to occur on the treatment site. Conduct the education training prior to starting work at the treatment site and upon the arrival of any new worker onto sites with the potential for special status species or sensitive natural communities.	√	√	√	*	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
6. District staff will work with care and caution to minimize potential disturbance to wildlife while performing surveillance and mosquito treatment/population management activities (see 1 through 5 above).	√	√	√	*	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
7. Identify probable (based on historical experience) treatment sites that may contain habitat for special status species every year prior to work to determine the potential presence of special status flora and fauna using the CNDDDB, relevant Habitat Conservation Plans (HCPs), NOAA Fisheries and USFWS websites, Calfish.org, and other biological information developed for other permits. Establish a buffer of reasonable distance, when feasible, from known special status species locations and do not allow application of pesticides/herbicides within this buffer whenever possible. Nonchemical methods are acceptable within the buffer zone when designed to avoid damage to any identified and documented rare flora and fauna.	√	√	√	*	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
8. Vehicles driving on levees to travel through tidal marsh or to access sloughs or channels for surveillance or treatment activities will travel at speeds no greater than 10 miles per hour to minimize noise and dust disturbance.	√	√	√	*	√								√								
9. District staff will implement site access selection guidelines to minimize equipment use in sensitive habitats including active nesting areas and to use the proper vehicles for onroad and offroad conditions.	√	√	√	*	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

**Table 5-3 Alameda County Mosquito Abatement District BMPs to Avoid / Minimize Environmental Impacts by Alternative**

Best Management Practice (BMP)	Alternative					Upland Habitats							Aquatic and Wetland Habitats									
	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Coniferous Forest	Deciduous Forest	Shrublands	Grasslands	Serpentine	Coastal Dunes	Tree Holes	Tidal Marsh and channels	Lagoon	Creeks and Rivers	Ponds and Lakes	Seasonal Wetlands (includes Vernal Pools)	Freshwater Marsh/Seeps	Riparian Corridor	Artificial Containers, Temporary Standing Waters and Artificial Ponds	Water and Wastewater Management Facilities	
10. Properly train all staff, contractors, and volunteer help to prevent spreading weeds and pests to other sites. The District headquarters contains wash rack facilities (including high-pressure washers) to regularly (in many cases daily) and thoroughly clean equipment to prevent the spread of weeds.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√				
11. Operation of noise-generating equipment (e.g., chainsaws, brushcutters) will abide by the time-of-day restrictions established by the applicable local jurisdiction (i.e., City and/or County) if such noise activities would be audible to receptors (e.g., residential land uses, schools, hospitals, places of worship) located in the applicable local jurisdiction. Shut down all motorized equipment when not in use.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
12. For operations that generate noise expected to be of concern to the public, the following measures will be implemented: <ul style="list-style-type: none"> <li>- <b>Measure 1: Provide Advance Notices:</b> A variety of measures are implemented depending on the magnitude/nature of the activities undertaken by the District, and may include but are not limited to press releases, the District website, social media, and posted signs. Public agencies and elected officials also may be notified of the nature and duration of the activities, including the Board of Supervisors or City Council, environmental health and agricultural agencies, emergency service providers, and airports.</li> <li>- <b>Measure 2: Provide Mechanism to Address Complaints:</b> District staff is available during regular business hours to respond to service calls and address concerns about nighttime operations.</li> </ul>	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
13. The District will perform public education and outreach activities.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
14. Engine idling times will be minimized either by shutting equipment and vehicles off when not in use or reducing the maximum idling time to 5 minutes. Correct tire inflation will be maintained in accordance with manufacturer's specifications on wheeled equipment and vehicles to prevent excessive rolling resistance. All equipment and vehicles will be maintained and properly tuned in accordance with manufacturer's specifications. All equipment will be checked by a certified visible emissions evaluator if visible emissions are apparent to onsite staff.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
<b>B. Tidal Marsh-Specific BMPs</b>																						
1. District staff will continue to implement the measures in the USFWS's "Walking in the Marsh: Methods to Increase Safety and Reduce Impacts to Wildlife/Plants." District staff will receive annual training and review of this document to remain up to date and current on this document and its methodologies for protecting sensitive species and the marsh habitat.	√	√	√	*	√								√	√								
2. District will minimize the use of equipment (e.g., ARGOs) in tidal marshes and wetlands. When feasible and appropriate, surveillance and control work will be performed on-foot with handheld equipment. Aerial treatment (helicopter) treatments will be utilized when feasible and appropriate to minimize the disturbance of the marsh during pesticide applications. When ATVs (e.g., ARGOs) are utilized techniques will be employed that limit impacts to the marsh including: slow speeds; slow, several point turns; using existing levees or upland to travel through sites when possible; use existing pathways or limit the number of travel pathways used.	√	√	√	*	√								√	√								
3. District will minimize travel along tidal channels and sloughs in order to reduce impacts to vegetation used as habitat (e.g., rail nesting and escape habitat).	√	√	√	*	√								√	√								
4. District staff will minimize the potential for the introduction and spread of <i>Spartina</i> , perennial pepperweed and other invasive plant species by cleaning all equipment, vehicles, personal gear, clothing, and boots of soil, seeds, and plant material prior to entering the marsh, and avoiding walking and driving through patches of perennial pepperweed to the maximum extent feasible.	√	√	√	*	√								√	√	√	√	√	√				
5. When feasible, boats will be used to access marsh areas for surveillance and treatment of mosquitoes to further reduce the risk of potential impacts that may occur when using ATVs to conduct mosquito management activities.	√	√	√	*	√								√	√								

**Table 5-3 Alameda County Mosquito Abatement District BMPs to Avoid / Minimize Environmental Impacts by Alternative**

Best Management Practice (BMP)	Alternative					Upland Habitats							Aquatic and Wetland Habitats									
	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Coniferous Forest	Deciduous Forest	Shrublands	Grasslands	Serpentine	Coastal Dunes	Tree Holes	Tidal Marsh and channels	Lagoon	Creeks and Rivers	Ponds and Lakes	Seasonal Wetlands (includes Vernal Pools)	Freshwater Marsh/Seeps	Riparian Corridor	Artificial Containers, Temporary Standing Waters and Artificial Ponds	Water and Wastewater Management Facilities	
6. The District currently references and provides staff training relevant to the USFWS "Walking in the Marsh: Methods to Increase Safety and Reduce Impacts to Wildlife/Plants" guidelines (USFWS undated). - District staff is trained to walk carefully and to continuously look ahead of themselves to avoid potential wildlife disturbance (e.g., carefully make observations in their surroundings to detect flushing birds and nests). Specific care is taken when walking and performing surveillance in the vicinity of natural and manmade ditches or sloughs or in vicinity of cord grass habitat (e.g., rack line). - District staff utilizes existing trails when possible (i.e., deer trails and other preexisting trails).	√	√	√	*	√	√	√	√	√	√	√		√	√	√	√	√	√	√			
<b>C. Salt Marsh Harvest Mouse (SMHM)</b>																						
1. Activities [surveillance, treatment (excluding aerial applications), source reduction] within or adjacent to harvest mouse habitat will not occur within two hours before or after extreme high tides of 6.9 feet National Geodetic Vertical Datum (NGVD) or above as measured at the Golden Gate Bridge (corrected for time and tide height for the site) or when the marsh plain is completely inundated because suitable upland refugia cover is limited and potentially disturbance-creating activities could prevent mice from reaching available cover.	√	√	√	*	√								√	√								
2. Vegetation removal is limited to the minimum amount necessary to allow for surveillance, treatment, and mosquito habitat reduction (vegetation management) to minimize or avoid loss of SMHM. Similarly, excavation, fill, or construction activities will also be limited to the minimum amount necessary to minimize/avoid loss of SMHM.	√	√	√	*	√								√	√								
3. Vegetation clearing will be conducted systematically within the project area to ensure that SMHM are encouraged to move toward remaining vegetation and are not trapped in islands of vegetation subject to removal and far from suitable cover.		√	√										√	√								
4. To the extent feasible, physical control, vegetation management and other mosquito habitat reduction activities will be conducted between December 1 and February 28 (outside of the SMHM breeding season). Surveillance, chemical control, biological control, and public education activities occur year-round and are therefore carefully coordinated with resource agencies to minimize potential impacts to SMHMs and their habitats.		√	√										√	√								
5. When walking in the marsh, existing trails will be used whenever possible. Specific care will be taken when walking and performing surveillance in the vicinity of natural and manmade ditches or sloughs or in the vicinity of tidal marsh habitat to avoid potential disturbance of SMHM.	√	√	√	*	√								√	√								
6. District staff will receive training on measures to avoid impacts to SMHM.	√	√	√	*	√								√	√								
7. If SMHM nests or adults are encountered during mosquito management activities, avoidance measures will be immediately implemented and findings will be reported to the appropriate resource agency.	√	√	√	*	√								√	√								
<b>D. Ridgway's Rail (RR)</b>																						
1. Activities (surveillance, treatment, source reduction) within or adjacent to Ridgway's Rail habitat will not occur within two hours before or after extreme high tides of 6.9 feet National Geodetic Vertical Datum (NGVD) or above as measured at the Golden Gate Bridge (corrected for time and tide height for the site) or when the marsh plain is completely inundated because suitable upland refugia cover is limited and potentially disturbance-creating activities could prevent clapper rails from reaching available cover.	√	√	√		√								√	√								
2. Vegetation removal is limited to the minimum amount necessary to allow for surveillance, treatment, and mosquito habitat reduction (vegetation management) to minimize or avoid loss of RR. Similarly, excavation, fill, or construction activities will also be limited to the minimum amount necessary to minimize/avoid loss of RR.	√	√	√		√								√	√								

**Table 5-3 Alameda County Mosquito Abatement District BMPs to Avoid / Minimize Environmental Impacts by Alternative**

Best Management Practice (BMP)	Alternative					Upland Habitats							Aquatic and Wetland Habitats									
	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Coniferous Forest	Deciduous Forest	Shrublands	Grasslands	Serpentine	Coastal Dunes	Tree Holes	Tidal Marsh and channels	Lagoon	Creeks and Rivers	Ponds and Lakes	Seasonal Wetlands (includes Vernal Pools)	Freshwater Marsh/Seeps	Riparian Corridor	Artificial Containers, Temporary Standing Waters and Artificial Ponds	Water and Wastewater Management Facilities	
3. To the extent feasible, physical control, vegetation management and other mosquito habitat reduction activities will be conducted between September 1 and January 31 (outside of the RR breeding season). Surveillance, chemical control, biological control, and public education activities occur year-round and are therefore carefully coordinated with resource agencies to minimize potential impacts to RRs and their habitats.		√	√										√	√								
4. District staff will notify the appropriate resource agency prior to entering potential RR habitats and will regularly coordinate with the resource agency(ies) on the locations of breeding RRs and avoid breeding RRs to the extent feasible. Any observations of adverse effects to RRs will be reported by District staff.	√	√	√		√								√	√								
5. When walking in the marsh District staff will use existing trails whenever possible. Specific care will be taken when walking and performing surveillance in the vicinity of natural and manmade ditches or sloughs or in the vicinity of tidal marsh habitat to avoid potential disturbance of RRs.	√	√	√		√								√	√								
6. Entry into suitable breeding habitat for RR will be minimized. When entry is required, the preferred method will be by foot. Other entry methods will be based on consultation with the appropriate resource agency.	√	√	√		√								√	√								
7. District staff will receive training on measures to avoid impacts to RRs	√	√	√		√								√	√								
8. If RR nests or adults are encountered during mosquito management activities, avoidance measures, as provided during training from the resource agencies, will be immediately implemented and findings will be reported to the appropriate resource agency.	√	√	√		√								√	√								
<b>E. California Least Tern (CLT)</b>																						
1. District staff will notify the appropriate resource agency prior to entering potential CLT habitats between April 15 and August 31 (breeding season) and will regularly coordinate with the resource agency(ies) on the locations of breeding CLTs and avoid breeding CLTs to the extent feasible. Any observations of adverse effects to CLTs will be reported by District staff.	√				√						√											
2. Entry into suitable breeding habitat for CLT will be minimized. When entry is required, vehicle speed will be reduced to 5mph and peripheral paths will be utilized to the extent feasible. Other entry methods will be based on consultation with the appropriate resource agency.	√				√						√											
3. District staff will receive training on measures to avoid impacts to CLTs	√				√						√											
4. If CLT nests or adults are encountered during mosquito management activities, avoidance measures, as provided during training from the resource agencies, will be immediately implemented and findings will be reported to the appropriate resource agency.	√				√						√											
<b>F. Western Snowy Plover (WSnPI)</b>																						
1. District staff will notify the appropriate resource agency prior to entering potential WSnPI habitats between March 1 and September 15 (breeding season) and will regularly coordinate with the resource agency(ies) on the locations of breeding WSPs and avoid breeding WSnPIs to the extent feasible. Any observations of adverse effects to WSnPIs will be reported by District staff.	√				√						√											
2. Entry into suitable breeding habitat for WSnPI will be minimized. When entry is required, vehicle speed will be reduced to 5mph and peripheral paths will be utilized to the extent feasible. Other entry methods will be based on consultation with the appropriate resource agency.	√				√						√											
3. District staff will receive training on measures to avoid impacts to WSnPIs	√				√						√											

**Table 5-3 Alameda County Mosquito Abatement District BMPs to Avoid / Minimize Environmental Impacts by Alternative**

Best Management Practice (BMP)	Alternative					Upland Habitats							Aquatic and Wetland Habitats									
	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Coniferous Forest	Deciduous Forest	Shrublands	Grasslands	Serpentine	Coastal Dunes	Tree Holes	Tidal Marsh and channels	Lagoon	Creeks and Rivers	Ponds and Lakes	Seasonal Wetlands (includes Vernal Pools)	Freshwater Marsh/Seeps	Riparian Corridor	Artificial Containers, Temporary Standing Waters and Artificial Ponds	Water and Wastewater Management Facilities	
4. If WSnPI nests or adults are encountered during mosquito management activities, avoidance measures, as provided during training from the resource agencies, will be immediately implemented and findings will be reported to the appropriate resource agency.	√				√						√											
<b>G. California Tiger Salamander (CTS)</b>																						
1. Trucks and ARGOs will be restricted to established roads and berms in vernal pool areas. Only small ATVs (e.g. Polaris) will be utilized near vernal pools.	√				√				√								√					
2. Methoprene, monomolecular films, and aduicides will not be used in vernal pool areas.					√				√								√					
3. District staff will receive training on measures to avoid impacts to CTS	√				√				√								√					
<b>H. Vernal Pool Tadpole Shrimp (VPTS)</b>																						
1. Trucks and ARGOs will be restricted to established roads and berms in vernal pool areas. Only small ATVs (e.g. Polaris) will be utilized near vernal pools.	√				√												√					
2. Methoprene, monomolecular films, and aduicides will not be used in vernal pool areas.					√												√					
3. District staff will receive training on measures to avoid impacts to VPTS	√				√												√					
<b>I. Contra Costa Goldfields (CCG)</b>																						
1. District staff will receive training on the identification, biology and preferred habitat of Contra Costa goldfields.	√				√		√		√								√					
2. When possible, project actions to be conducted in areas containing suitable habitat for this species will occur during the time period when CCG is in bloom and identifiable (March-June), so that any CCG plants observed can be avoided and documented.	√				√		√		√								√					
3. District staff will coordinate with CDFW and USFWS regarding the locations of known CCG populations, so that these populations can be avoided. Flagging may be used to identify the boundaries of known CCG populations.	√				√		√		√								√					
4. Trucks and ARGOs will be restricted to established roads and berms in vernal pool areas. Only small ATVs (e.g. Polaris) will be utilized near vernal pools. When feasible, mosquito management activities will be conducted on foot using hand equipment.	√				√		√		√								√					
<b>J. Palmate-Bracted Bird's Beak (PBBB)</b>																						
1. District staff will receive training on the identification, biology and preferred habitat of palmate-bracted bird's beak.	√				√			√	√													
2. When possible, project actions to be conducted in areas containing suitable habitat for this species will occur during the time period when palmate-bracted bird's beak is in bloom and identifiable (May-October), so that any palmate-bracted bird's beaks plants observed can be avoided and documented.	√			*	√			√	√													
3. District staff will coordinate with CDFW and USFWS regarding the locations of known palmate-bracted bird's beak populations, so that these populations can be avoided. Flagging will be used to identify the boundaries of known palmate-bracted bird's beak populations.	√			*	√			√	√													



**Table 5-3 Alameda County Mosquito Abatement District BMPs to Avoid / Minimize Environmental Impacts by Alternative**

Best Management Practice (BMP)	Alternative					Upland Habitats							Aquatic and Wetland Habitats									
	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Coniferous Forest	Deciduous Forest	Shrublands	Grasslands	Serpentine	Coastal Dunes	Tree Holes	Tidal Marsh and channels	Lagoon	Creeks and Rivers	Ponds and Lakes	Seasonal Wetlands (includes Vernal Pools)	Freshwater Marsh/Seeps	Riparian Corridor	Artificial Containers, Temporary Standing Waters and Artificial Ponds	Water and Wastewater Management Facilities	
4. When possible, mosquito management activities will be conducted on foot using hand equipment.	√			*	√			√	√													
<b>K. Vegetation Management</b>																						
1. Consultations will be made with the appropriate resource agency to discuss proposed vegetation management work, determine potential presence of sensitive species and areas of concern, and any required permits.		√	√										√	√	√	√	√	√	√			
2. Vegetation management work performed will typically be by hand, using handheld tools, to provide access to mosquito habitat for surveillance, and when needed control activities. Tools used include: machetes, small garden variety chain saw, hedge trimmers and "weed-eaters".		√	√										√	√	√	√	√	√	√			
3. District will consult and coordinate with resource agencies as well as have all necessary permits prior to the commencement of work using heavy equipment (e.g., larger than handheld/garden variety tools such as small excavators with rotary mowers) in riparian areas.		√	√										√	√	√	√	√	√	√			
4. Minor trimming of vegetation (e.g., willow branches approximately three inches in diameter or less, blackberry bushes, and poison oak) to the minimum extent necessary will occur to maintain existing paths or create access points through dense riparian vegetation into mosquito habitat. This may include minor trimming of overhanging limbs, brush and blackberry thickets that obstruct the ability to walk within creek channels. Paths to be maintained will not be a cut as a defined corridor but rather a path maintained by selective trimming of overhanging or intrusive vegetation. Paths to be maintained will range in width from 3 to 6 feet across.		√	√																√			
5. Downed trees and large limbs that have fallen due to storm events or disease will be cut only to the extent necessary to maintain existing access points or to allow access to mosquito habitats.		√	√																√			
6. Every effort will be made to complete vegetation management in riparian corridors prior to the onset of heavy rains. Maintenance work to be done in early spring will be limited to trimming of access routes to new tree shoots, poison oak, blackberries, and downed trees that block these paths.		√	√																√			
7. District staff will work with care and caution to minimize potential disturbance to wildlife, while performing vegetation management activities within or near riparian corridors.		√	√										√	√	√	√	√	√	√			
8. If suitable habitat necessary for special status species is found and if nonchemical physical and vegetation management control methods have the potential for affecting special status species, then the District will coordinate with the CDFW, USFWS, and/or NMFS before conducting control activities within this boundary or cancel activities in this area. If the District determines no suitable habitat is present, control activities may occur without further agency consultations.		√	√										√	√	√	√	√	√	√			
9. If using heavy equipment for vegetation management, District staff (and contractors) will minimize the area that is affected by the activity and employ all appropriate measures to minimize and contain turbidity. Heavy equipment will not be operated in the water and appropriate containment and cleanup systems will be in place on site to avoid, contain, and clean up any leakage of toxic chemicals.		√	√										√	√	√	√	√	√	√			
<b>L. Maintenance / Construction and Repair of Tide Gates and Water Structures in Waters of the U.S.</b>																						
1. District staff will consult with appropriate resource agencies (USACE, USFWS, CDFW, NMFS, BCDC, Regional Water Quality Control Board) and obtain all required permits prior to the commencement of ditch maintenance or construction within tidal marshes.		√											√	√	√	√	√	√				

**Table 5-3 Alameda County Mosquito Abatement District BMPs to Avoid / Minimize Environmental Impacts by Alternative**

Best Management Practice (BMP)	Alternative					Upland Habitats							Aquatic and Wetland Habitats								
	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Coniferous Forest	Deciduous Forest	Shrublands	Grasslands	Serpentine	Coastal Dunes	Tree Holes	Tidal Marsh and channels	Lagoon	Creeks and Rivers	Ponds and Lakes	Seasonal Wetlands (includes Vernal Pools)	Freshwater Marsh/Seeps	Riparian Corridor	Artificial Containers, Temporary Standing Waters and Artificial Ponds	Water and Wastewater Management Facilities
2. Work plans for the upcoming season' proposed work as well as a summary of the last season' completed work will be submitted for review and comment to USACE, USFWS, NMFS, CDFW, BCDC and the Regional Water Quality Control Board no later than July 1 of each year for which work is being proposed. The work plan will include a delineation of all proposed ditching overlain on topographic maps at a minimum of 1" = 1000' scale, with accompanying vicinity maps. The plan will also indicate the dominant vegetation of the site, based on subjective estimates, the length and width of the ditches to be maintained, cleared or filled, and the estimated date the work will be carried out.		√											√	√	√	√	√	√			
3. All maintenance work will be done at times that minimize adverse impacts to nesting birds, anadromous fish, and other species of concern, in consultation with USFWS, NMFS, and CDFW. Work conducted will, whenever possible, be conducted during approved in water work periods for that habitat, considering the species likely to be present. For example, tidal marsh work will be conducted between September 1 and January 31, where possible and not contraindicated by the presence of other sensitive species. Similarly, in water work in waterbodies that support anadromous fish, work will be conducted between July 1 and September 30 <sup>11</sup> .		√											√	√	√	√	√	√			
4. Care will be taken to minimize the risk of potential disruption to the indigenous aquatic life of a waterbody in which ditch maintenance is to take place, including those aquatic organisms that migrate through the area.		√											√	√	√	√	√	√			
5. Staging of equipment will occur on upland sites.		√											√	√	√	√	√	√			
6. Mats or other measures will be taken to minimize soil disturbance (e.g., use of low ground pressure equipment) when heavy equipment is used.		√											√	√	√	√	√	√			
7. All projects will be evaluated prior to bringing mechanical equipment on site, in order to identify and flag sensitive sites, select the best access route to the work site consistent with protection of sensitive areas, and clearly demarcate work areas.		√											√	√	√	√	√	√			
8. Measures will be taken to minimize impacts from mechanical equipment, such as hand ditching as much as possible; reducing turns by track-type vehicles, taking a minimum number of passes with equipment, varying points of entry, driving vehicles at low speed, and not driving on open mud and other soft areas.		√											√	√	√	√	√	√			
9. Discharges of dredged or fill material into tidal waters will be minimized or avoided to the maximum extent possible at the project site and will be consistent with all permit requirements for such activity. No discharge of unsuitable material (e.g., trash) will be made into waters of the United States, and material that is discharged will be free of toxic pollutants in toxic amounts (see section 307 of the Clean Water Act). Measures will be taken to avoid disruption of the natural drainage patterns in wetland areas.		√											√	√	√	√	√	√			
10. Discovery of historic or archeological remains will be reported to USACE and all work stopped until authorized to proceed by the appropriate regulatory authorities/resource agencies.		√											√	√	√	√	√	√			
11. Ditching that drains high marsh ponds will be minimized to the extent possible in order to protect the habitat of native salt pan species.		√											√	√							

<sup>11</sup> Dates are from District's USACE source reduction permit. July 31, 2007.



**Table 5-3 Alameda County Mosquito Abatement District BMPs to Avoid / Minimize Environmental Impacts by Alternative**

Best Management Practice (BMP)	Alternative					Upland Habitats							Aquatic and Wetland Habitats									
	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Coniferous Forest	Deciduous Forest	Shrublands	Grasslands	Serpentine	Coastal Dunes	Tree Holes	Tidal Marsh and channels	Lagoon	Creeks and Rivers	Ponds and Lakes	Seasonal Wetlands (includes Vernal Pools)	Freshwater Marsh/Seeps	Riparian Corridor	Artificial Containers, Temporary Standing Waters and Artificial Ponds	Water and Wastewater Management Facilities	
12. No spoils sidecast adjacent to circulation ditches will exceed 8 inches above the marsh plain to minimize risk of colonization of spoils by invasive, nonnative plants and/or the spoils lines from becoming access corridors for unwanted predators (e.g., dogs, cats, red fox). Sidecast spoil lines exceeding 4 inches in height above the marsh plain will extend no more than 6 feet from the nearest ditch margin. Any spoils in excess of these dimensions will be hydraulically redispersed on site (e.g., by rotary ditcher), or removed to designated upland sites (per conditions of resource agency issued permits). Sidecast spoil lines will be breached at appropriate intervals to prevent local impediments to water circulation.		√											√	√								
13. If review of the proposed work plan by USACE, USFWS, or CDFW determines the proposed maintenance is likely to destroy or damage substantial amounts of shrubby or sub-shrubby vegetation (e.g., coyote brush, gumplant) on old sidecast spoils, the District will provide a quantitative estimate of the extent and quality of the vegetation, and provide a revegetation plan for the impacted species prepared by a biologist/botanist with expertise in marsh vegetation. The Corps approved revegetation plan will be implemented prior to April 1 of the year following the impacts.		√											√	√								
14. Small ditch maintenance work will be performed by hand, whenever possible, using handheld shovels, pitch forks, etc., and small trimmers such as "weed-eaters". (Note: the majority of small ditch work performed by the District is by hand.)		√											√	√	√	√	√	√				
15. When feasible, work will be done at low tide (for tidal areas) and times of entry will be planned to minimize disruption to wildlife.		√											√	√	√	√	√	√				
16. In marshes which contain populations of invasive nonnative vegetation such as pepperweed or introduced <i>Spartina</i> , sidecast spoils will be surveyed for the frequency of establishment of these species during the first growing season following deposition of the spoils. The results of the surveys will be reported to the USACE, USFWS and CDFW. If it is determined the sidecasting of spoils resulted in a substantial increase in the distribution or abundance of the nonnative vegetation which is detrimental to the marsh, the District will implement appropriate abatement measures after consultation with the USACE, USFWS and CDFW.		√											√	√								
17. When possible (i.e., with existing labor and vehicles), refuse such as tires, plastic, and man-made containers found at the work site will be removed and properly discarded.		√											√	√	√	√	√	√				
<b>M. Applications of Pesticides, Surfactants, and/or Herbicides</b>																						
1. District staff will conduct applications with strict adherence to product label directions that include approved application rates and methods, storage, transportation, mixing, and container disposal.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
2. District will avoid use of surfactants when possible in sites with aquatic nontargets or natural enemies of mosquitoes present such as nymphal damselflies and dragonflies, dytiscids, hydrophilids, corixids, notonectids, ephydriids, etc. Surfactants are a least preferred method but must be used with pupae to prevent adult mosquito emergence. The District will use a microbial larvicide (Bti, Bs) or IGR (e.g., methoprene) instead or another alternative when possible.					√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
3. Materials will be applied at the lowest effective concentration for a specific mosquito species and environmental conditions. Application rates will never exceed the maximum label application rate.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
4. To minimize application of pesticides, applications will be determined by surveillance and monitoring of mosquito populations.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
5. District staff will follow label requirements for storage, loading, and mixing of pesticides and herbicides. Handle all mixing and transferring of pesticides and herbicides within a contained area.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

**Table 5-3 Alameda County Mosquito Abatement District BMPs to Avoid / Minimize Environmental Impacts by Alternative**

Best Management Practice (BMP)	Alternative					Upland Habitats							Aquatic and Wetland Habitats								
	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Coniferous Forest	Deciduous Forest	Shrublands	Grasslands	Serpentine	Coastal Dunes	Tree Holes	Tidal Marsh and channels	Lagoon	Creeks and Rivers	Ponds and Lakes	Seasonal Wetlands (includes Vernal Pools)	Freshwater Marsh/Seeps	Riparian Corridor	Artificial Containers, Temporary Standing Waters and Artificial Ponds	Water and Wastewater Management Facilities
6. Postpone or cease application when predetermined weather parameters exceed product label specifications, when wind speeds exceed the velocity as stated on the product label, or when a high chance of rain is predicted and rain is determining factor on the label of the material to be applied.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
7. Applicators will remain aware of wind conditions prior to and during application events to minimize any possible unwanted drift to waterbodies, and other areas adjacent to the application areas.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
8. Clean containers at an approved site and dispose of at a legal dumpsite or recycle in accordance with manufacturer's instructions if available.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
9. Special status Aquatic Wildlife Species: <ul style="list-style-type: none"> <li>- A CNDDDB search was conducted in 2012 and the results incorporated into Appendix A for this PEIR. District staff communicates with state, federal, and county agencies regarding sites that have potential to support special status species. Many sites where the District performs surveillance and control work have been visited by staff for many years and staff is highly knowledgeable about the sites and habitat present. If new sites or site features are discovered that have potential to be habitat for special status species, the appropriate agency and/or landowner is contacted and communication initiated.</li> <li>- Use only pesticides, herbicides, and adjuvants approved for aquatic areas or manual treatments within a predetermined distance from aquatic features (e.g., within 15 feet of aquatic features). Aquatic features are defined as any natural or man-made lake, pond, river, creek, drainage way, ditch, spring, saturated soils, or similar feature that holds water at the time of treatment or typically becomes inundated during winter rains.</li> <li>- If suitable habitat for special status species is found, including vernal pools, and if aquatic-approved pesticide, herbicide, and adjuvant treatment methods have the potential for affecting the potential species, then the District will coordinate with the CDFW, USFWS, and/or National Marine Fisheries Service (NMFS) before conducting treatment activities within this boundary or cancel activities in this area. If the District determines no suitable habitat is present, treatment activities may occur without further agency consultation.</li> </ul>			√		√		√	√		√	√	√	√	√	√	√	√	√	√		
10. District staff will monitor sites post-treatment to determine if the target mosquito population or weeds were effectively controlled with minimum effect to the environment and nontarget organisms. This information will be used to help design future treatment methods in the same season or future years to respond to changes in site conditions.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
11. Do not apply pesticides that could affect insect pollinators in liquid or spray/fog forms over large areas (more than 0.25 acres) during the day when honeybees are present and active or when other pollinators are active. Preferred applications of these specific pesticides are to occur in areas with little or no honeybee or pollinator activity or after dark. These treatments may be applied over smaller areas (with hand held equipment), but the technician will first inspect the area for the presence of bees and other pollinators. If pollinators are present in substantial numbers, the treatment will be made at an alternative time when these pollinators are inactive or absent.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
12. The District will provide notification to the public (as soon as operationally possible) and/or appropriate agency(ies) when applying pesticides or herbicides for large-scale treatments (e.g., fixed-wing aircraft or helicopters) that will occur in close proximity to homes, heavily populated, high traffic, and sensitive areas. The District infrequently applies or participates in the application of herbicides in areas other than District facilities.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
<b>N. Hazardous Materials and Spill Management</b>																					
1. Exercise adequate caution to prevent spillage of pesticides during storage transportation, mixing or application of pesticides. All pesticide spills and cleanups (excepting cases where dry materials may be returned to the container or application equipment) will be reported to the Field Operations Supervisor and District Manager and recorded in the District safety and incident file.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

**Table 5-3 Alameda County Mosquito Abatement District BMPs to Avoid / Minimize Environmental Impacts by Alternative**

Best Management Practice (BMP)	Alternative					Upland Habitats							Aquatic and Wetland Habitats								
	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Coniferous Forest	Deciduous Forest	Shrublands	Grasslands	Serpentine	Coastal Dunes	Tree Holes	Tidal Marsh and channels	Lagoon	Creeks and Rivers	Ponds and Lakes	Seasonal Wetlands (includes Vernal Pools)	Freshwater Marsh/Seeps	Riparian Corridor	Artificial Containers, Temporary Standing Waters and Artificial Ponds	Water and Wastewater Management Facilities
2. Maintain a pesticide spill cleanup kit and proper protective equipment at the District's Service Yard and in each vehicle used for pesticide application or transport.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
3. Manage the spill site to prevent entry by unauthorized personnel. Contain and control the spill by stopping it from leaking or spreading to surrounding areas, cover dry spills with polyethylene or plastic tarpaulin, and absorb liquid spills with appropriate absorbent materials.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
4. Properly secure the spilled material, label the bags with service container labels identifying the pesticide, and deliver them to the District/Field Operations Supervisor for disposal.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
5. A hazardous spill plan will be developed, maintained, made available, and staff trained on implementation and notification for petroleum-based or other chemical-based materials prior to commencement of mosquito treatment activities.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
6. Field-based mixing and loading operations will occur in such a manner as to minimize the risk of accidental spill or release of pesticides.			√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
<b>O. Worker Illness and Injury Prevention and Emergency Response</b>																					
1. Equip all vehicles used in wildland areas with a shovel and a fire extinguisher at all times.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
2. Train employees on the safe use of tools, equipment and machinery, including vehicle operation.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
3. District will regularly review and update their existing health and safety plan to maintain compliance with all applicable standards. Employees will be required to review these materials annually.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

### 5.2.2.3 Methodology

The methodology used to prepare this programmatic impact analysis section is as follows:

- > Obtain source-specific data for Program-specific chemical constituents.
- > Evaluate Appendix B sections related to the Program.
- > Identify terrestrial resource impacts and mitigation measures for Program activities, considering the appropriate HCPs and NCCPs for the area that may result in effects to nontarget terrestrial organisms.

Appendix B provides the results of review and evaluations of the pesticide (insecticides, herbicides) active ingredients and adjuvants the District currently uses or proposes for use (along with others the District has not selected for use). Application information, including the target organisms, number of treatments, total amount applied, and specific habitat types was obtained from the District. This information is presented in Appendix B, Attachment A, Tables A1-A5. A comprehensive literature review was conducted to evaluate environmental fate and general toxicity characteristics for the active ingredients and adjuvants. The results of the assessment were used to rank the potential for adverse effects to human health and the environment. Chemical and application characteristics such as the likelihood of exposure for nontarget species and habitats, the potential for drift, and the possible transport and fate of the chemical in various media (i.e., air, surface water/groundwater, soil) were considered in the assessment. Those active ingredients that appear to exhibit a higher level of risk are listed in Table 5-7.

Impacts are evaluated with regard to desired terrestrial plant and animal (e.g., native and listed species) communities, and effects on food supply for wildlife, using the criteria described above (Section 5.2.1.2). Potential impacts were assessed using available information on the types of control and treatment and the toxicity of the various chemicals used, the treatment descriptions, and the physical and biological connections between treatment areas and terrestrial ecosystems. This information was evaluated in the context of the treatment alternatives and the existing environment under baseline conditions in the Program Area as described in Section 5.1.1. Note that Chapter 6, Ecological Health, specifically addresses potential impacts to nontarget ecological receptors but is not focused on terrestrial habitat types.

The potential effects of the treatment alternatives will vary depending on the specific treatment applied, the size and location of the treated area, the type of habitat treated, and the timing and frequency of treatment. More targeted treatments would be expected to have lesser effects than less targeted treatments. Small treatment areas or less frequent applications of a treatment would generally be expected to result in lesser effects than the same treatment applied over a larger area or more frequently.

The potential impact of the nonchemical alternatives is based on the type and location of habitats affected and the magnitude and frequency of control activities. The potential impacts of the chemical alternatives were evaluated based on the magnitude and duration of the treatments and the toxicity information presented in Chapter 6, Ecological Health, and in Appendix B. The evaluation of alternatives considered the life histories of the different listed terrestrial species and ecological interactions including impacts to the terrestrial food chain.

This evaluation assumes that all pesticides are applied in accordance with product label instructions and USEPA and CDPR requirements. The USEPA requires mandatory statements on pesticide product labels that include directions for use; precautions for avoiding certain dangerous actions; and where, when, and how the pesticide should be applied. This guidance is designed to ensure proper use of the pesticide and prevent unreasonable adverse effects to humans and the environment. All pesticide labels are required to include the name and percentage by weight of each active ingredient in the product/formulation. Toxicity categories for product hazards and appropriate first-aid measures must be properly and prominently displayed. Pesticide labels also outline proper use, storage, and disposal procedures, as well as precautions to protect applicators. The directions for use specify the target organism (pest), appropriate application sites, application rates or dosages, contact times, and required application equipment for the

pesticide. Warnings regarding appropriate wind speeds, droplet sizes, or habitats to avoid during application are also prominently displayed.

This evaluation does not include assumptions about which alternative treatment strategy or strategies would be applied in any given area. Therefore, each treatment alternative is considered as a stand-alone option, although the Program may include multiple alternative implementations within a given area (i.e., physical controls followed by larvicide application). Criteria used to trigger a particular alternative based on mosquito abundance and other variables are included in District-specific operating procedures. This evaluation assumes that important parameters such as sediment half-life are dependent on the specific conditions at the time of pesticide application; therefore, the values listed herein serve as reference values.

#### **5.2.2.4 Assumptions**

The following assumptions were used in the assessment of potential terrestrial resource impacts from the Program alternatives:

- > Site-specific evaluation of terrestrial resource impacts is not within the scope of this programmatic evaluation.
- > The programmatic evaluation is based on the current proposed control methods and is subject to change based on the results of initial treatment.
- > Existing baseline environmental soil and tissue concentration data related to Program chemicals are unavailable for most areas.

Assumptions related to the analysis of hazards, toxicity, and exposure for chemical treatment methods are explained below, including the definition of key terms. The concept of ecological food web is explained as well.

##### **5.2.2.4.1 Hazardous Material**

A “hazardous material” is defined in California Health and Safety Code Section 25501 (p): as “any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. “Hazardous materials” include, but are not limited to, “hazardous substances, hazardous waste, and any material that a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.” Any liquid, solid, gas, sludge, synthetic product, or commodity that exhibits characteristics of toxicity, ignitability, corrosiveness, or reactivity has the potential to be considered a “hazardous material.”

##### **5.2.2.4.2 Toxicity and Exposure**

Toxicology is the study of a compound’s potential to elicit an adverse effect in an organism. The toxicity of a compound is dependent upon exposure, including the specific amount of the compound that reaches an organism’s tissues (i.e., the dose), the duration of time over which a dose is received, the potency of the chemical for eliciting a toxic effect (i.e., the response), and the sensitivity of the organism receiving the dose of the chemical. Toxicity effects are measured in controlled laboratory tests on a dose/response scale, whereby the probability of a toxic response increases as dose increases. Exposure to a compound is necessary for potential toxic effects to occur. However, exposure does not, in itself, imply that toxicity will occur. Thus, toxic hazards can be mitigated by limiting potential exposure to ensure that doses are less than the amount that may result in adverse health effects.

The toxicity data included in the numerous tables and charts in this document are generally derived from rigidly controlled laboratory animal studies designed to determine the potential adverse effects of the chemical under several possible routes of exposure. In these studies, the species of interest is exposed to

100 percent chemical at several doses to determine useful information such as the lowest concentration resulting in a predetermined adverse effect (lowest observed adverse effects level or LOAEL) on numerous selected physiological and behavioral systems. The second component of these tests is to determine the highest concentration of chemical that results in no measurable adverse effect (no observed adverse effects level or NOAEL).

However, these, and other, coordinated and focused laboratory tests are designed to document the effects of the chemical when a continuous, controlled, exposure exists and do not realistically reflect the likely exposures or toxicity in the District field application scenarios. As such, the toxicity information is intended as an overview of potential issues and guidance for understanding the completely “safe” maximum exposure levels of applications that would not adversely impact humans or nontarget plant and animal species.

Although the regulatory community uses this basic information to provide a relative comparison of the potential for a chemical to result in unwanted adverse effects and this information is reflected in the approved usage labels and material safety data sheets (MSDSs), in actual practice, the amounts applied in the District’s Program Area are substantially less than the amounts used in the toxicity studies. Because of these large inherent safety factors in recommended product application rates, the amount of chemical resulting in demonstrated toxicity in the laboratory is nowhere near the low exposure levels associated with an actual application. The application concentrations consistent with the labels or MSDSs are designed to be protective of the health of humans and other nontarget species (i.e., low enough to not kill them, weaken them, or cause them to fail to reproduce).

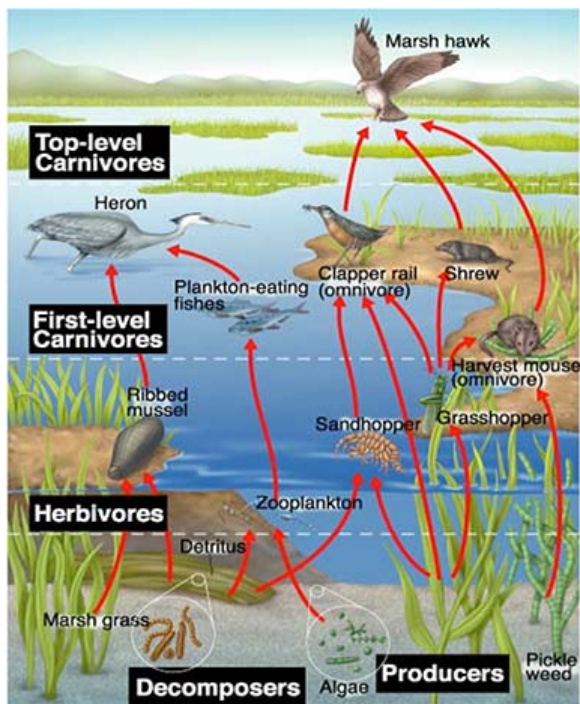
The toxicity of a chemical is also affected by various biological, chemical, and physical parameters that affect the behavior of a compound in the environment and its potential toxicity. The chemistry, fate, and transport of a compound must be analyzed to fully estimate potential exposure to a given receptor. The fate and transport of a compound is determined by the physical and chemical properties of the compound itself and the environment in which it is released. Thus, the following characteristics of a compound must be evaluated: its half-life in various environmental media (e.g., sediment, water, air); photolytic half-life; lipid and water solubility; adsorption to sediments and plants; and volatilization. Environmental factors that affect fate and transport processes include temperature, rainfall, wind, sunlight, water turbidity, dissolved oxygen concentrations, and water and soil pH. Information pertaining to these parameters allows evaluation of how compounds may be transported between environmental media (e.g., from sediments to biota), how a compound may be degraded into various breakdown products, and how long a compound or its breakdown products may persist in different environmental media. Appendix B provides a discussion of the environmental fate of the pesticide active ingredients and other chemicals associated with specific pesticide formulations used in the Program alternatives.

#### **5.2.2.4.3 Ecological Food Webs**

While it is important to evaluate the potential adverse impacts of a pesticide application to potentially affected nontarget species, it is neither feasible nor practical to evaluate those potential impacts to a representative food web. An ecological food web is represented in the illustration representing some of the multitude of possible biotic and food uptake interactions in an ecosystem. Each of the possible connections between species is also associated with other interactions. These interactions can be the result of higher levels of animal species organization (trophic) or paired interactions between individuals that result in added, positive associations (symbiotic) for both species.



Although ecological food webs could be used to describe the complex system interactions that might be associated with District application scenarios, it is neither feasible nor practical to evaluate those potential impacts using a food-web approach. The numerous, complex interactions in typical food webs would be fraught with uncertainty and complex animal associations and, as such, difficult to confidently assess relevant impacts. Because of these constraints and complexity, it would be neither practical nor productive to attempt to predict food-web interactions for each of the numerous application scenarios the



**Figure 5-2 Ecological Food Web Concept**

District uses. It is appropriate, however, to use a food-web analysis to identify and consider the first level of potentially adverse effects to nontarget species that might result from a pesticide application. This information is used to assure a minimal impact to nontarget species and is typically a part of the MSDS and Toxicology profiles, providing the basis for the more reasonable, technically feasible approach to evaluate the safety of the pesticides the District commonly uses. Figure 5-2 illustrates the ecological food web concept.

Various biological, chemical, and physical parameters affect the behavior of a compound in the environment and its potential toxicity. The chemistry, fate, and transport of a compound must be analyzed to fully estimate potential exposure. The fate and transport of a compound is determined by the physical and chemical properties of the compound itself and the environment in which it is released. Thus, the following characteristics of a compound must be evaluated: its half-life in various environmental media (e.g., sediment, water, air); photolytic half-life; lipid and water solubility; adsorption to sediments and plants; and

volatilization. Environmental factors that affect fate and transport processes include temperature, rainfall, wind, sunlight, water turbidity, and water and soil pH. Information pertaining to these parameters allows evaluation of how compounds may be transported between environmental media (e.g., from sediments to biota), how a compound may be degraded into various breakdown products, and how long a compound or its breakdown products may persist in different environmental media. Appendix B provides a discussion of the environmental fate of the pesticide active ingredients and other chemicals associated with specific pesticide formulations used in the Program alternatives.

### **5.2.3 Surveillance Alternative**

Surveillance activities involve monitoring the abundance of adult and larval mosquitoes, field inspection of mosquito habitat, testing for the presence of antibodies specific to encephalitis virus in domestic and wild fowl, collection and testing of mosquitoes, and/or evaluating results of requests for service from the public regarding pests such as mosquitoes.

Mosquito populations are monitored through the use of traps, inspections, and sampling in mosquito habitats. Known and suspected habitats are anywhere that water can collect, be stored, or remain standing for more than a few days, including, but not limited to, catch basins, stormwater detention systems, residential communities, parks, ornamental ponds, unmaintained swimming pools, seeps, seasonal wetlands, tidal and diked marshes, wastewater ponds, sewer plants, winery waste/agricultural ponds, managed waterfowl ponds, canals, creeks, tree holes, and flooded basements. If preexisting roads

and trails are not available, low ground pressure ATVs may be used to access sites. Offroad access is minimized and used only when roads and trails are not available.

Small impacts to upland and wetland habitats in the vicinity of aquatic ecosystems may occur when the District is required to maintain paths and clearings to access surveillance sites and facilitate sampling. These impacts are kept to the minimum amount necessary to minimize potential ingress of predators into these habitats. Such maintenance may include clearing small amounts of vegetation to retain footpaths up to 3 feet wide, or ATV/ARGO paths up to 6 feet wide. However, the vast majority of access routes are via preexisting roads, trails, and walkways, and do not require clearing by the District. Some trails do require periodic clearing by the District. Occasionally new access routes may be required to access a mosquito source. This process will often consist of personnel picking their way through natural openings in the vegetation to the source, but in some cases (i.e., heavy growth of blackberries or poison oak) a trail may need to be created. Where such clearing is required, it is done with hand tools. No trimming of vegetation greater than 4 inches diameter at breast height would be conducted. These activities are of small size with limited duration and noise effects and new access routes would be minimal, so indirect impacts to terrestrial habitats would be inconsequential.

The presence of District personnel implementing the Surveillance Alternative could result in disturbance to special status species. Such disturbance is most likely to occur during the nesting or breeding season, should the animals abandon suitable habitat as a result of such disturbance including equipment noise. These disturbances would be very minor and of short duration, so would likely not cause these animals to abandon the area. Special status plants would likely not be disturbed by the presence of District personnel during surveillance activities.

The Surveillance Alternative may also result in disturbance to species as District personnel are traveling to and from surveillance sites. These impacts would be minimized by adherence to the BMPs indicated in Table 5-3, but in particular those BMPs requiring discussing activities regularly with regulatory agencies or wildlife refuge managers, staying on existing access routes wherever possible, and maintaining and implementing training from USFWS and CDFW personnel regarding special status species. In addition, when working in tidal marshes, the District will implement all Tidal Marsh-specific BMPs, as well as those for salt marsh harvest mouse, and Ridgway's rail, where these species are potentially present, as determined through discussion with refuge managers, CDFW, or USFWS personnel. This implementation will include continuing to follow the measures provided in the USFWS' "Walking in the Marsh;" employing seasonal and daily activity restriction periods, wherever practical; minimizing travel along tidal channels and sloughs; limiting vegetation removal to the minimum amount necessary; and other BMPs, as indicated in Table 5-3. Through the implementation of these BMPs, substantial impacts to habitat would be avoided, and no impact to special status animals would occur.

Surveillance activities might result in some physical damage to habitat or associated vegetation from foot traffic in areas without marked trails to access areas for potential mosquito inspections. Special status species could be directly impacted by these activities. The District investigates sites for the presence of special status and sensitive species prior to initiating any further surveillance measures in natural habitat areas, and only small areas would be disrupted temporarily by access activities. Therefore, few impacts would occur to terrestrial resources.

This alternative would not affect the quantity or distribution of habitats, such as riparian areas, marshes, lakes or ponds, seasonal wetlands, or other habitat types. This alternative would not affect the composition of their vegetative community as very limited numbers of plants would be pruned or removed over a very small area. This alternative would not result in any ground disturbing activity and, therefore, would not result in any removal, filling or hydrologic interruption of federally protected wetlands. Any disruption of migration patterns would be due to the presence of personnel and machinery in the environment. In all cases this occurrence would be very short term, generally not more than a few hours in any given location and, therefore, this effect would be minimal and would have little effect on the



movement of wildlife and would not affect wildlife migration corridors or nursery areas, as no physical disturbance would occur.

The county and city general plans and their goals pertaining to natural resources are generally consistent with the CEQA criteria regarding impacts on species and habitats. Any impacts identified for these CEQA criteria would also be relevant to the county and city goals. The project would not affect trees more than 4 inches diameter breast height and, therefore, would not conflict with any tree ordinances.

Several HCPs or NCCPs were identified whose action area is within Alameda County, the primary service area, or in adjacent counties. District activities are typically not among those covered by these HCPs.. Therefore, the District activities would not be in conflict with the provisions of any HCP, NCCP or other approved local, regional, or state approved conservation plan.

### 5.2.3.1 **Impact Determinations**

**Impact TR-1.** The Surveillance Alternative would have a **less-than-significant** impact either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS. This alternative would not directly affect these species, as described above. Most surveillance occurs along access routes that are already established, and would only be cleared periodically to maintain access, as necessary. Where new access routes are required they would have only a very small effect on habitat in areas where surveillance occurs. No mitigation is required.

**Impact TR-2.** The Surveillance Alternative would have a **less-than-significant** impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS. Most surveillance occurs along access routes that are already established, and would only be cleared periodically, during the fall to minimize impacts, to maintain access, as necessary. Where new access routes are required they would have only a very small effect on habitat in areas where surveillance occurs. No mitigation is required.

**Impact TR-3.** The Surveillance Alternative would have a **less-than-significant** impact on federally protected wetlands as defined by CWA Section 404, (including but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. Most surveillance occurs along access routes that are already established, and would only be cleared periodically, during the fall to minimize impacts, to maintain access, as necessary. Where new access routes are required they would have only a very small effect on habitat in areas where surveillance occurs. No mitigation is required.

**Impact TR-4.** The Surveillance Alternative would have **no impact** on the movement of any native resident or migratory fish or wildlife species. Nor would it impact any native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.

**Impact TR-5.** The Surveillance Alternative would have **no impact** on local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, as none have been identified.

**Impact TR-6.** The Surveillance Alternative would not conflict with the provisions of any adopted HCP, NCCP, or other approved local, regional or state habitat conservation plan. Therefore, **no impact** would occur.

### 5.2.4 **Physical Control Alternative**

Physical control for mosquitoes consists of the management of aquatic areas that provide mosquito-producing habitat (including freshwater marshes and lakes, saltwater marshes, temporary standing water, vernal pools, and wastewater treatment facilities) especially through water control and maintenance or

improvement of channels, tide gates, levees, and other water control facilities. The District may also advise landowners and homeowners about the importance of dumping/inverting of containers holding water, controlling vegetation against structures. In situations where any potential exists for sensitive habitats or species to be present, the District includes information and contact data for resource agencies and potential permits.

The District would not conduct physical control measures in upland habitat types, but may affect terrestrial species that occur in wetland habitat types. This work in creeks, rivers, ponds, lakes, marshes, and other wetlands may require permits from the USACE, RWQCB, CDFW, USFWS, NOAA Fisheries, and others. Work would not begin until all required permits are obtained. The potential effects of this alternative on these habitats are described below.

#### **5.2.4.1.1 Coniferous Forest**

The general lack of surface water in coniferous forests (dominated by cone-bearing trees with needles, which include pines, firs and redwoods) usually does not facilitate the appropriate habitat to support mosquitoes. This habitat does support a variety of special status species including Foothill yellow-legged frog, Yellow warbler, pallid bat, Western mastiff bat, San Francisco dusky-footed woodrat as well as special status plants such as Pallid Manzanita, Lemmon's jewel-flower, Hospital Canyon larkspur, Western leatherwood, and Talus fritillary. The Physical Control Alternative would have no impact on special status species, since this alternative would not occur in this habitat.

#### **5.2.4.1.2 Deciduous Forest**

The general lack of standing surface water in deciduous forests (dominated by trees that drop leaves annually including buckeyes, some oaks and maples) usually does not facilitate the appropriate habitat to support mosquitoes. This habitat does support a variety of special status species including Western spadefoot, Alameda whipsnake, white-tailed kite, pallid bat, Townsend's big-eared bat, Western mastiff bat, Big free-tailed bat, and American badger, as well as special status plants such as Big-scale balsamroot, Round-leaved filaree, recurved larkspur and Western leatherwood. The Physical Control Alternative would have no impact on special status species or their habitat, since this alternative would not occur in this habitat.

#### **5.2.4.1.3 Shrublands**

The general lack of standing surface water in shrublands (dense to moderate stands of coyote brush, ceanothus, poison oak, sage, sagebrush, chamise and diverse other shrubs with grassy openings) usually does not facilitate the appropriate habitat to support mosquitoes. This habitat does support a variety of special status species including burrowing owl, Swainson's hawk and other avian species (afforded protection under USFWS and CDFW), pallid bat, Townsend's big-eared bat, Western mastiff bat and American badger, as well as special status plants such as Bent-flowered fiddleneck, Pallid Manzanita, palmate-bracted bird's-beak, robust spineflower, and recurved larkspur. The Physical Control Alternative would have no impact on special status species or their habitat, since this alternative would not occur in this habitat.

#### **5.2.4.1.4 Grasslands**

The general lack of standing surface water in grasslands (grasslands dominated by annual grasses, with varying amounts of native perennials) usually does not facilitate the appropriate habitat to support mosquitoes. This habitat does support a variety of special status species including burrowing owl, Swainson's hawk, white-tailed kite, northern harrier and other avian species (afforded protection under USFWS and CDFW), Bay checkerspot butterfly, California tiger salamander, Western spadefoot, Alameda whipsnake, and American badger, as well as special status plants such as Saline clover, Most beautiful jewel-flower, Contra Costa goldfields, Fragrant fritillary, palmate-bracted bird's-beak, Tiburon

buckwheat, and recurved larkspur. The Physical Control Alternative would have no impact on special status species or their habitat, since this alternative would not occur in this habitat.

#### **5.2.4.1.5 Serpentine**

The general lack of standing surface water in serpentine soils (shrublands and grasslands on serpentine soils and rock) usually does not facilitate the appropriate habitat to support mosquitoes. This habitat does support a variety of special status species including Bay checkerspot butterfly as well as an abundance of special status plants such as Sharsmith's onion, Big-scale balsamroot, Chaparral harebell, Tiburon buckwheat and Presidio clarkia. The Physical Control Alternative would have no impact on special status species or their habitat, since this alternative would not occur in this habitat.

#### **5.2.4.1.6 Coastal Dunes**

The general lack of standing surface water in coastal dunes (sandy soils with some active sand movement that supports low stands of diverse native perennials and beach grass) usually does not facilitate the appropriate habitat to support mosquitoes. This habitat does support a variety of special status species including western snowy plover and California least tern as well as special status plants such as San Francisco Bay spineflower, robust spineflower and Presidio clarkia. The Physical Control Alternative would have no impact on special status species or their habitat, since this alternative would not occur in this habitat.

#### **5.2.4.1.7 Treeholes**

Standing water in treeholes (cavities in branches and trunks of live trees or snags that may provide habitat for a variety of species) may facilitate the appropriate habitat to support mosquitoes. Treeholes support a variety of special status species including a variety of cavity nesting avian species such as owls (afforded protection under USFWS and CDFW), and western red bat, pallid bat and other bat species. Sometimes an absorbent material (e.g., Broadleaf P-4, a high-performance, long-lasting, hydrophilic polymer) may be used to reduce the quality of the habitats for treehole mosquitoes. This material absorbs the water as the treehole/rot cavity fills with rainwater. Use of this material is limited as many treeholes are not readily accessible (too high off ground, steep slopes covered in poison oak, etc.). This physical control measure would be used in preference to adulticides, when possible. If physical controls are used, the treehole will be examined for potential use by special status species before treatment is made. Sometimes the District will recommend the landowner/manager consult with an arborist or hire a crew to do this work. With these BMPs, the Physical Control Alternative would have a less-than-significant impact on special status species or their habitat.

#### **5.2.4.1.8 Tidal Marsh and Channels**

Tidal marsh and tidal channel habitats occur along the margins of San Francisco, San Pablo, and Suisun bays and are subject to tidal action.

They are typically bounded by levees and water control structures. The San Francisco Bay-Delta once supported vast tracts of freshwater, brackish, and saline marsh habitat. The vast majority of these marsh habitats have been converted to human uses such as farming, industrial uses, and urban development. Some of the remaining marsh lands are maintained and operated to provide habitat for wildlife or as private or public duck clubs. Several examples of these types of habitats occur along the western portion of Alameda County bordering the San Francisco Bay. These wetlands can be important sources of mosquitoes seasonally. These marshes are seasonally flooded and drained to optimize habitat for ducks, geese, and other wildlife.

Physical measures to control mosquitoes in these areas include maintenance of ditches and water control structures, removal of debris and weeds, clearance of brush for access to areas to be treated, and filling of nonfunctional water circulation ditches, as described in Chapter 2. Other measures include retaining

water on the surface of the area, and rotational impoundment monitoring, which reduces mosquito populations by increasing the frequency with which suitable habitats are inundated and drained. The District works with landowners and property managers to accomplish these actions on a District determined basis.

These activities would be subject to the BMPs described in Table 5-3, relating to agency communication, environmental training, and pretreatment screening. The tidal marsh specific BMPs would also be employed including conducting this work during appropriate seasons and times of day (when the tide is out and when Ridgway's rail, California black rail, Alameda song sparrow, saltmarsh common yellow throat and salt marsh harvest mouse as well as numerous other special status species are not nesting), making sure staff have appropriate training when working in the marsh, and minimizing the use of mechanical equipment where practical. Channels that have substantial tidal flow and inundation would not support mosquitoes and, thus, would not need to be maintained. The disturbance associated with the Physical Control Alternative would be short term and temporary and with the implementation of the BMPs described in Table 5-3 would not substantially affect special status species.

#### **5.2.4.1.9 Lagoon**

Lagoons, located at the mouths of creeks or rivers where they enter the ocean or bay, but isolated from the receiving waterbody by a berm, are indirectly influenced by the tide, which may cause freshwater to back up within the lagoon, and may also allow water to percolate through the berm, with the direction of such movement depending on water levels on either side of the berm. As a result, lagoons often contain a lens of freshwater at the surface and brackish water at the bottom. Thus, lagoons may support species from both creeks and rivers, and from the receiving waterbodies. Lagoons are an important feeding area for special status birds including bald eagles. Lagoons would support mosquitoes in areas of reduced circulation, often associated with emergent vegetation. Physical control in lagoons would include reconnecting isolated areas to the main lagoon. The BMPs in Table 5-3 would be applied to avoid or minimize impacts to environmental resources. With these BMPs, the effects of the Physical Control Alternative on resources within the lagoon would be less than significant.

#### **5.2.4.1.10 Creeks and Rivers and Riparian Forests**

Because their rapid currents do not provide suitable habitat for mosquitoes, creeks and rivers generally do not support substantial numbers of mosquitoes, although, some mosquitoes can be found in slow eddies and back channels, or in pools isolated on the banks as flows recede. Creeks and rivers and the surrounding riparian forest may support special status species including yellow warbler, Swainson's hawk, bank swallow, and additional avian species (afforded protection under USFWS and CDFW) and other species including special status plants, as indicated in Tables 4-3 and 4-4. Accessing the site to complete the work during the avian nesting season would be avoided or minimized by implementation of the BMPs in Table 5-3. Habitat alterations to drain such areas will be avoided to the maximum extent possible due to instream special status species addressed in Chapter 4. The District does not routinely conduct this type of activity, but it may be required in some circumstances. The potential effects of this alternative would be avoided or minimized through implementation of the BMPs in Table 5-3, including those relating to agency communication, environmental training, and pretreatment screening. Depending on the species potentially present in an area, species specific BMPs may also be applied, including seasonal avoidance measures. With these BMPs, the effects of this action would be less than significant.

#### **5.2.4.1.11 Ponds and Lakes**

The freshwater habitats that could be treated include the margin of reservoirs and ponds (including artificial ponds such as golf course ponds or stock ponds with natural bottoms). These areas are generally man-made habitats, but they may support special status species such as yellow-headed blackbird and additional avian species (afforded protection under USFWS and CDFW) as well as special status plants on the margins. This potential effect would be avoided and minimized by the BMPs in Table 5-3 relating to

agency communication, environmental training, and pretreatment screening. Depending on the species potentially present in an area, species-specific BMPs may also be applied, including seasonal avoidance measures. With these BMPs, the effects of this action would be less than significant.

#### **5.2.4.1.12 Seasonal Wetlands (includes Vernal Pools)**

The USACE defines wetlands as “those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. (33 [Code of Federal Regulations] CFR 328.3(b); 40 CFR 230.3(t)).” For the purposes of this document, seasonal wetlands are areas that are flooded for 1 week or more during the year, generally during the rainy season, but do not retain water through the entire year. Seasonal wetlands may be flooded by increased runoff, rainfall, or unusually high tides. The availability of such habitats has been substantially reduced by human land use practices and flood control measures. Reducing the frequency or duration with which such habitats are flooded would adversely affect habitat and terrestrial resources.

Vernal pools, a specific type of seasonal wetland, often support a unique assemblage of endemic plant and animal species, many of which have been identified as special status species by federal and state agencies (see Tables 4-3 and 4-4). Because of the sensitive nature of these habitat types, the District generally would not undertake Physical Control measures in these areas. In the event that physical control in seasonal wetlands or vernal pools was required, the District would not implement such actions without previously discussing their need with the relevant regulatory agencies to verify that no other option exists to control the mosquito problem and to make sure that any such activity would be done in such a way as to minimize its impacts. As a result, this “consultation prior to implementation” BMP would result in a less-than-significant impact to aquatic or terrestrial resources.

#### **5.2.4.1.13 Freshwater Marsh/Seeps**

Freshwater marsh and seeps may provide ideal habitat for mosquito breeding due to their substantial areas of shallow water, limited circulation and emergent vegetation. These areas may potentially support a number of special status plants and animals as indicated in Tables 4-3 and 4-4. Physical control in these areas would have the same potential effects as described for lake and pond habitats and would be avoided or minimized by the BMPs in Table 5-3 relating to agency communication, environmental training, and pretreatment screening. Depending on the species potentially present in an area, species-specific BMPs may also be applied, including seasonal avoidance measures. With these BMPs, the effects of this action would be less than significant.

#### **5.2.4.1.14 Artificial Containers, Temporary Standing Waters and Ornamental Ponds**

Artificial containers do not provide habitat for special status terrestrial species. Thus, physical control of artificial containers (ensuring that these containers do not hold water for a sufficient period to support mosquito larvae) would have no impact on these species or their habitat.

Temporary standing waters refers to water ponding on an upland habitat because of rainfall or irrigation. Ornamental ponds are small ponds with artificial bottoms. These habitats do not provide habitat for special status aquatic or terrestrial species.

#### **5.2.4.1.15 Wastewater Treatment Facilities/Septic Systems**

Wastewater treatment facilities may provide nesting habitat for special status avian species such as short eared owl and northern harrier hawk since such facilities may lie close to suitable habitats in streams or the San Francisco Bay Delta system. The extent to which these species may enter these facilities is unknown. Because of the limited number of such facilities, the limited use of such facilities by special

status species, and the application of the BMPs described in Table 5-3, physical control measures are not anticipated to substantially affect avian species.

Septic systems and their associated leach fields may provide habitat for special status avian species associated with riparian and emergent vegetation, such as song sparrows, yellow-breasted chat, yellow billed-cuckoo, and other passerine birds as indicated in Table 4-4, under freshwater marsh/seeps and riparian forest, although their presences would be dependent on suitable vegetation and other habitat conditions, generally not associated with septic systems.

Winery waste ponds generally contain waste from grape pressings and washwater from cleaning winery equipment. These ponds generally do not provide suitable habitat for special status species, as they are highly managed and often suffer low water quality. The District provides input relating to controlling mosquitoes associated with the ponds and winery operations. Physical control is not typically undertaken in winery waste ponds, although it is possible that it could be required under unusual circumstances. Because of the poor quality habitat provided and because physical control activities would rarely be conducted in these waste ponds, little likelihood of impacts to special status species exists.

Flood control channels and ditches may support special status species where they have suitable physical and vegetative structure. Physical management activities would be designed to reduce ponding of water within these areas. The application of the BMPs in Table 4-6, particularly those pertaining to agency communication, pretreatment screening, and environmental training, will avoid impacts to any special status species that might occur in these habitats.

#### **5.2.4.1.16 Effects on Habitat, Movement, Local Policies and Ordinances, and HCP/NCCPs**

Mosquitoes are part of the food web and their loss may reduce the food base for predators. Although mosquitoes serve a positive role as prey items for some avian insectivores, bats, and small reptiles and amphibians, the reduction of mosquito abundance over a small area will not affect the predator populations overall, as other prey sources are available.

Physical changes in the habitat would result that have the potential to affect migration. However, these changes would tend to enhance migration, opening routes, not closing them. However, this effect would occur within restricted areas and would not substantially alter migratory pathways or success. Additional disruption of migration patterns may occur due to the presence of personnel and machinery in the environment. In all cases this occurrence would be short term, generally not more than a few days in any given location and, therefore, this effect would be minimal and would have little effect on the movement of wildlife.

The county and city general plans and their goals pertaining to natural resources are generally consistent with the CEQA criteria regarding impacts on species and habitats. Any impacts identified for these CEQA criteria would also be relevant to the county and city goals. The project would not affect trees more than 4 inches diameter breast height and, therefore, would not conflict with any tree ordinances.

Several HCPs or NCCPs were identified whose action area is within Alameda County, the primary service area, or in adjacent counties. District activities are typically not among those covered by these HCPs.. Therefore, the District activities would not be in conflict with the provisions of any HCP, NCCP or other approved local, regional, or state approved conservation plan.

#### **5.2.4.1.17 Impact Determinations**

**Impact TR-7.** The Physical Control Alternative, with the BMPs identified in Table 5-3, would have a **less-than-significant** impact either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS. Regular coordination with resource agencies, worker environmental awareness training, disturbance minimization measures, and application of habitat

and species-specific BMPs as appropriate make it unlikely that this alternative would result in adverse effects to special status species. No mitigation is required.

**Impact TR-8.** The Physical Control Alternative, with the BMPs identified in Table 5-3, would have a **less-than-significant** impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS. Very little physical control work would be conducted in riparian habitats or other sensitive natural communities. No mitigation is required.

**Impact TR-9.** The Physical Control Alternative would have a **less-than-significant** impact on federally protected wetlands as defined by CWA Section 404, (including but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. The Physical Control alternative would not reduce the quantity of this habitat, but simply improve circulation within the marsh. Only inactive channels would be filled to eliminate ponding. All work in wetlands would be subject to additional permitting by the USACE, CDFW, and RWQCB. No mitigation is required.

**Impact TR-10.** The Physical Control Alternative would have **no impact** on the movement of any native resident or migratory fish or wildlife species. Nor would it impact any native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. This alternative would likely benefit the movement of fish and other aquatic species, as it would deepen channels and improve flow.

**Impact TR-11.** The Physical Control Alternative would have **no impact** on local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, as none have been identified.

**Impact TR-12.** The Physical Control Alternative would not conflict with the provisions of any adopted HCP, NCCP, or other approved local, regional or state habitat conservation plan. Therefore, **no impact** would occur.

### 5.2.5 Vegetation Management Alternative

The District performs vegetation management (including removal of noxious and/or invasive plants) to facilitate access to mosquito habitat, improve efficiency and effectiveness of mosquito control operations, and as a source reduction measure. For projects that result in materials (including plant materials, soils or sediments, or herbicides) entering the water or occur in sensitive wetland habitat, permits may be required from the USACE, RWQCB, CDFW, USFWS, NOAA Fisheries, and others. Work would not begin until all required permits are obtained. The District uses hand tools (e.g., shovels, pruners, chain saws, and weed-whackers) and possibly heavy equipment if necessary for vegetation removal or thinning and may apply herbicides to improve surveillance or reduce mosquito habitats. These activities primarily occur in or adjacent to aquatic habitats to assist with the control of mosquitoes. The District may also perform vegetation management to assist other agencies and landowners with the management of invasive/nonnative vegetation. These actions are typically performed under the direction of the concerned agency, which also maintains any required permits.

HCP/NCCPs generally incorporate measures to protect sensitive habitats and sensitive species, including plants. Protective measures or restoration goals for upland and other terrestrial habitats are often included in these documents and their accompanying permits. The Vegetation Management Alternative would alter habitats to make them less suitable to mosquito larvae, but this would primarily affect aquatic habitat. As a result, this alternative, when applied within the boundaries of an HCP/NCCP, would not likely conflict with the provisions of that HCP/NCCP for terrestrial species.

**5.2.5.1 Physical Management**

Nonherbicide management actions may involve reducing standing vegetation using equipment. The use of weed-whackers, chain saws, or shovels may lead to physical injury of terrestrial plants and animals in the treatment area. Manual removal is the primary method of vegetation removal and would not be anticipated to affect substantial patches of vegetation in the affected area. Use of heavy equipment for vegetation management could affect larger areas but would not affect a large enough area to change the quality or functionality of the habitat for nontarget species. Areas of vegetation managed with heavy equipment would generally not be larger than a few acres. The District would apply BMPs to reduce these impacts by (1) identifying sensitive species locations, if any, in the treatment area prior to commencing any vegetation removal actions, and (2) limiting the extent of heavy equipment use in order to minimize the area affected (Section 2.9.2). If work is being conducted in tidal marshes or special status species habitat, the BMPs specific to tidal marshes or the specific special status species would also be implemented. The potential impact on wildlife would be minimal at most as the animals would return to their selected habitats within a few hours after the cessation of the noise sources for most of the physical application techniques currently used by the Districts.

**5.2.5.2 Herbicides**

The District chooses to use physical removal of vegetation whenever possible, but rarely may need to use herbicides to control vegetation in and around mosquito habitats to improve surveillance and reduce suitable mosquito habitats. The herbicides the District might use are discussed in detail in Appendix B and are listed in Table 5-4.

**Table 5-4 Herbicide Control Options for Mosquito Abatement as Discussed in Appendix B**

Active Ingredient	Appendix B
Imazapyr	Section 4.6.1
Glyphosate	Section 4.6.2
Triclopyr	Section 4.6.3
Sulfometuron methyl	Section 4.6.5

Herbicides included in the Program have diverse chemical structures, act through distinct modes of action, and exhibit varying levels of potential toxicity to humans and nontarget species.

Certain herbicides are nonselective and broad-spectrum (e.g., imazapyr, sulfometuron methyl), while others are selective for certain plants. Herbicides function by inhibiting growth but do so in a multitude of ways. For example, sulfometuron methyl retards or stops root and shoot development (USEPA 2005). Most of the herbicides are moderately persistent in soil and water (for each herbicide’s half-life in soil and water, please refer to Appendix B).

Almost all of the herbicides the District may use exhibit low or no toxicity to mammals, birds, and terrestrial invertebrates. For detailed toxicity information see Appendix B. In addition, BMPs (see Table 5-3) are applied to minimize the impact of herbicide use on nontarget terrestrial plants, including special status plants. In particular, Districts take action to minimize drift of sprays to nontarget areas by carefully considering weather variables such as wind velocity and direction and chance of precipitation.

The herbicides that were identified for further evaluation (glyphosate) in Appendix B are discussed in further detail below.



### 5.2.5.2.1 Glyphosate

Although some recent concerns have been expressed about possible sublethal effects of glyphosate products (e.g., endocrine disruption in humans), it is virtually nontoxic to mammals and practically nontoxic to birds, fish, and invertebrates on an acute basis. With BMP application techniques, glyphosate can be used safely when an adequate buffer to water sources is maintained (glyphosate is much more toxic to fish and aquatic invertebrates than to mammals, birds, or terrestrial invertebrates) or when a formulation specifically designed for use in aquatic environments (Aquamaster) is used. In terrestrial systems, glyphosate is immobile and breaks down relatively quickly via microbial processes. Glyphosate does not pose a risk to nontarget terrestrial mammals, birds, or invertebrates based on current usage patterns and use of BMPs. This herbicide is nonselective and may affect many types of plants. Glyphosate is not effective on submerged or mostly submerged foliage and, therefore, is only applied to control emergent foliage (Schuette 1998; Siemering 2005). When BMPs are applied, the potential impact of glyphosate on special status species or other nontarget plants is greatly reduced. They include using targeted, small-scale treatments and taking actions to minimize drift and runoff post-application.

### 5.2.5.3 Adjuvants

An adjuvant is any compound that is added to an herbicide formulation or tank mix to facilitate the mixing, application, or effectiveness of that herbicide. Adjuvants can either enhance activity of an herbicide's active ingredient (activator adjuvant) or offset any problems associated with spray application, such as adverse water quality or wind (special purpose or utility modifiers). Activator adjuvants include surfactants, wetting agents, sticker-spreaders, and penetrants. The environmental fate and toxicity of adjuvants the District may use are described in detail in Appendix B and listed in Table 5-5. A subset of the adjuvants available for District use was identified for further examination based upon use patterns and toxicity (Appendix B, Table 1-1). They are listed again in Table 5-5.

**Table 5-5 Adjuvants for Weed Abatement as Discussed in Appendix B**

Active Ingredient	Appendix B
APEs	Section 4.7.1
Polydimethylsiloxane Fluids	Section 4.7.2
Modified Vegetable Oils and Methylated Seed Oil	Section 4.7.3

Polydimethylsiloxanes are insoluble in water and typically sorb to particulates. Degradation time varies depending on moisture in soils. These chemicals appear to be relatively nontoxic to most organisms, but data are lacking. Although toxicity and environmental fate information for these products is scarce, the toxicity and environmental fate of polydimethylsiloxanes, using BMP application practices to reduce the transfer of polydimethylsiloxanes to nontarget areas post-application (i.e., targeted applications), would minimize unwanted adverse effects.

Alkylphenol ethoxylates (APEs) include a broad range of chemicals that tend to bind strongly to particulates and persist in sediments. Nonylphenol and short-chain nonylphenol ethoxylates are moderately bioaccumulative and extremely toxic to aquatic organisms. Aside from use in agricultural herbicide mixtures, APEs are commonly present in detergents, cleaners, food packaging, and cosmetics. The acute toxicity of APEs to mammals is low. They are possible estrogen-mimics. Although the USEPA has recently recommended that this suite of chemicals be evaluated further due to their widespread use (past and present), persistence, and possible estrogen-mimicking behavior, current information about APEs is not adequate to determine the risk they may pose to nontarget terrestrial organisms (USEPA 2010).

Modified vegetable oils and methylated seed oils are essentially nontoxic to most organisms, including plants. Little is known of the environmental fate of these adjuvants. Although toxicity and environmental fate information for these oils is scarce, using current BMP application techniques to reduce the transfer of APEs to nontarget areas post-application (i.e., targeted applications), these products should not result in unwanted adverse effects to nontarget terrestrial organisms.

#### **5.2.5.3.1 Coniferous Forest**

The general lack of surface water in coniferous forests (dominated by cone-bearing trees with needles, which include pines, firs and redwoods) usually does not facilitate the appropriate habitat to support mosquitoes and, therefore, vegetation management would not be conducted in this habitat. However, access routes may be needed through this habitat to reach areas that do support mosquito breeding habitat. This access would generally be via existing access routes, but may require some vegetation removal along the route. This habitat does support a variety of special status species including Foothill yellow-legged frog, Yellow warbler, pallid bat, Western mastiff bat, San Francisco dusky-footed woodrat as well as special status plants such as Pallid Manzanita, Lemmon's jewel-flower, Hospital Canyon larkspur, Western leatherwood, and Talus fritillary. This activity would be done in coordination with landowners or land managers and resource agencies, as well as following the BMPs described in Table 5-3 relating to environmental training, pretreatment screening, disturbance minimization, avian nesting season, habitat and species-specific BMPs, and Vegetation Management Alternative-specific BMPs. This activity would result in less-than-significant impacts to special status species associated with coniferous forest habitat from the vegetation management alternative.

#### **5.2.5.3.2 Deciduous Forest**

The general lack of standing surface water in deciduous forests (dominated by trees that drop leaves annually including buckeyes, some oaks and maples) usually does not facilitate the appropriate habitat to support mosquitoes and, therefore, vegetation management would not be conducted in this habitat. However, access routes may be needed through this habitat to reach areas that do support mosquito breeding habitat. This access would generally be via existing access routes, but may require some vegetation removal along the route. This habitat does support a variety of special status species including Western spadefoot, Alameda whipsnake, white-tailed kite, pallid bat, Townsend's big-eared bat, Western mastiff bat, Big free-tailed bat, and American badger, as well as special status plants such as Big-scale balsamroot, Round-leaved filaree, recurved larkspur and Western leatherwood. This activity would be done in coordination with landowners or land managers and resource agencies, as well as following the BMPs described in Table 5-3 relating to environmental training, pretreatment screening, disturbance minimization, avian nesting season, habitat and species-specific BMPs, and Vegetation Management Alternative specific BMPs. This activity would result in less-than-significant impacts to special status species associated with deciduous forest from the vegetation management alternative.

#### **5.2.5.3.3 Shrublands**

The general lack of standing surface water in shrublands (dense to moderate stands of coyote brush, ceanothus, poison oak, sage, sagebrush, chamise and diverse other shrubs with grassy openings) usually does not facilitate the appropriate habitat to support mosquitoes and, therefore, vegetation management would not be conducted in this habitat. However, access routes may be needed through this habitat to reach areas that do support mosquito breeding habitat. This access would generally be via existing access routes, but may require some vegetation removal along the route. This habitat does support a variety of special status species including burrowing owl, Swainson's hawk and other avian species (afforded protection under USFWS and CDFW), pallid bat, Townsend's big-eared bat, Western mastiff bat and American badger, as well as special status plants such as Bent-flowered fiddleneck, Pallid Manzanita, palmate-bracted bird's-beak, robust spineflower, and recurved larkspur. This activity would be done in coordination with landowners or land managers and resource agencies, as well as following the

BMPs described in Table 5-3 relating to environmental training, pretreatment screening, disturbance minimization, avian nesting season, habitat and species-specific BMPs, and Vegetation Management Alternative specific BMPs. This activity would result in less-than-significant impacts to special status species associated with shrublands habitat from the vegetation management alternative.

#### **5.2.5.3.4 Grasslands**

The general lack of standing surface water in grasslands (grasslands dominated by annual grasses, with varying amounts of native perennials) usually does not facilitate the appropriate habitat to support mosquitoes and, therefore, vegetation management would not be conducted in this habitat. However, access routes may be needed through this habitat to reach areas that do support mosquito breeding habitat. This access would generally be via existing access routes, but may require some vegetation removal along the route. This habitat does support a variety of special status species including burrowing owl, Swainson's hawk, white-tailed kite, northern harrier and other avian species (afforded protection under USFWS and CDFW), Bay checkerspot butterfly, California tiger salamander, Western spadefoot, Alameda whipsnake, and American badger, as well as special status plants such as Saline clover, Most beautiful jewel-flower, Contra Costa goldfields, Fragrant fritillary, palmate-bracted bird's-beak, Tiburon buckwheat, and recurved larkspur. This activity would be done in coordination with landowners or land managers and resource agencies, as well as following the BMPs described in Table 5-3 relating to environmental training, pretreatment screening, disturbance minimization, avian nesting season, habitat and species-specific BMPs, and Vegetation Management Alternative specific BMPs. This activity would result in less-than-significant impacts to special status species associated with grassland habitat from the vegetation management alternative.

#### **5.2.5.3.5 Serpentine**

The general lack of standing surface water in serpentine soils (shrublands and grasslands on serpentine soils and rock) usually does not facilitate the appropriate habitat to support mosquitoes and, therefore, vegetation management would not be conducted in this habitat. However, access routes may be needed through this habitat to reach areas that do support mosquito breeding habitat. This access would generally be via existing access routes, but may require some vegetation removal along the route. This habitat does support a variety of special status species including Bay checkerspot butterfly as well as an abundance of special status plants such as Sharsmith's onion, Big-scale balsamroot, Chaparral harebell, Tiburon buckwheat and Presidio clarkia. This activity would be done in coordination with landowners or land managers and resource agencies, as well as following the BMPs described in Table 5-3 relating to environmental training, pretreatment screening, disturbance minimization, avian nesting season, habitat and species-specific BMPs, and Vegetation Management Alternative specific BMPs. This activity would result in less-than-significant impacts to special status species associated with serpentine soils and outcroppings habitat from the vegetation management alternative.

#### **5.2.5.3.6 Coastal Dunes**

The general lack of standing surface water in coastal dunes (sandy soils with some active sand movement that supports low stands of diverse native perennials and beach grass) usually does not facilitate the appropriate habitat to support mosquitoes and, therefore, vegetation management would not be conducted in this habitat. However, access routes may be needed through this habitat to reach areas that do support mosquito breeding habitat. This access would generally be via existing access routes, but may require some vegetation removal along the route. This habitat does support a variety of special status species including western snowy plover and California least tern as well as special status plants such as San Francisco Bay spineflower, robust spineflower and Presidio clarkia. This activity would be done in coordination with landowners or land managers and resource agencies, as well as following the BMPs described in Table 5-3 relating to environmental training, pretreatment screening, disturbance minimization, avian nesting season, habitat and species-specific BMPs, and Vegetation Management

Alternative specific BMPs. This activity would result in less-than-significant impacts to special status species associated with coastal dunes habitat from the vegetation management alternative.

#### **5.2.5.3.7 Treeholes**

Vegetation management activities would not be conducted in treehole habitat nor would vegetation management be used to access such habitats. Therefore, no impacts would occur to special status species associated with treeholes from the vegetation management alternative.

#### **5.2.5.3.8 Tidal Marsh and Channels**

Vegetation management activities are conducted in coordination with landowners or land managers and the resource agencies and generally focus on the removal of nondesired species. Tidal marshes may support a number of special status plants, including Hispid bird's-beak, Mason's lilaepsis, and Hairless popcornflower, and others (Table 4-3), and animals, including salt-marsh harvest mouse, Salt-marsh wandering shrew, Ridgway's rail, northern harrier, tricolored blackbird, and other passerine species (Table 4-4). Vegetation removal in tidal marshes is done using hand tools and in accordance with the BMPs identified in Table 5-3, relating to agency coordination, environmental training, pretreatment screening, disturbance minimization BMPs, as well as Vegetation Management Alternative, tidal marsh and species-specific BMPs. With these BMPs, the effects of the Vegetation Management Alternative on biological resources within tidal marshes would be less-than-significant.

#### **5.2.5.3.9 Lagoon**

Lagoons would support mosquitoes in areas of reduced circulation, often associated with emergent vegetation, supporting a number of special status species as identified in Tables 4-3 and 4-4, including many of the marsh and riparian species listed previously. Vegetation management in lagoons would be subject to the BMPs in Table 5-3 to avoid or minimize impacts to environmental resources. With these BMPs, the effects of the Vegetation Management Alternative on biological resources within lagoons would be less-than-significant.

#### **5.2.5.3.10 Creeks and Rivers and Riparian Forests**

Because their rapid currents do not provide suitable habitat for mosquitoes, creeks and rivers generally do not support substantial numbers of mosquitoes, although, some mosquitoes can be found in slow eddies and back channels, or in pools isolated on the banks as flows recede. Creeks and rivers and the surrounding riparian forest may support special status terrestrial species including yellow warbler, Swainson's hawk, bank swallow, and additional avian species (afforded protection under USFWS and CDFW) and other species including special status plants, as indicated in Tables 4-3 and 4-4. Vegetation that requires management would typically be confined to channel margins and backwaters with slow currents. This activity would be done in coordination with landowners or land managers and resource agencies, as well as following the BMPs described in Table 5-3 relating to environmental training, pretreatment screening, disturbance minimization, avian nesting season, habitat and species-specific BMPs, and Vegetation Management Alternative specific BMPs. This activity would result in less-than-significant impacts to special status species associated with creeks, rivers, streams and the associated riparian forests.

#### **5.2.5.3.11 Ponds and Lakes**

The freshwater habitats that could be treated include the margin of reservoirs and ponds (including artificial ponds such as golf course ponds or stock ponds with natural bottoms). These areas are generally man-made habitats, and they may support special status terrestrial species such as yellow-headed blackbird and additional avian species (afforded protection under USFWS and CDFW), as well as special status plants on the margins.

Vegetation management would be limited in this habitat type, except in smaller ponds, as the depth and size of these areas would typically preclude emergent vegetation from exceeding 30 percent of the surface area. Where necessary, vegetation management activities would be implemented in stagnant areas along the edges of these habitats where mosquito eggs and larvae occur. Special status avian species would likely not be impacted in reservoirs and ponds, as vegetation removal in these habitats is minimal. Special status plants would likely not be present in lakes or ponds but may be present along the margins. Vegetation management could directly affect these species but substantial areas of similar habitat would remain.

This potential effect would be avoided and minimized by the BMPs in Table 5-3 relating to agency communication, environmental training, and pretreatment screening. Vegetation Management Alternative specific BMPs would be applied. Depending on the species potentially present in an area, species-specific BMPs may also be applied, including seasonal avoidance measures. With these BMPs, the effects of this action would be less than significant.

#### **5.2.5.3.12 Seasonal Wetlands (includes Vernal Pools)**

Seasonal wetlands, including vernal pools, may also support substantial stands of emergent vegetation, although these areas are typically not inundated for long enough periods to support dense stands of vegetation preferred by mosquitoes. Terrestrial species that might occur here include tricolored blackbird, California tiger salamander, Vernal pool tadpole shrimp, Contra Costa goldfields, and others as indicated in Tables 4-3 and 4-4. As a result, these areas are unlikely to be subject to vegetation management actions. If vegetation management activities were required, potential effects would be avoided and minimized by the BMPs in Table 5-3 relating to agency communication, environmental training, and pretreatment screening. Vegetation Management Alternative specific BMPs would be applied. Depending on the species potentially present in an area, species-specific BMPs may also be applied, including seasonal avoidance measures. With these BMPs, the effects of this action would be less-than-significant.

#### **5.2.5.3.13 Freshwater Marsh/Seeps**

Freshwater marsh and seeps may provide ideal habitat for mosquito breeding due to their substantial areas of shallow water, limited circulation and emergent vegetation. These areas may potentially support a number of special status terrestrial plants and animals as indicated in Tables 4-3 and 4-4, such as Loma Prieta hoita, Mason's lilaepsis, Hairless popcornflower, American peregrine falcon, California black rail, White-tailed kite, and others. Vegetation management in these areas would have the same potential effects as described for lake and pond habitats and would be avoided or minimized by the BMPs in Table 5-3 relating to agency communication, environmental training, and pretreatment screening. Depending on the species potentially present in an area, species-specific BMPs may also be applied, including seasonal avoidance measures. With these BMPs, the effects of this action would be less than significant.

#### **5.2.5.3.14 Artificial Containers, Temporary Standing Waters, and Ornamental Ponds**

Vegetation Management does not occur in artificial containers. Artificial containers do not provide habitat for support populations of native or special status terrestrial species. Thus, this alternative would have no impact on these species or their habitat.

Temporary standing waters refer to water ponding on an upland habitat because of rainfall or irrigation. Ornamental ponds are small ponds with artificial bottoms. These habitats do not provide habitat for special status aquatic or terrestrial species. Therefore, no impact would occur to special status species from the vegetation management alternative in these habitats.

### 5.2.5.3.15 Wastewater Treatment Facilities/Septic Systems

Vegetation management activities may occur in coordination with the owners or operators of wastewater treatment facilities or septic systems. These facilities may provide nesting habitat for special status avian species such as short eared owl and northern harrier hawk since such facilities may lie close to suitable habitats in streams or the San Francisco Bay Delta system. The extent to which these species may enter these facilities is unknown. Septic systems and their associated leach fields may provide habitat for special status avian species, particularly those that nest in riparian or emergent vegetation. Because of the limited number of such facilities and the very limited use of such facilities by special status species, vegetation management measures would have a less-than-significant impact on terrestrial special status species and will be minimized with the implementation of the BMPs in Table 5-3.

### 5.2.5.3.16 Effects on Habitat, Movement, Local Policies and Ordinances, and HCP/NCCPs

Mosquitoes are part of the food web and their loss may reduce the food base for predators. Although mosquitoes serve a positive role as prey items for some avian insectivores, bats, and small reptiles and amphibians, the reduction of mosquito abundance over a small area will not affect the predator populations overall, as other prey sources are available.

This alternative could have a small effect on the migration of wildlife and movement and migration corridors. The removal of small areas of vegetation would not substantially affect movement corridors, but the presence of personnel and equipment may result in short-term avoidance of active work areas. In all cases this occurrence would be short term, generally not more than a few days in any given location and, therefore, this effect would be minimal and would have little effect on the movement of wildlife and would not affect wildlife migration corridors or nursery areas, as no physical disturbance would occur.

The county and city general plans and their goals pertaining to natural resources are generally consistent with the CEQA criteria regarding impacts on species and habitats. Any impacts identified for these CEQA criteria would also be relevant to the county and city goals. The project would not affect trees more than 4 inches diameter breast height and, therefore, would not conflict with any tree ordinances.

Several HCPs or NCCPs were identified whose action area is within Alameda County, the primary service area, or in adjacent counties. District activities are typically not among those covered by these HCPs.. Therefore, the District activities would not be in conflict with the provisions of any HCP, NCCP or other approved local, regional, or state approved conservation plan.

### 5.2.5.3.17 Impact Determinations

**Impact TR-13.** The Vegetation Management Alternative, with the BMPs identified in Table 5-3, would have a **less-than-significant** impact either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS. This work would be conducted in coordination with landowners or land managers and resource agencies, and all necessary permits would be acquired before work was implemented. BMPs relating to worker environmental awareness training, disturbance minimization measures, and application of habitat and species-specific BMPs, as appropriate, make it unlikely that this alternative would result in adverse effects to special status species. No mitigation is required.

**Impact TR-14.** The Vegetation Management Alternative, with the BMPs identified in Table 5-3, would have a **less-than-significant** impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS. Very little Vegetation Management work would be conducted in riparian habitats or other sensitive natural communities. No mitigation is required.

**Impact TR-15.** The Vegetation Management Alternative would not result in the direct removal, filling, or hydrological interruption of federally protected wetlands as defined by CWA Section 404,

(including but not limited to, marsh, vernal pool, coastal, etc.). It may result in the removal of minor amounts of vegetation in these areas. As such, this alternative would have a **less-than-significant** impact on these resources. No mitigation is required.

**Impact TR-16.** The Vegetation Management Alternative would have **no impact** on the movement of any native resident or migratory fish or wildlife species. Nor would it impact any native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.

**Impact TR-17.** The Vegetation Management Alternative would have **no impact** on local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, as none have been identified.

**Impact TR-18.** The Vegetation Management Alternative would not conflict with the provisions of any adopted HCP, NCCP, or other approved local, regional or state habitat conservation plan. Therefore, **no impact** would occur.

**5.2.6 Biological Control Alternative**

Biological control of mosquitoes involves the intentional use of vector pathogens, parasites, and predators to reduce the mosquito population. Its emphasis, as it currently exists in the District’s IMMP, is on control of mosquitoes in their immature stages in artificial waterbodies that are not connected to natural waterbodies. Currently, no commercial biological control agents or products are available for wasp and yellow jacket control.

**5.2.6.1 Mosquito Larvae Pathogens**

As part of their Biological Control Alternative, the District employs bacterial larvicides (Table 5-6) that are highly specific to mosquitoes. These biological controls include the active ingredients Bs, Bti, and spinosad. Because the potential environmental impacts of Bs or Bti application are generally similar to those of chemical pesticide applications, these materials and spinosad are evaluated below under Section 5.2.7.1.1, Chemical Control Alternative. The environmental fate and toxicity of these control agents is discussed further in Appendix B.

**Table 5-6 Biological Control Options for Larval Mosquito Abatement as Discussed in Appendix B**

Active Ingredient	Appendix B
Bs	Section 4.3.1
Bti	Section 4.3.2
Spinosad	Section 4.3.3

**5.2.6.2 Mosquito Predators**

Mosquitofish (*Gambusia affinis*) are presently the only commercially available mosquito predators. The District’s rearing and stocking of these fish in mosquito habitats is the most commonly used biological control agent for mosquitoes in the world. Used correctly, this fish can provide safe, effective, and persistent suppression in various mosquito sources. However, due to concerns that mosquitofish may potentially impact red-legged frog and tiger salamander populations in natural waterbodies, the District limits the use of mosquitofish to artificial waterbodies such as ornamental fish ponds, water troughs, water gardens, fountains, and unmaintained swimming pools. These artificial habitats are not included in HCPs/NCCPs. No

impact would occur to terrestrial habitats or species from the use of mosquitofish as described above and in Chapter 2.

#### **5.2.6.2.1 Effects on Habitat, Movement, Local Policies and Ordinances, and HCP/NCCPs**

This alternative would not affect any natural habitats or result in the presence of District personnel or equipment in natural habitats. Therefore, it would not affect the quantity or distribution of habitats, such as riparian areas, marshes, lakes or ponds, seasonal wetlands, or habitat types. This alternative would not affect the composition of their vegetative community. This alternative would not result in any ground disturbing activity and, therefore, would not result in any removal, filling or hydrologic interruption of federally protected wetlands. This alternative would have no effect on the movement of wildlife and would not affect wildlife migration corridors or nursery area.

The county and city general plans and their goals pertaining to natural resources are generally consistent with the CEQA criteria regarding impacts on species and habitats. Any impacts identified for these CEQA criteria would also be relevant to the county and city goals. The project would not affect trees more than 4 inches diameter breast height and, therefore, would not conflict with any tree ordinances.

Several HCPs or NCCPs were identified whose action area is within Alameda County, the primary service area, or in adjacent counties. District activities are typically not among those covered by these HCPs.. Therefore, the District activities would not be in conflict with the provisions of any HCP, NCCP or other approved local, regional, or state approved conservation plan.

#### **5.2.6.3 Impact Determinations**

**Impact TR-19.** The Biological Control Alternative would have **no impact** either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS, as the use of this alternative would be confined to artificial environments that are not connected to natural environments where special status species occur.

**Impact TR-20.** The Biological Control Alternative, with the BMPs identified in Table 5-3, would have **no impact** on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS.

**Impact TR-21.** The Biological Control Alternative would have **no impact** on federally protected wetlands as defined by CWA Section 404, (including but not limited to, marsh, vernal pool, coastal, etc.).

**Impact TR-22.** The Biological Control Alternative would have **no impact** on the movement of any native resident or migratory fish or wildlife species. Nor would it impact any native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.

**Impact TR-23.** The Biological Control Alternative would have **no impact** on local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, as none have been identified.

**Impact TR-24.** The Biological Control Alternative would not conflict with the provisions of any adopted HCP, NCCP, or other approved local, regional or state habitat conservation plan. Therefore, **no impact** would occur.

#### **5.2.7 Chemical Control Alternative**

Chemical control consists of the application of chemicals to directly reduce populations of vectors that pose a risk to public health. The majority of chemical control tools are used for mosquito abatement. As part of their IMMP, the District prioritizes the least toxic materials available for control of the larval stages,



focusing on bacterial larvicides, growth regulators, and surface films rather than Organophosphates (OP) or pyrethroids. Control of adult mosquitoes may become necessary under some circumstances, such as in the event of a disease outbreak (documented presence of infectious virus in active host-seeking adult mosquitoes), or lack of access to larval sources and habitats leading to the emergence of large numbers of biting adult mosquitoes. OP insecticides may be used in rotation with pyrethrins or pyrethroids for control of adult mosquitoes to avoid the development of resistance. The active ingredients currently used for control of adult mosquitoes have been deliberately selected for lack of persistence and minimal effects on nontarget organisms when applied at label rates for ULV mosquito control.

The District may also use insecticides to control populations of ground-nesting yellow jackets. This activity is generally triggered by access needs to mosquito sources. The District does not treat yellow jacket nests that are located inside or on a structure. Residents complaining of honeybee swarms or hives are referred to the County Agricultural Commissioner's Office for a referral list of beekeepers. If District technicians deem it appropriate to treat stinging insects, they will apply the insecticide directly within the nest to avoid drift or harm to other organisms.

The evaluation of each chemical option under the Chemical Control Alternative includes consideration of the HCPs and NCCPs that reflect important aspects of the selection of significance criteria and action thresholds. By focusing on the intent of the HCPs and NCCPs, the evaluation process identifies impacts that may rise to a level that is biologically significant. The environmental issues describe the mechanisms by which such impacts might occur and the species populations likely affected.

All chemicals used by the District (Tables 2-1 through 2-4 in Chapter 2) have been approved by the USEPA and CDPR for use in California and are applied in strict conformance with label requirements and additional BMPs listed in Table 5-3. Pesticide labels are legal requirements and include instructions telling users how to apply the product and precautions the applicator should take to protect human health and the environment. In addition, chemicals are applied in conformance with the PAP as required by the NPDES Vector Control Permit. All BMPs included in the PAP and product labels are followed and include such measures as restrictions in certain land uses and weather (i.e., wind speed) parameters.

With the application of these BMPs, these chemicals should not result in adverse effects to nontarget terrestrial organisms. Detailed discussions of the environmental fate and toxicity of these active ingredients are provided in Appendix B. A subset of the pesticides (Table 5-5) available for District use was identified for further examination based upon use patterns and toxicity (Appendix B, Table 1-1). The following discussion groups these chemicals based on their target organism or life stage and discusses these pesticides in reference to impacts to terrestrial nontarget organisms.

**Table 5-7 Chemical Control Active Ingredients and Adjuvants Identified in Appendix B**

<b>Active Ingredient</b>	<b>Vector</b>	<b>Potential Issue</b>
Methoprene	Mosquitoes	Prevalent use; toxicity to aquatics and insects
Etofenprox	Mosquitoes/ yellow jackets	Toxicity to aquatic organisms; no synergist required
Bti	Mosquitoes	Prevalent use; public concerns
Pyrethrins	Mosquitoes/ yellow jackets	Prevalent use; requires synergist (PBO)
Resmethrin	Mosquitoes	Requires synergist (e.g., PBO); potential endocrine disruptor
Vegetable Oil (coconut oil)/mix	Mosquitoes (surfactant)	Contains low percentage of petroleum distillate

**Table 5-7 Chemical Control Active Ingredients and Adjuvants Identified in Appendix B**

Active Ingredient	Vector	Potential Issue
Permethrin	Mosquitoes/ yellow jackets	Toxicity to aquatic organisms; potential endocrine disruptor
Lambda-cyhalothrin	Yellow jackets	Toxicity to aquatic organisms; potential to bioaccumulate
APEs	Vegetation (adjuvant)	Toxicity to aquatic organisms; moderately bioaccumulative
Glyphosate	Vegetation	Prevalent use; possible endocrine disruptor

See Appendix B, Table 1-1

**5.2.7.1 Mosquito Larvicides**

As part of their Chemical Control Alternative, the District employs bacterial larvicides that are highly specific to mosquitoes. These controls include the active ingredients Bs (a live bacteria), and Bti and spinosad (bacterial by-products that are toxic to mosquitoes). Larvicides are used to manage immature life stages of mosquitoes including larvae and pupae in aquatic habitats, as described previously. They are not applied in upland habitats, with the exception of temporary rainwater pools, seeps, and treeholes, although a small amount of spray drift may occur. These habitats may support special status terrestrial species as indicated in Tables 4-3 and 4-4. The larvicides are applied using ground application equipment, and aircraft, as described in Chapter 2 and listed in Table 2-5. District criteria for selecting application methods are predicated upon access, efficiency and effectiveness of application, size of the area to be treated, and the density and type of vegetation present at the application site (i.e., the likelihood of success in applying the material to the target area). The potential impact of equipment noise on wildlife would be minimal, as the animals would return to their selected habitats within a few hours at most for application techniques currently used by the District.

The toxicity of Bs, Bti, spinosad, methoprene, and surfactants are discussed in detail in Appendix B and listed in Table 5-8. The District employs BMPs to reduce the relative potential impacts of these chemical alternatives to nontarget organisms as well as to applicators. Because Bs, Bti, and spinosad are applied to aquatic rather than terrestrial environments to control larval mosquitoes, the potential for exposure of terrestrial organisms is low, although some spray drift could occur.

**Table 5-8 Chemical Control Options for Larval Mosquito Abatement as Discussed in Appendix B**

Chemical Classification	Active Ingredient	Appendix B
Bacterial larvicide	Bs	Section 4.3.1
Bacterial larvicide	Bti	Section 4.3.2
Bacterial larvicide	Spinosad	Section 4.3.3
Hydrocarbon ester	Methoprene and s-Methoprene	Section 4.3.4
Organophosphate	Temephos	Section 4.2.2
Surfactant	Alcohol Ethoxylated Surfactant (monomolecular film)	Section 4.3.5

### 5.2.7.1.1 Bacterial Larvicides (BS, Bti, spinosad)

Bacterial larvicides such as Bti and Bs are highly selective microbial pesticides (for mosquitoes) that when ingested, produce gut toxins that cause destruction of the insect gut wall leading to paralysis and death. These microbial agents are delivered as endospores in granular, powder, or liquid concentrate formulations. Bs and Bti are applied directly to larval mosquito habitats (water) rather than to terrestrial environments. These products are applied in strict adhere to product labels and all appropriate BMPs are applied when they are used. Bs and Bti are practically nontoxic to terrestrial organisms, including birds, bees, and mammals.

Spinosad is a natural insecticide derived from the fermentation of a common soil microorganism, *Saacharopolyspora spinosa*. Spinosad causes neurologic effects in insects consistent with the general activation of nicotinic acetylcholine receptors, but by a mechanism that is novel among known insecticides (Mayes et al. 2003). Exposure manifests as constant involuntary nervous system impacts ultimately leading to paralysis and death of the insect. Spinosad is highly effective against lepidopteron larvae (e.g., butterflies and moths), as well as some Diptera (mosquitoes and flies), Coleoptera (beetles), Thysanoptera (e.g., thrips), and Hymenoptera (e.g., bees, wasps) (Mayes et al. 2003). The effects of spinosad on beneficial pollinators such as honeybees are of concern. The District incorporates BMPs that are designed to minimize exposure of bees to spinosad, such as utilizing granular and tablet forms and limiting applications to artificial sources such as catch basins, storm drains and swimming pools. If a liquid form is used, additional BMPs include restricting applications to nighttime hours when bees are inactive, covering hives where possible with wet burlap and maintaining buffer zones. Bees and other nontarget insects may contact spinosad residues following applications; however, residues are generally are below acute toxicity thresholds to honeybees. Field studies evaluating typical spinosad applications have demonstrated low risk to adult honeybees and little to no effect on hive activity and brood development, provided that the residue is allowed to dry for up to three hours (Mayes et al. 2003).

Spinosad is of low acute toxicity to birds and mammals. Generally, spinosad is applied directly to larval mosquito habitat, thereby reducing potential exposures of sensitive terrestrial insects including moths, butterflies, and honeybees. Application of spinosad follows strict product label descriptions.

### 5.2.7.1.2 Hydrocarbon Esters (Methoprene)

(S)-Methoprene is an insect hormone analogue that interferes with larval development (growth regulator). This chemical does not exhibit the nonspecific target effects of neurological toxins such as pyrethrin.

Methoprene is used as a larvicide and, as such, is not applied to terrestrial environments. Some drift into terrestrial environments may occur when it is applied, but it is almost irrelevant for hand and aerial (e.g., helicopter) applications since treatments are restricted at moderate to high wind speeds. Methoprene is considered one of the safest of all larvicide options, and the District uses methoprene prevalently during each season of the year. Methoprene is highly effective against mosquitoes at low concentrations (very low volume applications are used when possible) and degrades quickly in the environment, thereby reducing the potential exposure and risk to nontarget organisms. The District avoids applying methoprene to vernal pools due to the fact that vernal pools provide habitat for many special status or sensitive species.

Methoprene has high toxicity to nontarget insects such as moths, butterflies, and beetles; however, moths, butterflies, and most species of beetles do not occupy aquatic habitats and so would have very limited exposure.

### 5.2.7.1.3 Organophosphates

Temephos is the only OP with larvicidal use and may be used occasionally to help prevent mosquitoes from developing resistance to the bacterial larvicides, although the District has not used it since 2011. Temephos has extremely low water solubility and binds strongly to soils. It is moderately acutely toxic to mammals and fish, but highly toxic to nontarget aquatic invertebrates (e.g., stoneflies, mayflies).

Temephos is applied following label requirements and at low concentrations. It is not expected to have direct impact on terrestrial animals and the use of temephos has declined over time in favor of bacterial larvicides, methoprene, and surface oils (USEPA 2000).

#### 5.2.7.1.4 Surfactants (Alcohol ethoxylated surfactant, aliphatic solvents)

Petroleum- and plant-based (ethoxylated isostearyl alcohols) oils are used as surface-active agents effective against larvae and pupae. These oils are effective against these immature life stages when inhaled at the water surface or by physically forming a surface film that drowns the mosquito. These treatments may also be effective against adult mosquitoes during adult emergence. These treatments are specific to aquatic environments and are not applied to terrestrial environments, although some drift may occur.

#### 5.2.7.2 Mosquito Adulticides

In addition to chemical control of mosquito larvae, the District may use pesticides for control of adult mosquitoes when no other tools are available and if specific criteria are met, including species composition, population density (as measured by landing count or other quantitative method), proximity to human populations, and/or human disease risk. Adulticides are used over terrestrial habitats. Treatment of adults is a tertiary line of defense employed when physical controls and larviciding are not sufficiently effective. As with larvicides, adulticides would be applied in strict conformance with label requirements and any applicable federal and state requirements (Appendix B). Adulticides the District may use are listed in Table 5-9. Because of the ecological sensitivity of vernal pools, which support numerous species of listed plants and invertebrates, and the toxicity of these chemicals to nontarget organisms, the District would avoid use of these adulticides in areas with vernal pools. A detailed discussion of the environmental fate and toxicity of these pesticides is provided in Appendix B. The potential impact on wildlife from noise associated with equipment use would be minimal, as the animals would return to their selected habitats within a few hours at most for application techniques the District currently uses.

**Table 5-9 Chemical Control Options for Adult Insect Abatement as Discussed in Appendix B**

Chemical Classification	Active Ingredient	Vector	Appendix B
Pyrethrin	Pyrethrin	Mosquito; yellow jacket	Section 4.1.1
Synthetic Pyrethroid	Allethrins and d- <i>trans</i> allethrin	Yellow jacket	Section 4.1.2
Synthetic Pyrethroid	Phenothrin (sumithrin or d-phenothrin)	Mosquito; yellow jacket	Section 4.1.3
Synthetic Pyrethroid	Prallethrin	Yellow jacket	Section 4.1.4
Synthetic Pyrethroid	Deltamethrin	Mosquito; yellow jacket	Section 4.1.5
Synthetic Pyrethroid	Lambda-cyhalothrin	Yellow jacket	Section 4.1.7
Synthetic Pyrethroid	Resmethrin	Mosquito	Section 4.1.8
Synthetic Pyrethroid	Tetramethrin	Yellow jacket	Section 4.1.9
Synthetic Pyrethroid	Permethrin	Mosquito; yellow jacket	Section 4.1.10
Pyrethroid-like	Etofenprox	Mosquito; yellow jacket	Section 4.1.11
Synergist	PBO	Mosquito; yellow jacket	Section 4.1.12
Organophosphate	Naled	Mosquito	Section 4.2.1

### 5.2.7.2.1 Pyrethrins

The District may use pyrethrin for mosquito and/or yellow jacket wasp control. For yellow jacket control, pyrethrin would be applied directly into ground nests. For mosquito control, pyrethrin may be applied over a wide range of land uses and terrestrial habitat types.

Pyrethrins readily degrade in water and soil, but may persist under anoxic conditions. They tend to strongly adsorb to soil surfaces and, hence, have low potential to leach into groundwater. These chemicals may have low to moderate acute toxicity to mammals; however, proper personal protective equipment would alleviate potential for human exposure, especially when delivered via ULV techniques. Pyrethrins may be highly toxic to fish (freshwater, estuarine, marine) and invertebrates, although exposures would likely be low during and following ULV applications, which are designed to prevent environmental persistence and potential impacts to nontarget ecological receptors.

Pyrethrins have low to moderate acute toxicity to mammals via the oral, dermal, and inhalation routes and are practically nontoxic to birds. The risks to nontarget insects such as honeybees are reduced by applying pyrethrins at night in the dark when bees and other pollinators are inactive. Little risk to nontarget terrestrial organisms is expected when this and other BMPs are applied.

### 5.2.7.2.2 Pyrethroids and Pyrethroid-Like Compounds

Pyrethroid insecticides are synthetic compounds that are chemically similar to the pyrethrins but have been modified to increase stability and activity against insects. Some synthetic insecticides are similar to pyrethroids, such as etofenprox, but have a slightly different chemical composition. First generation or "Type I" photosensitive pyrethroids include d-allethrin, phenothrin (sumithrin), prallethrin, resmethrin, and tetramethrin.. The newer second-generation pyrethroids are mostly "Type II" pyrethroids. Type II pyrethroids are more toxic (than Type I pyrethroids) because they are less photosensitive and persist longer in the environment. The active ingredients that fall into this group include deltamethrin, lambda-cyhalothrin, and permethrin.

Pyrethroids affect insect neuroactivity by binding to a protein at the nerve fiber that regulates the voltage-gated sodium channel. This binding can delay the closing of sodium channels and/or cause a persistent activation of the sodium channels, which often results in repetitive activity (Type I pyrethroid) or blockage of nerve conduction (Type II pyrethroid). Most pyrethroids and pyrethroid-like compounds are of low toxicity to birds and mammals, but of high toxicity to honeybees. The risks to nontarget insects such as honeybees are reduced by applying these compounds at night and predawn times, when bees and other pollinators are inactive. The active ingredients that have been selected for further evaluation in Appendix B (resmethrin, permethrin, and etofenprox) are discussed individually below.

#### Resmethrin

The District may apply resmethrin to tree holes, residential areas near reclaimed marshes, and industrial areas for mosquito control. ULV applications of resmethrin are used and this chemical is usually reserved for use when circumstances are critical (e.g., an outbreak of infectious mosquito-borne disease). Additionally, resmethrin use is declining in favor of nonresmethrin alternatives. Studies have shown rapid dissipation/low persistence following aerial ULV applications. Resmethrin is moderately toxic to birds and highly toxic to honeybees; however, little risk to nontarget terrestrial organisms is expected when BMPs are applied.

#### Permethrin

The District may use permethrin for mosquito and/or yellow jacket wasp control during spring, summer, and fall. Permethrin products may be used in or near reclaimed marshes, used around residences, and applied directly to ground nests. Permethrin has low toxicity to mammals and is practically nontoxic to birds. It is highly toxic to honeybees; however, this pesticide is generally used with careful and strict BMP

techniques such as using very small, localized applications. When used appropriately, little risk to nontarget terrestrial organisms is expected.

### **Etofenprox**

Etofenprox is a pyrethroid-like compound that does not tend to persist in the environment or appear to pose a risk to mammals as it is available to the general public for application to backyards and patios and sometimes directly to domestic pets (for flea and tick control).

Etofenprox is generally applied during the nighttime hours when sensitive receptors such as honeybees are not active. Based on toxicity, environmental fate, and usage patterns, etofenprox, using BMPs, is not likely to result in adverse impacts to nontarget terrestrial organisms.

#### **5.2.7.2.3 Synergist (Piperonyl Butoxide)**

PBO was first registered in the 1950s and acts as a synergist. Synergists are chemicals that primarily enhance the pesticidal properties of other active ingredients, such as pyrethrins and synthetic pyrethroids. PBO is a registered active ingredient in products used to control many different types of flying and crawling insects and arthropods, although no products contain only PBO. It is registered for use in agricultural, residential, commercial, industrial, and public health sites. PBO interferes with the insect's ability to detoxify pyrethrins and pyrethroids, by binding to microsomal enzymes in target organisms, thereby inhibiting the breakdown of other pesticides, including pyrethrins and pyrethroids (USEPA 2006a).

PBO degrades relatively rapidly in soil and water and, therefore, does not tend to persist in the environment. PBO may be highly toxic to some species of fish and aquatic invertebrates and is being evaluated as a possible endocrine disruptor. However, it is of low toxicity to terrestrial receptors such as mammals and honeybees. ULV applications of PBO are used whenever possible and in conjunction with BMPs for the co-applied pesticides.

#### **5.2.7.2.4 Organophosphates**

Naled may be used in rotation with pyrethrins or pyrethroids for control of adult mosquitoes to avoid the development of resistance. In addition to use for controlling adult mosquitoes, naled also has indoor and outdoor general use, and is used on food and feed crops, farms, dairies, pastureland, and in greenhouses and over standing water (CDPR 2010a). Naled tends to degrade quickly in surface waters especially following ULV applications. It has low water solubility and is mobile in some soils. Drift is almost irrelevant for hand and some aerial (e.g., helicopter) applications since treatments are restricted during moderate to high winds. In addition, spray setbacks are established to reduce spray drift for agricultural uses. The Districts strictly adhere to their BMPs and product label requirements, including the restriction of naled application to targets outside adequate buffer zones around permanent waterbodies to reduce runoff and impacts to aquatic organisms. It is moderately toxic to mammals and birds.

Naled has been associated with mortality of honeybees when residue levels exceed 2,000  $\mu\text{g}/\text{m}^2$  following typical ULV applications in Florida (Zhong et al. 2004). The District would implement BMPs such as adulticiding during the evening when bees are inactive; however, bees tend to cluster outside around the entrance to the hive during the evening. To further minimize potential effects on nontarget pollinators, the District would avoid spraying pesticides anywhere within a pre-determined proximity to bee hives. Naled is not currently used by the District.

#### **5.2.7.3 Yellow Jacket Abatement**

Besides using insecticides for mosquito populations, the District may selectively apply them to control ground-nesting yellow jacket populations that pose a threat to employees. For control of yellow jackets these pesticides are applied in highly localized areas.

Yellow jacket nests that are off the ground would be treated under special circumstances to protect the health and safety of the District's employees. When a technician encounters a honeybee swarm or unwanted hive, technicians will contact the County Agricultural Commissioner's Office or the appropriate Bee Guild contacts, which maintain referral lists of beekeepers that can safely remove the bees. If District technicians deem it appropriate to treat stinging insects, they will apply the insecticide directly within the nest in accordance with the District's policies to avoid drift of the insecticide or harm to other organisms.

Pyrethroid-based chemicals are typically used against ground-nesting yellow jackets. The potential environmental impacts of these materials are minimal due to the fact that they are applied directly to the underground nest. This application method prevents drift and further reduces the potential for inadvertent exposure of nontarget and sensitive species to these materials. The pesticides the District may use to control yellow jacket populations are shown in Table 5-9 and those selected for further review in Appendix B have been discussed previously.

The District adheres to the covenants of the appropriate HCPs/NCCPs, in the review and selection of primary and alternative treatment scenarios for each current and proposed chemical and for nonchemical treatments. This assures that any potential impact would not substantially change the quality or functionality of the habitat for non-target species and result in a determination of no significant impact for most abatement efforts.

#### **5.2.7.3.1 Pyrethrin**

The District uses pyrethrin for mosquito and/or yellow jacket wasp control. For yellow jacket control, pyrethrin is applied directly into ground nests. The potential impacts to terrestrial habitats through reduction of the amount or quality of habitat available, to native terrestrial plant or animal populations through direct mortality, or to special status species are discussed above under Mosquito Adulticides (Section 5.2.7.2).

#### **5.2.7.3.2 Pyrethroids and Pyrethroid-like Compounds**

The potential impacts impact to terrestrial habitats through reduction of the amount or quality of habitat available, to native terrestrial plant or animal populations through direct mortality, or to special status species for a number of pyrethroid or pyrethroid-like compounds are discussed above under Mosquito Adulticides (Section 5.2.7.2). When used for yellow-jackets, the use would be confined to a single nest, not over a large area, as discussed for mosquito adulticiding. Lambda-cyhalothrin was identified as a candidate for further evaluation in Appendix B and is discussed in detail below.

#### **5.2.7.3.3 Lambda-cyhalothrin**

The District has not historically used lambda-cyhalothrin for yellow-jacket abatement and has no plans to use it for this purpose in the future, but is including it here in case other materials are not available.

The potential for persistence of lambda-cyhalothrin and its toxicity to mammals, aquatic organisms (vertebrates and invertebrates), and nontarget insects such as honeybees is of concern from a terrestrial resource perspective, but it is used in highly contained situations, so poses little threat to nontarget organisms.

Lambda-cyhalothrin is available to the public in commonly used products for residential wasp control. The District may use lambda-cyhalothrin for targeted application to yellow jacket and paper wasp nests. This product (0.01 percent lambda-cyhalothrin) may be used as needed throughout the year. The amount the public and the District apply directly to wasp nests is minute and little to no potential exists for nontarget organism exposures.

Although potential exists for environmental persistence and exposure to domestic pets and nontarget receptors, this active ingredient is readily available as an insect spray and District use would be focused and very localized to minimize or eliminate those exposures. Lambda-cyhalothrin would not be applied to vernal pools due to the fact that vernal pools provide habitat for many rare, sensitive, and special status

species. In addition, lambda-cyhalothrin would not be applied where bee boxes are present to reduce risk to these important pollinators. Little risk to nontarget terrestrial organisms is expected when these and other BMPs are applied.

#### **5.2.7.3.4 Effects on Habitat, Movement, Local Policies and Ordinances, and HCP/NCCPs**

The Chemical Control Alternative would not affect the quantity or distribution of habitats, such as riparian areas, marshes, lakes or ponds, seasonal wetlands, or habitat types. This alternative would not affect the composition of their vegetative community, as the pesticides used would not be expected to affect plants or their physical or hydrologic attributes. This alternative would not result in any ground disturbing activity, and, therefore, would not result in any removal, filling or hydrologic interruption of federally protected wetlands. Any disruption of migration patterns would be due to the presence of personnel and equipment in the environment. In all cases this occurrence would be very short-term, generally not more than a few hours in any given location and, therefore, this effect would be minimal and would have little effect on the movement of wildlife and would not affect wildlife migration corridors or nursery areas, as no physical disturbance would occur.

The county and city general plans and their goals pertaining to natural resources are generally consistent with the CEQA criteria regarding impacts on species and habitats. Any impacts identified for these CEQA criteria would also be relevant to the county and city goals.

Several HCPs or NCCPs were identified whose action area is within Alameda County, the primary service area, or in adjacent counties. District activities are typically not among those covered by these HCPs.. Therefore, the District activities would not be in conflict with the provisions of any HCP, NCCP or other approved local, regional, or state approved conservation plan.

#### **5.2.7.4 Impact Determinations**

**Impact TR-25.** The Chemical Control Alternative, with the BMPs identified in Table 5-3, would have a **less-than-significant** impact either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS. Nonpersistent, chemicals proven to have low toxicity to nontarget organisms would be applied in strict accordance with label directions, any federal and state requirements, and BMPs, including those relating to worker environmental awareness training, disturbance minimization measures, and Applications of Pesticides, Surfactants, and/or Herbicides would be applied, as would appropriate habitat and species-specific BMPs. These practices make it highly unlikely that this alternative would result in adverse effects to special status species. No mitigation is required.

**Impact TR-26.** The Chemical Control Alternative, with the BMPs identified in Table 5-3, would have a **no impact** on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS. The chemicals considered under the Chemical Control alternative would not affect riparian habitats or other sensitive natural communities.

**Impact TR-27.** The Chemical Control Alternative would not result in the direct removal, filling, or hydrological interruption of federally protected wetlands as defined by CWA Section 404, (including but not limited to, marsh, vernal pool, coastal, etc.). This alternative would have **no impact** on these resources.

**Impact TR-28.** The Chemical Control Alternative would have **no impact** on the movement of any native resident or migratory fish or wildlife species. Nor would it impact any native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.



**Impact TR-29.** The Chemical Control Alternative would have **no impact** on local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, as none have been identified.

**Impact TR-30.** The Chemical Control Alternative would not conflict with the provisions of any adopted HCP, NCCP, or other approved local, regional or state habitat conservation plan. Therefore, **no impact** would occur.

### 5.2.8 Cumulative Impacts

“Cumulative impacts” are defined as “two or more individual effects which, when considered together, are considerable or compound or increase other environmental impacts (CEQA Guidelines Section 15355). Cumulative impacts, as they relate to terrestrial resources, include past, present, and reasonably foreseeable actions that potentially impact terrestrial mammalian and avian wildlife, reptiles, aquatic organisms, nontarget invertebrates and pollinators, and botanical resources. Cumulative impacts can result from individually minor, but collectively significant, projects taking place over a period of time. The determination is whether a proposed project’s incremental contribution to a cumulative impact results in a potentially “considerable” (i.e., significant) cumulative impact, and, if so, whether that project’s incremental contribution can be mitigated to a less-than-significant level. The cumulative impacts analysis for terrestrial resources is contained in Section 1.3, and the determinations of cumulatively considerable impacts are summarized here.

The Surveillance, Physical Control, Vegetation Management, and Chemical Control Alternatives’ impacts to terrestrial resources were determined to be less than significant or in some cases “no impact”. The Biological Control Alternative’s use of mosquitofish had no impact to terrestrial resources. The key issues for consideration herein are potential effects on beneficial insect pollinators from chemical applications and the potential cumulative impacts associated with Vegetation Management and Chemical Control Alternatives’ less-than-significant impacts.

- > **Effects on Pollinators:** Colony collapse disorder (CCD) and the resulting decline in bee populations is an existing significant cumulative impact in the region. In general, while insect abatement activities may affect native pollinators near or adjacent to treatment areas, the District’s careful practice of BMPs greatly reduces the potential cumulative impacts to nontarget pollinators. The Program’s **less-than-significant impacts on insect pollinators related to mosquito and yellow jacket abatement activities would not be cumulatively considerable or significant.**
- > **Vegetation Management Alternative:** Weed control activities the District may perform would be cumulative with those other entities perform within the Program Area. Weed control activities may affect native plants, as these species may lie within treatment areas, but the effects on individuals of native species are minimized, and the overall effect is likely beneficial, as native species will have less competition in treated areas and, thus, would be expected to be more successful. Based on this conclusion, the Program’s incremental **less-than-significant effects relating to weed abatement activities would not, when considered with other weed abatement activities in the Program Area, be cumulatively considerable or significant.**
- > **Chemical Control Alternative:** The uses of pesticides under the Chemical Control Alternative would be cumulative with uses of pesticides by agricultural, industrial, governmental, and residential users, an existing significant cumulative impact. The District’s relative contribution to the loads of such concentrations is small compared with other users. The District preferentially uses nonchemical alternatives and when using chemical alternatives, uses chemicals that are not persistent in the environment when chemicals are applied. As such, the District’s Chemical Control Alternative does not contribute substantially to pesticide and herbicide exposures in the terrestrial environment. The Chemical Control Alternative has a **less-than-significant cumulative impact on terrestrial resource exposures to herbicides and pesticides.**

### **5.2.9 Environmental Impacts Summary**

The Surveillance, Physical Control, Vegetation Management, and Biological Control alternatives are expected to have less-than-significant to no impact on terrestrial resources (Table 5-10). The Chemical Control Alternative (including the mosquito larvicide, mosquito adulticide, and potential yellow jacket pesticide and herbicide application scenarios [under existing BMPs]) is expected to have only minimal impacts to nontarget terrestrial resources, and any unforeseen impacts are expected to be less than significant.

**Table 5-10 Summary of Alternative Biological Resources - Terrestrial Impacts**

Impact Statement	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control
<b>Effects on Biological Resources - Terrestrial</b>					
<p><b>Impact TR-1.</b> The Surveillance Alternative would have a <b>less-than-significant</b> impact either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS. This alternative would not directly affect these species, as described above. Most surveillance occurs along access routes that are already established, and would only be cleared periodically to maintain access, as necessary. Where new access routes are required they would have only a very small effect on habitat in areas where surveillance occurs. No mitigation is required.</p>	LS	na	na	na	na
<p><b>Impact TR-2.</b> The Surveillance Alternative would have a <b>less-than-significant</b> impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS. Most surveillance occurs along access routes that are already established, and would only be cleared periodically, during the fall to minimize impacts, to maintain access, as necessary. Where new access routes are required they would have only a very small effect on habitat in areas where surveillance occurs. No mitigation is required.</p>	LS	na	na	na	na
<p><b>Impact TR-3.</b> The Surveillance Alternative would have a <b>less-than-significant</b> impact on federally protected wetlands as defined by CWA Section 404, (including but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. Most surveillance occurs along access routes that are already established, and would only be cleared periodically, during the fall to minimize impacts, to maintain access, as necessary. Where new access routes are required they would have only a very small effect on habitat in areas where surveillance occurs. No mitigation is required.</p>	LS	na	na	na	na
<p><b>Impact TR-4.</b> The Surveillance Alternative would have <b>no impact</b> on the movement of any native resident or migratory fish or wildlife species. Nor would it impact any native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.</p>	N	na	na	na	na
<p><b>Impact TR-5.</b> The Surveillance Alternative would have <b>no impact</b> on local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, as none have been identified.</p>	N	na	na	na	na
<p><b>Impact TR-6.</b> The Surveillance Alternative would not conflict with the provisions of any adopted HCP, NCCP, or other approved local, regional or state habitat conservation plan. Therefore, <b>no impact</b> would occur.</p>	N	na	na	na	na

**Table 5-10 Summary of Alternative Biological Resources - Terrestrial Impacts**

Impact Statement	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control
<p><b>Impact TR-7.</b> The Physical Control Alternative, with the BMPs identified in Table 5-3, would have a <b>less-than-significant</b> impact either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS. Regular coordination with resource agencies, worker environmental awareness training, disturbance minimization measures, and application of habitat and species-specific BMPs as appropriate make it unlikely that this alternative would result in adverse effects to special status species. No mitigation is required.</p>	na	LS	na	na	na
<p><b>Impact TR-8.</b> The Physical Control Alternative, with the BMPs identified in Table 5-3, would have a <b>less-than-significant</b> impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS. Very little physical control work would be conducted in riparian habitats or other sensitive natural communities. No mitigation is required.</p>	na	LS	na	na	na
<p><b>Impact TR-9.</b> The Physical Control Alternative would have a <b>less-than-significant</b> impact on federally protected wetlands as defined by CWA Section 404, (including but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. The Physical Control alternative would not reduce the quantity of this habitat, but simply improve circulation within the marsh. Only inactive channels would be filled to eliminate ponding. All work in wetlands would be subject to additional permitting by the USACE, CDFW, and RWQCB. No mitigation is required.</p>	na	LS	na	na	na
<p><b>Impact TR-10.</b> The Physical Control Alternative would have <b>no impact</b> on the movement of any native resident or migratory fish or wildlife species. Nor would it impact any native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. This alternative would likely benefit the movement of fish and other aquatic species, as it would deepen channels and improve flow.</p>	na	N	na	na	na
<p><b>Impact TR-11.</b> The Physical Control Alternative would have <b>no impact</b> on local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, as none have been identified.</p>	na	N	na	na	na
<p><b>Impact TR-12.</b> The Physical Control Alternative would not conflict with the provisions of any adopted HCP, NCCP, or other approved local, regional or state habitat conservation plan. Therefore, <b>no impact</b> would occur.</p>	na	N	na	na	na

**Table 5-10 Summary of Alternative Biological Resources - Terrestrial Impacts**

Impact Statement	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control
<b>Impact TR-13.</b> The Vegetation Management Alternative, with the BMPs identified in Table 5-3, would have a <b>less-than-significant</b> impact either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS. This work would be conducted in coordination with landowners or land managers and resource agencies, and all necessary permits would be acquired before work was implemented. BMPs relating to worker environmental awareness training, disturbance minimization measures, and application of habitat and species-specific BMPs, as appropriate, make it unlikely that this alternative would result in adverse effects to special status species. No mitigation is required.	na	na	LS	na	na
<b>Impact TR-14.</b> The Vegetation Management Alternative, with the BMPs identified in Table 5-3, would have a <b>less-than-significant</b> impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS. Very little Vegetation Management work would be conducted in riparian habitats or other sensitive natural communities. No mitigation is required.	na	na	LS	na	na
<b>Impact TR-15.</b> The Vegetation Management Alternative would not result in the direct removal, filling, or hydrological interruption of federally protected wetlands as defined by CWA Section 404, (including but not limited to, marsh, vernal pool, coastal, etc.). It may result in the removal of minor amounts of vegetation in these areas. As such, this alternative would have a <b>less-than-significant</b> impact on these resources. No mitigation is required.	na	na	LS	na	na
<b>Impact TR-16.</b> The Vegetation Management Alternative would have <b>no impact</b> on the movement of any native resident or migratory fish or wildlife species. Nor would it impact any native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.	na	na	N	na	na
<b>Impact TR-17.</b> The Vegetation Management Alternative would have <b>no impact</b> on local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, as none have been identified.	na	na	N	na	na
<b>Impact TR-18.</b> The Vegetation Management Alternative would not conflict with the provisions of any adopted HCP, NCCP, or other approved local, regional or state habitat conservation plan. Therefore, <b>no impact</b> would occur.	na	na	N	na	na

**Table 5-10 Summary of Alternative Biological Resources - Terrestrial Impacts**

Impact Statement	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control
<b>Impact TR-19.</b> The Biological Control Alternative would have <b>no impact</b> either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS, as the use of this alternative would be confined to artificial environments that are not connected to natural environments where special status species occur.	na	na	na	N	na
<b>Impact TR-20.</b> The Biological Control Alternative, with the BMPs identified in Table 5-3, would have <b>no impact</b> on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS.	na	na	na	N	na
<b>Impact TR-21.</b> The Biological Control Alternative would have <b>no impact</b> on federally protected wetlands as defined by CWA Section 404, (including but not limited to, marsh, vernal pool, coastal, etc.).	na	na	na	N	na
<b>Impact TR-22.</b> The Biological Control Alternative would have <b>no impact</b> on the movement of any native resident or migratory fish or wildlife species. Nor would it impact any native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.	na	na	na	N	na
<b>Impact TR-23.</b> The Biological Control Alternative would have <b>no impact</b> on local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, as none have been identified.	na	na	na	N	na
<b>Impact TR-24.</b> The Biological Control Alternative would not conflict with the provisions of any adopted HCP, NCCP, or other approved local, regional or state habitat conservation plan. Therefore, <b>no impact</b> would occur.	na	na	na	N	na
<b>Impact TR-25.</b> The Chemical Control Alternative, with the BMPs identified in Table 5-3, would have a <b>less-than-significant</b> impact either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS. Nonpersistent, chemicals proven to have low toxicity to nontarget organisms would be applied in strict accordance with label directions, and BMPs, including those relating to worker environmental awareness training, disturbance minimization measures, and Applications of Pesticides, Surfactants, and/or Herbicides would be applied, as would appropriate habitat and species-specific BMPs. These practices make it highly unlikely that this alternative would result in adverse effects to special status species. No mitigation is required.	na	na	na	na	LS

**Table 5-10 Summary of Alternative Biological Resources - Terrestrial Impacts**

Impact Statement	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control
<b>Impact TR-26.</b> The Chemical Control Alternative, with the BMPs identified in Table 5-3, would have a <b>no impact</b> on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS. The chemicals considered under the Chemical Control alternative would not affect riparian habitats or other sensitive natural communities.	na	na	na	na	N
<b>Impact TR-27.</b> The Chemical Control Alternative would not result in the direct removal, filling, or hydrological interruption of federally protected wetlands as defined by CWA Section 404, (including but not limited to, marsh, vernal pool, coastal, etc.). This alternative would have <b>no impact</b> on these resources.	na	na	na	na	N
<b>Impact TR-28.</b> The Chemical Control Alternative would have <b>no impact</b> on the movement of any native resident or migratory fish or wildlife species. Nor would it impact any native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.	na	na	na	na	N
<b>Impact TR-29.</b> The Chemical Control Alternative would have <b>no impact</b> on local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, as none have been identified.	na	na	na	na	N
<b>Impact TR-30.</b> The Chemical Control Alternative would not conflict with the provisions of any adopted HCP, NCCP, or other approved local, regional or state habitat conservation plan. Therefore, <b>no impact</b> would occur.	na	na	na	na	N

LS = Less-than-significant impact

N = No impact

na = Not applicable

SM = Potentially significant but mitigable impact

SU = Significant and unavoidable impact

### **5.2.10 Mitigation and Monitoring**

Although most of the application scenarios are conducted using strict BMPs and schedules that avoid periods when the nontarget receptors may be more sensitive to stresses (nesting, migration likes, known movements between habitats (small mammals and reptiles), the District conducts surveillance and monitoring of results on a routine basis. When the District receives information about vector outbreaks or unwanted population expansions, they are dealt with on a case-by-case basis, yet still following BMPs and acknowledging the HCPs and NCCPs whenever possible and feasible. While the actual amount of the exposure of nontarget species to the active ingredient in each pesticide of concern is generally well below the levels that could result in toxicity in the laboratory test, the results of the pesticide application programs are constantly under surveillance and are monitored for total use, use per acre, timing of applications, and all parameters affecting the program application scenarios. The fate and transport of the chemicals of interest are discussed in detail in Appendix B.

No new mitigation measures are proposed as no potentially significant impacts to terrestrial resources were identified.