Summary

This summary of the Marin/Sonoma Mosquito and Vector Control District's Programmatic Environmental Impact Report (PEIR) on the continuation of their Integrated (Mosquito and) Vector Management Program (IVMP or Program) presents an overview of the PEIR contents. It introduces key components of the Proposed Program and provides a summary of the potential environmental impacts of the Program alternatives. The text of the PEIR is supplemented by five technical reports included as appendices. The District, as Lead Agency under the California Environmental Quality Act (CEQA), has prepared this PEIR for their ongoing program of surveillance and control of mosquitoes and other vectors of human disease and discomfort.

S.1 Background

The District was established in 1915 to reduce the risk of vector-borne disease and discomfort to the residents of its Service Area. The District engages in activities and management practices to control mosquitoes and other vectors and to address specific situations within its Service Area (i.e., Marin and Sonoma counties). These management practices emphasize the fundamentals of integrated pest management (IPM), specifically integrated vector management (IVM) wherein source reduction, habitat modification, and biological control are used when appropriate before using pesticides. When pesticides are used, they are applied in a manner that minimizes risk to human health and ecological health. To avoid or manage the risk to human and animal health requires effective vector-borne disease surveillance and control strategies that may fluctuate temporally and regionally. Factors that influence the selected strategies include mosquito and pathogen biology, environmental factors, land use patterns, and resource availability to support production of the vectors in quantities that threaten human and animal health.

S.1.1 Vector-Borne Diseases in Program Area

Certain vectors can transmit a number of diseases. A vector is defined by the State of California as "any animal capable of transmitting the causative agent of human disease or capable of producing human discomfort or injury, including, but not limited to, mosquitoes, flies, other insects, ticks, mites, and rats, but not including any domesticated animal…" [California Health and Safety Code Section 2200(f)]. The diseases of most concern in the PEIR Program Area are as follows, by the vector they are associated with:

> Mosquito-transmitted illnesses: West Nile virus, western equine encephalomyelitis, Saint Louis encephalitis, dog heartworm, malaria, and myxomatosis

> Tick-transmitted illnesses: Lyme disease, babesiosis, ehrlichiosis, tularemia, Spotted fever group *Rickettsia*, anaplasmosis, *Rickettsia* 364D

> Rodent/rat-transmitted illnesses: leptospirosis, hantavirus pulmonary syndrome (HPS), tularemia, plague

> Other vector-transmitted illnesses: murine typhus transmitted by fleas (usually on rats)

Depending on the disease, both human and domestic animal health can be at risk of disability, illness, and/or death. Furthermore, potential exists for introduction and transmission of new diseases by current vectors and for new disease vectors to be introduced into the District's Service Area. An example of this is the recent discovery of *Aedes albopictus* (i.e., Asian tiger mosquito) and *Aedes aegypti* (i.e., yellow fever mosquito) mosquitoes in central and southern California. These mosquito species are known to be vectors of diseases such as Chickungunya virus, yellow fever, and Dengue fever.

S.1.2 Authority to Implement Vector Control

A number of legislative and regulatory actions form the basis for the District's authority to engage in vector control. The District's principal authority is derived from the California Health and Safety Code. It is a regulatory agency formed pursuant to California Health and Safety Code Section 2000 et seq. **State law charges the District with the authority and responsibility to take all necessary or proper steps for the control of mosquitoes and other vectors in the District.**

In accordance with California Health and Safety Code Section 2053:

(a) A district may request an inspection and abatement warrant pursuant to Title 13 (commencing with Section 1822.50) of Part 3 of the Code of Civil Procedure. A warrant issued pursuant to this section shall apply only to the exterior of places, dwellings, structures, and premises. The warrant shall state the geographic area which it covers and shall state its purposes. A warrant may authorize district employees to enter property only to do the following:

  (1) Inspect to determine the presence of vectors or public nuisances.

  (2) Abate public nuisances, either directly or by giving notice to the property owner to abate the public nuisance.

  (3) Determine if a notice to abate a public nuisance has been complied with.

  (4) Control vectors and treat property with appropriate physical, chemical, or biological control measures.

(b) Subject to the limitations of the United States Constitution and the California Constitution, employees of a district may enter any property, either within the district or property that is located outside the district from which vectors may enter the district, without hindrance or notice for any of the following purposes:

  (1) Inspect the property to determine the presence of vectors or public nuisances.

  (2) Abate public nuisances pursuant to this chapter, either directly or by giving notice to the property owner to abate the public nuisance.

  (3) Determine if a notice to abate public nuisance has been complied with.

  (4) Control vectors and treat property with appropriate physical, chemical, or biological control measures.

The California Department of Pesticide Regulation's (CDPR's) Pesticide Regulatory Program provides special procedures for vector control agencies that operate under a Cooperative Agreement with the California Department of Public Health (CDPH). The application of pesticides by vector control agencies is regulated by a special and unique arrangement among the CDPH, CDPR, and County Agricultural Commissioners. CDPR does not directly regulate vector control agencies. CDPH provides regulatory oversight for vector control agencies that are signatory to the Cooperative Agreement. Signatories to the agreement use only pesticides listed by CDPH, maintain pesticide use reports, and ensure that pesticide use does not result in harmful residues on agricultural products.

The District maintains a cooperative agreement with CDPH (CDPH and MSMVCD 2014). Its employees are certified by CDPH as vector control technicians, which helps to ensure that employees are adequately trained regarding safe and proper vector control techniques including the handling and use of pesticides and compliance with laws and regulations relating to vector control and environmental protection.

S.2 Program Objectives and Purpose

The District undertakes vector control activities through its Program to control and/or to provide information on the following vectors of disease and/ or discomfort in the Program Area: mosquitoes, cockroaches, fleas, flies, rats, mice, ticks, and yellow jacket wasps. The District may control noxious/invasive weeds primarily to facilitate access to vector habitat and as a vector habitat source reduction measure.

The Proposed Program's specific objectives are as follows:

> Reduce the potential for human and animal disease caused by vectors

> Reduce the potential for human and animal discomfort or injury from vectors

> Accomplish effective and environmentally sound vector management by means of:

- Surveying for vector presence, abundance, human and animal contact or potential for human and animal contact
- Establishing treatment guidelines
- Appropriately selecting from a wide range of Program tools or components

Most of the relevant vectors are quite mobile and cause the greatest hazard or discomfort at a distance from where they breed. Each potential vector has a unique life cycle, and most of them occupy several types of habitats. To effectively control them, an IVMP must be employed. District policy is to identify those species that are currently vectors, to recommend and implement techniques for their prevention and control, and to anticipate and minimize any new interactions between vectors and humans through direct control or through advice to property owners and the public.

S.3 Public Involvement Summary

Public involvement for this PEIR includes the following actions.

Marin/Sonoma Mosquito and Vector Control District (District) distributed a Notice of Preparation (NOP) of a Draft PEIR for the Integrated Mosquito Management Program (Program) pursuant to CEQA Guidelines (Section 15082) on May 25, 2012. The NOP was sent to 353 agencies, organizations, and individuals, including the following state responsible and trustee agencies:

> Air Resources Board

> Cal-EPA

> Caltrans District 4

> Coastal Commission

> Coastal Conservancy

> Department of Boating and Waterways

> Department of Fish and Wildlife, Region 3

> Department of Food and Agriculture

> Department of Parks and Recreation

> Department of Pesticide Regulation

> Department of Public Health

> Department of Public Health/Drinking Water

> Department of Toxic Substances Control

> Department of Water Resources

> Division of Forestry

> Native American Heritage Commission

> San Francisco Regional Water Quality Control Board (SFBRWQCB)

> State Lands Commission

> State Water Resources Control Board (SWRCB)

The NOP provided a description of the Program, the location of Program activities, and the resources and environmental concerns planned for analysis in the PEIR. The NOP announced public scoping meetings and requested submittal of comments on the content of the PEIR and the Program alternatives within 30 days of receipt. Two public scoping meetings were held at the following locations and times:

> San Rafael Community Center, San Rafael, on June 12, 2012 at 7:00 pm.

> Rohnert Park Senior Center, Rohnert Park, on June 14, 2012 at 7:00 pm.

Comments received during scoping on the content of the PEIR are addressed in the resource chapters.

A Notice of Availability of a Draft PEIR is being made available to agencies, organizations, and individuals on the District's mailing list.

S.4 Areas of Known Public Environmental Concerns

CEQA Guidelines Section 15123 requires that the Summary "shall identify areas of controversy known to the lead agency." The areas of greatest public controversy based on comments from public scoping and comments made during other District activities are:

> Use of Pesticides for Vector Control: Members of the public are distrustful of pesticide use for vector control. They prefer other methods to eliminate suitable habitat to deal with mosquito problems rather than spraying pesticides. If adulticides must be used, ensure use is justified with documented, mosquito-borne disease activity within or within flight range of the tidal marsh. Concern exists about pesticide applications drifting into backyards where the property owner wants to ensure their area is pesticide-free. The concern is not only with impacts to humans and "sensitive populations" but also to domestic animals and wildlife including nontarget insects.

> Use of Herbicides for Vegetation Management: Request for specific vegetation management information about the proposed chemical vegetation control agents (herbicides), the types, amounts and locations of chemical stored, application methods and rates, and their effects on the environment.

> Use of Biological Control Agents: Controversy exists over the use of some proposed biological control agents, in particular the use of mosquitofish and potential for them to impact sensitive species such as the California red-legged frog.

> District's Authority to Enter Public and Private Property for Control Activities: Some public agencies want the District to obtain an Encroachment Permit with notification of Park Supervisors for activities such as surveillance, physical control, or vegetation management where access to parkland is needed. Water districts insist that mosquito abatement materials and practices proposed for use on watershed lands must be thoroughly vetted and approved by CDPH. New legislation in 2014 clarified responsibilities of CDFW and the District to engage in mosquito abatement in CDFW owned and/or managed wildlife refuges.

S.5 Proposed Program Alternatives

S.5.1 Proposed Program

The District has, for at least the past 2 decades, taken an integrated systems approach to mosquito and vector control, utilizing a suite of tools that consist of surveillance, vegetation management, and physical, biological, and chemical controls along with public education. These Program "tools" or components are described herein as "Program alternatives" for the CEQA process (except for public education, which is exempt from CEQA). Program implementation is weighted heavily towards source reduction and biological control, in part, to reduce the need for chemical control. To realize effective and environmentally sound vector management, vector control must be based on several factors:

1. Carefully monitoring or surveying vector abundance and/or potential contact with people
2. Carefully monitoring and surveying for vector-borne diseases and their antecedent factors that initiate and/or amplify disease
3. Establishing treatment guidelines
4. Selecting appropriate tools from a wide range of control methods

This Program consists of a dynamic combination of surveillance, treatment guidelines, and use of multiple control activities in a coordinated program with public education that is generally known as Integrated Pest Management (IPM) or Integrated Vector Management (IVM) when focused on vector control.

While these Program components or tools together encompass the District's IVMP, it is important to acknowledge that the specific tools District staff use vary from day to day and from site to site in response to the vector species that are active, their population size or density, their age structure, location, time of year, local climate and weather, potential for vector-borne disease, proximity to human populations, including (a) proximity to sensitive receptors, (b) District staff's access to vector habitat, (c) abundance of natural predators, (d) availability and cost of control methods, (e) effectiveness of previous control efforts at the site, (f) potential for development of resistance in vector populations, (g) landowner policies or concerns, (h) proximity to special-status species, and (i) applicability of Endangered Species Recovery Plans, Habitat Conservation Plans (HCPs), Natural Community Conservation Plans (NCPPs), and local community concerns, among other variables. Therefore, the specific actions taken in response to current or potential vector activity at a specific place and time depend on factors of vector and pathogen biology, physical and biotic environment, human settlement patterns, local standards, available control methods, and institutional and legal constraints. While some consistent vector sources are exposed to repeated control activity, many areas with minor vector activity are not routinely treated, and most of the land within the District's Service Area has never been directly treated for vectors.

The District has implemented a number of procedures and practices under current Program activities that would continue into the future for the Proposed Program. These best management practices (BMPs) represent measures to avoid, minimize, or eliminate potential adverse effects on the human, biological, and physical environments and on District Staff. While similar to mitigation measures under CEQA, these BMPs are already in use and would continue as part of the Proposed Program. Subsequent environmental impact assessments in this PEIR reflect the continued use of these measures, which are organized under the following categories:

> General BMPs
> Tidal Marsh-Specific BMPs
> Salt Marsh Harvest Mouse (SMHM)
> Ridgway's Rail (RIRA)
> Soft Bird's Beak (SBB)

> Vegetation Management

> Maintenance/Construction and Repair of Tide Gates and Water Structures in Waters of the U.S.

> Applications of Pesticides, Surfactants, and/or Herbicides

> Hazardous Materials and Spill Management

> Worker Illness and Injury Prevention Program and Emergency Response.

The No Program Alternative is defined as the District not engaging in any of the control strategies and tools for mosquito and/or vector control. Past practices would not continue into the future. The District would not continue to operate and would close. Key assumptions for the future No Program Alternative are:

> Current regulatory controls would continue and expand as needed; however, the District would not engage in implementing any of these regulations concerning public health and management of vectors carrying potential diseases. For all practical purposes, the District's office would close. Public education and other outreach activities would cease along with the control activities.

> Private landowners would manage mosquito and/or vector problems on private land without any state or federal oversight with pesticides approved for use. Households would use pesticides commonly available from retail outlets where permethrin and pyrethroids are common ingredients.

> In the absence of the District's IVMP, the responsibility for vector management could fall on CDPH (or some other agency), who would not provide mosquito and vector control support but rather only "oversight" to local jurisdictions given lack of personnel, equipment, or funding. Management at the state level would likely be only reactive rather than proactive.

The District anticipates combining the following ongoing alternatives into its Proposed Program, a continuation of its existing Program with adaptations to meet future needs. The six alternatives evaluated in this PEIR are summarized below.

S.5.1.1 Surveillance

Vector surveillance, which is an integral part of the District's responsibility to protect public health and welfare, involves monitoring vector populations and habitat, their disease pathogens, and human/vector interactions. Vector surveillance provides the District with valuable information on what vector species are present or likely to occur, when they occur, where they occur, how many they are, and if they are carrying disease or otherwise affecting humans. Vector surveillance is critical to an IVMP because the information it provides is evaluated against treatment criteria to decide when and where to institute vector control measures. Information gained is used to help form action plans that can also assist in reducing the risk of contracting disease. Equally important is the use of vector surveillance in evaluating the efficacy, cost effectiveness, and environmental impacts of specific vector control actions. Examples include field counting/sampling and trapping, arbovirus surveillance, field inspection of known of suspected habitats, and documenting public service inquiries and requests.

S.5.1.2 Physical Control

Physical control is managing vector habitat to reduce vector production through "source control' measures that are nonchemical or nonbiological techniques. In many cases, physical control activities involve restoration and enhancement of natural ecological functioning. For mosquitoes, these activities include, but are not limited to, water management and maintenance of channels, tide gates, levees, and other water control facilities to improve water circulation. Physical control is usually the most effective mosquito control technique because it provides a long-term solution by reducing or eliminating mosquito development sites and ultimately reduces and potentially eliminates the need for chemical applications.

S.5.1.3 Vegetation Management

The species composition and density of vegetation are basic elements of the habitat value of any area for mosquitoes and other vectors, for predators of these vectors, and for protected flora and fauna. District staff periodically undertake vegetation management activities as a tool to reduce the habitat value of sites for mosquitoes and other vectors or to aid production or dispersal of vector predators, as well as to allow District staff's access to vector habitat for surveillance and other control activities. District staff's direct vegetation management generally consists of activities to reduce the mosquito habitat value of sites by improving water circulation or access by fish and other predators, or to allow District staff's access to standing water for inspections and treatment. For vegetation management, the District uses hand tools or other mechanical means (i.e., heavy equipment) for vegetation removal or thinning and sometimes applies herbicides (chemical pesticides with specific toxicity to plants) under the cooperating agencies' permitting to improve surveillance or reduce vector habitats. Vegetation removal or thinning primarily occurs in aquatic habitats to assist with the control of mosquitoes and in terrestrial habitats to help with the control of other vectors.

S.5.1.4 Biological Control

Pathogens

Mosquito pathogens are highly host-specific and usually infect mosquito larvae when they are ingested. Upon entering the host, these pathogens multiply rapidly, destroying internal organs and consuming nutrients. The pathogen can be spread to other mosquito larvae in some cases when larval tissue disintegrates and the pathogens are released into the water to be ingested by uninfected larvae. Examples of bacteria pathogenic to mosquitoes are *Bacillus sphaericus* (Bs), the several strains of *Bacillus thuringiensis israelensis* (Bti), and *Saacharopolyspora spinosa*. Two bacteria, Bs and Bti, produce proteins that are toxic to most mosquito larvae, while *Saacharopolyspora spinosa* produces compounds known as spinosysns, which effectively control all larval mosquitoes. Bs can reproduce in natural settings for some time following release. Bti materials the District applies do not contain live organisms, but only spores made up of specific protein molecules.

Predators

Mosquito predators are represented by highly complex organisms, such as insects, fish, birds, and bats that consume larval or adult mosquitoes as prey. Predators are opportunistic in their feeding habits and typically forage on a variety of prey types, which allows them to build and maintain populations at levels sufficient to control mosquitoes, even when mosquitoes are scarce. Examples of mosquito predators include representatives from a wide variety of taxa: coelenterates, *Hydra* spp.; platyhelminths, *Dugesia dorotocephala, Mesostoma lingua, and Planaria* spp.; insects, *Anisoptera, Zygoptera, Belostomidae, Geridae, Notonectidae, Veliidae, Dytiscidae, and Hydrophilidae*; arachnids, *Pardosa* spp.; mosquitofish, *Gambusia affinis*, *Gasterosteus aculeatus*; bats; and birds, *anseriformes, apodiformes, charadriiformes, and passeriformes*. Only mosquitofish are commercially available to use at present, while the District supports the presence of the other species as practical. The District's application of mosquitofish in mosquito habitat is the most commonly used biological control agent for mosquitoes in the world. Due to concerns that mosquitofish may potentially impact red-legged frog and tiger salamander populations, District policy is to limit the use of mosquitofish to ornamental fish ponds, water troughs, water gardens, fountains, unused swimming pools, and other types of isolated man-made ponds that do not provide habitat that could support native species and that are not connected to natural waterways. Limiting the introduction of the mosquitofish to these sources should prevent their migration or introduction into habitats used by threatened, endangered, or rare species.

S.5.1.5 Chemical Control

Chemical control is a Program tool that consists of the application of nonpersistent insecticides (and herbicides noted under Section S.5.1.3 above) to directly reduce populations of larval or adult mosquitoes and other invertebrate threats to public health (e.g., yellow jacket wasps, ticks). If and when inspections reveal that mosquitoes or other vector populations are present at levels that trigger the District's criteria for chemical control – based on the vector's abundance, density, species composition, proximity to human settlements, water temperature, presence of predators, and other factors – District staff will apply pesticides to the site in strict accordance with the pesticide label instructions and District best management practices (BMPs). All of the chemical tools the District uses are evaluated in Appendix B, *Ecological and Human Health Assessment Report*.

The vast majority of chemical control tools are used for mosquito abatement. The primary pesticides used can be divided between "larvicides," which are specifically toxic to mosquito and other insect larvae, and "adulticides," which are used to control adult mosquito populations. Larvicides are applied when the chemical control criteria for mosquito larvae are present and application rates vary according to time of year, water temperature, the level of organic content in the water, the type of mosquito species present, larval density, and other variables. Larvicide applications may be repeated at any site at recurrence intervals ranging from annually to weekly. 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. As with larvicides, adulticides are applied in strict conformance with label requirements. Adulticiding is the only known effective measure of reducing an adult mosquito population in a timely manner. All mosquito adulticiding activities follow reasonable guidelines to avoid affecting nontarget species including bees. Timing of applications (when mosquitoes are most active), avoiding sensitive areas, working and coordinating efforts with California Department of Fish and Wildlife (CDFW) or United States Fish and Wildlife Service (USFWS), and following label instructions all result in effective mosquito control practices.

Besides using insecticides for mosquito populations, the District selectively applies them to control ground-nesting yellow jackets, as well as to control tick populations that pose an imminent threat to people or to pets. This activity is generally triggered by public requests for District assistance or action rather than as a result of regular surveillance of their populations. The District excludes from its yellow jacket control program populations of this vector that are located in or on a structure. Yellow jacket nests that are off the ground would be treated under special circumstances to protect public health and safety of the District's residents.

S.5.1.6 Nonchemical Control/Trapping

This tool includes the trapping of rodents and/or trapping of yellow jackets that pose a threat to public health and welfare. For both vector species, tamper-resistant or baited traps are used. District staff place the trap(s) primarily at the request of the property owner or manager. When requests for rat and yellow jacket pest removal in or on structures occur, citizens are referred to the Marin or Sonoma County Animal Control Agency, or to a directory of local private pest control companies, because the District is not licensed for these types of activities.

S.5.2 Alternatives Eliminated From Further Consideration

The District determined that of the 20 potential tools considered in Appendix E, *Alternatives Analysis* Report, the following eight methods were not immediately available for use in its IVMP: biological control pathogens (viruses), biological control (parasites), mass trapping, attract and kill, inundative releases (both parasites and predators/other organisms), regulatory control, and repellents.

> Biological Control pathogens (viruses) is deemed infeasible, as this method is not commercially available in California, and there are currently many efficacy related issues.

> Biological Control (parasites) is deemed infeasible, as this method is not commercially available in California. Research on the use of parasites for mosquito control has also shown several limitations related to efficacy.

> Mass Trapping is not considered by the District to be a practical, effective, reliable method of controlling vector populations. It can be very expensive and time consuming (i.e., labor intensive).

> Attract and Kill is not considered by the District to be a practical, effective, reliable, method of controlling vector populations. The technology for both mosquitoes and yellow jackets is limited, and effectiveness is either not obtained or is inconsistent. Nontarget insects can be impacted. The District is aware of one commercially available attractive toxic sugar bait (ATSB) product, Terminix® AllClear. The District still needs to operationally test this material, as well as other potential ATSBs, to determine those circumstances where their use may be effective while also having little or no nontarget species impacts.

> Inundative Releases of parasites is not considered by the District to be a practical or currently feasible method of controlling vector populations. They are not commercially available and remain experimental at this time.

> Inundative Releases of predators, either sterilized or genetically altered organisms, is not considered by the District to be a practical or a currently feasible method of controlling vector populations. Genetically modified vectors are still experimental. They are also not commercially available at this time.

> Regulatory Control is not considered feasible because adoption of regulations is lengthy, time intensive, expensive and uncertain as to the regulatory outcome. This approach is not focused sufficiently on control of existing populations. Moreover, regulatory controls are dependent upon state and federal agencies to initiate and implement, and thus this approach cannot assure that any project objectives would be achieved.

> Repellants, although effective for small-scale use by humans and animals, are not part of the overall Program control strategy because they merely displace the problem and do not reduce the mosquito population in an area.

S.5.3 Environmentally Superior Alternative

Table S-1 presents a summary of all the impacts associated with each Program alternative and. therefore, the overall Proposed Program of all of the alternatives combined. It is based on Table 15-1 which presents a summary of all the statements of impact with significance determinations. For Surveillance, Physical Control, Vegetation Management, Chemical Control, and Nonchemical Control/Trapping Alternatives, the impacts are either “less than significant” (LS) or “no impact” (N) with one “potentially significant but mitigable impact” (SM).

There is only one potentially significant impact: the Chemical Control Alternative could subject people to objectionable odors. Impacts even with BMPs implemented could be **potentially significant but mitigable.** Certain VOCs, sulfur compounds, and chlorine compounds found in some pesticides emit characteristic odors when they evaporate (volatilize) into air, even at very low concentrations well within safety limits. Pesticides currently used or proposed for future use emit phenols (e.g., deltamethrin,

etofenprox, permethrin, or resmethrin). Materials such as Bti in liquid form and the adulticides pyrethrin and permethrin have an odor. Due to limited applicability, small quantities of these types of substances are typically used. The human sense of smell (olfactory system) is sensitive to these types of compounds as a warning mechanism, and some individuals are more sensitive than others. The Chemical Control Alternative would apply certain types of odorous treatments using hydraulic spraying and atomizing (fogging), which could result in drift of small droplets and gaseous vapors. Depending on atmospheric conditions (i.e., wind direction, wind speed, stability class), this drift could subject people to objectionable odors near a treatment area. The materials have been used in the current Program, and people have not complained about odors. However, it is possible that complaints could occur in the future despite public notification procedures about large-scale treatments.

Section 15.4 describes two "Reduced Program Alternatives:" Reduced Chemical Control and No Chemical Control.

> Reduced Chemical Control: To the extent the District can modify elements of the Chemical Control Alternative to mitigate identified impacts by avoiding the potentially significant impacts associated with some pesticide products by using less of any of these products or by eliminating one or more them in favor of other, less odorous products, then the **environmentally superior alternative would be a Program incorporating these modifications to this alternative as components of the overall IVMP as long as Program effectiveness is maintained.** Excluding air quality and the odor issue, the impacts to all of the other resources would be the same as for the Proposed Program.

> No Chemical Control: This alternative would completely remove the chemical treatment options under the Vegetation Management and Chemical Control Alternatives. It would not have any of the less-than-significant impacts associated with herbicide and pesticide use. However, it was determined to be inconsistent with Program objectives and IVM principles, and it could lead to significant and unavoidable impacts to human health due to the reduced effectiveness of the Program in controlling mosquito and other vector populations.

The No Program Alternative is not the environmentally superior alternative due to its potentially significant impacts to the following resources and concerns identified in Section 15.3: urban and rural land uses, aquatic and terrestrial biological resources, ecological health, human health, and public services and hazard response.

S.6 Summary of Environmental Impacts and Mitigation Measures

Table S-1 provides a summary of all of the environmental impacts and mitigation for the Program alternatives (to be combined into the overall Proposed Program). The existing condition (2012) sets the baseline against which the alternatives are evaluated for CEQA. Impact statements are presented in their entirety in the resource sections. For Table S-1, impact areas or environmental concerns are merely listed using brief terms for ease of comparison. Symbols used in the table for CEQA determinations of impact are:

SM = Potentially Significant but Mitigable Impact

LS = Less-than-Significant Impact

N = No Impact

Table S-2 presents only the potentially significant impact for the Program alternatives, the mitigation required, and the significance following mitigation implementation. The Program alternative with potentially significant but mitigable impacts is Chemical Control. Under the Chemical Control Alternative, a potentially significant impact to humans could occur from the use of odorous chemicals proposed for use in the Proposed Program. Without site-specific information, it cannot be determined whether an objectionable odor may persist downwind of a particular treatment area; therefore, an application containing an odorous compound may impact an undefined number people for an undefined period of time including recreationists and residents.

The materials have been used in the current Program, and people have not complained about odors. However, it is possible that complaints could occur in the future. Mitigation measures represent actions the District will take to reduce the air quality impact to a level of insignificance. If mitigation is not feasible or practical to implement, or simply not enough to reduce the impact to less than significant, then the impact would be "significant and unavoidable." **The potentially significant impact associated with the Chemical Control Alternative can be mitigated to a less-than-significant level.**

Table S-3 presents a comparison of the Reduced Chemical Control Program and the No Chemical Control Program with the Proposed Program.

Table S-1 Summary Comparison of Impacts of All Alternatives (Proposed Program)

Environmental Concern	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Other Nonchemical/ Trapping
3. Urban and Rural Land Uses						
Quantity and/or quality of recreational opportunities	LS	LS	LS	N	LS	LS
Conflict with applicable land use regulations	N	N	N	N	N	N
4. Biological Resources – Aquatic						
Candidate, sensitive, or special-status species	LS	LS	LS	N	LS	N
Riparian habitat/sensitive natural community	LS	LS	LS	N	LS	N
Federally protected wetlands	LS	LS	LS	N	N	N
Movement of species or impacts to wildlife corridors or nursery sites	N	LS	N	N	N	N
Conflict with local policies and ordinances	N	N	N	N	N	N
Conflict with appropriate HCP/NCCPs	LS	LS	LS	N	LS	N
5. Biological Resources – Terrestrial						
Candidate, sensitive, or special-status species	LS	LS	LS	N	LS	LS
Riparian habitat/sensitive natural community	LS	LS	LS	N	N	N
Federally protected wetlands	LS	LS	LS	N	N	N
Movement of species or impacts to wildlife corridors or nursery sites	LS	LS	N	N	N	N
Conflict with local policies and ordinances	N	N	N	N	N	N
Conflict with appropriate HCP/NCCPs	LS	LS	LS	N	LS	N
6. Ecological Health						
Impacts on nontarget ecological receptors	LS	LS	LS	LS	LS	LS

Table S-1 Summary Comparison of Impacts of All Alternatives (Proposed Program)

Environmental Concern	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Other Nonchemical/ Trapping
7. Human Health						
Impacts on human health	N	LS	N,LS	N	N, LS	N
8. Public Services and Hazard Response						
Increase demand for police, fire, or health-care services	N	N	N	N	N	N
Create a significant hazard to the public or the environment through routine transport, use, or disposal of hazardous materials or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment	N	N	N	N	N	N
Expose people or structures to a significant risk of loss, injury, or death involving wildland fires	N	N	N	N	N	N
9. Water Resources						
Impacts on surface water resources	LS, N	LS	LS	LS	LS	N
Impacts on groundwater resources	N	LS	N, LS	LS	LS	N
10. Air Quality						
SIP emission inventory and the compliance with applicable air regulations	LS	LS	LS	LS	LS	LS
Ambient air quality standard	LS	LS	LS	LS	LS	LS
Cumulatively considerable increase of nonattainment pollutants	LS	LS	LS	LS	LS	LS
Expose sensitive receptors to substantial pollutant concentrations	LS	LS	LS	LS	LS	LS
Subject people to objectionable odors	N	N	N	N	SM	N

Table S-1 Summary Comparison of Impacts of All Alternatives (Proposed Program)

Environmental Concern	Surveillance	Physical Control	Vegetation Management	Biological Control	Chemical Control	Other Nonchemical/ Trapping
11. Greenhouse Gases and Climate Change						
Cumulatively considerable amount of GHGs	LS	LS	LS	LS	LS	LS
Conflict with applicable plans, policies, or regulations for reducing GHG emissions	LS	LS	LS	LS	LS	LS
12. Noise						
Exceedance of noise standards	LS	LS	LS	LS	LS	LS
Substantial temporary increase in noise	LS	LS	LS	LS	LS	LS

Table S-2 Significant Impacts and Mitigation for Chemical Control Alternative

Affected Resource and Area of Potential Impact	Identified Impact	Mitigation Measures	Significance After Mitigation
10. Air Quality			
Objectionable Odors	**Impact AQ-25:** The Chemical Control Alternative could subject people to objectionable odors. Impacts could be **potentially significant but mitigable,** even with BMPs implemented**.**	To mitigate Impact AQ-25, the District and its contractors may implement any of the following measures as applicable to the specific application situation to reduce drift towards human populations/residences from the ground and aerial applications of odorous treatment compounds: deltamethrin, etofenprox, permethrin, resmethrin, Bti liquid, and pyrethrin, **Mitigation Measure AQ-25a:** Whenever possible and practicable, defer application of treatment compounds until such time that favorable wind conditions would reduce or avoid the risk of drift into populated areas. > Location: Areas to receive treatment with pesticides that are near residential and commercial land uses > Monitoring/Reporting Action: District staff to check current land use maps or aerial photos prior to treatments > Effectiveness Criteria: Document odor complaints from the public > Responsible Agency: District > Timing: Prior to chemical treatments **Mitigation Measure AQ-25b:** Utilize equipment such as wind meters and global positioning system (GPS) tracking when applicable that assist in documenting site-specific compliance with all label requirements for drift mitigation. > Location: Areas to receive treatment with pesticides that are near residential and commercial land uses > Monitoring/Reporting Action: District staff to check current land use maps or aerial photos prior to treatments > Effectiveness Criteria: Document odor complaints from the public	Less than significant

Table S-2 Significant Impacts and Mitigation for Chemical Control Alternative

Affected Resource and Area of Potential Impact	Identified Impact	Mitigation Measures	Significance After Mitigation
		> Responsible Agency: District > Timing: Prior to chemical treatments **Mitigation Measure AQ-25c:** Use precision application technology to reduce drift and the total amount of material applied. This measure can include (1) precision guidance systems that minimize ground or aerial spray overlap (e.g., GPS and Real Time Kinetics – GPS/RTK), and (2) computer-guided application systems that integrate real-time meteorological data and computer model guidance to reduce drift from aerial application (e.g., trade names "AIMMS," "Wingman™ GX," and "NextStar™ Flow Control"). > Location: Areas to receive treatment with pesticides that are near residential and commercial land uses > Monitoring/Reporting Action: District staff to check current land use maps or aerial photos prior to treatments > Effectiveness Criteria: Document odor complaints from the public > Responsible Agency: District > Timing: Prior to chemical treatments	Less than significant

Table S-3 Comparison of Reduced Program Alternatives to Proposed Program

	Proposed Program	**Reduced Chemical Control Program**	**No Chemical Control Program**
Alternative Component			
Surveillance	Included	Included	Included
Physical Control	Included	Included	Included
Vegetation Management > Physical Methods > Herbicides/Adjuvants	All physical methods and chemical options included	All physical methods and chemical options included	Includes physical methods only. > Excludes all herbicides and adjuvants. > Less effective with greater reliance on physical and mosquitofish options
Biological Control	Mosquitofish	Mosquitofish	Mosquitofish
Chemical Control	Use any or all pesticides and adjuvants, surfactants, and synergists listed in Chapter 2	Use less of or eliminate one or more of the following: > Deltamethrin > Etofenprox > Permethrin > Resmethrin > Pyrethrin > Bti liquid	Use none of the pesticides and adjuvants, surfactants, and synergists listed in Chapter 2
Nonchemical Control/Trapping	Included	Included	Included

Table S-3 Comparison of Reduced Program Alternatives to Proposed Program

	Proposed Program	Reduced Chemical Control Program	No Chemical Control Program
Impacts			
Biological Resource Impacts (excluding ecological health)	No Impact or Less-than-Significant Impact	No Impact or Less-than-Significant Impact	No Impact or Less-than-Significant Impact
Physical Resource Impacts (excluding air quality odors)	No Impact or Less-than-Significant Impact	No Impact or Less-than-Significant Impact	No Impact or Less-than-Significant Impact
Air Quality - Odors	Potentially Significant but Mitigable Impact Less-than-Significant after Mitigation	Less-Than-Significant Impact	No Impact
Ecological Health Impacts	Less-than-Significant Impact	Less-than-Significant Impact	Potentially Significant Impacts
Human Health Impacts	No Impact or Less-than-Significant Impact	No Impact or Less-than-Significant Impact	Significant and Unavoidable Impacts