Table of Contents

Tables

This page left intentionally blank

13 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). Previously approved projects will be part of the baseline, and future projects that are not now known are speculative and need not be considered in the analysis. However, the analysis does need to consider the impacts of the proposed project in combination with any other reasonably foreseeable projects, and all of those impacts must be considered against the environmental baseline.

The cumulative impact from several projects is the change in the environment that results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. The question is whether the project's incremental effect is cumulatively considerable. For a project to have a cumulative impact, it must have some incremental impact in the category being studied. For example, if the cumulative projects will all have impacts on Swainson's hawk, but the proposed project will not have any incremental impact on Swainson's hawk, the project has no cumulative impacts on Swainson's hawk. Conversely, if the project will have a large enough significant impact, such that it may affect an entire watershed or air basin, it may be considered to have significant cumulative impacts even if no other projects will contribute impacts. The determination is whether the proposed project's incremental contribution to a cumulative impact results in a potentially "considerable" (i.e., significant) cumulative impact, and, if so, whether the project's incremental contribution can be mitigated to a less-than-significant level.

The concern then is to assess the incremental environmental impact that can occur from a variety of sources, a summation of multiple insignificant impacts that, when taken together, result in a significant impact. If so, then the project's incremental contribution to the combined significant cumulative impact may be "cumulatively considerable." In summary, only the less-than-significant and potentially significant impacts of the District's Program alternatives have the potential to add an incremental effect to a cumulatively significant impact.

CEQA Guidelines Section 15130 requires that an EIR discuss cumulative impacts of a project and determines whether the project's incremental effect is "cumulatively considerable." The definition of cumulatively considerable is provided in Section 15065(a)(3):

> *"Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.*

According to CEQA Guidelines Section 15130(b),

> *The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the project alone. The discussion should be guided by standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.*

For purposes of this PEIR, the District's Program would have a significant cumulative effect if:

> ***(1) The cumulative effect of related projects (past, current, and probable future projects) without the project are not significant and the project's incremental***

impact is substantial enough, when added to the cumulative effects, to result in a significant impact; or

(2) The cumulative effects of related projects (past, current, and probable future projects) without the project are already significant and the project contributes considerably to the effect. The standards used herein to determine considerability are either that the impact must be substantial or must exceed an established threshold of significance.

Mitigation measures are to be developed, where feasible, that reduce the project's contribution to significant cumulative effects to a less-than-significant level.

To clarify, CEQA Guidelines Section 15064 (h) (4) states that the mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable. Where cumulative impacts are significant, any level of incremental contribution to that impact by the proposed project does not have to be called out as cumulatively considerable. Furthermore, when the District's IVMP makes no incremental contribution at all to a significant cumulative impact caused by other plans, programs, and projects, i.e., the "no impact" determination for a Program alternative, it cannot be called cumulatively considerable.

Two methods exist for analyzing the cumulative impacts of past, present, and reasonably foreseeable future projects: the "list method" and the "summary of projections method" (CEQA Guidelines Section 15130). Both of these methods are most appropriate to the evaluation of land development or projects involving changes in land use and related activities.

> The list method requires a discussion of related past, present, and future projects; and in the case of human health, it would require discovering and disclosing impacts to public health from all of these projects. This approach is not practical given the Program's extent to its Service Area and adjacent counties for a multi-county Program Area, which makes the development of a list of projects most difficult and would then require a human health impact assessment for a very long list and variety of projects potentially creating a physical change in the environment.

> The summary of projections method relies on projections contained in approved land use documents such as general plans, specific plans, and local coastal plans to serve as the foundation for the cumulative analysis. The issue is whether the project under evaluation is consistent with the forecasts of economic and population growth contained in the planning documents and, therefore, already addressed in the certified EIRs on these plans and projects. Can the agency rely on the cumulative analyses addressed in a prior EIR to say that no further analysis is needed?

The listing of all of the projects occurring in an area is not practical for this evaluation of a Program that could occur over multiple counties in California. The District's IVMP would not result in additional housing or commercial/industrial development in a treatment area. The alternative "summary of projections" method is also not practical because it is based on summaries of growth in city and county plans, which are not relevant for the Program as it does not induce growth or develop land. Because the Program Area is large, the impacts are explained in the context of a regional environmental concern, and the analysis includes consideration of regional trends in pesticide use from 2006 through 2010 (Section 13.4), where appropriate, as an alternative to the growth projections contained in local general plans.

The following discussion of cumulative impacts is for resources and environmental concerns with less-than-significant or potentially significant impacts and the geographic scope of the analysis is the District's Program Area (i.e., Service Area and adjacent counties where service could be provided upon request). A summary of the cumulative impact determinations by affected resources is presented at the end of the chapter.

13.1 Urban and Rural Land Uses

None of the Program alternatives would have any potentially significant impacts on the quantity and/or quality of recreational opportunities within the District's Program Area; however, all of the alternatives except for Biological Control could have less-than-significant impacts. Concerning land use regulations and policies in the Program Area, none of the Program alternatives would have impacts (i.e., determinations of no impact). However, the Chemical Control Alternative may limit recreational access and diminish recreational quality on a short-term basis during application events, a less-than-significant incremental impact. Due to the isolated nature of these events and the extensive recreational opportunities on public lands within the Program Area (i.e., no existing significant cumulative impact within the Program Area), the small incremental potential impacts on recreational opportunities from five of the Proposed Program alternatives when combined would not likely cumulatively contribute to recreational impacts in the region. No cumulative significant impacts to urban and rural land uses are anticipated when all of the Program's incremental impacts and the impacts of other activities in the region are considered together.

13.2 Biological Resources – Aquatic

Cumulative impacts, as they relate to aquatic resources, includes past, present, and reasonably foreseeable actions that potentially impact aquatic organisms, including fish and nontarget invertebrates. 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 following is a discussion of how the Program impacts could become cumulatively considerable with other impacts in the region. To make this determination, consideration is given to the combined contribution of Program impacts considered together with impacts that exist outside of the Program Area. The issue is whether the Program's incremental contribution to the combined significant cumulative impact is "cumulatively considerable."

The cumulative impact issues addressed first are regional fisheries trends, loss of shallow-water habitats, loss of wetlands, weed control, and trends in pesticide use (Section 13.2.1). Then the impacts by alternative are evaluated (Section 13.2.2).

13.2.1 Regional Fisheries Trends

13.2.1.1 Pelagic Organism Decline (POD)

POD refers to the recent (2002–present) steep decline of pelagic fishes (i.e., fish that occupy open-water habitats) within the Bay-Delta estuary (Armor et al. 2005; CDWR and CDFG 2007; Sommer 2007; Baxter et al. 2010). This environmental issue has emerged as one of overwhelming concern in the Delta.

The issues surrounding POD were announced in early 2005 as a possible change in the estuary's ability to support pelagic species and appeared to be a "step-change" from the preceding long-term decline. Four fish species are of primary concern: delta smelt, longfin smelt, young-of-year striped bass, and threadfin shad. From 2002 to 2007, despite moderate hydrologic conditions in the estuary, which would have been expected to result in moderate increases in population sizes, the populations of these species experienced sharp declines. Populations of each of the four species have been at or near all-time record lows since 2002. The numbers of many pelagic species increased substantially in 2011, but declined again to values near historic lows in 2012, based on the fall mid-water trawl index (CDFW 2013). This change has persisted for a sufficiently long period to conclude that it is the result of something other than the pattern of widely variable population levels observed historically or as part of the long-term decline previously observed.

The factors considered most likely to be responsible for POD are previous abundance of these species; changes in habitat, particularly changes in turbidity and the salinity field in the Delta, invasive weeds and

blue green algae blooms, and ammonia and pyrethroid toxicity; predation, particularly from introduced species such as striped bass, largemouth bass, and Mississippi silversides, and entrainment at the Central Valley Project and State Water Project Diversions; food-web effects from invasive clams; and changes in the phytoplankton and zooplankton community (CDWR and CDFG 2007; Sommer 2007; Baxter et al. 2010). These factors result in an existing significant cumulative impact.

Many of the Interagency Ecological Program studies to evaluate POD's causes have focused on these factors. To date, research has failed to identify a single factor responsible for the decline of all species or even that of a single species (CDWR and CDFG 2007; Sommer 2007; Baxter et al. 2010). POD researchers currently believe that important factors responsible for the decline may be different for each species and that even for a single species these factors may differ between seasons and by hydrologic condition (Wet and Dry years). These factors may operate cumulatively to cause the observed population declines.

The POD Management Team has hypothesized that a number of drivers have combined over time to decrease ecosystem resilience and result in a "regime shift" for the Delta and Suisun Bay region (Baxter et al. 2010). The drivers of the hypothesized regime shift include outflow, salinity, landscape, temperature, turbidity, nutrients, contaminants, and harvest. This hypothesis is currently under investigation.

In the Districts bordering on San Pablo and Suisun and the Delta, the Physical Control and Vegetation Management alternatives would contribute to landscape habitat modifications, while the Chemical Control Alternative would contribute to contaminants. The BMPs associated with the implementation of these alternatives substantially reduce these potential effects to be less than significant at the Program level. However, these less-than-significant Program effects, in combination with the regional context of impacts, would be cumulatively considerable.

> The District's Physical Control and Vegetation Management alternatives are limited to small areas of highly modified habitat. These areas are not primary habitat for POD species. Because the areas where these activities occur are very small relative to the overall area of wetlands in the region, these activities are not expected to have any substantive effect on food production for POD species. Therefore, these two alternatives do not contribute substantially to POD.

> The Chemical Control Alternative includes the use of pyrethrin and pyrethroid pesticides, which have been linked to POD. The District uses pyrethrin and pyrethroid pesticides as part of an IPM approach, where application of these materials is several levels down in the selection of control measures (least preferred), so the use of pyrethrins and pyrethroids is limited. When pyrethrins and pyrethroids are used, the District preferentially uses those with limited persistence in the environment. The District uses pyrethroids over aquatic habitats only under rare circumstances and always in ULV applications, and applies these chemicals according to product labels. Labeled application rates for mosquito control tend to be low; thus, the amounts of adulticide materials applied over aquatic habitats are minimal. Thus, the Chemical Control Alternative does not contribute substantially to the concentrations of pyrethroids in the environment or to POD.

Based on the foregoing, these less-than-significant Program effects, in combination with the regional context of impacts to POD, would not be cumulatively considerable.

The Surveillance, Biological Control, and Nonchemical Control Alternatives involve access, monitoring, and control activities with very limited potential to impact POD. Therefore, all of the Program alternatives have a less-than-significant cumulative impact on POD.

13.2.1.2 Salmonid Population Trends

Salmonid population trends were evaluated in a number of 5-year status reviews completed by NOAA Fisheries in 2011 (NOAA Fisheries 2011 a-f). These reviews indicated that most populations of salmonids showed some evidence of decline, although data are very sparse for some distinct population segments (steelhead) or evolutionarily significant units (Chinook and Coho salmon) (also see NOAA 2011g). The

declines in the 5-year period of review were largely due in part to poor ocean conditions in 2004 and 2005, which resulted in poor adult returns in 2007 through 2009 and drought (Lindley et al. 2009). However, based on the status reviews for these species, the principal factors resulting in their listing include:

> Loss, degradation, simplification, and fragmentation of habitat caused by a variety of activities including logging, road construction, urban development, mining activities, agriculture, ranching, and recreation

> Reduction or elimination of habitat or blocked access to habitat caused by water storage, withdrawal, conveyance and diversion facilities for agriculture, flood control, and domestic and hydropower purposes

> Point and nonpoint sources of pollution

> Loss of riparian habitats

The Physical Control and Vegetation Management alternatives would contribute to the first and last factors, while the Chemical Control Alternative would contribute to the third factor. These activities generally occur over small areas and have little impact on primary salmonid habitat. The BMPs associated with the implementation of these alternatives substantially reduce these potential impacts to be less than significant at the Program level, and these alternatives do not contribute substantially to the total amount of habitat loss for salmonids in the region.

The Chemical Control Alternative applies chemicals in aquatic environments at levels that have minimal impacts to fisheries resources or their food supply. BMPs restrict the application of chemicals with higher potential to harm fish from being used in water, and these chemicals are used in very small amounts and with low frequency relative to other sources in the region. The District also preferentially uses chemicals that degrade quickly in the environment, further reducing the risk associated with this alternative. Thus, the Chemical Control Alternative does not contribute substantively to chemical loads in salmonid habitats.

The Surveillance, Biological Control, and Other Nonchemical Control Alternatives involve access, monitoring, and control activities with very limited potential to impact salmonids. Therefore, all of the Program alternatives have a less-than-significant cumulative impact on salmonid population trends.

13.2.2 Program Alternatives

The Surveillance Alternative's maintenance of access routes and the sampling/ monitoring of mosquito and vector populations have less-than-significant impacts on aquatic habitats, native fish or aquatic invertebrates, special status species, or HCPs and NCCPs along with the Biological Control Alternative's use of mosquitofish in artificial/man-made water bodies and the trapping associated with the Other Nonchemical Control Alternative are not cumulatively considerable given their limited disruption to natural habitats. Consequently, the focus of the analysis below is on the Physical Control, Vegetation Management, and Chemical Control Alternatives.

13.2.2.1 Physical Control Alternative

The draining or filling of shallow-water habitats in natural areas under the Physical Control Alternative would be cumulative with historic and ongoing impacts to these habitats from other land management practices including flood control, urbanization, and channelization. The majority of such activities occurring as part of the action would occur in artificial environments such as drainage ditches, retention ponds, etc. As described in Section 4.2.4.1, shallow-water habitats can be important habitats for young fish and other sensitive aquatic organisms. Floodplains, off-channel pools and backwaters, and wetlands provide high quality habitat for fry and tadpoles that are subject to predation in deeper, connected habitats. However, where fry are present, they would prey on mosquito larvae and, thus, these areas would likely not need treatment. However, conditions in these habitats may change from seasonally or annually, depending on tides, flows, and precipitation patterns, so that a pool that supports fish or amphibians in one year may not have sufficient water to do so in other years.

This Program's Physical Control Alternative occurs in the context of an environment that is highly modified by human use, for agriculture, urbanization, and flood control. It is estimated that more than 90 percent of wetland and riparian habitats in California have been lost to human development (California Natural Resources Agency 2010). Today, recognition of the importance of wetlands is much greater and many wetland protection and restoration projects are underway throughout the state, including, but not limited to, the HCP/NCCPs described in Section 4.1.4. Activities affecting wetlands are subject to permitting requirements from a variety of agencies including the USACE, SWRCB or RWQCBs, CDFW, and others. However, wetlands continue to be affected by urban and agricultural development, roadwork, and other activities (California Natural Resources Agency 2010), an existing significant cumulative impact. The District's activities within this context do not contribute substantially to the cumulative effects of other activities within the region in part due to the constraints of required permits. Therefore, the Program would have a less-than-significant cumulative impact on the amount or quality of aquatic habitat.

13.2.2.2 Vegetation Management Alternative

The vegetation within and around aquatic habitats is an important component of the aquatic ecosystem, as described in Section 4.2.5. As described above, historic development has highly affected adversely wetland communities, in spite of their ecological importance. While these communities enjoy much more protection now than they have historically, impacts continue to occur because of human development.

The Vegetation Management Alternative includes measures to remove and maintain vegetation through manual, mechanical, and chemical treatments. Most of this activity would occur in artificial environments, where special-status species would not be impacted, but some activity in natural environments could occur. Similar activities may be undertaken by flood control or water supply agencies, and private and public landowners.

Numerous entities throughout the Program Area have weed control programs that they implement. These entities include California Department of Transportation and local roads departments, local utilities, service districts, government, agricultural districts, and public and private landowners. Information about the coordination of such efforts can be obtained from the CDFA's Noxious Weed Information Project (http://www.cdfa.ca.gov/plant/ipc/noxweedinfo/noxweedinfo_hp.htm). Fourteen federal, state, and county agencies founded the California Interagency Noxious Weed Coordinating Committee in 1995 to coordinate the management of noxious weeds. This group has assembled a variety of tools for those involved in weed control activities (http://www.cdfa.ca.gov/plant/ipc/CINWCC/cinwcc_hp.htm). These tools are designed to minimize disruption of native plants and to improve habitat for them. The District's activities are compliant with these tools.

Invasive weeds can disrupt native habitats. They compete with and may displace native plants, which may interfere with ecosystem functions, by altering and reducing the food resources available to primary and secondary consumers. Weed control activities the District performs would be cumulative with those other entities perform. These activities would focus on areas with dense concentrations of weeds and not on individual weed plants distributed broadly in otherwise natural habitats. Thus, 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. Therefore, there is not an existing significant cumulative impact to native habitats. The District's incremental activities associated with the control of invasive weeds would not be cumulatively considerable, i.e., less than significant.

13.2.2.3 Chemical Control Alternative

As described in Section 13.4 (Ecological Health) and 13.5 (Human Health), historic trends in pesticide use vary from county to county based on information available from CDPR. Within the District's Program Area as a whole, pesticide use is decreasing. This reduction may be due in part to public pressure to reduce the amount of pesticide used , along with extensive regulatory oversight of pesticide use by the USEPA, CDPR,

USFWS, NMFS, SWRCB, CDFW, and others. However, the use of pesticides and herbicides will continue to be necessary. Many of these chemicals exhibit some environmental persistence and a number of water bodies have been listed as impaired for sediment toxicity, pesticides, or unknown toxicity (see Table 9-1). 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. Contaminants and pesticides have been hypothesized to contribute to declines in fish populations. . 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 loads in the aquatic environment. The Chemical Control Alternative has a less-than-significant cumulative impact on herbicide and pesticide loads.

13.3 Biological Resources – Terrestrial

Cumulative impacts, as they relate to terrestrial resources, include past, present, and reasonably foreseeable actions that potentially impact terrestrial mammalian and avian wildlife, herptiles, 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 following is a discussion of how the Program impacts could become cumulatively considerable with other impacts in the region. To make this determination, consideration is given to the combined contribution of Program impacts considered together with impacts that exist outside of the Program Area. The issue is whether the Program's incremental contribution to the combined significant cumulative impact is "cumulatively considerable."

In summary, only the Program alternatives' less-than-significant and potentially significant impacts have the potential to add an incremental effect to a cumulatively significant impact. In Section 5.2, the Surveillance, Physical Control, Vegetation Management, Chemical Control, and Other Nonchemical Control Alternatives" impacts to terrestrial resources were determined to be less than significant. (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.

Program alternative impacts to terrestrial resources were identified as "less than significant" (LS) if the likely exposure to terrestrial habitats, to native terrestrial plant or animal populations, or to special-status species was either very short or the application medium (spray or liquid) was typically highly dilute (ULV techniques). Additionally, the LS determination was applied if it was indicated that exposure could be considered likely incomplete due to little or no overlap of application areas and typical habitat associated with nontarget special-status or sensitive terrestrial species. .

13.3.1 Effects on Pollinators

Some of the currently available insecticides used to control mosquitoes and yellow jackets may also exhibit toxicity to selected beneficial insects. The District employs a number of strict BMPs specifically designed to minimize or eliminate the impact of chemical treatments on nontarget insects such as honeybees. Of particular concern recently is a group of insecticides known as neonicotinoids, which target the nervous system of target insects, resulting in paralysis and death (Harmon 2012). However, reports implicate this group of pesticides as one of the possible contributors to reported decreases in bee colonies, known as colony collapse disorder (CCD). This disorder and the resulting decline in bee populations is an existing significant cumulative impact in the region. As reported, CCD has been used to

correlate some reports of the apparent disappearance of honeybees from hives. A recent in situ study attempted to replicate CCD wherein the authors claimed that the only variable that contributed significantly to hive death was exposure to sublethal levels of imidacloprid (a commonly use neonicotinoid insecticide), although the authors reported mortalities in bees that were fed only contaminated fructose (large doses of the insecticide) (Lu et al. 2012). After this report was published, peer reviews of the article indicated that the methodology was substantially flawed by the use of extremely high levels of pesticides in the tests that are actually already known to be very toxic to bees (400 ppb) when fed directly with no opportunity to obtain alternate, uncontaminated sources of food (fructose).

In addition to the potential impacts of some pesticides on bees, it is clear that many other factors can impact bee colonies in their hives. Activities such as housing development and expansion of public projects decrease the number and proximity of orchards, and in many urban or semi-urban areas the restrictions on keeping bees severely limit the number of hives. These activities, in conjunction with vector control activities, can be considered cumulatively considerable, without precisely accounting for relative impacts to bee colonies. The claims that the problems with bee colonies are purely due to pesticide applications are not supported.

As an example of the conservative nature of pesticide applications the District practices, the District does not use neonicotinoid insecticides (e.g., imidacloprid and other pesticides recently claimed to be associated with CCD) and is not considering them for future use. As a result, the vector control and maintenance programs the District uses have not been associated with CCD. Insect control activities the District performs would be cumulative with vector control programs and habitat maintenance activities other, sometimes nearby, private and/or public groups perform that are within the range of influence of the bee hives of interest. In general, while it is true that insect abatement activities may affect native pollinators near or adjacent to treatment areas, the careful practice of BMPs greatly reduces the potential cumulative impacts to nontarget pollinators. Based on these conclusions, 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.

13.3.2 Vegetation Management

Numerous entities throughout the Program Area have weed control programs that they implement. These entities include the California Department of Transportation and local roads departments, local utilities, service districts, government, agricultural districts, and public and private landowners. Information about the coordination of such efforts can be obtained from the CDFA's Noxious Week Information Project (http://www.cdfa.ca.gov/plant/ipc/noxweedinfo/noxweedinfo_hp.htm). Fourteen federal, state, and county agencies founded the California Interagency Noxious Week Coordinating Committee in 1995 to coordinate the management of noxious vegetation. This group has assembled a variety of tools for those involved in weed control activities (http://www.cdfa.ca.gov/plant/ipc/CINWCC/cinwcc_hp.htm).

Invasive vegetation can disrupt native habitats. It competes with and may displace native plants. This tendency may interfere with ecosystem functions, by altering and reducing the food resources available to primary and secondary consumers. Weed control activities the District performs would be cumulative with those other entities perform. 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.

13.3.3 Chemical Control Alternative

As described in Section 13.4 (Ecological Health), historic trends in pesticide use vary from county to county based on information available from CDPR. Within the District's Program Area as a whole, pesticide use

varies by county in 2010 relative to 2006 including reductions in Alameda and Contra Costa counties' pesticide use. This reduction may be due in part to public pressure to reduce the amount of pesticide used, and regulatory oversight of pesticide use by the USEPA, CDPR, USFWS, NMFS, SWRCB, CDFW, and others is extensive. However, the use of pesticides and herbicides will continue to be necessary. Many of these chemicals exhibit some environmental persistence. 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.

13.4 Ecological Health

Cumulative impacts, as they relate to ecological health include past, present, and reasonably foreseeable actions that potentially impact aquatic/terrestrial mammalian and avian wildlife, herptiles, aquatic organisms, nontarget invertebrates and pollinators, and botanical resources. See also Sections 13.2 Aquatic Resources and 13.3 Terrestrial Resources for additional discussion of cumulative impacts. To make a determination of a cumulatively considerable impact, consideration is given to the combined contribution of Program impacts (mostly less than significant) considered together with impacts that exist outside of the Program from the activities of agencies and individuals. If those impacts, taken all together result in a significant impact, then the Program's incremental contribution to the combined significant cumulative impact is "cumulatively considerable" if it triggers the significant cumulative impact or if it has a substantial contribution to the existing significant cumulative impact

The Proposed Program does result in the use of pesticides and a potential increase in pesticide use over existing conditions for certain formulations. Local planning agencies, County Agricultural Commissioners, and CDPR do not forecast future pesticide use. However, the cumulative analysis for ecological health concerns can address the question of increases in pesticide use as a result of the Proposed Program as a variation of the "summary of projections method" to address regional cumulative impacts of pesticide use and whether the incremental contributions of the Program's chemical treatment methods contribute to cumulative significant ecological health-related impacts. The estimates of pesticide use in the District's Program Area are not based on population or housing units or employees in the state but rather on past trends in pesticide use from available data on pesticide sales of products, as active ingredients, reported to the CDPR for 2006-2010. The analysis seeks to provide the regional context needed for a reasonable discussion of cumulative impacts. Just as local and regional plans project growth based on past trends, the analysis below relies on past trends to address changes in pesticide use and potential cumulative ecological health impacts.

This analysis considers whether potential exists for any incremental contribution of chemical use from the Program, when combined with other reasonably foreseeable uses of the specific pesticides considered in this PEIR (and Appendix B), which would result in cumulative impacts that could be considered "cumulatively considerable" to ecological health. The District's activities would involve the application of low concentrations of pesticide and herbicide active ingredients. Further, the District's practices including avoidance of some habitat types and strict adherence to product labels, which typically require concentrations well below known toxicity values, would result in very short exposures. Program alternative impacts were identified as "less than significant" if the likely exposure to nontarget species was either very short or the application medium (spray or liquid) was typically highly dilute (ULV techniques). Additionally, the less-than-significant determination was applied if it was indicated that exposure could be considered likely incomplete due to little or no overlap of application areas and typical species habitat.

Trends in Pesticide Use 2006–2010

Trends in pesticide use help to determine whether there is an existing cumulatively considerable impact in the region from the uses of pesticides by agricultural, industrial, governmental, and residential users. In general, there is an existing significant cumulative impact from the quantities of materials applied overall with some reductions in use of selected materials. Table 13-1 Historical Pesticide Use in the Contra Costa Mosquito & Vector Control District's Program Area illustrates the changes in relative pesticide use (as pounds per year of active ingredients) for the 46 chemicals in the counties represented in the District's Program Area (Service Area plus adjacent counties) which is the focus of this PEIR. After inspection of the yearly data reported by the CDPR, it is difficult to determine any repeatable or linear trends in use patterns. The potential cumulative impact of the use of similar pesticides by numerous agencies, organizations, and individuals in the counties suggests that many potential interactions could lead to cumulative pesticide impacts without definitive determination of the relative volume of each of the sources. However, pesticide use in the Program Area has decreased since 2006. The amount of active ingredients used in the Program Area in 2006 was approximately 2,218,546 pounds, whereas it decreased to 460,029 pounds in 2010 (CDPR).

Although the reported cumulative pesticide product used has a very wide range for each county in the table, some generalities can be made for each county although the data are limited to 2006 to 2010:

> Alameda County reported 8.2 tons fewer pesticides used in 2010 than in 2006

> Contra Costa County reported 49 tons fewer pesticides used in 2010 than in 2006

> Sacramento County reported 245 tons more pesticides used in 2010 than in 2006

> San Joaquin County reported 104 tons more pesticides used in 2010 than in 2006

> Solano County reported 131 tons more pesticides used in 2010 than in 2006

Although large uncertainty and high variation exist in the reported amounts of pesticide use by these counties, they vary according to their particular needs, majority of habitat type, and seasonal vector outbreaks. The public is aware of these pesticide uses and, in general, is pressuring agencies within these counties to use less pesticide whenever possible.

The District uses very strict and thorough BMPs in its pesticide applications for mosquito and vector control and is attempting to reduce total pesticide use where possible consistent with IPM practices. The District's annual use of pesticides is reported to the Contra Costa County Agricultural Commissioner and provided here in Table 13-2, Pesticide Use within the Contra Costa Mosquito & Vector Control District Service Area.

The District's small incremental contributions to overall pesticide use within its Program Area do not trigger a cumulatively considerable impact. While the overall use of pesticides throughout the Program Area may be considered cumulatively significant, the District's small incremental contributions to this impact are not cumulatively significant. Therefore, the Program's long-term activities including chemical applications would not contribute considerably to nontarget ecological receptor impacts. The Program alternatives would not result in significant cumulative impacts to the ecological health condition of the region.

Table 13-1 Historical Pesticide Use within the CCMVCD Program Area

		Service Area Contra Costa County			Adjacent Counties											
					Alameda			Solano			Sacramento			San Joaquin		
Active Ingredient	**Vector**	**2006**	**2008**	**2010**	**2006**	**2008**	**2010**	**2006**	**2008**	**2010**	**2006**	**2008**	**2010**	**2006**	**2008**	**2010**
2,4-D	Herbicide	5950	1611	1808	6316	3161	1504	27481	33478	25791	9132	13706	12270	36640	33608	54612
Alcohol Ethoxylated Surfactant	Mosquito															
Aliphatic Solvents	Mosquito															
APEs	Herbicide															
Allethrins	Mosquito, Yellow Jacket / Wasp	6.7	0.9	12.6	1.3	1.8	1.2	0.3	0.3	0.2	135	1.7	0.4	2.6	3	2
Bs	Mosquito	18964	211.3	451.5	1418.8	310.7	578.8	9.8	0.9	0.4	1055	365	181	9349	3715	706
Bti	Mosquito	7305	119	570	100	17.3	59.9	9.1	3.9	2.3	858	962	1148	15749	7672	9589
Benfluralin (Benefin)	Herbicide	0.3	100.2	190.5	1.8	15.1	4.1	60.2	90.9	2.8	45	146	7	106		4
Bentazon	Herbicide													0.6		
Brodifacoum	Rodents	0.08	0.06	0.04	0.08	0.04	0.03	0.02	0.02	0.03	0.2	0.1	0.2	0.06	0.04	0.05
Bromadiolone	Rodents	0.5	0.4	0.4	0.8	0.6	1.7	0.3	0.2	0.3	0.6	0.6	0.8	0.6	0.3	0.4
Chlorophacinone	Rodents	0.4	0.2	0.2	0.3	0.2	1.8	0.01	0.01		0.2	2.2	0.2	0.1	0.1	0.05
Cholecalciferol	Rodents	0.01	0.8	1	0.1	2.3	0.5	0.6	0.08	0.03	0.02	0.02	0.02	0.01	0.03	0.03
DCPA	Herbicide															
Deltamethrin	Mosquito, Yellow Jacket / Wasp	532		109.8	148.6	244.6	72.1	75.4	55.8	45.3	1550	146	257	581	70	310
Difethialone	Rodents	0.2	0.1	6	0.2	0.1	0.2			0.1	0.02	0.02	0.07	0.02		0.02
Diphacinone	Rodents	2.6	3.7	4.3	4.3	3.3	4	0.6	4	0.3	1.1	0.3	0.4	1.7	0.6	0.7
Dithiopyr	Herbicide	458.8	692.3	889.9	72.9	215.2	149	34.1	270	780.5	733	1317	2634	360	433	1429
Diuron	Herbicide	26914	32567	14772	24179	22630.5	3356	21737	17130.4	4813.3	11179	7377	7576	89135	29483	15307
Esfenvalerate	Yellow Jacket / Wasp	10.2	14.9	51.6	2.5	0.3	4.3	251.3	1034.6	264.7	464	421	435	2690	1618	2095
Etofenprox	Mosquito, Yellow Jacket / Wasp															
Glyphosate	Herbicide	80522	50778	68934	43179	42564	50824	80536	77951	112532	143959	126078	155084	331986	241221	376729
Imazapyr	Herbicide	123.2	57.2	103.9	290.2	378.6	1564		5.5	18.3	19	23	65		20	75
Lambda-cyhalothrin	Mosquito, Yellow Jacket / Wasp	442	335.7	210.2	99.1	706.4	106.9	519.6	1042.6	889.4	480	611	566	2664	2670	3605
Lecithin	Herbicide	43.4	9.9	8.6	1522	3.8	70.3	476.3	310.6	521.8	216	208	1553	590	834	1696
Methroprene	Mosquito	2555	168	152.7	44	34.6	41.5	231	298	277	542	561	545	1557	177	171
Metolachlor	Herbicide			3050				12771	13434	17020	4756	3973	3500	36771	33832	32233
Modified Vegetable Oil	Herbicide															
Naled	Mosquito					2.1	2	195.8			542	767	321	8251	30498	1616
Oryzalin	Herbicide	2187.4	3559.2	5168.4	5880	4068	3679	6610	17648.4	4618.1	15142	16938	3933	42788	29157	35678
Pendimethalin	Herbicide	12489	7600	5711.1	4631	3905	2211	8666	15030.9	20641.3	6209	7290	20001	29296	86222	87693
Permethrin	Mosquito, Yellow Jacket / Wasp	4387	1438	923.2	1085	1055	839.5	458.3	446.8	1360	2310	2822	2583	7700	12851	7348
Phenothrin	Yellow Jacket / Wasp	2.1	1	13.1	0.9	1.8	1.5	0.2	0.2	0.3	0.7	1	80	1.7	1.4	3

Table 13-1 Historical Pesticide Use within the CCMVCD Program Area

		Service Area Contra Costa County			Adjacent Counties											
					Alameda			Solano			Sacramento			San Joaquin		
Active Ingredient	**Vector**	**2006**	**2008**	**2010**	**2006**	**2008**	**2010**	**2006**	**2008**	**2010**	**2006**	**2008**	**2010**	**2006**	**2008**	**2010**
PBO	Mosquito	3971	443.8	947	190	216.6	1154.7	212	338.4	425.3	3777	3610	4967	54372	7670	5457
Polydimethylsiloxane Fluids	Herbicide															
Potassium Salts	All	207	609	1450	12	1524	927	11399	3592	5457	20376	16865	5830	18962	61211	308047
Prallethrin	Mosquito			5.6			7.8			1.2			0.9	0.01	13.5	0.6
Pyrethrins	Mosquito, Yellow Jacket / Wasp	613.6	185.1	184.3	57	88.4	155.9	42.2	87.8	108.6	499	460	575	5511	985	775
Resmethrin	Mosquito, Yellow Jacket / Wasp	174.2	3.3	2.1		0.2	0.05				0.4	0.01		2.7		
Sodium Nitrate	Fumigant	46500	18.2	34.2	13.7	124.3	174.7		1.8	0.2	16	12	61	471	318	578
Spinosad	Mosquito	17	5.3	13.4	11	0.4	2.2	3	1.2	28.3	41	34	167	236	141	190
Sulfometuron methyl	Herbicide	2344.7	955.7	800.6	514.4	551.8	424	113.2	197.2	134.8	712	433	683	342	329	386
Sulfur	Fumigant	69349	80688	81823	17054	22125	22079	220538	232318	458364.1	1768474	1976755	2257414	5429469	3530235	5392251
Temephos	Mosquito						0.4									34
Tetramethrin	Yellow Jacket / Wasp								0.01		0.02	0.02	0.04			
Triclopyr	Herbicide	8019	4875	7614	1242	1880	1740	2037	3604	2877	3198	3545	3298	6317	1748	1957
Total		**294091.4**	**187052.3**	**196017.2**	**108071.98**	**105833.04**	**91743.08**	**394468.33**	**418377.52**	**656975.96**	**1996422**	**2185431**	**2485737**	**6131903**	**4116737**	**6340578**

Note:
Blank cells mean that there was either no use reported for that chemical in that county in that year or the reported data was less than 0.005 lbs.
*All values are reported in weight (lbs) of Active Ingredient used in a county over the given year.
*From the California Department of Pesticide Regulation, Pesticide Use Reporting database.

Table 13-2 Pesticide Use within the CCMVCD Service Area

Pesticide (units)	Amount Used			
	2006	2008	2010	2012
Mosquito Larvicides				
Agnique (lbs)	*13*	*6*	*18*	*36*
Agnique (gal)	1.8	0.752	2.44	4.83
Agnique Granules (lb)				0.0704
Methoprene (lbs)	*135*	*179*	*149*	*94*
Altosid Briquets (lbs)	51.46	1.29	0.84	1.90
Altosid XR Briquets (lbs)		12.34	9.90	15.27
Aquaprene XL CB Briquets (lbs)		0.08	0.00	0.00
Altosid Granules (lbs)	0.07	0.00	0.00	0.00
Altosid XR Granules (lbs)		0.00	0.00	0.00
Altosid Pellets (lbs)	69.15	161.43	134.47	67.07
Altosid Pellets WSP (lbs)		0.25	0.34	0.13
Aquaprene Tossits (lbs)		0.25	0.00	0.00
Altosid Liquid (Duplex) (gal)	1.65	0.47	0.41	0.12
MetaLarv S-PT (lbs)				8.16
Larvicidal Oils (lbs)	*30,940*	*45,329*	*10,881*	*3,753*
Golden Bear 1111 (gal)	4,164	6,101	1,463	0
BVA Larvicidal Oil (gal)			1	505
Bti (lbs)	*89*	*90*	*198*	*54*
Acrobe (gal)	0	0	0	0
Bactimos WP (lbs)	0	0.5	0	0
VectoBac 12 AS (gal)	11.24	11.09	3.15	2.80
VectoBac Granules (lbs)	3.88	5.72	19.28	9.16
FourStar Briquet 45d (lbs)[1]				0.00
FourStar Briquet 90d (lbs)[1]				0.00
FourStar Briquet 180d (lbs)[1]				6.38
VectoMax CG (lbs)[1]			155.35	17.08
B. sphaericus (lbs)	*282*	*222*	*263*	*209*
Vectolex Granules (lbs)	266.78	115.48	155.97	53.10
Vectolex WDG (lbs)		101.38	12.35	106.29
Vectolex WSP (lbs)	14.98	5.09	1.06	1.13
FourStar Briquet 45d (lbs)[1]				0.00
FourStar Briquet 90d(lbs)[1]				0.00
FourStar Briquet 180d (lbs)[1]				38.28

Table 13-2 Pesticide Use within the CCMVCD Service Area

Pesticide (units)	Amount Used			
	2006	2008	2010	2012
VectoMax CG (lbs)[1]			93.20	10.26
Spinosad (lbs)			*0.04*	*1.52*
Natular T30 (lbs)			0.00	0.00
Natular G (lbs)			0.00	0.00
Natular G30 (lbs)				1.38
Natular XRG (lbs)			0.04	0.13
Natular 2EC (gal)				0.00
Carbamate	*0*	*0*	*0*	*0*
Organophosphate	*0*	*0*	*0*	*0*
Mosquito Adulticides				
Natural Pyrethrins (lbs)	*41.58*	*26.19*	*3.15*	*21.61*
Pyrenone 25-5 (gal)	5.65	3.55	0.01	0.00
Pyrocide 7396 (gal)	0.00	0.01	0.42	2.92
Pyronyl Crop Spray (gal)		0.00	0.00	0.00
Synthetic Pyrethroids (lbs)	*4.63*	*3.34*	*2.02*	*7.43*
Scourge (gal)	0.64	0.46	0.28	1.03
Synergists (lbs)[2]	*223.26*	*141.92*	*21.97*	*130.86*
Piperonyl butoxide (gal)	30.17	19.18	2.97	17.68
Other Insecticides				
Total (lbs)	*3.0*	*1.8*	*6.0*	*5.8*
Drione (lbs)	2.97	1.76	4.30	5.79
M-Pede (gal)	0.00	0.00	0.23	0.00
Rodenticides				
Total (lbs)	*0.04*	*0.03*	*0.03*	*0.01*
Bromethalin (lbs)	0.0006	0.0	0.0	0.0
Contrac Super-Size Blox (lbs)[3]	0.033	0.021	0.029	0.01200
Contrac Small Blox (lbs) [3]				0.00033
Ditrac Blox (lbs)[4]	0.006	0.010	0.004	0.00135
Diphacinon (lbs)[4]	0.00	0.00	0.00	0.00
First Strike Blox (lbs)[5]				0.00065
Terad 3 Blox (lbs)[6]				0.00

[1] VectoMax and FourStar are a combination of Bti and B. sphaericus. Active ingredients tabulated separately.

[2] PBO is a component of pyrethroid adulticides. Not listed separately prior to 2009.

[3] Bromadiolone

[4] Diphacinone

[5] Difethialone

[6] Cholecalciferol

13.5 Human Health

Cumulative impacts, as they relate to human health, include past, present, and reasonably foreseeable actions that potentially impact humans. Cumulative impacts can result from individually minor, but collectively significant, projects taking place over a period of time. To make a determination of a cumulatively considerable impact, consideration is given to the combined contribution of Program impacts (mostly less than significant) considered together with impacts that exist outside of the Program from the activities of agencies and individuals. If those impacts, taken all together result in a significant impact, then the Program's incremental contribution to the combined significant cumulative impact is "cumulatively considerable" if it triggers the significant cumulative impact or if it has a substantial contribution to the existing significant cumulative impact.

The Proposed Program does result in the use of pesticides and a potential increase in pesticide use over existing conditions for certain formulations. Local planning agencies, County Agricultural Commissioners, and CDPR do not forecast future pesticide use. However, the cumulative analysis for human health concerns can address the question of increases in pesticide use as a result of the Proposed Program as a variation of the summary of projections method to address regional cumulative impacts of pesticide use and whether the incremental contributions of the Program's chemical treatment methods contribute to cumulative significant human health-related impacts. The estimates of pesticide use in the District's Program Area provided in the preceding analysis in Section 13.4(Tables 13-1a through 13-1i) are not based on population or housing units or employees in the state but rather on past trends in pesticide use from available data on pesticide sales of products, as active ingredients, reported to the CDPR. The analysis seeks to provide the regional context needed for a reasonable discussion of cumulative impacts. Just as local and regional plans project growth based on past trends, the analysis below relies on past trends to address changes in pesticide use and potential cumulative human health impacts.

This analysis considers whether potential exists for any incremental contribution of chemical use from the Program, when combined with other reasonably foreseeable uses of the specific pesticides considered in this PEIR (and Appendix B), which would result in cumulative impacts that could be considered "cumulatively considerable" to human health. The District's activities would involve the application of low concentrations of pesticide and herbicide active ingredients. Further, the District's practices including avoidance of some habitat types and strict adherence to product labels, which typically require concentrations well below known toxicity values, would result in very short exposures. Program alternative impacts were identified as "less than significant" if the likely exposure to humans was either very short or the application medium (spray or liquid) was typically highly dilute (ULV techniques). Additionally, the less-than-significant determination was applied if an indication existed that exposure could be considered likely incomplete due to little or no overlap of application areas.

Trends in Pesticide Use 2006-2010

Trends in pesticide use help to determine whether there is an existing cumulatively considerable impact in the region from the uses of pesticides by agricultural, industrial, governmental, and residential users. In general, there is an existing significant cumulative impact from the quantities of materials applied overall with some reductions in use of selected materials. Table 13-1 Historical Pesticide Use in the Contra Costa Mosquito & Vector Control District's Program Area illustrates the changes in relative pesticide use (as pounds per year of active ingredients) for the 46 chemicals in the counties represented in the District's Program Area (Service Area plus adjacent counties) which is the focus of this PEIR. After inspection of the yearly data reported by the CDPR, it is difficult to determine any repeatable or linear trends in use patterns. The potential cumulative impact of the use of similar pesticides by numerous agencies, organizations, and individuals in the counties suggests that many potential interactions could lead to cumulative pesticide impacts without definitive determination of the relative volume of each of the

sources. However, pesticide use in the Program Area has decreased since 2006. The amount of active ingredients used in the Program Area in 2006 was approximately 2,218,546 pounds, whereas it decreased to 460,029 pounds in 2010 (CDPR).

Although the reported cumulative pesticide product used has a very wide range for each county in the table, some generalities can be made for each county although the data are limited to 2006 to 2010:

> Alameda County reported 8.2 tons less total chemical use in 2010 than in 2006.

> Contra Costa County reported 49 tons less pesticide used in 2010 than in 2006.

> Solano County reported using slightly more than 131 tons of pesticide in 2010 than in 2006.

> Sacramento County reported an increase of 245 tons of pesticide used in 2010 than in 2006.

> San Joaquin County reported an increase of 104 tons of pesticide used in 2010 from 2006.

Although a large uncertainty and high variation exist in the reported amounts of pesticide use by these counties, they vary according to their particular needs, majority of habitat type, and seasonal vector outbreaks. The public is aware of these pesticide uses and, in general, is pressuring agencies within these counties to use less pesticide whenever possible.

The District uses very strict and thorough BMPs in its pesticide applications for mosquito and vector control and is attempting to reduce total pesticide use where possible, consistent with IPM practices. The District's annual use of pesticides is reported to the Contra Costa County Agricultural Commissioner and provided in Table 13-2, Pesticide Use with the Contra Costa Mosquito & Vector Control District Service Area.

The District's small incremental contributions to overall pesticide use within its Program Area do not trigger a cumulatively considerable impact. While the overall use of pesticides throughout the Program Area may be considered cumulatively significant, the District's small incremental contributions to this impact are not cumulatively significant. Therefore, the Program's long-term activities including chemical applications would not contribute considerably to human health impacts. The Program alternatives would not result in significant cumulative impacts to the human health condition of the region.

13.6 Public Services and Hazard Response

The District's Program would not incrementally increase demand for police, fire, or health-care services, nor would it create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials, through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment, or through the operation of aircraft. In addition, the Program would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires. In short, the Proposed Program does not have incremental impacts on public services, and implementation of any of the Program alternatives (individually or in combination) would not result in a significant contribution to any cumulative public services and hazard response impacts that could result from other projects in the vicinity of the treatment areas.

13.7 Water Resources

Less-than-significant impacts to water resources are identified for all Program activities, except for use of selected herbicides under the Vegetation Management Alternative and use of selected pesticides under the Chemical Control Alternative. Because the use of chemicals that could cause impacts are associated with site-specific treatment needs that are not linked temporally or spatially and because the activities are only occasionally conducted, application of Program chemicals and biological agents (with use of identified mitigations) would not adversely affect water resources nor would these alternatives exceed any thresholds or water quality regulations.

In addition to the use of naled, which was identified to cause significant and unavoidable impacts, the District's use of some of the more toxic and persistent pyrethroids (permethrin and resmethrin) could contribute to impairments of receiving water identified on the CWA 303(d) list as caused by pyrethroids and sediment toxicity. Where receiving waters have been designated as impaired for pesticides used under the District's IVMP, a cumulatively considerable impact results from all uses of these pesticides or the receiving waters would not be designated as impaired. The District's use of these "impairment chemicals" is contributing in less-than-significant amounts to an existing cumulatively considerable impact in the Program Area and are not cumulatively considerable. No additional impacts were identified in association with the chemical and nonchemical Program alternatives, and no additional cumulative impacts are anticipated to occur (i.e., the District's less-than-significant impacts are not triggering a new cumulative impact).

13.8 Air Quality

Impacts to regional ambient air quality by all Program alternatives would be less than significant for criteria pollutant emissions. The majority of air districts in California, including BAAQMD, NSCAPCD, and MBUAPCD, assume that if project-level emissions do not exceed significance thresholds, and no closely related project exists, then a project would not have a cumulatively considerable impact on air quality. In most of the areas the District is likely to target for Program activities, related projects would be similar programs other Districts conduct in their respective jurisdictions and CDFA's special campaigns to control specific threats such as gypsy moths, light brown apple moths, and Mediterranean fruit flies. These projects would not occur at the same times (days) and same locations. All of the Program alternative emissions (separately and combined for the District's entire Program) would be below the significance thresholds for criteria pollutant emissions. The incremental impacts on air quality from the Program alternatives are not individually significant nor are they cumulatively considerable. Therefore, cumulative impacts to regional air quality are less than significant.

13.9 Greenhouse Gases and Climate Change

Scientific consensus concurs that global climate change will increase the frequency of heat extremes, heat waves, and heavy precipitation events. Currently accepted models predict that continued GHG emissions at or above current rates will induce more extreme climate changes during the 21st century than were observed during the 20th century. A warming of about 0.2℃ per decade is projected. Even if the concentrations of all GHGs and aerosols are kept constant at year 2000 levels, a further warming of about 0.1℃ per decade would be expected. A faster temperature increase will lead to more dramatic, and more unpredictable, localized climate extremes. Other likely direct effects of global warming include an increase in the areas affected by drought, an increase in tropical cyclone activity and higher sea level, and the continued recession of polar ice caps. Already some identifiable signs exist that global warming is taking place. In addition to substantial ice loss in the Arctic, the top 7 warmest years since the 1890s have been after 1997. (IPCC 2007)

The overall global climate change will be comprised of social and economic losses. These negative effects will likely be disproportionately shouldered by the poor who do not have the resources to adapt to a change in climate. Some of the main ecosystem changes anticipated are that biodiversity of terrestrial and freshwater ecosystems could be reduced and that the ranges of infectious diseases would likely increase.

Cumulative impacts were assessed in a qualitative manner by determining if the Program alternatives, in conjunction with other projects throughout the Program Area, would have the potential to contribute to a long-term cumulative impact on climate change. Given that GHG emissions and climate change are global issues, a statewide framework or cumulative approach for consideration of environmental impacts may be most appropriate. Virtually every project California, as well as those outside the state, would have GHG emissions.

All Program alternatives would generate some GHG emissions individually but would not conflict with current plans, policies, and regulations. No potentially significant impact would occur as a result of any of the Program alternatives (individually or when combined for the entire Program), and no mitigation is required for GHGs and climate change. However, optional mitigation measures (BMPs) for all alternatives are listed in Section 11.2.11. Even with mitigation, the alternatives would generate GHG emissions and incrementally contribute to climate change, however minor.

When all Program emissions are viewed in combination with global emission levels that are contributing to the existing cumulative impact on global climate change, the incremental contribution of these Program emissions would not be cumulatively considerable because they occur intermittently on a very small scale (i.e., not stationary sources). Therefore, all Program alternatives (either individually or in combination) would not have a cumulatively considerable impact on global climate change. If optional mitigation measures (BMPs) are implemented, the Program alternatives' incremental contribution would be reduced further.

13.10 Noise

Program activities would result in temporary, sporadic noise impacts from equipment use, and any given surveillance or treatment area would be affected only for a brief period. Cumulative impacts would result from the implementation of Program activities in combination with those of other reasonably foreseeable projects and actions occurring at the same time and in the same place. The likelihood of this happening and resulting in noise levels that would exceed thresholds or cause a substantial temporary increase in noise levels is remote; moreover, noise impacts from the Program would be temporary, lasting only a brief period of time at any given location, after which time the noise would cease. Thus, the potential for cumulative impacts is low, and any impacts that could occur would be of short duration and less than significant. The incremental noise impacts from any of the Program alternatives, individually or in combination for the entire Program, would not be cumulatively considerable and would not trigger cumulative noise impacts in a given area.

13.11 Summary of Cumulative Impacts

None of the Program alternatives would have incremental impacts that would be cumulatively considerable. The cumulative impacts by resource or environmental topic are summarized as follows:

> Urban and Rural Land Uses: No cumulative significant impacts to urban and rural land uses are anticipated when all of the Program's incremental impacts and the impacts of other activities in the region are considered together.

> Biological Resources- Aquatic: All of the Program alternatives have a less-than-significant cumulative impact on POD. All of the Program alternatives have a less-than-significant cumulative impact on salmonid population trends. The Program would have a less-than-significant cumulative impact on the amount or quality of aquatic habitat from the Physical Control Alternative. The District's incremental activities associated with the control of invasive weeds under the Vegetation Management Alternative would not be cumulatively considerable,

> Biological Resources-Terrestrial: The District's Proposed Program does not contribute substantially to pesticide and herbicide exposures in the terrestrial environment. The Chemical Control and Vegetation Management Alternatives have a less-than-significant cumulative impact on terrestrial resource exposures to herbicides and pesticides. 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.

> Ecological Health: While the overall use of pesticides throughout the Program Area may be considered cumulatively significant for nontarget ecological receptors including honey bees, the District's small incremental contributions to this impact are not cumulatively significant. Therefore, the Program's long-

term activities including chemical applications would not contribute considerably to ecological health impacts.

> Human Health: While the overall use of pesticides throughout the Program Area may be considered cumulatively significant, the District's small incremental contributions to this impact are not cumulatively significant. Therefore, the Program's long-term activities including chemical applications would not contribute considerably to human health impacts.

> Public Services and Hazard Response: The Proposed Program does not have incremental impacts on public services, and implementation of any of the Program alternatives (individually or in combination) would not result in a significant contribution to any cumulative public services and hazard response impacts that could result from other projects in the vicinity of the treatment areas

> Water Resources: Where receiving waters have been designated as impaired for pesticides used under the District's IVMP, a cumulatively considerable impact results from all uses of these pesticides or the receiving waters would not be designated as impaired. The District's use of these "impairment chemicals" is contributing in less-than-significant amounts to an existing cumulatively considerable impact in the Program Area and are not cumulatively considerable.

> Air Quality: All of the Program alternative emissions (separately and combined for the District's entire Program) would be below the significance thresholds for criteria pollutant emissions. The incremental impacts on air quality from the Program alternatives are not individually significant nor are they cumulatively considerable.

> Climate Change: When all Program emissions are viewed in combination with global emission levels that are contributing to the existing cumulative impact on global climate change, the incremental contribution of these Program emissions would not be cumulatively considerable because they occur intermittently on a very small scale (i.e., not stationary sources).

> Noise: Any impacts that could occur would be of short duration and less than significant. The incremental noise impacts from any of the Program alternatives would not be cumulatively considerable and would not trigger cumulative noise impacts.