3.9 Public Health and Vector Management

This section of the Draft Environmental Impact Statement/Report (EIS/R) describes the existing public health and vector management within the Eden Landing Phase 2 project area and analyzes whether implementation of the project would cause a substantial adverse effect on public health and vector management practices. The information presented is based on a review of existing public health and vector management within the area and other pertinent federal, state, and local regulations, which are presented in Section 3.9.2, Regulatory Setting. Using this information as context, an analysis of the public health and vector-management-related environmental impacts of the project is presented for each alternative. The program mitigation measures described in Chapter 2, Alternatives, would be implemented with the project. Therefore, this section only includes additional project-specific mitigation measures as needed.

3.9.1 Physical Setting

Methodology

The development of the baseline conditions, significance criteria, and impact analysis for public health and vector management is commensurate to and reliant on the analysis conducted in the 2007 South Bay Salt Pond (SBSP) Restoration Project Final EIS/R (2007 Final EIS/R). The baseline conditions specific to the Eden Landing pond complex are based on the current conditions of this area, which are based on the information and data gathered for preparation of this Draft EIS/R.

Regional Setting

As stated in the programmatic portion of the 2007 Final EIS/R, there are five species of mosquitoes that are routinely controlled by the mosquito and vector control agencies in the South San Francisco Bay (South Bay) area: the summer salt marsh mosquito (*Aedes dorsalis*), winter salt marsh mosquito (*Aedes squamiger*), Washino's mosquito (*Aedes washinoi*), western encephalitis mosquito (*Culex tarsalis*), and winter marsh mosquito (*Culiseta inornata*).

The ecology of these mosquitoes is summarized in the programmatic discussion in the 2007 Final EIS/R. All five of these species can be found in the southern half of Eden Landing, and individuals can disperse distances that are large enough for breeding populations to migrate into the project area from other areas or to disperse from the project area into other locations. None of these species is specific to the southern half of Eden Landing. Within the Eden Landing Phase 2 project area, the Alameda County Mosquito Abatement District (ACMAD) is responsible for managing and controlling mosquito populations in Alameda County.

Project Setting

Potential habitats for several mosquito species are found in the Eden Landing Phase 2 project area. Table 3.10-1 of the 2007 Final EIS/R listed the habitat types in the SBSP Restoration Project and the mosquito species associated with those habitats. A similar version of that table, modified to the Phase 2 Eden Landing ponds, is provided in Table 3.9-1.

Table 3.9-1 indicates that under the existing conditions, the Eden Landing Phase 2 project area is currently classified as muted tidal salt marsh. Section 3.5, Biological Resources, provides a detailed description of the habitats present in the Eden Landing Phase 2 pond complex.

Within the Eden Landing Phase 2 project area, the four Bay Ponds are large, open water ponds with vigorous wave action. The Inland Ponds and Southern Ponds are managed seasonally for different wildlife and water quality goals, but under that management system, they are a seasonally and annually varied mix of habitats that may include the descriptions in Table 3.9-1 for muted tidal salt marsh and seasonal brackish (though tending toward more saline) wetlands. Habitats in and around Eden Landing support seasonal habitat for five different species of mosquitos.

Table 3.9-1 Mosquito Species Found in the SBSP Restoration Project Eden Landing Phase 2 Area

HABITATS	MOSQUITO SPECIES	PHASE 2 POND GROUP
Open water salt pond with vigorous wave action, tidal mudflat, high-salinity salt ponds	None	Bay Ponds; portions of the Inland Ponds
Fully tidal salt marsh: higher ground with pools or borrow channels that do not flush	*Aedes squamiger* (winter), *Aedes melanimon* (fall), *Aedes dorsalis* (summer), *Aedes taeniorhynchus* (summer), *Culiseta inornata* (winter)	None
Muted tidal salt marsh, pools, and channels that do not flush vigorously	*Aedes squamiger* (winter), *Aedes melanimon* (fall), *Aedes dorsalis* (summer), *Aedes taeniorhynchus* (summer), *Culiseta inornata* (winter)	Inland Ponds and Southern Ponds
Seasonal wetland; brackish to nearly freshwater pools with vegetated margins	*Aedes squamiger* (winter), *Aedes melanimon* (fall), *Aedes dorsalis* (summer), *Aedes taeniorhynchus* (summer), *Aedes washinoi* (winter freshwater), *Culex tarsalis* (spring, summer), *Culex erythrothorax* (summer in tules), *Culex pipiens* (foul freshwater), *Culiseta incidens* (spring, fall freshwater), *Culiseta inornata* (winter)	Inland Ponds and Southern Ponds
Vernal pools, upland freshwater marsh	*Aedes washinoi* (winter), *Culex tarsalis* (spring, summer), *Culex erythrothorax* (summer in tules), *Culex pipiens* (foul freshwater), *Culiseta incidens* (spring, fall freshwater), *Culiseta inornata* (winter)	None

Tidal marshes that lack vigorous tidal flow can provide suitable mosquito breeding habitat. But functional tidal marshes with vigorous tidal flow do not provide high-quality habitat for the most troublesome mosquito species in the Bay Area, and maintenance and restoration of natural tidal flushing in these marshes are effective at limiting mosquito populations while sustaining the natural hydrology of the marsh (San Francisco Bay Joint Venture 2004, as cited in the 2007 Final EIS/R). Project actions that convert former small or shallow ponded areas to well-drained functional tidal marsh or that improve the ability to rapidly change water levels, salinity, and other constituents through mixing and circulation would not increase the difficulty of mosquito control.

Detailed records are maintained by the local mosquito and vector control districts concerning major mosquito breeding areas, population densities, and control techniques and materials. The mosquito and vector control management that occurs within the Eden Landing pond complex is conducted by the ACMAD and follows techniques described in the SBSP Restoration Project's Adaptive Management Plan (AMP). The California Department of Fish and Wildlife (CDFW) staff coordinates with the ACMAD to allow the monitoring and, if necessary, control of mosquitoes on the Eden Landing Ecological Reserve

(ELER, or Reserve) to minimize public health risks from mosquito-borne diseases. Wetland management Best Management Practices for proactive mosquito control are regularly used. These include, but are not limited to, water management techniques, and maintenance and improvement of water control structures. CDFW also coordinates with the ACMAD on timing of flood-up schedules and any problems with unplanned flooding.

The goal of the vector control portion of the AMP is to maintain or improve current levels of vector management. Through the AMP, mosquito and vector control focuses on monitoring for specific triggers and implementing management actions after a trigger has been signaled. Monitoring protocols have been employed to pinpoint problem areas for vector management. Monitoring parameters include:

- Presence/absence of mosquitoes in former salt ponds
- Number of acres of breeding mosquitoes
- Number of larvae per sampling 'dip' in potential breeding habitat
- Number of acres within the project area treated for mosquitoes
- Costs/level of effort (e.g., hours spent in treatment, amount of material applied, helicopter cost) to control mosquitoes

If any of the vector control AMP management triggers are signaled, AMP management actions are deployed. Management actions are triggered when the following circumstances are discovered as a result of monitoring:

- Detection of breeding mosquitoes in a former salt pond
- Detectable increase in monitoring parameters (relative to the baseline), particularly in areas with human activity/exposure
- Detection of mosquitoes that are known disease vectors and/or are of particular concern (i.e., *Aedes squamiger*, *A. dorsalis*) in the project area

The AMP lists and describes the following vector control management actions and directs implementation of the following activities when necessary:

- Adjust design to enhance drainage or tidal flushing, control vegetation in ponded areas, and/or facilitate access (for control) to marsh ponds.
- Increase level of vector control (preferably only as an interim measure while design issues are addressed to reduce mosquito breeding habitat).
- Study relationship between fish abundance and fish community composition with mosquito larval abundance in marsh features (e.g., ponds and pannes) and managed ponds.
- Ensure management actions throughout implementation of the AMP are consistent with mosquito management policies in the Don Edwards San Francisco Bay National Wildlife Refuge.

Mosquito control techniques employed by the ACMAD in cooperation with management of the ELER emphasize minimization and disruption of suitable habitat and control of larvae through chemical and biological means, as opposed to the spraying of adults. Control techniques most often include source

reduction, source prevention, larviciding, use of predatory fish, and use of bacteria that are toxic to mosquito larvae. The ACMAD thereby minimizes the number and severity of mosquito outbreaks and addresses those that do occur. The environmental baseline does not have significant mosquito-control or vector-related public health problems in the Eden Landing Phase 2 project area, which consists of open spaces that do not have homes or businesses within them.

3.9.2 Regulatory Setting

The activities of the ACMAD are governed by federal and state regulations, including the Clean Water Act (CWA), the Federal Endangered Species Act (ESA), the California ESA, the federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the California Health and Safety Code, and the California Food and Agriculture Code. The ACMAD discharges aquatic pesticides and biological control into waters of the United States pursuant to the National Pollutant Discharge Elimination System (NPDES) permit program. These permits are occasionally amended or replaced.

The ACMAD follows specific protocols to avoid affecting endangered species. These protocols are included and described in the vector control portion of the AMP to avoid effects to sensitive species or their habitat (i.e., nesting bird habitat or endangered species habitat) when conducting vector control activities. Additional procedural processes are necessary, including consultation with wildlife agencies, if an endangered species or designated critical habitat would be adversely affected from vector control activities. These processes would result in additional measures to be implemented to minimize effects to endangered species or designated critical habitat.

Per FIFRA, any pesticide that is used must be licensed by the United States Environmental Protection Agency (USEPA) and used in accordance with the specifications and labeled directions. Also, the ACMAD may only use pesticides that are registered for use in California. Individuals must be certified by the California Department of Health Services (CDPH) to apply pesticides or work under the direct supervision of somebody that is certified (CDPH 2005).

3.9.3 Environmental Impacts and Mitigation Measures

Overview

The thresholds of significance for potential Eden Landing Phase 2 impacts to public health and vector management follow. The rationale for the potential impacts as they relate to the significance criteria can be found in Section 3.10.3 of the programmatic discussion in the 2007 Final EIS/R and in summary form below. In tiering from the 2007 Final EIS/R, the impacts and analysis for Eden Landing Phase 2 match the style, format, and content contained in the programmatic discussion in the 2007 Final EIS/R, but consider new effects under Eden Landing Phase 2 that were not been specifically considered in the programmatic discussion in the 2007 Final EIS/R.

Significance Criteria

As defined in the programmatic discussion in the 2007 Final EIS/R, a significant impact to public health and vector control would result if the project would cause “a substantial increase in the need for vector management activities in any of the Eden Landing Phase 2 project areas as a result of implementation of project activities.”

As explained in Section 3.1.2, Environmental Setting and Impact Analysis, although both the Council on Environmental Quality (CEQ) Regulations for Implementing the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) Guidelines were considered during the impact analysis, the impacts identified in this Draft EIS/R are characterized using CEQA terminology. Refer to Section 3.1.2 for a description of the terminology used to explain the severity of the impacts.

Program-Level Evaluation Summary

In the programmatic portion of the 2007 Final EIS/R, the determination was made that under Programmatic Alternative C, the impacts to public health and vector management would be less than significant. Also, Programmatic Alternative C would result in a less-than-significant increase in mosquito populations, and the implementation of the AMP would not result in a substantial increase in the need for vector management activities.

Project-Level Evaluation

Phase 2 Impact 3.9-1: Potential increase in mosquito populations.

Alternative Eden A (No Action). Under Alternative Eden A, the No Action (No-Project) Alternative, the CDFW would continue maintaining and operating the Eden Landing pond complex in accordance with the *Eden Landing Ecological Reserve System E2 and E2C Operation Plan*, the AMP, and current CDFW practices. Under this alternative, no new actions would be implemented as part of the Eden Landing Phase 2 project. The high-priority levees around the ponds would be maintained to continue to provide de facto inland flood protection. Also, the existing Pacific Gas and Electric Company (PG&E) distribution lines and the access to them would be maintained by others under this alternative.

ACMAD would continue to monitor and mitigate any mosquito and vector management issues that may arise and would continue to adhere to the vector control portion of the AMP and follow CDFW practices. Because no new construction would occur under Alternative Eden A, the AMP management actions would be limited to adjusting the level of vector control at the ponds, as needed, and ensuring AMP activities are consistent with CDFW mosquito management practices. By design, the established AMP management triggers would lead to the implementation of the AMP management actions early enough to avoid substantial increases in the need for vector management activities. The AMP management actions would also minimize potential increases in mosquito populations. Therefore, impacts under Alternative Eden A would be considered less than significant.

Alternative Eden A Level of Significance: Less than Significant

Alternative Eden B. Under Alternative Eden B, full tidal marsh restoration would be achieved during a single stage of construction and project implementation. Bottom elevations would be raised in the Bay and Inland Ponds, the easternmost levees would be fortified to allow continued provision of de facto inland flood protection, and the San Francisco Bay (or Bay)-facing levees would be breached to allow tidal flows to Ponds E1 and E6. Pilot channels would be excavated to help the ponds fill and drain and to prevent residual ponding at low tides. After establishment of full tidal marsh habitat, the amount of viable mosquito-breeding habitat in the project area would decrease. The increase in tidal action would allow the ponds to be flushed more thoroughly, which would decrease the amount of potential mosquito-breeding habitat in the area. However, some new upland areas (e.g., habitat transition zones) would be constructed adjacent to the improved levees. Upland areas have the potential to increase the amount of mosquito-breeding habitat if they are not designed, constructed, and maintained so that water does not pool in them.

The upland areas in this alternative would be designed to enhance drainage and therefore lower the risk of mosquitoes establishing breeding habitats in these areas. They would also be placed so as to be accessible from adjacent levees to allow easier access by the ACMAD.

As described above in the analysis for Alternative Eden A, mosquito and vector management would continue to follow the vector control portion of the AMP and current CDFW practices. Under this alternative, the amount of viable mosquito-breeding habitat would be expected to decrease within the project area. By design, the implementation of the AMP management actions would occur early enough, due to the established AMP management triggers, to avoid substantial increases in the need for vector management activities while minimizing potential increases in mosquito populations. Therefore, impacts under Alternative Eden B would be less than significant.

Alternative Eden B Level of Significance: Less than Significant

Alternative Eden C. Under Alternative Eden C, the Bay Ponds would be restored to tidal marsh as described above in Alternative Eden B; however, the Inland and Southern Ponds would be retained as enhanced managed ponds. Bottom elevations would be raised in the Bay Ponds, and levee breaches and excavated pilot channels would be used to transition the Bay Ponds into tidal marsh habitat. Pilot channels would also help the ponds fill and drain and prevent residual ponding at low tides. An improved levee would be constructed mid-complex for flood risk management. Water control structures would be installed to manage water quality, depth, salinity, and other features, as necessary. This alternative would create managed ponds that could serve as viable breeding habitat for several Alameda County mosquito species. The Inland Ponds and Southern Ponds would continue to be large, open water ponds with vigorous wave action that would discourage mosquito production, though the ponds are managed seasonally for different wildlife and water quality goals.

Although this alternative may increase the amount of mosquito-breeding habitat in the area, water control structures would be installed so that the CDFW or ACMAD would be able to alter the water characteristics to produce unfavorable mosquito-breeding conditions. Habitat transition zones, habitat islands, and the raised levee could potentially provide depressions that could fill with water and support mosquito breeding, but through the implementation of the AMP, the design of these upland areas would be configured to enhance drainage. Also, the habitat transition zones and the raised mid-complex levee would be located to allow access for ACMAD staff to execute necessary mosquito control measures. By design, the implementation of the AMP management actions would occur early enough, due to the established AMP management triggers, to avoid substantial increases in the need for vector management activities while minimizing potential increases in mosquito populations. Therefore, impacts under Alternative Eden C would be less than significant.

Alternative Eden C Level of Significance: Less than Significant

Alternative Eden D. Under Alternative Eden D, all of southern Eden Landing would be restored to tidal marsh in a staged implementation approach. Bottom elevations would be raised in the Bay and Inland Ponds, and the Bay Ponds would be made tidal in the first stage, as in Alternatives Eden B and Eden C. Pilot channels would be excavated to help the ponds fill and drain and to prevent residual ponding at low tides. Similar to Alternative Eden C, a mid-complex levee would be constructed and the Inland and Southern Ponds would become managed ponds. This mid-complex levee could be temporary, though. If ongoing studies show that pond-dependent species are not being significantly affected by converting ponds to tidal marsh, then—once the Bay Ponds are restored to tidal marsh—the mid-complex levee and

other levees would be breached and/or water control structures would be removed. Over time, the Inland and Southern Ponds would ultimately transition to tidal marsh.

During the transition period when the Inland and Southern Ponds are temporary managed ponds, mosquito-breeding habitat could potentially increase. If Alternative Eden D is fully implemented, and the transition to tidal marsh has been achieved, viable mosquito habitat would decrease in the project area due to tidal flushing, as described in Alternative Eden B. If tidal flushing does not take place, then the Inland Ponds and Southern Ponds would remain as described in Alternative Eden C. The Inland Ponds and Southern Ponds would continue to be large, open water ponds with vigorous wave action that would discourage mosquito production, though the ponds are managed seasonally for different wildlife and water quality goals. By design, the implementation of the AMP management actions would occur early enough, due to the established AMP management triggers, to avoid substantial increases in the need for vector management activities while minimizing potential increases in mosquito populations. Therefore, impacts under Alternative Eden D would be less than significant.

Alternative Eden D Level of Significance: Less than Significant

Impact Summary

Phase 2 impacts for public health and vector control and their levels of significance are summarized in Table 3.9-2. The levels of significance are those remaining after implementation of program-level mitigation measures, project-level design features, and the AMP. The public health and vector management analysis required no project-level mitigation measures to reduce the impacts to a level that was less than significant.

Table 3.9-2 Phase 2 Summary of Impacts – Public Health and Vector Management

IMPACT	ALTERNATIVE EDEN A	ALTERNATIVE EDEN B	ALTERNATIVE EDEN C	ALTERNATIVE EDEN D
Phase 2 Impact 3.9-1: Potential increase in mosquito populations.	LTS	LTS	LTS	LTS

Notes: Alternative A is the No Action Alternative (No Project Alternative under CEQA).

LTS = Less than Significant

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