

13.0 CUMULATIVE IMPACTS AND OTHER REQUIRED ANALYSES

13.1 CUMULATIVE IMPACTS

13.1.1 Analysis Approach

CEQA requires the analysis of cumulative impacts (Section 13.1), significant irreversible environmental changes (Section 13.1), growth-inducing impacts (Section 13.2), and significant unavoidable adverse effects (Section 13.3).

Cumulative impacts are effects that result incrementally from an action or undertaking and other past, present, and reasonably foreseeable near-term future actions, taken together (regardless of the agencies or parties involved). In other words, significant cumulative impacts can result from the combination of effects within a given locality or region that are not individually significant.

For the purposes of this analysis, “past actions” are actions within the project region of influence (ROI) that occurred within the past 10 years. “Present actions” include (1) current operations within the ROI and (2) current resource management programs, land use activities and development projects that are being implemented by other governmental agencies and the private sector (where they can be identified) within the region. To avoid undue speculation about possible future projects that may contribute to cumulative effects, “reasonably foreseeable future actions” are those where applications have been submitted or that have been approved for implementation by appropriate authorities.

Project-specific effects identified in Chapters 3 through 12 were evaluated to determine whether they could also contribute to cumulative impacts in the ROI. The project would have a significant cumulative impact if, in conjunction with other projects, it would exceed the significance criteria established for a resource topic.

The following resource areas were determined to be subject to cumulative impacts:

- Hydrology and water quality (see Chapter 3)
- Biological resources (see Chapter 5)
- Traffic and transportation (see Chapter 6)
- Air quality (see Chapter 7)
- Noise (see Chapter 8)

Generally, mitigation proposed for significant impacts of each of the restoration alternatives (Proposed Project and Alternatives 1 and 2) would also serve to mitigate any potential contribution these alternatives would have to cumulative effects.

Effects to the following resource categories discussed in detail in this EIR were found not to have the potential to contribute to cumulative impacts because effects are expected to be minor, of very short duration, beneficial, and/or to have no potential to be additive and therefore to contribute to cumulative impacts:

- Geology and soils (see Chapter 4)-The project would be internally balanced with respect to fill removal and emplacement (i.e., there would be no importation of soils and no need to dispose of soils off-site). Therefore, impacts to soils from removal, filling, and grading are limited to the project site and are not subject to cumulative impacts.
- Public health (mosquito abatement; see Chapter 9)-The proposed restoration alternatives (Proposed Project and Alternatives 1 and 2) would reduce the favorable conditions for mosquito production that currently exist at the site. Since the mosquito impact (the only public health concern related to the project) is site-specific and since the project is expected to have a beneficial impact in this area, public health impacts are not considered subject to cumulative impacts.
- Aesthetics (see Chapter 10)-Impacts to views of the project site during project construction are expected to be minor and of short duration and therefore are not subject to cumulative impacts.
- Recreation and public access (see Chapter 11)-The proposed tidal restoration project will not cause any long-term changes to public access or recreational uses. Improved wildlife habitat would result in better opportunities for recreational wildlife viewing. Short-term impacts to recreational use of the project site during project construction are site specific and are not subject to cumulative impacts. Potential short-term cumulative impacts to safety for users of neighborhood parks are addressed under Traffic and Transportation (Section 13.1.3.3, below).
- Cultural resources (see Chapter 12)-No significant project impacts to cultural resources have been identified. Therefore, cultural resources are not subject to cumulative impacts.

The approach used to analyze the cumulative impacts associated with the key resource topics identified above included:

1. Developing a list of past, present, and reasonably foreseeable future projects in the project ROI (see Section 13.1.2 below)
2. Reviewing concerns recently expressed by a scientific panel about the cumulative impacts of bay-wide restoration and mitigation efforts
3. Reviewing the general plans of local counties
4. Qualitatively evaluating the cumulative impacts of past, present, and future projects

13.1.2 Projects Included in the Cumulative Impact Analysis ROI

For this project, the ROI is the northwest San Pablo Bay, centered around the Petaluma River, and bounded roughly by Tubbs Island on the east, the City of Novato on the west, Gness Field on the north and Hamilton Air Force Base on the south. Past, ongoing, and reasonably foreseeable projects in the project ROI that could result in cumulative impacts are shown in Figure 13-1. Most of these are wetlands restoration, enhancement, and creation projects (including tidal wetlands, muted tidal wetlands, managed marsh, perennial and seasonal non-tidal wetlands). These projects will generate similar types of impacts to the Bahia Marsh Restoration Project and are therefore more likely to contribute to cumulative impacts than other types of development projects (e.g., residential, commercial, industrial).

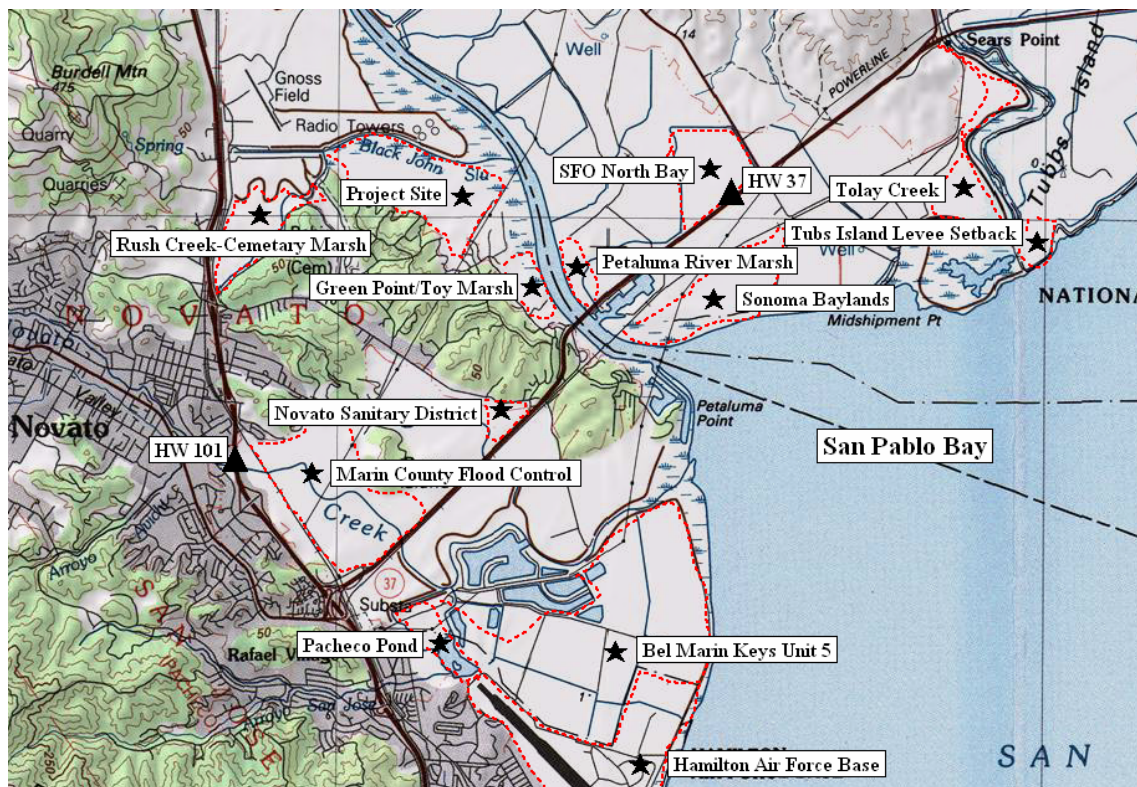


Figure 13-1 North Bay Restoration Sites

In addition to the restoration projects shown in Figure 13-1, the Bahia Homeowners Association (HOA) Lagoon Dredging Project was considered in the cumulative impacts analysis. There appear to be a number of problems with permitting this project (e.g., it would have probably significant impacts for special-status species, such as the California clapper rails). Nevertheless, since an application has been submitted, it is considered in this cumulative analysis. Initially proposed in 1999, the project would: 1) close the connection between the existing HOA channel and HOA West Bahia Lagoon; 2) excavate a new connection between the West and East Bahia lagoons across the Western

Peninsula of East Bahia; 3) construct a lock at the north end of the East Lagoon at the location of an existing culvert, thereby connecting the East Bahia Lagoon to the Petaluma River via a portion of the existing channel, and 4) dredge this functional portion of the channel. The project is designed to provide boat access between the Bahia community and Petaluma River and to prevent tidal action and reduce sedimentation in the HOA channel and lagoon system. The channel and lagoon have silted in since they were last dredged in 1987 and are currently not navigable.

The Bahia HOA Dredging Project proposes to deposit dredge spoils on a property on the east side of the Petaluma River, northeast of the project site. As mitigation, the project also proposes to enhance approximately 8.7 acres of tidal salt marsh (owned by the State Lands Commission) along the Petaluma River, adjacent to the proposed dredge disposal site. An EIR for this project (City of Novato, 1999) considered two project alternatives, in addition to the required No Project Alternative: 1) dredging the channel and lagoon (similar to what last occurred in 1987) and 2) eliminating the proposed connection between the East and West Bahia lagoons and placing the lock at an alternative location.

Although the dredging project is located adjacent to and partially overlapping the proposed Bahia Marsh Restoration Project (where the proposed connection between the two lagoons would be excavated across the Western Peninsula), the long-term impacts of the two projects would be of a different nature and would therefore not combine to create cumulative impacts. However, if construction of the two projects were to occur simultaneously, short-term construction-related impacts, (e.g., traffic, noise, and air emissions from operation of construction equipment and vehicles) could combine to create cumulative impacts.

Generally, many of the impacts expected from the dredging project would be informally mitigated by the restoration project. For example, the dredging project would result in a loss of habitat, including wetlands, while the restoration project would restore and enhance wetland habitat. The dredging project would cause a reduction in tidal prism in Black John Slough and upstream marshes; while the restoration project would actually enlarge the tidal prism at these locations.

13.1.3 Cumulative Impacts Analysis

13.1.3.1 Hydrology and Water Quality

The reintroduction of tidal influence to the project site and other restoration projects in the region would generally improve water quality in San Francisco Bay. In the long term, the impact of the project and other wetlands restoration, enhancement, and creation projects, is expected to be positive since wetlands are generally acknowledged to provide favorable water quality improvement mechanisms, such as filtration, settling and entrapment of sediment, photodegradation, adsorption, and enhanced biological activity (uptake, chemical transformation, degradation).

Water quality (including water salinity) at the project site is the same or nearly the same as the Petaluma River, so re-introduction of tidal circulation itself should not impact water quality. Project construction could cause some potentially significant temporary water quality impacts (e.g., operation of construction equipment could cause minor releases of contaminants and minor erosional impacts causing elevation of suspended sediment and turbidity). However, these impacts would be limited in scope and duration, would be mitigated by use of best management practices (BMPs), and are unlikely to contribute to cumulative water quality impacts in the Bay or any of its tributaries.

Sedimentation and tidal prism are inversely related and are therefore jointly discussed under the topic of hydrology in this EIR. There is concern that the project could contribute cumulatively to existing problems with increased sedimentation and decreased tidal prism in Black John Slough and upstream marshes (Rush Creek and Cemetery Marshes). If a portion of the HOA channel were dredged, as proposed in the Bahia HOA Dredging Project, the channel would capture tide signal from Black John Slough, also contributing cumulatively to increased sedimentation and reduced tidal prism in the slough and marshes upstream from the channel.

However, by implementing a phased approach to tidal circulation, as the Bahia Marsh Restoration Project currently proposes, this project would not contribute to cumulative impacts to upstream hydrology. In fact, as noted previously, the restoration project is actually expected to enlarge the upstream tidal prism, which would effectively mitigate (informally) the effects of the dredging project, if implemented.

There is some concern that, with the scale of wetland restoration projects being undertaken around the San Francisco Bay, there may not be adequate local sediments available for the restoration projects. Many of the proposed sites are subsided and would require substantial sedimentation before restoration could proceed. In addition, there is a concern that these projects could alter the sediment balance in the Bay and result in a reduction in mudflat/shallow water habitats. Implementation of the Proposed Project would not require the use of off-site sediments. Sediments excavated from the East Bahia peninsulas to restore tidal marsh habitat in that portion of the site would be used to create additional habitat in East and Central Bahia. The Proposed Project is internally balanced with respect to sediments. Therefore, the Bahia Marsh Restoration Project would not contribute to cumulative impacts to the sediment balance in the Bay.

13.1.3.2 Biological Resources

Implementation of the proposed Bahia Marsh Restoration Project is part of a long-term strategy to re-create a complex mosaic of wetlands habitats in the San Francisco Bay area. Specifically, the project would allow the establishment of transitional salt marsh and brackish marsh plant communities within an area of 375 acres, contributing to other efforts to restore, enhance, or create these types of plant communities in the Bay Area. The project would also enhance 6.5 acres of freshwater ponds and 3.5 acres of seasonal wetlands on the East Bahia Peninsulas.

The proposed Bahia Marsh Restoration Project and other wetlands restoration, enhancement, and creation projects in the north San Pablo Bay will result in cumulatively beneficial impacts to plants and wildlife, including special-status species, providing additional habitat in which these sensitive communities can flourish and resulting in greater habitat complexity, diversity, and productivity. These projects would result in an overall increase in the availability, and ultimately the quality, of fringe marsh aquatic habitats throughout the San Francisco Bay area. Nursery habitat for many birds and other wildlife species, as well as juvenile and rearing habitat for many species of fish, would thereby be greatly enhanced. The projects would also result in a cumulative increase in middle marsh and high marsh habitats suitable for various endangered species and species of special concern, including the California clapper rail, California black rail, salt marsh harvest mouse, salt marsh wandering shrew, northern harrier, and salt marsh common yellowthroat.

Potentially significant adverse cumulative impacts to biological resources to which the Proposed Project could contribute include conversion of open water habitat favored by some shorebirds to habitat favoring tidal marsh-dependent bird species; removal or disturbance of small areas containing jurisdictional wetland vegetation and pickleweed cover (used by the salt marsh harvest mouse [SMHM], a state- and federal-listed endangered species); and the spread of invasive plant species, such as invasive cordgrasses. These impacts are discussed below in this section.

In addition, should construction for the Bahia HOA Dredging Project and Bahia Marsh Restoration Project be undertaken simultaneously (an unlikely scenario), construction traffic, air quality, and noise impacts from the two projects would combine to create significant short-term impacts for resident wildlife at the project site (see discussions below under Sections 3.1.3.3 through 3.1.3.5).

Shorebirds and Waterfowl Habitat– Cumulative Impacts

The potential conversion of open water and seasonal wetland habitats to tidal habitats could have a long-term adverse impact on shorebird and waterfowl populations and their use of the project site. Since San Francisco Bay is one of only a few sites in North America that regularly support shorebirds in the hundreds of thousands, the loss of open water habitat could have an impact on regional shorebird populations. San Francisco Bay is also a critically important site for wintering and migrating water birds in the Pacific Flyway and the project could contribute to cumulative impacts on water bird populations throughout the Pacific Flyway. Proposed restoration projects in San Pablo Bay are expected to cause a cumulative change in open water habitats used by migratory shorebirds and waterfowl over the next 20 to 50 years. This change could result in either an increase or decrease of open water habitat, depending on which restoration/mitigation projects are implemented.

Although shorebirds and waterfowl may use the open water ponds at the site to some degree, compared to other locations in the north San Pablo Bay, the Bahia project site is not a major site for shorebird and waterfowl use. Any impacts of the project to migratory shorebirds and waterfowl would be mitigated by the availability of numerous foraging

and refuge areas throughout the Bay. Migratory shorebirds and waterfowl using the site would likely re-distribute among other available habitats in the North Bay.

Jurisdictional Wetlands – Cumulative Impacts

Altogether, the Proposed Project would directly impact an estimated 31.4 acres of jurisdictional wetlands federally protected under Section 404 of the Clean Water Act. However, in the long term, the project would create approximately 375 acres of new tidal wetlands, for a net gain of over 343 acres of tidal wetlands. Additionally, 6.5 acres of freshwater ponds will be enhanced and 3.5 acres of seasonal wetlands on the East Bahia Peninsulas will be restored. Therefore, this impact is considered less than significant.

Overall, the project is likely to provide a significant increase in SMHM habitat within the project site. This, together with improvement in SMHM habitat resulting from other habitat projects, would contribute to a cumulative benefit by improving long-term habitat viability and expanding and connecting existing habitat areas as part of the recovery strategy for the species.

It should be noted that the cumulative acreage of impacted SMHM habitat is not a good measure of the significance of the impact to the species. This is because SMHM populations tend to be confined to small, disjunct marsh areas. The populations are typically genetically isolated and the long-term survival of these individual populations is dependent on the ability to maintain viable numbers of individuals within the specific habitat area. The significance of impacts to the species is based on the ability to sustain these separate populations. Impacts of habitat loss or gain would only be cumulatively significant if the loss or gain reduced, eliminated, or improved the ability of a site to sustain or expand the population at that site.

Invasive Plant Species – Cumulative Impacts

The project may contribute to negative cumulative impacts related to the invasion of aggressive non-native plant species. The project, along with other proposed or reasonably foreseeable tidal restoration projects would expand tidal habitat suitable for the rapid invasion and dominance by non-native cordgrasses and other aggressive exotic plant species. Smooth cordgrasses and other non-native invasive species are aggressive colonizers of open, unvegetated habitats typical of early tidal marsh restoration projects.

To date, there is no evidence that *S. alterniflora* has established as far north as the project site. However, another invasive cordgrass, *Spartina densiflora* has been found in Marin County. The closest known occurrence of *S. densiflora* to the project site is at the mouth of Galinas Creek. If left unabated, *S. densiflora* could become a dominant salt marsh plant species in the San Pablo Bay, changing important ecosystem functions such as sedimentation dynamics and detrital production. Once established in the San Francisco Bay Estuary, invasive cordgrasses could rapidly spread to other estuaries along the California coast through seed dispersal on the tides, potentially resulting in a variety of long-term cumulative impacts to existing plants and wildlife throughout the California coast.

The number of restoration projects planned in the area increases the availability of suitable habitat for colonization. Several restoration projects along San Francisco Bay have been degraded because non-native cordgrass has out-competed native California cordgrass. The proposed project could create conditions favorable for establishment of invasive cordgrass species and their hybrids on approximately 375 acres. Monitoring by the San Francisco Estuary Invasive *Spartina* Project found that non-native *Spartina* species had spread to dominate nearly 500 acres of tidal marsh, predominantly in the South and Central Bay, by the year 2000 (CSCC and USFWS, 2003). Additional cordgrass colonization on the 375 acres made suitable by the Bahia Marsh Restoration Project would be a significant contribution to this cumulative impact.

The ability to successfully control the cumulative effects and spread of exotic species of cordgrass and other plants requires a region-wide effort and the willingness of resource agencies to fund bay-wide control programs. The proposed project includes provisions for monitoring and control of exotic pest plant species within the restored marsh and adjacent tidal marshes. MAS will coordinate with the Invasive *Spartina* Project (a region-wide program to control non-native *Spartina* in the San Francisco Estuary) during project implementation.

13.1.3.3 Traffic and Transportation

Traffic impacts during project construction would be limited to a two- to six-week period. Short-term traffic impacts from trucks hauling fill materials through the Bahia community, including short-term safety impacts for users of neighborhood parks, could potentially combine with impacts from trucks working on the Bahia HOA Dredging Project. However, this would only occur if the two projects were implemented simultaneously.

13.1.3.4 Air Quality

The Proposed Project would improve odor problems related to standing water at the project site. Earth-moving activities at the site would involve very limited production of fugitive dust and emissions from construction vehicles. Fugitive dust would be limited by the wetness of site sediments, would be limited to the immediate site vicinity, and would be short in duration. Should the Bahia BOA Dredging Project and Bahia Marsh Restoration Project be implemented simultaneously, dust emissions generated by construction of the two projects could combine to produce cumulatively significant short-term impacts, primarily for some nesting and resident wildlife species. Some human residents of the Bahia community could also be impacted by the cumulative impact, but most residences are too far away from the construction areas to be significantly impacted. Vehicle emissions caused by the Proposed Project would be minor compared to motor vehicle emissions on highways and streets in the project area and would therefore not contribute substantially to cumulative impacts.

13.1.3.5 Noise

Should the Bahia BOA Dredging Project and Bahia Marsh Restoration Project be implemented simultaneously, noise generated by construction of the two projects could combine to produce cumulatively significant short-term impacts, primarily for some nesting and resident wildlife species. As with air quality impacts, some human residents of the Bahia community could also be impacted by the cumulative noise impact, but most residences are too far away from the construction areas to be significantly impacted.

13.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Implementation of any of the restoration alternatives (Proposed Project, Alternatives 1 and 2) would require a relatively small and insignificant, but irretrievable commitment of fossil fuels and other energy sources to implement construction plans. Proposed breaching of the site levees and restoration of tidal circulation to the site is an action that could theoretically be reversed at some point in the future. Other proposed construction plans are also theoretically reversible.

13.4 GROWTH-INDUCING IMPACTS

The proposed Bahia Marsh Restoration Project would not foster economic or population growth or the construction of additional housing, and therefore would not have a growth-inducing impact.

13.5 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

The proposed Bahia Marsh Restoration Project is not expected to cause any significant unavoidable adverse impacts. All impacts identified in this EIR are expected to be less than significant with the implementation of proposed mitigation measures.