CHAPTER 8.0 CUMULATIVE BENEFITS AND IMPACTS

Cumulative benefits and impacts are the result of the incremental benefits and impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions. This chapter summarizes the potential cumulative benefits and impacts associated with the placement of dredged material within the in-Bay, ocean, and upland environments, as described in the Affected Environment Section (Chapter 4) of this document. The potential cumulative benefits and impacts associated with implementation of the LTMS are described for the three proposed action alternatives, described in Chapter 6, that have been brought forward for public comment.

Potential cumulative impacts are primarily discussed on a regional programmatic basis since the impacts of specific projects would not be known until case-by-case, project specific analyses are performed. The benefits associated with the implementation of an action alternative are also accrued on a regional basis. However, localized benefits associated with upland/wetland reuse of dredged material are also likely. These cumulative local and regional benefits, as analyzed on a programmatic level, are discussed below. As explained in Chapter 2, a primary goal of the LTMS is to shift the current dredged material disposal practices, primarily unconfined aquatic disposal, at in-Bay sites, to a more productive long-term distribution of dredged material that would provide for increased beneficial reuse and avoid long-term environmental impacts.

Sections 8.2, 8.3, and 8.4 below discuss the identified potential regional cumulative impacts associated with the implementation of an action alternative. These impacts include potential increases in air emissions, increases in the volume of waterborne and land transportation, changes in land use, and habitat conversion/modification. The principal identified cumulative benefits would be associated with the reuse of dredged material in the upland/wetland reuse environment. As discussed below, these cumulative benefits include the restoration of depleted tidal wetland habitat, water quality improvements, Delta flood protection, and the indirect benefits associated with the reduction of in-Bay disposal.

8.1 POTENTIAL CUMULATIVE EFFECTS OF ACTION ALTERNATIVES ON THE IN-BAY ENVIRONMENT

No direct cumulative benefits are associated with the use of any of the existing in-Bay disposal sites. The principal indirect cumulative benefit associated with the implementation of an action alternative is the reduction of dredged material disposed of in the Bay, with attendant reduction in the risk of adverse impacts from such disposal. The potential cumulative impacts associated with the use of existing in-Bay disposal sites are described below.

8.1.1 Water Quality

Impacts

As addressed in the Generic Analysis, section 6.1.1, some degree of water quality impacts will occur with dredged material disposal within the in-Bay environment, at any disposal volume. These water quality effects would be associated with sediment plumes from the initial disposal event and with the subsequent resuspension of material from the dispersive in-Bay sites. However, it is at the higher disposal volumes where the greatest potential for cumulative degradation of water quality would occur. This water quality degradation would be due to the higher potential occurrence of high-frequency disposal events which are more likely to occur with higher disposal volumes (i.e., there would be the likelihood for multiple disposal events occurring within a limited time period).

No significant cumulative impacts are anticipated in association with the implementation of any of the action alternatives. In fact, the implementation of any one of the action alternatives would provide for a reduction in the current in-Bay disposal volume, thereby reducing the potential occurrence of high frequency disposal events. However, combined with pollutant loading to the Bay from urban and non-urban sources, and other types of stresses on the Estuary, the high in-Bay dredged material disposal volumes of the “No Action” alternative could result in some cumulative impacts.

8.1.2 Changes to the Bay System

Impacts

The implementation of any one of the action alternatives will result in a long-term reduction in the quantity of dredged material disposed of in the Bay. The cumulative effects of such a change in dredged material management on the functions of the Bay system is not known. The implementation of an action alternative will result in an increase in dredged material being placed in the upland environment and disposed of at the ocean site. Subsequently, there will be less material placed at dispersive in-Bay sites and thus less resuspension of dredged material within the Bay system. The possible effects of this include less available material for marsh sediment accretion and an overall reduction of sediment deposition throughout the Bay. However, this is not expected to be significant given that sediment suspended from mud flats each year is many times greater than that associated with dredged material disposal.

8.1.3 Air Quality

Implementation of any one of the action alternatives, presented in Chapter 6, would result in cumulative impacts to air quality. Emissions associated with in-Bay disposal would occur on the waters of the San Francisco Bay. These emissions would predominately be transitory and would occur away from sensitive receptors. On a programmatic evaluation level, in-Bay disposal associated air emissions would not be expected to adversely impact sensitive receptor populations. However, project-specific cumulative impact analyses would need to be evaluated within individual project-level EIS/EIRs since they are not evaluated in this Policy EIS/Programmatic EIR.

8.2 POTENTIAL CUMULATIVE EFFECTS OF ACTION ALTERNATIVES ON THE OCEAN ENVIRONMENT

Similar to the disposal of dredged material at existing in-Bay disposal sites, there are no direct cumulative benefits associated with the use of the Deep Ocean Disposal Site. The principal indirect cumulative benefit associated with the use of the site is the reduction of material disposed of in the Bay. The potential cumulative impacts associated with the use of the Deep Ocean Disposal Site are described below.

8.2.1 Water Quality

The Final EIS for the Deep Ocean Disposal Site designation (USEPA 1993) concluded impacts to water quality associated with dredged material disposal at the site are expected to be local, transitory, and insignificant. The transitory nature of water column impacts would preclude additive (cumulative) effects. The water quality model for sediment dispersion at the site predicted a low probability that fine-grained sediments would reach the boundary of any National Marine Sanctuaries following a disposal action. Moreover, only dredged material that meets all applicable water quality criteria and sediment quality guidelines will be disposed of at the Deep Ocean Disposal Site. Therefore, the USEPA determined that water quality impacts (direct and cumulative) would not be significant.

8.2.2 Increased Maritime Traffic

The implementation of any one of the three actions alternatives, presented in Chapter 6, would result in an increase in waterborne barge traffic to the Deep Ocean Disposal Site. However, as addressed in the EIS for the designation of the Deep Ocean Disposal Site (USEPA 1993), the Deep Ocean Disposal Site is located outside of designated commercial vessel traffic lanes and away from any restricted passage areas, precautionary zones, or anchorages for commercial shipping. Other ocean related projects considered in a cumulative analysis were determined to be well away from the site. Additionally, it was determined that the use of the Deep Ocean Disposal Site would result in negligible impacts to recreational or commercial fishing. Therefore, it is not anticipated that cumulative impacts associated with increased marine traffic would occur.

8.2.3 Air Quality

Implementation of any one of the action alternatives, presented in Chapter 6, would result in cumulative impacts to air quality. The air quality analysis conducted for this EIS/EIR concluded that the dredged material placement environment with the largest contribution of emissions would be the Deep Ocean Disposal Site, even though disposal volumes at this site would be approximately one-fifth the volumes of in-Bay sites, depending on the action alternative chosen (see sections 6.1.5.1 and 6.2.4). This difference is due to the much longer transportation distance to the Deep Ocean Disposal Site, which would produce substantially greater tugboat emissions. Emissions associated with ocean disposal activities would generally occur on the waters of the San Francisco Bay and offshore regions. Consequently, these emissions would occur at a considerable distance from any sensitive receptors and would not be expected to adversely impact this portion of the population. Ocean disposal would be the least threatening to sensitive receptors of all the proposed placement environments.

Project-specific cumulative impacts to sensitive receptors would need to be addressed within individual project-level EIS/EIRs and were not evaluated for this Policy EIS/Programmatic EIR.

8.3 POTENTIAL CUMULATIVE BENEFITS AND IMPACTS OF ACTION ALTERNATIVES ON THE UPLAND/ WETLAND REUSE ENVIRONMENT

Each of the action alternatives, presented in Chapter 6, effectuates to a greater or lesser extent the upland/wetland reuse of dredged material. It is this reuse opportunity which provides for the greatest potential cumulative benefits associated with the implementation of the LTMS. In contrast to the primarily localized adverse impacts associated with upland/wetland reuse, both local and regional cumulative benefits could be realized. These benefits, as well as potential cumulative impacts are discussed below by benefit/impact type.

8.3.1 Habitat Conversion

Benefits

The past modification of the Estuary, as describe in Chapter 4, has greatly impacted its ecosystem. The reduction of wetlands, associated with diking and filling along the margins of the Bay, have deprived the Estuary of this habitat type to a significant extent, resulting in a patchwork of wetlands that have reduced value to wildlife, greatly reduced the filtering and absorption of pollutants, and significantly reduced regional biodiversity. Although it is evident that areas of the diked former bayland support wildlife habitat, a newfound recognition of the importance of the Estuary's tidal wetland systems has spurred efforts to restore such wetlands, especially those at the margins of the San Pablo Bay and within the Delta. In addition to the reintroduction of tidal action to a site, tidal wetland restoration projects of areas that were diked off from the Bay, require either extensive natural sedimentation to occur or the placement of soil/sediment material at a site to raise the land surface elevation to that suitable for vegetative colonization. The reuse of dredged material is one method of achieving a site's elevational needs.

Potential opportunities for the restoration of wetlands utilizing dredged material have been identified through the LTMS Technical Studies (Gahagan & Bryant Associates 1994b). The creation of tidal marsh habitat is one of the principal identified cumulative benefit associated with upland/wetland reuse of dredged material (see Section 4.4.4.1). The creation of tidal marsh habitat utilizing dredged material presents an opportunity to more rapidly create this greatly depleted habitat type than may otherwise be possible through other means. Such restoration activities would have significant benefits both on a local and regional level for many fish and wildlife species which are dependent on tidal wetland as a primary or temporary (seasonal or nursery ground) habitat.

Impacts

The construction of upland/wetland reuse projects could result in the conversion of existing habitat at potential reuse sites. For example, seasonal wetlands habitat found within some of the diked historic baylands sites would be lost through the conversion of these sites to tidal marsh habitat or the construction and operation of rehandling facilities. While the conversion of bayland sites to tidal wetlands reflects the historical distribution of tidal marshes, the conversion will result in the loss of the some important habitat functions for local and migratory shorebirds and waterfowl, including supplemental foraging habitat during high tides for small shorebirds, loss of nesting habitat for resident species, and winter storm refugia (see Chapter 4, section 4.4.4.1). Combined with other past, present, and potential activities within the baylands which may result in the loss of habitat value (e.g., urban development, intensified agricultural practices, etc.), the conversion of seasonal wetlands to tidal wetland habitat or rehandling facilities may results in an overall regional loss of these important functions. Such a loss of these seasonal wetland functions could result in a significant cumulative impact.

The policy-level mitigation measures, presented in Chapter 5 of this document were developed to address the cumulative, as well as localized impacts associated with habitat conversion. As discussed above, the development of increased tidal wetland habitat along the Bay margins is considered to be a net cumulative benefit, replacing a habitat type which was lost due to past diking and other Bay fill activities. However, this cumulative benefit would not apply in the case of rehandling facilities, were any existing land uses, including wildlife habitat, would be changed to reflect an this industrial type activity. As explained in Chapter 6, the development of rehandling would require specific habitat replacement mitigation, thereby reducing the associated cumulative habitat conversion impacts.

8.3.2 Water Quality

Benefits

In contrast to potential localized adverse water quality impacts, region-wide water quality benefits are attainable through the implementation of any one of the action alternatives. For example, when properly sited and designed, habitat restoration projects (particularly tidal wetland restoration) can result in a significant net benefit to water quality by contributing to increased sediment retention, filtration of pollutants, and shoreline stabilization. Additionally, indirect regional benefits could be obtained through the reduction of in-Bay disposal of dredged material and through the flood protection achievable in the Delta region through the reuse of dredged material for levee repair and stabilization. Cumulatively, reuse of dredged material in the upland/wetland environment could result in significant benefits.

Impacts

The placement of material determined to be suitable for aquatic disposal (SUAD) in the upland/wetland reuse environments (see Chapter 3, section 3.2) can have either beneficial or adverse cumulative impacts on water quality, depending on the specific type of reuse and circumstances at placement sites. In general, regional cumulative water quality impacts associated with upland/wetland reuse are not anticipated. For this reason, adverse water quality impacts would need to be evaluated on a case-by-case, site-specific basis. An exception to this may occur on Delta islands where dredged material would be utilized for levee maintenance and repair activities. Due to the sensitivity of the Delta inner-island environments, already impacted by agricultural practices, including fertilizer and pesticide use, as well as ground and surface water pumping, inner-island cumulative impacts association salt loading may occur (see Chapter 6, section 6.1.3.2). However, even these impacts would be considered fairly localized.

8.3.3 Air Quality

Benefits

There are no direct cumulative air quality benefits associated with upland/wetland reuse of dredged material.

Impacts

It is anticipated that air quality impacts associated with the reuse of dredged material would likely be short-term (with the exception of ongoing operations at rehandling facilities), localized, and not contribute to significant cumulative changes in air quality. Potential cumulative air quality impacts, including incremental additions of vehicle and construction equipment exhaust emissions associated with sediment transport, handling, and placement would occur, depending on the reuse parameters. These parameters include the placement method chosen, the location of reuse sites within regional air basins, and the proximity of reuse sites to sensitive receptors. Project-specific, case-by-case cumulative impact evaluation and application of appropriate mitigation measures would be necessary prior to the implementation of individual reuse projects. The construction and operation of rehandling facilities would result in the highest amount of air emissions per unit volume of disposed material compared to other placement options. However, relatively few such facilities (one or two) would need to be operated to meet the regional needs.

Project-specific cumulative impacts to sensitive receptors would need to be addressed within individual project-level environmental reviews and were not evaluated for this Policy EIS/Programmatic EIR.

8.3.4 Truck Traffic

Benefits

There are no direct cumulative benefits associated with the upland transport of dredged material. Indirect cumulative benefits, however, would be associated with the use of dredged material at landfills, levee repair and stabilization projects, and other upland use. The use of dredged material for these purposes replaces the need for excavating and transporting other material to these sites, while meeting beneficial reuse goals for dredged material.

Impacts

As discussed in Chapter 4, section 4.4.4.3 and Chapter 6, section 6.1.4.3, the construction and operation of rehandling facilities will result in an increase in truck traffic in the areas where such facilities would be located.

Whether such increases would result in significant cumulative impacts would need to be analyzed on a project-specific basis for each proposed rehandling facility prior to the construction of a new facility or expansion of existing facilities. However, preliminary estimates based upon the plenary dredged material volume figures, presented in Section 4.4.3, indicate that under a high upland reuse scenario (not a proposed alternative) approximately 780,000 cubic yards of material would be rehandled each year. Given that haul-truck capacities range from 10- to 20-cubic yards and that material shrinkage (due to drying) would be approximately 20 to 40 percent, truck traffic requirements would be approximately 64 to 170 trucks per day, for all rehandling facilities (new or existing) combined. Under the medium upland reuse scenario, truck needs would be reduced to approximately 31 and 85 round trips per day for all rehandling facilities combined. Cumulative impacts associated with increases in truck traffic would depend on various factors such the number of new facilities constructed, the throughput capacities of the facilities, and the location of the facilities in relation to existing traffic patterns and routes to end-use sites.