would likely not be measurable in the environment. In the LLT, the primary difference would be changes in the Delta source water fractions to hydrologic effects from climate change and higher water demands. These effects would occur regardless of the implementation of Alternative 4A and, therefore, at the LLT the effects of the alternative on mercury are expected to be similar to those described above.

Because some of the affected species of fish in the Delta are pursued during subsistence fishing by minority and low-income populations, this increase creates the potential for mercury-related health effects on these populations. Asian, African-American, and Hispanic subsistence fishers pursuing fish in the Delta already consume fish in quantities that exceed the US Environmental Protection Agency reference dose of 7 micrograms (µg) per day total (Shilling et al. 2010:5). This reference dose is set at 1/10 of the dose associated with measurable health impacts (Shilling et al. 2010:6). The highest rates of mercury intake from Delta fish occur among Lao fishers (26.5 µg per day, Shilling et al. 2010:6). Increased mercury was modeled based upon increases modeled for one species: largemouth bass. These effects are considered unmitigable (see Chapter 8, *Water Quality,* Mitigation Measure WQ-13).

The associated increase in human consumption of mercury caused by these alternatives would depend upon the selection of the fishing location (and associated local fish body burdens), and the relative proportion of different Delta fish consumed. Different fish species would suffer bioaccumulation at different rates associated with the specific species, therefore the specific spectrum of fish consumed by a population would determine the effect of increased mercury body burdens in individual fish species. These confounding factors make demonstration of precise impacts on human populations infeasible. However, because minority populations are known to practice subsistence fishing and consume fish exceeding US EPA reference doses, any increase in the fish body burden of mercury may contribute to an existing adverse effect. Because subsistence fishing is specifically associated with minority populations in the Delta compared to the population at large this effect would be disproportionate on those populations for Alternative 4A. This effect would be adverse.

4.3.24.8 Summary of Environmental Justice Effects under Alternative 4A

Alternative 4A would result in disproportionate effects on minority and low-income communities resulting from land use, socioeconomics, aesthetics and visual resources, cultural resources, noise, and public health effects. Mitigation and environmental commitments are available to reduce these effects; however, effects would remain adverse. For these reasons, effects on minority and low-income populations would be disproportionate and adverse.

4.3.25 Climate Change

This section is organized differently from the other sections above because analyzing how Alternative 4A would affect the Delta's resiliency and adaptability to climate change is a fundamentally different analysis than those presented in other resource analyses. Whereas the other sections are organized to identify effects of Alternative 4A and how to mitigate any significant impacts, this section's function is to analyze and disclose how Alternative 4A would affect the Delta's resiliency and adaptability to expected climate change. While climate change is already ongoing and would occur under the ELT timeframe, effects of Alternative 4A on the resiliency and adaptability would be greater under LLT conditions as climate change effects are expected to be more pronounced[6]. Nevertheless, an assessment of conditions under the ELT timeframe is provided below.

[6] The ELT timeframe is modeled at 2025. The LLT timeframe is modeled at 2060.

As described in Draft EIR/EIS Chapter 29, *Climate Change,* Section 29.6.1.1, impact analyses evaluated potential sea level increases of 6 inches (15 centimeters) in 2025, which is relevant to the early long-term timeframe considered for the purposes of Alternative 4A. Expected changes in precipitation and hydrology were also evaluated including earlier runoff as a result of warmer temperatures causing more precipitation to fall as rain instead of snow and the remaining snow melting earlier. These hydrologic changes will make water management more challenging and more constrained in the future and are expected to result in more years of critical dryness. DWR's modeling of future conditions suggests that with current management and operations, level of demand, and current climate, major CVP and SWP reservoirs could reach dead storage levels (the level below which water cannot be released) and that the likelihood of these critical conditions will increase substantially as the climate warms. In these instances, there would be critical water shortages leading to potentially extreme impacts on agriculture, municipal, industrial, and ecological water uses.

Alternative 4A would provide resiliency and adaptation benefits over the No Action/No Project alternative for dealing with the combined effect of increases in sea level rise and changes in upstream hydrology. As shown in Table B.1-3 in Appendix B of this RDEIR/SDEIS, implementation of this alternative would result in Delta exports that could range from slightly lower (less than 1% decrease under Scenario H3) to somewhat higher (11% increase under Scenario H4) than those under the No Action Alternative (ELT). Alternative 4A includes dual conveyance facilities, allowing water to be moved through the Delta when conditions permit and allowing water to be diverted from the Sacramento River in the northern Delta when conditions do not permit through Delta conveyance. The location of the north Delta diversion facility is further inland making it less vulnerable to salinity intrusion. Even with substantial sea level rise and critically dry upstream conditions, salinity could be repelled from this location. By establishing an alternative diversion point for Delta exports, a great deal of Delta management flexibility is added. Currently, management of the Delta is constrained by requirements to maintain X2 at specific locations during certain times of the year to ensure water diversions have low salinity and to ensure that critical fish populations stay outside of the entrapment zone. Alternative 4A would allow the Delta to be managed in a number of different ways, including maintaining salinity as it is currently managed or allowing salinity to fluctuate more freely in the Delta as it did prior to the development of upstream reservoirs. This added flexibility would allow managers more options for adaptively managing the Delta so that conditions can be optimized to provide benefits across all Delta water uses and habitat conditions. Alternative 4A would also provide more reliable water supplies, which will provide additional resilience and adaptability to increases in water demand as a result of higher temperatures and increased evapotranspiration and evaporation.

In addition to added water management flexibility created by proposed water conveyance facilities, Alternative 4A includes Environmental Commitments 3, 4, 12, 15, and 16 that provide for actions that will improve habitat in certain areas and reduce the effects of stressors, though to a substantially smaller geographic extent than proposed under Alternative 4. By enhancing, restoring, and protecting habitat, Alternative 4A would increase resilience and adaptability to the climate changes described above by increasing the amount of habitat that is available during periods of high stress such as very high or low freshwater inflow or very high salinity intrusion. By creating a wider variety of water management options and restoring habitat, Alternative 4A can also help buffer potential negative effects of increased water temperatures thereby adding resiliency to increased water temperatures. More detail on existing temperature conditions in watersheds within the Delta and water temperature effects on aquatic habitat as well as biological and biochemical processes,

and how managed flows influence water temperatures can be found in Chapter 11, Fish and Aquatic Resources.

Similarly, in consideration of terrestrial species, protection and restoration of a variety of natural communities will increase the patch size and connectivity of habitats. Increasing patch size will tend to increase population sizes of native species, which provides more resilience against a changing climate. Increasing connectivity allows more genetic exchange among populations and movement to more suitable habitats as environmental conditions change. By reducing stressors on the Delta ecosystem through predator control at the north Delta intakes and Clifton Court Forebay and installation of a nonphysical fish barrier at Georgiana Slough, Alternative 4A will contribute to the health of the ecosystem and of individual species populations making them stronger and more resilient to the potential variability and extremes caused by climate change.

As described for Alternative 4, Alternative 4A would not be anticipated to add resiliency to existing levees; levee fragility would remain high and increase with time as in the No Action/No Project Alternative. However, Alternative 4A would provide additional adaptability to catastrophic failure of Delta levees. By providing an alternate conveyance route around the Delta, this alternative provides a mechanism to continue making water deliveries to SWP/CVP contractors and local and in-Delta water users with conveyance interties even if the Delta were temporarily disrupted by a catastrophic levee failure.

Construction and operation of the proposed water conveyance facilities and implementation of environmental commitments under Alternative 4A would not affect the ability of agencies to implement plans and proactive measures associated with climate change resiliency (see Draft EIR/EIS Chapter 29, *Climate Change,* Section 29.7 for a discussion of individual plans and policies). Accordingly, the project would be compatible with these federal and state plans to address climate change.