Climate Change Resilience

Even conservative climate change scenarios predict that the temperature in the Authority's jurisdiction will increase 3.6 to 10.8˚F by the end of the century (Ekstrom and Moser 2012), resulting in warmer summers and winters, and earlier spring arrivals. This will alter vegetation patterns; as ecosystems shift, species may be squeezed out of suitable habitat, eventually being lost. Higher temperatures and drier conditions are likely to aggravate the intensity and frequency of wildfires, as well as spread of invasive species (Sandel and Dangremond 2012). These shifts will affect not only natural and urbanized areas, but also the use and management of agricultural lands, including water regimes and availability and crop suitability. Changes in precipitation and rainfall will likely increase both drought and flooding – affecting urban areas, aquatic ecosystems, and water supply (PRBO Conservation Science 2011). Sea level rise and flooding will have significant effects in Santa Clara County, which has some of the highest projected property value losses in the Bay Area region (Heberger *et al.* 2012). Within the Open Space Authority's jurisdiction, much of the urban development is in flood-risk areas that are physically incapable of absorbing change in the natural environment.

Protecting open space is one of the most effective ways for the Authority to mitigate the impacts of climate change and allow adaptation to its effects. The Authority aims to protect large blocks of habitat that will provide more opportunities for species to adapt and shift their ranges in response to increasing temperatures, decreasing precipitation, and more intense storm and fire events. Protection of natural open spaces and working lands can help mitigate climate change by sequestering carbon, one of the primary contributors to global warming (California State Coastal Conservancy 2013).

To include climate change impacts in every conservation decision, the Open Space Authority uses Climate-Smart Principles (see sidebar) to guide land protection and management efforts. By protecting large, interconnected landscapes, focusing on water resources, and planning for extremes, the Authority can help build in resilience to help natural and human communities adapt.

Figure 6 depicts areas that provide ecological resilience to a changing climate, and that may serve as critical climate refugia for plants and animals under changing conditions. These include streams, wetlands, and riparian areas that provide perennial water sources for wildlife; north-facing slopes; and other areas with high environmental and topographic variability where cool local microclimates will persist even when the region is generally getting hotter and drier. Riparian habitats are especially important as they serve as local wildlife corridors that allow plant and annual species to move and adapt as temperatures change, particularly up and down elevation gradients that connect terrestrial and aquatic ecosystems. Many of these areas are located in places that emerged as high priorities for land conservation and stewardship in the Valley Greenprint (**Figure 2**). Efforts by the Authority and its partners to protect these areas will have an added benefit of ensuring resilience to climate change.

As conditions change toward mid-century and beyond, there will be much greater environmental stress on the landscape, requiring the Authority to increasingly focus resource planning and land management efforts to address climate change. Critical projects include the protection of stock ponds and other water resources that are increasingly at risk, weed management projects (for example, protecting the rare serpentine grasslands at Coyote Ridge from the increased spread of barbed goat grass), and development of interagency coordinated wildfire protection plans.

Climate-Smart Principles

The principles, developed by the Bay Area Ecosystems Climate Change Consortium (BAECCC), use a nature-based approach to enhance ecosystem services, and allow for humans and wildlife to adapt to climate change.

- Focus goals on future conditions – consider extremes and projections.
- Design actions in ecosystem context – consider ecosystem function, multiple benefits, and broad geographic scope.
- Employ adaptive and flexible approaches – monitor, learn what works, and reassess to adapt to change.
- Prioritize actions – based on science, multiple scenarios, and across species.
- Collaborate and communicate across sectors – partner to learn quickly, solve problems, and share knowledge.
- Practice the 10% rule – spend 10% of your time on creative new approaches.