

Delta Adapts Vulnerability Assessment: A Subset of Key Findings

Information Sheet



**Delta
Stewardship
Council**

A CALIFORNIA STATE AGENCY

- The Delta Stewardship Council is leading a comprehensive climate change vulnerability and adaptation study called Delta Adapts.
- Finalized in June 2021, [the Vulnerability Assessment](#) evaluates the vulnerability of the Sacramento-San Joaquin Delta and Suisun Marsh to climate impacts through the end of the century; it improves our understanding of regional climate vulnerabilities that threaten the vital resources the Delta provides to California and beyond.
- The Council is currently in its second and final phase of Delta Adapts: preparing an Adaptation Plan that will develop tools and strategies to address these vulnerabilities and create a more resilient Delta.

Snapshot of Key Findings

The Delta as an Evolving Place

Includes an analysis of how the people in the Delta are being and will be impacted by climate change.

- Approximately 66,000 residents will be exposed to **flooding** by mid-century, and 133,000 residents will be exposed by end-of-century. This is especially dangerous for socially vulnerable populations that may have limited resources for flood impact preparedness and recovery.
- The communities most vulnerable to **extreme heat** are in Stockton and Tracy. By mid-century, these communities are projected to experience approximately 25 extreme heat days per year compared to 5 days per year currently – a five-fold increase.

June 2023

- More frequent and severe **droughts** will impact people and communities who use Delta water. Conditions like the 2012-2016 drought may be 5 to 7 times more likely by 2100. Such droughts will especially affect low-income communities, self-supplied communities and communities that depend on small water systems, and rural, low-income agricultural communities and farmworkers.



Agriculture

Includes approximately 377,000 acres of prime farmland and another 112,000 acres of unique farmland, farmland of statewide or local importance, or farmland of potential local importance and is the prevailing land use in the Delta.

- Approximately 148,000 acres of agricultural lands, \$73 million in agricultural assets, and \$79 million in annual agricultural economic activity will be exposed to **flooding** by mid-century. Approximately 257,000 acres of agricultural lands will be exposed by end-of-century.
- **Warming temperatures** will decrease yields for most current Delta crops, including most fruit and nut trees. Increases in **extreme heat** days may lead to crop losses due to heat and water stress.
- Water quality may decline during **droughts** due to low flow conditions and salinity intrusion, causing significant loss of productivity and potential damage to agricultural production. Delta farmers will face increased uncertainty and impacts due to increased **precipitation variability**.
- **Sea level rise** may increase salinity exposure of crop lands in parts of the Delta, especially during droughts. It may also increase rates of levee seepage, raise groundwater levels on islands, and expand wet, non-farmable, and marginally farmable areas in the Delta, which can detrimentally affect levee stability.

Ecosystems

Include 750 unique plant and animal species and have declined by as much as 95 percent from their historical extents.

- 55 percent of leveed ecosystems will be exposed to **flooding** by mid-century and 73 percent of leveed ecosystems will be exposed by end-of-century, possibly transitioning these areas to open water.
- **Warming temperatures** will cause increased competition for limited water supplies, modified species dynamics and composition, changes to species distributions, and establishment of more temperature tolerant non-native species. **Extreme heat** events can cause mass-mortality events for vegetation and wildlife within the Delta, shift species distributions, reduce reproductive success and fitness, and intensify disease outbreaks.
- Extended **drought** periods and changing flood patterns may result in reduced biodiversity.
- Projected inter-annual **precipitation variability** may stress Delta species, favor less diverse species assemblages, and lead to increased presence of more tolerant non-native species.
- **Rising sea levels** will cause tidal wetlands to transition to different plant communities or drown completely. Waterfowl, the primary target of managed wetlands, may be negatively impacted if these areas transition to tidal brackish wetland.



Water Supply Reliability

Includes a portion of reliable water supply for nearly 2/3 of Californians, or 27 million residents.

- The Delta and its contributing watersheds will be impacted by **warming temperatures**, increased interannual **precipitation variability**, and **sea level rise**. These changes will alter the timing, magnitude, and reliability of runoff from Delta watersheds and further stress the water supply system in the future.



- **Drought** events will become more frequent and severe. Annual Delta exports will likely be reduced at 2050 relative to historical levels, with projected average decreases of 10 to 20 percent. Reductions in Delta exports will have considerable economic impacts to municipal, industrial, and agricultural activities throughout the State.
- Increases in interannual **precipitation variability** are projected to result in changes to water storage and exacerbate low storage during below average runoff years, resulting in less reliability year-to-year.

Cultural Resources

Include the legacy communities of Bethel Island, Clarksburg, Courtland, Freeport, Hood, Isleton, Knightsen, Rio Vista, Ryde, Locke, and Walnut Grove, as well as historic places and landmarks.

- A number of culturally significant sites will be exposed to **flooding** in the future. Flood impacts to the Delta's cultural resources could damage or destroy landmarks that played a pivotal role in the region's history.
- Without modifications to accommodate **extreme heat** conditions, the continued use of many Delta historic buildings is at risk.



Critical Facilities

Include life safety facilities (fire stations, police stations, and hospitals), schools (public and private), wastewater treatment plants, and prisons.

- Several life safety facilities, schools, and wastewater treatment plants will be exposed to **flooding** by mid-century and even more by end-of-century. Flooding of these facilities may disrupt core community services and adversely affect public health and safety.
- **Extreme heat** will impact the Delta's critical facilities, particularly the emergency response facilities of fire, police, and hospitals. It may impair the functionality of hospitals and place an increased demand on emergency response resources.

Residential, Commercial, and Industrial Areas

Include residential property parcels and housing structures, and commercial and industrial areas such as commercial storefronts, warehouses, and offices.

- By mid-century, 17,000 residential parcels with structure improvements valued at \$2.7 billion will be exposed to **flooding**. By end-of-century, 37,500 residential

parcels will be exposed to flooding. This will directly impact the households of Delta residents.

- Mobile homes are particularly vulnerable to **flooding** due to the physical characteristics of the structures. By end-of-century almost all mobile home parks outside of West Sacramento and in east Contra Costa County will be exposed to flooding.
- By mid-century, 2,000 commercial and industrial parcels with structural improvements valued at \$1.1 billion and \$1.8 billion in annual net revenues will be exposed to **flooding**. By end-of-century, 3,800 commercial and industrial parcels will be exposed to flooding. This will impact both the physical structures within the Delta that support commercial and industrial activities as well as disrupt economic activity associated with these businesses.



Recreation

Includes fishing, boating, birdwatching, hunting, and hiking.

- Forty-five parks and campgrounds will be exposed to **flooding** by mid-century and 69 parks and campgrounds will be exposed by end-of-century. Flooding of Delta recreational facilities would further limit the availability of low-cost recreation opportunities for Delta residents and nearby communities.
- Increases in the occurrence of **extreme heat** events could affect visitor patterns, reduce availability of heat refuge, and alter the use of the Delta's recreational sites.
- An increasing frequency and duration of **drought** conditions will impact the Delta's water-based recreation activities such as fishing and boating, creating disproportionate losses in rural areas that are dependent on marine operations as a livelihood.



Infrastructure & Assets

Include energy and utilities, transportation, solid/hazardous waste facilities, flood management infrastructure, and water supply infrastructure.

- The Delta's 31 state and local water diversions and over 3,400 private points of diversion may be impacted by **flooding** of Delta islands. A portion of the Mokelumne Aqueduct will be exposed to flooding by mid-century and nearly 50

miles of water conveyance infrastructure will be exposed by end-of-century, disrupting the complex water supply delivery system that millions of Californians depend on.

- Much of the Delta's energy industry may be exposed to **flooding**, with the greatest number of exposed assets located in San Joaquin County, causing substantial impacts to public health, safety, and economy.
- **Flooding** will impact key regional transportation routes in the Delta, including roads, highways, rail, and evacuation routes, requiring additional road maintenance and repairs and significant economic impacts. Flooding events around Delta ports may impact jobs and businesses that rely on their operations.
- An increase in the frequency and duration of **extreme heat** events will place increased demand on the energy grid and may affect regional power supply in the future. It may also increase maintenance and repair needs for transportation infrastructure and impact worker safety.
- **Sea level rise** and changes in hydrologic patterns in Delta watersheds will place greater stress on the Delta's flood management infrastructure, such as upstream reservoirs and Delta levees, which protect more than 800,000 acres of land and play a critical role in conveying water supply through the Delta.



Next Steps

The second and final phase of Delta Adapts – the Adaptation Plan – will develop strategies and tools to address these vulnerabilities and create a more resilient Delta. State, regional, and local governments can use these strategies and tools to help communities, infrastructure, and ecosystems thrive in the face of climate change.

To learn more, visit the Delta Adapts web page (deltacouncil.ca.gov/delta-plan/climate-change) or contact climatechange@deltacouncil.ca.gov.