



Scenarios Overview

These scenarios are land use options and activities that emphasize different overarching goals for adaptation. They represent an illustrative modeling exercise that helps inform adaptation strategies alongside many other inputs.

Scenario 1 Climate Smart Agriculture Focused

This scenario focuses on the continuation of existing land uses, which in the Delta is primarily agriculture.

This scenario includes the following components:

- All existing land zoned for agriculture continues on privately-owned land;
- Restoration or multibenefit land cover mosaics (e.g., mix of rice and habitat) occur on suitable publicly owned lands;
- Approximately 9% of subsidized lands have subsidence reversal land cover types (e.g., rice production, managed wetlands, or non-tidal wetlands);
- Restoration in Suisun Marsh limited to less than 5,000 additional acres on public lands;
- Climate smart adaptation strategies enable agricultural use to continue on existing private lands with changing climate conditions; and
- Assumes all levees are improved to accommodate climate change through 2050.

Benefits and Tradeoffs

- Maintains agricultural jobs and revenue.
- Maximizes protection of prime farmland.
- Total levee improvement costs are estimated at \$3.34 billion and habitat restoration costs are estimated at \$246 million.
- Continuation of agricultural activities allows for assessments to provide ongoing maintenance of levees by agricultural users/landowners.
- Improved levees accommodate climate change, protect people, property, habitat, water supply, and many other assets, while minimizing salinity intrusion due to levee breaches.
- High greenhouse gas emissions from continued agricultural operations and subsidized lands.
- Habitat restoration on public lands sequesters carbon and helps the State meet its climate goals. This scenario would accumulate approximately 2.0 million metric tons (MMT) of carbon over 40 years and reduce overall carbon losses by 3.9 MMT, compared to the baseline.
- Continued subsidence on farmed lands could threaten levee integrity.
- Does not meet Delta Plan restoration acreage or habitat type targets.
- Does not meet adopted resource plan habitat goals in Suisun Marsh.



Scenario 2 Restoration Focused

This scenario focuses on meeting restoration targets and habitat types that are identified in the Delta Plan, assuming restoration occurs on suitable public lands first. The remaining restoration acreage needed to meet the targets are then assumed to occur on private lands suitable for the habitat types needed. Conversion of private lands would be voluntary and only occur if landowners are willing to sell their property.

This scenario includes the following components:

- Restoration is focused on public lands first to meet Delta Plan restoration targets of 60,000 to 80,000 acres and Performance Measure 4.16 specifying targets for 2050 by habitat type;
- Restoration on private lands is limited to approximately 30,000 acres (or 5% of the Delta) in areas at suitable elevation; conversion is voluntary and only would occur if landowners are willing to sell their property;
- Approximately 30% of subsidized lands are identified for subsidence reversal land cover types;
- Restoration in Suisun includes approximately 21,000 acres on public lands, exceeding the 5,000-7,000 acreage target range identified in the adopted resource plan; and
- Assumes all levees are improved to accommodate climate change through 2050.

Benefits and Tradeoffs

- Less overall agricultural jobs with less farmland and more rice acreage (which is more mechanized); however, this scenario results in the second-highest number of jobs created from levee improvement and habitat restoration actions.
- Reduced agricultural economy is likely to lead to broader shifts in local economies and communities currently employed in agriculture sector.
- Total levee improvement costs are estimated at \$3.29 billion and habitat restoration costs are estimated at \$425 million.
- Reduction in economic activity on lands converted from agriculture leads to reduced assessments that aren't sufficient to comprise the local cost share required to operate and maintain Delta levees.
- Improved levees accommodate climate change, protect people, property, habitat, water supply, and many other assets, while minimizing salinity intrusion from levee breaches.
- Results in nearly 30% less greenhouse gas emissions compared to Scenario 1 and sequesters more carbon.
- Additional habitat and rice sequester more carbon and help the State meet its climate goals. Scenario 2 would accumulate approximately 2.5 million metric tons (MMT) of carbon over 40 years and reduce overall carbon losses by 7.6 MMT, compared to the baseline.

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- Supports a more resilient long-term Delta landscape by halting and reversing subsidence, which can help reduce flood risk.
- Meets Delta Plan restoration goals and by acreage and by habitat types.
- Exceeds adopted resource plan habitat goals in Suisun Marsh.

Scenario 3 Less Restoration in Delta

This scenario focuses on meeting overall restoration targets established in the Delta Plan and reducing conversion of prime farmland.

This scenario includes the following components:

- Similar to Scenario 2, focuses restoration on public lands first;
- Substantially reduces the amount of restoration assumed on private lands in the Delta by approximately 15,000 acres while still meeting overall restoration acreage goals;
- Approximately 30% of subsided lands are identified for subsidence reversal land cover types;
- Restoration in Suisun includes approximately 21,000 acres on public lands; adds an additional 3,000 acres of restoration on privately-owned land; and
- All levees are improved to accommodate for climate change through 2050.

Benefits and Tradeoffs

- Less overall agricultural revenue and jobs with less farmland and more rice acreage (which is more mechanized); however, this scenario results in the highest number of jobs created from levee improvements and habitat restoration actions.
- Reduced agricultural economy is likely to lead to broader shifts in local economies and communities currently employed in agriculture sector.
- Reduces loss of prime farmland on privately owned lands in Delta by about 15,000 acres.
- Total levee improvements costs are estimated at \$3.24 billion and habitat restoration costs are estimated at \$388 million.
- Reduction in economic activity on lands converted from agriculture leads to reduced assessments that aren't sufficient to comprise the local cost share required to operate and maintain Delta levees.
- Improved levees accommodate climate change, protect people, property, habitat, water supply, and many other assets, while minimizing salinity intrusion from levee breaches.
- Results in nearly 30% less greenhouse gas emissions when compared to Scenario 1 and sequesters more carbon.
- Additional habitat and rice sequester more carbon and help the State meet its climate goals. Scenario 3 would accumulate approximately 2.9 million metric tons (MMT) of carbon over 40 years and reduce overall carbon losses by 7.6 MMT, compared to the baseline.

- Supports a more resilient long-term Delta landscape by halting and reversing subsidence, which can help reduce flood risk.
- Meets overall Delta Plan restoration goals by acreage, but not by habitat types, and slightly lower overall restoration acreages than Scenario 2.
- Exceeds adopted resource plan habitat goals in Suisun Marsh.

Scenario 4 Levee Underinvestment

Assuming less funding for flood risk reduction is available, this scenario highlights the Delta impacts that would occur with less levee improvements made.

This scenario includes the following components:

- Considers no levee improvements for some islands where the cost to improve levees is greater than the economic values of the assets; these islands are assumed to have high flood risk in the future with climate change but they are not all assumed to become permanent open water;
- Assumes approximately 9% of subsided lands are converted to rice;
- All other existing uses remain the same; and
- The total levee investment is lower.

Benefits and Tradeoffs

- Results in loss of agricultural revenue and jobs, and the least number of jobs created from levee improvements and habitat restoration actions.
- Total levee improvements costs are estimated at \$1.8 billion (about half the levee costs in each of the other scenarios) and habitat restoration costs are estimated at \$305 million.
- Greater avoided emissions and sequestered carbon than baseline, but less than under Scenario 2. This scenario would accumulate 2.1 million metric tons (MMT) of carbon over 40 years and reduce overall carbon losses by 4.2 MMT, as compared to the baseline.
- Approximately 4,140 Delta residents would be exposed to flooding, 500 of which are living in socially vulnerable communities.
- Critical transportation and utility infrastructure would be exposed to flooding that includes the Stockton Wastewater Treatment Plant Ponds, 3.8 miles of California Highway 4, and approximately three miles of Interstate 5.
- Expected asset values that would be exposed to flooding total approximately \$98 million; specifically, estimated values include approximately \$11 million of agricultural land, \$68 million of residential assets, \$1 million of commercial assets, and \$18 million of energy assets.
- Total agricultural annual economic activity that would be exposed to flooding total \$28.4 million and \$5.7 million of commercial annual economic activity.
- Failed islands could contribute to ecosystem degradation by providing favorable habitat for invasive species and negative impacts to water quality.