

Appendix E

Performance Measures for the Delta Plan

As Amended, April 26, 2018

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Appendix E

Performance Measures for the Delta Plan¹

Performance Measure Types

Delta Plan performance measures have been placed into three general classes:

- **Administrative** performance measures describe decisions made by policy makers and managers to finalize plans or approve resources (funds, personnel, projects) for implementation of a program or group of related programs.
- **Output** (also known as “driver”) performance measures evaluate the factors that may be influencing outcomes and include on-the-ground implementation of management actions, such as acres of habitat restored or acre-feet of water released, as well as natural phenomena outside of management control (such as a flood, earthquake, or ocean conditions).
- **Outcome** performance measures evaluate responses to management actions or natural outputs.

Core Output/Outcome Performance Measure Criteria

- **Metrics** define the unit(s) of measure and other characteristics for tracking aspects of performance over time.
- **Baselines** are standards or historical reference conditions for comparing with the current condition.
- **Targets** are the desired future conditions or trends.

Chapter 2: The Delta Plan

Administrative Performance Measures

- ◆ Establishment of the Delta Plan Interagency Implementation Committee by January 31, 2013.
- ◆ Completion of Report on Revisions to Delta Plan Performance Measures by December 31, 2014.
- ◆ The initial Delta Plan and all future revisions and amendments to the Delta Plan by the Council are consistent with an adaptive management approach and are informed by the best available science, where applicable.

¹ The Council authorizes staff to make non-substantive alterations to metrics within these performance measures as follows: (1) such non-substantive alterations must be driven by the availability of new data sources or technological improvements, and (2) such non-substantive alterations must be functionally equivalent to, or better than, the existing metrics or targets. The Council expects that any substantive alterations to metrics will be brought to the Council for review and approval.

- ◆ A minimum of every 5 years (beginning 5 years after adoption of the Delta Plan), the Delta Plan is reviewed by the Council and revised if deemed appropriate.
- ◆ Governance structure is reviewed and revised (if necessary) to ensure that there is adequate institutional capacity to interact, learn, and adapt in a manner that supports adaptive management.
- ◆ The Delta Science Program develops a Delta Science Plan including responding to Delta Independent Science Board review and comments by December 31, 2013.

Chapter 3: A More Reliable Water Supply for California

Strategy 3.1: Increase Water Conservation and Expand Local and Regional Supplies

Strategy 3.2: Improve Groundwater Management

Strategy 3.3: Improve Conveyance and Expand Storage

Strategy 3.4: Improved Water Management Information

Outcome Performance Measures

- ◆ Urban water suppliers that are within the Delta watershed, or those relying on water from the Delta watershed, demonstrate reliability during single and multiple dry years through their UWMPs. Single and multiple dry year projections should account for decreased availability of supplies from the Delta watershed. Reliability can be achieved through increased use of alternative supplies, demand management, or both. (Strategy 3.1)

Metrics:

- Percentage of urban water suppliers that are within the Delta watershed, or those relying on water from the Delta watershed, projecting reliability during a single dry year (i.e., lowest water supply available to the agency for a single year). This will be evaluated at least every five years as UWMPs are updated.
- Percentage of urban water suppliers that are within the Delta watershed, or those relying on water from the Delta watershed, projecting reliability for multiple dry years (i.e., lowest water supply available to the agency for three consecutive years). This will be evaluated at least every five years as UWMPs are updated.

Baseline:

- Percentage of urban water suppliers that are within the Delta watershed, or those relying on water from the Delta watershed, projecting reliability during a single dry year in their 2015 UWMPs.
- Percentage of urban water suppliers that are within the Delta watershed, or those relying on water from the Delta watershed, projecting reliability for multiple dry years in their 2015 UWMPs.

Target:

- One-hundred percent of urban suppliers that are within the Delta watershed, or those relying on water from the Delta watershed, project shortages no greater than 20 percent during single and multiple dry years by 2020—taking into account the reduced availability of water from the Delta watershed during dry years.

- ◆ A decrease in Delta exports during critically dry years, and an increase in Delta exports during wet years, with an overall average decrease in Delta exports². (Strategy 3.3)

Metrics:

- Total water exported by the State Water Project and the Central Valley Project, during each critically dry year, through the Harvey O. Banks and C.W. Bill Jones Pumping Plants in the southern Delta. This will be evaluated following critically dry years.
- Total water exported each wet year by the State Water Project and the Central Valley Project, through the Harvey O. Banks and C.W. Bill Jones Pumping Plants in the southern Delta. This will be evaluated following wet years.
- Fifteen-year average total water exported annually (for all water year types) by the State Water Project and the Central Valley Project, through the Harvey O. Banks and C.W. Bill Jones Pumping Plants in the southern Delta. This will be evaluated at least every five years.

Baseline:

- Median total water exported during critically dry years by the State Water Project and the Central Valley Project, through the Harvey O. Banks and C.W. Bill Jones Pumping Plants in the southern Delta, for the years 1975–2014.
- Median total water exported during wet years by the State Water Project and the Central Valley Project, through the Harvey O. Banks and C.W. Bill Jones Pumping Plants in the southern Delta, for the years 1975–2014.
- Average total water exported annually (for all water year types) by the State Water Project and the Central Valley Project, through the Harvey O. Banks and C.W. Bill Jones Pumping Plants in the southern Delta, for the years 2000–2014.

Target:

- A statistically significant decrease in annual total exports during critically dry years as compared to historical deliveries for critically dry years in 1975–2014. This target is to be achieved by 2030.
- A statistically significant increase in total exports during wet years compared to historical deliveries for wet years in 1975–2014. This target is to be achieved by 2030.
- Fifteen-year average total exports during all year types decreases by 5 percent or more from the average historical deliveries for the years 2000–2014 (5.1 million acre-feet (MAF)). This target is to be achieved by 2030.

Output Performance Measures

- ◆ Urban water suppliers that are within the Delta watershed, or those relying on water from the Delta watershed, achieve their individual targets set through the Senate Bill (SB) X7-7 process or its successor legislation or regulatory targets. (Strategy 3.1)

Metrics:

- Gallons per capita per day of urban water use. This will be evaluated at least every five years as Urban Water Management Plans (UWMP) are updated.

² This performance measure will be re-evaluated for consistency with the State Water Resources Control Board's updates to the 2006 Bay-Delta Water Quality Control Plan. Phase I and II updates are currently expected to undergo review and adoption in late 2017 or early 2018 (see: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/).

- Percentage change in urban per capita water use from SB X7-7 baseline years. This will be evaluated at least every five years as UWMPs are updated.

Baseline:

- SB X7-7 baselines established in 2010/2015 UWMPs.

Target:

- 2015 targets established in 2010/2015 UWMPs. Interim targets are set by individual suppliers, using one of four methods identified in SB X7-7, and are to be achieved by December 31, 2015, and reported in subsequent UWMPs.
- 2020 targets established in 2010/2015 UWMPs. Targets are set by individual suppliers, using one of four methods identified in SB X7-7, and are to be achieved by December 31, 2020, and reported in subsequent UWMPs.

- ◆ Urban water suppliers that are within the Delta watershed, or those relying on water from the Delta watershed, demonstrate sustained progress towards achieving their individual projections for water recycling, storm water capture, and use of advanced water technologies in their UWMPs. (Strategy 3.1)

Metrics:

- Percentage of urban water suppliers meeting their recycled water projections. This will be evaluated at least every five years as UWMPs are updated.
- Percentage of urban water suppliers meeting their storm water-use projections. This will be evaluated at least every five years as UWMPs are updated.
- Percentage of urban water suppliers meeting their desalination projections. This will be evaluated at least every five years as UWMPs are updated.

Baseline:

- Each five-year UWMP update includes projections of future water supply sources in five-year increments.

Target:

- Suppliers meet at least 75 percent of their projected beneficial use of recycled water, storm water, and desalinated groundwater or ocean water, established in their previous UWMP. Achievement of target to be met every five years as set by UWMP updates.

Administrative Performance Measures

Strategy 3.1: Increase Water Conservation and Expand Local and Regional Supplies

- ◆ Identify number of water suppliers that have undertaken covered actions that have (1) completed a current urban or agricultural water management plan that has been reviewed by the DWR for compliance with applicable legal requirements, (2) commenced implementation of identified measures which will reduce reliance on the Delta, and (3) starting in 2015, reported on the expected outcome for measureable reductions in reliance on the Delta and improvement in regional self-reliance as the reduction in the amount of water used, or the percentage of water used, from the Delta watershed.
- ◆ Identify number of urban and agricultural water suppliers that certify that they have adopted and are implementing supply planning, conservation, and efficiency measures required by State law by 2015, meeting the standards and deadlines established by code.

- ◆ DWR adopts and implements a requirement for SWP contracts and transfer agreements that requires implementation of State water efficiency, water management laws, goals and regulations including compliance with water code section 85021.
- ◆ SWRCB adopts a policy that requires evaluation of new water rights or a new or changed point of diversion, place of use, or purpose that result in a new or increased long-term average use of water from the Delta watershed for consistency with reasonable and beneficial use and Water Code sections 85021, 85023, and 85031 and other provisions of California law.
- ◆ Identify percentage of urban and agricultural water suppliers that receive water from the Delta watershed that have incorporated an expanded Water Supply Reliability Element in their UWMP and AWMP by December 31, 2015.
- ◆ DWR has developed and published guidelines for the preparation of an expanded Water Supply Reliability Element by December 31, 2014.
- ◆ DWR and SWRCB have established an advisory group and identified impediments to achievement of statewide water conservation, recycled water and stormwater goals by 2014 and have evaluated and recommended update goals by 2018, including an assessment of how regions are achieving their proportional share of these goals.
- ◆ State grant and loan ranking criteria have been revised by December 31, 2013.
- ◆ State agencies report to DSC on an annual basis on their actions to demonstrate state leadership, to increase water efficiency, use recycled water, and incorporate stormwater runoff capture and low impact development strategies.
- ◆ Meet the requirement of SB X7-7, the Water Conservation Act of 2009, which requires agricultural water suppliers to submit an Agricultural Water Management Plan (AWMP) to the State of California Department of Water Resources (DWR). (Strategy 3.1)
 - Metrics:
 - Percentage of AWMPs submitted to DWR on time. This will be evaluated at least every five years as AWMPs are updated.
 - Percentage of AWMPs submitted to DWR that include a quantification of water-use efficiency. This will be evaluated at least every five years as AWMPs are updated.
 - Baseline:
 - Fourteen percent of the required AWMPs (8 of the estimated 56) were submitted to DWR on time for the 2012 cycle. Thirty-seven percent of required AWMPs (35 of the estimated 95) were submitted to DWR on time for the 2015 cycle.
 - Zero percent of AWMPs (0 of the estimated 56 required) submitted to DWR for the 2012 cycle included a quantification of water-use efficiency improvements.
 - Target:
 - By 2020, 100 percent of AWMPs are submitted to DWR on time.
 - By 2020, 100 percent of AWMPs submitted to DWR include a quantification of water-use efficiency.

Strategy 3.2: Improve Groundwater Management

- ◆ Completion by DWR of the update of Bulletin 118 information (using field data, CASGEM, and best available science) and identification of the state's groundwater basins which are in a critical condition of overdraft by December 31, 2014.
- ◆ Information in updated Bulletin 118 is included in the next (2018) California Water Plan Update and the 2020 Urban Water Management Plans and Agricultural Water Management Plans.
- ◆ Number of water suppliers in areas that receive water from the Delta watershed that have developed groundwater management plans that are consistent with the required and recommended components of groundwater management plans listed in DWR Bulletin 118-03 by 2014.
- ◆ Identify number of groundwater basins identified by DWR as being in a critical condition of overdraft that have groundwater management plans consistent with the required and recommended components of groundwater management plans listed in DWR Bulletin 118-03 by 2014.
- ◆ SWRCB report to DSC on proposed action to address groundwater basins in critical overdraft.
- ◆ Responsible State and local agencies complete the 2014 Sustainable Groundwater Management Act (SGMA) mandates. Upon completion of Groundwater Sustainability Plans (GSPs), this measure will be updated to track achievement of the measurable objectives and five-year interim milestones identified by local agencies in the plan. Groundwater levels and groundwater storage will be targeted specifically. (Strategy 3.2)
 - Metric:
 - Completion of actions required by SGMA. This will be evaluated annually until GSPs are completed.
 - Baseline:
 - N/A
 - Target:
 - The actions required by SGMA have various target dates. One-hundred percent of actions required by SGMA are completed by their target dates.³

Strategy 3.3: Improve Conveyance and Expand Storage

- ◆ DWR completes Surface Water Storages studies by December 31, 2012 with recommendations for projects to be implemented.
- ◆ DWR has completed a survey of past grant applicants to identify projects that may implemented within the next 5 to 10 years to expand existing surface and groundwater storage facilities, create new storage, improve Delta conveyance facilities, and improve opportunities for water transfers by December 31, 2012.
- ◆ California Water Commission holds hearings and provides recommendation on priority projects by December 31, 2013.

³ Seventeen actions leading to adoption of GSPs have been identified. These actions are to be completed by the Department of Water Resources, the State Water Resources Control Board, and local agencies, with target dates ranging from January 31, 2015, to January 31, 2022. All medium and high-priority basins must be managed under a GSP by January 31, 2022. Medium and high-priority basins subject to critical conditions of overdraft must be managed under a GSP by January 31, 2020. On April 1, following GSP adoption and annually thereafter, local agencies must provide a report on progress towards sustainability to the Department of Water Resources. These reports may form the basis for a future groundwater performance measure.

- ◆ DWR and SWRCB, in collaboration with the DSC, have established an advisory group and recommended measures to reduce procedural and administrative impediments to water transfers by December 31, 2016.

Strategy 3.4: Improved Water Management Information

- ◆ DWR and Bureau of Reclamation contracting processes have been implemented consistent with applicable policies.
- ◆ SWRCB has modified its supplemental water diversion and use or progress reports to require additional information on water efficiency, water supply projects, and net (consumptive) use.
- ◆ DWR has completed the development and initiated implementation of an integrated statewide system for water use reporting in coordination with other state agencies by 2014.
- ◆ DWR has modified the California Water Plan update to include specified categories of information to be tracked.
- ◆ Development of appropriate performance measures will be done by DSC in consultation with the agencies. These performance measures will be rolled into the California Water Plan Update.
- ◆ DWR has prepared an assessment of the State’s water infrastructure.

Chapter 4: Protect, Restore, and Enhance the Delta Ecosystem

Strategy 4.1: Create More Natural Functional Flows

Strategy 4.2: Restore Habitat

Strategy 4.3: Improve Water Quality to Protect the Ecosystem

Strategy 4.4: Prevent Introduction of and Manage Nonnative Species Impacts

Strategy 4.5: Improve Hatcheries and Harvest Management

Outcome Performance Measures

- ◆ Restoring to a healthier estuary using more natural functional flows—including in-Delta flows⁴ and tributary-input flow—to support ecological floodplain processes (e.g., spring peak flows along the Sacramento River, and more gradual recession flows at the end of the wet season). (Strategy 4.1)

Metrics:

- Area and duration of inundation in the Yolo Bypass, evaluated annually on a five-year rolling basis.
- Frequency of two-year return interval peak flows, between November 1 to April 30, evaluated annually on a five-year rolling basis, at Bend Bridge on the Sacramento River.
- Rate of change in the hydrograph on the receding limb as measured from spring high flows to summer low flows, evaluated annually on a five year rolling basis,

⁴ Please see Chapter 6 *Water Quality* performance measure on salinity in-Delta flows for X2.

at Bend Bridge on the Sacramento River⁵.

- 10-year rolling average slope of the Delta outflow-inflow ratio, disaggregated by seasonal, annual, and 10-year periods and evaluated annually; outflow-inflow ratio in dry and critically dry years, evaluated annually on a five-year rolling basis.

Baseline:

- Modeling, for the years 1997–2012, estimates that events with a 14-day duration inundated 45,100 acres in 33 percent of years; 19,700 acres in 50 percent of years; and 16,400 acres in 67 percent of years. Events with a duration of at least 21 days are estimated to have covered 36,300 acres in 33 percent of years; 15,800 acres in 50 percent of years; and 10,000 acres in 67 percent of years, between November 1 and May 30 (DWR 2015)⁶.
- Hydrograph data for the Bend Bridge gage station (USGS gage 11377100) indicate that the magnitude of flow for pre-Shasta Dam (1891–1943) and post-Shasta Dam (1960–2013) events, with 14-day duration, are similar (approximately 20,000 cubic feet per second, CFS)⁷. However, the pre-Shasta Dam historical 1.5-year recurrence interval peak flow (approximately 75,000 CFS) even now occurs approximately every two years, and the pre-Shasta Dam 10-year recurrence interval flow (206,200 CFS) has been nearly halved (133,842 CFS)⁸.
- Long-term hydrograph data from the U.S. Geological Survey gage station at Bend Bridge (USGS 11377100).
- Long-term ratio of Delta outflow to Delta inflow. The period before construction of the Central Valley Project, State Water Project, and select major dams (hydrograph between 1931 – 1954) had a Delta outflow-inflow ratio of 0.88. Post-completion of most components of the State Water Project (hydrograph between 1981–2015), the Delta outflow-inflow ratio was 0.75⁹.

Target:

- By 2030, allow for at least 17,000 acres of inundation for at least 14 days in two out of three years, and at least 21 days in one out of two years, between November 1 and March 15¹⁰.
- By 2030, at least one peak flow greater than 75,000 CFS, lasting at least 48 hours in duration, every two years, at Bend Bridge on the Sacramento River¹¹.
- By 2030, daily decrease in flow will be less than 3.5 percent per day, as calculated by a five-day rolling average during the period of spring flow

⁵ For this performance measure, the focal period is from April 1 to July 31, but the start of spring flows will differ depending on water-year type and water-management actions. The definition of spring high flows, or the start of spring recession, is defined as the third consecutive day of decreasing flow following the last peak flow between March 15 and June 1. Low flows are defined as the date when the daily recession rate average, over five days, is less than 3.5 percent per day.

⁶ This baseline reflects the existing Fremont Weir configuration as of 2017.

⁷ DWR 2016, Central Valley Flood Protection Plan Conservation Strategy, Appendix H, Tables 3-1 and 4-1. Shasta Dam was completed in 1943. The dates here coincide with dates used in the Central Valley Flood Protection Plan, and are illustrative of the pre- and post-Shasta periods.

⁸ Michalkova et al. 2011, Constantine 2006, and Micheli et al. 2011.

⁹ Delta Inflow and Net Delta Outflow Index estimates for the period of 1929–1955 can be retrieved from DWR: <http://www.water.ca.gov/dayflow/>

¹⁰ This performance measure may be refined to ensure consistency with the State Water Resources Control Board update of the Bay-Delta Water Quality Control Plan.

¹¹ This performance measure may be refined to ensure consistency with the State Water Resource Control Board update of the Bay-Delta Water Quality Control Plan.

- recession, in at least 1 out of 5 years, at Bend Bridge on the Sacramento River¹².
 - By 2030, 10-year rolling average slope of Delta outflow-inflow ratio is greater than zero (i.e., positive)¹³, and annual average Delta outflow-inflow ratio in dry as well as in critically dry years is greater than 0.5¹⁴.
- ◆ Progress toward achieving the State and federal “doubling goal” for wild Central Valley salmon relative to the period of 1967-1991 levels. Trends will be derived from long-term salmon monitoring surveys conducted by the U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, and others. (Strategy 4.2)

Metrics:

- Number of naturally spawned wild adult salmon by run type, annually censused for the general population in the Central Valley and selected rivers:
 - Sacramento River:
 - American River
 - Feather River
 - Sacramento River mainstem
 - San Joaquin River:
 - Tuolumne River
 - Merced River
 - Stanislaus River
 - Mokelumne River

Baseline:

- Salmon population numbers relative to average levels during the period of 1967-1991.

Target:

- As defined by the Central Valley Project Improvement Act “doubling goal” that “...natural production of anadromous fish in Central Valley Rivers and streams will be sustainable, on a long term basis, at levels not less than twice the average levels attained during the period of 1967-1991.”

- ◆ Progress toward the documented occurrence in and use of protected and restored habitats and migratory corridors by native resident and migratory Delta fish and bird species. Trends in the number of native species in protected and restored habitats and corridors will be derived from monitoring surveys that are conducted as part of adaptive management strategies for the protection and restoration of these areas. (Strategy 4.2)

Metrics:

- Assess native fish:
 - Relative abundance of native fish in and near restoration project sites.
- Assess native birds:
 - Counts of native birds, including waterfowl in the Delta.

Baseline:

- Fish relative abundance as of Delta Plan adoption, May 2013.
- Breeding waterfowl for 2010-2014:

¹² Target recession rate informed by research and analyses conducted for the Environmental Flows Tool (Alexander et al. 2014) and Stillwater Sciences (2007).

¹³ Positive slope of the 10-year rolling average of Delta outflow-inflow ratio means an increasing portion of inflow water flowing out of the Delta over a given period of time.

¹⁴ Following the State Water Resources Control Board’s completion of updates to the Bay-Delta Water Quality Control Plan, this performance measure will be reevaluated for consistency with the Board’s regulations.

- Delta counts (5-year average): 7,414
- Suisun Marsh counts (5-year average): 23,122

Target:

- Upward trend as measured by the metrics above.

- ◆ Progress toward; 1) increased habitat, connectivity, and functionality; and 2) more favorable spatial distribution of habitat types. (Strategy 4.2)

Metrics:

- Assess the function ‘Provides habitat and connectivity for fish’.
 - Spatial-temporal variability of seasonal short-term and long-term flooding and tidal inundation.
 - Marsh to open water ratio.
 - Adjacency of marsh to open water by length and marsh patch size.
 - Ratio of looped to dendritic channels (by length and adjacent habitat type).
- Assess the function ‘Provides habitat and connectivity for marsh wildlife’.
 - Marsh area by patch size (patch size distribution).
 - Marsh area by nearest large (>100 ha) neighbor distance.
 - Marsh core area ratio.
 - Marsh fragmentation index.
- Assess the function ‘Provides habitat and connectivity for waterbirds’.
 - Wetted area by type in winter.
- Assess the function ‘Provides habitat and connectivity for riparian wildlife’.
 - Riparian habitat area by patch size.
 - Riparian habitat length by width class.
- Assess the function ‘Provides habitat and connectivity for marsh- terrestrial transition zone wildlife’.
 - Length of marsh-terrestrial transition zone by terrestrial habitat type.

Baseline:

| Metric | Baseline (“Modern” Delta) | Metric | Baseline (“Modern” Delta) |
|---|---|---|--|
| Spatial-temporal variability of seasonal short-term and long-term flooding and tidal inundation | <u>Tidal Inundation</u> <ul style="list-style-type: none"> • Dec – Feb: 3,303 ha • Mar – May: 3,303 ha • Jun – Aug: 3,303 ha • Sep – Nov: 3,303 ha <u>Seasonal long-duration flooding</u> <ul style="list-style-type: none"> • Dec – Feb: 0 ha • Mar – May: 0 ha • Jun – Aug: 0 ha • Sep – Nov: 0 ha <u>Seasonal short-term flooding</u> <ul style="list-style-type: none"> • Dec – Feb: 18,128 ha • Mar – May: 18,128 ha • Jun – Aug: 0 ha • Sep – Nov: 0 ha | Marsh area by nearest neighbor distance | ≤10 m: 1,161 ha 10 – 100 m: 143 ha 100 – 1,000 m: 87 ha 1,000 – 10,000 m: 630 ha >10,000 m: 2,317 ha |

| | | | |
|---|---|---|---|
| Marsh to Open Water Ratio | <u>Marsh</u> : 4,296 ha <u>Open water</u> : 26,554 ha <u>Marsh to Open Water Ratio</u> : 0.16 | Marsh core area ratio | <u>Core Habitat</u> : 815 ha <u>Edge Habitat</u> : 3,522 ha <u>Core to Edge Ratio</u> : 0.23 |
| Adjacency of marsh to open water by length and marsh patch size | <u>Marsh Patch >100 ha</u> : 31 km <u>Marsh Patch 10 – 100 ha</u> : 236 km | Marsh fragmentation index | <u>Areas of marsh core habitat within large marsh patch (>100 ha) or within small patches < 1km from large patch</u> : 491 ha |
| Ratio of looped to dendritic channels | <u>Dendritic channels adjacent to marsh</u> : 84 km <u>Dendritic channels not adjacent to marsh</u> : 255 km <u>Looped Channels</u> : 768 km <u>Fluvial or Detached</u> : 298 km | Wetted area by type in winter | <u>Ponds, Lakes, Channels and Flooded Islands</u> : 26,530 ha <u>Tidal Inundation</u> : 3,303 ha <u>Seasonal long-duration flooding</u> : 0 ha <u>Seasonal short-term flooding</u> : 18,128 ha |
| Marsh area by patch size | <u><=10 ha</u> : 1,427 ha <u>10 – 100 ha</u> : 1,757 ha <u>100 – 1,000 ha</u> : 1,154 ha <u>1,000 – 10,000 ha</u> : 0 ha <u>>10,000 ha</u> : 0 ha | Riparian habitat length by width class | <u>0 – 100m</u> : 626 km <u>100 – 500m</u> : 87 km <u>>500 m</u> : 11 km |
| Riparian habitat area by patch size | <u><=20 ha</u> : 1,991 ha <u>20 – 80 ha</u> : 1,364 ha <u>80 – 320 ha</u> : 1,470 ha <u>320 – 1,280 ha</u> : 2,066 ha <u>>1,280 ha</u> : 0 ha | Length of marsh-terrestrial transition zone by terrestrial habitat type | <u>Willow Riparian Scrub or Shrub</u> : 370 km <u>Valley Foothill Riparian</u> : 116 km <u>Oak Woodland and Oak Savannah</u> : 0 km <u>Alkali Seasonal Wetland Complex</u> : 19 km <u>Wet Meadow and Seasonal Wetland</u> : 30 km <u>Stabilized Interior Dune Vegetation</u> : 0 km <u>Grassland</u> : 103 km <u>Willow Thicket</u> : 59 km <u>Vernal Pool Complex</u> : 4 km |

Target:

- Increasing extent of flooding by different inundation types throughout the year, including seasonal shallow short-term flooding, seasonal deeper long-duration flooding, and tidal inundation.
- Increasing proportion of marsh to open water habitat.
- Increasing proportion and extent of marsh-open water edge that occurs along large marsh patches (>100 ha). Decreasing proportion of marsh-open water edge that occurs along small marsh patches.
- Decreasing proportion of looped to dendritic channels.
- Increasing extent and proportion of marsh habitat that are in large size classes (>100 ha).
- Decreasing proportion of marsh that occurs in small size classes.
- Increasing proportion of marsh habitat that occurs in close proximity to a large marsh patch (>100 ha).

- Increasing proportion and extent of marsh habitat that occurs in “core” habitat (at least 50 m from outside edge of marsh).
 - Increasing proportion and extent of marsh habitat that occurs either in core habitat of large marsh patches or in smaller patches less than 1 km from nearest large patch.
 - Increased extent of different types of inundation for types wintering waterfowl.
 - Increasing proportion and extent of riparian habitat that occur in larger patches. Decreasing proportion of riparian habitat that occurs in smaller patches.
 - Increasing proportion and extent of riparian habitat length that occurs in wider width size classes. Decreasing proportion of riparian habitat length that occurs in narrow width size classes.
 - Increasing length of marsh-terrestrial transition zone.
- ◆ Prevention and reduction of key nonnative terrestrial and aquatic invasive species in the Delta and Suisun Marsh. (Strategy 4.4)

Metrics:

Metrics are to be evaluated annually:

- Number of key new nonnative invasive species of fish, plants, and invertebrates establishing populations in the Delta (e.g., Quagga and Zebra mussels, *Hydrilla verticillata*, and others as they are identified).
- Managing nonnative fish:
 - Percentage of the total biomass of fish that are native fish species based on USFWS beach seine surveys (and other relevant surveys).
 - Percentage of total relative abundance that are native species in the Delta and Suisun Marsh based on USFWS beach seine surveys (and other relevant surveys).
- Managing invasive nonnative vegetation:
 - Number of acres treated for invasive plants as defined by individual plans and projects (e.g., Central Valley Flood Protection Plan Conservation Strategy, Arundo control project, California Division of Boating and Waterways (DBW) aquatic invasive species control programs, etc.).
 - Peak coverage, in acres, of invasive nonnative plant species (e.g., *Eichhornia crassipes*, *Ludwigia spp.*, *Egeria densa*, *Arundo donax*, and *Phragmites australis*) in the Delta and Suisun Marsh.

Baseline:

- Species reported as established in the Delta prior to 2013 Delta Plan adoption will be used for baseline identification of new invasive species established post-2013.
- Fish:
 - Average percentage of total fish biomass that are native fish species based on USFWS beach seine surveys from the period of 1995-2015.
- Vegetation:
 - Number of acres treated set at zero as of 2013.
 - Peak coverage estimates, in acres, for nuisance nonnative aquatic plant species based on available hyperspectral and Landsat remote sensing surveys conducted in the Delta during the period of 2003–2016. *Arundo donax* surveys conducted for the Delta Conservancy in 2015. Suisun Marsh vegetation surveys conducted between 1999–2013.

Target:

To be achieved by 2030:

- Zero new nonnative invasive species of fish, plants, and invertebrates established in the Delta.
- Fish¹⁵:
 - 20 percent increase in the biomass of the native inshore fish community, relative to total fish biomass.
 - 20 percent increase in the relative abundance of the native inshore fish community, compared to total relative abundance.
- Vegetation:
 - Acreage targets for treatment of invasive plants as defined by individual plans and projects:
 - 680 acres within lower Sacramento¹⁶.
 - 800 acres within lower San Joaquin¹⁷.
 - 15 acres in the Cache Slough Complex (Arundo control project).
 - 5,000 acres annually, for herbicide floating aquatic vegetation treatment in the Delta¹⁸.
 - 2,500 acres during treatment seasons for herbicide submersed aquatic vegetation treatment in the Delta¹⁹.
 - A 50 percent reduction in peak nonnative invasive plant species coverage (acres), including, but not limited to: *Eichhornia crassipes*, *Ludwigia spp.*, *Egeria densa*, *Arundo donax*, *Rubus armeniacus*, *Lepidium latifolium*, and *Phragmites australis*.

Output Performance Measures

- ◆ Progress toward higher acreage of the following types: floodplain, tidal and subtidal, emergent wetland, shaded riverine aquatic and upland and riparian forest habitats. Tidal wetland and floodplain restoration projects should occur in the priority habitat restoration areas described in ER R2. (Strategy 4.2)

Metrics:

- Number of acres of restoration projects constructed by habitat type, including

¹⁵ Fish targets were calculated and derived from Mahardja, B., Farruggia, M.J., Schreier, B., and Sommer, T. (2017). *Evidence of a Shift in the Littoral Fish Community of the Sacramento-San Joaquin Delta*. PLOS ONE, 12(1), e0170683. Percentage increase in native fish biomass and in relative abundance reflects percentage decrease in nonnative fish species of the respective metric. Nonnative fish may prey upon native species, compete for food, take over habitat space, and alter food webs.

¹⁶ See the 2016 Draft Central Valley Flood Protection Plan Conservation Strategy for more details: http://www.water.ca.gov/conservationstrategy/docs/cs_draft.pdf.

¹⁷ See the 2016 Draft Central Valley Flood Protection Plan Conservation Strategy for more details: http://www.water.ca.gov/conservationstrategy/docs/cs_draft.pdf.

¹⁸ See the California State Parks Division of Boating and Waterways' Floating Aquatic Vegetation (FAV) Control Programs: http://www.dbw.ca.gov/?page_id=28995.

¹⁹ This reduction in invasive vegetation is based on efforts from large scale projects that address impacts of invasive species. This includes, but is not limited to: individual plans and projects that include treatment, California EcoRestore program, and project and non-project levee vegetation management. A full list of efforts will be described in the datasheet

progress toward the biological opinions' targets of restoring 8,000 acres of tidal wetlands and 17,000-20,000 acres of floodplain habitat in the Priority Restoration Habitat Areas.

Baseline:

- Set at zero, the number of acres restored as of the Delta Plan's adoption date (May 2013) to capture all the restoration actions that have been implemented after the plan was completed.

Target:

- 8,000 acres of tidal wetlands and 17,000-20,000 acres of floodplain habitat projects constructed in the Priority Restoration Habitat Areas as described in the 2008 and 2009 Biological Opinions for the state and federal water projects.

- ◆ All hatchery anadromous salmonids marked and tagged. (Strategy 4.5)

Metrics:

- Percent marked and tagged, as reported by National Marine Fisheries Service and California Department of Fish and Wildlife.

Baseline:

- As of May 2013 (Delta Plan adoption date):
 - 100% marked and tagged for Chinook salmon winter-run, spring-run and late-fall run.
 - 25% marked and tagged for Chinook salmon fall-run.
 - 0% tagged and 100% marked for steelhead.

Target:

- 100% of hatchery fish are marked and tagged.

Administrative Performance Measures

Strategy 4.1: Create More Natural Functional Flows

- ◆ Prior to the establishment of revised flow objectives identified above, 100% of proposed actions that could significantly affect flow in the Delta are consistent with the existing Bay Delta Water Quality Control Plan objectives.
- ◆ The SWRCB adopts Delta flow objectives that are necessary to achieve the coequal goals by June 2, 2014.
- ◆ The SWRCB adopts flow objectives that are necessary to achieve the coequal goals for the major tributary rivers to the Delta by June 2, 2018.

Strategy 4.2: Restore Habitat

- ◆ 100% of proposed actions that include habitat restoration in the Delta meet one of the following standards: 1) are consistent with the text of Appendix H, based on the *Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions* (DFG 2011); or 2) are not consistent with the elevation map (Figure 4-6), but the deviation is supported by a rationale based on best available science.
- ◆ 100% of all proposed actions other than habitat restoration have clearly demonstrated that significant adverse impacts to the opportunity for habitat restoration as described in ER P2 were avoided or mitigated.

- ◆ 100% of proposed actions to construct new levees or substantially rehabilitate or reconstruct existing levees in the opportunity areas defined in Appendix 8, demonstrate that they have evaluated alternatives (including use of setback levees), and where feasible, have incorporated such alternatives into levee projects to increase the extent of floodplain and riparian habitat.
- ◆ DFW, DWR, and/or the Delta Conservancy identify number of projects and amount of funding for priority habitat restoration projects.
- ◆ The preponderance of proposed habitat restoration projects is within the six priority areas and considers landscape elements and improvement in water quality.
- ◆ 100% of proponents of habitat restoration projects consult the California Department of Public Health’s *Best Management Practices for Mosquito Control in California*.
- ◆ The Delta Conservancy develops and adopts criteria for prioritization and integration of large-scale ecosystem restoration in the Delta and Suisun Marsh, with sustainability and use of best available science as foundational principles.
- ◆ The Delta Conservancy develops and adopts processes for ownership and long-term operations and management of land in the Delta and Suisun Marsh acquired for conservation or restoration.
- ◆ The Delta Conservancy develops and adopts a formal mutual agreement with the Department of Water Resources, Department of Fish and Wildlife, federal interests, and other State and local agencies on implementation of ecosystem restoration in the Delta and Suisun Marsh.
- ◆ The Delta Conservancy develops a plan and protocol for acquiring the land necessary to achieve ecosystem restoration consistent with the coequal goals and the Ecosystem Restoration Program’s Delta Conservation Strategy.
- ◆ The Delta Conservancy leads an effort to investigate how to better use habitat credit agreements.
- ◆ The Delta Conservancy, in conjunction with DFW and USFWS, develop rules for voluntary Safe Harbor Agreements with property owners in the Delta.
- ◆ The U.S. Army Corps of Engineers develops an agreed-upon variance process to exempt Delta levees from the U.S. Army Corps of Engineers’ levee vegetation policy where appropriate.
- ◆ BCDC updates the Suisun Marsh Protection Plan to address adaptation to sea-level rise and ensure consistency with the Suisun Marsh Preservation Act, the Delta Reform Act and the Delta Plan.
- ◆ BCDC submits amendments of the Suisun Marsh Protection Plan to the Council for review for consistency.
- ◆ BCDC submits amendments of components of the Suisun Marsh Local Protection Program to the Council for review for consistency.
- ◆ BCDC adopts the updated Suisun Marsh Protection Plan and the Suisun Marsh Local Protection Program.

Strategy 4.3: Improve Water Quality to Protect the Ecosystem

See Chapter 6: Water Quality.

Strategy 4.4: Prevent Introduction of and Manage Nonnative Species Impacts

- ◆ 100% of all proposed actions that have the reasonable probability of introducing, or improving the habitat conditions for, nonnative invasive species have demonstrated that the potential for new

introductions of and/or improved habitat conditions for nonnative invasive species have been fully considered and avoided or mitigated in a way that appropriately protects the ecosystem.

- ◆ The Department of Fish and Wildlife develops for consideration by the Fish and Game Commission proposals for new or revised fishing regulations designed to increase populations of listed fish species through reduced predation by introduced sport fish.
- ◆ The Department of Fish and Wildlife and other appropriate agencies prioritize the list of “Stage 2 Actions for Nonnative Invasive Species.”
- ◆ The Department of Fish and Wildlife and other appropriate agencies fully implement the 2014 Ecosystem Restoration Program “Conservation Strategy” list for Strategic Goal 5.

Strategy 4.5: Improve Hatcheries and Harvest Management

- ◆ Hatcheries develop scientifically sound Hatchery and Genetic Management Plans (HGMPs).
- ◆ The Department of Fish and Wildlife provides annual updates to the Council on the status of HGMPs within its jurisdiction.
- ◆ The Department of Fish and Wildlife, in cooperation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service revises and begins implementing its program for marking and tagging hatchery salmon and steelhead to improve management of hatchery and wild stocks by December 2014.

Chapter 5: Protect and Enhance the Unique Cultural, Recreational, Natural Resource, and Agricultural Values of the California Delta as an Evolving Place

Strategy 5.1: Designate the Delta as a Special Place

Strategy 5.2: Plan to Protect the Delta’s Lands and Communities

Strategy 5.3: Maintain Delta Agriculture

Strategy 5.4: Encourage Recreation and Tourism

Strategy 5.5: Sustain a Vital Delta Economy

Outcome Performance Measures

- ◆ Increase acres with subsidence reversal or carbon sequestration practices. (Strategy 5.2)

Metrics:

- Acres of subsidence reversal and carbon sequestration projects, evaluated annually.

Baseline:

- Set at zero as of 2008.

Target:

- 30,000 acres by January 1, 2030 (905 acres were converted in 2008-2011 and will be included towards meeting the target).

- ◆ No change in agricultural land use due to urban development from 2013–2025²⁰. (Strategy 5.2, 5.3)

Metrics:

Metrics to be evaluated annually:

- Conversion of farmland acres to urban development, evaluated in conjunction with updates to the Farmland Mapping and Monitoring Program²¹.
- Conversion of land designated for agricultural use to urban land use, under General Plan land designations, evaluated annually.

Baseline:

- Number of acres of Delta rural farmland designated for agriculture in Delta Plan regulations, at the time of Delta Plan adoption in May of 2013.

Target:

- By 2025, no conversion of farmland to urban development as defined by Delta Plan regulations.

- ◆ Increase in delta recreation and tourism trends²². (Strategy 5.4)

Metrics:

Metrics evaluated annually:

- Acres of State and federal land accessible by the public for recreation and tourism.
- Length (linear feet) of shoreline accessible for public recreation.
- Number of fishing licenses bought per year by county.
- Number of first-time visitors.
- Number of off-season visitors.
- Number of website views and social media traffic.
- Number of existing and new visitor engagement.

Baseline:

- Measured as of July 2018.

Target:

- Increase of 5 percent, for each metric from the prior year, over a 5-year period beginning once a baseline is established in 2018.

- ◆ Improvement in the Regional Opportunity Index within the Delta²³. (Strategy 5.3, 5.5)

Metrics:

Metrics to be evaluated every 5 years:

²⁰ The importance of agricultural lands, as they relate to wildlife habitat and ecosystem restoration, will be addressed through future Delta Plan review and amendment processes.

²¹ As identified in the Farmland Mapping and Monitoring Program (FMMP), including Prime Farmland, Unique Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Grazing Land. Department of Conservation (<http://www.conservation.ca.gov/dlrp/fmmp>).

²² Data will be tracked as part of the collaboration between the Delta Marketing Task Force, Sacramento-San Joaquin Delta Conservancy, Delta Protection Commission, and Delta Stewardship Council, in an effort to implement the objectives of the *Delta Tourism Awareness 5-year Marketing Plan*, released February 2017: http://deltaconservancy.ca.gov/wp-content/uploads/2015/06/AI-12.2-Marketing-Plan-Design_Complete-20170224.pdf.

²³ Developed by the Center for Regional Change at UC Davis, this index incorporates 33 indicators that measure relative opportunity, for both people and the places in which they live, and focuses on six broad domains: education, economy, housing, transportation/mobility, health/environment, and civic engagement.

- Regional Opportunity Index for People and Place, in the Primary Zone and Secondary Zone (score).

Baseline:

- Measured as of 2012.

Target:

- Regional Opportunity Index for People and Place (score), within the Delta, increases by 5 percent by 2025²⁴.

- ◆ Increase in regional recreation opportunities throughout the Delta and Suisun Marsh. (Strategy 5.4)

Metrics:

- Number of regional Recreation Proposal recommendations and outcomes implemented within the Delta and Suisun Marsh, evaluated annually²⁵.

Baseline:

- Measured as of the date of the regional Recreation Proposal completed in 2011.

Target:

- Implementation of the recommendations and outcomes put forward within the Recreation Proposal, to be achieved by 2025.

Output Performance Measures

- ◆ Prepare and implement plans for the vitality and preservation of each Delta legacy community. (Strategy 5.2)

Metrics:

- Number of community action plans adopted and initiated to achieve legacy community Delta Plan objectives, evaluated annually.

Baseline:

- Set at zero as of the Delta Plan's adoption date, May 2013.

Target:

- All legacy communities have plans adopted by 2021.
- 25 percent implementation of plan objectives achieved by 2025.

Administrative Performance Measures

Strategy 5.1: Designate the Delta as a Special Place

- ◆ Delta Protection Commission completes application for designation of the Delta and Suisun Marsh as a National Heritage Area.
- ◆ The California Department of Transportation prepares a scenic byway plan and pursues National Scenic Byway status for Route 160 by January 1, 2014.

²⁴ The UC Davis Center for Regional Change will be releasing new information and features for the Regional Opportunity Index (ROI) (<http://interact.regionalchange.ucdavis.edu/roi/webmap/webmap.html>) which will provide the foundation to refine targets for the Delta; periodic evaluation of targets may be required in collaboration with the Delta Protection Commission.

²⁵ Recommendations and outcomes proposed by California Department of Parks and Recreation in Recreation Proposal for the Sacramento-San Joaquin Delta and Suisun Marsh, per 2009 Delta Reform Act legislative directive (http://www.parks.ca.gov/?page_id=26677).

- ◆ Congress designates a National Heritage Area that includes the Delta and Suisun Marsh by January 1, 2014.

Strategy 5.2: Plan to Protect the Delta's Lands and Communities

- ◆ 100% of proposed actions for urban development meet one of the following standards: 1) are located within areas that current city or county general plans as of the date of the Delta Plan's adoption designate for development in cities or their spheres of influence; areas within Contra Costa County's 2006 voter-approved urban limit line, except Bethel Island; areas within the Mountain House General Plan Community Boundary in San Joaquin County; or the unincorporated Delta towns of Clarksburg, Courtland, Hood, Locke, Ryde and Walnut Grove; 2) if located on Bethel Island, are consistent with the Contra Costa County general plan effective as of the date of the Delta Plan's adoption; or 3) if located outside the areas described above, are consistent with the land uses designated in county general plans as of the date of the Delta Plan's adoption and are otherwise consistent with Delta Plan policies.
- ◆ Water management facilities, ecosystem restoration, and flood management infrastructure are sited to avoid or reduce conflicts with existing or planned uses when feasible, considering comments from local agencies and the Delta Protection Commission. Plans for ecosystem restoration consider sites on existing public lands, when feasible and consistent with a project's purpose, before privately owned sites are purchased.
- ◆ Local governments prepare plans for each community that emphasize its distinctive character, encourage historic preservation, identify opportunities to encourage tourism, serve surrounding lands, or develop other appropriate uses, and reduce flood risks.
- ◆ Agencies acquiring land for water management facilities, ecosystem restoration, and flood management infrastructure purchase from willing sellers, when feasible, including consideration of whether lands suitable for proposed projects are available at fair prices.
- ◆ The California Department of Transportation, local agencies, and utilities develop plans infrastructure, such as roads and highways, to meet needs of development consistent with sustainable community strategies, local plans, Delta Protection Commission's Land Use and Resource Management Plan, and the Delta Plan.
- ◆ As part of the prioritization of State levee investments called for in RR P4, the Delta Stewardship Council consults with the California Department of Transportation as provided in Water Code section 85307(c) to consider the effects of flood hazards and sea level rise on state highways in the Delta.
- ◆ The Council, in conjunction with the California Air Resources Board (CARB) and the Delta Conservancy, investigates the opportunity for the development of a carbon market whereby Delta farmers could receive credit for growing native marsh and wetland plants.
- ◆ The Department of Water Resources has developed a plan, including funding needs, for increasing the extent of their subsidence reversal and carbon sequestration projects to 5,000 acres by January 1, 2017.
- ◆ 100% of State agencies have not renewed or entered into agricultural leases on Delta or Suisun Marsh islands if the actions of the lessee promote or contribute to subsidence on the leased land, unless the lessee participates in subsidence reversal or reduction programs.

Strategy 5.3: Maintain Delta Agriculture

- ◆ Local governments and economic development organizations take steps to encourage value-added processing of Delta crops in appropriate locations.

- ◆ Local governments and economic development organizations take steps to support growth in agritourism, particularly in and around legacy communities.
- ◆ The Department of Fish and Wildlife, the Delta Conservancy, and ecosystem restoration agencies take steps to encourage habitat enhancement and wildlife friendly farming systems on agricultural lands to benefit both the environment and agriculture.

Strategy 5.4: Encourage Recreation and Tourism

- ◆ Water management and ecosystem restoration agencies provide recreation opportunities, including visitor-serving business opportunities, at new facilities and habitat areas whenever feasible, and protect existing recreation facilities using California State Parks' *Recreation Proposal for the Sacramento-San Joaquin Delta and Suisun Marsh* and Delta Protection Commission's *Economic Sustainability Plan* as guides.
- ◆ The Delta Protection Commission and Delta Conservancy take steps to encourage partnerships between other state and local agencies, and local landowners and business people to expand recreation, including boating, promote tourism, and minimize adverse impacts to non-recreational landowners.
- ◆ Dedicated funding sources are identified to add or improve recreation facilities in the Delta.
- ◆ The Department of Fish and Wildlife, in cooperation with other public agencies, should collaborate with nonprofits, private landowners, and business partners to expand wildlife viewing, angling, and hunting opportunities.
- ◆ The Department of Boating and Waterways coordinates with the U.S. Coast Guard and State and local agencies on an updated marine patrol strategy for the region.
- ◆ Public agencies owning land increase opportunities, where feasible, for bank fishing, hunting, levee top trails, and environmental education.
- ◆ Cities, counties, and other local and state agencies work together to protect and enhance visitor serving businesses by planning for recreation uses and facilities in the Delta, providing infrastructure to support recreation and tourism, and identifying settings for private visitor-serving development and services.

Strategy 5.5: Sustain a Vital Delta Economy

- ◆ The ports of Stockton and West Sacramento encourage maintenance and carefully designed and sited development of port facilities.
- ◆ The Energy Commission and Public Utilities Commission cooperate with the Delta Stewardship Council as described in Water Code section 85307(d) and identify actions that should be incorporated in the Delta Plan to address the needs of Delta energy development, storage, and distribution by 2017.

Chapter 6: Improve Water Quality to Protect Human Health and the Environment

Strategy 6.1: Require Delta-Specific Water Quality Protection

Strategy 6.2: Protect Beneficial Uses by Managing Salinity

Strategy 6.3: Improve Drinking Water Quality

Strategy 6.4: Improve Environmental Water Quality

Outcome Performance Measures

- ◆ Water quality in the Delta and Suisun Marsh meets the standards of the Clean Water Act. (Strategy 6.1)

Metrics:

- The number of Delta watershed waterbody-contaminant combinations on the 303(d) list, evaluated every 8 years within the State Water Resources Control Board Integrated Report.

Baseline:

- Measured as of the 2010 Integrated Report²⁶.

Target:

- Reduction of 40 percent of the waterbody-contaminant combinations on the 303(d) list by 2034.

- ◆ Water management agency compliance with State Water Resources Control Board objectives for salinity in the Delta for D-1641 and X2²⁷. (Strategy 6.2)

Metrics:

- Monthly electrical conductivity and water temperature, and X2 in the Delta, evaluated annually.

Baseline:

- Average monthly electrical conductivity and water temperature, and X2, at compliance points from 1995 to 2015.

Target:

- Targets are to be achieved upon the adoption of these performance measures²⁸:
 - Water management agencies meet State Water Resources Control Board salinity objectives for ecosystem purposes, at least 99 percent of the time, at compliance points.

²⁶ State Water Resources Control Board, 2010 Integrated Report—Clean Water Act Section 303(d) List/305(b) Report (http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml); to be prepared on a tri-region cycle every 2 years, with data available for each region on an 8-year interval.

²⁷ X2 is the distance from the Golden Gate Bridge to the point where daily average salinity is 2 parts per thousand at 1 meter off the bottom (Jassby et al., 1995).
http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/exhibits/usdoi/spprt_docs/doi_jassby_1994.pdf.

²⁸ The targets are to be met during periods when Temporary Urgency Change Petitions (TUCPs) are not in effect (e.g., TUCPs may be in effect during severe drought).

- Water management agencies meet all other State Water Resources Control Board salinity objectives for urban and agricultural beneficial use, at least 99 percent of the time, at compliance points.
 - Water management agencies maintain average X2, for September and October, at or less than 74 km in the fall following wet years, and at or less than 81 km in the fall following above normal years. The monthly average X2 must be maintained at or seaward of these values for each individual month, and cannot be averaged over the two-month period²⁹.
- ◆ Consistently meeting applicable dissolved oxygen (DO) standards in the Delta by 2020 (i.e., Stockton Deep Water Ship Channel, Suisun Marsh, and Old and Middle River). (Strategy 6.4)

Metrics:

Progress of PM metrics are to be evaluated annually:

- Milligrams of DO per liter of water (mg/L).
- Continuous, real-time DO measurements made at multiple locations throughout the Delta.

Baseline:

- Measured as of the date of the Delta Plan's adoption, May 2013.

Target:

- Targets to be achieved upon the adoption of this performance measure:
 - Meet water quality objectives for DO in the Stockton Deep Water Ship Channel, Suisun Marsh, and Old and Middle River.
 - Maintain or exceed the minimum DO concentrations of³⁰:
 - 5 mg/L daily average everywhere in the Delta.
 - 6 mg/L daily average, from September through November, only in the San Joaquin River between Turner Cut and Stockton.

- ◆ Measurable reduction in positive toxicity tests, using standard methods, for pesticides and other pollutants in Delta waters. (Strategy 6.4)

Metrics:

- Toxicity in sediments using invertebrates determined by standard methods approved by the USEPA, as measured by the State Water Resources Control Board³¹.

Baseline:

- The 2008-2012 averaged levels of toxicity using combined Toxic and Highly toxic sites from the Stream Pollution and Monitoring Program Report (18.8% toxicity).

Target:

- Less than 1 percent toxicity in sediment samples from pesticides and other contaminants, using invertebrate testing, by 2034.

²⁹ The standards of 74 km in wet years, and 81 km in above normal years, are designed to mitigate the effects of X2 encroachment upstream, in current and proposed action operations, and to provide suitable habitat for organisms using this low-salinity region. The target is referenced in the Biological Opinions: https://www.fws.gov/sfbaydelta/documents/SWP-CVP_OPs_BO_12-15_final_OCR.pdf.

³⁰ DO concentration can peak during daylight hours and drop during nighttime hours. As a result, a daily and/or monthly average needs to consistently meet TMDL standards in the Delta

³¹ The Stream Pollution Trends Monitoring Program monitors trends in toxicity and pollution for California waters, and was implemented in 2008.

- ◆ Reduced spatial coverage of freshwater harmful algal blooms in waterbodies in the Delta. (Strategy 6.1 and Strategy 6.4)

Metrics:

Progress of PM metrics are to be evaluated annually:

- Spatial coverage (acres) of *Microcystis* sp. cell concentration equivalents (cells/ml), in Delta waterbodies large enough to use the SWRCB mapping tool³² (e.g., Discovery Bay; South Delta along Grantline Canal and Old River surrounding Fabian Tract; Big Break Regional Shoreline; and San Joaquin River between Antioch and Stockton) with densities of 100,000 cell/ml³³ or greater.

Baseline:

- Spatial coverage (acres) based on satellite images during the period of 2016–2017.

Target:

Target to be achieved by 2034:

- Zero acres of waterbodies with densities of 100,000 cells/ml³⁴.

Output Performance Measures

- ◆ Implementation of the North Bay Aqueduct Alternate Intake Project to improve water quality, protect native fishes, and to provide reliable water deliveries. (Strategy 6.3)

Metrics:

- Project status.

Baseline:

- The Notice of Preparation for the North Bay Aqueduct Alternate Intake Project Environmental Impact Report was published on November 24, 2009.

Target:

- The Department of Water Resources, in collaboration with beneficiaries, would begin constructing the North Bay Aqueduct Alternate Intake Project by the end of 2019.

- ◆ Protect groundwater beneficial uses. Groundwater meets drinking water quality standards in the Delta for levels of nitrate (10 ppm NO₃-N) and arsenic (10 ppb As). (Strategy 6.3)

Metrics:

- Number of groundwater wells used for drinking water supply that exceed arsenic and/or nitrate drinking water limits, evaluated every 5 years.

³² The State Water Resources Control Board is in the process of finalizing an interactive mapping tool used for displaying estimated concentrations of cyanobacteria in large water bodies. The satellite tool will use data from the new Sentinel3b satellite, which detects the absorption of chlorophyll in phytoplankton and provides an estimate of chlorophyll-a concentration, and can detect the presence of phycocyanin. This data can then be used to calculate the portion of the biomass associated with cyanobacteria and non-cyanobacteria. Estimates for the average baseline reported between 2016-2017 will be calculated upon the tool's release date (expected November 2017).

³³ The tool for maintaining spatial images and cell count can be found through the SWRCB Cyanobacteria and Harmful Algal Bloom Network page: <http://www.mywaterquality.ca.gov/habs/where/satellite.html>. The tool is expected to be released in November 2017, and baseline satellite images will begin between 2016-2017.

³⁴ Cell densities exceeding the 100,000 cells/ml threshold constitute a high-risk exposure, with an increased probability of irritative symptoms of exposure and potential health impacts. See the [WHO guideline values](#) for relative probability of acute health effects.

Baseline:

- Number of wells within the Delta which exceed 2008 California water quality standards for levels of nitrate (not to exceed 10 ppm NO₃-N) and arsenic (not to exceed 10 ppb As), between the years of 2001–2013.

Target:

A 50 percent reduction in the number of wells exceeding nitrate and arsenic standards from baseline levels, using historical data from 2001–2013, achieved by 2034.

- ◆ Reduction in number of critical pesticides in the waters and sediments of the Delta and Suisun Marsh. (Strategy 6.4)

Metrics:

- The number of Delta watershed waterbody-pesticide combinations on the 303(d) list, as evaluated every 8 years within the State Water Resources Control Board Integrated Report.

Baseline:

- Number of waterbody-pesticide combinations on the 303(d) list reported in the 2010 Integrated Report³⁵.

Target:

- Zero Delta watershed waterbody-pesticide combinations on the 303(d) list by 2034.

- ◆ Reducing concentrations and/or loads of bio-stimulatory substances in Delta waters. (Strategy 6.4)

Metrics:

- Concentration and/or loads of bio-stimulatory substances (in organic nutrients such as ammonium, nitrate, and phosphate) Delta water quality monitoring locations, evaluated annually.

Baseline:

- Bio-stimulatory substance concentrations, loads, and trends during the period of 2004-2013.

Target:

- Meet the limits and targets identified by the Delta Nutrient Science and Research Program³⁶ by 2034.

Administrative Performance Measures

Strategy 6.1: Require Delta-Specific Water Quality Protection

- ◆ There is no administrative performance measure for this policy at this time.

³⁵ State Water Resources Control Board, 2010 Integrated Report—Clean Water Act Section 303(d) List/305(b) Report (http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml); to be prepared on a tri-region cycle every 2 years, with data available for each region on an 8-year interval.

³⁶ The State and Regional Water Resources Control Board are finalizing research prioritization and scientific work which will provide the foundation for interim targets addressing bio-stimulatory substances (e.g., Delta Nutrient Research Plan, Biological Integrity Assessment Project, and Bio-stimulatory Substances Project, to be completed in 2018). Future evaluation of targets may be required in the case of rulemaking processes and resulting regulations by SWRCB.

(http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/delta_nutrient_research_plan/).

- ◆ 100% of covered actions that affect water quality in the Delta identify any significant negative water quality impacts.
- ◆ SWRCB and RWQCBs evaluate and include appropriate protections in any applicable water quality control plan.

Strategy 6.2: Protect Beneficial Uses by Managing Salinity

See Chapter 4 Strategy 1: Create More Natural Functional Flows

Strategy 6.3: Improve Drinking Water Quality

- ◆ Central Valley RWQCB completes the Central Valley Drinking Water Policy by July 2013.
- ◆ The Department of Water Resources completes the North Bay Aqueduct Alternate Intake Project EIR by July 1, 2012.
- ◆ SWRCB completes development of a Strategic Workplan for protection of groundwater beneficial uses by December 31, 2012.
- ◆ Central Valley RWQCB and SWRCB adopt policies and regulations necessary to require all relevant water users that are supplied water from the Delta or the Delta Watershed or discharge wastewater to the Delta or the Delta Watershed to participate in CV-SALTS.

Strategy 6.4: Improve Environmental Water Quality

- ◆ SWRCB develops a proposed policy for nutrients for Inland Surface Waters of the State of CA by January 1, 2014.
- ◆ SWRCB and RWQCBs begin implementation of a study plan for the development of objectives for nutrients in the Delta and Suisun Marsh by January 1, 2013, and complete studies by January 1, 2016.
- ◆ SWRCB and RWQCBs adopt objectives for nutrients in the Delta by January 1, 2018.
- ◆ TMDLs and Basin Plan Amendments for diazinon and chlorpyrifos are completed by January 1, 2013.
- ◆ The Central Valley Pesticide TMDL is completed by January 1, 2016.
- ◆ SWRCB and RWQCBs complete TMDLs and Basin Plan Amendments for methylmercury.
- ◆ The Central Valley Regional Water Quality Control Board review the methyl mercury control studies by December 31, 2018 and determine control measures for implementation starting in 2020.
- ◆ A Delta regional water quality monitoring program is developed.
- ◆ A Delta regional monitoring program is implemented within the first 5 years of the Delta Plan.
- ◆ The Central Valley Regional Water Quality Control Board requires responsible entities that discharge wastewater treatment plant effluent or urban runoff to Delta waters to evaluate whether all or a portion of the discharge can be recycled, otherwise used, or treated in order to reduce contaminant loads to the Delta by January 1, 2014.
- ◆ The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board complete the Phase 2 control plan for the Total Maximum Daily Load and Basin Plan Amendment for dissolved oxygen in the Stockton Ship Channel by January 1, 2015.

- ◆ The State Water Resources Control Board and the San Francisco Bay Regional Water Quality Control Board complete the Total Maximum Daily Load and Basin Plan Amendment for dissolved oxygen in Suisun Marsh Wetlands by January 1, 2014.

Chapter 7: Reduce Risk to People, Property, and State Interests in the Delta

Strategy 7.1: Improve Emergency Preparedness and Response

Strategy 7.2: Finance and Implement Local Flood Management Activities

Strategy 7.3: Prioritize Flood Management Investment

Strategy 7.4: Improve Residential Flood Protection

Strategy 7.5: Protect and Expand Floodways, Floodplains, and Bypasses

Strategy 7.6: Integrate Delta Levees and Ecosystem Function

Strategy 7.7: Limit State Liability

Outcome Performance Measures

- ◆ Decrease in expected annual fatalities and expected property damages from flood emergencies in the Delta (Strategy 7.1)

Metrics:

- Expected Annual Fatalities (EAF) in the Delta. This will be evaluated at least every 5 years.
- Expected Annual Damages (EAD) in the Delta. This will be evaluated at least every 5 years.

Baseline:

- EAF for the Delta using best available data as of 2017, as reported in the Delta Levees Investment Strategy final report.
- EAD for the Delta using best available data as of 2017, as reported in the Delta Levees Investment Strategy final report.

Target:

- 50 percent decrease in EAF by 2025.
- 50 percent decrease in EAD by 2025.

- ◆ Water-delivery interruptions due to floods or earthquakes in the Delta. (Strategy 7.3)

Metrics:

- Number of water-delivery interruptions caused by floods or earthquakes in the Delta. This performance measure will be assessed following any major floods or earthquakes in the Delta
- Acre-feet of water not delivered due to disruptions caused by floods or earthquakes in the Delta. This performance measure will be assessed following any major floods or earthquakes in the Delta

Baseline:

- N/A because this measure has a prescribed target and is not showing a change from a baseline.

Target:

- No water delivery interruptions. This target is to be achieved upon the adoption of this performance measure.
- ◆ Increase in community credit points in National Flood Insurance Program (NFIP) Community Rating System. (Strategy 7.8)

Metrics:

- Community Rating System credit points of Delta communities participating in the NFIP. This will be evaluated at least every 5 years.

Baseline:

- Community Rating System credit points at the time of Delta Plan adoption in May 2013, or nearest available date.

Target:

- 1 percent increase in Community Rating System credit points by 2025.

Output Performance Measures

- ◆ Responsible local, State, and federal agencies with emergency response authority, implement the recommendations of the Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5) by end of 2018. (Strategy 7.1)

Metric:

- Percent of recommendations implemented. This will be evaluated annually.

Baseline:

- Zero percent (0/11) of recommendations implemented.

Target:

- 100 percent (11/11) of recommendations implemented by the end of 2018.

- ◆ Level of flood-risk reduction provided by Delta levees. (Strategy 7.3)

Metrics:

- Percent of urban area in the Delta protected by levees meeting DWR's urban level of flood protection criteria. This will be evaluated at least every 5 years.
- Percent of rural Delta islands and tracts protected by levees at or above the Bulletin 192-82/PL 84-99 standard. This will be evaluated at least every 5 years.

Baseline:

- Percent of urban area in the Delta protected by levees meeting DWR's urban level of flood protection criteria, as of completion of the Delta Levees Investment Strategy.
- Percentage of rural Delta islands and tracts protected by levees at or above the Bulletin 192-82/PL 84-99 standard, as of completion of the Delta Levees Investment Strategy.

Target:

- 100 percent of urban communities in the Delta are protected by levees meeting DWR's urban level of flood protection criteria, demonstrated by 2025.
- 100 percent of the rural Delta islands and tracts are protected by levees at or above the Bulletin 192-82/PL 84-99 standard, demonstrated by 2050.

- ◆ Consideration of sea level rise in flood protection planning for new residential development in the Delta. (Strategy 7.5)

Metric:

- Number of proposed actions covered by the Delta Plan policy to require flood

protection for residential development in rural areas (RR P2). This performance measure will be evaluated as covered actions are submitted.

Baseline:

- N/A because this measure has a prescribed target and is not showing a change from a baseline.

Target:

- 100% of proposed actions to which RR P2 are applicable meet the requirements of RR P2. This target is to be achieved upon the adoption of this performance measure.

Administrative Performance Measures

Strategy 7.1: Improve Emergency Preparedness and Response

- ◆ Responsible local, State, and federal agencies with emergency response authority consider the recommendations of the Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5) by January 1, 2014.
- ◆ The Department of Water Resources evaluates the potential of creating stored material sites by “over-reinforcing” west Delta levees by January 1, 2014.
- ◆ Local levee maintaining agencies consider developing their own emergency action plans, and stockpiling rock and flood fighting materials by January 1, 2014.
- ◆ State and local agencies and regulated utilities that own and/or operate infrastructure in the Delta prepare coordinated emergency response plans to protect the infrastructure from long-term outages resulting from failures of the Delta levees by January 1, 2014.

Strategy 7.2: Finance and Implement Local Flood Management Activities

- ◆ The Legislature creates a Delta Flood Risk Management Assessment District with fee assessment authority.
- ◆ The Public Utility Commission (PUC) does the following:
 - Holds hearings on the topic of imposing a reasonable fee for flood and disaster prevention on regulated privately owned utilities with facilities located in the Delta.
 - Directs all regulated public utilities in the PUC’s jurisdiction to immediately take steps to protect the public utilities’ facilities in the Delta from the consequences of catastrophic failure of levees in the Delta.
- ◆ The governor issues an executive order directing State agencies with projects or infrastructure in the Delta to set aside funding to pay for flood protection and disaster prevention.

Strategy 7.3: Prioritize Flood Management Investment

- ◆ The Delta Stewardship Council facilitates development of funding priorities for State investments in Delta levees by January 1, 2015.
- ◆ The Delta Stewardship Council develops funding priorities for State investments in Delta levees by January 1, 2015.

Strategy 7.4: Improve Residential Flood Protection

- ◆ 100% of covered actions that involve new residential developments of five or more parcels provide a minimum 200-year level of flood protection when the new developments are located outside specified areas described in the Delta Plan.

Strategy 7.5: Protect and Expand Floodways, Floodplains, and Bypasses

- ◆ 100% of covered actions that encroach upon a floodway do not significantly impede the free flow of water or jeopardize public safety.
- ◆ 100% of covered actions that encroach upon a floodplain do not significantly affect floodplain values and functions, per stated requirements.
- ◆ The Department of Water Resources and the Central Valley Flood Protection Board evaluate a bypass and floodways on the San Joaquin River near Paradise Cut.
- ◆ Current efforts to maintain navigable waters in the Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel, led by the U.S. Army Corps of Engineers and described in the Delta Dredged Sediment Long-Term Management Strategy (USACE 2007, Appendix G), are continued in a manner that supports the Delta Plan and the coequal goals. Appropriate dredging throughout other areas in the Delta for maintenance purposes, or that would increase flood conveyance and provide potential material for levee maintenance or subsidence reversal is implemented in a manner that supports the Delta Plan and coequal goals.
- ◆ The Central Valley Flood Protection Board evaluates whether additional areas both within and upstream of the Delta should be designated as floodways.

Strategy 7.6: Integrate Delta Levees and Ecosystem Function

- ◆ DWR develops criteria to define locations for future setback levees in the Delta and Delta watershed.

Strategy 7.7: Limit State Liability

- ◆ The Legislature requires an adequate level of flood insurance for residences, businesses, and industries in flood-prone areas.
- ◆ The Legislature considers making changes to State law and/or constitutional changes that address the State's potential flood liability, including giving State agencies the same level of immunity with regard to flood liability as federal agencies have under federal law.

Chapter 8: Funding Principles to Support the Coequal Goals

Administrative Performance Measures

- ◆ An inventory of current State and federal spending on programs and projects that contribute to the coequal goals is conducted.
- ◆ A Delta Finance Plan has been developed and is funded.
- ◆ State and federal funding gaps have been identified that are determined to hinder progress toward meeting the coequal goals.