

# **Appendix E: Performance Measures for the Delta Plan**

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*As Amended, June 23, 2022*

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# Appendix E

## Performance Measures for the Delta Plan<sup>1</sup>

### Performance Measure Types

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

- **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; including 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- **Baselines** are standards or historical reference conditions for comparing with current conditions.
- **Targets** are the desired future conditions or trends.

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<sup>1</sup> 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.

## **Adaptive Management**

Performance measures are an integral component of the Delta Plan Adaptive Management framework. Assessments of performance measures will inform the adaptive management of the Delta Plan. The Delta Reform Act requires the Council to review the Delta Plan at least once every five years.

The Five-Year Review of the Delta Plan ensures that the Delta Plan is reviewed periodically, and updated if the Council deems appropriate, to incorporate new information or to modify policies and recommendations to further achievement of the coequal goals. Five-year assessments of performance measures are based on evaluation of interim milestones set for each measure. Assessments of performance measures will inform the Five-Year Review findings and recommendations. The Five-Year Review process also sets a framework for conducting an evaluation of performance measures for their effectiveness.

# 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.
- 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

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

Core Strategy 3.2: Improve Groundwater Management

Core Strategy 3.3: Improve Conveyance and Expand Storage Strategy

Core Strategy 3.4: Improved Water Management Information

## Outcome Performance Measures

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

#### *Performance Measure 3.4*

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.

#### **Metrics:**

1. 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
2. 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:**

1. 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.
2. 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.

**Core Strategy 3.3: Improve Conveyance and Expand Storage Strategy****Performance Measure 3.9**

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 exports.<sup>2</sup>

**Metrics:**

1. 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.
2. 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.
3. 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:**

1. 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.
2. 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.
3. 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:**

1. 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.

<sup>2</sup> 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](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta)).

2. 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.
3. 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

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

#### *Performance Measure 3.1*

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.

#### **Metrics:**

1. 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. 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:**

1. 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.
2. 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.

#### *Performance Measure 3.2*

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.

#### **Metrics:**

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

3. 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

### Core 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 measurable 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.
- PM.3.6: 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).

**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.

## Core 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.
  - **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.<sup>3</sup>

<sup>3</sup> 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

### **Core 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.
- 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.

### **Core 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.

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towards sustainability to the Department of Water Resources. These reports may form the basis for a future groundwater performance measure.

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

Core Strategy 4.1: Create More Natural Functional Flows

Core Strategy 4.2: Restore Ecosystem Function

Core Strategy 4.3: Protect Land for Restoration and Safeguard Against Land Loss

Core Strategy 4.4: Protect Native Species and Reduce the Impact of Nonnative Invasive Species

Core Strategy 4.5: Improve Institutional Coordination to Support Implementation of Ecosystem Protection, Restoration, and Enhancement

## Outcome Performance Measures

### Core Strategy 4.1 Create More Natural Functional Flows

#### *Performance Measure 4.2*

Restoring to a healthier estuary using more natural functional flows—including in-Delta flows<sup>4</sup> 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).

#### **Metrics**

1. Area and duration of inundation in the Yolo Bypass, evaluated annually on a five-year rolling basis.
2. 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.
3. 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, at Bend Bridge on the Sacramento River.<sup>5</sup>

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

<sup>5</sup> 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.

4. 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

1. 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.<sup>6</sup>
2. 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 at approximately 20,000 cubic feet per second (cfs).<sup>7</sup> 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).<sup>8</sup>
3. Long-term hydrograph data from the U.S. Geological Survey gage station at Bend Bridge (USGS 11377100).
4. 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-

<sup>6</sup> This baseline reflects the existing Fremont Weir configuration as of 2017. Department of Water Resources (DWR). 2015. Yolo Bypass Salmonid Habitat Restoration and Fish Passage Hydrodynamic Modeling Draft Report. April 21. Provided courtesy of DWR.

<sup>7</sup> 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.

<sup>8</sup> M. Michalková, H. Piégay, G.M. Kondolf, and S.E. Greco. 2011. Lateral Erosion of the Sacramento River, California (1942–1999), and Responses of Channel and Floodplain Lake to Human Influences. *Earth Surface Processes and Landforms*. 36(2): pp. 257–272. Available at: <https://doi.org/10.1002/esp.2106>

Constantine, C.R. 2006. Quantifying the Connections Between Flow, Bar Deposition, and Meander Migration in Large Gravel-bed Rivers. University of California, Santa Barbara. In: Michalková, M., Piégay, H., Kondolf, G.M., and Greco, S.E. 2011. Lateral Erosion of the Sacramento River, California (1942–1999), and Responses of Channel and Floodplain Lake to Human Influences. *Earth Surface Processes and Landforms*. 36(2): pp. 257–272. Available at: <https://doi.org/10.1002/esp.2106>

Micheli, E.R. and E.W. Larsen. 2011. River Channel Cutoff Dynamics, Sacramento River, California, USA. *River Research and Applications*. 27(3): pp. 328–344. Available at: <https://doi.org/10.1002/rra.1360>

completion of most components of the State Water Project (hydrograph between 1981–2015), the Delta outflow-inflow ratio was 0.75.<sup>9</sup>

### Target

1. 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 15.<sup>10</sup>
2. 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 River.<sup>11</sup>
3. 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 recession, in at least 1 out of 5 years, at Bend Bridge on the Sacramento River.<sup>12</sup>
4. By 2030, 10-year rolling average slope of Delta outflow-inflow ratio is greater than zero (i.e., positive),<sup>13</sup> and annual average Delta outflow-inflow ratio in dry as well as in critically dry years is greater than 0.5.<sup>14</sup>

## Core Strategy 4.2: Restore Ecosystem Function

### Performance Measure 4.15

Restoring land-water connections to increase hydrologic connectivity and seasonal floodplain inundation.

### Metrics

Acres within the Sacramento-San Joaquin Delta and Suisun Marsh that are:

1. Hydrologically connected to fluvial and tidally influenced waterways.

<sup>9</sup> 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>

<sup>10</sup> 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.

<sup>11</sup> 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.

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

<sup>13</sup> 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.

<sup>14</sup> 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.

2. A nontidal floodplain<sup>15</sup> area that inundates<sup>16</sup> at least once every two years.

Metric will be evaluated annually.

**Baseline**

As of the year 2018:

1. An estimated 75,000 acres of land physically connected to the fluvial river and tidal system.
2. Approximately 15,000 acres of the connected land inundated at a two-year interval, calculated as a long-term average for 1985-2018.

**Target**

By 2050:

1. Additional 51,000 acres added to the 75,000-acre baseline that are physically connected to the fluvial river and tidal system, for a total of 126,000 acres.
2. At least an additional 19,000 acres of non-tidal floodplain area is inundated on a two-year recurrence interval, for a total of at least 34,000 acres.

***Performance Measure 4.16***

Restoring large areas of natural communities to provide for habitat connectivity and crucial ecological processes, along with supporting viable populations of native species.

**Metric**

Acres of natural communities restored. This metric will be updated and evaluated every five years.

**Baseline**

Acres of natural communities from the 2007 Vegetation Classification and Mapping Program (VegCAMP) dataset by the California Department of Fish and Wildlife (CDFW), as designated below:

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<sup>15</sup> Area that is inundated on a two-year recurrence frequency and is connected via surface water to the fluvial river or tidal system.

<sup>16</sup> There is no depth threshold for the inundation analysis, as inundation is deemed to occur at any depth. While depth of inundation is important for ecological processes, the available data do not include depth measurements.

<b>Ecosystem Type</b>	<b>Baseline Acres (2007 VegCAMP)</b>
Seasonal Wetland Wet Meadow Nontidal Wetland	5,100
Willow Riparian Scrub/Shrub Valley Foothill Riparian Willow Thicket	14,200
Tidal Wetland	19,900
Stabilized Interior Dune Vegetation	20
Oak Woodland	0
Grassland	33,000
Vernal Pool Complex	5,100
Alkali Seasonal Wetland Complex	700

**Target**

Net increase of target acres of natural communities by 2050:

<b>Ecosystem Type</b>	<b>Target Acres Net Increase (from Baseline Acres)</b>	<b>Total Area (Baseline Acres Plus Net Increase)</b>
Seasonal Wetland Wet Meadow Nontidal Wetland	19,000	24,100
Willow Riparian Scrub/Shrub Valley Foothill Riparian Willow Thicket	16,300	30,500
Tidal Wetland	32,500	52,400
Stabilized Interior Dune Vegetation	640	660
Oak Woodland	13,000	13,000
Grassland	No net loss	33,000
Vernal Pool Complex	670	5,770
Alkali Seasonal Wetland Complex	230	930

## **Core Strategy 4.4: Protect Native Species and Reduce the Impact of Nonnative Invasive Species**

### ***Performance Measure 4.10***

Prevention and reduction of key nonnative terrestrial and aquatic invasive species in the Delta and Suisun Marsh.

**Metrics**

To be evaluated annually:

1. 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).
2. Managing nonnative fish:
  - i. Percentage of the total biomass of fish that are native fish species based on U.S. Fish and Wildlife Service (USFWS) beach seine surveys (and other relevant surveys).
  - ii. 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).
3. Managing invasive nonnative vegetation:
  - i. 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 aquatic invasive species control programs).
  - ii. 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**

As of the year 2013<sup>17</sup>:

1. Species reported as established in the Delta prior to 2013 Delta Plan adoption will be used for baseline identification of new invasive species establishing post-2013.
2. Fish:
  - i. Average percentage of total fish biomass that are native fish species based on USFWS beach seine surveys from the period of 1995-2015.
3. Vegetation:
  - i. Number of acres treated set at zero as of 2013.
  - ii. 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*

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<sup>17</sup> 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.

*donax* surveys conducted for the Delta Conservancy in 2015. Suisun Marsh vegetation surveys conducted between 1999–2013.

### Target

To be achieved by 2030:

1. Zero new nonnative invasive species of fish, plants, and invertebrates established in the Delta.
2. Fish:<sup>18</sup>
  - i. 20 percent increase in the biomass of the native inshore fish community, relative to total fish biomass.
  - ii. 20 percent increase in the relative abundance of the native inshore fish community, compared to total relative abundance.
3. Vegetation:
  - i. Acreage targets for treatment of invasive plants as defined by individual plans and projects:
    - a. 680 acres within lower Sacramento River area.<sup>19</sup>
    - b. 800 acres within lower San Joaquin River area.<sup>20</sup>
    - c. 15 acres in the Cache Slough Complex (*Arundo* control project).
    - d. 5,000 acres annually, for herbicide floating aquatic vegetation treatment in the Delta.<sup>21</sup>
    - e. 2,500 acres during treatment seasons for herbicide submersed aquatic vegetation treatment in the Delta.<sup>22</sup>

<sup>18</sup> 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.

<sup>19</sup> See the 2016 Draft Central Valley Flood Protection Plan Conservation Strategy for more details: [http://www.water.ca.gov/conservationstrategy/docs/cs\\_draft.pdf](http://www.water.ca.gov/conservationstrategy/docs/cs_draft.pdf).

<sup>20</sup> See the 2016 Draft Central Valley Flood Protection Plan Conservation Strategy for more details: [http://www.water.ca.gov/conservationstrategy/docs/cs\\_draft.pdf](http://www.water.ca.gov/conservationstrategy/docs/cs_draft.pdf).

<sup>21</sup> See the California State Parks Division of Boating and Waterways' Floating Aquatic Vegetation (FAV) Control Programs: [http://www.dbw.ca.gov/?page\\_id=28995](http://www.dbw.ca.gov/?page_id=28995).

<sup>22</sup> 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 nonproject levee vegetation management. A full list of efforts will be described in the datasheet.

- ii. 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*.

**Performance Measure 4.6**

Increase in Central Valley Chinook salmon population recovery with natural production to reach the state and federal doubling goal.

**Metric**

Annual average natural production of all Central Valley Chinook salmon runs and for individual run types on select rivers: fall, late-fall, spring, and winter. Census will be conducted annually for the general population in the Central Valley and select rivers.

**Baseline**

Set by the Central Valley Project Improvement Act (CVPIA), the baseline is the 1967–1991 Chinook salmon natural production annual average of 497,054 for all Central Valley runs, and for individual run types on select rivers, the baseline values are specified below.<sup>23</sup>

**Target**

The 15-year rolling annual average of natural production for all Central Valley Chinook salmon runs increases for the period of 2035-2065, and reaches 990,000 fish by 2065, for each run on select rivers, the target values are specified below.<sup>24</sup>

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<sup>23</sup> The baseline values in the table do not add up to the baseline for all runs because not all tributaries are included. The Council will only track individual run types for the select rivers specified in the table.

<sup>24</sup> The targets in the table do not add up to the target for all runs because not all tributaries are included. The Council will only track individual run types for the select rivers specified in the table.

## Central Valley Chinook Salmon Natural Production Baseline and Target Levels by Run Type and Selected Rivers

Baseline (1967–1991)	Baseline (1967–1991)	Target (2065)	Target (2065)
Sacramento River Watershed	San Joaquin River Watershed	Sacramento River Watershed	San Joaquin River Watershed
Sacramento River mainstem Fall: 115,369 Late-Fall: 33,941 Spring: 29,412 Winter: 54,316	Tuolumne River Fall: 18,949	Sacramento River mainstem Fall: 230,000 Late-Fall: 68,000 Spring: 59,000 Winter: 110,000	Tuolumne River Fall: 38,000
American River Fall: 80,874	Merced River Fall: 9,005	American River Fall: 160,000	Merced River Fall: 18,000
Feather River Fall: 86,028	Stanislaus River Fall: 10,868	Feather River Fall: 170,000	Stanislaus River Fall: 22,000
	Mokelumne River Fall: 4,680		Mokelumne River Fall: 9,300

## Output Performance Measures

### Core Strategy 4.2: Restore Ecosystem Function

#### *Performance Measure 4.14*

Increased funding for projects that possess priority attributes to restore ecosystem functions and support a resilient, functioning Delta ecosystem.

#### **Metric**

Project funding of covered actions that file a certification of consistency under New ER Policy “A” (Disclose Contributions to Restoring Ecosystem Function). This metric excludes funding for projects that do not include protection, enhancement, or restoration of the Delta ecosystem. This metric will be reported annually.

#### **Baseline**

Set at zero as of the effective date of New ER Policy “A.”

#### **Target**

By 2030, 80 percent of total funding for covered action projects that file certifications of consistency with New ER Policy “A” is for projects with Ecosystem Restoration Tier 1 or 2 attributes.

## **Core Strategy 4.3: Protect Land for Restoration and Safeguard Against Land Loss**

### ***Performance Measure 4.12***

Subsidence reversal<sup>25</sup> activities are located at shallow subtidal elevations to prevent net loss of future opportunities to restore intertidal wetlands through tidal reconnection in the Delta and Suisun Marsh.

#### **Metric**

1. Acres of Delta and Suisun Marsh land with subsidence reversal activity located on islands with large areas at shallow subtidal elevations. This metric will be reported annually.
2. Average elevation accretion at each project site presented in centimeters per year. This metric will be reported every five years. Tracking will continue until a project is tidally reconnected.

#### **Baseline**

1. In 2019, zero acres of subsidence reversal on islands with large areas at shallow subtidal elevations.
2. Soils in the Delta are subsiding between 0 cm/year and 1.8 cm/year.

#### **Target**

1. By 2030, 3,500 acres in the Delta and 3,000 acres in Suisun Marsh with subsidence reversal activities on islands with at least 50 percent of the area or at least 1,235 acres at shallow subtidal elevations.
2. For each project, an average elevation accretion of at least 4 centimeters per year until the project is tidally reconnected.

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<sup>25</sup> Subsidence reversal is a process that halts soil oxidation and accumulates new soil material in order to increase land elevations. Examples of subsidence reversal activities are rice cultivation, managed wetlands, and tidal marsh restoration.

## Core Strategy 4.4: Protect Native Species and Reduce the Impact of Nonnative Invasive Species

### **Performance Measure 4.13**

Remediate fish passage at priority barriers and select large rim dams in the Sacramento–San Joaquin River watershed, and screen priority diversions along native, anadromous fish migration corridors within the Delta.<sup>26</sup>

#### **Metric**

Priority fish migration barriers and select large rim dams in the Sacramento–San Joaquin River watershed, and unscreened diversions along native, anadromous fish migration corridors in the Delta and Suisun Marsh. This metric will be evaluated annually.

#### **Baseline**

Number of fish passage barriers, large rim dams, and unscreened diversions listed in:

1. CDFW 2018 Priority Barriers.
2. Central Valley Flood Protection Program (CVFPP) 2016 Conservation Strategy (Appendix K).
3. Large rim dams in the Sacramento–San Joaquin River watershed identified in the National Marine Fisheries Service’s Central Valley Recovery Plan for Central Valley Salmon and Steelhead (2014) with recovery actions.
4. Unscreened diversions along Delta native, anadromous migration corridors listed in the Passage Assessment Database (PAD) March 2018 version.

#### **Target**

1. By 2030, remediate all (100 percent) priority barriers identified in the 2018 CDFW priority barriers list. For subsequent updates, remediate 100 percent within 10 years of being included in the priority barrier list.
2. By 2030, remediate all (100 percent) of the priority fish migration barriers listed in CVFPP 2016 Conservation Strategy.
3. By 2050, remediate fish passage at all (100 percent) large rim dams in the Sacramento-San Joaquin River watershed.

<sup>26</sup> *Remediate* in this context means to provide passage upstream and downstream to migratory fish by constructing, modifying, or removing a barrier.

- For rim dams, remediate means implementing a long-term fish passage program that may include capture, transport, and release of fish at different life stages.
- For unscreened diversions, remediate means to screen the diversion so that juvenile and adult fish are physically protected from entrainment.

4. By 2030, prioritize all (100 percent) unscreened diversions along native, anadromous fish migration corridors in the Delta, and by 2050 screen all (100 percent) priority diversions.

## Administrative Performance Measures

### Core Strategy 4.1: Create More Natural Functional Flows

- The State Water Resources Control Board adopts updates to the Bay-Delta Water Quality Control Plan, including updates to Delta outflow and Bay-Delta watershed tributary flow objectives, within one year of adoption of amendments to Chapter 4 of the Delta Plan.

### Core Strategy 4.2: Restore Ecosystem Function

- 100 percent of proposed actions that include ecosystem protection, enhancement, or restoration use the Good Neighbor Checklist to avoid or reduce conflicts with existing uses.
- The U.S. Army Corps of Engineers (USACE) develops an agreed-upon variance process to exempt Delta levees from the USACE's levee vegetation policy, where appropriate.

### Core Strategy 4.3: Protect Land for Restoration and Safeguard Against Land Loss

- The San Francisco Bay Conservation and Development Commission (BCDC) updates and certifies components of 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.
- The BCDC submits amendments of the Suisun Marsh Protection Plan to the Council for review, for consistency.
- The BCDC supports local governments and districts with jurisdiction in the Suisun Marsh in amending their components of the Suisun Marsh Local Protection Program to submit to the Council for review, for consistency with the Delta Plan.
- The BCDC adopts the updated Suisun Marsh Protection Plan and certifies components of the Suisun Marsh Local Protection Program that are consistent with the Delta Plan.
- The Sacramento–San Joaquin Delta Conservancy (Delta Conservancy) develops incentive programs for public and private landowners which encourage land

management practices that stop subsidence on deeply subsided lands in the Delta and Suisun Marsh.

- State investments in ecosystem restoration in subsided areas, coordinated by DWR, CDFW, and the Delta Conservancy, are directed at projects that both reverse subsidence and restore intertidal marsh habitat.
- The California Legislature provides state agencies with funding to provide resources and support to resource conservation districts, reclamation districts, and other local agencies and districts, to restore ecosystem function or improve agricultural land management practices that support native species.
- DWR, CDFW, the Delta Protection Commission, the Delta Conservancy, and other state agencies work with local resource conservation districts and other local agencies and districts to adaptively manage agricultural land management practices to improve habitat conditions for native bird and fish species.
- State and local agencies have developed management plans, for all publicly owned lands in the Delta or Suisun Marsh, which address subsidence and consider the feasibility of subsidence reversal.
- For all publicly owned lands in the Delta or Suisun Marsh, state and local agencies, including Reclamation Districts, should develop or update plans that identify land management goals, identify appropriate public or private uses for the land, and describe the operation and maintenance requirements needed to implement management goals. These activities address subsidence and consider the feasibility of subsidence reversal.

#### **Core Strategy 4.4: Protect Native Species and Reduce the Impact of Nonnative Invasive Species**

- The Delta Conservancy, Council's Delta Science Program, CDFW, California Department of Food and Agriculture, California Department of Parks and Recreation, Division of Boating and Waterways, and other state and federal agencies, develop and implement communication strategies, based on scientific expertise, to manage existing nonnative invasive species and for rapid response to address introductions of nonnative invasive species.
- The Delta Conservancy, Council's Delta Science Program, CDFW, California Department of Food and Agriculture, California Department of Parks and Recreation, Division of Boating and Waterways, and other state and federal agencies, develop and implement funding strategies, based on scientific expertise, to manage existing nonnative invasive species and for rapid response to address introductions of nonnative invasive species.

- CDFW prioritizes unscreened diversions in the Delta for remediation.
- Public agencies fund and implement projects that improve aquatic habitat conditions and reduce predation risk for juvenile salmon.
- CDFW and the USFWS ensure hatcheries develop, or continue to develop, periodically update, and implement scientifically sound Hatchery and Genetic Management Plans (HGMPs).
- CDFW, in cooperation with the USFWS and the National Marine Fisheries Service, should seek coordination among researchers studying juvenile anadromous fish migration pathways and survival upstream of and within the Delta waterways to improve synthesis of results across research efforts and application to adaptive management actions.

#### **Core Strategy 4.5: Improve Institutional Coordination to Support Implementation of Ecosystem Protection, Restoration, and Enhancement**

- The Delta Plan Interagency Implementation Committee (DPIIC) develops strategies for acquisition and long-term ownership and management of lands necessary to achieve ecosystem restoration, consistent with the guidance in Appendix Q2.
- DPIIC develops a funding strategy that identifies a portfolio of approaches to remove institutional barriers and fund Ecosystem Restoration Tier 1 or 2 actions within the Delta.
- DPIIC establishes program-level endangered species permitting mechanisms that increase efficiency for Ecosystem Restoration Tier 1 or 2 actions within the Delta and compatible ecosystem restoration projects within the Delta watershed.
- DPIIC coordinates with the Delta Science Program to align state, federal, and local resources for scientific support of restoration efforts, including adaptive management, data tools, monitoring, synthesis, and communication.
- DPIIC develops a landscape-scale strategy for recreational access to existing and future restoration sites, where appropriate, and while maintaining ecological value.
- DPIIC coordinates alignment of state, local, and regional restoration strategies, plans, or programs in the Delta to be consistent with the priority attributes described in Appendix Q2.

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

Core Strategy 5.1: Designate the Delta as a Special Place

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

Core Strategy 5.3: Maintain Delta Agriculture

Core Strategy 5.4: Encourage Recreation and Tourism

Core Strategy 5.5: Sustain a Vital Delta Economy

## Outcome Performance Measures

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

#### *Performance Measure 5.2*

Increase acres with subsidence reversal or carbon sequestration practices.

**Metric:**

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).

#### *Performance Measure 5.3*

No change in agricultural land use due to urban development from 2013–2025.<sup>27</sup> (Also applies to Core Strategy 5.3)

**Metrics:**

Metrics to be evaluated annually:

1. Conversion of farmland acres to urban development, evaluated in conjunction

<sup>27</sup>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.

with updates to the Farmland Mapping and Monitoring Program.<sup>28</sup>

2. 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.

## **Core Strategy 5.4: Encourage Recreation and Tourism**

### ***Performance Measure 5.8***

Increase in Delta recreation and tourism trends.<sup>29</sup>

**Metrics:**

Metrics evaluated annually:

1. Acres of State and federal land accessible by the public for recreation and tourism.
2. Length (linear feet) of shoreline accessible for public recreation.
3. Number of fishing licenses bought per year by county.
4. Number of first-time visitors.
5. Number of off-season visitors.
6. Number of website views and social media traffic.
7. 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.

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<sup>28</sup> 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>).

<sup>29</sup> 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>.

**Performance Measure 5.6**

Increase in regional recreation opportunities throughout the Delta and Suisun Marsh.

**Metric:**

Number of regional Recreation Proposal recommendations and outcomes implemented within the Delta and Suisun Marsh, evaluated annually.<sup>30</sup>

**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.

**Core Strategy 5.5: Sustain a Vital Delta Economy****Performance Measure 5.9**

Improvement in the Regional Opportunity Index within the Delta.<sup>31</sup> (Also applies to Core Strategy 5.3)

**Metrics:**

1. Metrics to be evaluated every 5 years:
2. 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 2025.<sup>32</sup>

<sup>30</sup> 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

<sup>31</sup> 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.

<sup>32</sup> 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](http://www.parks.ca.gov/?page_id=26677)).

## Output Performance Measures

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

#### *Performance Measure 5.5*

Prepare and implement plans for the vitality and preservation of each Delta legacy community.

**Metric:**

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:**

1. All legacy communities have plans adopted by 2021.
2. 25 percent implementation of plan objectives achieved by 2025.

## Administrative Performance Measures

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

### Core 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.

### **Core 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.

### **Core 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.

### **Core 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

Core Strategy 6.1: Require Delta-Specific Water Quality Protection

Core Strategy 6.2: Protect Beneficial Uses by Managing Salinity

Core Strategy 6.3: Improve Drinking Water Quality

Core Strategy 6.4: Improve Environmental Water Quality

## Outcome Performance Measures

### Core Strategy 6.1: Require Delta-Specific Water Quality Protection

#### *Performance Measure 6.1*

Water quality in the Delta and Suisun Marsh meets the standards of the Clean Water Act.

#### *Metric:*

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 Report.<sup>33</sup>

#### *Target:*

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

### Core Strategy 6.2: Protect Beneficial Uses by Managing Salinity

#### *Performance Measure 6.2*

Water management agency compliance with State Water Resources Control Board objectives for salinity in the Delta for D-1641 and X2.<sup>34</sup>

<sup>33</sup> 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](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.

<sup>34</sup> 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](http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/exhibits/usdoi/spprt_docs/doi_jassby_1994.pdf).

**Metric:**

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 measures.<sup>35</sup>

1. Water management agencies meet State Water Resources Control Board salinity objectives for ecosystem purposes, at least 99 percent of the time, at compliance points.
2. 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.
3. 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 period.<sup>36</sup>

## Core Strategy 6.4: Improve Environmental Water Quality

### *Performance Measure 6.5*

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).

**Metrics:**

Progress of PM metrics are to be evaluated annually:

1. Milligrams of DO per liter of water (mg/L).
2. 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:

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<sup>35</sup> 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).

<sup>36</sup> 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](https://www.fws.gov/sfbaydelta/documents/SWP-CVP_OPs_BO_12-15_final_OCR.pdf).

1. Meet water quality objectives for DO in the Stockton Deep Water Ship Channel, Suisun Marsh, and Old and Middle River.
2. Maintain or exceed the minimum DO concentrations of:<sup>37</sup>
  - a. 5 mg/L daily average everywhere in the Delta.
  - b. 6 mg/L daily average, from September through November, only in the San Joaquin River between Turner Cut and Stockton.

### ***Performance Measure 6.9***

Measurable reduction in positive toxicity tests, using standard methods, for pesticides and other pollutants in Delta waters.

#### **Metric:**

Toxicity in sediments using invertebrates determined by standard methods approved by the USEPA, as measured by the State Water Resources Control Board.<sup>38</sup>

#### **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.

### ***Performance Measure 6.10***

Reduced spatial coverage of freshwater harmful algal blooms in waterbodies in the Delta. (Also applies to Core Strategy 6.1)

#### **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 tool<sup>39</sup> (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

<sup>37</sup> 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.

<sup>38</sup> The Stream Pollution Trends Monitoring Program monitors trends in toxicity and pollution for California waters, and was implemented in 2008.

<sup>39</sup> 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).

densities of 100,000 cell/ml<sup>40</sup> 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/ml.<sup>41</sup>

## Output Performance Measures

### Core Strategy 6.3: Improve Drinking Water Quality

#### *Performance Measure 6.3*

Implementation of the North Bay Aqueduct Alternate Intake Project to improve water quality, protect native fishes, and to provide reliable water deliveries.

**Metric:**

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.

#### *Performance Measure 6.4*

Protect groundwater beneficial uses. Groundwater meets drinking water quality standards in the Delta for levels of nitrate (10 ppm NO<sub>3</sub>-N) and arsenic (10 ppb As).

**Metric:**

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

**Baseline:**

Number of wells within the Delta which exceed 2008 California water quality standards for levels of nitrate (not to exceed 10 ppm NO<sub>3</sub>-N) and arsenic (not to exceed 10 ppb As), between the years of 2001–2013.

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<sup>40</sup> 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.

<sup>41</sup> 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.

**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.

**Core Strategy 6.4: Improve Environmental Water Quality*****Performance Measure 6.7***

Reduction in number of critical pesticides in the waters and sediments of the Delta and Suisun Marsh.

**Metric:**

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 Report.<sup>42</sup>

**Target:**

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

***Performance Measure 6.8***

Reducing concentrations and/or loads of bio-stimulatory substances in Delta waters.

**Metric:**

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 Program<sup>43</sup> by 2034.

<sup>42</sup> 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](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.

<sup>43</sup> 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/](http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/delta_nutrient_research_plan/)).

## Administrative Performance Measures

### Core Strategy 6.1: Require Delta-Specific Water Quality Protection

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

### Core Strategy 6.2: Protect Beneficial Uses by Managing Salinity

See Chapter 4 Strategy 1: Create More Natural Functional Flows

### Core 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.

### Core 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

Core Strategy 7.1: Improve Emergency Preparedness and Response

Core Strategy 7.2: Finance and Implement Local Flood Management Activities

Core Strategy 7.3: Prioritize Flood Management Investment

Core Strategy 7.4: Improve Residential Flood Protection

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

Core Strategy 7.6: Integrate Delta Levees and Ecosystem Function

Core Strategy 7.7: Limit State Liability

## Outcome Performance Measures

### Core Strategy 7.1: Improve Emergency Preparedness and Response

#### *Performance Measure 7.2*

Decrease in expected annual fatalities and expected property damages from flood emergencies in the Delta

#### **Metrics:**

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

#### **Baseline:**

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

#### **Target:**

1. 50 percent decrease in EAF by 2025.
2. 50 percent decrease in EAD by 2025.

## Core Strategy 7.3: Prioritize Flood Management Investment

### *Performance Measure 7.5*

Water-delivery interruptions due to floods or earthquakes in the Delta.

**Metrics:**

1. 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.
2. 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.

### *Performance Measure 7.7*

Increase in community credit points in National Flood Insurance Program (NFIP) Community Rating System. (Also applies to Core Strategy 7.7).

**Metric:**

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

### Core Strategy 7.1: Improve Emergency Preparedness and Response

#### *Performance Measure 7.1*

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.

**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.

**Core Strategy 7.3: Prioritize Flood Management Investment**

***Performance Measure 7.3***

Level of flood-risk reduction provided by Delta levees.

**Metrics:**

1. 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.
2. 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:**

1. 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.
2. 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:**

1. 100 percent of urban communities in the Delta are protected by levees meeting DWR's urban level of flood protection criteria, demonstrated by 2025.
2. 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.

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

***Performance Measure 7.6***

Consideration of sea level rise in flood protection planning for new residential development in the Delta.

**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

### Core 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.

### Core 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.

### Core 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

**Core 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.

**Core 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.

**Core 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.

**Core 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.