

Delta Plan Performance Measures – Staff Recommendations

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

Strategies supporting this chapter:

1. Create More Natural Functional Flows
2. Restore Habitat
3. Improve Water Quality to Protect the Ecosystem
*Addressed in Chapter 6 Water Quality
4. Prevent Introduction of and Manage Nonnative Species Impacts
5. Improve Hatcheries and Harvest Management

Ref. #	Strategy #	Policy or Rec.	Short Title	Type	Current Delta Plan Wording	Proposed Delta Plan Wording or Recommended Reclassification (in bold)	Performance Measure Components
4.28	1	ER R1	Adopt Delta Flow Objectives	Output	The SWRCB adopts Delta flow objectives by June 2, 2014.	Administrative Performance Measure: The SWRCB adopts Delta flow objectives by June 2, 2014.	N/A
4.31	1	ER R1	Progress towards restoring in-Delta flows	Outcome	Progress toward restoring in-Delta flows to more natural functional flow patterns to support a healthy estuary. Metrics: results from hydrological monitoring and hydrodynamic modeling.	Progress toward restoring more natural functional flow patterns to support ecological floodplain processes in the Yolo Bypass.¹ Progress will likely require modifications to infrastructure and/or water management protocols that increase floodplain connectivity. <u>Notes:</u> The State Water Board is in the process of developing and implementing flow objectives for the Delta. This may delay proper measuring for in-Delta flows progress. Thus the Yolo Bypass flows will be used as an indicator in the interim to measure success until new information become available.	Metric: <ul style="list-style-type: none"> • Frequency of achieving >17,000 acres of inundation for 14 or more consecutive days in the Yolo Bypass. Baseline: <ul style="list-style-type: none"> • Between 1984 and 2007 the Bypass flooded intermittently, only meeting 2009 National Marine Fisheries Service (NMFS) Biological Opinion requirements for 14 consecutive days of floodplain inundation between December and April once every 10 years. Target: As an interim target: <ul style="list-style-type: none"> • >17,000 acres of Yolo Bypass inundation for 14 or more consecutive days between December and March in at least two out of three years. Data Sources: <ul style="list-style-type: none"> • River discharge and river stage at select measurement stations, e.g., Fremont Weir. Data provided by California Department of Water Resources (DWR) and hosted by California Data Exchange Center (CDEC). • CDEC installs, maintains, and operates a hydrologic data collection network including flow data obtained at stations along the Sacramento and San Joaquin Rivers.

¹ This performance measure should be considered an interim step because it is spatially limited to the Yolo Bypass. The Council intends to develop a flow performance measure for the Delta that covers the entire area, but that measure is not yet ready for review.

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							<ul style="list-style-type: none"> Yolo Bypass Salmonid Habitat Restoration and Fish Passage Implementation Plan, 2012.
4.33	1	ER R1	Adopt flow objectives for major tributaries	Output	The SWRCB adopts flow objectives for the major tributaries by 2018 (or as soon as reasonably possible).	Administrative Performance Measure: The SWRCB adopts flow objectives for the major tributaries by 2018 (or as soon as reasonably possible).	N/A
4.27	2	ER R2	Acres of habitat restored	Output	Pilot scale Delta habitat restoration projects are developed and initiated in the priority areas described in ER R2 by 2015. These projects include tidal brackish and freshwater marsh as well as floodplain restoration, and have clear adaptive management plans aimed at improving outcomes and providing lessons for the development of large-scale restoration projects.	Delta habitat projects are constructed including 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. <u>Notes:</u> The opportunity to align 30,000 acres from EcoRestore was not added because at least 3,500 acres of the 30,000 acres will not occur within the PRHAs. These 3,500 acres of carbon sequestration/subsidence reversal projects are already noted in Chapter 5 and are not part of the PRHAs because they will by design occur in subsided areas of the Delta not suitable for floodplain or tidal wetland restoration.	Metric: <ul style="list-style-type: none"> Number of acres of restoration projects constructed by habitat type, including progress toward the biological opinions' targets of restoring 8,000 acres of tidal wetland and 17,000-20,000 acres of floodplain habitat in the Priority Restoration Habitat Areas (PRHAs). Baseline: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 8,000 acres of tidal wetland and 17,000-20,000 acres of floodplain habitat restored in the PRHAs. Data Sources: <ul style="list-style-type: none"> The California EcoRestore program tracks and reports on habitat restoration progress in acres by habitat type on their website. Fish Restoration Program (FRP) annual reports contain acreage totals related to implementing the fish habitat restoration requirements and related actions of the biological opinions and the Incidental Take Permit (ITP) in the Delta, Suisun Marsh, and Yolo Bypass. The FRP is focused on restoring 8,000 acres of intertidal and sub-tidal habitat in the Delta and Suisun Marsh. Fishery Agency Strategy Team (FAST). USFWS, NMFS, DFW, and USBR are a part of FAST. FAST has a specific process for crediting DWR and USBR projects towards meeting the BOs. Confirmed credits are provided after project construction. The Delta Conservancy tracks habitat restoration projects progress using the publically accessible EcoAtlas database.
4.29	2	ER R2	Progress towards BiOps'	Output	Progress, measured in acres of restored or enhanced habitat, is being made toward the biological opinions' targets or restoring 8,000 acres of tidal marsh and 17,000 to 20,000 acres of floodplain rearing habitat.	REMOVED <u>Notes:</u> This measure was merged with the focus of 4.29, which has the BiOps targets. Changed the focus the performance measure	N/A

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						4.27, pilot scale habitat restoration projects, to the current focus of the implementation of restoration.	
4.30	2	ER R2	Progress toward “doubling goal” for wild CV salmonids	Outcome	Progress toward achieving the State and federal “doubling goal” for wild Central Valley salmonids relative to 1995 levels. Trends will be derived from long-term salmonids monitoring surveys conducted by the National Marine Fisheries Service, US Fish and Wildlife Service, and others.	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 US Fish and Wildlife Service, California Department of Fish and Wildlife , and others.	<p>Metric: Number of naturally spawned wild adult salmon by run type, annually censused for the general population in the Central Valley and selected rivers:</p> <ul style="list-style-type: none"> • Sacramento River: <ul style="list-style-type: none"> ○ American River ○ Feather River ○ Sacramento River mainstem • San Joaquin River: <ul style="list-style-type: none"> ○ Tuolumne River ○ Merced River ○ Stanislaus River ○ Mokelumne River <p>Baseline:</p> <ul style="list-style-type: none"> • Salmon population numbers relative to the period of 1967-1991. <p>Target:</p> <ul style="list-style-type: none"> • As defined by the Central Valley Project Improvement Act (CVPIA) “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.” <p>Data Sources:</p> <ul style="list-style-type: none"> • Long-term monitoring surveys conducted by the US Fish and Wildlife Service, California Department of Fish and Wildlife, and others. • ChinookProd, a spreadsheet database maintained by the USFWS Anadromous Fish Restoration Program (AFRP) to assess progress toward the CVPIA doubling goal. Data for ChinookProd is obtained from CDFW’s Grand Tab, which provides estimates based on counts of fish entering hatcheries and migrating past dams, carcass surveys, live fish counts, and ground and aerial red counts. • Estimates are provided by CDFW, USFWS DWR, EB MUD, USBR, the lower Yuba River Management team, and the Fisheries Foundation of California. Grand Tab does not characterize whether fish are wild or hatchery origin, just whether the adults are spawning in natural or

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							hatchery areas.
4.32	2	ER R2	Progress toward occurrence & use of protected & restored habitat by native species	Outcome	Progress toward the documented occurrence and use of protected and restored habitats and migratory corridors by native resident and migratory Delta species. Trends in occurrence, use, and performance of native species in protected and restored habitats and corridors will be upward over the next decade. These trends will be derived from animal and plant monitoring surveys that are conducted as part of adaptive management strategies for the protection and restoration of these areas.	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. <u>Notes:</u> Each project site is different, and each individual project will therefore have its own baseline and target. As such, the individuals conducting surveys will set appropriate baselines and targets.	<p>Metrics:</p> <ul style="list-style-type: none"> Assess native fish: <ul style="list-style-type: none"> Relative abundance of native fish in and near restoration project sites. Assess native birds: <ul style="list-style-type: none"> Counts of waterfowl in the Delta. <p>Baseline:</p> <ul style="list-style-type: none"> Baselines are set from monitoring prior to restoration at each site. <p>Target:</p> <ul style="list-style-type: none"> As ongoing restoration projects are approved, targets need to be determined as part of the restoration goals and monitoring plan for each of the restoration projects. <p>Data Sources:</p> <ul style="list-style-type: none"> Monitoring data for individual restoration projects. Protected sites (Cosumnes River Preserve, Yolo Bypass Wildlife Area, and the Stone Lakes NWR) also have monitoring data for many species, including birds and terrestrial wildlife. California Estuary Monitoring Workgroup (CEMW) is tasked with identifying key questions to assess the ecological health of the San Francisco Bay-Delta Estuary. The data can be found through the California Estuaries Portal. State of the Estuary Report. IEP Tidal Wetland Monitoring Project Work Team will collaborate in the design of monitoring programs for fish and food web resources in restored tidal wetlands in the Bay Delta system. This work is associated with FRP.
4.37	2	ER R2	Landscape metrics to assess ecological functions	Outcome	N/A: New measure	Assess the extent and distribution of specific ecological functions, use metrics for specific species/guilds of wildlife and define how the functions quantify.	<p>Metrics:</p> <ul style="list-style-type: none"> Assess the function 'Provides habitat and connectivity for fish'. <ul style="list-style-type: none"> Inundation extent, duration, timing, and frequency. 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).

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							<ul style="list-style-type: none"> • Assess the function 'Provides habitat and connectivity for marsh wildlife'. <ul style="list-style-type: none"> ○ Marsh area by patch size (patch size distribution). ○ Marsh area by nearest neighbor distance. ○ Marsh core area ratio. ○ Marsh fragmentation index. • Assess the function 'Provides habitat and connectivity for waterbirds'. <ul style="list-style-type: none"> ○ Ponded area in summer by depth and duration. ○ Wetted area by type in winter. • Assess the function 'Provides habitat and connectivity for riparian wildlife'. <ul style="list-style-type: none"> ○ 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'. <ul style="list-style-type: none"> ○ Length of marsh-terrestrial transition zone by terrestrial habitat type. <p>Baseline: Habitat acreage as published in historical habitat type maps using data from the early 1800s. The historical habitat type map was taken from the Sacramento-San Joaquin Delta Historical Ecology Investigation. Baseline habitat types by hectares (ha) as seen:</p> <ul style="list-style-type: none"> • Managed wetlands: 0 • Urban/Barren: 0 • Agriculture/Non-native: 0 • Stabilized interior dune vegetation: 1,032 • Willow riparian scrub/shrub: 1,637 • Willow thicket: 3,567 • Grassland: 9,108 • Alkali seasonal wetland complex: 9,193 • Vernal pool complex: 11,262 • Water: 13,772 • Valley foothill riparian: 15,608 • Oak woodland/savanna: 20,460 • Wet meadow/Seasonal wetland: 37,561 • Freshwater emergent wetland: 193,224 <p>Target:</p> <ul style="list-style-type: none"> • To be determined through the development of landscape restoration

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							frameworks, initially focusing on pilot efforts in Cache Slough and the Northeast Delta led by the Delta Conservancy, Delta Science Program, SFEI and others. Data Source: <ul style="list-style-type: none"> SFEI.
4.34	4	ER R7	Implement the 2014 ERP Conservation Strategy	Output	The DFW and other appropriate agencies fully implement the list of "Stage 2 Actions for Nonnative Invasive Species."	Administrative Performance Measure: The DFW and other appropriate agencies fully implement the 2014 ERP "Conservation Strategy" list for Strategic Goal 5.	N/A
4.35	4	ER P5	Progress towards decreasing trends in new/existing nonnative invasive spp., and abundance/distribution of existing nonnative invasive spp.	Outcome	Progress toward decreasing annual trends in both the number of new and existing aquatic and terrestrial nonnative species, and the abundance and distribution of existing aquatic and terrestrial nonnative species in the Delta over the next decade. These trends will be derived from long-term animal and plant monitoring surveys conducted by the Interagency Ecological Program agencies, the California Department of Boating and Waterways, the U.S. Department of Agriculture, the San Francisco Estuary Institute, and others.	Progress toward managing aquatic and terrestrial invasive nonnative species in the Delta over the next decade. Long-term animal and plant monitoring surveys will be conducted by the Interagency Ecological Program agencies, the California Department of Boating and Waterways, the U.S. Department of Agriculture, the San Francisco Estuary Institute, and others. * Established invasive nonnative aquatic plants will be reported on in Chapter 6. <u>Notes:</u> A thorough assessment of progress toward managing invasive nonnative species in the Delta includes targeting new and existing species.	Metrics: <ul style="list-style-type: none"> Assess progress managing nonnative fish: <ul style="list-style-type: none"> Relative abundance of individual native fish and individual nonnative fish in the Delta. Number of newly identified nonnative fish species. Assess progress managing invasive nonnative vegetation: <ul style="list-style-type: none"> Number of newly identified invasive nonnative plant species reported in the Delta. Coverage, in acres, of invasive nonnative plant species (e.g. Arundo donax and Phragmites australis) in the Delta. Baseline: <ul style="list-style-type: none"> Number of new invasive nonnative species set at zero. Abundance of existing specific nonnative species set at the adoption of the Delta Plan May 2013. Target: <ul style="list-style-type: none"> Difficult to define; decreased abundance of indicators (goal may be zero but that would be unlikely for many species until thresholds are developed). For fish, decrease relative abundance of nonnative/introduced fish. Data Sources: <ul style="list-style-type: none"> Long-term animal and plant monitoring surveys are conducted by the Interagency Ecological Program agencies. Programs aimed to prevent introduction of new species: <ul style="list-style-type: none"> CDFW's Marine Invasive Species Program (MISP). California State Lands Commission (SLC).

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							<ul style="list-style-type: none"> • State of the Estuary Report data. • California Estuaries Portal. • Invasive Species Council of California (ISCC). The ISCC also appointed the California Invasive Species Advisory Committee (CISAC) to develop and prioritize an Invasive Species Action plan. • Calflora, iNaturalist and CalWeedMapper applications. • IEP data. • UC Davis Suisun Marsh sampling.
4.36	5	ER R9	Percent of hatchery fish that are marked and tagged	Output	N/A: New measure	All hatchery anadromous salmonids marked and tagged.	<p>Metric:</p> <ul style="list-style-type: none"> • Percent marked and tagged as reported by NMFS and CDFW. <p>Baseline: As of May 2013 (Delta Plan adoption date):</p> <ul style="list-style-type: none"> • 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. <p>Target:</p> <ul style="list-style-type: none"> • 100% of hatchery fish are marked and tagged. <p>Data Sources:</p> <ul style="list-style-type: none"> • NMFS reports. • CDFW reports.