

1 **APPENDICES**

2 **Contents**

3 Appendix I - Summary of Draft Goals, Strategies, and Objectives ..... 2

4 Appendix II – Conservation Opportunity Areas..... 10

5 Appendix III – Bay Delta Conservation Plan ..... 1

6 Appendix IV – California *EcoRestore* ..... 1

7 Appendix V – Preliminary Goals for the Delta Plan Chapter 4 ..... 1

8 Appendix VI – Delta Conservation Framework 2016 Workshop Series ..... 1

9 Appendix VII – Existing Planning Documents ..... 1

10 Appendix VIII – Delta Plan Recommendations..... 1

11 Appendix IX – Good Neighbor Checklist..... 1

12 Appendix X – Wildlife-Friendly Agriculture ..... 1

13 Appendix XI – Species Recovery Briefs..... 1

14 Appendix XII – Delta Ecosystems and Associated Habitat Types ..... 1

15 Appendix XIII – Regulatory Compliance and Permitting for Conservation Implementation ..... 1

16 Appendix XIV - Grants..... 1

17 Appendix XV – Open Standards..... 1

18

19

20 **Appendix I - Summary of Draft Goals, Strategies, and Objectives**

21

22 **GOAL A: Integrate regular stakeholder communication and socioeconomic considerations into Delta conservation planning, implementation,**  
23 **science, and adaptive management processes.**

24 **Strategy A1: Utilize collaborative regional partnerships and regular coordinated forums to plan, implement, and manage conservation**  
25 **and evaluate progress.**

- 26 • **OBJECTIVE A1-1:** By 2019, establish a permanent public advisor position to serve as:
  - 27 • Liaison between Delta community members, agency representatives, scientists, and other stakeholders;
  - 28 • Coordinator of regularly scheduled meetings to develop *Regional Conservation Strategies* with regionally focused conservation
  - 29 targets and timelines.
- 30 • **OBJECTIVE A1-2:** By 2022, identify a lead organization that develops web tools and content to include recommended collaboration and  
31 coordination practices and links to other existing resources.
- 32 • **OBJECTIVE A1-3:** By 2022, continue existing partnerships, and initiate new partnerships, to engage stakeholders (conservation  
33 practitioners, federal, state, and local planning and permitting agencies, willing farmers, landowners, and other community members)  
34 when planning *Regional Conservation Strategies*, implementing conservation projects, and managing conservation areas.
- 35 • **OBJECTIVE A1-4:** By 2022, initiate two new *Regional Conservation Strategy* planning processes, or similar partnership planning  
36 processes, as suggested in the Conservation Opportunity Regions (CORs) outlined in the Delta Conservation Framework.

37 **Strategy A2: Align conservation practices with best practices for supporting Delta agriculture and community needs.**

- 38 • **OBJECTIVE A2-1:** By 2019, engage with existing and establish new public advisors to help farmers and landowners navigate regulatory  
39 requirements associated with agricultural areas near conservation lands, and advocate for funding to provide financial incentives for  
40 implementing wildlife-friendly agricultural practices and associated research and evaluation.
- 41 • **OBJECTIVE A2-2:** Within four years after initiation of a *Regional Conservation Strategy* or similar planning process, conduct at least  
42 two region-specific socioeconomic research projects investigating the costs and benefits of Delta conservation (including ecosystem  
43 services) and show how findings can be incorporated into conservation project planning and evaluation.
- 44 • **OBJECTIVE A2-3:** By 2022, regional partnerships and individual project proponents consider inclusion of applicable Department of  
45 Water Resources (DWR) *Agricultural and Land Stewardship Workgroup strategies* (DWR 2017), and available socioeconomic and  
46 natural resource management research outcomes, in the planning of *Regional Conservation Strategies* and for project implementation  
47 and management.

- 48
- **OBJECTIVE A2-4:** By 2022, regional planning partnerships implement and evaluate efficacy of *DWR Agricultural and Land Stewardship Workgroup strategies* (DWR 2017) intended to minimize the impacts of conservation projects on agricultural productivity and maximize societal benefits from ecosystem services according to a suite of relevant performance measures.
- 51

52 **GOAL B: Support and expand existing public education programs and run state and national outreach campaigns focused on Delta values and**  
53 **ecosystem conservation.**

54 **Strategy B1: Support and expand existing public education programs to include a focused curriculum on integrating agriculture, Delta**  
55 **communities, and ecosystem conservation that also communicates impending changes to resources and ecosystem services from climate**  
56 **change.**

- 57
- **OBJECTIVE B1-1:** By 2019, secure funding support for the 5-year implementation of a coordinated Delta public education program integrating a conservation focus into existing curricula.
  - **OBJECTIVE B1-2:** By 2022, lead organization initiates the expanded 5-year Delta public education program focused on multiple local audiences, including community groups and schools.
- 60

61 **Strategy B2: Continue support for the expansion and implementation of existing outreach and education campaigns to promote the**  
62 **Delta and the importance of multi-benefit conservation outcomes to a wide audience at both state and national levels.**

- 63
- **OBJECTIVE B2-1:** By 2020, secure funding support and expand existing programs to continue statewide and national outreach with a focused campaign about water, people, and wildlife in the Delta.
  - **OBJECTIVE B2-2:** By 2022, lead organizations secure funding support and build on initial efforts to launch a three-year statewide and national media campaign to promote the Delta widely and build support for conservation.
- 66

67

68

69 **GOAL C: Develop multi-benefit focused conservation and land management solutions to balance environmental and human needs.**

70 **Strategy C1: Incorporate conservation goals with levee maintenance and flood management practices to provide habitat along Delta**  
71 **channels, river corridors, and riparian zones.**

- 72
- **OBJECTIVE C1-1:** By 2022, identify and implement conservation opportunities for enhancing wildlife habitat along Delta channels, river corridors, and riparian zones in the context of flood management within regions identified by the 2017 Central Valley Flood
- 73

74 Protection Plan (CVFPP) Conservation Strategy and in collaboration with the Delta Levee Habitat Advisory Committee.

75 **Strategy C2: Support sustainable wildlife-friendly agriculture to provide additional wildlife and migratory bird habitats.**

- 76 • **OBJECTIVE C2-1:** By 2019, create a common understanding of science-based wildlife-friendly agricultural practices and their potential  
77 benefits to wildlife in the Delta.
- 78 • **OBJECTIVE C2-2:** By 2022, utilize existing incentives (including agricultural conservation easements) and develop new incentives, such  
79 as *Habitat Exchange* programs run by nongovernmental organizations or state agency-run funding programs, to support wildlife-  
80 friendly farming conservation projects in the Delta.
- 81 • **OBJECTIVE C2-3:** By 2019, appoint a local farmer *Ombudsman* for all Delta counties to provide outreach and support to willing  
82 agricultural practitioners and landowners about economic and other incentives to help expand wildlife-friendly agriculture in the Delta.

83 **Strategy C3: Control and reverse land subsidence and support climate change mitigation efforts by implementing carbon farming**  
84 **projects where plants sequester carbon and build up soils over time.**

- 85 • **OBJECTIVE C3-1:** By 2030, at least quadruple the number of Delta “carbon farming” projects that aim to manage lands to reverse  
86 land subsidence and sequester carbon with funding support through available carbon market opportunities.
- 87 • **OBJECTIVE C3-2:** Prioritize carbon management activities that are consistent with the carbon sequestration strategies, such as  
88 carbon farming practices, for Natural and Working Lands presented in the state’s 2017 Scoping Plan.

89

90 **Strategy C4: Advance state and local agency and stakeholder land management processes and procedures.**

- 91 • **OBJECTIVE C4-1:** By 2022, identify a suite of 5-10 recommended tactics to improve cross-agency and stakeholder communication and  
92 coordination related to the management of state-owned lands.

93 **Strategy C5: Develop best practices for assuring reliable water distribution for in-Delta uses and when implementing conservation.**

- 94 • **OBJECTIVE C5-1:** By 2022, develop a suite of 5-10 best practices to help preserve reliable in-Delta water supplies when  
95 implementing conservation projects.
- 96 • **OBJECTIVE C5-2:** By 2020, assess the need to install fish screens at agricultural water diversions throughout the Delta and make  
97 recommendations for appropriate action.

98 **Strategy C6: Integrate solutions for improving surface- and groundwater quality into conservation project planning and implementation.**

- 99
- **OBJECTIVE C6-1:** By 2022, integrate and/or expand existing best practices for improved water quality into conservation projects, where appropriate, with focus on both surface- and groundwater.
- 100
- 101

102 **GOAL D: Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to**  
103 **climate change.**

104 **Strategy D1: Restore, enhance, and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging *Regional***  
105 ***Partnerships, in Regional Conservation Strategies to improve function and life history support for native and migratory wildlife.***

- **OBJECTIVE D1-1:** Within 10-30 years, implement conservation actions to reestablish **fluvial processes** along streams to provide resilient habitat and foster life history support for healthy populations of resident and anadromous fish and other wildlife species.
  - **OBJECTIVE D1-2:** Within 10-30 years, implement conservation actions to reestablish **functional channels and connections between streams and tidal floodplains** for support of resident and migratory aquatic species.
  - **OBJECTIVE D1-3:** Within 10-30 years, implement conservation actions to reestablish **tidal marsh processes in areas at intertidal elevations** to provide resilient habitats and life history support for marsh wildlife.
  - **OBJECTIVE D1-4:** Within 10 – 30 years, implement conservation actions to reestablish **tidal marsh processes in subsided areas** to provide resilient habitats and life history support for marsh wildlife.
  - **OBJECTIVE D1-5:** Within 10-30 years, implement conservation actions to reestablish **tidal processes in channel and open water areas** (flooded islands) to provide resilient habitats and life history support for marsh wildlife.
  - **OBJECTIVE D1-6:** Within 10-30 years, implement conservation actions to reestablish **tidal-terrestrial transition zones** to provide resilient habitats and life history support for wildlife.
  - **OBJECTIVE D1-7:** Within 10-30 years, implement conservation actions to restore **connected terrestrial ecosystems of the Delta** to provide resilient habitats and life history support for wildlife and migratory birds.
  - **OBJECTIVE D1-8:** Within 10-30 years, implement conservation actions to expand **wildlife-friendly agriculture** and operate **managed wetland processes** to provide resilient habitat and foster life history support for healthy populations of native and migratory wildlife species.
  - **OBJECTIVE D1-9:** Within 10-30 years, implement conservation actions to integrate support for native wildlife into **urban areas** to provide supplementary habitat for certain species, increase wildlife connectivity, and provide opportunities for people to connect to nature.
- 125

126 **Strategy D2: Through technical analyses conducted by given *Regional Partnerships*, identify and prioritize available areas to protect Delta**  
127 **ecosystems and transition zones with the potential for providing landscape connectivity and resiliency to ecosystem function.**

- 128 • **OBJECTIVE D2-1:** Within 5 years of implementation of a given *Regional Conservation Partnership*, identify and prioritize available areas  
129 for conservation of ecosystem types or processes that are most vulnerable to climate change and that also support climate vulnerable  
130 (and listed) species for inclusion in the *Regional Conservation Strategy*.
- 131 • **OBJECTIVE D2-2:** Within 20 years of implementation of a given *Regional Conservation Strategy*, protect at minimum 25% of ecosystem  
132 types and transition zones prioritized therein as important for ecosystem connectivity and resiliency.
- 133 • **OBJECTIVE D2-3:** By 2050, protect a variety of interconnected functioning ecosystems throughout the Delta as diverse mosaics of  
134 complementary habitat types, including wildlife-friendly agriculture, to support a broad suite of ecological processes.

135 **Strategy D3: Improve the connectivity of ecosystems and associated wildlife populations at multiple scales.**

- 136 • **OBJECTIVE D3-1:** By 2025, initiate projects to improve connectivity and meandering waterways along selected Delta rivers, sloughs,  
137 agricultural channels, or streams, and riverine and riparian migratory corridors for wildlife.
- 138 • **OBJECTIVE D3-2:** By 2025, develop and initiate projects to remove barriers and improve connectivity along terrestrial (overland)  
139 movement corridors, including established migratory corridors for birds and other wildlife.
- 140 • **OBJECTIVE D3-3:** By 2025, develop and initiate projects to address priority actions to remove barriers and improve connectivity  
141 across transitional zones.

142 **Strategy D4: Create conditions conducive to meeting the goals in existing species recovery plans to maintain or improve the distribution**  
143 **and abundance of listed species supported by Delta ecosystems.**

- 144 • **OBJECTIVE D4-1:** By 2024, implement all recommendations in the Delta smelt and Sacramento Valley salmon resiliency strategies to  
145 support the recovery of these listed species.
- 146 • **OBJECTIVE D4-2:** By 2050, reestablish Delta ecosystem functional processes according to recommendations in species recovery plans to  
147 achieve measurable improvements in conditions that support the distribution and abundance of a majority of listed species in the Delta.

148 **Strategy D5: Implement conservation actions to improve ecosystem function and support a thriving aquatic food web in the Delta.**

- 149 • **OBJECTIVE D5-1:** By 2025, through continued scientific investigations on Delta primary production, determine a suite of priority  
150 conservation actions to reestablish a thriving Delta aquatic food web.
- 151 • **OBJECTIVE D5-2:** By 2030, develop, implement, and evaluate effects of at least five conservation projects that include one or

152 more priority actions to reestablish a thriving Delta aquatic food web to support native wildlife.

153 **Strategy D6: Support and coordinate proactive approaches for the early detection, rapid response, and long-term control and**  
154 **management of harmful invasive species.**

- 155 • **OBJECTIVE D6-1:** By 2020, increase support for Delta county weed management areas and California State Parks Division of  
156 Boating and Waterways, to prioritize implementation of area-wide control of problematic invasive species.
- 157 • **OBJECTIVE D6-2:** By 2030, double the current level of early detection and management of invasive species of concern in the Delta, to  
158 reduce negative impacts on ecosystem function, special status species, and Delta community interests and increase ecosystem  
159 resilience.

160 **Strategy D7: Balance the benefits of conservation areas for human use with reduced adverse effects on Delta wildlife from human**  
161 **disturbance.**

- 162 • **OBJECTIVE D7-1:** By 2020, develop a Public Access Plan for Delta conservation lands, recognizing existing management plans and  
163 management objectives to clearly outline a needed balance between conserving Delta ecosystems and supporting public access and  
164 recreation activities.
- 165 • **OBJECTIVE D7-2:** By 2030, double the current capacity for law enforcement and public safety in the context of public access and  
166 conservation land management.

167

168 **GOAL E: To evaluate conservation progress and address climate change stressors and other drivers of change, implement the Delta Science**  
169 **Program and Interagency Ecological Program (IEP) science strategies, the adaptive management program for Biological Opinions related to state**  
170 **and federal water project operations (AMP), and the California *EcoRestore* adaptive management program.**

171 **Strategy E1: Implement the priority research science actions and needs outlined in the Delta Science Strategy, the IEP science agenda,**  
172 **and Delta smelt and salmonid Resiliency Strategies.**

- 173 • **OBJECTIVE E1-1:** By 2021, implement the 2017-2021 SAA and 2016 IEP science agenda priority actions pertinent to ecosystem  
174 conservation and evaluate progress through the AMP and California *EcoRestore* Adaptive Management Program to inform planning  
175 and management decisions and evaluate conservation progress in the Delta.
- 176 • **OBJECTIVE E1-2:** By 2021, implement and evaluate progress of the Delta Smelt Resiliency Strategy and Sacramento Valley Salmon  
177 Resiliency Strategy.

- 178
- **OBJECTIVE E1-3:** Advance integrated modeling tools to support research efforts and science-based decision making.
- 179
- **OBJECTIVE E1-4:** By 2021, implement research aimed at assessing the human dimensions of natural resource management
- 180
- decisions.

181 **Strategy E2: Utilize adaptive management, including coordinated, area-wide monitoring programs, as an integrated part of Delta**

182 **conservation to assess progress and status and trends of resources of interest.**

- 183
- **OBJECTIVE E2-1:** By 2018, implement actions outlined by the AMP and California *EcoRestore* Adaptive Management Program and
- 184
- coordinated monitoring programs such as the Tidal Wetland Monitoring Framework (IEP 2017).

185 **Strategy E3: Develop resources and recommended best practices to maintain or increase ecosystem and wildlife resiliency to projected**

186 **climate change effects.**

- 187
- **OBJECTIVE E3-1:** By 2019, develop a suite of recommended best practices to maintain or increase ecosystem and wildlife
- 188
- resiliency to projected climate change effects in the Delta.

- 189
- **OBJECTIVE E3-2:** Identify practices that will achieve, and maximize, both climate adaptation and carbon sequestration benefits in tidal
- 190
- wetlands and managed wetlands in the Delta.

- 191
- **OBJECTIVE E3-3:** By 2022, implement and evaluate the effectiveness of best practices to maintain or increase ecosystem and wildlife
- 192
- resiliency to projected climate change effects, including sea-level rise, salinity intrusion, precipitation and temperature changes, and
- 193
- extreme weather events.

194

195 **GOAL F: Improve the capacity and approaches for permitting processes in the context of Delta conservation implementation.**

196 **Strategy F1: Directly engage with permitting agencies to find ways to improve the permitting process for conservation-related projects**

- 197
- **OBJECTIVE F1-1:** By 2018, establish a permanent *permitting ombudsman* dedicated to facilitating communication and
- 198
- collaboration among entities responsible for implementing conservation projects and state, federal, and local regulatory
- 199
- agencies.

- 200
- **OBJECTIVE F1-2:** By 2020, develop and initiate strategies to provide funding to increase dedicated regulatory staff positions for
- 201
- restoration projects in the Delta, Yolo Bypass, and Suisun Marsh.

- 202
- **OBJECTIVE F1-3:** By 2018, bring together Delta conservation practitioners, regulators, and experts for regular regional meetings
- 203
- to discuss ways to improve efficiency of conservation-related permitting processes and requirements.

204 **Strategy F2: Develop permitting guidelines for the Delta Conservation Opportunity Regions**

- 205 • **OBJECTIVE F2-1:** Beginning in 2018, initiate discussions with regulatory agencies to develop permitting guidelines to provide high-  
206 level guidance for project proponents and agency staff issuing permits for individual projects in the Delta.

207 **Strategy F3: Develop regional programmatic permits for conservation projects in the Delta**

- 208 • **OBJECTIVE F3-1:** By 2022, develop guidelines and find lead implementation agency with executive sponsorship for “programmatic”  
209 regional permitting frameworks in the Delta.

210

211 **GOAL G: Develop mechanisms to secure long-term funding for continued conservation implementation and management.**

212 **Strategy G1: Utilize existing short-term state funding opportunities**

- 213 • **OBJECTIVE G1-1:** By 2018, update grant solicitation language for available state funding opportunities to directly tie Delta  
214 Conservation Framework goals to those funds.
- 215 • **OBJECTIVE G1-2:** By 2022, recognize the potential limitations of current funding programs, and work with policy staff on new bond  
216 language to support the Delta Conservation Framework

217 **Strategy G2: Develop long-term funding support for Delta conservation and adaptive management**

- 218 • **OBJECTIVE G2-1:** By 2022, develop a suite of 5-10 strategies to develop and secure long-term funding streams for continued  
219 implementation and management of conservation lands.

220 **Strategy G3: Develop tools to effectively publicize available funding opportunities**

- 221 • **OBJECTIVE G3-1:** By 2022, identify a lead organization and develop and maintain an ongoing information exchange and  
222 clearinghouse for available Delta conservation funding opportunities.

223

224 **Appendix II – Conservation Opportunity Areas**

225 **(Please access individual COR descriptions as separate pdfs on DCF website)**

226

227 COR overviews (*posted as separate pdfs*) provide individual, standalone summaries of conservation opportunity regions identified by 2016 Delta  
228 Conservation Framework workshop participants. These overviews should serve as resources for distribution to stakeholders or use within Regional  
229 Conservation Strategy partnership processes.

230 Appendix II includes the following COR overviews (*Please Note: East Contra Costa COR is still in development*):

- 231 • Yolo Bypass
- 232 • Central Delta Corridor
- 233 • Cache Slough Complex
- 234 • South Delta
- 235 • North Delta
- 236 • Suisun Marsh
- 237 • *East Contra Costa (still in development)*

238

239

## Appendix III – Bay Delta Conservation Plan

The Bay Delta Conservation Plan (BDCP) intended to improve Delta ecosystems by protecting and improving habitat linkages to promote the movement of native species; accommodating future sea level rise by providing transitional areas that allow future upslope establishment of tidal wetlands; allowing natural flooding to promote the regeneration of vegetation and related ecosystem processes; and connecting rivers and their floodplains to recharge groundwater, provide fish spawning and rearing habitat, and increase food supply. Examples of elements of the BDCP strategy to support natural communities included controlling invasive nonnative plant species, restoring or creating 5,000 acres of riparian forest and corridors of riparian vegetation along 20 miles of channel margin, restoring 2,000 acres of grassland, and protecting at least 20,000 acres of cultivated land to support suitable habitat for native species. The BDCP also planned to propose comprehensive programs for monitoring, research, and adaptive management.

The BDCP took a landscape-level processes approach, aiming to create a reserve system consisting of a mosaic of natural communities that would be adaptable to changing conditions (including sea level rise) to sustain populations of covered species and maintain or increase native biodiversity (BDCP 2013). The BDCP proposed to consider protection of specific habitat acreages with at least 31,000 acres of existing natural communities, and restoration or creation of at least 72,809 acres of natural communities, including at least 65,000 acres of tidally influenced natural communities.

The Delta Conservation Framework reflects these BDCP aims for improvement of Delta ecosystem function to benefit wildlife, yet it does not offer direct acreage targets beyond those already established through Biological Opinions for state and federal water project operations or other vetted planning documents, nor does it address the issue of providing a secure and reliable water supply that the California *WaterFix* initiative is undertaking. It specifically takes into account the majority of conservation measures outlined in the BDCP (BDCP 2013), incorporating into its overarching goals and strategies 14 of 22 BDCP conservation measures, as outlined in Table III.1 and the following narrative.

The Yolo Bypass Fisheries Enhancement conservation measure (CM2) was aimed at modifying the Yolo Bypass to increase the frequency, duration, and magnitude of floodplain inundation and improving access for covered fish species to this floodplain habitat. Strategies of 10 Delta Conservation Framework goals address CM2 (BDCP 2013) (see Table IV.1). Both CM3 and CM11 were focused on the establishment of a Delta reserve system through land acquisition for natural communities' protection and restoration (CM3) and through natural community enhancement and management (CM11), which would prepare and implement management plans for natural communities and covered species habitats throughout the reserve system. Instead of building a reserve system "top down," the Delta Conservation Framework is promoting the implementation of *Regional Conservation Partnerships* throughout the planning area, where ecosystem conservation in *Conservation*

*Opportunity Regions* is achieved “bottom up,” working in integrative partnerships with all interested stakeholders (Goals A and C). The Delta Conservation Framework, therefore, offers the overarching system-wide framework that connects these individual efforts with a direct link to the Delta Plan.

A number of BDCP conservation measures focused more specifically on the restoration of natural communities of various types, including: perennial aquatic, tidal mudflat, and tidal emergent wetlands along a contiguous gradient encompassing shallow subtidal aquatic, tidal mudflat, tidal marsh plain, and adjoining transitional upland natural communities as sea level rise accommodation space (CM4); seasonally inundated floodplains by breaching or setting back river levees (CM5); channel margin habitat by improving channel geometry and restoring riparian, marsh, and mudflat habitats on the inboard side of levees (CM6); riparian forest and scrub in association with restoration of tidal and floodplain areas and channel margin enhancements, to include the range of conditions necessary to support habitat for each of the riparian associated covered species (CM7); grassland natural community (CM8) and vernal pool complex and alkali seasonal wetland complex (CM9) in uplands near the Cache Slough complex, Clifton Court Forebay, or Suisun marsh region; and nontidal freshwater marsh and managed wetlands restored or created in the Yolo Bypass and northeastern Delta region around the Cosumnes/Mokelumne confluence (CM10). All of these conservation measures are addressed by Delta Conservation Framework Goals A, C, D, E, and G and associated strategies.

The remaining BDCP conservation measures are focused on remediation of various stressors, including minimizing conditions that promote production of methylmercury in restored areas and its subsequent introduction to the food web (CM 12) and the introduction and spread of invasive aquatic plant species (CM13). CM21 was to provide funding to remediate nonproject diversions (diversions of the natural surface waters in the Plan Area for purposes other than meeting the State Water Project and Central Valley Project water supply needs) that may cause entrainment of covered fish. These three conservation measures are covered by Delta Conservation Framework Goal A (Strategy A2); Goal C (Strategy C6); and Goals D, E, and G. CM 20 is addressed by Strategy D7. Other stressors highlighted in CMs 14-19 in the BDCP are not specifically addressed by the Delta Conservation Framework.

**Table III.1. Bay Delta Conservation Plan Draft Conservation Measures with Delta Conservation Framework Goals and Strategies**

Bay Delta Conservation Plan Draft Conservation Measures (CM)													
Delta Conservation Framework (DCF) Goals and Strategies	CM2	CM 3	CM 11	CM 4	CM 5	CM 6	CM 7	CM 8	CM 9	CM 10	CM 12	CM 13	CM 21
	Yolo Bypass Fisheries Enhancement	Natural Communities Protection and Restoration	Natural Communities Enhancement and Management	Tidal Restoration	Seasonally Inundated Floodplain Restoration	Channel Margin Enhancement	Riparian Restoration	Grassland Restoration	Vernal Pool and Alkali Seasonal Wetland Complex	Nontidal Marsh Restoration	Methyl-mercury Management	Invasive Aquatic Vegetation Control	Non-project Diversions
<i>GOAL A: Integrate regular stakeholder communication and socioeconomic considerations into Delta conservation planning, implementation, science, and adaptive management processes</i>													
<u>Strategy A1:</u> Utilize collaborative regional partnerships and regular coordinated forums to plan, implement, and manage conservation and evaluate progress													
<u>Strategy A2:</u> Align conservation practices with best practices for supporting Delta agriculture and community needs.													

DCF Goals and Strategies	CM2	CM 3	CM 11	CM 4	CM 5	CM 6	CM 7	CM 8	CM 9	CM 10	CM 12	CM 13	CM 21
<i><b>GOAL B: Support and expand existing public education programs and run state and national outreach campaigns focused on Delta values and ecosystem conservation</b></i>													
<u>Strategy B1:</u> Support and expand existing public education programs to include a focused curriculum on integrating agriculture, Delta communities, and ecosystem conservation that also communicates impending changes to resources and ecosystem services from climate change.													
<u>Strategy B2:</u> Continue support for the expansion and implementation of existing outreach and education campaigns to promote the Delta and the importance of multi-benefit conservation outcomes to a wide audience at both state and national levels.													

DCF Goals and Strategies	CM 2	CM 3	CM 11	CM 4	CM 5	CM 6	CM 7	CM 8	CM 9	CM 10	CM 12	CM 13	CM 21
<b>GOAL C: Develop multi-benefit conservation strategies and projects that balance environmental and human needs</b>													
<u>Strategy C1:</u> incorporate conservation goals with levee maintenance and flood management practices to provide habitat along Delta channels, river corridors, and riparian zones													
<u>Strategy C2:</u> Support sustainable, wildlife-friendly agriculture to provide additional wildlife and migratory bird habitats													
<u>Strategy C3:</u> Control and reverse land subsidence and support climate change mitigation efforts by implementing “carbon farming” projects, where plants sequester carbon and build up soils over time													

DCF Goals and Strategies	CM 2	CM 3	CM 11	CM 4	CM 5	CM 6	CM 7	CM 8	CM 9	CM 10	CM 12	CM 13	CM 21
<u>Strategy C4:</u> Advance state and local agency and stakeholder land management processes and procedures													
<u>Strategy C5:</u> Develop best management practices for assuring reliable water distribution for In-Delta uses and when implementing conservation													
<u>Strategy C6:</u> Integrate solutions for improving surface- and groundwater quality into conservation project planning and implementation													

DCF Goals and	CM 2	CM 3	CM 11	CM 4	CM 5	CM 6	CM 7	CM 8	CM 9	CM 10	CM 12	CM 13	CM 21
---------------	------	------	-------	------	------	------	------	------	------	-------	-------	-------	-------

Strategies													
<b>GOAL D: Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change</b>													
<b>Strategy D1:</b> Restore, enhance, and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging Regional Partnerships, in Regional Conservation Strategies to improve function and life history support for native and migratory wildlife													
<b>Strategy D2:</b> Through technical analyses conducted by given Regional Partnerships, identify and prioritize available areas to protect Delta ecosystems and transition zones with the potential for providing landscape connectivity and resiliency to ecosystem function													
<b>Strategy D3:</b> Improve the connectivity of ecosystems and associated wildlife populations at multiple scales													

DCF Goals and Strategies	CM 2	CM 3	CM 11	CM 4	CM 5	CM 6	CM 7	CM 8	CM 9	CM 10	CM 12	CM 13	CM 21
--------------------------	------	------	-------	------	------	------	------	------	------	-------	-------	-------	-------

<p><u>Strategy D4:</u> Create conditions conducive to meeting the goals in existing species recovery plans to maintain or improve the distribution and abundance of listed species supported by Delta ecosystems</p>														
<p><u>Strategy D5:</u> Implement conservation actions to improve ecosystem function and support a thriving aquatic food web in the Delta</p>														
<p><u>Strategy D6:</u> Support and coordinate proactive approaches for the early detection, rapid response, and long-term control and management of harmful invasive species</p>														
<p><u>Strategy D7:</u> Balance the benefits of conservation areas for human use with reduced adverse effects on Delta wildlife from human disturbance</p>												CM 20		

DCF Goals and Strategies	CM 2	CM 3	CM 11	CM 4	CM 5	CM 6	CM 7	CM 8	CM 9	CM 10	CM 12	CM 13	CM 21
<b>GOAL E: To evaluate conservation progress and address climate change stressors and other drivers of change, implement the Delta Science Program and Interagency Ecological program (IEP) science strategies, the adaptive management program for the Biological Opinions related to state and federal water project operations (AMP), and the California EcoRestore adaptive management program.</b>													
<u>Strategy E1:</u> Implement the priority research science actions and needs outlined in the Delta Science Strategy, the IEP science agenda, and Delta smelt and salmonid Resiliency Strategies													
<u>Strategy E2:</u> Utilize adaptive management, including coordinated, area-wide monitoring programs, as an integrated part of Delta conservation to assess progress and status and trends of resources of interest													
<u>Strategy E3:</u> Develop resources and recommended best practices to maintain or increase ecosystem and wildlife resiliency to projected climate change effects													

DCF Goals and	CM 2	CM 3	CM 11	CM 4	CM 5	CM 6	CM 7	CM 8	CM 9	CM 10	CM 12	CM 13	CM 21
---------------	------	------	-------	------	------	------	------	------	------	-------	-------	-------	-------

Strategies												
<b><i>GOAL F: Improve the capacity and approaches for permitting processes in the context of Delta conservation implementation.</i></b>												
Strategy F1: Directly engage with permitting agencies to find ways to improve the permitting process for conservation-related projects												
Strategy F2: Develop regional permitting guidelines for the Delta Conservation Opportunity Regions												
Strategy F3: Develop regional programmatic permits for conservation projects in the Delta												

DCF Goals and Strategies	CM 2	CM 3	CM 11	CM 4	CM 5	CM 6	CM 7	CM 8	CM 9	CM 10	CM 12	CM 13	CM 21
<i>GOAL G: Develop mechanisms to secure long-term funding for continued conservation implementation and management</i>													
Strategy G1: Utilize existing short-term state funding opportunities													
Strategy G2: Develop long-term funding support for Delta conservation and adaptive management													
Strategy G3: Develop tools for effectively broadcasting available funding opportunities													

## Conservation Measures as outlined in the BDCP Public Draft Executive Summary (BDCP 2013):

### **Water Flow**

- **CM2 Yolo Bypass Fisheries Enhancement** will modify the Yolo Bypass to increase the frequency, duration, and magnitude of floodplain inundation, and improve access for covered fish species to this floodplain habitat. These actions will improve passage and habitat conditions for Sacramento splittail (*Pogonichthys macrolepidotus*), Chinook salmon (*Oncorhynchus tshawytscha*), green sturgeon (*Acipenser medirostris*), white sturgeon (*A. transmontanus*), lamprey (*Petromyzontiformes*), and possibly steelhead (*O. mykiss irideus*).

### **Natural Communities Protection**

- **CM3 Natural Communities Protection and Restoration** will provide the mechanism and guidance to establish the reserve system by acquiring lands for protection and restoration. Such a system is needed to meet the biological goals and objectives addressed under the BDCP.
- **CM11 Natural Communities Enhancement and Management** will prepare and implement management plans for natural communities and covered species habitats throughout the reserve system

### **Natural Communities Restoration**

- **CM4 Tidal Natural Communities Restoration** will provide for the restoration of tidal perennial aquatic, tidal mudflat, and tidal emergent wetland natural communities in the restoration opportunity areas. Tidal natural communities will be restored along a contiguous gradient encompassing shallow subtidal aquatic, tidal mudflat, tidal marsh plain, and adjoining transitional upland natural communities. The transitional upland areas will accommodate up to approximately 3 feet of sea level rise and can function as tidal marsh plain at some future time.
- **CM5 Seasonally Inundated Floodplain Restoration** will breach or setback river levees and restore seasonally inundated floodplains that historically existed in the Plan Area but have been lost because of flood control and channelization.
- **CM6 Channel Margin Enhancement** will restore channel margin habitat by improving channel geometry and restoring riparian, marsh, and mudflat habitats on the inboard side of levees.
- **CM7 Riparian Natural Community Restoration** will restore riparian forest and scrub in association with restoration of tidal and floodplain areas and channel margin enhancements. Riparian forest and scrub will be restored to include the range of conditions necessary to support habitat for each of the riparian associated covered species.
- **CM8 Grassland Natural Community Restoration** will restore grassland natural community in Conservation Zones 1, 8, or 11.

- **CM9 Vernal Pool and Alkali Seasonal Wetland Complex Restoration** will restore vernal pool complex and alkali seasonal wetland complex in Conservation Zones 1, 8, or 11 to achieve no net loss of either vernal pool acreage or alkali seasonal wetland acreage from covered activities.
- **CM10 Nontidal Marsh Restoration** will restore or create nontidal freshwater marsh and managed wetlands in Conservation Zones 2 and 4.
- **CM12 Methylmercury Management** will minimize conditions that promote production of methylmercury in restored areas and its subsequent introduction to the food web, and to covered species in particular.
- **CM13 Invasive Aquatic Vegetation Control** will control the introduction and spread of invasive aquatic plant species.
- **CM21 CM 13** will provide funding to remediate nonproject diversions (diversions of the natural surface waters in the Plan Area for purposes other than meeting the State Water Project and Central Valley Project water supply needs) that may cause entrainment of covered fish.

#### **Other Stressors**

- **CM14 Stockton Deep Water Ship Channel Dissolved Oxygen Levels** will ensure that the Stockton Deep Water Ship Channel Aeration Facility will continue to operate as needed in order to maintain the concentrations of dissolved oxygen above target levels.
- **CM15 Localized Suppression of Predatory Fishes** will reduce the local effects of predators on covered fish species by removing structures that host predatory nonnative fishes, conducting predator control at hotspot locations, conducting an extensive research program to evaluate alternative predatory fish control strategies, and implementing those strategies in an adaptive management context.
- **CM16 Nonphysical Fish Barriers** will improve the survival of out-migrating juvenile salmon and steelhead by using nonphysical barriers (underwater lights, sound, and bubbles) to encourage juvenile fish to avoid channels and river reaches in which survival is lower than in alternate routes.
- **CM17 Illegal Harvest Reduction** will fund enforcement actions to reduce illegal harvest of Chinook salmon, Central Valley steelhead, green sturgeon, and white sturgeon in the Delta, bays, and upstream waterways.
- **CM18 Conservation Hatcheries** will establish new, and expand existing, conservation propagation programs for delta and longfin smelt (*Spirinchus thaleichthys* and *Hypomesus transpacificus*).
- **CM19 Urban Stormwater Treatment** will provide funding to support urban stormwater treatment measures that will result in decreased discharge of contaminants to the Delta.

- **CM20 Recreational Users Invasive Species Program** will reduce the risk of nonnative aquatic species proliferation in the Plan Area by supporting the California Department of Fish and Wildlife Watercraft Inspection Program in the Delta.

### *References*

BDCP (2013). Bay Delta Conservation Plan Public Draft (BDCP). Available:

<http://baydeltaconservationplan.com/EnvironmentalReview/EnvironmentalReview/2013-2014PublicReview/2013PublicReviewDraftBDCP.aspx>.

Accessed 6/2/16.

## Appendix IV – California *EcoRestore*

[California \*EcoRestore\*](#) is a five-year initiative through the California Natural Resources Agency to coordinate and help advance the protection, restoration, enhancement, and management of ecosystems in the Sacramento-San Joaquin Delta, the Yolo Bypass, and Suisun Marsh (Delta). Initiated in 2015, the goal of California *EcoRestore* is to initiate improvement of at least 30,000 acres via 25 critical Delta ecosystem restoration projects by 2020 (CNRA 2015, CNRA 2017). *EcoRestore* projects focus on protecting, enhancing, and reestablishing aquatic, subtidal, tidal, riparian, floodplain, and upland ecosystems to benefit fish, wildlife, and people into the future. Specifically, these projects are aimed at floodplain restoration, fish passage improvements, setback levees, subsidence reversal, carbon storage, and tidal marsh restoration. Based on science and guided by an adaptive management framework (IAMIT 2017), California *EcoRestore* aggressively pursues conservation projects with clearly defined acreage targets, political momentum, and financial resources to help ensure project initiation success by 2020. This includes:

- Habitat restoration projects for 25,000 acres associated with existing mandates for the recovery of listed species, pursuant to federal biological opinions related to the operation of the state and federal water projects (USFWS 2008, NMFS 2009). The state and federal water contractors operating the State Water Project and the Central Valley Project will exclusively provide funding for these projects to offset negative impacts of their operations on these listed species.
- Habitat enhancement projects for an additional 5,000 acres via public funding from Water Bond - Proposition 1 grants to local governments, nonprofit organizations, and other entities.

The projects that are tracked by the California *EcoRestore* program are listed below. They are at various stages of development from completed to conceptual (<http://resources.ca.gov/ecorestore/california-ecorestore-projects/>).

### *Construction completed:*

1. [Knights Landing Outfall Gate](#) - Fish passage
2. [Lindsey Slough](#) – Tidal restoration
3. [Sherman Island – Mayberry Farms Wetlands](#) – Subsidence reversal and carbon storage (USFWS 2008)
4. [Sherman Island – Whale’s Mouth Wetland](#) – Subsidence reversal and carbon storage
5. [Sherman Island Setback Levee-Mayberry Slough](#) – Setback levee
6. [Twitchell Island – East End Wetland](#) – Subsidence reversal and carbon storage

*2016/2017 Target construction start dates:*

7. [Decker Island Tidal Habitat Restoration](#) – Tidal restoration
8. [Dutch Slough Tidal Marsh Restoration Project](#) – Tidal restoration
9. [Fremont Weir Modification](#) - Fish passage
10. [Hill Slough](#) – Tidal restoration
11. [McCormack Williamson Tract Project](#) – Floodplain restoration
12. [Tule Red Restoration](#) – Tidal restoration
13. [Wallace Weir Modification](#) - Fish passage

*2018+ Target construction start dates:*

14. [Bradmoor Island](#) – Tidal restoration
15. [Goat Island](#) – Tidal restoration
16. [Grizzly Slough Floodplain Project](#) – Floodplain restoration
17. [Lisbon Weir](#) - Fish passage
18. [Lower Putah Creek Realignment](#)- Fish passage
19. [Lower Yolo Ranch](#)– Tidal restoration
20. [Prospect Island Tidal Habitat Restoration](#) – Tidal restoration
21. [Sherman Island – Belly Wetland Restoration](#) – Subsidence reversal and carbon storage
22. [Southport Levee](#) – Setback levee
23. [Twitchell Island – San Joaquin River Levee](#) – Setback levee
24. [Twitchell Island – West End Wetland](#) – Subsidence reversal and carbon storage
25. [Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project](#) – Floodplain restoration

*Conceptual:*

26. [Sherman Island – Future projects](#) – Palustrine emergent wetlands, upland and riparian habitats

*References*

CNRA (2015). Restoring the Sacramento-San Joaquin Delta Ecosystem. California Natural Resources Agency (CNRA), Sacramento, CA. Available: [http://resources.ca.gov/docs/ecorestore/ECO\\_FS\\_Overview.pdf](http://resources.ca.gov/docs/ecorestore/ECO_FS_Overview.pdf). Accessed June 10, 2016.

CNRA (2017). What is California EcoRestore? California Natural Resources Agency (CNRA), Sacramento, CA. Available: <http://resources.ca.gov/ecorestore/what-is-california-ecorestore/>. Accessed: January 26, 2017.

IAMIT (2017). EcoRestore Adaptive Management Program white paper - Draft 3/7/2017. Delta Stewardship Council, Interagency Adaptive Management Integration Team (IAMIT), Sacramento, CA. Available: <http://resources.ca.gov/ecorestore/wp-content/uploads/2017/04/2017-3-8-EcoRestore-Adaptive-Management-Program-White-Paper-v3-7-2017.pdf>. Accessed: August 23, 2017.

NMFS (2009). Endangered Species Act section 7 consultation and biological opinion: Proposed long-term operations of the Central Valley Project and State Water Project. National Marine Fisheries Service, Southwest Region (NMFS), Long Beach, CA. Memorandum 2008/09022.

USFWS (2008). Formal Endangered Species Act consultation and biological opinion: proposed coordinated operations of the Central Valley Project (CVP) and State Water Project (SWP). US Fish and Wildlife Service, California and Nevada Region (USFWS). Sacramento, CA. Memorandum 81420-2008-F-1418-5.

## Appendix V – Preliminary Goals for the Delta Plan Chapter 4

Table VI.1. Crosswalk of preliminary goals for the Delta Plan Chapter 4 amendment with the Delta Conservation Framework (DCF) goals/strategies/objectives.

Preliminary Goals for Delta Plan Chapter 4 Amendment	DCF Goals/Strategies/Objectives
<p>Landscape composed of diverse habitats, both terrestrial and aquatic</p>	<p><b>DCF Vision</b></p> <p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and improve conditions for species recovery.</p> <p><b>Strategy D1:</b> Restore, enhance and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging Regional Partnerships, in Regional Conservation strategies to improve function and life history support for resident and migratory wildlife.</p> <p><b>Strategy D2:</b> Through technical analyses conducted by given Regional Partnerships, identify and prioritize available areas to protect Delta ecosystems and transition zones with the potential for providing landscape connectivity and resiliency to ecosystem function.</p> <p><b>Strategy D3:</b> Improve the connectivity of ecosystems and associated wildlife populations at multiple scales</p> <p><b>Strategy D4:</b> Create conditions conducive to meeting the goals in existing species recovery plans to maintain or improve the distribution and abundance of listed species supported by Delta ecosystems</p> <p><b>Strategy D5:</b> Implement conservation actions to improve ecosystem function and support a thriving aquatic food web in the Delta</p> <p><b>Strategy D6:</b> Support and coordinate proactive approaches for the early detection, rapid response, and long-term control and management of harmful invasive species.</p> <p><b>Strategy D7:</b> Balance the benefits of conservation areas for human use with reduced adverse effects on Delta wildlife from human disturbance</p>
<p>Develop new or improved terrestrial habitats and protect existing terrestrial ecosystems and transition zones</p>	<p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and improve conditions for species recovery</p> <p><b>Strategy D1:</b> Restore, enhance and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging Regional Partnerships, in Regional Conservation Strategies to improve function and life history support for resident and migratory wildlife.</p> <ul style="list-style-type: none"> <li>• <b>OBJECTIVE D1-6:</b> Within 10-30 years, implement conservation actions to re-establish <b>tidal-terrestrial transition zones</b> to provide resilient habitats and life history support for wildlife.</li> <li>• <b>OBJECTIVE D1-7:</b> Within 10-30 years, implement conservation actions to restore <b>connected terrestrial ecosystems of the Delta</b> to provide resilient habitats and life history support for wildlife and migratory birds.</li> </ul>

Preliminary Goals for Delta Plan Chapter 4 Amendment	DCF Goals/Strategies/Objectives
<p>Develop new or improved terrestrial habitats and protect existing terrestrial ecosystems and transition zones</p>	<ul style="list-style-type: none"> <li>• <b>OBJECTIVE D1-8:</b> Within 10-30 years, implement conservation actions to expand <b>wildlife-friendly agriculture</b> and operate <b>managed wetland processes</b> to provide resilient habitat and foster life history support for healthy populations of native and migratory wildlife species.</li> <li>• <b>OBJECTIVE D1-9:</b> Within 10-30 years, implement conservation actions to integrate support for native wildlife into <b>urban areas</b> to provide supplementary habitat for certain species, increase wildlife connectivity, and provide opportunities for people to connect to nature.</li> </ul> <p><b>Strategy D2:</b> Through technical analyses conducted by given <i>Regional Partnerships</i>, identify and prioritize available areas to protect Delta ecosystems and transition zones with the potential for providing landscape connectivity and resiliency to ecosystem function.</p> <ul style="list-style-type: none"> <li>• <b>OBJECTIVE D2-1:</b> Within 5 years of implementation of a given <i>Regional Conservation Partnership</i>, identify and prioritize available areas for conservation of ecosystem types or processes that are most vulnerable to climate change and that also support climate vulnerable (and listed) species for inclusion in the <i>Regional Conservation Strategy</i>.</li> <li>• <b>OBJECTIVE D2-2:</b> Within 20 years of implementation of a given <i>Regional Conservation Strategy</i>, protect at minimum 25% of ecosystem types and transition zones prioritized therein as important for ecosystem connectivity and resiliency.</li> </ul> <p><b>Strategy D3:</b> Improve the connectivity of ecosystems and associated wildlife populations at multiple scales.</p> <ul style="list-style-type: none"> <li>• <b>OBJECTIVE D3-1:</b> By 2025, initiate projects to improve connectivity and meandering waterways along selected Delta rivers, sloughs, agricultural channels, or streams, and riverine and riparian migratory corridors for wildlife.</li> <li>• <b>OBJECTIVE D3-2:</b> By 2025, develop and initiate projects to remove barriers and improve connectivity along terrestrial (overland) movement corridors, including established migratory corridors for birds, and other wildlife.</li> <li>• <b>OBJECTIVE D3-3:</b> By 2025, develop and initiate projects to address priority actions to remove barriers and improve connectivity across transitional zones.</li> </ul>

Preliminary Goals for Delta Plan Chapter 4 Amendment	DCF Goals/Strategies/Objectives
<p>Conserve (protect, restore, enhance) diverse and biologically appropriate habitats and ecosystem processes</p>	<p><b>Goal C:</b> Develop multi-benefit focused conservation and land management solutions to balance environmental and human needs</p> <p><b>Strategy C1:</b> Incorporate conservation goals with levee maintenance and flood management practices to provide habitat along Delta channels, river corridors, and riparian zones.</p> <p><b>Strategy C2:</b> Support sustainable wildlife-friendly agriculture to provide additional wildlife and migratory bird habitats.</p> <p><b>Strategy C3:</b> Control and reverse land subsidence and support climate change mitigation efforts by implementing <i>carbon farming</i> projects where plants sequester carbon and build up soils over time.</p> <p><b>Strategy C4:</b> Advance state and local agency and stakeholder land management processes and procedures.</p> <p><b>Strategy C5:</b> Develop best practices for assuring reliable water distribution for in-Delta uses and when implementing conservation.</p> <p><b>Strategy C6:</b> Integrate solutions for improving surface- and groundwater quality into conservation project planning and implementation.</p> <p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change.</p> <p><b>Strategy D1:</b> Restore, enhance, and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging <i>Regional Partnerships</i>, in <i>Regional Conservation Strategies</i> to improve function and life history support for native and migratory wildlife.</p> <p><b>Strategy D2:</b> Through technical analyses conducted by given <i>Regional Partnerships</i>, identify and prioritize available areas to protect Delta ecosystems and transition zones with the potential for providing landscape connectivity and resiliency to ecosystem function.</p> <p><b>Strategy D3:</b> Improve the connectivity of ecosystems and associated wildlife populations at multiple scales.</p> <p><b>Strategy D4:</b> Create conditions conducive to meeting the goals in existing species recovery plans to maintain or improve the distribution and abundance of listed species supported by Delta ecosystems.</p> <p><b>Strategy D5:</b> Implement conservation actions to improve ecosystem function and support a thriving aquatic food web in the Delta.</p> <p><b>Strategy D6:</b> Support and coordinate proactive approaches for the early detection, rapid response, and long-term control and management of harmful invasive species.</p> <p><b>Strategy D7:</b> Balance the benefits of conservation areas for human use with reduced adverse effects on Delta wildlife from human disturbance.</p>
Preliminary Goals for Delta	DCF Goals/Strategies/Objectives

Plan Chapter 4 Amendment		
<p>Conserve (protect, restore, enhance) large areas of interconnected habitats within the Delta and its watershed</p>	<p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change.</p> <p><b>Strategy D1:</b> Restore, enhance, and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging <i>Regional Partnerships</i>, in <i>Regional Conservation Strategies</i> to improve function and life history support for native and migratory wildlife.</p> <p><b>Strategy D2:</b> Through technical analyses conducted by given <i>Regional Partnerships</i>, identify and prioritize available areas to protect Delta ecosystems and transition zones with the potential for providing landscape connectivity and resiliency to ecosystem function.</p> <p><b>Strategy D3:</b> Improve the connectivity of ecosystems and associated wildlife populations at multiple scales.</p>	
<p>Conserve (protect, restore, enhance) Delta Channels and River Corridors</p>	<p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change.</p> <p><b>Strategy D1:</b> Restore, enhance, and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging <i>Regional Partnerships</i>, in <i>Regional Conservation Strategies</i> to improve function and life history support for native and migratory wildlife.</p> <p><b>Strategy D2:</b> Through technical analyses conducted by given <i>Regional Partnerships</i>, identify and prioritize available areas to protect Delta ecosystems and transition zones with the potential for providing landscape connectivity and resiliency to ecosystem function.</p> <p><b>Strategy D3:</b> Improve the connectivity of ecosystems and associated wildlife populations at multiple scales.</p> <p><b>Strategy D4:</b> Create conditions conducive to meeting the goals in existing species recovery plans to maintain or improve the distribution and abundance of listed species supported by Delta ecosystems.</p> <p><b>Strategy D5:</b> Implement conservation actions to improve ecosystem function and support a thriving aquatic food web in the Delta.</p> <p><b>Goal C:</b> Develop multi-benefit focused conservation and land management solutions to balance environmental and human needs</p> <p><b>Strategy C1:</b> Incorporate conservation goals with levee maintenance and flood management practices to provide habitat along Delta channels, river corridors, and riparian zones.</p> <ul style="list-style-type: none"> <li>• <b>OBJECTIVE C1-1:</b> By 2022, identify and implement conservation opportunities for enhancing wildlife habitat along Delta channels, river corridors, and riparian zones in the context of flood management within regions identified by the 2017 Central Valley Flood Protection Plan (CVFPP) Conservation Strategy and in collaboration with the Delta Levee Habitat Advisory Committee.</li> </ul>	
<p>Preliminary Goals for Delta Plan Chapter 4</p>	<p>DCF Goals/Strategies/Objectives</p>	

Amendment	
<p>Develop a comprehensive approach for conservation (protect, restore, enhance) of functional corridors for migratory species</p>	<p><b>Goal C:</b> Develop multi-benefit focused conservation and land management solutions to balance environmental and human needs  <b>Strategy C1:</b> Incorporate conservation goals with levee maintenance and flood management practices to provide habitat along Delta channels, river corridors, and riparian zones.  <b>Strategy C2:</b> Support sustainable wildlife-friendly agriculture to provide additional wildlife and migratory bird habitats.</p> <p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change.  <b>Strategy D1:</b> Restore, enhance, and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging <i>Regional Partnerships</i>, in <i>Regional Conservation Strategies</i> to improve function and life history support for native and migratory wildlife.  <b>Strategy D2:</b> Through technical analyses conducted by given <i>Regional Partnerships</i>, identify and prioritize available areas to protect Delta ecosystems and transition zones with the potential for providing landscape connectivity and resiliency to ecosystem function.  <b>Strategy D3:</b> Improve the connectivity of ecosystems and associated wildlife populations at multiple scales.</p>
<p>Develop a comprehensive approach for conservation (protect, restore, enhance) of Delta channels</p>	<p><b>Goal C:</b> Develop multi-benefit focused conservation and land management solutions to balance environmental and human needs  <b>Strategy C1:</b> Incorporate conservation goals with levee maintenance and flood management practices to provide habitat along Delta channels, river corridors, and riparian zones.</p> <ul style="list-style-type: none"> <li>• <b>OBJECTIVE C1-1:</b> By 2022, identify and implement conservation opportunities for enhancing wildlife habitat along Delta channels, river corridors, and riparian zones in the context of flood management within regions identified by the 2017 Central Valley Flood Protection Plan (CVFPP) Conservation Strategy and in collaboration with the Delta Levee Habitat Advisory Committee.</li> </ul>

Preliminary Goals for Delta Plan Chapter 4 Amendment	DCF Goals/Strategies/Objectives
Develop a comprehensive approach for conservation (protect, restore, enhance) of Delta channels	<p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change.</p> <p><b>Strategy D1:</b> Restore, enhance, and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging <i>Regional Partnerships</i>, in <i>Regional Conservation Strategies</i> to improve function and life history support for native and migratory wildlife.</p> <ul style="list-style-type: none"> <li>• <b>OBJECTIVE D1-1:</b> Within 10-30 years, implement conservation actions to reestablish <b>fluvial processes</b> along streams to provide resilient habitat and foster life history support for healthy populations of resident and anadromous fish and other wildlife species.</li> <li>• <b>OBJECTIVE D1-2:</b> Within 10-30 years, implement conservation actions to reestablish <b>functional channels and connections between streams and tidal floodplains</b> for support of resident and migratory aquatic species.</li> </ul>
Develop a comprehensive approach for conservation (protect, restore, enhance) of Migratory Bird Habitat Expansion and Improvement	<p><b>Goal C:</b> Develop multi-benefit focused conservation and land management solutions to balance environmental and human needs</p> <p><b>Strategy C2:</b> Support sustainable wildlife-friendly agriculture to provide additional wildlife and migratory bird habitats.</p> <p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change.</p> <p><b>Strategy D1:</b> Restore, enhance, and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging <i>Regional Partnerships</i>, in <i>Regional Conservation Strategies</i> to improve function and life history support for native and migratory wildlife.</p> <p><b>Strategy D2:</b> Through technical analyses conducted by given <i>Regional Partnerships</i>, identify and prioritize available areas to protect Delta ecosystems and transition zones with the potential for providing landscape connectivity and resiliency to ecosystem function.</p> <p><b>Strategy D3:</b> Improve the connectivity of ecosystems and associated wildlife populations at multiple scales.</p>

Preliminary Goals for Delta Plan Chapter 4 Amendment	DCF Goals/Strategies/Objectives
Protect, restore, enhance, and adaptively manage existing habitat to avoid a net loss of high-quality habitat	<p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change.</p> <p><b>Strategy D1:</b> Restore, enhance, and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging <i>Regional Partnerships</i>, in <i>Regional Conservation Strategies</i> to improve function and life history support for native and migratory wildlife.</p> <p><b>Strategy D2:</b> Through technical analyses conducted by given <i>Regional Partnerships</i>, identify and prioritize available areas to protect Delta ecosystems and transition zones with the potential for providing landscape connectivity and resiliency to ecosystem function.</p> <p><b>Strategy D3:</b> Improve the connectivity of ecosystems and associated wildlife populations at multiple scales.</p>
Increase high-quality migratory bird habitat to support viable populations of native resident and migratory bird species	<p><b>Goal C:</b> Develop multi-benefit focused conservation and land management solutions to balance environmental and human needs</p> <p><b>Strategy C2:</b> Support sustainable wildlife-friendly agriculture to provide additional wildlife and migratory bird habitats.</p> <p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change.</p> <p><b>Strategy D1:</b> Restore, enhance, and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging <i>Regional Partnerships</i>, in <i>Regional Conservation Strategies</i> to improve function and life history support for native and migratory wildlife.</p> <p><b>Strategy D2:</b> Through technical analyses conducted by given <i>Regional Partnerships</i>, identify and prioritize available areas to protect Delta ecosystems and transition zones with the potential for providing landscape connectivity and resiliency to ecosystem function.</p> <p><b>Strategy D3:</b> Improve the connectivity of ecosystems and associated wildlife populations at multiple scales.</p>
Offer direct connection with wildlife-friendly farming (e.g., rice farming for waterbirds, flooded corn fields for cranes, irrigated pasture for Swainson’s hawk)	<p><b>Goal C:</b> Develop multi-benefit focused conservation and land management solutions to balance environmental and human needs.</p> <p><b>Strategy C2:</b> Support sustainable wildlife-friendly agriculture to provide additional wildlife and migratory bird habitats.</p> <ul style="list-style-type: none"> <li>• <b>OBJECTIVE C2-1:</b> By 2019, create a common understanding of science-based wildlife-friendly agricultural practices and their potential benefits to wildlife in the Delta.</li> </ul>

	<ul style="list-style-type: none"><li>• <u>OBJECTIVE C2-2</u>: By 2022, utilize existing incentives (including agricultural conservation easements) and develop new incentives, such as <i>Habitat Exchange</i> programs run by nongovernmental organizations or state agency-run funding programs, to support wildlife-friendly farming conservation projects in the Delta.</li><li>• <u>OBJECTIVE C2-3</u>: By 2019, appoint a local farmer <i>Ombudsman</i> for all Delta counties to provide outreach and support to willing agricultural practitioners and landowners about economic and other incentives to help expand wildlife-friendly agriculture in the Delta.</li></ul>
--	---

Endangered Species Recovery	DCF Goals/Strategies/Objectives
<p>Create conditions conducive to meeting or exceeding the goals in existing species recovery plans to support viable populations of native resident and migratory species.</p>	<p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change.</p> <p><b>Strategy D4:</b> Create conditions conducive to meeting the goals in existing species recovery plans to maintain or improve the distribution and abundance of listed species supported by Delta ecosystems.</p> <ul style="list-style-type: none"> <li>• <b>OBJECTIVE D4-1:</b> By 2024, implement all recommendations in the Delta smelt and Sacramento Valley salmon resiliency strategies to support the recovery of these listed species.</li> <li>• <b>OBJECTIVE D4-2:</b> By 2050, reestablish Delta ecosystem functional processes according to recommendations in species recovery plans to achieve measurable improvements in conditions that support the distribution and abundance of a majority of listed species in the Delta.</li> </ul>
<p>Establishing migratory corridors for fish, birds, and other animals along selected Delta channels, including rivers, sloughs, agricultural channels, and streams.</p>	<p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change.</p> <p><b>Strategy D1:</b> Restore, enhance, and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging <i>Regional Partnerships</i>, in <i>Regional Conservation Strategies</i> to improve function and life history support for native and migratory wildlife.</p> <ul style="list-style-type: none"> <li>• <b>OBJECTIVE D1-1:</b> Within 10-30 years, implement conservation actions to reestablish <b>fluvial processes</b> along streams to provide resilient habitat and foster life history support for healthy populations of resident and anadromous fish and other wildlife species.</li> <li>• <b>OBJECTIVE D1-2:</b> Within 10-30 years, implement conservation actions to reestablish <b>functional channels and connections between streams and tidal floodplains</b> for support of resident and migratory aquatic species.</li> </ul>
<p>Restore Delta flows and channels to support a healthy estuary and other ecosystems.</p>	<p><b>Goal C:</b> Develop multi-benefit focused conservation and land management solutions to balance environmental and human needs.</p> <p><b>Strategy C5:</b> Develop best practices for assuring reliable water distribution for in-Delta uses and when implementing conservation.</p> <ul style="list-style-type: none"> <li>• <b>OBJECTIVE C5-1:</b> By 2022, develop a suite of 5-10 best practices to help preserve reliable in-Delta water supplies when implementing conservation projects.</li> </ul>

Endangered Species Recovery	DCF Goals/Strategies/Objectives
<p>Promoting self-sustaining, diverse populations of native and valued species by reducing the risk of take and harm from invasive species.</p>	<p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change.</p> <p><b>Strategy D6:</b> Support and coordinate proactive approaches for the early detection, rapid response, and long-term control and management of harmful invasive species.</p> <ul style="list-style-type: none"> <li>• <b>OBJECTIVE D6-1:</b> By 2020, increase support for Delta county weed management areas and California State Parks Division of Boating and Waterways, to prioritize implementation of area-wide control of problematic invasive species.</li> <li>• <b>OBJECTIVE D6-2:</b> By 2030, double the current level of early detection and management of invasive species of concern in the Delta, to reduce negative impacts on ecosystem function, special status species, and Delta community interests and increase ecosystem resilience.</li> </ul>
<p>Restore Delta flows and channels to support a healthy estuary and other ecosystems.</p>	<p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change.</p> <p><b>Strategy D1:</b> Restore, enhance, and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging <i>Regional Partnerships</i>, in <i>Regional Conservation Strategies</i> to improve function and life history support for native and migratory wildlife.</p> <ul style="list-style-type: none"> <li>• <b>OBJECTIVE D1-1:</b> Within 10-30 years, implement conservation actions to reestablish <b>fluvial processes</b> along streams to provide resilient habitat and foster life history support for healthy populations of resident and anadromous fish and other wildlife species.</li> <li>• <b>OBJECTIVE D1-2:</b> Within 10-30 years, implement conservation actions to reestablish <b>functional channels and connections between streams and tidal floodplains</b> for support of resident and migratory aquatic species.</li> </ul>
<p>Improve water quality in the context of conservation projects.</p>	<p><b>Goal C:</b> Develop multi-benefit focused conservation and land management solutions to balance environmental and human needs.</p> <p><b>Strategy C6:</b> Integrate solutions for improving surface- and groundwater quality into conservation project planning and implementation.</p> <ul style="list-style-type: none"> <li>• <b>OBJECTIVE C6-1:</b> By 2022, integrate and/or expand existing best practices for improved water quality into conservation projects, where appropriate, with focus on both surface- and groundwater.</li> </ul>

Other Themes Addressed by DCF	DCF Goals/Strategies/Objectives
Adaptive Management	<p><b>Goal E:</b> To evaluate conservation progress and address climate change stressors and other drivers of change, implement the Delta Science Program and Interagency Ecological Program (IEP) science strategies, the adaptive management program for Biological Opinions related to state and federal water project operations (AMP), and the California <i>EcoRestore</i> adaptive management program.</p> <p><b>Strategy E2:</b> Utilize adaptive management, including coordinated, area-wide monitoring programs, as an integrated part of Delta conservation to assess progress and status and trends of resources of interest.</p> <ul style="list-style-type: none"> <li>• <b>OBJECTIVE E2-1:</b> By 2018, implement actions outlined by the AMP and California <i>EcoRestore</i> Adaptive Management Program and coordinated monitoring programs such as the Tidal Wetland Monitoring Framework (IEP 2017).</li> </ul>
Climate Change Resilience	<p><b>Goal E:</b> To evaluate conservation progress and address climate change stressors and other drivers of change, implement the Delta Science Program and Interagency Ecological Program (IEP) science strategies, the adaptive management program for Biological Opinions related to state and federal water project operations (AMP), and the California <i>EcoRestore</i> adaptive management program.</p> <p><b>Strategy E3:</b> Develop resources and recommended best practices to maintain or increase ecosystem and wildlife resiliency to projected climate change effects.</p> <ul style="list-style-type: none"> <li>• <b>OBJECTIVE E3-1:</b> By 2019, develop a suite of recommended best practices to maintain or increase ecosystem and wildlife resiliency to projected climate change effects in the Delta.</li> <li>• <b>OBJECTIVE E3-2:</b> By 2022, implement and evaluate the effectiveness of best practices to maintain or increase ecosystem and wildlife resiliency to projected climate change effects, including sea-level rise, salinity intrusion, precipitation and temperature changes, and extreme weather events.</li> </ul>
Integration of Conservation with Human Dimension - Delta Community	<b>Goals A-C</b> – all strategies and objectives
Permitting for Conservation	<b>Goal F</b> – all strategies and objectives
Funding for Conservation	<b>Goal G</b> – all strategies and objectives

## Appendix VI – Delta Conservation Framework 2016 Workshop Series

The 2016 Delta Conservation Framework workshop series provided stakeholder input on the development of the first draft of this document. Summaries of feedback from stakeholders who attended the workshops are provided in this appendix. Lists of workshop participants are also included.

A set of topics was presented to participants at each workshop. During Workshops 1 through 3, participants were asked a set of focus questions to discuss each topic within small groups, and draft documents or maps were provided to the participants to facilitate the discussions. Small groups contained participants representing different types of stakeholders; for example, agency staff, local residents or representatives, agricultural or commercial interests, nongovernmental organization staff, and academic students or faculty could have comprised a single group. Workshop 4 was held for two days. The format for Workshop 4 was to provide a forum of open discussion on potential *Conservation Opportunity Regions* and the Delta Conservation Framework in general. Group comments were recorded and are summarized below.

### *Workshop 1 – August 18, 2016*

#### *Focus Topics*

Topics for Workshop 1 included the Delta Conservation Framework vision, purpose, and guiding principles. It also addressed challenges to conservation in the Delta and potential solutions. Focus questions presented to the participants regarding the vision, purpose, and principles were:

- 1) What are your three main goals for the Delta for the next 25 years? Are these reflected in the purpose and vision statements?
- 2) Do you agree with the set of principles guiding the Delta Conservation Framework? What is missing?
- 3) Do you have concerns regarding conservation in the Delta? If so, what are they? What are factors that in your view need to be balanced?
- 4) In your view, how should this document best be used? Please refer to items in the purpose statement for suggestions.

For the second half of the workshop, participants were asked to come up with at least one challenge to conservation that was missing from the list provided. They were then asked the following questions:

- 1) In your view, what are the five most important strategies/opportunities for improvement:
  - a. for the Delta as a system that supports people and wildlife?
  - b. for the implementation of conservation programs/projects?
- 2) What are other potential solutions or challenges that should be incorporated into the document to address listed and added challenges?
- 3) Please list three to five actual examples of any of the solutions—planned or implemented.
- 4) List ideas of conservation opportunities relevant to the challenges and potential solutions discussed.

### *Summary of Responses – Vision, Purpose, and Guiding Principles*

#### *Vision:*

- 1) Tighten and focus wording with clear, focused statements.
- 2) Multi-benefit terminology is not accessible. Use terms such as “natural variation,” “enhanced”, “mosaic of working landscape”, or “resilient”.
- 3) Don't limit the vision to a 25-year span; it should be longer.
- 4) Add environmental education, and add conformance with and advancement of the Water Action Plan.
- 5) Emphasize the importance of facilitating and maximizing broad community buy-in.
- 6) Define "resilience" beyond 25 years, including an eye toward the future.
- 7) Consider local water supply issues in terms of flows for people and wildlife/fish. Water quality means different things to different people
- 8) Recognize the challenges of recreation, such as bringing in too many people.
- 9) The vision is ambitious; is it achievable? Build and expand what's achievable at the local scale rather than set high goals. Focus on a “robust, healthy, and viable” delta.
- 10) Recognize the Delta as an interconnected landscape, and capture the Delta as part of a larger system with other Delta uses, such as in the Central Valley and the watershed.
- 11) Levee goals will be very challenging but have great potential. Flood management objectives need to be part of the vision.
- 12) Multi-benefit projects are not always possible; acknowledge trade-offs of individual project values and constraints. Recognize where one project may balance the effect of another.
- 13) Clarify what is meant by "communities," and differentiate local communities from a single Delta community.

*Purpose:*

- 1) The purpose should lead to improved implementation cost, cost-sharing, streamlined planning, and permitting.
- 2) “Opportunities” are not specific enough and do not go far enough. Involve locals within a specific forum.
- 3) Prioritization within projects will lead to implementation.
- 4) Address long-term maintenance, management, and monitoring of conservation lands, including funding challenges.
- 5) The purpose of the process is to build community, relationships, and communication; the process is where the value is.
- 6) Link vision and purpose statements (such as community, flood, etc.).
- 7) Justify future funding to gain positive support for new grant programs.
- 8) Condense and combine the long list to focus on “why” and “how”, who it serves, what it provides, and how the Delta Conservation Framework should be used.
- 9) How does the Delta Conservation Framework fit with state and federal plans and dovetail with local (county) plans? How is it consistent with federal regulations?
- 10) Strengthen the goal of solving challenges, not just recognizing them. Focus on solutions for common problems for restoration (e.g., permitting).
- 11) There needs to be a goal statement for the Delta Conservation Framework.
- 12) Clarify who manages lands for outdoor recreation and access for monitoring or research.
- 13) Where there are challenges with integrating habitat on levees, separate levee improvement and habitat projects.

*Principles:*

- 1) Consider how to tie all of the components together more tightly; pull out the main principles and get more specific in later chapters.
- 2) Overstress the importance of *Delta as a place*; it needs to be stronger and more comprehensible.
- 3) Incorporate the *Good Neighbor Checklist* and concept throughout the framework. Mitigate impacts to neighbors; ensure this is embedded in actions and a good-faith effort.
- 4) Consider multi-benefit elements for projects. Consider regional to site-specific projects, as well as facilitating, streamlining, and grouping projects.
- 5) Principles are missing emphasis on a multi-stressor approach, such as food availability and life stage stressors of species, predation, and water quality.
- 6) Add economics as a local driver.
- 7) Recognize local dynamics of cultural elements.

- 8) Add more on invasive species, not just invasive weeds. Some invasive species may have benefits.
- 9) Communication is important. Use technology for the public to access planning documents (goals, objectives, planning) and for understanding terminology and how they interrelate.
- 10) Recognize existing landscapes and what is in the Delta now to achieve comprehensive planning. Consider how actions will affect people and their livelihoods.
- 11) Prioritize public and existing mitigation lands for conservation and restoration to take pressure off of the private landowners and counties.
- 12) Strongly clarify that we cannot restore the Delta to historic conditions. Clarify the baseline when referencing historic ecology.
- 13) Adaptive management should include managing for land uses other than ecosystem restoration and protection.
- 14) Consider a multi-jurisdictional approach with clear contacts. Upper Yolo Bypass is a good example.

### *Summary of Responses – Challenges and Potential Solutions*

- 1) For climate change adaptation, don't wait until it's too late. Address solutions incrementally over time for less of an economic hit (e.g., slowly building up levees). Refer to examples regarding climate change responses and levees, such as Section 3.8 of the Central Valley Flood Protection Plan (CVFPP) and Delta levee reports (DISB, DSC, or PPIC).
- 2) There needs to be integration of flood management, conservation, and existing uses. One solution is to reuse dredge materials for ecosystem restoration and levee maintenance; however, challenges of permitting, cost, and landowner coordination need to be resolved. Examples of dredge re-use projects include Antioch Dunes and Winter Island.
- 3) When integrating flood management and conservation, there are different regulatory authorities and a focus on species. Consider ecosystem function in the context of CESA and ESA.
- 4) Outreach to stakeholders has not been effective. Stakeholders are having a hard time keeping track of planning processes; outreach is not reaching everyone. A website is not enough (some don't have internet). Do not conduct planning processes and meetings in a vacuum or silo; use stakeholders as a building block, not just through outreach. Local engagement could be through county administration, the Natural Resources Conservation Service (NRCS), agricultural commissioners, local reclamation districts (RD), or RD board members (leaders in the community) participating in planning meetings.
- 5) Make planning multi-objective and multi-jurisdictional. For Delta planning relationships, put together a planning “congress” for outreach, with official representation of local farmers and residents. The Yolo Bypass and Cache Slough Partnerships are examples of good coordination between state, federal, and local stakeholders.
- 6) There needs to be a common vision, including the vision of Delta residents.

- 7) Create a common process, including meetings of various forums, for people to know what to expect. Streamline planning processes, break them down, and simplify. Determine the pathway for Delta community members to get their vision to the agencies; for example, direct conversations between local representatives and agency staff or putting RD representatives on mailing lists for planning processes.
- 8) Planning can be fragmented. There are different needs for different land or water uses (e.g., ecosystem conservation, flood planning, local jurisdictions, endangered species acts, water storage, planning for San Francisco Bay), and some planning needs can be barriers to others. Determine how overall planning can help individual projects.
- 9) Ensure economic vitality and viability in the Delta. Recognize there are other industries in the Delta besides agriculture.
- 10) Permitting requirements for projects are often inconsistent and usually require a “VIP” government sponsor to push the permitting process through in a timely manner, which is not an optimal approach. Potential solutions include: expanding mitigation banks and making them more affordable, providing funding for dedicated agency staff, bringing regulators and experts together in regular meetings, creating a permitting ombudsman, developing a permitting guide book for access online, creating a MOU or joint work plan, building permitting into the project cost, clarifying regulatory processes and timelines to maximize efficiency, summarizing lessons learned from past projects, and using a regional approach. Impact mitigation could be consolidated through self-mitigating projects that acknowledge species’ life cycles.
- 11) To address the challenges with providing resources for long-term management and monitoring of restoration sites, solutions could be: different entities managing the land, creating endowments as part of mitigation early in the process, revisiting (researching) water rights uncertainties, setting up more preserves that include working lands and building those partnerships (for example, Cosumnes River Preserve), linking to existing collaboratives (e.g., “friends” groups), and utilizing citizen science to help with monitoring. Recognize that easements are a tool that should not always be used. For example, success of the *Arundo* removal project was achieved by a private landowner’s regular operation and maintenance activities.
- 12) When planning for resources, be aware of demands on agency staff and unfunded mandates.
- 13) Long-term support for funding and resources at a regional scale, beyond bond terms, is needed. Agency/regulatory processes limit creativity and flexibility. There are constraints on bond language. There needs to be clear bond language for flexible solutions; incentives for agricultural practices; and broad support, from all sides, of a consistent message that short- and long-term funding is needed. One idea is to use the General Fund, since ecosystem conservation is a public benefit. Use the Natural Resources Agency or higher level in state government as a lead/central agency, and use agency contracting with existing entities (such as conservancies or NGOs). Consolidate a list of funding opportunities.
- 14) Challenges with flow requirements and water management include challenges to monitoring; such as knowing what kind of monitoring to do and what the requirements are (i.e., from the Regional Water Quality Control Board), who will do it, how or if it will be funded, permitting, what the scope and function is of the project, and what to do with the data (for example, how are the data managed and how will they be useable for decision making).

- 15) Potential solutions to the challenge of invasive species include working with agencies with experience and data (e.g., Boating and Waterways) and other groups doing the work; reaching out and leveraging partner resources (such as data and equipment); and considering how to keep invasive species out with project design. To control invasive species after restoration projects are constructed, utilize adaptive management and early action, such as monitoring and recognizing invasive species' limitations and trends.
- 16) Potential solutions to integrating Delta community goals and building local support, including conflicting land uses, are to: invest in talking to locals about their needs and strengths, provide benefits to the community and minimize impacts on them, engage the community in the process, understand local interests by supporting socioeconomic research (e.g., long-term trends in agriculture), determine how to balance or incorporate community uses with conservation based on natural sciences, and weigh long-term goals with short-term impacts.
- 17) Communication across interests (local, state, and federal) is a challenge; there is a lot going on in the Delta. There is a need for coordination. Break out of traditional roles and assumptions, redefine relationships, empower others, and reconcile different objectives. Increase coordination through a process like the Delta Conservation Framework to identify challenges, address what is going on in the Delta, and increase opportunities. Increase education and alignment to address a universal lack of understanding regarding species recovery. Perfecting the art of broad buy-in requires ego management and humility to transcend our own limitations and engage in nontraditional partnerships.
- 18) Missing challenges include conservation in the context of existing infrastructure, working with large projects with regulatory constraints, and considering the larger planning context for projects. To move projects forward, utilize budget scoping, implement smaller pieces with larger planning efforts in mind, phase projects, and use adaptive management from the beginning to address uncertainties.
- 19) When planning projects, preserve access to local water supplies for local agriculture.
- 20) Conflicts between existing plans or processes may result from cross-pollination or too many dispersed planning efforts, groups, and meetings. Understand interactions and conflicts between existing plans and processes. Consolidate and build broader local and agency support, and support existing stakeholder groups.
- 21) Building local support should be broader, at statewide, federal, and legislative levels. Keep Tahoe Blue and "save water" groups are examples of building broader local support. Think big more than local.

### *Workshop 1 Participants*

Amanda Bohl	Delta Stewardship Council (DSC)
Anitra Pawley	Department of Water Resources (DWR)
Blake Roberts	Delta Protection Commission (DPC)
Brett Milligan	University of California, Davis
Brooke Jacobs	California Department of Fish and Wildlife (CDFW)
Campbell Ingram	Sacramento-San Joaquin Delta Conservancy (SSJDC)
Cassandra Enos	DSC

Charlotte Biggs	DWR
Cindy Messer	DWR
Clark Blanchard	CDFW
Daniel Huang	DSC
Darcy Austin	DSC - Delta Science Program
Dave Contreras	CDFW
Don Thomas	Sacramento County Water Agency
Doug Brown	Douglas Environmental
Erik Vink	DPC
Greg Yarris	Central Valley Joint Venture (CVJV)
Hildie Spautz	CDFW
Jeff Stoddard	CDFW
Jessica Davenport	DSC
Judah Grossman	The Nature Conservancy (TNC)
Kathryn Hyatt	SSJDC
Kris Tjernell	Natural Resources Agency
Laura Simonek	Metropolitan Water District
Martha Ozonoff	Yolo Basin Foundation
Michael Perrone	DWR
Nate Hershey	MBIC Engineers
Ramona Swenson	Environmental Science Associates
Randi Logsdon	CDFW
Roberta Goulant	Solano County
Robin Kulakow	Yolo Basin Foundation
Robin McGinnis	DWR
Rogene Reynolds	South Delta Landowner
Ron Melcer	DWR
Ryan Carrothers	CDFW
Ryan Luster	TNC
Sakura Evans	CDFW
Scott Cantrell	CDFW
Steve Gonzales	CDFW
Tara Beltran	State and Federal Water Contractors Agency
Terri Gaines	DWR

## *Workshop 2 – September 21, 2016*

### *Focus Topics*

Topics for Workshop 2 included 1) conservation topics and related goals; and 2) developing focus-specific implementation strategies: linking conservation topics and goals to potential challenges/solutions from Workshop 1. Focus questions for conservation topics and goals included:

- 1) Which conservation topic is missing?
- 2) Which goals are missing from each topic?
- 3) Are there any conflicting goals?
- 4) Rank goals for each conservation topic by discussing and considering the following criteria (0=not at all; 1= somewhat; 2=yes):
  - a. Is the goal linked to the conservation topic?
  - b. Is the goal measurable?
  - c. Is the goal time limited?
  - d. Is the goal specific?

Focus questions for specific implementation strategies included:

- 1) Do the outlined goals-challenges/solution-specific implementation strategy links make sense? What needs to be changed? Added?
- 2) What are actual examples of any of these strategies you know of that could be included in the document? These do not have to be Delta specific examples.
- 3) Rank strategies for each topic by discussing and considering the following criteria (0=no/low; 1= maybe/medium; 2=yes/high):
  - a. What is the likelihood the strategy will be successful?
  - b. What is the feasibility and appropriateness of the strategy?
  - c. What is the likely cost of the strategy?
  - d. Are there existing gaps the strategy would address?

### *Summary of Responses – Conservation Topics and Related Goals*

- 1) There are a lot of goals, and they are overwhelming and complex. Streamline or consolidate to four or five. A lot of jargon was used and too many qualifiers; identify broad topics and provide more information. It reads like a laundry list that is too large to foster.
- 2) If we're trying to integrate with Delta residents, how can we make this document usable? How is this different/better than other efforts? How else is the plan going to help or be useful? How do we bring landowners on board?
- 3) Although the goals lack acreage targets, this is a weakness. The public will be suspicious and left wondering about the end point. Focus conservation on public lands first and adaptively manage with the locals.
- 4) Summarize goals and organize them more effectively. We need individual, specific goals. Optimize them more than maximize. Use SMART goals.
- 5) Goals are missing natural stressors and human pressures related to ecosystem function; for example, Delta inflow and predation pressure. Missing conservation subtopics include food webs, flow (including quantity, landscape configuration, and timing), public access (direct and managed), and Delta woody riparian.
- 6) Consolidate water flows with water quality goals.
- 7) Balance short-term conflicts with long-term benefits. For example, "sustained migratory bird habitats" should include goals of enhancing fish and wildlife habitat and enhancing connectivity. There are potential conflicts in specific areas, but general expansion will benefit all in the long term.
- 8) Address permitting issues, such as including subtopics of funding and permitting/regulation assurances. Include goals for agricultural neighbors, developing approaches to function through ESA and CESA, establishing a permit ombudsman, and considering permits for nonmitigation.
- 9) There is substantial overlap among subtopics and redundancy. Highlight where overlap is necessary.
- 10) For community integration, include a goal to maintain the rural character of the Delta--Delta as a place.
- 11) The goal of native species dominating natural communities may be too ambitious; focus more on processes.
- 12) Under the subtopic of landscape dynamics, merge the goal with those for climate change--habitat evolution, sea level rise, and salinity intrusion.
- 13) Provide a goal for anticipatory adaptive management.
- 14) For aquatic weeds, focus more on management, money, agriculture infrastructure, and ditches; beneficial re-use; and research. For example, add a goal to manage invasive weeds to improve boating access.
- 15) Examples of conflicting goals include invasive species management with water quality and native species habitat quality and increasing tidal marsh habitat for fish at the expense of migratory bird habitat.

- 16) Add a goal for enhancing flood-compatible agriculture.
- 17) Include a goal for institutional improvements to permitting and other regulatory issues.
- 18) Engage landowners and provide local benefits to help with implementation. Ask what the community goals and local values are. Integrate community action plans.
- 19) What does wildlife friendly mean? An alternative term is "conservation minded."
- 20) Balance water quality goals with water supply; for example, working with flow, where to add more nutrients, and to whom the water belongs.
- 21) Public engagement means involvement, consideration, due process, integration, explanation (why?), adapting, and a mechanism to continue engagement beyond planning—e.g., “close the loop.” In order to achieve this, government agencies need to build a collaborative bureaucracy.
- 22) Establish multidisciplinary teams--break out of silos.
- 23) Adaptive process: Use research and monitoring to inform goals.
- 24) A good goal is for sustainable funding for long-term and adaptive management of conservation lands.
- 25) The goal of coordination among land managers should include agricultural, conservation, and local.
- 26) Address how we can learn lessons from past projects and improve information exchange between agencies, NGOs, and university researchers.
- 27) Provide public education workshops and increase awareness. Make information more accessible to interested parties/landowners. There are too many concurrent planning processes, so stakeholders can't keep up.
- 28) Don't be constrained by the legal Delta.
- 29) Implement conservation-minded public access into projects. Ensure management of facilities and funding are available to manage public benefits, targeted locations with best access, and increased buy-in from the community (Cache vs. Putah Creek examples).

### *Summary of Responses – Specific Implementation Strategies*

- 1) Many of the draft goals read like strategies, and some of the draft strategies read like goals; thus it was difficult to identify implementation strategies in the absence of a revised, consolidated set of topics and goals. The Delta Conservation Framework should contain less goals and more strategies. Some of the draft goal statements could be converted to strategies.
- 2) Promote conservation-oriented branding (e.g., “bird-friendly rice”).
- 3) Pursue agricultural and conservation easements, and build wildlife-friendly farming practices into easements. For example, Yolo RCD work in the Yolo Bypass; NRCS' Waterbird Habitat Enhancement Program; Central Valley Joint Venture; and the Yolo Bypass Wildlife Area.

- 4) Focus conservation on publicly owned lands first and willing landowners. Develop a network of willing landowners.
- 5) Create incentives for certain landowner practices; for example, the Central Valley Habitat Exchange.
- 6) Support and possibly expand existing programs. Leverage existing programs and research.
- 7) Look to learn from successful projects, including existing regional plans, and adapt as you learn.
- 8) Pursue federal mandates to address permitting and limitations in agency staffing. Coordinated permitting won't work without buy-in from federal agencies, since they each have their own mandates. This needs congressional-level support. Acknowledge permitting challenges, but don't try to provide specific remedies.
- 9) Establish a high-level policy group to guide permitting.
- 10) Build strategies around community values. Foster local ownership and building local support. Integrate conservation planning with community goals.
- 11) Get the "right" people together.
- 12) Seek to "preserve" and be "cost effective."
- 13) Promote education (e.g., tours, school programs, and lectures); for example, Yolo Basin Foundation's citizen science and volunteers.
- 14) Work with the legislature to secure adequate dedicated and sustained funding, including funding for long-term monitoring and O&M; obtain federal funding.
- 15) Provide funding to offset environmental mitigation costs.
- 16) Work at the local government level and tap existing boards.
- 17) Make strategies more actionable with time frames; see the CCMP (Comprehensive Conservation and Management Plan for the San Francisco Estuary) for examples.
- 18) Use the Delta Conservation Framework as a clearinghouse for mitigation credits. Pursue bulk mitigation sites to serve mitigation needs for multiple related projects (region-wide projects) that can lead to larger, continuous habitat.
- 19) Promote green infrastructure to address climate change.
- 20) Consider "extreme or catastrophic event-based change" in planning processes (for example, climate change adaptation).
- 21) Rely on regional plans for implementation of specific actions.
- 22) Consider what's working, what's not, and why; for example, planning (research/synthesis) the program and funding. Focus on the history, who will implement the actions, and whether or not there will be resources.
- 23) Solve problems at the lowest possible level, but think at a higher landscape level.
- 24) Provide analyses of costs and benefits over longer time scales. For example, setback levees are expensive but are a more effective form of flood protection in the long term that also provides habitat value (i.e., the long-term benefits outweigh the initial high cost).
- 25) There needs to be a longer time frame to implement strategies; for example, subsidence. Consider 40 years.

- 26) Focus on win-win opportunities and work together to address conflicts.
- 27) Incorporate the *Good Neighbor Checklist* (include it in the document).
- 28) Forge public-private partnerships; for example, mitigation banking.

### ***Workshop 2 Participants***

Aaron Haimon	Delta Conservancy
Alejo Kraus-Folk	University of California, Davis
Anitra Pawley	DWR
Ben Nelson	U.S. Bureau of Reclamation
Blake Roberts	DPC
Erik Ringelberg	Freshwater Trust
Erik Vink	DPC
Greg Yarris	CVJV
Judah Grossman	TNC
Judy Bendix	Mosaic Associates
Khara Strum	Audubon California
Laura Jenger	Delta Conservancy
Letitia Grenier	San Francisco Estuary Institute (SFEI)
Martha Ozonoff	Yolo Basin Foundation
Megan Brooks	DSC
Michael Perrone	DWR
Mike Dunphy	CVJV
Robin Kulakow	Yolo Basin Foundation
Rogene Reynolds	South Delta landowner
Ryan Carrothers	CDFW
Sakura Evans	CDFW
Scott Cantrell	CDFW
Shelley Phillips	DWR
Stacy Sherman	CDFW
Terri Gaines	DWR
YouChen Chow	DWR

### ***Workshop 3 – October 20, 2016***

#### ***Focus Topics***

The topics for Workshop 3 were 1) refining draft strategies and related objectives, and 2) defining *Conservation Opportunity Regions*.

For the second topic, participants were provided with a set of maps and were asked to break out in groups to suggest opportunities by region. They were asked to consider opportunity regions now and 30 years in the future and to draw those boundaries on a map. In addition, participants were asked the following focus questions:

- 1) What should the overall Delta Conservation Framework planning boundary be? And why?
- 2) How would you draw “fuzzy” lines around opportunity areas from a socioeconomic perspective, keeping in mind the Delta Conservation Framework overarching goals and strategies? Why?
- 3) How would you draw “fuzzy” lines around opportunity areas from an ecological perspective, keeping in mind the Delta Conservation Framework overarching goals and strategies? Why?

### *Summary of Responses – Conservation Objectives and Strategies*

- 1) Consider re-organizing some of the objectives. Some are really strategies.
- 2) Revisit the timing of some objectives. Some are very ambitious.
- 3) Leverage existing groups as much as possible. Be specific enough so that stakeholders can see themselves as part of the process. Consider constant/ongoing coordination with local and regional stakeholders. Consider one-on-one engagement with stakeholders. Identify and build on what’s already out there.
- 4) Acknowledge where work has been done relative to specific objectives.
- 5) It may be difficult to evaluate the effectiveness or achievability of certain objectives in the absence of specific targets.
- 6) Consider incorporating targets from existing plans, and cite the plans.
- 7) There is redundancy between goals.
- 8) Consider scenario planning as a tool for engaging stakeholders.
- 9) Acknowledge and build in good neighbor guidelines.
- 10) Consider making permitting a strategy rather than a goal.
- 11) Consider the balance between conservation and community goals.
- 12) Define “responsible entity”. Consider an alternative term (e.g., lead agency).
- 13) Engage the California Department of Agriculture

### *Summary of Responses – Regional Conservation Areas*

- 1) Keep the planning area boundaries “fuzzy”.
- 2) Focus on conservation potential and opportunity.

- 3) Provide space to expand as conditions change.
- 4) Consider including the Contra Costa shoreline.
- 5) Carefully consider community values and services in each region. Consider what defines different communities.
- 6) Let the regional planning efforts define each region.
- 7) Consider regulatory boundaries.
- 8) Anchor individual regions with existing planning efforts.
- 9) Consider “secondary” zones as areas potentially outside the planning area, but important to the planning area, such as upstream watersheds.
- 10) Be as inclusive as possible.
- 11) Consider how things may change over time (e.g., agricultural practices, sea level rise).
- 12) Consider up to the 25-foot contour.
- 13) Consider landscape units (e.g., fluvial vs. tidal).
- 14) Consider corridors.
- 15) Consider connectivity between regions (e.g., Yolo Bypass and Cache Slough).

### *Workshop 3 Participants*

Alejo Kraus Polk	University of California, Davis
Anitra Pawley	DWR
Blake Roberts	DPC
Bob Amrine	Bethel Island Municipal Improvement District
Brooke Jacobs	CDFW
Campbell Ingram	Delta Conservancy
Carl Wilcox	CDFW
Chad Dibble	CDFW
Charlotte Biggs	DWR
Chris Alford	Yolo Habitat Conservancy
Christina Sloop	CDFW
David Okita	Natural Resources Agency - EcoRestore
Desiree Loggins	Audubon California
Doug Brown	Douglas Environmental
Erik Vink	Delta Protection Commission
Gilbert Cosio	MBIC Engineers
Greg Yarris	CVJV
Hildie Spautz	CDFW
Judah Grossman	TNC
Judy Bendix	Mosaic Associates
Julie Beagle	SFEI
Laura Jensen	Delta Conservancy
Lauren Hastings	Delta Science Program
Mark Pruner	Delta resident
Rogene Reynolds	South Delta Landowner
Ron Melcer	DWR
Ryan Carrothers	CDFW
Sakura Evans	CDFW
Sam Safi	Sacramento County Regional Sanitation District

Sam Safran	SFEI
Scott Cantrell	CDFW
Steven Mayo	San Joaquin Council of Governments
Teresa Pacheco	WVI Consulting
Terri Gaines	DWR
Virginia Gardner	DSC
YouChen Chow	DWR

### *Workshop 4 – November 30, 2017*

#### *Focus Topics*

The agenda for the first day of Workshop 4 was to focus on *Conservation Opportunity Regions* and to discuss challenges, opportunities, and potential stakeholders and partners for each of the proposed *Conservation Opportunity Regions*. Responses from the participants are detailed below by region.

#### *Summary of Responses – West/Central Delta*

##### *Challenges:*

- 1) *Microcystis* or other blue-green algae and invasive aquatic weeds impact recreation and represent both an environmental and economic concern. Efforts to address invasive aquatic weeds could provide multiple benefits.
- 2) Salinity intrusion/water quality is a common community concern in the western and central Delta. This should be discussed and evaluated when doing any conservation planning in the region.
- 3) High-value agricultural lands (prime 1 soils) throughout East Contra Costa County should be protected. Conservation efforts on these lands should focus on wildlife-friendly agriculture.
- 4) Consider sea level rise and climate change impacts in the West Delta, including impacts on salinity and hydrology.

##### *Opportunities:*

- 1) There is an existing inventory of current land uses that could be used.
- 2) There are existing state-owned lands, an HCP, and ongoing projects, such as the Knightsen biofilter project, that could be leveraged.
- 3) Existing agricultural lands present opportunities for wildlife habitat.

- 4) The Land IQ dataset could be helpful in developing regional conservation strategies.
- 5) ECATs offer existing multi-agency groups that have been used as a centralized forum for permitting discussions.
- 6) Incorporate annual presentations to key forums (e.g., technical advisory committees, DPC), including updates on the previous year and discussions on the upcoming year, providing an opportunity for stakeholders to comment on projects, processes, and ideas before they move farther along.
- 7) Consider separating the West and Central Delta into two planning regions.
- 8) Look at ongoing DPIIC (Delta Plan Interagency Implementation Committee) discussions regarding permitting, including suggestions for a coordinated, consolidated process with common application forms, grant funding process, and programmatic EIR/EISs. The Delta long-term management strategy for the shipping channels is a good example. Also see the CCMP.

*Stakeholders/Partners:*

- 1) Contra Costa County General Plan update. County supervisors and advisory councils provide points of contact for communication and coordination with locals and counties going forward.
- 2) Ironhouse Sanitary District—important stakeholder.
- 3) East Contra Costa County HCP. Also see county regional plan.
- 4) Local Reclamation Districts (they hold monthly citizen meetings in Isleton).
- 5) Local marinas provide informal presentations at existing scheduled meetings.
- 6) Sacramento Area Council of Governments.
- 7) Farm Bureaus.
- 8) Windsurfing community—recreation.

**Summary of Responses – South Delta**

*Challenges:*

- 1) Accomplishing flood control plus restoration plus agriculture.
- 2) Restoration in entrainment zone. Find ways to move forward with restoration that does not increase entrainment.
- 3) Encroachment of vines/trees at the Stanislaus/San Joaquin River confluence.
- 4) Urban pressures in the secondary Delta.
- 5) Foreclosures around Tracy—frozen urbanization.
- 6) Manteca, Lodi, and Stockton have disadvantaged community status.

- 7) Very little public land or land managed for conservation and parks.
- 8) San Joaquin River Steelhead--ensuring survival of juveniles.
- 9) Need to develop local capacity.
- 10) Need a permitting liaison to navigate through the process and “open doors” to resolve issues.
- 11) Regional permitting is a good idea, but still requires a lot of work.
  - a. Consider a Yolo-like MOU to streamline permitting and bring people together.
  - b. Need someone to propose that the 2016 Flood Protection Conservation Strategy *is* the Regional Conservation Investment Strategy under AB 2087.

*Opportunities:*

- 1) Riverine between Vernalis and Interstate 5.
- 2) Floodplain/channel margin habitat in the legal Delta:
  - a. Link with Water Board flows process; and
  - b. Link to the San Joaquin River National Wildlife Refuge to the south.
- 3) See CVFPP efforts to consider conservation opportunities in the South Delta.
- 4) 295 million dollars in Proposition 1 funding is available to DWR for multi-benefit levees; can this be used here?

*Stakeholders/Partners:*

- 1) South Delta Water Agency--engaging landowners.
- 2) San Joaquin Area Flood Control Agency.
- 3) San Joaquin County.
- 4) RD 17.
- 5) San Joaquin Farm Bureau.
- 6) San Joaquin County Resource Conservation District.

*Summary of Responses – North Delta*

*Challenges:*

- 1) Recognize/acknowledge that private lands are being converted to public lands in the name of conservation, which is adversely affecting landowners and local communities.

- 2) Public agencies/land managers must be responsible for outcomes, including potential adverse impacts on local landowners and communities.
- 3) Government is a bad neighbor--managing lands poorly. Increased public lands also leads to loss of tax revenue and impacts on adjacent landowners.
- 4) Avoid driving private landowners out.
- 5) Don't use Adaptive Management--we can't constantly change rules. Don't "kick the can down the road".
- 6) Goals should include:
  - a. No net loss of private property;
  - b. Improved flood protection, including along the Sacramento River;
  - c. No loss of water quality or quantity;
  - d. No inundation that affects adjacent wells.
- 7) Fix the map to show the Sacramento River from Courtland to Freeport.
- 8) Flood control policy needs to be more than just state interest. It should also benefit local landowners. There is concern that flood control investments are just to protect state interests and resources.
- 9) Be specific--don't be "fuzzy."
- 10) Specify what we are trying to protect and conserve.
- 11) Lack of money for land management.

*Opportunities:*

- 1) Elk Slough is an example of an area that might benefit from conservation actions that could also be good for the community. The question is who will take responsibility for doing this?
- 2) Levee improvements combined with habitat.
- 3) Qualify measurable outcomes (i.e., quantitative conservation), including clear triggers for change.
- 4) Incentivize land owners to participate in new conservation projects.
- 5) Provide examples of where public lands are being managed well.

*Stakeholders/Partners:*

- 1) Commit to scheduling regional community meetings as part of the Delta Conservation Framework.
- 2) Include large landowners such as Metropolitan Water District in future meetings and planning.
- 3) Hold additional workshops with proper notice to each community.

- 4) Do more community outreach up front--take more time.
- 5) Build in implementation of outreach with specific accountability, including specifying who will do it, how it will be done, and how it will be measured. Consider a checklist.
- 6) Ask the communities what they want.
- 7) Identify existing projects and discuss them with the community.

### *Summary of Responses – Northeast Delta*

#### *Challenges:*

- 1) Outside of Delta influences--big agricultural or other business coming in and buying large acreage.
- 2) Conversion of crops from annual to permanent.
- 3) Production facilities.
- 4) Increasing land values and crop profits.
- 5) Growers don't want to be told what to do or be liable for someone else's decision.
- 6) Agriculture wants to stay agriculture.

#### *Opportunities:*

- 1) Wildlife-friendly farming.
- 2) Integration.
- 3) Landscape-level mosaic.
- 4) Greater rural-urban connection. Consider a "food desert" analysis for rural-urban connections.
- 5) Reconciliation--a functioning ecosystem that allows human uses.
- 6) Voluntary easements.
- 7) Consider specific land uses for specific parcels. For example, if a parcel that's part of a larger property is at an intersection, consider different land uses for that particular parcel.

#### *Stakeholders/Partners:*

- 1) Provide better signage at postings stating this is a public meeting.
- 2) Provide posters at libraries and post offices.
- 3) Host night meetings.

- 4) Farm Bureau and key opinion leaders.
- 5) Consider a community liaison to help with outreach.
- 6) Don't ask for acceptance of the plan, but how "planning can help you". How can this benefit farmers?

### *Summary of Responses – Yolo Bypass/Cache Slough*

#### *Challenges:*

- 1) Wide range of land uses and impacts (e.g., infrastructure, agriculture, flood protection, wildlife habitat, duck clubs, and managed wetlands).
- 2) Regional and urban water supply (e.g., to Napa and Solano counties via the North Bay Aqueduct).
- 3) Concern regarding lifestyle change—the sociocultural way of life.
- 4) Change from terrestrial land or agriculture to water.
- 5) Land differences from north to south (e.g., size, use).
- 6) In the north, there is a heavy focus on fisheries; all land is already spoken for (e.g., Tule Ranch North).
- 7) One region, but recognize subregional differences.
- 8) Need for maintenance/monitoring.
- 9) Public access, recreation, education opportunities, and funding.
- 10) Public access areas conflict with private or restoration areas; game wardens are needed to control nuisance problems.
- 11) Upper bypass versus lower bypass—connections and impacts.
- 12) Agriculture, especially flooded agriculture, is valuable as waterfowl and other species' habitat.
- 13) Transition zones (e.g., levees); how to address regulatory challenges.

#### *Opportunities:*

- 1) Adult fish passage in Yolo Bypass.
- 2) Increased effectiveness of floodplain rearing (17,000+ acres).
- 3) 8,000+ acres of tidal restoration.
- 4) Financing from state and federal water contractors.
- 5) Prioritize projects; e.g., lower Elkhorn Slough, Putah Creek.
- 6) Opportunities on agricultural lands, particularly operations and management of rice for waterfowl.
- 7) Connect slivers between existing conservation areas to create opportunities.

- 8) Fish Restoration Program.
- 9) For water quality (Total Maximum Daily Load), mercury concerns, and mosquito control, refer to best management practices for water management in the Yolo Bypass.
- 10) Additional incentives for winter flooding; address mercury.
- 11) Monitor and inventory water quality impacts and impacts to fisheries.
- 12) Collective solutions, funding for urban use and fisheries.
- 13) A multi-benefit solution is planning to resolve water supply vs. fish as co-equal goals.
- 14) Corridor Management Framework: [www.yolowra.org/board\\_agendas/2015/CMF-LSND.pdf](http://www.yolowra.org/board_agendas/2015/CMF-LSND.pdf).

*Stakeholders/Partners:*

- 1) Institutionalize through project-based governance.
- 2) Use the Yolo Bypass/Cache Slough partnership as a model.
- 3) Local decision-maker involvement needs to happen at the outset.
- 4) Creative stakeholder engagement; get involvement early.
- 5) Need for constant education; address multiple interests.
- 6) Adequate notice of meetings.
- 7) Provide follow-up summary notes.
- 8) Integrate and clearly address agricultural sustainability into the Delta Conservation Framework document.
- 9) Bypasses as “best hope” for certain crops and habitat that will not be developed.
- 10) Outreach to farmers and Board of Supervisors, communication of activities and potential benefits; for example, through a newsletter.

*Workshop 4- November 30th Participants*

Aaron Haiman	Delta Conservancy
Agnes Farres	San Francisco Bay – State Water Resources Control Board
Alejo Kraus Polk	University of California, Davis
Amanda Bohl	DSC
Amber Manfree	University of California, Davis – Center for Watershed Sciences
Amelia Raquel	TNC – Conservation Farms and Ranches
Anna Swenson	The Freshwater Trust
Barbara Daly	DPC Advisory Committee

Bjarni Serup	CDFW
Blake Roberts	DPC
Bob Amrine	Bethel Island Municipal Improvement District
Brett Milligan	University of California, Davis
Brooke Jacobs	CDFW
Bruce DiGennaro	The Essex Partnership
Carl Wilcox	CDFW
Charlotte Biggs	DWR
Chris Alford	Yolo Habitat Conservancy
Chris Brieno	Assemblyman Jim Frazier
Christina Sloop	CDFW
Daniel Constable	DSC
Dave Stirling	Public
Debra Kustic	Delta Conservancy
Desiree Loggins	Audubon California
Doug Brown	Douglas Environmental
Doug Weinrich	U.S. Fish and Wildlife Service (USFWS)
Eugene Phillips	Property owner
Galea Kusic	Public
George Strnad	AECOM
Greg Yarris	CVJV
Heather Swinney	USFWS
Jennifer Hobbs	USFWS
Jim Long	DWR (Delta Levees Enhancement)
John Cain	American Rivers
Kate Anderson	DSC
Kris Tjernell	Natural Resources Agency
Laura Jensen	Delta Conservancy
Linda Dorn	Sacramento Regional County Sanitation District
Mark Pruner	Clarksburg Fire Protection District
Mark Wilson	Wilson Vineyards, Clarksburg

Martha Ozanoff	Yolo Basin Foundation
Megan Keever	Stillwater Sciences
Mike Campbell	Clarksburg volunteer
Ramona Swenson	ESA
Rebecca Fris	CDFW – Wetlands Restoration Grants Branch
Rhianna Mulligan	DWR
Richard Reed	Yolo County Board of Supervisors
Roberta Goulart	Solano County
Robin Kulakow	Yolo Basin Foundation
Ryan Hernandez	Contra Costa County
Sakura Evans	CFDW – Interagency Ecological Program
Sam Safi	Sacramento County Regional Sanitation District
Shelley Phillips	DWR
Stephan Heringer	Reclamation District 999
Terri Gaines	DSC
Thomas Pate	Solano County Water Agency
YouChen Chow	DWR

### *Workshop 4 – December 1, 2016*

#### *Focus Topics*

The agenda for the second day of Workshop 4 was to focus on presenting the Delta Conservation Framework, and a summary of the previously held workshops, to the Delta’s local community members, landowners, and other stakeholders and to allow a forum for them to express their concerns. Participants provided comments within the larger group format, which are summarized below.

#### *Summary of Responses*

- 1) The “EcoFunction” slide inappropriately puts ecological benefits on top of other benefits.
- 2) Who will be involved in developing the plan? The plan seems vague and unrealistic.
- 3) Avoid more regulations and impacts on agriculture.
- 4) How do we create a more productive approach? Identify win-wins.

- 5) More burden is created with this effort.
- 6) The Delta Conservation Framework is being created by agencies and NGOs. There should be more landowner involvement.
- 7) Question of timing—why now?
- 8) The “plan” appears to be already “baked”.
- 9) This is just one more “plan” with limited input from local landowners.
- 10) It is difficult to have a large ecological plan without displacing agriculture.
- 11) Provide for preservation of agriculture.
- 12) Agriculture is the economic engine of the Delta.
- 13) What would a multi-benefit agriculture-friendly project be?
  - a. Flood protection combined with seasonal agriculture and recreation (e.g., hunting) with additional wildlife benefits; for example, Yolo Bypass Wildlife Area.
- 14) The document must be locally initiated and developed.
- 15) This process is a waste of time.
- 16) The Delta Conservancy should develop its own policy.
- 17) Develop locally with local support.
- 18) Modify the outreach strategy.
- 19) Institutionalize input over time through ongoing public input as the Delta Conservation Framework is implemented.
- 20) See other habitat conservation plans and the Caltrans plan.
- 21) Don’t draw any lines on maps relative to regions.
- 22) Add to Purpose for the Delta Conservation Framework: Inform federal funding priorities.
- 23) Recognize agriculture as the backbone to protect and preserve; list this first.
- 24) Maintain productivity.
- 25) Any reference to coequal goals should include qualifier language from the Delta Reform Act.
- 26) Plan in terms that recognize history and landscapes.
- 27) Consider certified organic, sustainable growers.
- 28) Can we use agricultural byproducts in a productive way that might provide ecological benefits?
- 29) The Delta Conservancy already has an implementation checklist. Do we need another one?
- 30) We don’t need a big, top-down “plan”. Good projects come organically—bottom up.
- 31) Incorporate public access. Examples: Sears Point, Eden Landing in the Bay Area.
- 32) Reach out to East Bay Regional Parks District.

- 33) Document failures and lessons learned. Monitor performance and share information.
- 34) Replant habitat on levees (e.g., on the Sacramento River).
- 35) Reach out and tap into existing meetings.
- 36) No more PowerPoint.
- 37) Recognize that recreation and tourism are important economic drivers.
- 38) Acknowledge and recognize the historical significance of the Sacramento River.

*Workshop 4 - December 1st Participants*

Amanda Bohl	DWR
Andrew March	Office of Rep. John Garamendi
Barbara Daly	Public
Bill Wells	Delta Chamber and Visitor Bureau
Brooke Jacobs	CDFW
Bruce DiGennaro	Essex Partnership (facilitator)
Campbell Ingram	Delta Conservancy
Carl Wilcox	CDFW
Christina Sloop	CDFW
Don Thomas	Sacramento County
John Viano	Contra Costa Farm Bureau
Kathy Bunton	Delta Kayak Adventures
Mark Pruner	Delta resident
Mark Wilson	Wilson Vineyards
Nicky Suard	Delta business owner
Patrick Johnston	DSC
Russ Van LobenSels	Delta farmer
Tim Neuharth	Steamboat Acres

## Appendix VII – Existing Planning Documents

Many important planning documents exist to consider when evaluating the potential for conservation in the Delta. A number of important planning references are listed in this Appendix to help inform ongoing and future planning at the regional and local scale.

### *California Water Action Plan*

The 2014 California Water Action Plan (CWAP) outlines ten main actions for achieving reliable and resilient water systems and restoring the most important California ecosystems. As such, it calls for achieving the Delta Reform Act’s coequal goals (Natural Resources Agency, CDFA et al. 2014, Natural Resources Agency, CDFA et al. 2016) (also see California Water Code §85204). The CWAP recognizes the social and political complexities around Delta issues yet states that “the status quo in the Delta is unacceptable and it would be irresponsible to wait for further degradation or a natural disaster before taking action” (Natural Resources Agency, CDFA et al. 2016).

More specifically, the CWAP outlines concerns regarding declines in the Delta’s native wildlife species, resilience of Delta levees to significant seismic events, and the Delta’s vulnerability to floods and sea level rise impacts posing significant risks to Delta residents. Relevant CWAP actions to address these concerns include:

Action 3: Achieve the co-equal goals for the Delta

Action 4: Protect and restore important ecosystems

Action 8: Increase flood protection

Action 9: Increase operational and regulatory efficiency

The Delta Conservation Framework includes several overarching long-term goals with strategies to address these CWAP actions. These include strategies related to:

- reestablishing or improving Delta ecosystem function (GOAL D; Section III);
- optimizing connectivity, functional food webs, management of harmful invasive species, and low-impact human use of conservation areas to reduce negative effects on sensitive wildlife (GOAL D; Section III);

- levee maintenance and flood management practices that also afford additional or improved habitat, and advancing agency land management processes and procedures (GOAL C; Section II);
- climate adaptation and adaptive management in Delta conservation and community planning going forward (GOAL E; Section III);
- improving permitting procedures (GOAL F, Section V);
- securing funding support (GOAL G, Section V).

As such, implementation of the Delta Conservation Framework will serve to further Actions 3, 4, 8, and 9 in the CWAP over the short and long term.

### ***The Delta Plan***

The Delta Plan was first released in 2013 when state and federal agencies were working toward a habitat conservation planning approach with the 50-year Bay-Delta Conservation Plan (BDCP; see below and Appendix III). The 2013 Delta Plan outlines policies and recommendations to provide a more reliable water supply for California (Chapter 3); preserve and improve Delta ecosystems (Chapter 4); protect and enhance “*Delta as an evolving place*” (Chapter 5); improve water quality (Chapter 6); and reduce risk to people, property, and state interests (Chapter 7, Appendix VIII) (Delta Stewardship Council 2013). It further highlights funding needs and options for Delta Plan implementation (Chapter 8). Associated white paper publications also provide guidance on adaptive management, performance measures, a levee investment strategy, and a long-term strategy for dredged sediment reuse (Delta Stewardship Council 2013). Table VIII.1 in Appendix VIII shows how the Delta Conservation Framework aligns with current 2013 Delta Plan recommendations, and additional Delta Conservation Framework strategies are suggested for inclusion in the Delta Plan amendment as new recommendations in the upcoming update of Delta Plan Chapter 4 (see Section VI and Appendix V for more information about how the Delta Conservation Framework relates to the Delta Plan amendment of Chapter 4).

### ***Bay Delta Conservation Plan Public Draft***

The BDCP was initiated in 2006 as a permitting framework for the construction of proposed Delta water conveyance improvements through a combined 50-year HCP/NCCP spanning the Delta, Yolo Bypass, and Suisun Marsh (BDCP 2013). In April 2015, the Brown administration announced a change in the permitting approach for new Delta water conveyance infrastructure, shifting state efforts away from the BDCP. Conservation measures presented in the 2013 Public Draft of the BDCP were intended to restore a more naturally functioning Delta ecosystem, contribute to the recovery of covered species through establishing a large Delta reserve system, and establish a secure and reliable Delta water supply for human use while managing flows to protect and support life history requirements of special status fish. The draft BDCP offers a wealth of information useful to inform future planning and development of *Regional Conservation Strategies*. The Delta Conservation Framework goals, strategies, and objectives reflect many of the BDCP conservation measures targeted to improve the Delta ecosystem function

to benefit fish, wildlife, and natural communities. However, the Delta Conservation Framework does not offer direct acreage targets beyond those already established through existing planning documents, nor does it address the issue of providing a secure and reliable water supply for human use. For more details of how the Delta Conservation Framework incorporates elements of the BDCP, please refer to Table III.1 in Appendix III.

### *Delta Economic Sustainability Plan*

To inform the Delta Stewardship Council's policies concerning the socioeconomic sustainability of the Delta region, the 2009 Delta Reform Act required the Delta Protection Commission to prepare an Economic Sustainability Plan (ESP) for the Delta region (DPC 2012). The ESP, adopted in January 2012 (Public Resources Code §29759), includes recommendations on levees, public safety, and updates to the Department of Water Resources (DWR) flood management plan, to inform local government general plans and economic efforts affecting Delta agriculture and infrastructure. It also provides options for Delta *Legacy Communities* to encourage recreation and tourism investments in the Delta to maintain and enhance economic prosperity, particularly if there are declines in agriculture. As a key finding, the ESP emphasizes water quality, water supply, and the ability to divert water in the Delta as essential drivers for the sustainability of habitat and ecosystem improvement, agriculture, tourism, and recreation in the Delta. The ESP is being updated with the most current information on recreation, agriculture, tourism, business development, and more. This ESP update and available Community Action Plans (DPC 2016, DPC 2016a, DPC 2016b) will be critical resources to inform *Regional Conservation Partnership* planning processes to help integrate Delta conservation practices with the human dimension going forward. Planning partnerships and individual project proponents should look to the updated ESP and Community Action Plans for specific guidance on how Delta socioeconomic aspects relate to conservation in a given focus region.

### *Central Valley Flood Protection Plan and Conservation Strategy 2017*

Pursuant to the Central Valley Flood Protection Act of 2008 (Act) in 2012, the Central Valley Flood Protection Plan (CVFPP) serves as a guide to the State's participation in managing flood risk in areas protected by the State Plan of Flood Control (SPFC) and provides a framework for prioritization of investments in the SPFC (DWR 2011). Reservoirs operated for flood management, water supply, water quality, power generation, wildlife and fisheries habitat, and recreation regulate the majority of flows that pass through the SPFC. Correspondingly, the system of river and bypass channels, levees, and water control structures in the Central Valley also provides agricultural uses in the bypasses, functions as valued recreational areas and open space, aids in the management of surface water supplies and management of groundwater and water quality, and offers critical remnant riparian and floodplain habitats for many fish and wildlife species. The CVFPP recognizes that flood risks, water supplies, and functioning Central Valley ecosystems are interconnected, with actions in one area influencing the other areas.

As a strategic, long-range plan, the CVFPP seeks to improve flood risk management (the primary goal), improve operations and maintenance and institutional support, and promote ecosystem function and multi-benefit projects where feasible. Its 2017 update contributes to a programmatic vision for flood system improvements over time in accordance with the requirements of the Act. The nonregulatory companion, *CVFPP Conservation Strategy*, is an integral part of the CVFPP that focuses on the improvement of ecosystem functions through the integration of ecological restoration with flood risk reduction projects where feasible (DWR 2016). The *CVFPP Conservation Strategy* is intended to be implemented through actions by DWR and its partners in flood management and conservation in the Sacramento and San Joaquin Valleys. These partners include federal and state agencies, Local Maintaining Agencies, local communities, and nongovernmental organizations. The CVFPP planning area includes the Delta Conservation Framework *Conservation Opportunity Regions* (CORs; see section VI and Appendix II). Planning partnerships and individual project proponents should look to the CVFPP for specific guidance on conservation of fluvial, riparian, and floodplain ecosystems in the context of flood protection activities.

The purpose of the *CVFPP Conservation Strategy* is to offer a comprehensive, long-term, nonregulatory approach for improving riverine and floodplain ecosystems through multi-benefit projects that provide ecological benefits while protecting public safety. It is to help provide a regional programmatic framework for increasing the predictability and cost effectiveness of permitting, while resulting in more effective and less costly conservation outcomes, and to make available contextual information and tools for use in planning and permitting processes.

More specifically, the *CVFPP Conservation Strategy*:

- discusses the **importance of incorporating environmental improvements into flood risk management activities**;
- provides **goals and measurable objectives for monitoring and evaluating progress in implementing conservation in conjunction** with investments in flood reduction actions;
- describes approaches for integrating ecosystem restoration into multi-benefit flood risk management projects and for **fostering agricultural stewardship**;
- provides a strategic approach for DWR and other agencies (federal, state, and local) to achieve **permitting efficiencies** for capital improvements and system maintenance in conjunction with ecosystem improvements and provides foundational scientific, institutional, and regulatory information needed to implement such an approach;
- recommends an implementation approach that could attract **greater cost sharing** because of the **broader range of benefits it yields**; and
- proposes an **adaptive management approach** that relies on ongoing monitoring and evaluation to adapt plans, designs, construction, and operations and management to achieve the goals and objectives of the CVFPP.

The CVFPP Conservation Strategy goals directly overlap with Goal C, Strategy C1 of the Delta Conservation Framework. Other goals and strategies also overlap regarding river and floodplain conservation with a focus on:

1. **Multi-benefit projects** that combine flood risk reduction with ecological benefits, environmental improvements, and agricultural stewardship (Delta Conservation Framework Goal C, Strategies C1, C2, C4, C5, C6);
2. **Promoting natural dynamic hydrologic and geomorphic processes** underlying ecosystem function (Delta Conservation Framework Goal D, Strategy D1);
3. Contributing to the **recovery of special status species** in riverine and floodplain habitats (Delta Conservation Framework Goal D, Strategies D1, D2, D3, D4, D5);
4. **Increased predictability and cost effectiveness of permitting processes** as related to multi-benefit projects (Delta Conservation Framework Goal F); and
5. Goals and measurable objectives for **progress evaluation within an adaptive management framework** (Delta Conservation Framework Goal E).

Table VII.1: Relating the CVPP Conservation strategy goals with Delta Conservation Framework goals and strategies.

<b>CVFPP Conservation Strategy Goals</b>	<b>Corresponding Delta Conservation Framework Goals - Strategies</b>
<p><b>Ecosystem Processes: Improve dynamic hydrologic (flow) and geomorphic processes in the SPFC</b>— These ecosystem processes are critical for maintaining certain habitats and species. A diversity of flows, suitable sources of sediment, and a sufficiently broad river corridor to allow stream meandering are necessary to sustain fisheries and riverine habitats.</p>	<ul style="list-style-type: none"> <li>• <b>Goal D – Strategy D1</b></li> </ul>
<p><b>Habitats: Increase and improve the quantity, diversity, and connectivity of riverine and floodplain habitats</b>—These habitats include aquatic, riparian, wetland, SRA cover, and other floodplain habitats, as well as agricultural lands that can provide important wildlife values.</p>	<ul style="list-style-type: none"> <li>• <b>Goal D – Strategies D1, D2, D3</b></li> </ul>

<b>CVFPP Conservation Strategy Goals</b>	<b>Corresponding Delta Conservation Framework Goals - Strategies</b>
<p><b>Species: Contribute to the recovery and sustainability of native species populations and overall biotic community diversity</b>—Native species addressed by this Strategy include species that are primarily associated with riverine habitats and that are at risk of extirpation or extinction. Although the preceding goals are the foundation for species conservation, this goal emphasizes the need to avoid and minimize adverse effects on sensitive species, develop compensatory habitat (particularly on adversely affected sites), and contribute to species recovery in addition to mitigating impacts.</p>	<ul style="list-style-type: none"> <li>• <b>Goal D – Strategies D1, D2, D3, D4</b></li> </ul>
<p><b>Stressors: Reduce stressors related to the development and operation of the SPFC that negatively affect at-risk species</b>—These stressors include invasive plant species, constraints on sediment sources and channel meander migration, isolation of floodplains from rivers by levees, and fish passage barriers, all of which contribute to loss and degradation of ecosystem functions and habitat.</p>	<ul style="list-style-type: none"> <li>• <b>Goal D – Strategies D1, D3, D6, D7</b></li> </ul>

### *The Suisun Marsh Habitat Management, Preservation, and Restoration Plan*

The Suisun Marsh Habitat Management, Preservation, and Restoration Plan (SMP) is a 30-year comprehensive plan that addresses habitats and ecological processes, public and private land use, levee system integrity, and water quality through tidal restoration and managed wetland activities (Reclamation, USFWS et al. 2013). The SMP's purpose is to create an acceptable balance between protection and enhancement of managed wetlands and the restoration and protection of tidal wetlands (SMP Final EIR/EIS, Volume II, Appendix E, Page E-4). The SMP was developed by and is overseen by the Suisun Principal Agencies (the Principals). These agencies are the U.S. Fish and Wildlife Service (USFWS); U.S. Department of Interior, Bureau of Reclamation (Reclamation); California Department of Fish and Wildlife (CDFW); DWR; National Marine Fisheries Services (NMFS); Suisun Resource Conservation District; and the Delta Stewardship Council (successor to the CALFED Bay-Delta Program).

The objectives of the SMP are to preserve and enhance the quality and diversity of the Suisun Marsh (Marsh) aquatic and wildlife habitats and to assure retention of upland areas adjacent to the Marsh in uses compatible with its protection. These objectives are integrated within Delta Conservation Framework Goal C, strategy C2 *“Support sustainable wildlife-friendly agriculture to provide additional wildlife and migratory bird habitats,”* and Goal D, strategies D1-D2, *“Restore, enhance, and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging Regional Partnerships, in Regional Conservation Strategies to improve function and life history support for native and migratory wildlife,”* and *“Through technical analyses conducted by given Regional Partnerships, identify and prioritize available areas to protect Delta ecosystems and transition zones with the potential for providing landscape connectivity and resiliency to ecosystem function.”* For implementation of projects in Suisun Marsh, individual project proponents should work closely with the Suisun Resource Conservation District and the San Francisco Bay Conservation and Development Commission. *Regional Conservation Partnerships* and individual project proponents should look to the SMP and its implementation for guidance on “lessons learned” and as an example of a “living” regional conservation effort.

### *Yolo Bypass Salmonid Habitat Restoration and Fish Passage Implementation Plan*

Prepared jointly by DWR and Reclamation in 2012, the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Draft Implementation Plan addresses two specific Reasonable and Prudent Alternative (RPA) actions in the NMFS state and federal water project Biological Opinion for the recovery of endangered salmonid species, focused on increased seasonal inundation and fish passage in the Yolo Bypass (DWR and Reclamation 2012):

- *RPA Action I.6.1: Restoration of floodplain rearing habitat, through the increase of seasonal inundation within the lower Sacramento River basin; and*
- *RPA Action I.7: Reduce migratory delays and loss of salmon, steelhead, and sturgeon, through the modification of Fremont Weir and other structures of the Yolo Bypass.*

Flooding in approximately 80% of years, the Yolo Bypass offers many characteristics of historic floodplain habitat favorable to various fish species (DWR and Reclamation 2012). Flood protection is the primary function of the Yolo Bypass, with managed agricultural activities in most of the area during the dry season. As a potential site to increase benefits to threatened and endangered fish species, the Yolo Bypass has also been identified as a potential site for habitat restoration (DWR and Reclamation 2012). At present, a number of Yolo Bypass focused restoration projects are being planned and implemented through the California *EcoRestore* initiative (Natural Resources Agency 2015, Natural Resources Agency 2017) (also see Appendix IV – California *EcoRestore*).

Since 2016, the associated Yolo Bypass and Cache Slough Partnership (Partnership) now also provides a vehicle to incorporate local governments into planning and decision making relative to restoration actions in the Yolo Bypass and Cache Slough. It was convened to provide a framework and focal point for these various planning efforts. Made up of 15 local, state, and federal agencies, the Partnership’s purpose is to improve executive-level interagency coordination. The policy-level Partnership was formed via a Memorandum of Understanding that emphasizes the importance of achieving across-the-board improvements in habitat, flood protection, agricultural sustainability, recreation, and other public values (Natural Resources Agency 2016). This foundational acknowledgement has set the stage for improved trust between stakeholders, a key ingredient in successful efforts of this scale.

### *Delta Landscapes Project Report Series*

The *Delta Landscapes Project* (2012-2016) provides a series of reports to inform landscape-scale conservation of the Sacramento-San Joaquin Delta ecosystem. Funded by the CDFW Ecosystem Restoration Grants Program, the project includes the Delta historical ecology investigation outlining how Delta ecosystems functioned prior to the California Gold Rush and subsequent landscape-level changes in the early 1800s (Whipple, Grossinger et al. 2012). Two successive reports utilized the resulting historical baseline to evaluate and describe how the Delta was altered over time (“*A Delta Transformed*”) and how it might be improved in the future to better support resilient populations of native wildlife (“*A Delta Renewed: A Guide to Science-Based Ecological Restoration in the Sacramento-San Joaquin Delta*”) (Robinson, Safran et al. 2014, Robinson, Safran et al. 2016). The Delta Conservation Framework goals, strategies, and objectives related to ecosystem function as part of a landscape-level perspective (in particular for Goal D) are directly based on information provided in the *Delta Landscapes Project* report series (Whipple, Grossinger et al. 2012, Robinson, Safran et al. 2014, Robinson, Safran et al. 2016) (see Section IV for more information). *Regional*

*Conservation Partnerships* and individual project proponents should look to the *Delta Landscapes Project* report series for detailed maps, historical context and how Delta function has changed, and for recommendations on conservation practices to support ecological functions in the Delta going forward.

### ***ERP Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta, Sacramento Valley and San Joaquin Valley Regions***

The Ecosystem Restoration Program (ERP) Conservation Strategy serves as the conceptual framework to guide ERP environmental restoration, including development of conservation priorities and processes to identify and implement restoration opportunities and monitoring to guide and improve their success, in the Sacramento-San Joaquin Delta (Delta), the Sacramento Valley, and San Joaquin Valley regions (CDFW 2014). The ERP approach for ecosystem restoration focused mainly on aquatic habitats and species in the Delta and the Sacramento and San Joaquin Valley regions. The ERP Conservation Strategy describes goals and conservation priorities for Stage 2 of the CALFED Bay-Delta Program. The ERP implementing agencies--consisting of CDFW, USFWS, and National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries)--will use the ERP Conservation Strategy as a guide until 2030. The vision and goals of the Delta Conservation Framework directly integrate what is presented in the ERP Conservation Strategy, while providing an additional link to the Delta community and specific focus on implementation of Delta conservation. *Regional Conservation Partnerships* and individual project proponents should look to the ERP Conservation Strategy for details on aquatic habitat descriptions, stressors, and related goals and conservation priorities.

### ***California State Wildlife Action Plan***

The California State Wildlife Action Plan 2015 Update (SWAP 2015) is a region-based strategic conservation plan developed by CDFW (CDFW 2015). The document provides a blueprint for actions necessary to sustain the integrity of California ecosystems, for their intrinsic values and as natural resources and heritages.

SWAP 2015 articulates conservation priorities for species and ecosystems that will be implemented over the next ten years, with a timespan of five decades in which desired conditions will be attained and sustainability improved. These priorities are summarized into three statewide conservation goals to ensure system health: 1) abundance and richness of species and ecosystems, 2) enhancing the quality of ecosystem conditions; and 3) enhancing ecosystem functions and processes (CDFW 2015). Supported by 12 subgoals, these statewide goals represent the overarching desired outcomes of integrated implementation and provide a framework for complementary tier-down regional goals and objectives.

SWAP 2015 highlights the Delta as part of the Bay Delta Conservation Unit, within the Bay Delta and Central Coast Province. The conservation target ecosystems for the Bay Delta Conservation unit are freshwater marsh, including nontidal freshwater emergent wetlands; salt marsh,

including saline emergent wetlands and tidal freshwater wetlands in the Delta; and American Southwest riparian forest and woodland, which includes the Valley Foothill Riparian natural community in the Delta. Delta species of greatest conservation need identified within the target ecosystems of the Delta include Chinook salmon (*Oncorhynchus tshawytscha*), longfin smelt (*Spirinchus thaleichthys*), Delta smelt (*Hypomesus transpacificus*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), giant garter snake (*Thamnophis gigas*), Swainson's hawk (*Buteo swainsoni*), California black rail (*Laterallus jamaicensis coturniculus*), Ridgway's rail (*Rallus obsoletus*), sandhill crane (*Antigone canadensis*), tricolored blackbird (*Agelaius tricolor*), and salt-marsh harvest mouse (*Reithrodontomys raviventris*). The SWAP highlights the pressures in the Delta that make it a prime region for conservation. Targets and conservation strategies were developed by reviewing and synthesizing other planning efforts for more specific guidance, including the BDCP, Delta Plan, and other planning documents described in this appendix. However, *Regional Conservation Partnerships* and project proponents should consult the SWAP when planning projects for or within target ecosystems and are strongly advised to consult the SWAP if applying for federal funding through the State Wildlife Grant or Endangered Species Act Section 6 program.

### ***San Francisco Bay Comprehensive Conservation and Management Plan***

The San Francisco Bay Comprehensive Conservation and Management Plan (CCMP) or “Estuary Blueprint” incorporates input from more than 70 organizations that reached collaborative agreement on four long-term goals to be achieved by 2050 and 32 actions to be taken over the next five years. The goals and actions are to protect, restore, and sustain the San Francisco Estuary (Estuary), from the Delta (and by extension its watersheds) at the upstream end of the Estuary to San Francisco Bay (Bay) at the downstream end of the Estuary (SFEP 2016). Considering a long-term vision by asking what the Estuary will look like by 2050, the four long-term CCMP goals entirely or in part align with overarching goals of the Delta Conservation Framework (indicated below in parentheses). The CCMP's long-term Estuary-wide goals are to: 1) Sustain and improve the Estuary's habitats and living resources (*Goals C-D*); 2) Bolster the resilience of Estuary ecosystems, shorelines, and communities to climate change (*Goals D-E*); 3) Improve water quality and increase the quantity of fresh water available to the Estuary (*Goal C - water quality*; overall freshwater flow quantities are not addressed by the Delta Conservation Framework); and 4) Champion the Estuary (*Goals A-B, and F-G*).

The CCMP priorities for actions implemented within the next five years (2016-2021) also overlap with Delta Conservation Framework's overarching strategies (shown in parentheses below). The CCMP priority actions are to improve our understanding and monitoring of how watersheds support aquatic resources and to connect the management of streams, rivers, and downstream habitats (*Strategies C1, C4*); to protect and grow a healthy mosaic of habitat types along shorelines, coasts, rivers, and stream banks; help the ecosystem continue to function and bolster food webs, connections between habitats, and the movement of fresh water and sediments through the Estuary so that ecosystems can sustain fish, birds, and other wildlife (*Strategies C1-C5; D1-D6*); support ecological solutions for adapting to the challenge of rising sea levels by building natural infrastructure (wetlands, horizontal levees, buffering habitats) and resilience into shorelines (*Strategy E3*); better plan for

long-term droughts by encouraging water conservation, recycling, and regional planning to increase supply without diverting more from fish to cities; keep addressing pollution challenges (*Strategy D7*); persist in finding solutions to climate challenges (*Strategies D1-D2; E1-E3*), including wetland related carbon sequestration opportunities (*Strategy C3*) and other solutions for improved and resilient land use practices (*Strategies C1-C6*); and making strides in informing and integrating the public in these planning and implementation activities (*Strategies A1-A2, B1-B2*).

While the Delta Conservation Framework only addresses the CCMP goals and priority actions within the upstream portion of the Estuary, the short- and long-term effects of implementation of goals and strategies for the Delta (and with extension its watersheds) through *Regional Conservation Partnerships* will extend to downstream conditions in the Bay and out into the Pacific ocean; and perhaps the other way around, it will address upstream conditions as sea level rises and salinity and other effects also felt in the Bay reach further into the Delta. Therefore, a sustained and improved connection among efforts in the upstream (Delta) and downstream (Bay) regions of the Estuary will become increasingly important. *Regional Conservation Partnerships* should ideally reach out to invite participants from the entire Estuary to share learning and integrate approaches, evaluation efforts, and initiatives. Therefore, *Regional Conservation Partnerships* and individual project proponents should look to the CCMP for guidance on how their efforts relate to the Estuary-wide perspective.

#### ***Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary***

The California State Water Resources Control Board (State Water Board) is responsible for developing and modifying the Water Quality Control Plan for the San Francisco Bay and the Delta (Bay-Delta Plan) (Kapahi, Baer et al. 2006). The Bay-Delta Plan establishes beneficial uses to be protected and water quality control measures needed to afford sound protection of the beneficial water uses in the Bay-Delta Watershed. Implementing the Bay-Delta Plan through water rights and other measures, the State Water Board also administers water rights in the Bay-Delta watershed and is currently in the process of developing and implementing updates to the Bay-Delta Plan and flow objectives for priority tributaries to the Delta to protect Bay-Delta watershed beneficial uses. The first phase of this effort involves updating San Joaquin River flow and southern Delta water quality requirements included in the Bay-Delta Plan, followed by other comprehensive changes to the Bay-Delta Plan to protect beneficial uses not addressed in Phase 1 (Delta outflows, Sacramento River inflows, Suisun Marsh salinity, Delta Cross Channel gate closure, export limits, reverse flows). Other phases involve changes to water rights and other measures to implement changes to the Bay-Delta Plan Phases 1 and 2, as well as developing and implementing flow objectives for priority Delta tributaries outside of the Bay-Delta Plan updates.

The Delta Conservation Framework addresses water quality challenges and solutions only in the context of conservation project planning and implementation (*Strategy C6*) and so defers to the Bay-Delta Plan for implementing measures to address the more comprehensive requirements for Delta-wide water quality improvements. State or regional Water Board representatives should be invited to participate in conservation project planning and implementation of *Regional Conservation Strategy* efforts. This will help to better integrate and coordinate planning and

permitting activities with regard to short- and long-term conservation related water quality impacts or benefits. *Regional Conservation Partnerships* and individual project proponents should look to the Bay-Delta Plan for specific guidance on water rights, water quality regulations, and targets related to conservation project implementation and management.

### *Habitat Conservation Plans/Natural Community Conservation Plans*

The Delta Conservation Framework defers to the species and acreage targets outlined in Habitat Conservation Plans (HCP), Natural Community Conservation Plans (NCCP), or relevant Conservation Strategies, where they overlap with the Delta planning region. Here, we provide short overviews of HCP or NCCP initiatives within the Delta primary or secondary planning zones. *Regional Conservation Partnership* efforts are recommended to integrate targets and goals of these types of conservation plans.

#### *East Alameda County Conservation Strategy (EACCS)*

The EACCS is not an HCP or NCCP; however, it is a framework intended to protect, enhance, and restore natural resources. A final draft was released in October 2010 (EACCS 2010). The purpose of the EACCS is to preserve endangered and other special-status species and their habitats through a shared vision for long-term habitat protection in East Alameda County. The EACCS will establish guiding biological principles for conducting conservation in the county by assessing East Alameda County areas for their conservation value. Resulting guidance will include working with willing landowners to implement long-term conservation stewardship efforts to offset impacts from local land use, transportation, or other infrastructure projects. Only the most northeastern tip of Alameda County overlaps with the legal Delta, which is conservation zone 7 (CZ7) in the EACCS. This area consists of a small amount of grassland and alkali meadows with ponds, and the rest is agricultural. Special-status species that occur or historically occurred in CZ7 include San Joaquin kit fox (*Vulpes macrotis mutica*), California red-legged frog, and California tiger salamander.

#### *East Contra Costa County HCP/NCCP*

This is an approved 30-year HCP/NCCP, developed, in part, to address indirect and cumulative impacts to terrestrial species from development supported by increases in water supply provided by the Contra Costa Water District (East Contra Costa County Habitat Conservancy 2006). The final plan was released in October 2006. While the HCP/NCCP plan area includes land within the Legal Delta, the focus of the Plan is primarily on grasslands, riparian, and other upland habitats and the terrestrial species dependent on these ecosystems. However, some natural community level goals include preserving and restoring wetlands. Most of the investments in land acquisition and habitat improvements are focused outside of the Legal Delta. Key restoration priorities in the Delta include the Dutch Slough/Big Break area, lower Marsh Creek, and lower Kellogg Creek. Projects within the Delta would help to achieve the plan's species-level goals for giant garter snake, tricolored blackbird, Swainson's hawk, and western pond turtle (*Actinemys marmorata*). The HCP/NCCP does not cover fish species, including salmonids, and impacts to fisheries are addressed through separate consultation and permitting.

### South Sacramento HCP

Currently under development, with a working draft from 2010, the primary focus of the South Sacramento HCP is to protect vernal pool and other upland habitats that are being diminished by vineyards and development, but it also protects wetland and riparian habitats and agriculture (County of Sacramento, City of Elk Grove et al. 2010). The plan covers several special status terrestrial species that also inhabit the Delta, such as Swainson's hawk, tricolored blackbird, sandhill crane, giant garter snake, Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), western pond turtle, white-tailed kite (*Elanus leucurus*), California tiger salamander, and western burrowing owl (*Athene cunicularia*). The geographic scope of this HCP includes a small portion of the Sacramento-San Joaquin Delta in Sacramento County, extending from about the Stone Lakes National Wildlife Refuge in the north (and up to Florin Road in Sacramento) to Tyler Island in the south. The westernmost boundary of the plan area is the Sacramento River. Portions of the Plan Area are included in the Delta Conservation Framework's secondary planning zone, where habitat could become important for species such as sandhill crane and giant garter snake as sea levels rise and other future conditions render legal Delta habitat less suitable. Reserve areas adjacent to the Delta could also provide stepping-stone connectivity between Delta wildlife populations and populations to the east. This HCP does not address aquatic species, as they have historically been covered by U.S. Army Corps of Engineers' (USACE) 404 permits and CDFG Streambed Alteration Agreements. Programmatic permits that may be incorporated into the HCP are developed by Sacramento County in collaboration with the USACE, U.S. Environmental Protection Agency, and CDFW.

### Solano Multispecies HCP (MSHCP)

The Solano MSHCP is still in development, with a final administrative draft updated in October 2012. This HCP will promote conservation of biodiversity and preservation of covered species and their habitats in relation to urban development, flood control, and infrastructure improvement activities (Solano County Water Agency 2012). Federally- and state-listed fish species and other species of concern on lands within the Delta will be included in the HCP as covered species. These include many of the species also covered by the BDCP. Natural communities to be protected include grasslands and vernal pools, riparian and stream habitats, and marshes. The plan area includes all of Solano County and a small portion of Yolo County, overlapping the Delta primarily in Suisun Marsh and the vicinity of Cache and Lindsey sloughs.

### San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP)

Approved in 2001, this HCP was developed to provide guidelines for preserving agriculture and protecting species in the context of conserving open space and the need for converting open space to other land uses (SJMSCP 2000). The geographic scope includes all lands within the legal Delta that overlap with San Joaquin County, as well as secondary zones to the east and southwest of the Delta. The purpose of the plan is to balance the needs to conserve open space and special status species with the region's agricultural economy and landowner property rights. The SJMSCP is a 50-year plan covering 97 special status plant, fish, and wildlife species in 52 vegetative communities. The covered species in the Delta are mostly the same species covered by the BDCP and some species not included in the BDCP, such as bank swallow (*Riparia riparia*).

## Yolo HCP/NCCP

The Yolo county-wide HCP/NCCP is under development. A second administrative draft was released in 2015. It will address the conservation of 70-80 species in five habitat types: wetland, riparian, oak woodland, grassland, and agriculture (Yolo County HCP/NCCP Joint Powers Agency 2015). It will not address aquatic species; however, project-specific mitigation will be developed for projects affecting aquatic resources. Yolo County only overlaps the Delta in the Yolo Bypass and the area between the Sacramento Deep Water Ship Channel and the Sacramento River. However, there are a lot of special status species covered by this area, including valley elderberry longhorn beetle, giant garter snake, Swainson's hawk, western burrowing owl, and tricolored blackbird. There was even a sighting of least Bell's vireo (*Vireo bellii pusillus*) in this area.

## *Human Use of Restored and Naturalized Delta Landscapes*

This one-year study on *Human Use of Restored and Naturalized Delta Landscapes* explores the California Delta from an integrative human-environment perspective (Milligan and Kraus-Polk 2016). It offers a holistic integration of multiple goals and land use agendas using a landscape planning approach. The report advances a reconciliation approach, which seeks synergies between ecosystem needs and the desires of those who live, work, and play in the Delta, both now and in the future. Main findings include: Delta restored and *naturalized landscapes*--reclaimed areas unintentionally or accidentally returned to natural ecosystems and habitat, such as Liberty Island--are expanding; human use, presence, and management has and will continue to affect these Delta landscapes; Delta restored and naturalized landscapes are subject to multiple and conflicting uses and values; more comprehensive planning and design is required to reconcile human uses with ecological restoration; funding in support of recreation and human uses in restoration planning is an important investment in the long term; adaptive management efforts should integrate human uses of restored landscapes; and the public is an overlooked asset and advocate for restoring and monitoring Delta landscapes.

Recommendations include the need for a significant shift in the way restored Delta landscapes are conceptualized and considered in planning, policy, and design efforts and advocating for an approach in which human presence is understood as integral to these landscapes. This will require integration of a multitude of values--economic, ecological, scientific, and recreational--and will make restorative efforts more realistic and effective. However, reconciling human uses with restoration objectives will also require a more holistic type of stewardship. Implementing adaptive management efforts is therefore a further recommendation, combined with adequate resources for support. *Regional Conservation Partnerships* and individual project proponents should look to this report for guidance on how to integrate the human dimension in conservation. Many of the recommendations in this report are also integrated into the Delta Conservation Framework overarching goals, and they were also voiced and captured during the 2016 stakeholder workshop process (see Appendix VI). In particular, Goals A-C address the human integration into Delta conservation processes and the heightening of national, state, and even local awareness of Delta values and culture.

### *California State Parks Recreation Proposal for the Sacramento-San Joaquin Delta*

The California State Parks Recreation Proposal for the Sacramento-San Joaquin Delta (recreation proposal) provides recommendations for the improvement or expansion of California State Parks' four Delta recreation areas and six other state parks on the edge of the Delta and Suisun Marsh and for connecting them with destinations inside the Delta and Suisun Marsh region (California State Parks 2011). It outlines opportunities to create four new state parks for the region, and it suggests ways to improve recreation at wildlife habitat areas, publicly owned levees, scenic highways, state recreational trails, and other public lands. It also includes suggestions for coordination of recreation and tourism efforts.

A network of recreation areas—including parks, resorts, boating facilities, historic communities, agricultural-tourism attractions, and other visitor-oriented places that are connected by scenic driving routes, boating trails, or bicycling and hiking trails—are proposed. The proposal highlights existing recreation assets as well as new recreation opportunities compatible with projects that may alter recreation opportunities in the region. These projects may include flood-control efforts, pipelines and canals, and restoring large wildlife habitat areas, especially at the six potential “restoration opportunity areas” mapped in the recreation proposal. Partnerships among agencies, businesses, and nonprofit groups would help advance such multi-benefit outcomes and reveal the region to more visitors under this proposal. Co-benefit recreation opportunities are integrated into Delta Conservation Strategy Goal C, “*Develop multi-benefit focused conservation and land management solutions to balance environmental and human needs.*” *Conservation Planning Partnerships* and individual project proponents should look to the recreation proposal for guidance on how to integrate existing and recommended recreation areas, and integrate its broad recommendations for recreation, into their project planning efforts.

### *Ecosystem and Species Recovery Plans and Conservation Strategies*

Recovery plans for federally threatened or endangered species relevant to the Delta planning region include recovery strategies for species in tidal marsh, vernal pool, and Antioch Dunes ecosystems and for upland species of the San Joaquin Valley. Recovery plans for individual species include California tiger salamander (draft), giant garter snake, California red-legged frog, Least Bell's vireo (draft), and California least tern (*Sternula antillarum browni*). Recovery plans for Delta fish include Central Valley salmon and steelhead (*O. mykiss irideus*) (NMFS 2014) and Sacramento-San Joaquin Delta native fishes, which includes Delta smelt, Sacramento splittail (*Pogonichthys macrolepidotus*), longfin smelt, green sturgeon (*Acipenser medirostris*), Chinook salmon, and Sacramento perch (*Archoplites interruptus*) (USFWS 1996). A recovery plan was written for Valley elderberry longhorn beetle (VELB) in 1984 (USFWS 1984). VELB was delisted in 2012 (77 FR 60238); however, the USFWS published conservation guidelines for the species (USFWS 1999) and a post-delisting monitoring protocol (USFWS 2012). Also relevant are the recovery outlines for the green sturgeon southern distinct population segment (NMFS 2010) and Central California coast steelhead (NMFS 2007).

For recovery of state-listed species, conservation plans or strategies are generally written by species' experts. Conservation strategies or plans have been written for Delta species such as bank swallow (Bank Swallow Technical Advisory Committee 2013), Swainson's hawk (Dorin Bradbury 2009), and tricolored blackbird (Tricolored Blackbird Working Group 2007). A conservation strategy for greater sandhill crane (*A. c. tabida*) is in process, but a draft has not yet been released. Some species recovery strategies are incorporated in conservation plans for specific ecosystems, such as for riparian birds (Riparian Habitat Joint Venture and California Partners in Flight 2004).

Goal D, Strategy D4 of the Delta Conservation Framework, "*Create conditions conducive to meeting the goals in existing species recovery plans to maintain or improve the distribution and abundance of listed species supported by Delta ecosystems,*" refers to the existing recovery goals for the above ecosystems and species. Other strategies under Goal D focus on optimizing connectivity, ecosystem function to support food webs, control and management of harmful invasive species, and minimizing adverse effects from human disturbance. Regional conservation strategy partnerships or individual project proponents should directly consider and reference the geographically relevant recovery plans or strategies in their planning and implementation efforts.

### *References*

77 FR 60238 (2012) Proposed rule: Endangered and threatened wildlife and plants; Removal of the valley elderberry longhorn beetle from the federal list of endangered and threatened wildlife, Federal Register 77:60238.

Bank Swallow Technical Advisory Committee (2013). Bank Swallow (*Riparia riparia*) Conservation Strategy for the Sacramento River Watershed, California: Version 1.0. Bank Swallow Technical Advisory Committee. Available: <http://www.sacramentoriver.org/bans/index.php?id=recovery>.  
BDCP (2013). Bay Delta Conservation Plan Public Draft (BDCP). Available: <http://baydeltaconservationplan.com/EnvironmentalReview/EnvironmentalReview/2013-2014PublicReview/2013PublicReviewDraftBDCP.aspx>. Accessed 6/2/16.

California State Parks (2011). Recreation proposal for the Sacramento-San Joaquin Delta and Suisun Marsh. California State Parks, Planning Division, Sacramento, CA.

CDFW (2014). Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta, Sacramento Valley and San Joaquin Valley Regions. California Department of Fish and Wildlife Ecosystem Restoration Program (CDFW), Sacramento, CA.  
Available: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=31232&inline>. Accessed December 29, 2015.

CDFW (2015). State wildlife action plan, 2015 update: A conservation legacy for Californians. California Department of Fish and Wildlife (CDFW) with assistance from Ascent Environmental, Inc., Sacramento, CA. Available: <https://www.wildlife.ca.gov/SWAP/Interim-Products>.

Natural Resources Agency, CDFG and CalEPA (2014). California Water Action Plan. California Natural Resources Agency, California Department of Food and Agriculture (CDFG), and California Environmental Protection Agency (CalEPA), Sacramento, CA. Available: [http://resources.ca.gov/docs/california\\_water\\_action\\_plan/2014\\_California\\_Water\\_Action\\_Plan.pdf](http://resources.ca.gov/docs/california_water_action_plan/2014_California_Water_Action_Plan.pdf). Accessed: June 23, 2016.

Natural Resources Agency, CDFG and CalEPA (2016). California Water Action Plan 2016 update. California Natural Resources Agency, California Department of Food and Agriculture (CDFG), and California Environmental Protection Agency (CalEPA), Sacramento, CA. Available: [http://resources.ca.gov/docs/california\\_water\\_action\\_plan/Final\\_California\\_Water\\_Action\\_Plan.pdf](http://resources.ca.gov/docs/california_water_action_plan/Final_California_Water_Action_Plan.pdf). Accessed: June 23, 2016.

County of Sacramento, City of Elk Grove, City of Galt, City of Rancho Cordova, Sacramento Regional County Sanitation District, Sacramento Area Sewer District, Sacramento County Water Agency and Southeastern Connector (2010). South Sacramento Habitat Conservation Plan working draft. County of Sacramento, Sacramento, CA.

Delta Stewardship Council (2013). The Delta Plan: Ensuring a reliable water supply for California, a healthy Delta ecosystem, and a place of enduring value. Delta Stewardship Council, Sacramento, CA . Available: <http://deltacouncil.ca.gov/delta-plan-0>. Accessed: June 23, 2016.

Dorin Bradbury, M. (2009). Conservation Strategy for Swainson's hawks in California. Friends of the Swainson's Hawk, Sacramento, CA. Available: <http://www.swainsonshawk.org/Images/Conservation%20Plan%2009%20final.pdf>. Accessed: July 7, 2016.

DPC (2012). Economic sustainability plan for the Sacramento-San Joaquin River Delta - Executive summary. Delta Protection Commission (DPC), West Sacramento, CA.

DPC (2016). Clarksburg Community Action Plan. Delta Protection Commission (DPC), West Sacramento, CA.

DPC (2016a). Courtland Community Action Plan. Delta Protection Commission (DPC), West Sacramento, CA.

DPC (2016b). Walnut Grove Community Action Plan. Delta Protection Commission (DPC), West Sacramento, CA.

DWR (2011). 2012 Central Valley Flood Protection Plan: Public Draft. Department of Water Resources, Central Valley Flood Management Planning Program, FloodSafe California (DWR), Sacramento, CA. Available: [http://www.water.ca.gov/cvfm/docs/2012\\_CVFPF\\_FullDocumentHighRes\\_20111230.pdf](http://www.water.ca.gov/cvfm/docs/2012_CVFPF_FullDocumentHighRes_20111230.pdf). Accessed: June 24, 2016.

DWR (2016). Central Valley Flood Protection Plan Conservation Strategy. California Department of Water Resources (DWR), Sacramento, CA. Available: [http://www.water.ca.gov/conservationstrategy/docs/cs\\_draft.pdf](http://www.water.ca.gov/conservationstrategy/docs/cs_draft.pdf). Accessed: August 24, 2017.

DWR and Reclamation (2012). Yolo Bypass salmonid habitat restoration and fish passage implementation plan. Department of Water Resources Fish Passage Improvement Program, FloodSAFE Environmental Stewardship and Statewide Resources Office (DWR FESSRO), Sacramento, CA; U.S. Bureau of Reclamation, Mid-Pacific Region (Reclamation), Sacramento, CA. Available: <http://www.water.ca.gov/fishpassage/docs/yolo2.pdf>. Accessed: 6/3/16.

EACCS (2010). East Alameda County Conservation Strategy final draft. East Alameda County Conservation Strategy (EACCS). Available: <http://www.eastalco-conservation.org/documents.html>. Accessed: June 29, 2016.

East Contra Costa County Habitat Conservancy (2006). East Contra Costa County habitat conservation plan and natural community conservation plan. Available: <http://www.co.contra-costa.ca.us/depart/cd/water/HCP/documents.html>. Accessed: December 22, 2011.

Kapahi, G., I. Baer, J. Farwell, D. Riddle and G. Wilson (2006). Water quality control plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. State Water Resources Control Board, Division of Water Rights, Sacramento, CA. Available: [http://www.waterboards.ca.gov/waterrights/water\\_issues/programs/bay\\_delta/wq\\_control\\_plans/2006wqcp/](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/wq_control_plans/2006wqcp/).

Milligan, B. and A. Kraus-Polk (2016). Human use of restored and naturalized delta landscapes. Department of Human Ecology, Landscape Architecture Unit, University of California, Davis, Davis CA: Available: [https://watershed.ucdavis.edu/files/biblio/Human%20Use%20Report\\_for%20screen%20viewing%20%28spreads%29.compressed.pdf](https://watershed.ucdavis.edu/files/biblio/Human%20Use%20Report_for%20screen%20viewing%20%28spreads%29.compressed.pdf).

Natural Resources Agency (2015). Restoring the Sacramento-San Joaquin Delta Ecosystem. California Natural Resources Agency (CNRA), Sacramento, CA. Available: [http://resources.ca.gov/docs/ecorestore/ECO\\_FS\\_Overview.pdf](http://resources.ca.gov/docs/ecorestore/ECO_FS_Overview.pdf). Accessed June 10, 2016.

Natural Resources Agency (2017). California EcoRestore projects. California Natural Resources Agency, Sacramento, CA. Available: <http://resources.ca.gov/ecorestore/california-ecorestore-projects/>. Accessed: August 24, 2017.

NMFS (2007). 2007 federal recovery outline for the distinct population segment of central California coast steelhead. National Marine Fisheries Service, Southwest Region Office (NMFS), Santa Rosa, CA.

NMFS (2010). Federal recovery outline: North American green sturgeon Southern Distinct Population Segment. National Marine Fisheries Service, Southwest Region (NMFS), Santa Rosa, CA.

NMFS (2014). Recovery plan for the evolutionarily significant units of Sacramento River winter-run Chinook salmon and Central Valley spring-run Chinook salmon and the distinct population segment of California Central Valley steelhead. National Marine Fisheries Service, California Central Valley Area Office (NMFS), Sacramento, CA. Available: [http://www.westcoast.fisheries.noaa.gov/publications/recovery\\_planning/salmon\\_steelhead/domains/california\\_central\\_valley/final\\_recovery\\_plan\\_07-11-2014.pdf](http://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/california_central_valley/final_recovery_plan_07-11-2014.pdf).

Reclamation, USFWS and CDFG (2013). Suisun Marsh habitat management, preservation, and restoration plan. U.S. Bureau of Reclamation, Mid-Pacific Region (Reclamation), Sacramento, CA; U.S. Fish and Wildlife Service (USFWS); California Department of Fish and Game (CDFG), Stockton, CA. Available: [http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc\\_ID=17283](http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=17283). Accessed June 9, 2016.

Riparian Habitat Joint Venture and California Partners in Flight (2004). Version 2.0 The riparian bird conservation plan: A strategy for reversing the decline of riparian associated birds in California. Point Blue Conservation Science, California Chapter of Partners in Flight, Petaluma, CA. Available: [http://www.prbo.org/calpif/pdfs/riparian\\_v-2.pdf](http://www.prbo.org/calpif/pdfs/riparian_v-2.pdf). Accessed: July 8, 2016.

Robinson, A., S. Safran, J. Beagle, L. Grenier, R. Grossinger, E. Spotswood, S. Dusterhoff and A. Richey (2016). A Delta Renewed: A guide to science-based ecological restoration in the Sacramento-San Joaquin Delta, a report for the Delta Landscapes Project: Management tools for landscape-scale restoration of ecological functions. Prepared for California Department of Fish and Wildlife, Sacramento, CA. San Francisco

Estuary Institute (SFEI) Aquatic Science Center, Richmond, CA. Available:

[http://www.sfei.org/sites/default/files/project/SFEI\\_DeltaRenewed\\_102616\\_lowres.pdf](http://www.sfei.org/sites/default/files/project/SFEI_DeltaRenewed_102616_lowres.pdf). Accessed January 25, 2017.

Robinson, A., S. Safran, J. Beagle, R. Grossinger, L. Grenier and R. Askevold (2014). A delta transformed: ecological functions, spatial metrics, and landscape change in the Sacramento-San Joaquin Delta. Prepared for California Department of Fish and Wildlife, Ecosystem Restoration Program, Sacramento, CA. San Francisco Estuary Institute-Aquatic Science Center, Richmond, CA, Publication #729. Available:

<http://www.sfei.org/documents/delta-transformed-ecological-functions-spatial-metrics-and-landscape-change-sacramento-san>. Accessed: January 26, 2016.

SFEP (2016). Final draft CCMP 2016: Comprehensive conservation and management plan for the San Francisco Estuary - goals for 2050 - actions for 2021. San Francisco Estuary Partnership (SFEP), Oakland, CA. Available: [http://www.sfestuary.org/wp-content/uploads/2013/10/CCMP\\_FinalDraft\\_051216.pdf](http://www.sfestuary.org/wp-content/uploads/2013/10/CCMP_FinalDraft_051216.pdf). Accessed: July 7, 2016.

SJMSCP (2000). San Joaquin Multispecies Habitat Conservation and Open Space Plan. San Joaquin Council of Governments (SJMSCP), Stockton, CA. Available: <http://www.sicog.org/DocumentCenter/View/5>.

Solano County Water Agency (2012). Public Draft Solano Multispecies Habitat Conservation Plan. <http://www.scwa2.com/water-supply/habitat/solano-multispecies-habitat-conservation-plan>.

Tricolored Blackbird Working Group (2007). Conservation Plan for the tricolored blackbird (*Agelaius tricolor*). S. Kester (editor). Sustainable Conservation, San Francisco, CA. Available:

<http://tricolor.ice.ucdavis.edu/files/trbl/Conservation%20Plan%20MOA%202009%202.0%20update.pdf>. Accessed: July 7, 2016.

USFWS (1984). Recovery Plan - Valley elderberry longhorn beetle. U.S. Fish and Wildlife Service Region 1 (USFWS), Portland, OR.

USFWS (1996). Recovery plan for the Sacramento-San Joaquin Delta native fishes. U.S. Fish and Wildlife Service Region 1 (USFWS), Portland, OR.

USFWS (1999). Conservation guidelines for the valley elderberry longhorn beetle. U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, CA.

USFWS (2012). Draft post-delisting monitoring plan for the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). US Fish and Wildlife Service, Sacramento Field Office (USFWS), Sacramento, CA.

Whipple, A., R. Grossinger, D. Rankin, B. Stanford and R. Askevold (2012). Sacramento-San Joaquin Delta historical ecology investigation: Exploring pattern and process. Prepared for the California Department of Fish and Game and Ecosystem Restoration Program. San Francisco Estuary Institute-Aquatic Science Center, Richmond, CA.

Yolo County HCP/NCCP Joint Powers Agency (2015). Chapter 6 Conservation Strategy. In Second administrative draft Yolo Habitat Conservation Plan and Natural Community Conservation Plan. Yolo Habitat Conservancy, Woodland, CA. Available:

[https://media.wix.com/ugd/8f41bd\\_0481abda525446f588081cebbc22ae20.pdf](https://media.wix.com/ugd/8f41bd_0481abda525446f588081cebbc22ae20.pdf). Accessed: March 6, 2017.

## Appendix VIII – Delta Plan Recommendations

Table VIII.1. Delta Plan recommendations and desired outcomes (Delta Stewardship Council 2013) aligned with Delta Conservation Framework overarching goals and strategies.

CURRENT DELTA PLAN RECOMMENDATIONS	DESIRED OUTCOMES	DELTA CONSERVATION FRAMEWORK GOALS AND STRATEGIES
<p><b><i>Re-establish or improve Delta ecosystems</i></b></p>	<ul style="list-style-type: none"> <li>• Availability of quality habitats for self-sustaining and persistent resident and migratory fish, birds, and upland wildlife;</li> <li>• Connectivity via migratory corridors, containing areas with high-quality cover and feeding opportunities, and resiliency to absorb and adapt to current and future effects of multiple stressors.</li> </ul>	<p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and improve conditions for species recovery.</p> <p><b>Strategy D1:</b> Restore, enhance and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging Regional Partnerships, in Regional Conservation strategies to improve function and life history support for resident and migratory wildlife.</p> <p><b>Strategy D2:</b> Through technical analyses conducted by given Regional Partnerships, identify and prioritize available areas to protect Delta ecosystems and transition zones with the potential for providing landscape connectivity and resiliency to ecosystem function.</p> <p><b>Strategy D3:</b> Improve the connectivity of ecosystems and associated wildlife populations at multiple scales</p> <p><b>Strategy D4:</b> Create conditions conducive to meeting the goals in existing species recovery plans to maintain or improve the distribution and abundance of listed species supported by Delta ecosystems</p> <p><b>Strategy D5:</b> Implement conservation actions to improve ecosystem function and support a thriving aquatic food web in the Delta</p> <p><b>Strategy D6:</b> Support and coordinate proactive approaches for the early detection, rapid response, and long-term control and management of harmful invasive species.</p> <p><b>Strategy D7:</b> Balance the benefits of conservation areas for human use with reduced adverse effects on Delta wildlife from human disturbance.</p>
CURRENT DELTA PLAN	DESIRED OUTCOMES	DELTA CONSERVATION FRAMEWORK GOALS AND STRATEGIES

RECOMMENDATIONS		
<p><b><i>Re-establish or improve Delta ecosystems</i></b></p>	<ul style="list-style-type: none"> <li>• Availability of quality habitats for self-sustaining and persistent resident and migratory fish, birds, and upland wildlife;</li> <li>• Connectivity via migratory corridors, containing areas with high-quality cover and feeding opportunities, and resiliency to absorb and adapt to current and future effects of multiple stressors.</li> </ul>	<p><b>Goal C:</b> Develop multi-benefit focused conservation and land management solutions to balance environmental and human needs</p> <p><b>Strategy C1:</b> Incorporate conservation goals with levee maintenance and flood management practices to provide habitat along Delta channels, river corridors, and riparian zones.</p> <p><b>Strategy C4:</b> Advance state and local agency and stakeholder land management processes and procedures.</p> <p><b>Goal E:</b> To evaluate conservation progress and address climate change stressors and other drivers of change, implement the Delta Science Program and Interagency Ecological Program (IEP) science strategies, the adaptive management program for Biological Opinions related to state and federal water project operations (AMP), and the California <i>EcoRestore</i> adaptive management program.</p> <p><b>Strategy E1:</b> Implement the priority research science actions and needs outlined in the Delta Science Strategy, the IEP science agenda, and Delta smelt and salmonid Resiliency Strategies.</p> <p><b>Strategy E2:</b> Utilize adaptive management, including coordinated, area-wide monitoring programs, as an integrated part of Delta conservation to assess progress and status and trends of resources of interest.</p> <p><b>Strategy E3:</b> Develop resources and recommended best practices to maintain or increase ecosystem and wildlife resiliency to projected climate change effects.</p>

CURRENT DELTA PLAN RECOMMENDATIONS	DESIRED OUTCOMES	DELTA CONSERVATION FRAMEWORK GOALS AND STRATEGIES
<p><b><i>Respect local land use when siting and restoring habitats to encourage multiple benefit outcomes for people and wildlife</i></b></p>	<ul style="list-style-type: none"> <li>• Good-neighbor practices implemented to minimize negative effects;</li> <li>• Wildlife-friendly agriculture aimed at providing co-benefits;</li> <li>• Carbon farming aimed at subsidence reduction to reverse historical legacy effects.</li> </ul>	<p><b>Goal A:</b> <i>Integrate regular stakeholder communication and socioeconomic considerations into Delta conservation planning, implementation, science, and adaptive management processes.</i></p> <p><b>Strategy A1:</b> Utilize collaborative regional partnerships and regular coordinated forums to plan, implement, and manage conservation and evaluate progress.</p> <p><b>Strategy A2:</b> Align conservation practices with best practices for supporting Delta agriculture and community needs.</p> <p><b>Goal C:</b> Develop multi-benefit focused conservation and land management solutions to balance environmental and human needs</p> <p><b>Strategy C2:</b> Support sustainable wildlife-friendly agriculture to provide additional wildlife and migratory bird habitats.</p> <p><b>Strategy C3:</b> Control and reverse land subsidence and support climate change mitigation efforts by implementing <i>carbon farming</i> projects where plants sequester carbon and build up soils over time.</p>

CURRENT DELTA PLAN RECOMMENDATIONS	DESIRED OUTCOMES	DELTA CONSERVATION FRAMEWORK GOALS AND STRATEGIES
<p><b><i>Recreate more natural variations in aquatic ecosystem water availability and quality through conservation actions</i></b></p>	<ul style="list-style-type: none"> <li>• Aquatic habitats, tidal marshes, and floodplains are more dynamic to encourage survival of native species, and better resist invasions by weeds and animal pests;</li> <li>• Restored reaches where Delta tributaries and streams are free to meander and connect seasonally to functional floodplains;</li> <li>• Tidal channels and bays in the Delta and Suisun Marsh connect with freshwater creeks, upland grasslands, and woodlands.</li> </ul>	<p><b>Goal C:</b> Develop multi-benefit focused conservation and land management solutions to balance environmental and human needs</p> <p><b>Strategy C1:</b> Incorporate conservation goals with levee maintenance and flood management practices to provide habitat along Delta channels, river corridors, and riparian zones.</p> <p><b>Strategy C4:</b> Advance state and local agency and stakeholder land management processes and procedures.</p> <p><b>Strategy C5:</b> Develop best practices for assuring reliable water distribution for in-Delta uses and when implementing conservation.</p> <p><b>Strategy C6:</b> Integrate solutions for improving surface- and groundwater quality into conservation project planning and implementation.</p> <p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change.</p> <p><b>Strategy D1:</b> Restore, enhance, and manage ecosystem processes Delta-wide, as identified and specified by existing or emerging <i>Regional Partnerships</i>, in <i>Regional Conservation Strategies</i> to improve function and life history support for native and migratory wildlife.</p> <p><b>Strategy D2:</b> Through technical analyses conducted by given <i>Regional Partnerships</i>, identify and prioritize available areas to protect Delta ecosystems and transition zones with the potential for providing landscape connectivity and resiliency to ecosystem function.</p> <p><b>Strategy D3:</b> Improve the connectivity of ecosystems and associated wildlife populations at multiple scales.</p> <p><b>Strategy D4:</b> Create conditions conducive to meeting the goals in existing species recovery plans to maintain or improve the distribution and abundance of listed species supported by Delta ecosystems.</p> <p><b>Strategy D5:</b> Implement conservation actions to improve ecosystem function and support a thriving aquatic food web in the Delta.</p> <p><b>Strategy D6:</b> Support and coordinate proactive approaches for the early detection, rapid response, and long-term control and management of harmful invasive species.</p>

CURRENT DELTA PLAN RECOMMENDATIONS	DESIRED OUTCOMES	DELTA CONSERVATION FRAMEWORK GOALS AND STRATEGIES
<i>Improve water quality to protect all beneficial ecosystem uses of water</i>	<ul style="list-style-type: none"> <li>• Identification of water quality impacts of proposed conservation projects</li> </ul>	<p><b>Goal C:</b> Develop multi-benefit focused conservation and land management solutions to balance environmental and human needs  <b>Strategy C6:</b> Integrate solutions for improving surface- and groundwater quality into conservation project planning and implementation.</p>
<i>Prevent introduction of and managing nonnative species impacts to benefit people and native wildlife.</i>	<ul style="list-style-type: none"> <li>• Prioritized actions to control nonnative invasive species;</li> </ul>	<p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change.  <b>Strategy D6:</b> Support and coordinate proactive approaches for the early detection, rapid response, and long-term control and management of harmful invasive species.</p>
<i>Encourage partnerships to support recreation and tourism to enhance nature-based recreation.</i>	<ul style="list-style-type: none"> <li>• Expanding state recreation areas and recreation on public lands;</li> <li>• Californians recognize and celebrate the Delta’s unique natural resource values through wildlife observation, angling, waterfowl hunting, and other outdoor recreation</li> </ul>	<p><b>Goal A:</b> <i>Integrate regular stakeholder communication and socioeconomic considerations into Delta conservation planning, implementation, science, and adaptive management processes.</i>  <b>Strategy A1:</b> Utilize collaborative regional partnerships and regular coordinated forums to plan, implement, and manage conservation and evaluate progress.</p> <p><b>Goal B:</b> <i>Support and expand existing public education programs and run state and national outreach campaigns focused on Delta values and ecosystem conservation.</i>  <b>Strategy B1:</b> Support and expand existing public education programs to include a focused curriculum on integrating agriculture, Delta communities, and ecosystem conservation that also communicates impending changes to resources and ecosystem services from climate change.  <b>Strategy B2:</b> Continue support for the expansion and implementation of existing outreach and education campaigns to promote the Delta and the importance of multi-benefit conservation outcomes to a wide audience at both state and national levels.</p> <p><b>Goal D:</b> Conserve ecosystems and their ecological processes to promote function to benefit society and wildlife and enhance resilience to climate change.  <b>Strategy D7:</b> Balance the benefits of conservation areas for human use with reduced adverse effects on Delta wildlife from human disturbance.</p>

*References:*

Delta Stewardship Council (2013). The Delta Plan: Ensuring a reliable water supply for California, a healthy Delta ecosystem, and a place of enduring value. Delta Stewardship Council, Sacramento, CA . Available: <http://deltacouncil.ca.gov/delta-plan-0>. Accessed: June 23, 2016.



## Appendix IX – Good Neighbor Checklist

### Good Neighbor Checklist

Department of Water Resources Agricultural Lands Stewardship Workgroup

<https://agriculturallandstewardship.water.ca.gov/web/guest/good-neighbor-checklist>

The Sacramento-San Joaquin Delta (Delta) is the home of numerous habitat restoration efforts. Many Delta farmers are concerned that habitat lands could harm nearby agriculture in various ways. They would like assurance that entities that establish and manage habitat projects will consult with their neighbors and find ways to avoid impacts and resolve problems if they arise.

Restoration project managers can use the following checklist to ensure they comprehensively consider and examine the impacts of their project on neighbors as well as the impacts of neighboring lands on conservation projects. The checklist is based on a discussion paper, "Agricultural and Land Stewardship Strategies" (see <https://agriculturallandstewardship.water.ca.gov>), which identifies a menu of mitigation measures and enhancements for the Delta. The measures described in the discussion paper, called *Strategies*, are referenced in the checklist.

- Have project proponents consulted with all neighboring landowners and operators about the project and its potential impacts? (See Strategy E1.1, which recommends involvement of landowners in project planning.)
- Have project proponents designated a local contact person to meet with neighboring landowners and discuss any issues of concern? (See Strategy D5.1, which suggests establishment of a public advisor position to help the public work with government agencies.)
- Will the project need access through other properties? If so, have access agreements been obtained?
- Does the management plan for the project provide for an on-site patrol or manager to deter trespass and vandalism? (See Strategy A4.3, which suggests the hiring of game wardens, sheriff's deputies, or private security guards.)
- Will the project increase the presence of vegetation susceptible to fire? (If yes, see Strategy A4.3.)
- Will the project discontinue maintenance of flood control features, involve prolonged or repeated flooding of previously dry land, or affect wind fetch across waterways? (If yes, see Strategy A1, which discusses flood protection improvements, and Strategy E1.3.2, which discusses drainage and seepage.)

- As a result of the project, are species on the project site expected to increase markedly in abundance and move from the site to neighboring lands or waterways? If yes, which species? (See Strategy A4.2, which suggests ways to protect landowners from liability under endangered species laws.)
- Is it reasonably possible that species in the project area could damage crops or promote the growth of weeds or diseases on neighboring farms? (If yes, see Strategy A3, which suggests ways to control weeds, and Strategy A4.1, which suggests the use of buffer zones and mechanisms for compensation for crop damages.)
- Will the project disturb utilities, roads, bridges, or other infrastructure that serve agricultural uses? (If yes, see Strategy D3, which suggests improvements to transportation infrastructure.)
- Will the project fragment or isolate farmland? (If yes, see Strategy E1.1, which encourages collaborative project planning.)
- Do domestic or feral animals or livestock occur on lands neighboring the project? (If yes, see Strategy A4.1, which suggests the use of buffer zones.)
- Do neighboring farms use chemicals as fertilizer or to control weeds or crop pests? (If yes, see Strategy A4.1, which suggests the use of buffer zones.)

## Appendix X – Wildlife-Friendly Agriculture

### *Migratory Bird Conservation Partnership*

The Migratory Bird Conservation Partnership (MBCP) is comprised of three of California’s top organizations for bird conservation: Audubon California, Point Blue Conservation Science, and The Nature Conservancy (TNC). Since 2008, the MBCP has addressed issues concerning birds’ habitat and biological needs while working with a broad array of partners to develop multi-benefit conservation solutions for birds, wildlife, and human communities. Aligned with the work of the Central Valley Joint Venture, the MBCP develops strategies that deliver gains in ecosystem conservation through the development of knowledge and essential relationships ([http://www.camigratorybirds.org/?page\\_id=60](http://www.camigratorybirds.org/?page_id=60)).

One of MBCP’s strategies for protecting, restoring, or enhancing lands that support bird populations is a program on wildlife-friendly working lands (MBCP 2017, [http://www.camigratorybirds.org/?page\\_id=30](http://www.camigratorybirds.org/?page_id=30)). Since the steep decline of natural wetlands in California, millions of birds depend on over 25 million acres of agricultural fields. The MBCP works with farmers to keep agriculture productive, such as providing an abundant food supply, while at the same time providing critically needed habitat for birds. For example, the MBCP has had good success working with rice farmers in the Sacramento Valley. From this work with farmers to optimize management practices for wildlife, migrating birds are able to use the rice fields for nesting, roosting, and foraging on waste grains to prepare for their long migrations. Benefits to the farmers include long-term productivity and protection from urban development. The partnership between the MBCP and working farmers will provide scientifically tested and cost-effective practices that complement existing crop management while increasing benefits for the birds; for example, strategically planning crop field locations and types. This strategy aims to provide long-term sustainability of both food-producing crops and wildlife.

*The MBCP spent three years working directly with the rice community and developing the concept with a handful of willing farmers. In August 2011, the MBCP’s work led the National Resources Conservation Service (NRCS) to provide nearly \$3 million for a pilot program to give farmers incentives to manage their lands as bird habitat. Working closely with the NRCS and the California Rice Commission, the MBCP helped to enroll about 75 farmers and more than 23,000 acres in the program. Based on that success, the MBCP helped the NRCS expand the program in 2012 and 2013 to over 100,000 acres. Today, the program is going strong—roughly 20 percent of all rice lands in California are participating to benefit both migratory birds and farmers. (MBCP 2017)*

### *BirdReturns Project*

TNC is spearheading the *BirdReturns* project, which aims to provide global benefits of conserving the Pacific Flyway (<https://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/california/howwework/california-migratory-birds.xml>). As a result of habitat destruction, water and food shortages, and climate change, migrating birds are having difficulty finding wetlands along the Pacific Flyway to stop for feeding, resting, and overwintering. To address the decline of the Pacific Flyway's support of avian migration that spans from Alaska to South America, the pilot *BirdReturns* project combines scientific data with economic incentives to provide habitat for birds on rice fields in the Sacramento Valley.

California supports some of the largest concentrations of wintering waterfowl and shorebirds in the world; therefore, the decline of migratory birds in California affects the status of migratory birds on a global scale. Two of the *BirdReturns* strategies to conserve migratory birds are to 1) protect and enhance bird-friendly agricultural lands; and 2) secure adequate water supply to wetlands and compatible agricultural lands. Through partnerships with the California Rice Commission, Cornell Lab of Ornithology, and Point Blue Conservation Science, TNC has a goal to create one million acres of Central Valley wetland habitat, ensuring the approach protects nature and helps farmers to thrive. In addition, migratory bird conservation would support an economy based on billions of dollars in revenue from birdwatching and hunting.

Here is how it works: Citizen scientists record bird data in the eBird database, which is sent to the Cornell Lab of Ornithology. Maps are generated showing the highest concentration of birds on the remaining Central Valley wetlands and where the habitat needs are greatest. TNC then pays the rice farmers located along the Sacramento River to keep their fields flooded at optimal depths as flocks of migratory birds arrive. The farmers bid for the leases to provide temporary wetlands for the migrating birds. With a modestly low cost to TNC, the project aims to increase the number of shorebirds that stop in the Central Valley by over 50% and to provide 10,000 acres of habitat each year for hundreds of thousands of migrating birds that rely on the Central Valley (Robbins 2014, <https://www.nytimes.com/2014/04/15/science/paying-farmers-to-welcome-birds.html>; Change the Course 2017, <http://changethecourse.us/projects/sacramento-river-wetland-enhancement-project/>).

*In the first year of BirdReturns, 10,000 acres owned by 40 farmers were flooded for up to eight weeks. Participating farmers included the Rue & Forsman Ranch, which grows sushi rice near Wheatland, CA. While the timing of flooding may have had a disadvantage for planting, the compensation was "better than adequate," according to the farmer. If more farmers get involved, migratory bird habitat could be created along all of the Pacific Flyway.  
(Robbins 2014)*

### *Delta Working Landscapes*

The Delta Protection Commission (DPC), through wildlife friendly agriculture and wetland restoration, provided examples of what measures private landowners could adopt on larger scales throughout the Delta through the Delta Working Landscapes Program (DWLP) ([http://delta.ca.gov/land\\_use/wildlife/](http://delta.ca.gov/land_use/wildlife/)). In collaboration with Ducks Unlimited, Hart Restoration, Inc., and local landowners, objectives of the program were to:

- Improve the environmental quality of existing landscapes in the Delta;
- Demonstrate economic benefits of habitat-friendly cultural practices;
- Understand the social, economic, environmental, and governmental policy hurdles and/or incentives to perform conservation practices; and
- Communicate the advantages of wildlife-friendly agricultural practices to landowners.

The DWLP focused on pilot projects that demonstrated how farmers can integrate habitat restoration into farming practice (DPC 2012). For example, the program established vegetative buffers along irrigation ditch banks and hedgerow plantings, designed to provide habitat for wildlife, improve water quality, and enhance levee stability. Restoration projects also included creating seasonal and permanent wetlands on marginal farmlands, providing essential habitat for waterfowl. By 2012, the projects resulted in a total of 312 acres of wetlands and 6.5 miles of enhanced levees and waterways. Many of the revegetated areas support native plants and wildlife and filter agricultural drainage, which improves water quality and enhances levee stability. The wetland restoration sites support multiple species of waterfowl and are used for brooding and feeding. Despite some of the challenges to the program, DWLP projects can be expanded through better communication between policy and regulatory agencies and by publicizing successful projects (DPC 2012).

Within the primary zone of the Delta (Water Code § 12220), 16 projects were completed at 10 sites (DPC, CDFW et al. 2013). (See Table XI.1.)

Table X.1. Summary of DWLP Projects

<b>Project Name and Location</b>	<b>Project Partners</b>	<b>Project Goals</b>
Uslan Farms, Hamilton Road	Uslan Farm, Ducks Unlimited	Create semi-permanent wetland, seasonal wetland, and associated upland habitat
Winchester Vineyards, Winchester Lake	Ducks Unlimited, Hart Restoration, Winchester Vineyards, Winchester Lake Ski Club, Reclamation District 999	Create habitat along Winchester Lake that promotes slope stability, and create adjacent seasonal wetland habitat in low-yield crop area
Heringer Ranch, Elkhorn Slough	Heringer Vineyards, Hart Restoration	Reduce erosion of landside levee slope and prevent burrowing animals through plantings of native grasses
Heringer Ranch, Netherlands Road	Heringer Vineyards, Hart Restoration	Reduce erosion on slopes along Netherlands Road through vegetation plantings
Heringer Ranch (Vineyard), between Elkhorn Slough and Netherlands Road	Heringer Vineyards, Hart Restoration	Plant native vegetation to reduce erosive surface water runoff and provide habitat for wildlife
Vino Farms (Lambert Road), Pierson District	Vino Farms, Hart Restoration, Ducks Unlimited	Create slope wetland and use buffer plantings to stabilize slope bank
Vino Farms (Ditch 1 & 2), Merritt Island	Vino Farms, Hart Restoration	Plant native grasses and vegetation to reduce erosive surface water runoff and provide habitat for wildlife
C&M Orchards, North Stone Lake	C&M Orchards, Ducks Unlimited	Improve three acres of unfarmable land through creation of seasonal wetland
Woody's by the River, Empire Tract	Woody's by the River, Ducks Unlimited	Create berms around the existing corn field to facilitate seasonal flooding for waterbird habitat
Wilson Farms, Merritt Island	Wilson Vineyards, Hart Restoration	Create buffer strip to promote habitat and slope stabilization
San Joaquin Delta Farms, Lower Jones Tract	San Joaquin Delta Farms, Ducks Unlimited, U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program	Create seasonal wetland, upland habitat, and a brood pond on a 400-acre cereal crop farm
Van Loben Sels Ranch, Pierson District	Van Loben Sels Farms, Hart Restoration	Plant native grasses along the levee of Snodgrass Slough to prevent erosion. Plant wild rye, sedge, and rushes along the irrigation ditch to reduce runoff from irrigation

## *References*

DPC (2012). Delta Working Landscapes: public and private partnerships for habitat. The Delta Protection Commission (DPC), West Sacramento, CA. Available: [http://delta.ca.gov/wp-content/uploads/2016/10/Delta\\_Working\\_Landscapes\\_Report\\_October\\_2012.pdf](http://delta.ca.gov/wp-content/uploads/2016/10/Delta_Working_Landscapes_Report_October_2012.pdf). Accessed: August 25, 2017.

DPC, CDFW, DU and Delta Eco Farms (2013). Delta Working Lands final report: September 2013. Delta Protection Commission (DPC), West Sacramento, CA; California Department of Fish and Wildlife (CDFW), Sacramento, CA; Ducks Unlimited (DU), Sacramento, CA. Available: [http://delta.ca.gov/wp-content/uploads/2016/10/DWL\\_Final\\_Report\\_9-2013.pdf](http://delta.ca.gov/wp-content/uploads/2016/10/DWL_Final_Report_9-2013.pdf). Accessed: August 9, 2017.

## Appendix XI – Species Recovery Briefs

### *Giant Garter Snake*

#### General Description

Recognized as a full species in 1987, giant garter snakes (GGS; *Thamnophis gigas*) are distinguishable from other garter snakes, such as the common garter snake (*T. sirtalis*) and western terrestrial garter snake (*T. elegans*), by the size and number of facial scales (USFWS 2015, Hansen 2016). A wide range of phenotypic variability makes it difficult to distinguish GGS from other garter snakes or even gopher snakes (Hansen 2016). Generally, GGS are larger than other garter snakes, observed up to about four feet in length and about two pounds in weight (Casazza 2016). GGS coloration generally varies from brown to olive with a cream, yellow, or orange dorsal stripe and two light-colored lateral stripes; but some GGS may have a checkered pattern, with or without the stripes (USFWS 2015). GGS may be behaviorally distinguished from other snakes by its wary and alert nature, such as its common practice of crypsis, escape reaction to being approached, and habitat preferences (Hansen 2016).



Photo: Margaret Mantor, CDFW

GGS are endemic to the Central Valley of California. Historically, GGS ranged throughout the Sacramento and San Joaquin valleys in wetlands that extended from northern Butte County near Chico to Buena Vista Lake near Bakersfield in Kern County (USFWS 2015). Although abundance has declined, the distribution of GGS in the Sacramento Valley remains similar to the historic distribution; however, the distribution and abundance in the San Joaquin Valley has been greatly reduced and fragmented (BDCP 2013, USFWS 2015). In and near the Delta, researchers identified populations at Badger Creek in the Cosumnes River Ecological Reserve, near White Slough on Shin Kee and Terminous Tracts, and in the Yolo Basin (Engstrom 2010). Recent detections imply another population may have established along the False River (CNDDDB Element Occurrences #402, #359, #170). Recent sightings on other islands indicate that the distribution of GGS in the Delta is currently not well understood.

## Status and Threats

Due to a 95% reduction in natural wetland habitat, its shrinking range, and declining populations, GGS were listed as threatened under the federal Endangered Species Act (ESA) in 1993 and state listed as threatened in 1971 under the California Endangered Species Act (CESA) (Wylie, Cassaza et al. 1997, Engstrom 2010). In the Delta region, populations have become increasingly spatially and genetically isolated, and low genetic exchange threatens the future sustainability of GGS in this area (Engstrom 2010). The Badger Creek population (Snake Marsh) was found to be the most stable and genetically diverse (Engstrom 2010); however, due to the 2015-2016 drought and other factors, the status of this population is now uncertain (L. Patterson personal communication 9/22/2016).

Besides reduction of habitat, GGS are threatened by predation, mostly from bullfrogs and predatory fish but also crayfish and mammals (USFWS 2012, USFWS 2015). The invasive water snake (*Nerodia* spp.) is an identified threat to GGS if they co-occur, because it is an efficient competitor and could be a carrier of disease (USFWS 2012, USFWS 2015). Where there is a lack of native prey, GGS may forage on catfish (*Ictaluridae*) with spines that cause internal injury and mortality (Ersan, Halstead et al. 2016). Threats of flooding include inundation of burrows, drowning, or displacement (USFWS 2015, Casazza 2016). Levee maintenance and flood control work threaten GGS that use levee habitats for their life history needs. Other threats include contamination, canal management, and changes in water management (USFWS 2012).

## Habitat Requirements

GGS spend the active season (typically April 15 – October 1) in and near aquatic habitats with emergent vegetation, including tule marshes, seasonal wetlands, small lakes or ponds, low-gradient streams, flooded rice fields, or agricultural waterways such as irrigation and drainage canals or ditches (Halstead, Skalos et al. 2015, USFWS 2015). GGS use aquatic habitat for foraging, breeding, and dispersal. GGS require freshwater habitat that remains perennial from March through November and generally consists of shallow water, lower-order tributaries, or floodplains (USFWS 1999, USFWS 2015). GGS rarely use deep water or fast-flowing channels, such as rivers, that contain predatory fish (USFWS 1999). They prefer aquatic habitat that is slow-moving or stagnant, with a muddy substrate, and without a thick riparian canopy (USFWS 2015). In the Delta, however, recent detections imply GGS may be using larger waterways. Some of these waterways could be suitable if pockets of dense emergent vegetation slow down the flow enough to provide shelter or concentration of prey (L. Patterson personal communication 8/23/2016). More recent observations in waterside riprap revetment, with little to no emergent vegetation, suggest GGS may be able to forage and maintain cover in the interstices of the revetment (Stillwater Sciences 2017).

During the active and dormant seasons, GGS use upland habitat consisting of vegetated levees or stream banks, generally within 200 feet of aquatic habitat (USFWS 2015). During the summer, GGS may spend more than half their time in the early afternoon in burrows or other

sources of cover, and they will likely be found within 98 feet of the water's edge (Halstead, Skalos et al. 2015). Upland habitat requires vegetative cover such as grasses and forbs, as well as the presence of small mammal burrows, cracks, or crevices used for hibernation, thermoregulation, ecdysis (shedding of skin), and refuge from predators (USFWS 2015). GGS also use open areas for basking and thermoregulation (USFWS 2015).

### **Recovery Needs**

The draft U.S. Fish and Wildlife Service (USFWS) revised recovery plan for GGS (USFWS 2015) focuses on protecting existing, occupied habitat and identifying and protecting areas for habitat restoration, enhancement, or creation; reducing threats; and improving the population status. A critical component of the recovery plan is to provide connectivity between populations that are protected and self-sustaining. Engstrom (2010) found the White Slough and Snake Marsh populations were genetically distinct, with unique haplotypes that represent a large proportion of GGS' genetic diversity. In the Delta, habitat between populations is fragmented. Without adequate migration of females to other patches of suitable habitat, these diverse populations would not be able to provide gene flow or demographic rescue of extirpated populations (Engstrom 2010). Protection or creation of sufficient habitat linkages, with the removal or reduction of threats, could increase genetic diversity and population resilience. Of equal importance is to establish ongoing survey and monitoring efforts throughout the Delta and Cosumnes River Preserve, to understand where populations currently exist and what types of habitats they use.

While restoration of connected wetlands is underway, increasing the amount and distribution of flooded rice fields in the Delta would provide interim habitat, as long as agricultural or other waterways are also maintained across the landscape to connect patches of suitable wetlands and rice fields (USFWS 2015). For example, most of the waterways between contiguous blocks of habitat in the Stone Lakes National Wildlife Refuge and the Cosumnes River Preserve are small and fragmented (ICF International 2016). Reestablishing connection between these areas through working agricultural landscapes could help to recolonize GGS in the north Delta.

### **Multi-Benefit Opportunities to Support Recovery**

Restoration or farming of wetlands would not only provide needed habitat for GGS and other wetland-dependent species, but would also sustain waterfowl and fisheries for recreational hunting and fishing. Wetlands also attract birdwatching, bringing visitors to experience the Delta's natural beauty; and such visitors may support local businesses. Cultivated rice for GGS would benefit a large list of waterfowl, shorebirds, wading birds, and other wildlife, if flooded in the summer and winter (<http://calrice.org/wildlife/>). In addition to restoring wetlands, rice farming could serve to sequester greenhouse gases (GHG); however, the amount of time the rice is flooded before and after harvest affects its efficacy as a GHG sink (Knox, Sturtevant et al. 2015). Therefore, flooding rice for both GGS and wintering birds could benefit farmers by providing potential cap-and-trade income. Incentive-based rice farming has provided economic returns to farmers creating rice

habitat in the Yolo Bypass (Hayden 2015). Similar economic incentives could help make rice profitable in the Delta, where growth conditions are suitable. The Department of Water Resources (DWR) is growing rice and restoring wetlands on Twitchell Island to test this method for subsidence reversal (DWR 2008, DSC 2015). In 2016, DWR staff observed GGS on Twitchell and Sherman Islands adjacent to wetland restoration sites, and additional potential sightings were made near rice (J. Long personal communication 8/22/17, Long 2016). Accretion of land on subsided islands protect levee stability, and the property of farmers and landowners, from the flood risks associated with sea level rise and other climatic events (Deverel, Ingrum et al. 2016). In addition to increasing GGS habitat and connectivity, wetland vegetation “farming” may become a lucrative option for farmers in the future as the climate changes the viability of currently grown crops.

Other flood protection strategies for farmers and residents in the Delta are compatible with the conservation needs of GGS. Flood protection levees managed with water-side vegetation can provide upland habitat; however, GGS may also use riprapped levees along sloughs or rivers for cover or overwintering (Wylie, Cassaza et al. 1997, Wylie and Amarello 2008). GGS were recently observed using riprap with emergent vegetation on Jersey Island along the False River (CNNDDB Element Occurrence #402) and along Little Connection Slough (CNDDDB Element Occurrence #307). In 2017, seven additional GGS were observed along the San Joaquin River on Jersey Island, basking or burrowing within the riprap on the waterside of the levee with little or no vegetation (Stillwater Sciences 2017). This flood control revetment provided upland habitat needs for GGS.

#### *Wildlife-friendly Agriculture*

- In the northern **Yolo Bypass**, Conaway Ranch manages an agricultural conservation easement of approximately 1,000 acres with rice fields and drainage canals for GGS (WCB 2012), in an area where the species had been found (CNDDDB Element Occurrences #314, #267, #294, #295, #266). Also in the northern Yolo Basin, Knaggs Ranch maintains about 1,700 acres of flooded habitat in a wildlife-friendly rice operation for birds and fish, which also provides habitat for GGS (Hayden 2015). Since the Yolo Bypass is suitable for rice farming, there is an opportunity to create additional easements near extant occurrences and habitat.
- In the **Cosumnes River Preserve**, there is an opportunity for California Department of Fish and Wildlife (CDFW) to maintain the Snake Marsh population near Badger Creek by working cooperatively with farmers. The properties are owned and managed by CDFW, with some acreage leased as cropland (Kleinschmidt Associates 2008). CDFW works closely with farmers to manage utility costs and timing of pumping water to irrigate crops and to maintain freshwater marsh habitat for GGS (E. Kleinfelter personal communication 8/17/17). Additionally, run-off from farming operations provides water to GGS habitat. Therefore, this area supports both wildlife-friendly farming and recovery of GGS.

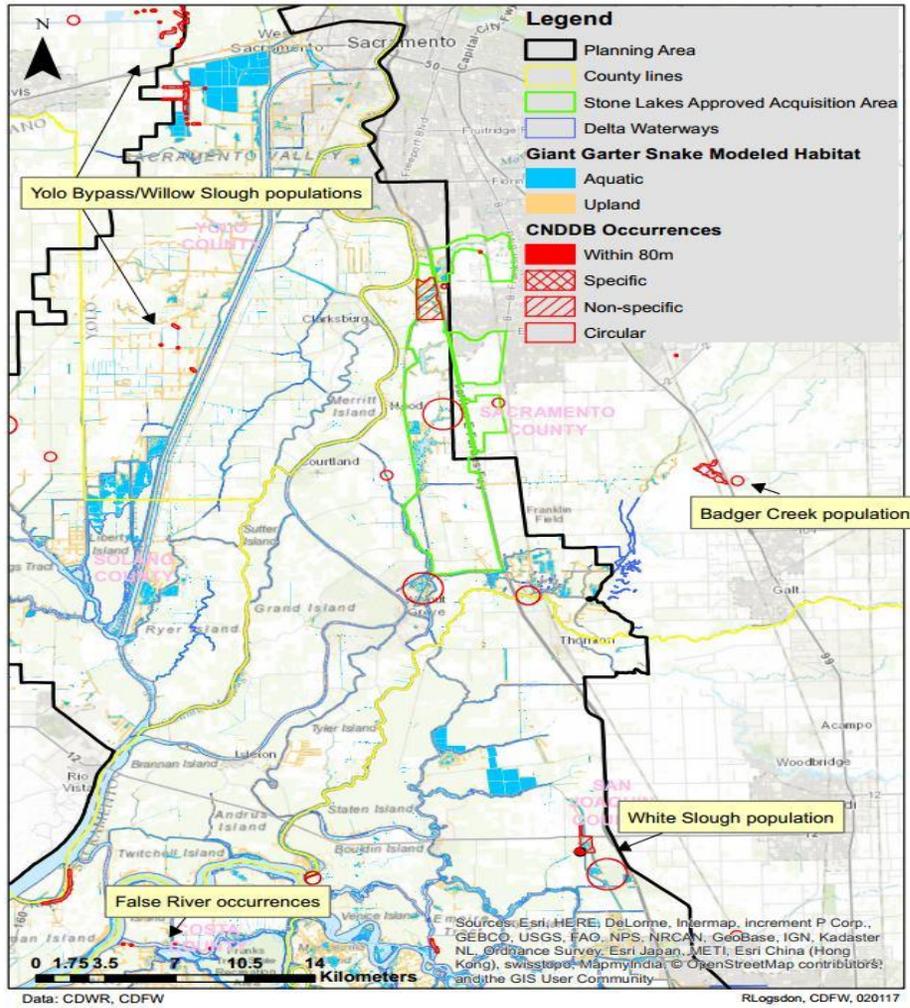
### Future Outlook and Suggested Strategies

Changes in climate over the next 30 years could affect the persistence of aquatic habitat in the Delta through prolonged periods of drought or intense flooding caused by sea level rise, more frequent extreme storms, and rapid snowmelt from the Sierra Nevada (Reclamation and CDWR 2008, USFWS 2012). Concurrent with climate impacts, suitable wetland and agricultural habitat may continue to decline due to conversion to incompatible uses, such as perennial crop agriculture and commercial or residential development. Populations of GGS in the Delta could be at risk of disappearing due to genetic isolation, which could result in loss of resilience and local extirpations (Engstrom 2010). Increased and higher intensity flood events would increase inundation of habitat--potentially flooding occupied burrows, displacing GGS to other locations, or altering aquatic habitat to the point it is no longer suitable (USFWS 2012).

Suggested strategies for the future include: 1) Maintain or increase suitable habitat in and around already occupied sites; 2) Create or conserve dispersal habitat between occupied populations at Snake Marsh and White Slough to enable recolonization of unoccupied habitat in the Cosumnes River Preserve and Stone Lakes National Wildlife Refuge, through developing and managing networks of restored freshwater wetlands, managed wetlands, agricultural drainage or irrigation systems, flooded rice fields, and natural waterways with suitable adjacent uplands; 3) Ensure availability of water for managing aquatic habitat during years of drought at viable population sites, such as Snake Marsh; 4) Protect, enhance, or restore wetland habitat and/or provide rice agricultural easements at higher elevations (above 50 feet) with dispersal corridors to existing habitat; and 5) Maintain a functional west-east corridor between the False River occurrences and the White Slough habitat to facilitate migration out of subsided areas of the Delta and genetic exchange. (See figure XI.1 on the following page.)

Figure XI.1

Giant Garter Snake Habitat and Populations



## Swainson's Hawk

### General Description

Recognized as the species *Buteo Swainsoni* Bonaparte in 1838 (Bechard, Houston et al. 2010), the Swainson's hawk is a medium-sized raptor with relatively long, pointed wings that curve up while in flight (Battistone, Marr et al. 2016). Swainson's hawks in California generally have dark body plumage with a light-colored underside. However, there is variation in plumage and light morphs occur. The Swainson's hawk's most distinguishing feature is a bright yellow cere (fleshy region at the base of the upper bill), which contrasts with the bird's generally dark head (Bradbury 2014, Battistone, Marr et al. 2016). Another diagnostic feature is a light-colored leading edge of the wing. South of Butte Valley in California, adult sizes range from 19 to 39 ounces (550 to 1100 grams), and females are generally larger than males (Battistone, Marr et al. 2016).



Photo: Stuart Itoga, CDFW

Swainson's hawks in the western United States range from Canada and possibly as far north as Alaska during the breeding season to as far south as the pampas region of Argentina for wintering, and populations extend to the east as far as Illinois (Bechard, Houston et al. 2010, BDCP 2013, Bradbury 2014). Ninety-five percent of the Swainson's hawks in California breeds in the Central Valley, from Tehama to Kern County; and over 60% of the Swainson's hawks in the Central Valley population (hereafter, SWHA) breeds in the counties of Yolo, Sacramento, Solano, and San Joaquin (Anderson, Dinsdale et al. 2007, Battistone, Marr et al. 2016). Records of breeding pairs are spread throughout the Delta, with high concentrations in the northern and eastern Delta and surrounding agricultural landscapes (CNDDDB query 1/3/17); see figure XI.2. Breeding SWHA could occupy the Delta as early as March 1 and as late as September 30.

### Status and Threats

Due to their rapid decline and continuing threats, SWHA were listed as threatened under CESA in 1993. Over 90% of historical breeding pairs in the Central Valley declined by 1979 (Bloom 1980). Although population censuses fluctuated between the 1990s and 2007 and showed a slight

increase over time, the most recent estimate is still well below the historical population estimate (Dorin Bradbury 2009, Battistone, Marr et al. 2016, Anderson, Dinsdale et al. In prep). The Central Valley population is spatially separate from the other Swainson's hawk populations and has experienced genetic divergence and a decline in its genetic variability (Hull, Anderson et al. 2008, Bechard, Houston et al. 2010). The Central Valley population also has different migration patterns than the other populations. While most of the Swainson's hawks winter in Argentina, smaller groups from the Central Valley population were found wintering in Central America, Mexico, and as far north as the Delta, indicating shorter migration distances than in the past (Bechard, Houston et al. 2010, Bradbury 2014).

The largest threat is loss of foraging habitat connected to breeding habitat, particularly in urban and agricultural areas, where longer distances between suitable breeding and foraging habitats increase energy demand and impact nesting success (Estep 1989, CDFG 1993, Babcock 1995, England, Estep et al. 1995, Dorin Bradbury 2009, Battistone, Marr et al. 2016). As their natural feeding grounds declined, SWHA adapted to foraging in the agricultural landscape (Estep 1989). However, compatible crops for foraging have been rapidly converted to incompatible uses such as vineyards, orchards, other perennial crops, and rice (Estep 1989, CDFG 1993, Swolgaard, Reeves et al. 2008); and this rapid conversion continues (Breitler 2014). At the same time, riparian habitats and large trees in which SWHA nest continue to decline in the Central Valley and Delta (Riparian Habitat Joint Venture 2004, BDCP 2013). Other threats to SWHA include nest disturbances, such as people or vehicles approaching the nest tree too closely; loud noise near nest sites where pairs are not already acclimated; removal of occupied or potentially occupied nest trees; or nests lost from high winds. Direct mortality could result from wind turbine, transmission line, or vehicle strikes; disease; predation at nests abandoned by the parents due to disturbances; pesticide poisoning; illegal shooting; and competition (Estep 1989, England, Bechard et al. 1997, BDCP 2013, Stillwater Sciences 2015, Battistone, Marr et al. 2016).

### Habitat Requirements

SWHA nesting habitat includes riparian corridors, isolated trees or groves generally associated with farmlands, tree rows along the edges of fields and roads, and trees in urban areas where suitable foraging habitat is nearby (Bloom 1980, Schlorff and Bloom 1984, Estep 1989, England, Estep et al. 1995, Estep 2007, Estep 2008, Dorin Bradbury 2009). Nests are generally within two miles of foraging grounds, but a high percentage of nests observed in and near the Delta had good foraging habitat within 0.5 mile (Estep 2007, Estep 2008, Stillwater Sciences 2015). Species mostly used for nesting in the Central Valley include valley oak (*Quercus lobata*), Fremont cottonwood (*Populus fremontii*), Hinds' walnut (*Juglans hindsii*), willows (*Salix spp.*), and eucalyptus (*Eucalyptus spp.*); and in more urban areas, conifers such as ponderosa pine (*Pinus ponderosa*) and western juniper (*Juniperus occidentalis*) are used (Bloom 1980, Schlorff and Bloom 1984, Estep 1989, England, Estep et al. 1995, Anderson, Dinsdale et al. 2007, Estep 2007, Swolgaard, Reeves et al. 2008). Tree height rather than species may be the most limiting factor for nest site selection, with tree heights averaging between six meters (20 feet) and 22 meters (72 feet) high (Schlorff and Bloom 1984, England, Estep et al. 1995, Anderson, Dinsdale et al. 2007, Cahill 2014).

Historically, SWHA foraged in grasslands and meadows for their preferred prey, California vole (*Microtus californicus*) and other large rodents (Estep 1989). As natural habitats declined in California, SWHA adjusted to foraging in agricultural lands such as cultivated crops or pastures (Estep 1989). In the north Central Valley and Delta, alfalfa is the highest quality foraging used by SWHA, followed by irrigated field or row crops, fallowed fields, pastures, and annual grasslands (Babcock 1995, Estep 2007, Estep 2008, Anderson, Dinsdale et al. 2011, Cahill 2014). Crop management practices such as disking, irrigating, and harvesting enhance access to prey and increase foraging value (Estep 1989, Babcock 1995, Estep 2007, Estep 2009). A field size of at least 40 acres increases SWHA's ability to locate the site and the value of the habitat (Estep 2007, Stillwater Sciences 2015).

### Recovery Needs

Since availability of agricultural lands is important for SWHA recovery, conservation specifically needs to support compatible agriculture in the Delta. Identified opportunities include improved mitigation for agricultural foraging habitat loss, preserving compatible agricultural lands, and efforts to reduce threats (Dorin Bradbury 2009). The Bay Delta Conservation Plan (2013) conservation strategy identified at least 43,000 acres of agricultural lands to be protected within the reserve and also included protecting, restoring, or enhancing at least 500 acres of mature riparian forest and over 8,000 acres of native grasslands. Cultivated lands with rotations of at least 50% alfalfa and 50% crops with moderate to high foraging value were part of the BDCP conservation strategy for SWHA (BDCP 2013). There are other conservation plans in place or under development that have similar measures to protect or restore SWHA habitat in or near the Delta. For example, the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP) has a goal to secure lands with occupied nests and suitable nest trees and to acquire at least 3,600 acres of suitable foraging habitat in the vicinity of Dutch Slough (East Contra Costa County Habitat Conservancy 2006).

Making a concerted effort toward achieving these conservation strategy objectives would recover SWHA in the Delta. To achieve these objectives, there is a need to slow down the conversion of compatible agriculture to perennial tree and vine crops and to maintain large heterogeneous landscapes that contain crops such as alfalfa and grazed grasslands (Swolgaard, Reeves et al. 2008). In addition to habitat protection, management practices are needed to increase SWHA reproductive success; for example, restricting project or recreational disturbances to outside of the nesting season or creating disturbance buffers around nest trees. Monitoring and managing conserved habitats, including agricultural lands, will be needed to benefit SWHA (SJMSCP 2000, ICF International 2016). Even management practices in existing vineyards could increase prey abundance and accessibility; for example, maintaining between-row cover crops, trimming the vines, and establishing areas of native grasses between isolated tracts (Swolgaard, Reeves et al. 2008). In addition, farmers or landowners who maintain suitable nest trees on their properties could contribute to increasing SWHA nesting opportunities near suitable foraging habitat.

## Multi-Benefit Opportunities to Support Recovery

There are incentive-based programs that facilitate crop rotations and management to enhance SWHA habitat while paying dividends to the farmers, such as the Central Valley Habitat Exchange (CVHE), which allows farmers to sell mitigation credits based on the habitat value of their properties (EDF 2017). Such programs would also benefit special status species that use similar agricultural lands, such as the white-tailed kite (*Elanus leucurus*) and tricolored blackbird (*Agelaius tricolor*). Preservation of agriculture and other foraging habitat for SWHA conserves open space, restricts urban sprawl, provides outdoor education or recreation opportunities, and provides jobs and locally grown crops for consumers (Dorin Bradbury 2009). Preserving agriculture also preserves property tax reductions for farmers under the Williamson Act (<http://www.conservation.ca.gov/dlrp/lca>) and the Delta's productive economy. Further, alfalfa—the preferred foraging crop for SWHA—is resilient in drought conditions, and with water use efficiency and economic strategies, can maintain more yield during years of prolonged drought than other crops, including incompatible tree crops (Orloff, Putnam et al. 2015).

Preservation of riparian habitat and nest trees within the Delta would also benefit the aesthetic and recreational value of Delta lands, as long as recreation is low impact and doesn't disturb active nest sites. Maintaining nest trees also provides habitat for other riparian-dependent species, sequesters greenhouse gases, and removes air pollutants (Nowak, Crane et al. 2006). Tree rows could be used by landowners to protect crops, livestock, or infrastructure (such as barns or houses) from wind; provide shade; and screen out disturbances.

### *Wildlife-friendly Agriculture*

- In the **North Delta** near West Sacramento, the Environmental Defense Fund (EDF) started a pilot study for SWHA (Holmes 2014), testing the CVHE's ability to provide habitat credits for mitigation needs on private lands owned by farmers. EDF developed a habitat quality assessment tool (HQT) to rank the extent of habitat quality on private farmlands that could be eligible for mitigation credits paid to the farmer (Stillwater Sciences 2014). Local area farmers participated in the testing of the HQT on their properties. Subsequently, ten private farms or ranches in the Delta, Yolo Bypass, and outlying areas participated in the pilot program to test the HQT for evaluating SWHA habitat on their properties (Stillwater Sciences 2016). Besides mitigation, the tool could be used to evaluate potential farmlands for other methods of SWHA habitat conservation.
- In the northern **Yolo Bypass**, the Conaway Preservation Group entered into an agricultural conservation easement on Conaway Ranch for SWHA (WCB 2012). The easement is approximately 1,000 acres with compatible agricultural land for SWHA foraging, and it is consistent with the Yolo Natural Heritage Plan, an HCP/NCCP in development (Yolo County HCP/NCCP Joint Powers Agency 2015). The easement enhances the value of SWHA foraging habitat by providing 500 acres in rotated alfalfa. There are several records of SWHA nests in the vicinity of this easement that likely benefit from the foraging habitat (CNDDDB occurrences accessed March 6, 2017).

- The Friends of the Swainson’s Hawk identified the California Heartland Project as an important linkage between agriculture and habitat that includes agricultural preservation in Heartland Project goals (Dorin Bradbury 2009, ECOS 2017). The Habitat 2020 vision of preserving a network of working lands would potentially connect occupied SWHA habitat **east of the Delta** with the Yolo Basin, Stone Lakes National Wildlife Refuge, the Cosumnes River Preserve, and Delta Meadows.

### Future Outlook and Suggested Strategies

The future outlook for SWHA foraging habitat will be partly dependent on the agricultural climate of the Delta, such as the rate of conversion from compatible field and row crops to incompatible crops, as well as the rate of urban development. Drought caused by the changing climate may play a role in slowing down the trend of cropland conversions (Licht 2015); however, accelerated climate change adds to the unpredictable state of SWHA (Battistone, Marr et al. 2016). Winter runoff and flooding could have deleterious impacts to riparian nesting habitat. Sea level rise and levee failures could inundate foraging habitat that currently exists or is being conserved for SWHA. Increased fluctuations in water availability could significantly reduce the farmers’ ability to supply alfalfa and high-quality pasture habitat (Battistone, Marr et al. 2016). Increased drought, alterations of hydrology processes, and other impacts to the Delta’s water supply could affect the survival and new growth of existing and potential nest trees. Measures to mitigate climate change impacts could also negatively affect SWHA. Changing compatible crop rotations to low-value foraging habitat (such as corn) or incompatible crops (such as rice), for the purpose of increasing carbon sequestration, could restrict SWHA’s access to suitable foraging (Battistone, Marr et al. 2016). Tidal restoration projects intended to benefit fish and other natural resources, and marshlands restored for carbon sequestration or reversal of subsidence, could also decrease the extent of crops that provide SWHA with suitable foraging habitat near nest sites.

Suggested strategies for SWHA in the future include: 1) acquiring properties and managing them for SWHA before incompatible land use conversions, to preserve the agricultural and natural resource value of at-risk habitat; 2) ensure conservation of hydrology processes and water availability for compatible crops and trees to slow down the decline of nesting and foraging habitat; 3) encourage Delta farmers, residents, and other landowners to retain mature trees on their properties to help provide nesting habitat; 4) protect agricultural and natural lands for SWHA habitat that are spread across an elevational gradient, to reduce dependency on subsided islands most susceptible to climate change impacts; 5) secure compatible agriculture for SWHA so incompatible land cover will be converted for climate change mitigation; and 6) develop tidal restoration projects that retain SWHA habitat elements; for example, at Dutch Slough.



## *Tricolored Blackbird*

### General Description

Tricolored blackbirds (TRBL) are a glossy blackbird, with plumage that has a bluish sheen when viewed in sunlight, and is similar in appearance to the common red-winged blackbird (*A. phoeniceus*; RWBL). Male TRBL plumage includes a white wing stripe and bright red shoulder marking (epaulet), which differs from the male RWBL's dull red or orange epaulet and lack of white on the wing (Meese and Iglecia 2014). The female is mostly dark brown dorsally, with heavy brown streaking on the underside (Meese and Iglecia 2014), and has light markings on the head that is not seen on the male. Diagnostic features, however, are mostly behavioral (ICE 2014, Meese and Iglecia 2014). TRBL nest in colonies and form large social foraging flocks in the breeding season, and vocalizations are loud and synchronous during some stages of nesting (Hamilton III 2004). The distinctive flight lines of foraging flocks are generally compact and consist of synchronized rise-and-fall inundations as birds move to and from feeding grounds (Meese, Beedy et al. 2014). Nesting birds often fly between the colony site and foraging grounds in long single-file lines, bill-to-tail, making it easier for observers to locate colonies (ICE 2014). Males usually perch high in vegetation near the colony during nest building, and females may be found near sources of vegetation, and sometimes mud, to build and line the nests (Meese and Iglecia 2014). During the winter, TRBL often forage and roost socially in large flocks of multiple blackbird species (Meese, Beedy et al. 2014).



Photo: Becky Matsubara, CDFW

TRBL's range is primarily within California (Beedy 2008, Meese, Beedy et al. 2014). A few small nesting colonies were found in Oregon, Washington, Nevada, and coastal Baja California; however, over 99% of breeding adults are found in California in most years, with over 90% of those breeding in the Central Valley (Hamilton III 2000, Beedy 2008, Meese, Beedy et al. 2014). TRBL are itinerant breeders. Many colonies nest early in the San Joaquin Valley then move north to nest again later in the season, or they may change nesting locations between years as favorable conditions change and shift across the landscape (Beedy and Hamilton III 1997, ICE 2014, ICE 2017). Many TRBL remain in the

Central Valley over the winter, with large numbers moving into the Delta region and to locations along the central and northern California coast in the fall (Beedy and Hamilton III 1997, Meese, Beedy et al. 2014).

### Status and Threats

Due mostly to wetland habitat loss and other stressors, the USFWS advanced TRBL as a candidate for listing under ESA (80 FR 56423) in 2015, and the California Fish and Game Commission designated TRBL as a candidate for listing under CESA. The historical breeding range of TRBL included all of the Central Valley and surrounding foothills and coastal regions from Marin County to Baja California (Beedy 2008). With severe reduction of wetlands since the 1930s, populations continued to decline precipitously where once abundant (Beedy and Hamilton III 1997, Meese 2014, Meese 2015), and TRBL began using novel, mostly nonnative, upland vegetation for breeding. Following reclamation, most of the natural wetlands and surrounding uplands in the Delta were converted to an agricultural landscape bounded by levees (Robinson, Safran et al. 2014). There are few known breeding colonies in the legal Delta. Most colony detections have been in the Yolo Basin, Suisun Marsh, grasslands southwest of the Delta, and in south Sacramento County grasslands east of the Delta (CNDDDB query 4/6/17, Tricolored Blackbird Portal 2017; see figure XII.3). Several breeding colonies in the Delta region have not been active for many years, and some may be locally extirpated (Tricolored blackbird portal 2017).

The immense number of nestlings in large TRBL breeding colonies requires an extremely abundant source of insect prey to support growth and development; therefore, a large foraging landscape surrounding breeding colonies is essential for successful breeding. Vast areas of upland foraging habitats (such as grasslands) are not abundant or have been fragmented, making nesting in the central Delta unlikely. Heavy use of insecticides on Delta farmlands may also minimize insect prey abundance (Meese 2013), causing colonies to fail or not become established. Other potential threats include colony predation, removal of nonnative nesting substrates, vehicle or transmission line collisions, or direct shooting of adults in multispecies flocks that depredate crops (Meese 2012, Meese 2013, Meese 2014, Meese 2015). People approaching colonies too closely cause disturbance to breeding adults (ICE 2014), which may cause temporary abandonment of nests or breeding activities.

### Habitat Requirements

Vegetation used for TRBL breeding colonies is typically armored or flooded to limit predator access. TRBL may also nest in patches of vegetation about 30 feet or more wide (Hamilton III 2004); however, they have been observed nesting in narrower strips of vegetation (N. Clipperton personal communication 6/28/17). Historically, TRBL nested in large patches of healthy marsh vegetation, such as cattails (*Typha* spp), bulrush (*Scirpus* spp), and tules (*Schoenoplectus acutus*) (Beedy 2008). By the 1970s and concurrent with the decline of California's wetlands, TRBL increasingly switched to nesting in armored upland vegetation to evade predation (Beedy 2008). Himalayan blackberry (*Rubus armeniacus*) is one of the most commonly used substrates north of the San Joaquin Valley (Meese 2015). Armored nesting substrates may also

include stinging nettle (*Urtica dioica*) or milk thistle (*Silybum marianum*). Large weedy fields, such as mallow (*Malvaceae*) or mustard (*Brassicaceae*), or flooded riparian, such as small willows (*Salix* spp.), cottonwoods (*Populus* spp.), and other small trees or shrubs (ICE 2014) are occasionally used. Additionally, TRBL adapted to nesting in agricultural grain fields—primarily in tall grain crops such as triticale (ICE 2014). Nesting colonies are generally within 0.3 mile of an accessible water source and have abundant suitable foraging habitat within three miles of the colony (Beedy and Hamilton III 1997, Hamilton III 2004, Meese, Beedy et al. 2014). Wintering TRBL may roost in heavily vegetated marsh, pastures, riparian trees, or even orchards (Hamilton III 2004, Graves, Holyoak et al. 2013, Meese, Beedy et al. 2014).

Large foraging grounds with an abundance of large insects are necessary for egg formation by females and for provisioning hatchlings until they are at least nine days old (Meese 2014). Common foraging habitat types during breeding include grasslands, pastures, and selected agricultural crop types. In grasslands, TRBL typically prey on grasshoppers (*Orthoptera*), but they also forage on beetles (*Coleoptera*) and other bugs and flying insects (Crane and DeHaven 1977, Graves, Holyoak et al. 2013, Meese 2013). Breeding adults typically forage from the ground in grasslands; vernal pool and alkali seasonal wetland complexes; pastures; dairies or livestock lots with stored grains; and crops such as rice, alfalfa, and sunflowers (Hamilton III 2004, Meese, Beedy et al. 2014, ICF International 2016). During the winter, TRBL frequently forage on sources of stored grains for livestock; but they also forage on a wide variety of plant seeds, including rice and wild plants, and in recently tilled fields (Meese, Beedy et al. 2014). Crops used by wintering TRBL may also include millet or corn (ICF International 2016).

### Recovery Needs

Objectives to recover viable, self-sustaining populations of TRBL include avoiding losses of colonies and habitat, as well as increasing breeding opportunities on public and private land (Beedy and Hamilton III 1997). Restoring large patches of emergent cattail, tule, and bulrush in freshwater marshes or ponds would assist in reversing the decline of nesting habitat in the Delta. Enhancing public awareness of TRBL and their needs would help to minimize habitat or colony losses. Crops planted in tall grains such as triticale may increase the amount of breeding habitat available, but they would need to be harvested strategically to avoid juvenile mortality before fledging. Land management practices that avoid encroachment of people or predators on colonies will reduce the loss of reproductive success. Until large-scale wetland restoration has been successfully completed, private landowners or public land managers could provide alternative breeding habitats by maintaining nonnative nesting substrates near reliable sources of water and suitable foraging; for example, large weedy fields, thistle, nettles, or blackberries (Beedy and Hamilton III 1997, Meese 2013). Removal of Himalayan blackberry copses resulted in a substantial loss of colonies that commonly used this substrate (Meese 2015). Suitable foraging habitat also needs to be maintained in the Delta, ideally within two miles of existing or restored breeding habitats. Restoring and maintaining grasslands or pasturelands in the upland areas of wetland restoration sites would produce high-quality foraging needed for TRBL. Large crop mosaics that include alfalfa, grains, sunflower, and rice—particularly

unsprayed--will increase foraging opportunities (Hamilton III 2004, Meese 2013). Insect prey would remain abundant where breeding habitat is near organic rice or other insecticide-free farming operations (Meese 2013).

Extensive range-wide censuses need to continue (Hamilton III 2004). The University of California, Davis, Information Center for the Environment (ICE) maintains a TRBL data portal that tracks the results of surveys conducted statewide every three years by wildlife professionals and volunteers, as well as annual surveys conducted by experts (ICE 2014). Continuing to support and maintain this ongoing effort will be critical to obtain the best scientific information on nesting locations, local extirpations, and rate of decline. *Regional Conservation Partnerships* could use this tool to select areas previously occupied by TRBL colonies that have not supported recent breeding. However, survey efforts in the Delta have been less extensive than in other portions of the state (ICE 2014) and would need to increase as restoration projects and conservation actions are completed--particularly in the Yolo Bypass, Suisun Marsh, and peripheral areas of the legal Delta.

### **Multi-Benefit Opportunities to Support Recovery**

Restoring wetlands and cultivating flooded rice for the benefit of TRBL will also benefit other wetland species, such as California black rail (*Laterallus jamaicensis coturniculus*), sandhill crane (*Antigone canadensis*), giant garter snake, Chinook salmon (*Oncorhynchus tshawytscha*), waterfowl, and waterbirds. Restored wetlands would serve to reverse subsidence and slow down or sequester greenhouse gas emissions, which also benefits farmers and residents facing an uncertain future (Delta Conservancy 2015, Knox, Sturtevant et al. 2015). Restoring natural wetland and riparian habitats for the benefit of TRBL will also increase the recreational and aesthetic values of properties in the Delta, as long as the recreation is low impact and doesn't disturb the colonies. Birdwatching has become an increasingly popular outdoor activity and is encouraged in the Delta (<http://californiadelta.org/bird-watching/>). Birders generally congregate in wetlands and riparian areas where access is allowed. In turn, they subsidize local businesses, such as lodging, stores, restaurants, and marinas.

It is possible TRBL would nest in fields of large, sturdy grain crops, such as triticale, if grown in the Delta and if suitable foraging habitat is nearby. Growing grain crops is beneficial to farmers serving the livestock market (DPC 2012), and triticale may be adaptable in changing climate conditions (Bishnoi and Pancholy 1980, Kutlu, Gozde Ayter et al. 2009). Another potential nesting opportunity would be for landowners to line the edges of agricultural fields or infrastructure with blackberry bushes (*Rubus* spp). Blackberry windbreaks protect crops from wind and soil erosion and improve yield, provide berries as a source of food or secondary income, and provide habitat value for wildlife (Quam, Gardner et al. 1991). For foraging opportunities, insecticide-free farming near TRBL nesting colonies would benefit farmers entering the profitable organic food market, while maintaining insect populations needed for TRBL and other insectivorous species. Cultivating alfalfa would also enhance TRBL foraging habitat and benefit other species, such as Swainson's hawk. Alfalfa cultivation could be managed to

increase resiliency in drought conditions and maintain higher yields than other crops (Orloff, Putnam et al. 2015). In addition, preservation of agriculture reduces urban sprawl into the Delta, while providing jobs and locally grown crops for consumers (Dorin Bradbury 2009).

### *Wildlife-friendly Agriculture*

- In the northern **Yolo Bypass**, Conaway Ranch contains an agricultural conservation easement for TRBL (WCB 2012). The easement maintains approximately 224 acres that benefit TRBL, containing a waterfowl brood pond with emergent vegetation and agricultural fields for foraging. TRBL uses the brood pond, as well as Himalayan blackberry, for nesting (Tricolored blackbird portal 2017). Conaway Ranch farms organic rice near alfalfa fields and sunflowers, which enhances foraging opportunities near nest sites (Meese 2015a). These habitats support large breeding colonies; an estimated 7,000 TRBL were detected in the area in 2014 (Tricolored blackbird portal 2017).
- In **Suisun Marsh**, Rush Ranch maintains impounded ponds that are used for watering cattle. The ponds featured freshwater marsh vegetation such as cattail and bulrush near vast grasslands in the Potrero Hills. TRBL consistently nested in the impoundment between 2005 and 2015, with up to 1,000 individuals nesting in 2005 (CNDDDB EO#833) (Solano County 2015). There is an opportunity for cattle ranchers to provide TRBL habitat as long as the cattle ponds are managed to maintain the marsh vegetation.

### **Future Outlook and Suggested Strategies**

Occurrence data suggest TRBL are confined to peripheral areas of the Delta and surrounding landscapes (CNDDDB, Tricolored blackbird portal 2017). Climate change and sea level rise mostly threaten subsided central Delta islands; however, very few historic records exist there (see figure XI.3). Sea level rise may threaten Suisun Marsh, which could be a concern for TRBL, depending on where and how marsh habitats are restored and the level of accretion (Reclamation, USFWS et al. 2013). Yolo Bypass habitat could be threatened by increased flooding from the Sacramento River or drought. A concerted effort to target peripheral areas of the Delta for ongoing surveys of breeding colonies would be necessary to identify occupied habitat in the Delta that is at most risk of intense storms, floods, or drought, particularly as restoration projects are completed. For example, wetland restoration projects on Twitchell and Sherman Islands, which are subsided (DWR 2008, Delta Stewardship Council 2015), could attract TRBL to created breeding habitat. Suitable foraging habitat that was occupied by TRBL is nearby in the Montezuma Hills (HTH 2013). Potential strategies in an uncertain future include: 1) large-scale freshwater marsh restoration near grasslands to provide breeding and foraging habitat in higher elevations or where subsidence can be reversed; 2) securing water supply during years of drought to maintain managed wetlands in public lands; 3) incentivizing farmers to provide suitable foraging habitat within two miles of restored or existing breeding habitat (such as through a habitat exchange program); 4) maintaining alternative nesting substrates above sea level or flood levels while wetland restoration is in progress; and 5) linking habitat landscapes to increase population sizes and resiliency.



## Greater Sandhill Crane

### General Description

Greater Sandhill Cranes (*A. c. tabida*) are one of six subspecies of sandhill cranes in North America (Meine and Archibald 1996, Tacha, Nesbitt et al. 2014, Avibase 2017). Sandhill Cranes are large-bodied, long-legged social birds that are one of many culturally revered crane species that occur worldwide (Tacha, Nesbitt et al. 2014). Greater Sandhill Cranes are the largest in size of the other subspecies (Tacha, Nesbitt et al. 2014, Ivey, Dugger et al. 2015) and have a bill that is longer relative to the head (G. Ivey, Sandhill Crane workshop, February 18, 2015).

Greater Sandhill Cranes can weigh up to 15 pounds and stand up to four feet tall, with a wing span of up to nearly seven feet (Lockman, Serdiuk et al. 1985, Tacha, Nesbitt et al. 2014). Adults are easily recognizable by the visible red crown and light gray or white feathers on the cheeks, chin, and upper throat; the body, wing, and tail are generally gray or brownish-gray and sometimes stained with rust (Tacha, Nesbitt et al. 2014). They are also recognizable by flight and sound—

generally flying in flocks with their long necks and legs extended and making distinctly loud rattling and resonating calls, described by most as trumpeting or bugling (Johnsgard 1983, Tacha, Nesbitt et al. 2014). Male and female adults are similar in morphology. Juveniles may have body, head, and wing feathers that are more tinted with tawny or cinnamon colors, particularly in their first year (Johnsgard 1983).

Five greater sandhill crane populations are recognized throughout North America (Meine and Archibald 1996). The Central Valley population breeds in Canada, Washington, Oregon, northwestern Nevada, and northeastern California and migrates in the winter to the California Central Valley and Imperial Valley (Meine and Archibald 1996, Littlefield and Ivey 2000, Tacha, Nesbitt et al. 2014). The majority of Greater Sandhill Cranes in the Central Valley population (hereafter, GSCR) winters in the Central Valley and is mostly concentrated in the Sacramento Valley and the Delta, including the Cosumnes River Preserve (Littlefield and Ivey 2000, Ivey, Herziger et al. 2014). GSCR are partially sympatric with and similar in appearance to the other two migrating subspecies that winter in the Delta, lesser (*A. c. canadensis*) and Canadian (*A. c. rowani*) sandhill cranes. In the Delta, all of the wintering sandhill cranes are mostly concentrated between Freeport and Highway 4 (Ivey, Herziger et al. 2014).



## Status and Threats

Due to habitat loss and hunting, GSCR were added to the California Rare Animals list in 1983. In 1984, they were listed as threatened under CESA. They are also designated as a Fully Protected species under California Fish and Game Code §3511, which prohibits take except for certain conservation actions. Primary reasons for the rapid decline of GSCR include habitat loss and fragmentation due to long-term land conversions and urban development in both breeding and wintering grounds (Littlefield and Ivey 2000). Breeding grounds are mostly situated on private lands, generally flooded rice or wetlands, which are being converted to unsuitable agriculture (Littlefield and Ivey 2000). In the winter, GSCR generally concentrate around agricultural fields with small grain crops, some of which are protected from development by their farmland value (Littlefield and Ivey 2002). Rapid conversion of suitable crops to orchards and vineyards threaten GSCR's agricultural wintering habitat (Littlefield and Ivey 2000, Ivey, Dugger et al. 2014). Other threats to wintering GSCR in the Delta include incompatible management of preferred agricultural crops, changes in water availability, human disturbance, predation, collisions with transmission lines, and disease (Meine and Archibald 1996, Littlefield and Ivey 2000, Ivey, Dugger et al. 2014).

## Habitat Requirements

GSCR require different habitat characteristics for roosting at night and foraging or loafing during the day. GSCR typically roost in shallow water to deter predators such as the coyote (*Canis latrans*), including flooded meadows, fields, or pastures; shallow lakes or ponds; mudflats; and seasonal or managed wetlands with emergent vegetation (Littlefield and Ivey 2000, Littlefield and Ivey 2002). In the Delta, roosting habitat mostly consists of flooded agricultural fields, such as corn or rice, with water depths averaging three to eight inches (Littlefield and Ivey 2000, Littlefield and Ivey 2002). The majority of roosting sites for GSCR is within two miles of foraging habitat and, at most, within three miles (Ivey, Herziger et al. 2014, Ivey, Dugger et al. 2015).

Suitable foraging habitat for wintering sandhill cranes historically consisted of wetlands, grasslands, and pastures; however, in the altered landscape of the Central Valley, it is primarily grain crops such as milo, wheat, corn, or rice (Littlefield and Ivey 2000, Littlefield and Ivey 2002). The preferred crop type in the Delta is chopped corn, possibly because of its availability and carbohydrate value; while in the Sacramento Valley, GSCR mostly consume rice (Littlefield and Ivey 2000, CFR and TNC 2015, Shuford, Reiter et al. 2015). Although waste corn grain is a primary food source in the Delta, sandhill cranes also consume plants and small invertebrates and forage in other crop types (Pogson and Lindstedt 1991, CFR and TNC 2015, Shuford, Reiter et al. 2015). On Staten Island, GSCR foraged in fields of triticale, harvested or tilled potatoes, and ponded chopped corn; and they were observed consuming grit such as gravel, used by birds to help digest food in their gizzards, on dirt roads and levees (Littlefield and Ivey 2000, CFR and TNC 2015). Availability, stage of crop growth, and harvest management influence foraging preferences; for example, delaying tilling to leave waste grain in the field (Ivey, Herziger et al. 2014, CFR and TNC 2015). Sandhill

cranes generally forage in the mornings and evenings; mid-day, they loaf (i.e., occasionally feed but mostly rest) in pastures; alfalfa fields; along canals, levees, ditches, or rice fields; or on the shorelines of shallow ponds, lakes, or wetlands (Littlefield and Ivey 2000).

### **Recovery Needs**

GSCR in the Delta are most likely concentrated within a small area north of Highway 12 (see Figure XI.4). In a 2015 survey across public lands, the highest number of sandhill cranes was concentrated on Staten Island; and secondarily, on the Woodbridge Ecological Reserve on Brack Tract (L. Shaskey personal communication 12/7/15). Lesser sandhill cranes tend to disperse farther from previously used roost sites, while GSCR exhibit strong roost site fidelity and shorter foraging trips where the habitat remains suitable and available (Ivey, Dugger et al. 2015). Where habitat needs are reduced or absent, GSCR will move across the landscape to other suitable roost sites (Ivey, Herziger et al. 2014). Creating more accessible roost sites at least 20 acres in size across a wider landscape could alleviate problems GSCR may face from overcrowding and disease (Littlefield and Ivey 2000). Priority areas for GSCR conservation within the Delta include New Hope, Canal Ranch, Brack, and Terminous tracts; Tyler, Grand, and Bouldin islands; and east of the Sacramento River at Clarksburg and the Pierson District (Ivey, Herziger et al. 2014). East of the Delta, priority areas include south of Elk Grove and west of Galt (Ivey, Herziger et al. 2014).

Restoration of wetlands within native grassland habitats should be a priority for GSCR wintering in the Delta to expand the distribution; however, waterfowl hunting would need to be restricted in restored wetlands to benefit GSCR (Littlefield and Ivey 2000). There is also an immediate need for GSCR to find available food sources that provide enough fat and nutrition for successful migration and breeding. Agricultural easements or incentives to farmers to cultivate and manage grain crops for the benefit of GSCR is a crucial first step (Littlefield and Ivey 2000). Acquiring or locking suitable croplands into easements before they are converted to an incompatible use, such as vineyards or orchards, would be another effective, immediate-need strategy. Conservation lands would need to be managed to reduce threats. For example, installing flight diverters on transmission lines near roost sites would reduce the threat of collisions (Yee 2007, IAMIT 2017). Monitoring for disease, human disturbances, and other potential threats would also be necessary.

### **Multi-Benefit Opportunities to Support Recovery**

Wildlife-friendly agriculture or habitat restoration that benefits sandhill cranes also supports a large amount of wading birds and waterfowl that use the same habitat types (CFR and TNC 2015, Shuford, Reiter et al. 2015). The Cosumnes River Preserve and Stone Lakes National Wildlife refuge conserve sandhill crane habitat and, at the same time, provide recreational opportunities such as wildlife viewing, photography, hiking, and fishing (USFWS 2007, CRP 2017). Staten Island and Woodbridge Ecological Reserve provide birding opportunities that attract visitors, who in turn help to strengthen the economy by subsidizing local businesses and promoting the beauty and unique appeal of the Delta. Agricultural easements preserve the agricultural value of the land as well, preventing land use changes that impact farmers and

wildlife. Often, agricultural easements come with tax credits and other fiscal incentives, such as financial and technical assistance to farmers to keep their lands productive.

By supporting the persistence of sandhill cranes in the Delta, conservation also enriches the experiences of Delta residents and visitors. As evidenced by the annual Lodi Crane Festival, winter migration to the Delta marks an anticipated event that residents are proud of, and they look forward to the arrival of their iconic sandhill cranes every November (Eaton 2015). The festival draws visitors from areas outside of the Delta and from different walks of life, who may then appreciate and subsequently support the Delta. Because of the sandhill crane's significance to the people of the Delta, ecological importance as a keystone species, and economic importance to the Delta, protection of the GSCR residually protects the lands, culture, and other values of *Delta as Place*.

### *Wildlife-friendly Agriculture*

- **Staten Island** in the north Delta is one of the most important sites in California for wintering GSCR. Over 9,000 acres of wildlife-friendly and economically viable farming operations are under easements with The Nature Conservancy (TNC; CFR and TNC 2015). Farmers on Staten Island are interested and engaged in sandhill crane conservation. Thousands of sandhill cranes use Staten Island annually (L. Shaskey personal communication 12/7/15), attesting to the success of the program.
- 2015 survey counts for Mello Farms on **Tyler Island** exceeded 1,000 foraging sandhill cranes (L. Shaskey personal communication 12/7/15). Mello Farms is under a conservation easement that supports sandhill cranes and other migratory birds through the cultivation of corn and grains, flooding, and managing crops for high-quality foraging. The Lodi Sandhill Crane Association honored the owner with its Conservation Farmer Award for wildlife-friendly practices used by Mello Farms since 1984 (<http://www.recordnet.com/article/20141104/news/141109844>).
- The **Cosumnes River Preserve**, east of the Delta, also provides wildlife-friendly farming easements for sandhill cranes and other birds. Each year, over 1,000 acres of organic rice is grown and harvested (CRP 2017). Sandhill cranes use the rice for roosting, loafing, and foraging (Littlefield and Ivey 2000, Littlefield and Ivey 2002, Tacha, Nesbitt et al. 2014). Valensin Ranch was identified by Ivey, Herziger et al. (2014) as an important area for conservation of sandhill cranes. This ranch consists of 4,300 acres that include natural habitat and cultivated crops such as corn (CRP 2017).
- The **Stone Lakes National Wildlife Refuge** management plan calls for providing information on incentives for farmers to maintain grain fields for sandhill crane foraging within five miles of the refuge. In addition, the management plan suggests maintaining 40 to 60 acres of agricultural fields of corn, winter wheat, and other small grains for sandhill crane foraging on the refuge (USFWS 2007).

## Future Outlook and Suggested Strategies

In recent years, GSCR have increasingly used the Delta more than the San Joaquin and Sacramento Valleys (Littlefield and Ivey 2000); and during these years, this density represents the majority of the wintering population. The largest concentration of wintering GSCR in the Delta occurs on Staten Island, Brack Tract, Canal Tract, and surrounding tracts and islands (Ivey, Herziger et al. 2014, Ivey, Dugger et al. 2014). This area is below sea level (USGS Digital Elevation Map, accessed 9/28/16), and it is at a high risk of inundation from sea level rise, levee damage, or flooding. During winter storms in 2017, levee stress from the Mokelumne River caused evacuation on the Tyler Island side of the river and flooding on New Hope Tract, adjacent to Staten Island (see sidebar in Section II). Although there are roost sites and foraging grounds in less subsided areas, these roost sites carry a lower density of GSCR (BDCP 2013, Ivey, Herziger et al. 2014). The Cosumnes River floodplain is also at risk of flooding during winter storm events. It flooded in the winter of 2017 in Wilton, about three miles from some known roost sites (Fox 40 news, 2/10/17). In the context of climate change, these storms may become more frequent and more intense. Another effect of sea level rise could be seepage of salinity into farmland soils impacting agricultural production (Medellin-Azuara, Howitt et al. 2014). Corn is the primary crop farmed on and around Staten Island and is used for roosting and foraging GSCR within this subsided area (Pogson and Lindstedt 1991, CFR and TNC 2015). Corn is sensitive to salinity, and low salinity thresholds can decrease yield and profitability to farmers; although, certain cultivars are more tolerant than others (Hoque, Jun et al. 2015). Conservation priorities recommended to TNC include higher-elevation areas within and east of the Delta (Ivey, Herziger et al. 2014). TNC developed a draft model of these priority areas for the conservation of sandhill cranes over the long term (see figure XI.5). As habitat features degrade or are lost over time, GSCR would need these areas to seek alternative and available suitable habitat.

Suggested strategies for the uncertain future include: 1) Protect and restore habitat in TNC's modeled conservation priority areas to increase the amount of available upland habitat for GSCR to use if currently used habitats become unsuitable; 2) Work with tribes and city governments to address urban development pressure south of Elk Grove and east of Galt and to ensure water supply for roost sites (see ECOS 2017); 3) Act soon to slow down the trend of an agricultural landscape with more orchards and vineyards by acquiring the land or providing incentives to landowners to maintain compatible crop production; 4) Strengthen levees along Staten and Tyler Islands, as well as other GSCR conservation priority areas, to minimize levee stress and flooding<sup>1</sup> (DSC 2017); 5) Assist with and incentivize early planning for farmers to plant corn cultivars with higher salinity tolerance; and 6) provide incentives for flooded rice cultivation to augment roosting and foraging habitat for GSCR.

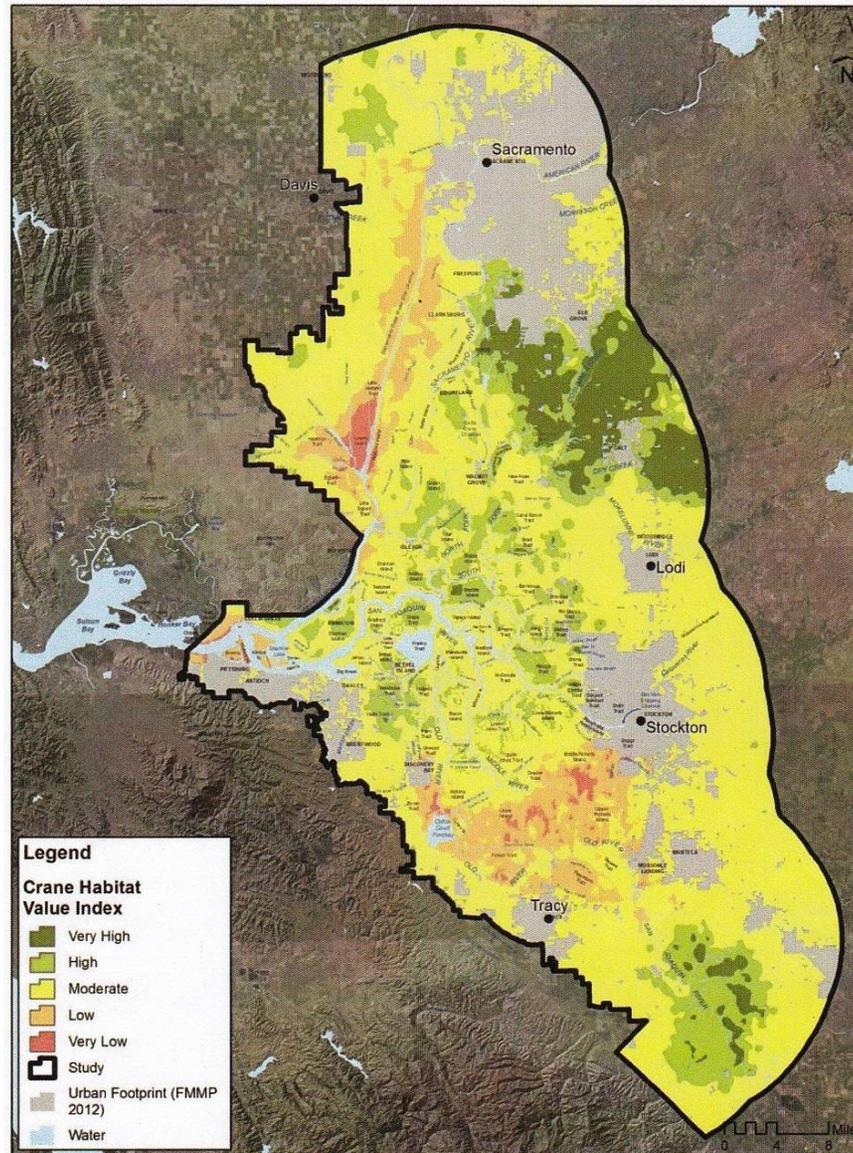
---

<sup>1</sup> Delta Levee Investment Strategy priorities proposed by the Delta Stewardship Council for levee improvements include Grand Island as "very high" priority; Bouldin, Staten, and Tyler Islands and New Hope and Terminous Tracts as "high" priorities; and Brack and Canal Ranch Tracts as "other".



Figure XI.5

Relative Priority Areas for Long-term Conservation (Delta remains critical but is at high risk)



Source: TNC 2016

## References

80 FR 56423 (2015) Endangered and threatened wildlife and plants; 90-day findings on 25 petitions, Federal Register 80:56423.

Anderson, R., J. Dinsdale, C. Battistone, K. Cripe, C. Chun, R. Schlorff, M. Bradbury, J. Estep and S. Torres (In prep). Population inventory of Swainson's hawk in California: A statewide sampling for population monitoring. Draft report.

Anderson, R., J. Dinsdale, C. Chun, K. Fien and R. Schlorff (2011). Forging value of crops/habitat for Swainson's hawks of California's Central Valley. Prepared for California Department of Fish and Game, Sacramento, CA; University of California, Davis, CA. Final Progress Report P0685903.

Anderson, R., J. Dinsdale and R. Schlorff (2007). California Swainson's hawk inventory: 2005-2006. Prepared for California Department of Fish and Game, Resource Assessment Program, Sacramento, CA. Final Report P0485902.

Avibase (2017). Avibase - the world bird database (Avibase), Bird Studies Canada, Port Rowan, Ontario, Canada. Available: <http://avibase.bsc-eoc.org/species.jsp?lang=EN&avibaseid=E196D6F9AB1DFF7E&sec=taxon&version=aou>. Accessed: April 13, 2017.

Babcock, K. W. (1995). Home range and habitat use of breeding Swainson's hawks in the Sacramento Valley of California. *Journal of Raptor Research*. **29 (3)**: 193-197.

Battistone, C., J. Marr, T. Gardner and D. Gifford (2016). Status review: Swainson's hawk (*Buteo swainsoni*) in California. Prepared for the California Fish and Game Commission, Sacramento, CA. California Department of Fish and Wildlife, Wildlife and Fisheries Division, Nongame Wildlife Program, Sacramento, CA.

BDCP (2013). Appendix 2A. In Bay Delta Conservation Plan Public Draft (BDCP). Available: <http://baydeltaconservationplan.com/2013-2014PublicReview/2013PublicReviewDraftBDCP.aspx>.

BDCP (2013). Appendix 5JC Analysis of potential bird collisions at proposed BDCP powerlines. In Bay Delta Conservation Plan Public Draft (BDCP). Available: <http://baydeltaconservationplan.com/2013-2014PublicReview/2013PublicReviewDraftBDCP.aspx>.

BDCP (2013). Chapter 3. In Bay Delta Conservation Plan public draft (BDCP). Available: <http://baydeltaconservationplan.com/EnvironmentalReview/EnvironmentalReview/2013-2014PublicReview/2013PublicReviewDraftBDCP.aspx>. Accessed: June 22, 2016.

Bechard, M. J., C. S. Houston, J. H. Saransola and S. A. England (2010). Swainson's hawk (*Buteo swainsoni*) In *The Birds of North America*. P. G. Rodewald (editor). Cornell Lab of Ornithology, Ithaca, NY.

Beedy, E. and W. Hamilton III (1997). Tricolored blackbird status update and management guidelines. Prepared for the US Fish and Wildlife Service and California Department of Fish and Game. Jones & Stokes Associates, Inc., Sacramento, CA; and University of California, Davis, CA. Available: <http://tricolor.ice.ucdavis.edu/files/trbl/Beedy%20&%20Hamilton%201997.pdf>.

Beedy, E. C. (2008). Tricolored blackbird (*Agelaius tricolor*). In Bird Species of Special Concern: a ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Schuford and Gardali (editors), Western Field Ornithologists, Camarillo, CA, and California Department of Fish and Game, Sacramento, CA.

Bishnoi, U. R. and D. K. Pancholy (1980). Comparative salt tolerance in triticale, wheat and rye during germination. *Plant and Soil*. **55**: 491-493.

Bloom, P. H. (1980). The status of the Swainson's hawk in California, 1979. California Department of Fish and Game, Wildlife Management Branch, Nongame Wildlife Investigations, Sacramento, CA; United States Bureau of Land Management, Sacramento, CA. Federal Aid in Wildlife Restoration, Project W-54-R-12.

Bradbury, M. (2014). Swainson's hawks in California's Central Valley. Swainson's hawk workshop on 17 April 2014. The Sacramento-Shasta Chapter of the Wildlife Society, West Sacramento, CA.

Breitler, A. (2014). Farmers shift to permanent crops, despite water uncertainty. Recordnet.com, Stockton, CA. Available: <http://www.recordnet.com/article/20141115/NEWS/141119629>. Accessed March 2, 2017.

Cahill, K. (2014). Foraging and nesting habitat association of Swainson's hawk (*Buteo swainsoni*) along Lower Cache Creek, Yolo County, California. M.S. thesis, California State University, Sacramento.

Casazza, M. (2016). Giant garter snake - A tale of persistence in an uncertain world. PowerPoint presentation and lecture at the Giant Garter Snake Workshop September 21 2016. The Sacramento-Shasta Chapter of the Wildlife Society, The Falls Event Center, Elk Grove, CA.

CDFG (1993). 5-year status review: Swainson's hawk (*Buteo swainsoni*). California Department of Fish and Game, Wildlife and Management Division, Nongame Bird and Mammal Program (CDFG), Sacramento, CA. Status Report.

CFR and TNC (2015). Population trends, habitat selection and food availability for sandhill cranes and large waterfowl on Staten Island and associated management recommendations. Conservation Farms and Ranches (CFR) and The Nature Conservancy (TNC). 2014-15 Annual Report.

Crase, F. T. and R. W. DeHaven (1977). Food of nestling tricolored blackbirds. *Condor*. **79**: 265-269.

CRP (2017). Cosumnes River Preserve - Recreation. Cosumnes River Preserve, Galt, CA. Available: <http://www.cosumnes.org/activities/>. Accessed: April 14, 2017.

Delta Conservancy (2015). Wetland and rice cultivation in the Sacramento-San Joaquin Delta, San Francisco Estuary and the coast of California-draft methodology for reducing greenhouse gas emissions and sequestering carbon. Delta Conservancy, West Sacramento, CA.

Delta Stewardship Council (2015). Attachment 1: Output/outcome performance measures reporting highlights. In Delta Plan performance measures, Agenda Item 11, August 27-28, 2015. Delta Stewardship Council (DSC), Sacramento, CA.

Delta Stewardship Council (2017). Delta Levees Investment Strategy, Chapter 7 narrative 7.0, final draft. Delta Stewardship Council (DSC), Sacramento, CA.

Deverel, S. J., T. Ingrum and D. Leighton (2016). Present-day oxidative subsidence of organic soils and mitigation in the Sacramento-San Joaquin Delta, California, USA. *Hydrogeol J.* **24**: 569-586.

Dorin Bradbury, M. (2009). Conservation Strategy for Swainson's hawks in California. Friends of the Swainson's Hawk, Sacramento, CA. Available: <http://www.swainsonshawk.org/Images/Conservation%20Plan%2009%20final.pdf>. Accessed: July 7, 2016.

DPC (2012). Economic sustainability plan for the Sacramento-San Joaquin River Delta - Executive summary. Delta Protection Commission (DPC), West Sacramento, CA.

DWR (2008). Interim Delta actions: subsidence mitigation through rice cultivation research. California Department of Water Resources (DWR), Sacramento, CA.

Eaton, J. (2015). A festival of cranes. Bay Nature Institute, Berkeley, CA. Available: <https://baynature.org/article/a-festival-of-cranes/>. Accessed: April 26, 2017.

ECOS (2017). California Heartland Project. Environmental Council of Sacramento (ECOS), Sacramento, CA. Available: <http://www.ecosacramento.net/about-us/our-work/california-heartland-project/>. Accessed: March 6, 2017.

EDF (2017). Central Valley Habitat Exchange: working with farmers to protect multiple species in California's Central Valley. Environmental Defense Fund (EDF), New York, NY. Available: <https://www.edf.org/ecosystems/central-valley-habitat-exchange>. Accessed: March 3, 2017.

England, A. S., M. J. Bechard and C. S. Houston (1997). Swainson's hawk (*Buteo swainsoni*). In *The birds of North America*, No. 265. Poole and Gill (editors), The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.

England, A. S., J. A. Estep and W. R. Holt (1995). Nest-site selection and reproductive performance of urban-nesting Swainson's hawks in the Central Valley of California. *J. Raptor Res.* **29**: 179-186.

Engstrom, T. (2010). Genetic analysis of giant garter snake (*Thamnophis gigas*) populations in the San Joaquin and Sacramento Valleys. Prepared for US Fish and Wildlife Service. California State University, Chico, CA. Revised final report for contracts 802706G121 and 802707G111.

Ersan, J. S., B. J. Halstead, E. L. Wildy, M. L. Casazza and G. D. Wylie (2016). Diet, prey preference and selection of giant gartersnakes (*Thamnophis gigas*) from the Sacramento Valley of California. Powerpoint presentation at the giant gartersnake symposium 21 September 2016. Sacramento-Shasta Chapter of the Wildlife Society, The Falls Event Center, Elk Grove, CA.

Estep (2007). The distribution, abundance, and habitat associations of the Swainson's hawk (*Buteo swainsoni*) in south Sacramento County. Prepared for the City of Elk Grove. Estep Environmental Consulting, Sacramento, CA.

Estep (2008). The distribution, abundance, and habitat associations of the Swainson's hawk (*Buteo swainsoni*) in Yolo County, California. Prepared for Technology Associates International Corporation and the Yolo Natural Heritage Plan. Estep Environmental Consulting, Sacramento, CA.

Estep (2009). The influence of vegetation structure on Swainson's hawk foraging habitat suitability in Yolo County. Prepared for Technology Associates International Corporation, San Diego, CA, and Yolo Natural Heritage Program, Woodland, CA. Estep Environmental Consulting (Estep), Sacramento, CA.

Estep, J. (1989). Biology, movements, and habitat relationships of the Swainson's hawk in the Central Valley of California, 1986–87. California Department of Fish and Game, Wildlife Management Division, Nongame Bird and Mammal Section, Sacramento, CA.

Graves, E. E., M. Holyoak, T. R. Kelsey and R. J. Meese (2013). Understanding the contribution of habitats and regional variation to long-term population trends in tricolored blackbirds. *Ecology and Evolution*. **3**: 2845-2858.

Halstead, B., S. Skalos, G. Wylie and M. Casazza (2015). Terrestrial ecology of semi-aquatic giant garter snakes (*Thamnophis gigas*). *Herpetological Conservation and Biology*. **10**: 633-644.

Hamilton III, W. J. (2000). Tricolored blackbird 2000 breeding season census and survey - observations and recommendations. University of California, Davis, Department of Environmental Science and Policy, Davis, CA. Available: <http://tricolor.ice.ucdavis.edu/files/trbl/Hamilton%202000%20%20TRBL%20breeding%20census%20&%20survey%20in%202000%20observ%20and%20recs2.pdf>. Accessed: April 5, 2017.

Hamilton III, W. J. (2004). Tricolored blackbird (*Agelaius tricolor*). In *The Riparian Bird Conservation Plan: a strategy for reversing the decline of riparian-associated birds in California*. California Partners In Flight. [https://www.prbo.org/calpif/pdfs/riparian\\_v-2.pdf](https://www.prbo.org/calpif/pdfs/riparian_v-2.pdf). Accessed November 21, 2016.

Hansen, E. C. (2016). Notes and procedures for identifying the giant garter snake (*Thamnophis gigas*). PowerPoint presentation and lecture at the Giant Garter Snake Workshop September 21 2016. The Sacramento-Shasta Chapter of the Wildlife Society, The Falls Event Center, Elk Grove, CA.

Hayden, A. (2015). How a California rice farmer uses the market to protect wildlife - and boost profits. Environmental Defense Fund, New York, NY. Available: <https://www.edf.org/blog/2015/03/10/how-california-rice-farmer-uses-market-protect-wildlife-and-boost-profits>. Accessed January 6, 2017.

Holmes, E. J. (2014). Central Valley Habitat Exchange: a voluntary program creating new financial returns for landowners. Powerpoint presentation at the Swainson's Hawk Technical Advisory Committee Meeting on 10 April 2014.

Hoque, M. M. I., Z. Jun and W. Guoying (2015). Evaluation of salinity tolerance in maize (*Zea mays* L.) genotypes at seedling stage. *J. BioSci. Biotechnol.* **4**: 39-49.

- H. T. Harvey & Associates (HTH) (2013). Bird and bat movement patterns and mortality at the Montezuma Hills Wind Resource Area. Prepared for California Energy Commission, Sacramento, CA. Available: <http://www.energy.ca.gov/2013publications/CEC-500-2013-015/CEC-500-2013-015.pdf>. Accessed: September 7, 2017.
- Hull, J. M., R. Anderson, M. Bradbury, J. A. Estep and H. B. Ernest (2008). Population structure and genetic diversity in Swainson's hawks (*Buteo swainsoni*): implications for conservation. *Conservation Genetics*. **9**: 305-316.
- ICE (2014). Tricolored blackbird statewide survey protocol. Information Center for the Environment (ICE), UC Davis, CA. Available: <http://tricolor.ice.ucdavis.edu/files/trbl/Tricolored%20Blackbird%20Statewide%20Survey%20Protocol%202014.pdf>. Accessed: November 22, 2016.
- ICE (2017). Tricolored blackbird portal: where to see tricolors [Internet]. Information Center for the Environment (ICE), University of California, Davis. Available: <http://tricolor.ice.ucdavis.edu/content/where-see-tricolors>. Accessed: June 13, 2017.
- ICF International (2016). State incidental take permit application for the construction and operation of dual conveyance facilities of the State Water Project, October draft (ICF 00443.12). Prepared for California Department of Water Resources, Sacramento, CA.
- Ivey, G., C. Herziger and D. Hardt (2014). Conservation priorities and best management practices for wintering sandhill cranes in the Central Valley of California. Prepared for The Nature Conservancy. International Crane Foundation, Baraboo, WI.
- Ivey, G. L., B. D. Dugger, C. P. Herziger, M. L. Casazza and J. P. Fleskes (2014). Distribution, abundance, and migration timing of greater and lesser sandhill cranes wintering in the Sacramento-San Joaquin River Delta Region of California. *Proceedings of the North American Crane Workshop*. **12**: 1-11.
- Ivey, G. L., B. D. Dugger, C. P. Herziger, M. L. Casazza and J. P. Fleskes (2015). Wintering ecology of sympatric subspecies of sandhill crane: correlations between body size, site fidelity, and movement patterns. *The Condor*. **117**: 518-529.
- J. Long personal communication 8/22/17.
- Johnsgard, P. A. (1983). *Cranes of the world: sandhill crane (Grus canadensis)*. University of Nebraska, Lincoln. Available: <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1025&context=bioscicranes>. Accessed: April 13, 2017.
- Kleinschmidt Associates (2008). Cosumnes River Preserve Management Plan- Final. Prepared for Cosumnes River Preserve, Galt, CA. Available: [http://www.blm.gov/style/medialib/blm/ca/pdf/folsom/plans.Par.67798.File.dat/CRP\\_Final\\_Mgmt\\_Plan.pdf](http://www.blm.gov/style/medialib/blm/ca/pdf/folsom/plans.Par.67798.File.dat/CRP_Final_Mgmt_Plan.pdf). Accessed: July 8, 2016.
- Knox, S. H., C. Sturtevant, J. Hatala Matthes, L. Koteen, J. Verfaillie and D. Baldocchi (2015). Agricultural peatland restoration: effects of land-use change on greenhouse gas (CO<sub>2</sub> and CH<sub>4</sub>) fluxes in the Sacramento-San Joaquin Delta. *Global Change Biology*. **21**: 750-765.
- Kutlu, I., N. Gozde Ayter and Z. Budak (2009). Genetic variations of triticale genotypes in different NaCl concentrations. *Journal of Applied Biological Sciences*. **3**: 21-27.

- Licht, S. (2015). Field and orchard crops declining amid drought, California Climate & Agriculture Network, Sebastopol, CA. Available: <http://calclimateag.org/field-and-orchard-crops-declining-amid-drought/>. Accessed: March 6, 2017.
- Littlefield, C. and G. Ivey (2000). Conservation assessment for greater sandhill cranes wintering on the Cosumnes River floodplain and Delta regions of California. Prepared for The Nature Conservancy, Cosumnes River Preserve.
- Littlefield, C. D. and G. L. Ivey (2002). State of Washington sandhill crane recovery plan. Washington Department of Fish and Wildlife, Wildlife Program, Wildlife Diversity Division, Olympia, WA.
- Lockman, D. C., L. Serdiuk and R. Drewien (1985). An experimental greater sandhill crane and Canada goose hunt in Wyoming. Proceedings 1985 Crane Workshop: 47-57.
- Long, J. (2016). CNDDDB online field survey report form. Prepared for California Department of Fish and Wildlife, California Natural Diversity Database, Sacramento, CA. Department of Water Resources, Sacramento, CA.
- Medellin-Azuara, J., R. E. Howitt, E. Hanak, J. R. Lund and W. E. Fleenor (2014). Agricultural losses from salinity in California's Sacramento-San Joaquin Delta. San Francisco Estuary and Watershed Science. **12**: 1-16.
- Meese, R. (2014). Results of the 2014 tricolored blackbird statewide survey. University of California Davis, Department of Environmental Science and Policy, Davis, CA.
- Meese, R. J. (2012). Cattle egret predation causing reproductive failures of nesting tricolored blackbirds. California Fish and Game. **98**: 47-50.
- Meese, R. J. (2013). Chronic low reproductive success of the colonial tricolored blackbird from 2006 to 2011. Western Birds. **44**: 98-113.
- Meese, R. J. (2015). Detection, monitoring, and fates of tricolored blackbird colonies in 2015 - final report. Prepared for California Department of Fish and Wildlife, Wildlife Branch, Nongame Program, Sacramento, CA. Available: <http://tricolor.ice.ucdavis.edu/content/detection-monitoring-and-fates-tricolored-blackbird-colonies-california-2015>. Accessed: April 6, 2017.
- Meese, R. J. (2015a). The alarming decline in abundance of California's blackbird, the tricolor. PowerPoint presentation to the California Department of Fish and Wildlife 26 February 2015.
- Meese, R. J., E. C. Beedy and W. J. Hamilton III (2014). Tricolored blackbird *Agelaius tricolor*. Birds of North America [Internet]. P. G. Rodewald (editor). The Cornell Lab of Ornithology, Ithaca, New York. Retrieved from: <https://birdsna-org.bnaproxy.birds.cornell.edu/Species-Account/bna/species/tribla>. Accessed: March 20, 2017.
- Meese, R. J. and M. Iglecia (2014). Tricolored blackbird statewide survey training. PowerPoint presentation at the statewide survey training on April 13 2014. UC Davis and Audubon Society, Glide Ranch, Davis, CA.
- Meine, C. D. and G. W. Archibald (1996). The cranes - status survey and conservation action plan. C. D. Meine and G. W. Archibald (editors), IUCN, Gland, Switzerland, and Cambridge, U.K.

Nowak, D. J., D. E. Crane and J. C. Stevens (2006). Air pollution removal by urban trees and shrubs in the United States. *Urban Forestry & Urban Greening*. **4**: 115-123.

Orloff, S., D. Putnam and K. Bali (2015). Drought tip: drought strategies for alfalfa, ANR Publication 8522. University of California, Davis, Agriculture and Natural Resources, Davis, CA. Available: [http://alfalfa.ucdavis.edu/-files/pdf/Drought\\_Tip\\_Drought\\_Strategies\\_for\\_Alfalfa\\_8522.pdf](http://alfalfa.ucdavis.edu/-files/pdf/Drought_Tip_Drought_Strategies_for_Alfalfa_8522.pdf). Access Date: May 4, 2017.

Pogson, T. H. and S. M. Lindstedt (1991). Distribution and abundance of large sandhill cranes, *Grus canadensis*, wintering in California Central Valley. *Condor*. **93**: 266-278.

Quam, V. C., J. Gardner, J. R. Brandle and T. K. Boes (1991). Windbreaks in sustainable agricultural systems. USDA National Agroforestry Center, Lincoln, Nebraska. Available: <https://nac.unl.edu/documents/morepublications/ec1772.pdf>. Accessed: April 7, 2017.

Reclamation and CDWR (2008). Appendix R: Sensitivity of future Central Valley Project and StateWater Project operations to potential climate change and associated sea level rise - final report Inthe CVP/SWP OCAP Biological Assessment on the continued long-term operations of the Central Valley Project and State Water Project. U.S. Bureau of Reclamation Technical Service Center, Denver, CO, and Mid-Pacific Region, Sacramento, CA (Reclamation) and California Department of Water Resources (CDWR), Sacramento, CA. Available: [https://www.usbr.gov/mp/cvo/ocapBA\\_2008.html](https://www.usbr.gov/mp/cvo/ocapBA_2008.html). Accessed January 25, 2017.

Riparian Habitat Joint Venture and California Partners in Flight (2004). Version 2.0 The riparian bird conservation plan: A strategy for reversing the decline of riparian associated birds in California. Point Blue Conservation Science, California Chapter of Partners in Flight, Petaluma, CA. Available: [http://www.prbo.org/calpif/pdfs/riparian\\_v-2.pdf](http://www.prbo.org/calpif/pdfs/riparian_v-2.pdf). Accessed: July 8, 2016.

Robinson, A., S. Safran, J. Beagle, R. Grossinger, L. Grenier and R. Askevold (2014). A delta transformed: ecological functions, spatial metrics, and landscape change in the Sacramento-San Joaquin Delta. Prepared for California Department of Fish and Wildlife, Ecosystem Restoration Program, Sacramento, CA. San Francisco Estuary Institute-Aquatic Science Center, Richmond, CA, Publication #729. Available: <http://www.sfei.org/documents/delta-transformed-ecological-functions-spatial-metrics-and-landscape-change-sacramento-san>. Accessed: January 26, 2016.

Schlorff, R. W. and P. H. Bloom (1984). Importance of riparian systems to nesting Swainson's hawks in the Central Valley of California. In *California riparian systems: Ecology, conservation, and productive management*. R. E. Warner and K. M. Hendrix (Editors), University of California Press, Berkeley, CA. pp. 612-619.

SFEP (2016). Final draft CCMP 2016: Comprehensive conservation and management plan for the San Francisco Estuary - goals for 2050 - actions for 2021. San Francisco Estuary Partnership (SFEP), Oakland, CA. Available: [http://www.sfestuary.org/wp-content/uploads/2013/10/CCMP\\_FinalDraft\\_051216.pdf](http://www.sfestuary.org/wp-content/uploads/2013/10/CCMP_FinalDraft_051216.pdf). Accessed: July 7, 2016.

Shaskey, L. Personal communication to the Greater Sandhill Crane Technical Advisory Committee, December 7, 2015.

Shuford, W. D., M. E. Reiter, K. M. Strum, M. M. Gilbert, C. M. Hickey and G. H. Golet (2015). The benefits of crops and field management practices to wintering waterbirds in the Sacramento-San Joaquin River Delta of California. *Renewable Agriculture and Food Systems*, available on CJO2015. doi:10.1017/S174217051500040X. **FirstView**: 1-12.

SJMSCP (2000). San Joaquin Multispecies Habitat Conservation and Open Space Plan. San Joaquin Council of Governments (SJMSCP), Stockton, CA. Available: <http://www.sjcog.org/DocumentCenter/View/5>.

Solano County (2015). Exhibit 5: CEQA Documents. Rush Ranch habitat restoration, facility improvements, and site utilization project. Minor revision No. 2 to conditional use permit & marsh development permit U-90-29 & MD-90-05. Recirculated draft initial study and mitigated negative declaration. County of Solano, Department of Resource Management. Fairfield, CA. Available: [http://scc.ca.gov/webmaster/ftp/pdf/sccbb/2016/1603/20160324Board03B\\_USBC\\_Enhancement\\_Ex5.pdf](http://scc.ca.gov/webmaster/ftp/pdf/sccbb/2016/1603/20160324Board03B_USBC_Enhancement_Ex5.pdf). Accessed: August 4, 2017.

Stillwater Sciences (2014). Field guidance for the CVHE Swainson's hawk habitat quantification tool. Prepared for the Environmental Defense Fund, Sacramento, CA. Stillwater Sciences, Berkeley, CA.

Stillwater Sciences (2015). Draft Swainson's hawk habitat quantification tool, scientific rationale document, Volume 3. Prepared for Environmental Defense Fund, Sacramento, CA.

Stillwater Sciences (2016). TAC meeting for Swainson's hawk HQT for the Central Valley Habitat Exchange. PowerPoint presentation for the Swainson's Hawk Technical Advisory Committee meeting on 29 September 2016. Swainson's Hawk Technical Advisory Committee teleconference.

Stillwater Sciences (2017). Jersey Island Levee Bank Protection Project: pre-construction survey methods and results for stations 390+00 to 475+00. Prepared for Brian Janowiak, Nate Hershey, and Tina Anderson (MBK Engineers) by Holly Burger (Wildlife Biologist, Stillwater Sciences) on June 2, 2017. Technical Memorandum.

Swolgaard, C. A., K. A. Reeves and D. A. Bell (2008). Foraging by Swainson's hawks in a vineyard-dominated landscape. *Journal of Raptor Research*. **42**: 188-196.

Tacha, T. C., S. A. Nesbitt and P. A. Vohs (2014). Sandhill Crane *Antigone Canadensis* In *Birds of North America*. The Cornell Lab of Ornithology, Ithaca, NY [Internet].

Tricolored blackbird portal (2017). Tricolored blackbird portal, Information Center for the Environment, UC Davis, CA. Available: <http://tricolor.ice.ucdavis.edu/locations/public>. Accessed: April 6, 2017.

Tricolored Blackbird Working Group (2007). Conservation Plan for the tricolored blackbird (*Agelaius tricolor*). S. Kester (editor). Sustainable Conservation, San Francisco, CA. Available: <http://tricolor.ice.ucdavis.edu/files/trbl/Conservation%20Plan%20MOA%202009%202.0%20update.pdf>. Accessed: July 7, 2016.

USBR, USFWS and CDFG (2013). Suisun Marsh habitat management, preservation, and restoration plan. U.S. Bureau of Reclamation, Mid-Pacific Region (USBR), Sacramento, CA; U.S Fish and Wildlife Service (USFWS); California Department of Fish and Game (CDFG), Stockton, CA. Available: [http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc\\_ID=17283](http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=17283). Accessed June 9, 2016.

USFWS (1999). Draft recovery plan for the giant garter snake (*Thamnophis gigas*). US Fish and Wildlife Service, Region 1 (USFWS), Portland, OR.

USFWS (2007). Stone Lakes National Wildlife Refuge - comprehensive conservation plan. U.S. Fish and Wildlife Service, California Nevada Operations Refuge Planning Office (USFWS), Sacramento, CA, and Stone Lakes National Wildlife Refuge, Elk Grove, CA. Available: [https://www.fws.gov/uploadedFiles/Region\\_8/NWRS/Zone\\_1/Stone\\_Lakes/Images/PDFs/SL%20CCP%20Final%20low%20res.pdf](https://www.fws.gov/uploadedFiles/Region_8/NWRS/Zone_1/Stone_Lakes/Images/PDFs/SL%20CCP%20Final%20low%20res.pdf). Accessed: July 8, 2016.

USFWS (2008). Formal Endangered Species Act consultation and biological opinion: proposed coordinated operations of the Central Valley Project (CVP) and State Water Project (SWP). US Fish and Wildlife Service, California and Nevada Region (USFWS). Sacramento, CA. Memorandum 81420-2008-F-1418-5.

USFWS (2012). Giant garter snake (*Thamnophis gigas*) 5-year review: summary and evaluation. U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office (USFWS), Sacramento, CA.

USFWS (2015). Revised draft recovery plan for the giant garter snake (*Thamnophis gigas*). U.S. Fish and Wildlife Service, Pacific Southwest Region (USFWS), Sacramento, CA.

WCB (2012). August 30, 2012 Wildlife Conservation Board Meeting. Powerpoint presentation at the Wildlife Conservation Board meeting on 30 August 2012. Wildlife Conservation Board, State Capitol, Room 112, Sacramento, CA.

Wylie, G. and M. Amarello (2008). Results of 2006 monitoring for giant garter snakes (*Thamnophis gigas*) for the bank protection project on the left bank of the Colusa Basin drainage canal in Reclamation District 108, Sacramento River Bank Protection Project, Phase II. U.S. Geological Survey, Biological Resources Discipline, Western Ecological Research Center, Dixon Field Station, Dixon, CA. Prepared for U.S. Army Corps of Engineers, Sacramento District, Sacramento, CA. Available: <https://www.werc.usgs.gov/ProductDetails.aspx?ID=3667>. Accessed: May 10, 2017.

Wylie, G. D., M. L. Cassaza and J. K. Daugherty (1997). 1996 progress report for the giant garter snake study. United States Geological Survey Biological Resources Division (USGS), California Science Center, Dixon Research Center, Dixon, CA.

Yee, M. (2007). Testing the effectiveness of an avian flight diverter for reducing avian collisions with the distribution power lines in the Sacramento Vallley, California. Prepared for the California Energy Commission, Public Interest Energy Research Program. Final Project Report #CEC-500-2007-122.

Yolo County HCP/NCCP Joint Powers Agency (2015). Chapter 6 Conservation Strategy. In Second administrative draft Yolo Habitat Conservation Plan and Natural Community Conservation Plan. Yolo Habitat Conservancy, Woodland, CA. Available: [https://media.wix.com/ugd/8f41bd\\_0481abda525446f588081cebbc22ae20.pdf](https://media.wix.com/ugd/8f41bd_0481abda525446f588081cebbc22ae20.pdf). Accessed: March 6, 2017.

## Appendix XII – Delta Ecosystems and Associated Habitat Types

The list in Table XII.1 was developed through collaboration between the California Department of Fish and Wildlife, Delta Conservancy, and Delta Stewardship Council, with close alignment to the information presented in *A Delta Transformed* (Robinson, Safran et al. 2014) and *A Delta Renewed* (Robinson, Safran et al. 2016).

Table XII.1

<b>Upland / Terrestrial Ecosystem</b>	<b>Definition</b>	<b>Source</b>
<b>Grassland</b>	Low herbaceous communities occupying well-drained soils and composed of native forbs and annual and perennial grasses and usually devoid of trees. Few to no vernal pools present.	Delta Transformed (p. 18)
<b>Oak woodland/savanna</b>	Oak dominated communities with sparse to dense cover (10-65% cover) and an herbaceous understory.	Delta Transformed (p. 18)
<b>Stabilized interior dune vegetation</b>	Vegetation dominated by shrub species with some locations also supporting live oaks on the more stabilized dunes with more well-developed soil profiles.	Delta Transformed (p. 18)
<b>Agriculture - high intensity</b>	Active agricultural lands in high-intensity crops such as fruit or nut orchards and/or vineyards.	Delta Transformed (p. 18) with added split between high/low intensity
<b>Agriculture - low intensity</b>	Active agricultural lands in low-intensity crops such as row crops, rice fields, alfalfa, or pasture.	Delta Transformed (p. 18) with added split between high/low intensity
<b>Ruderal/nonnative</b>	Areas dominated by nonnative vegetation and ruderal lands.	Delta Transformed (p. 18)
<b>Urban</b>	Urban remnant natural areas (greens, trees, and other features such as water-treatment wetlands).	Delta renewed (p. 78)
<b>Riparian Ecosystem</b>	<b>Definition</b>	<b>Source</b>
<b>Valley foothill riparian</b>	Mature riparian forest usually associated with a dense understory and mixed canopy, including sycamore, oaks, willows, and other trees. Historically occupied the supratidal natural levees of larger rivers that were occasionally flooded.	Delta Transformed (p. 18)

<b>Riparian Ecosystem</b>	<b>Definition</b>	<b>Source</b>
<b>Willow riparian scrub-shrub</b>	Riparian vegetation dominated by woody scrub or shrubs with few to no tall trees. This habitat type generally occupies long, relatively narrow corridors of lower natural levees along rivers and streams.	Delta Transformed (p. 18)
<b>Willow thicket</b>	Perennially wet, dominated by woody vegetation (e.g., willows). Emergent vegetation may be a significant component. Generally located at the “sinks” of major creeks or rivers as they exit alluvial fans into the valley floor.	Delta Transformed (p. 18)
<b>Aquatic - Perennial Wetland Ecosystem</b>	<b>Definition</b>	<b>Source</b>
<b>Freshwater emergent marsh/wetland - tidal</b>	Perennially wet, high water table, dominated by emergent vegetation. Woody vegetation (e.g., willows) may be a significant component for some areas, particularly the western-central Delta. Wetted or inundated by spring tides at low river stages (approximating high tide levels).	Delta Transformed (p. 18)
<b>Freshwater emergent wetland/marsh - nontidal</b>	Temporarily to permanently flooded, permanently saturated, freshwater nontidal wetlands dominated by emergent vegetation. In the Delta, occupies upstream floodplain positions above tidal influence.	Delta Transformed (p. 18)
<b>Saline emergent wetland (SEW)</b>	Herbaceous-dominated: > 2% total cover by herbaceous species and < 10% total cover by tree or shrub species; limited to tidally-influenced portions of coastal regions. SEW cross-walks to CALVEG <sup>2</sup> pickleweed-cordgrass and tule-cattail.	(CDFG 1988, Springer 1988)
<b>Vernal pool complex</b>	Area of seasonally flooded depressions, characterized by a relatively impermeable subsurface soil layer and distinctive vernal pool flora. These often comprise the upland edge of perennial wetlands.	Delta Transformed (p. 18)
<b>Alkali seasonal wetland complex</b>	Temporarily or seasonally flooded, herbaceous, or scrub communities characterized by poorly-drained, clay-rich soils with a high residual salt content. These often comprise the upland edge of perennial wetlands.	Delta Transformed (p. 18)

<sup>2</sup> The CALVEG ("Classification and Assessment with Landsat of Visible Ecological Groupings") system

<b>Aquatic - Seasonal Wetland Ecosystem</b>	<b>Definition</b>	<b>Source</b>
<b>Wet meadow and seasonal wetland</b>	Temporarily or seasonally flooded, herbaceous communities characterized by poorly-drained, clay-rich soils. These often comprise the upland edge of perennial wetlands.	Delta Transformed (p. 18)
<b>Managed wetland</b>	Areas that are intentionally flooded and managed during specific seasonal periods, often for recreational uses such as duck clubs.	Delta Transformed (p. 18)
<b>Aquatic - Open Water Ecosystem</b>	<b>Definition</b>	<b>Source</b>
<b>Fluvial - low order channel</b>	Distributaries, overflow channels, side channels, swales. No influence of tides. These occupy nontidal floodplain environments or upland alluvial fans.	Delta Transformed (p. 18)
<b>Fluvial - mainstem channel</b>	Rivers or major creeks with no influence of tides.	Delta Transformed (p. 18)
<b>Fluvial - shaded riverine aquatic</b>	Aquatic edge habitat that is shaded by adjacent riparian vegetation.	(IAMIT 2017)
<b>Fluvial - channel margin habitat</b>	In-water habitat along the channel margin which generally ranges from perennial aquatic wetlands to floodplain and riparian habitats. This habitat type generally includes shaded riverine aquatic habitat at upper elevations. It is also referred to as fish-friendly levee habitat.	(IAMIT 2017)
<b>Freshwater pond or lake</b>	Permanently flooded depressions, largely devoid of emergent Palustrine vegetation. These occupy the lowest-elevation positions within wetlands.	Delta Transformed (p. 18)
<b>Freshwater intermittent pond or lake</b>	Seasonally or temporarily flooded depressions, largely devoid of emergent Palustrine vegetation. These are most frequently found in vernal pool complexes at the Delta margins and also in the nontidal floodplain environments.	Delta Transformed (p. 18)
<b>Tidal - mainstem channel</b>	Rivers, major creeks, or major sloughs forming Delta islands where water is understood to have ebb and flow in the channel at times of low river flow. These delineate the islands of the Delta.	Delta Transformed (p. 18)

Aquatic - Open Water Ecosystem	Definition	Source
<b>Tidal - low order channel</b>	Dendritic tidal channels (i.e., dead-end channels terminating within wetlands) where tides ebb and flow within the channel at times of low river flow.	Delta Transformed (p. 18)
Overlapping/Transitional Ecosystem Categories/Features	Definition	Source
<b>Upland transitional corridors</b>	The connected terrestrial ecosystems within and around the periphery of the Delta (e.g., to support wildlife movement and dispersal).	Delta Renewed (p. 70)
<b>Marsh-terrestrial transition zone</b>	“Marsh” includes both tidal and nontidal freshwater emergent wetland; the “marsh-terrestrial transition zone” was mapped wherever marsh polygons and terrestrial habitat type polygons were adjacent to one another; “terrestrial habitat types” include oak woodlands, seasonal wetlands, and riparian habitat, among others (i.e., everything other than marsh, open water, urban/barren, and agricultural/nonnative)	Delta Transformed (pp. 71-72)
<b>Marsh to open-water edge</b>	All areas mapped as open water and marsh, regardless of their tidal status, connectivity, or form. Seasonally and tidally inundated areas are not included within the area mapped as open water. Linear areas where the two habitat types were mapped as adjacent to one another are identified as the open water-marsh edge.	Delta Transformed (p. 44)
<b>Floodplain</b>	The area at low to mid elevations adjacent to and transitioning between fluvial, or riverine, and tidal areas, that is subject to flooding during periods of high discharge.	(IAMIT 2017)
<b>Floodplain - seasonal short-term flooding</b>	<p><b>Floodplain:</b> The area at low to mid elevations adjacent to and transitioning between fluvial, or riverine, and tidal areas, that is subject to flooding during periods of high discharge.</p> <p><b>Seasonal short term flooding:</b> Short-term fluvial inundation</p> <ul style="list-style-type: none"> <li>• intermediate recurrence (~10 events per year)</li> <li>• low duration (days to weeks per event)</li> <li>• generally shallower than seasonal long-duration flooding</li> </ul>	(IAMIT 2017); Delta Transformed definitions for subtypes (pp. 38-39)

Overlapping/Transitional Ecosystem Categories/Features	Definition	Source
<b>Floodplain - seasonal, long duration</b>	<p><b>Floodplain:</b> The area at low to mid elevations adjacent to and transitioning between fluvial, or riverine, and tidal areas, that is subject to flooding during periods of high discharge.</p> <p><b>Seasonal, long duration:</b> Prolonged inundation from river overflow into flood basins</p> <ul style="list-style-type: none"> <li>• low recurrence (~1 event per year)</li> <li>• high duration (persists up to 6 months)</li> <li>• generally deeper than seasonal short-term flooding</li> </ul>	(IAMIT 2017); Delta Transformed definitions for subtypes (pp. 38-39)
<b>Floodplain - tidal inundation</b>	<p><b>Floodplain:</b> The area at low to mid elevations adjacent to and transitioning between fluvial, or riverine, and tidal areas, that is subject to flooding during periods of high discharge.</p> <p><b>Tidal inundation:</b> Diurnal overflow of tidal sloughs into marshes</p> <ul style="list-style-type: none"> <li>• high recurrence (twice daily)</li> <li>• low duration (&lt;6 hours per event)</li> <li>• low depth (“wetted” up to 0.5 mile)</li> </ul>	(IAMIT 2017); Delta Transformed definitions for subtypes (pp. 38-39)
<b>Floodplain - ponds, lakes, channels, and flooded islands</b>	<p><b>Floodplain:</b> The area at low to mid elevations adjacent to and transitioning between fluvial, or riverine, and tidal areas, that is subject to flooding during periods of high discharge.</p> <p><b>Ponds, lakes, channels, and flooded islands:</b> Perennial open water features (with the exception of historical intermittent ponds and streams)</p> <ul style="list-style-type: none"> <li>• recurrence not applicable (generally perennial features)</li> <li>• high duration (generally perennial features)</li> <li>• variable depth</li> </ul>	(IAMIT 2017); Delta Transformed definitions for subtypes (pp. 38-39)

<b>Overlapping/Transitional Ecosystem Categories/Features</b>	<b>Definition</b>	<b>Source</b>
<b>Wildlife-friendly agriculture best management practices (BMPs)</b>	Any activity carried out on agricultural lands that benefits wildlife. These wildlife-friendly activities may help protect or increase quantity and/or quality of habitat found in or adjacent to agricultural landscapes. Availability, quantity, and quality of crop and grain residue within the field and fence-line vegetation, pesticide application and management, water management, and timing of these activities affect the value agricultural lands provide for wildlife. Delta Renewed guidelines to benefit wildlife include six categories of BMPs, defined as "practices that support native wildlife on agricultural lands, including practices which manage fields as wetlands that wildlife can access (rice crops and flooded fields)."	(Burmester 2015); Delta Renewed (pp. 76-77, 117)
<b>Wildlife-friendly agriculture BMPs - minimize water quality impacts from agriculture</b>	BMPs that include reduced pesticide use, integrated pest management, settling basins, and buffer strips to filter runoff.	Delta Renewed wildlife-friendly agriculture (pp. 76-77, 117)
<b>Wildlife-friendly agriculture BMPs - minimize water diversion impacts from agriculture</b>	BMPs that could include adding fish screens to prevent entrainment, conservation measures to reduce volume of water diverted, or changing the location or timing of diversion to minimize impacts.	Delta Renewed wildlife-friendly agriculture (pp. 76-77, 117)
<b>Wildlife-friendly agriculture BMPs - flexible and responsive management in agricultural areas</b>	Managing different crops with potential to provide support for different wildlife species. For example, The Nature Conservancy's "pop-up habitats" divert water to farms when waterbird densities are high; or row crops and rice fields support waterbirds and fish, while hedgerows support terrestrial wildlife.	Delta Renewed wildlife-friendly agriculture (pp. 76-77, 117)
<b>Wildlife-friendly agriculture BMPs - agricultural fields managed as seasonal wetland or floodplain</b>	Agricultural practices that create seasonal or perennial wetlands that mimic the hydrology of historical wetlands. For example, rice fields provide long-duration floods and invertebrate-rich rearing habitats, which flood basins provided historically. Agricultural wetlands can support high densities of wintering and migrating waterbirds, as well as fish, and are critical to supporting these species in the absence of extensive natural wetlands. Agricultural wetlands support different species depending on crop type, flooding patterns, and post-harvest practices.	Delta Renewed wildlife-friendly agriculture (pp. 76-77, 117)

Overlapping/Transitional Ecosystem Categories/Features	Definition	Source
<b>Wildlife-friendly agriculture BMPs - hedgerows and native vegetation within/between agricultural fields</b>	Patches of native vegetation within or between agricultural fields, whether remnants of historical habitats (e.g., oak trees, vernal pools) or linear features along the edge of fields (e.g., buffer strips, hedgerows), to provide habitat for native wildlife and easier movement through the landscape.	Delta Renewed wildlife-friendly agriculture (pp. 76-77, 117)
<b>Wildlife-friendly agriculture BMPs - minimize distance from agricultural fields to nearby wildland areas</b>	Species supported by wildlife-friendly agriculture that benefit from close proximity to appropriate wildland habitats.	Delta Renewed wildlife-friendly agriculture (pp. 76-77, 117)

*References*

Burmester, D. (2015). Wildlife-Friendly Agriculture. California Department of Fish and Wildlife, Ecosystem Restoration Program, Sacramento, CA.

CDFG (1988). A guide to wildlife habitats in California.

IAMIT (2017). EcoRestore Adaptive Management Program white paper - Draft 3/7/2017. Delta Stewardship Council, Interagency Adaptive Management Integration Team (IAMIT), Sacramento, CA. Available: <http://resources.ca.gov/ecorestore/wp-content/uploads/2017/04/2017-3-8-EcoRestore-Adaptive-Management-Program-White-Paper-v3-7-2017.pdf>. Accessed: August 23, 2017.

Robinson, A., S. Safran, J. Beagle, L. Grenier, R. Grossinger, E. Spotswood, S. Dusterhoff and A. Richey (2016). A Delta Renewed: A guide to science-based ecological restoration in the Sacramento-San Joaquin Delta, a report for the Delta Landscapes Project: Management tools for landscape-scale restoration of ecological functions. Prepared for California Department of Fish and Wildlife, Sacramento, CA. San Francisco Estuary Institute (SFEI) Aquatic Science Center, Richmond, CA. Available: [http://www.sfei.org/sites/default/files/project/SFEI\\_DeltaRenewed\\_102616\\_lowres.pdf](http://www.sfei.org/sites/default/files/project/SFEI_DeltaRenewed_102616_lowres.pdf). Accessed January 25, 2017.

Robinson, A., S. Safran, J. Beagle, R. Grossinger, L. Grenier and R. Askevold (2014). A delta transformed: ecological functions, spatial metrics, and landscape change in the Sacramento-San Joaquin Delta. Prepared for California Department of Fish and Wildlife, Ecosystem Restoration Program, Sacramento, CA. San Francisco Estuary Institute-Aquatic Science Center, Richmond, CA, Publication #729. Available: <http://www.sfei.org/documents/delta-transformed-ecological-functions-spatial-metrics-and-landscape-change-sacramento-san>. Accessed: January 26, 2016.

Springer, P. F. (1988). Saline emergent wetland. In California Wildlife Habitat Relationships System. California Department of Fish and Game, California Interagency Wildlife Task Group, Sacramento, CA.



## Appendix XIII – Regulatory Compliance and Permitting for Conservation Implementation

The implementation of conservation projects—specifically ecosystem enhancement, restoration and management activities—requires compliance with federal and state environmental laws and regulations. To ensure compliance, project proponents must consult with the federal and state agencies that issue permits for environmental impacts caused by conservation project construction or management actions (see the list of commonly required permits below). Permit requirements typically include appropriate measures for minimizing and mitigating the expected environmental impact of project activities and long-term maintenance.

The Federal authorities for environmental permitting are: 1) the U.S. Army Corps of Engineers (USACE) under the Clean Water Act (Section 404), U.S. Code Section 408, and the Rivers and Harbors Act of 1899 (Sections 9, 10, 14); and 2) the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service under the Endangered Species Act (ESA, Sections 7 and 10) and for issuance of Safe Harbor (USFWS 2016) and Candidate Conservation Agreements (USFWS 2017). State authorities for incidental take permitting include the California Department of Fish and Wildlife (CDFW), under the Natural Community Conservation Planning Act (NCCPA) and California Endangered Species Act (CESA) . The State Water Resources Control Board (SWRCB) or Regional Water Quality Control Board (RWQCB) regulates water resources under the Porter-Cologne Water Quality Control Act, Clean Water Act, and Wetland and Riparian Area Protection Policy. The State Office of Historic Preservation regulates historic assets under the National Historic Preservation Act. Other agencies that can issue state authorizations include the Central Valley Flood Protection Board (CVFPB), the California State Lands Commission, and the Delta Stewardship Council.

The primary permitting processes commonly required for implementation of restoration projects in the Delta, Suisun Marsh, or the Yolo Bypass include:

Authorization for incidental take under ESA: Incidental take is defined as any action that will “*harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct*” (16 U.S.C. § 1532 (19)) a threatened or endangered species (listed species) that is “*incidental to, and not the purpose of, the carrying out of an otherwise lawful activity*” (16 U.S.C. §1539 (a)(1)(B)). Section 7 of ESA prohibits the destruction or adverse modification of designated “*Critical Habitat*” for listed species. These are geographic areas “*on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection*” (ESA Section 3[5][A]). Incidental take is authorized either through a Biological Opinion and incidental take statement (ESA Section 7) or through a Habitat Conservation Plan (ESA Section 10). Landowners who cooperate with the

federal fish and wildlife agencies by taking management actions that contribute to the recovery of species can be authorized for incidental take of those species through a Safe Harbor Agreement (SHA). Take of species resulting from recovery actions such as restoration may also be authorized by a recovery permit under ESA Section 10(a)(1)(A).

Section 404 of the Clean Water Act: A Section 404 permit regulates the discharge of dredge or fill material into waters of the United States, including wetlands. A permit from USACE is required for any potentially significant impacts to U.S. waters (CWA Section 404[b][1]). A general permit may be issued for projects that have minimal effects, which may proceed with fewer delays.

Section 408 permit for alteration of Civil Works projects: A Section 408 permit is required from USACE under the authority of U.S. Code Title 33, § 408. This permit authorizes alterations or use of any USACE civil works project, including dams, levees, floodwalls, flood risk management channels, and navigation projects. Any breach in a USACE levee, for example, would require a Section 408 permit.

Section 401 Water Quality Certification and Wetlands Program: The RWQCB issues permits that regulate discharge of fill and dredged material under the Clean Water Act Section 401 and the Porter-Cologne Water Quality Control Act. A permit provides protection for all waters of the state, particularly for wetlands, riparian areas, and headwaters. The RWQCB will issue permits for projects that affect waters within their regions (for example, the Central Valley RWQCB); projects that affect multiple regions are permitted by the SWRCB.

Encroachment permits: The CVFPB requires an encroachment permit for any project that is within an area for which there is an Adopted Plan of Flood Control—such as the State Plan of Flood Control (SPFC)—under CCR Title 23, Division 1 (DWR 2016). If work is located within a flood control right-of-way, near a regulated Central Valley stream, or may impact the SPFC, a permit is required (CVFPB 2017). For example, the legal Delta and Yolo Bypass are within the CVFPB jurisdiction, so restoration projects in those areas commonly need this permit. Suisun Marsh, however, is outside of the CVFPB jurisdiction and would not.

Lake and Streambed Alteration (LSA) Agreements: A project proponent is required to notify CDFW before starting any project that may divert or obstruct the natural flow of any river, stream, or lake; change or use any material from the bed, channel, or bank of any river, stream, or lake; or deposit debris, waste, or other materials that could pass into any river, stream, or lake under Fish & G. Code § 1600-1603 (<https://www.wildlife.ca.gov/conservation/lisa>). An LSA Agreement is required if CDFW determines the project activity described in the notification may adversely affect fish and wildlife. The LSA Agreement requires measures to avoid or minimize harm to fish and wildlife or mitigate for impacts.

Authorization for incidental take under CESA: Take of a threatened, endangered, or candidate species (listed species) is defined as “*hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill*” in Fish & G. Code § 86. CDFW may authorize take that is

incidental to an otherwise lawful activity through an incidental take permit (Fish & G. Code § 2081 (b)). The impacts of the authorized take must be minimized and fully mitigated (Fish & G. Code § 2081 (b)(2)). If a species is listed under ESA and CESA, an applicant who obtains federal incidental take authorization may request that CDFW determine whether the federal incidental take authorization is consistent with CESA. If the federal incidental take authorization is deemed consistent, no further authorization or approval is necessary under CESA for that person to take the state-protected species incidental to their proposed activity identified in, and in accordance with, the federal authorization. CDFW would then prepare a *Consistency Determination*.

Section 2081, subdivision (a), allows CDFW to authorize import, export, take, or possession of listed species for scientific, educational, or management purposes through memoranda of understanding (MOU). CDFW may also authorize take of listed species through a SHA (Fish & G. Code § 2089.6; <https://www.wildlife.ca.gov/Conservation/CESA/Safe-Harbor-Agreements>). This agreement allows private landowners to collaborate with CDFW on conservation of listed species on their lands. Landowners that enter into an SHA are authorized to take listed species under this permit as long as implementation of the agreement is reasonably expected to provide a net conservation benefit to the species, among other provisions (Fish & G. Code § 2089.6). California SHAs are analogous to the federal SHA program; CDFW has the authority to issue a consistency determination based on a federal SHA (Fish & G. Code § 2088.22). Finally, accidental take of listed species is not prohibited if it occurs during the course of ongoing agricultural activities on a farm or ranch (Fish & G. Code § 2087).

The California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA): CEQA and NEPA each require a lead agency and a process of evaluating projects for their impacts on environmental resources, including air quality, water quality, biological, archeological, cultural, and other impacts (CDFW 2017, USEPA 2017). The purpose of CEQA and NEPA is to disclose to the public any “significant” (CEQA) or “adverse” (NEPA) effects on the environment through the preparation of an Environmental Impact Report (CEQA) or an Environmental Impact Statement (NEPA). No state or federal agency may approve or initiate a nonexempt project without going through the process. Under NEPA and CEQA, alternative courses of action are presented with their respective likely impacts on the environment, and these alternatives are subject to public review at various stages of the process. For each alternative, mitigation measures are developed to reduce the impacts to less than significant or not adverse, and the “environmentally superior” (CEQA) alternative (generally referred to as the preferred alternative) or “environmentally preferable” (NEPA) alternative is identified. At the end of the process, a final Notice of Determination (CEQA) or Record of Decision (NEPA) is filed before the project can be approved (GOPR 2011, USEPA 2017). While CEQA and NEPA do not provide permits for projects, completed CEQA or NEPA findings are often required before permits can be issued.

There may be other permits less commonly required for conservation projects, depending on the circumstances, such as when agreements regarding the constraints of pipelines and transmission facilities are required. Adaptive management (scientific investigations, monitoring, or

surveying) may require a combination of capture, handling, or collection permits. Federal permits include a recovery permit under ESA 10(a)(1)(A), permits under the Migratory Bird Treaty Act, or golden eagle take permits. State permits include scientific collecting permits or MOUs for listed (but not fully protected) species. Management of restored or protected land, including protection from depredation on agricultural or other conservation properties, or sensitive species, may also require permits.

### *References:*

- CDFW (2017). A summary of the California Environmental Quality Act (CEQA). California Department of Fish and Wildlife (CDFW), Sacramento, CA. Available: <https://www.wildlife.ca.gov/Conservation/CEQA/Purpose>. Accessed: August 25, 2017.
- CVFPB (2017). Need for an encroachment permit - Brochure. Central Valley Flood Protection Board (CVFPB), California Department of Water Resources, Sacramento, CA. Available: [http://www.water.ca.gov/floodmgmt/docs/brochure\\_recbord\\_permit.pdf](http://www.water.ca.gov/floodmgmt/docs/brochure_recbord_permit.pdf). Accessed: August 25, 2017.
- DWR (2016). State Plan of Flood Control descriptive document update. California Department of Water Resources, Sacramento, CA. Available: <http://www.water.ca.gov/cvfmp/docs/SPFC-DescriptiveDoc-Draft-Compiled-2016.pdf/>. Accessed: May 2017.
- GOPR (2011). CEQA document submission. The Governor's Office of Planning and Research (GOPR), Sacramento, CA. Available: [https://www.opr.ca.gov/s\\_ceqadocumentsubmission.php](https://www.opr.ca.gov/s_ceqadocumentsubmission.php). Accessed: August 25, 2017.
- USEPA (2017). Environmental Impact Statement filing guidance. United States Environmental Protection Agency (USEPA). Available: <https://www.epa.gov/nepa/environmental-impact-statement-filing-guidance#notice>. Accessed: August 25, 2017.
- USEPA (2017). National environmental review process. United States Environmental Protection Agency (USEPA). Available: <https://www.epa.gov/nepa/national-environmental-policy-act-review-process>. Accessed: August 25, 2107.
- USFWS (2016). Endangered species - For landowners - Safe Harbor agreements. U.S. Fish and Wildlife Service (USFWS). Available: <https://www.fws.gov/endangered/landowners/safe-harbor-agreements.html>. Accessed: August 25, 2017.
- USFWS (2017). Candidate conservation/candidate conservation agreements. U.S. Fish and Wildlife Service (USFWS). Available: <https://www.fws.gov/endangered/what-we-do/cca.html>. Accessed: August 25, 2017.

## Appendix XIV - Grants

Tables XIV.1, XIV.2, and XIV.3 are examples of grants that have been funded or approved for funding under the California Department of Fish and Wildlife (CDFW) Proposition 1 grant programs, the Delta Conservancy Proposition 1 grant program, and the Wildlife Conservation Board Environmental Improvement and Acquisition Projects program.

Table XIV.1. Projects funded under Proposition 1 – CDFW *Delta Water Quality, Ecosystem Restoration, and Greenhouse Gas Emission Reduction* Grant Programs.

Program	Fiscal Year	Project Type	Applicant	Project Title	Grant Amount
Greenhouse Gas	2014-2015	Implementation	Reclamation District 341	Sherman Island Wetland Restoration Project	\$10,386,139
Prop 1	2015-2016	Scientific Studies	San Francisco State University	Mechanisms underlying the flow relationship of longfin smelt: I. Movement and feeding	1,263,991
Prop 1	2015-2016	Scientific Studies	Regents of the University of California	Problems and Promise of Restoring Tidal Marsh to Benefit Native Fishes in the North Delta during Drought and Flood	969,238
Prop 1	2015-2016	Scientific Studies	Regents of the University of California	Hydrodynamic influences on the food webs of restoring tidal wetlands	867,235
Prop 1	2015-2016	Implementation	Solano Land Trust	Rush Ranch Lower Spring Branch Creek and Suisun Hill Hollow Tidal Connections Project	839,449
Prop 1	2015-2016	Scientific Studies	Regents of the University of California	Reconstructing juvenile salmon growth, condition and Delta habitat use in the 2014-15 drought and beyond	800,484
Prop 1	2015-2016	Scientific Studies	Regents of the University of California	The Effect of Drought on Delta Smelt Vital Rates	678,275

Program	Fiscal Year	Project Type	Applicant	Project Title	Grant Amount
Prop 1	2015-2016	Scientific Studies	Regents of the University of California	Drought-related high water temperature impacts survival of California salmonids through disease, increasing predation risk	\$625,740
Prop 1	2015-2016	Scientific Studies	Yolo County	Yolo Bypass Westside Tributaries Flow Monitoring Project	331,148
Prop 1	2015-2016	Planning	East Contra Costa County Habitat Conservancy	Knightsen Wetland Restoration and Flood Protection Project	240,000
Prop 1	2015-2016	Planning	Ducks Unlimited	Yolo Bypass Wildlife Area Habitat and Drainage Improvement Project Permitting	145,944
Prop 1	2016-2017	Acquisition	American Rivers	Paradise Cut Flood and Conservation Easement Acquisition	2,035,000
Prop 1	2016-2017	Planning	Contra Costa County Flood Control and Water Conservation District	Lower Walnut Creek Restoration Project	537,457
Prop 1	2016-2017	Scientific studies	Regents of the University of California	Contaminant Effects on Two California Fish Species and the Food Web That Supports Them	1,701,829
Prop 1	2016-2017	Scientific studies	Regents of the University of California	Impact of Spatial and Temporal Dynamics of Water Flows on Migratory Behavior of Chinook Salmon Smolts in the South Delta	1,510,723
Prop 1	2016-2017	Scientific Studies	Aquatic Toxicology Program	Impact of Climate Variability on Surface Water Quality: Cyanobacteria and Contaminants	891,341
Prop 1	2016-2017	Scientific studies	Metropolitan Water District of Southern California	Investigating the Factors that Affect Age-0 Longfin Smelt Abundance, Distribution, and Recruitment in the Upper SF Estuary	330,811
<b>Total</b>					<b>\$24,154,804</b>

Source: CDFW, <https://www.wildlife.ca.gov/Conservation/Watersheds/Restoration-Grants>

Table XIV.2. Projects funded under Proposition 1 – Delta Conservancy Grant Program.

<b>Fiscal Year</b>	<b>Applicant</b>	<b>Project Title</b>	<b>Grant Amount</b>
2015-2016	Ducks Unlimited	Yolo Bypass Wildlife Area Habitat and Drainage Improvement Project	\$2,000,000
2015-2016	California Land Stewardship Institute	Fish Friendly Farming Certification Program for the Sacramento-San Joaquin Delta	89,450
2015-2016	Ducks Unlimited	Sherman Island Wetland Restoration Project, Phase III	100,000
2015-2016	American Rivers	Three Creeks Parkway Restoration Project	836,409
2015-2016	San Joaquin County Resource Conservation District (RCD)	Paradise Cut Flood and Conservation Easement Acquisition	2,000,000
2015-2016	San Joaquin County RCD	Paradise Cut Conservation and Flood Management Plan	99,924
2015-2016	Yolo RCD	Yolo Bypass Corridors for Flood Escape on the Yolo Bypass Wildlife Area	688,196
2015-2016	American Rivers	Lower Marsh and Sand Creek Watershed Riparian Restoration Planning	73,493
2016-2017	Reclamation District 2137	Dutch Slough Revegetation	2,900,000
2016-2017	Solano RCD	Petersen Ranch: Working Waterway Habitat Enhancement Project	444,795
2016-2017	Sacramento County Regional Parks	Restoration of Priority Freshwater Wetlands for Endangered Species at the Cosumnes River Preserve	943,549

<b>Fiscal Year</b>	<b>Applicant</b>	<b>Project Title</b>	<b>Grant Amount</b>
2016-2017	The Regents of the University of California (UC Davis)	Investigations of restoration techniques that limit invasion of tidal wetlands	107,655
<b>Total</b>			<b>\$10,283,471</b>

Source: Delta Conservancy, <http://deltaconservancy.ca.gov/active-prop-1-grants/>.

Table XIV.3. Projects in or near the Delta region approved to be funded by the Wildlife Conservation Board, Environmental Improvement and Acquisition Projects program.

<b>Year</b>	<b>Grantee</b>	<b>Description of Project</b>	<b>Grant Amount</b>
2017	East Contra Costa County Habitat Conservancy (ECCCHC)	Cooperative project with the East Bay Regional Park District to acquire approximately 40 acres of land for the protection and preservation of existing regional wildlife linkages and grassland habitats that support listed species identified in the ECCCHC/Natural Community Conservation Plan, south of the city of Antioch in Contra Costa County	\$317,000
2014	Reclamation District 2035 (RD 2035)	Cooperative project with the U.S. Bureau of Reclamation, the Department of Water Resources, and the Woodland-Davis Clean Water Agency to construct a new screened water intake for RD 2035, the largest remaining unscreened intake on the Sacramento River north of the Sacramento-San Joaquin Delta. This proposed project is located five miles east of Woodland on privately owned land on the west bank of the Sacramento River levee, approximately one-half mile north of Interstate 5, in Yolo County	2,000,000
2013	East Contra Costa County Habitat Conservancy	Cooperative project with the East Bay Regional Park District to acquire approximately 1,885 acres of land for the protection and preservation of existing regional wildlife linkages, including grassland and oak woodland savannah habitat areas within the East Contra Costa County Natural Community Conservation Plan/Habitat Conservation Plan in the Diablo Mountain Range, above the City of Antioch	4,800,000
<b>Total</b>			<b>\$7,117,000</b>

Source: CDFW, <http://www.wildlife.ca.gov/News>.

## Appendix XV – Open Standards

The Open Standards involves five main process steps (CMP 2013):

### 1. *Conceptualize Project*

The first steps to conceptualize a program or project involve defining the vision and geographic, temporary, and sociopolitical scope; selection of the planning and implementation team and their roles and responsibilities; identification of *conservation target* (species, habitat, or ecosystem biodiversity) and human wellbeing aims (*aims* are focus items, such as reestablishing fluvial processes along streams, integrating recreation and other human benefits into conservation outcomes, or incorporating agricultural sustainability into Delta landscape-scale conservation); description of the current status of these aims; identification of direct threats, pressures, or contributing factors with regard to key ecological, biophysical, or human wellbeing attributes; and performing a *situation analysis*. This involves creating a conceptual model of how all *key factors*--including threats, enabling conditions, and potential opportunities--affect the aims. A built-in technique for evaluating and ranking factors helps to identify critical threats/pressures for which priority goals and strategies can then be determined.

### 2. *Develop a Formal Action Plan*

With a conceptual understanding of the underlying assumptions of how pressures and contributing factors influence the aims, the next process step is to develop *goals* for each aim and identify *key factors* and strategies to reach the identified goals. Linking the strategies to the desired goals and ultimate outcomes allows the determination of *key intervention points* and related actionable objectives that may involve intermediate outcomes on the path to reaching a desired goal. Performing this in-depth, rational analysis of individual strategies allows the evaluation of whether they are linked, focused, feasible, and appropriate for reaching the targeted goal. By following “if, then” logic steps along a “*results chain*,” this evaluation will ultimately result in prioritization of strategies and related actions.

### 3. *Implement Actions and Monitoring*

With the set of priority strategies in mind, the next step is to develop short- and long-term work plans and timelines for implementing and monitoring actions. This can then support the solicitation of necessary implementation funds. In addition to, or as part of, the work plan, it is critical to develop a monitoring plan with identified *indicators*, *performance measures* and *metrics* to evaluate the progress

toward goals, or the status and trends of aims. Incorporating targeted, goal-oriented assessment in the project budget likely increases the likelihood of funding support for the adaptive management and monitoring aspect of the program or project.

#### 4. *Analyze, Use, Adapt*

Once actions and monitoring have been implemented, a system for handling the project data has to be made available to support data analysis. In this respect, shared, easy access data management portals have been shown to be successful tools. Project results and assumptions, and operational and financial data, are then analyzed at set intervals over time, followed by documented discussions and decisions that may or may not lead to the revision of project plans at given points in time.

#### 5. *Capture and Share Learning*

Key results and lessons are documented throughout program or project implementation to serve as the foundation for sharing insights and knowledge gained throughout. Depending on identified key audiences, communication strategies can be developed and executed. It is important to create a learning environment where regular feedback can be shared formally or informally, regular evaluations that demonstrate a commitment to learning are carried out, and a safe environment for experimentation is provided, allowing sharing of successes and failures with other teams.

### *References*

CMP (2013). Open standards for the practice of conservation version 3.0. Conservation Measures Partnership (CMP). Available: <http://cmp-openstandards.org/download-os/>. Accessed: June 29, 2016.