Spencer Kenner (SBN 148930)
James E. Mizell (SBN 232698)
Emily M. Thor (SBN 303169)
DEPARTMENT OF WATER RESOURCES
Office of the Chief Counsel
1416 9th St., Room 1104
Sacramento, CA 95814
Telephone: 916-653-5966
E-mail: jmizell@water.ca.gov

Attorneys for California Department of Water Resources

DWR-1219

BEFORE THE

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

HEARING IN THE MATTER OF CALIFORNIA DEPARTMENT OF WATER RESOURCES AND UNITED STATES BUREAU OF RECLAMATION REQUEST FOR A CHANGE IN POINT OF DIVERSION FOR CALIFORNIA WATER FIX	**TESTIMONY OF DR. CHRISTOPHER EARLE**

I, Christopher Earle, do hereby declare:

I am employed as a Senior Technical Analyst with ICF and have previously been recognized as an expert in these proceedings. Information on my education, experience, and expertise is provided by my Statement of Qualifications and direct testimony, previously admitted in this proceeding. (Exhibits DWR-1003 and DWR-1014.)

I. OVERVIEW OF TESTIMONY

The purpose of my testimony is to provide evidence rebutting the claims brought by a number of parties concerning impacts of the California WaterFix (CWF) on wildlife and plant species. In particular, this rebuttal testimony responds to issues related to terrestrial impacts and monitoring raised in Part 2 by Dr. Shilling, Dr. Ivey, Dr. Pandolfino, Mr. Pachl, Mr. Wirth, Mr. Burness and Dr. Fries. In addition to additional authorities cited herein, my testimony relies on the information and analysis contained in the 2016 FEIR/S (Exhibit

SWRCB-102), 2017 Certified FEIR, (Exhibits SWRCB-102, SWRCB-108, SWRCB-109, SWRCB-110, SWRCB-111, SWRCB 112), the Biological Assessment (BA) (Exhibit SWRCB-104), the 2081(b) Application (Exhibit DWR-1036), the Biological Opinion (BO) issued by the US Fish and Wildlife Service (Exhibit SWRCB-105), the California Department of Fish and Wildlife issued 2081(b) Incidental Take Permit (ITP) (Exhibit SWRCB-107), BDCP Appendix 5.J, Attachment 5J.C, *Analysis of Potential Bird Collisions at Proposed BDCP Powerlines* (Exhibit SWRCB-5) in FEIR/S Appendix 11F (Exhibit SWRCB-102), BDCP Appendix 5.J, Attachment 5J.D, *Indirect Effects of the Construction of the BDCP Conveyance Facility on Sandhill Crane* (Exhibit SWRCB-5) in FEIR/S Appendix 11F, (Exhibit SWRCB-102), and the January 2018 Final EIR Addendum (Exhibit DWR-1295). I am also familiar with the June 2018 Administrative Draft Supplemental EIR/EIS, which found that the proposed CWF project would result in fewer impacts on terrestrial biological resources than the project approved in the FEIR/S. (Exhibit SWRCB-113, Chpt. 12.) Nothing in the June 2018 Administrative Draft Supplemental EIR/EIS changes my opinion from my direct testimony that the CWF is reasonably protective of wildlife and plant species. (Exhibit DWR-1014, pp. 3:1 to 4:14 [Overview of Testimony].)

II. THE TERRESTRIAL ANALYSIS FOR THE CALIFORNIA WATERFIX EVALUATED MORE THAN JUST LISTED SPECIES.

During Part 2 of the proceeding, a number of protestants claimed or suggested that the CWF considered only the effect of the CWF only on species listed under California or federal law. (See e.g., LAND-135 [Shilling], p. 2:21-22, March 5, 2018 Transcript, vol. 10, p. 195:3-10.) This is incorrect. The FEIR/S analyzed the effects of Alternative 4A on the terrestrial biological resources present or potentially occurring in the study area in Final EIR/EIS Chapter 12, Section 12.3.4.2, *Alternative 4A—Dual Conveyance with Modified Pipeline/Tunnel and Intakes 2, 3, and 5 (9,000 cfs; Operational Scenario H)*. (Exhibit SWRCB-102, pp. 12-3412 to 12-3787; see also March 5, 2018 Transcript, vol. 10, p. 195:7-10). This analysis included consideration of:

- natural communities (Exhibit SWRCB-102, Impacts BIO-1 to BIO-31, pp. 12-3412 to 12-3471);
- special status wildlife species, which included threatened, endangered, and candidate species under the ESA and CESA, California species of special concern, California fully protected species, bat species identified on the Western Bat Working Group list, and species that occur on the CDFW Special Animals List (Exhibit SWRCB-102, Impacts BIO-32 to BIO-168, pp. 12-3471 to 12-3734);
- special status plant species, which included threatened, endangered, and candidate species under the ESA, plants listed as rare under the California Native Plant Protection Act, California Rare Plan Rank 1B and 2, and some that are rank 3 and 4, and plants on the CDFW Special Plants, Bryophytes, and Lichens List) (Exhibit SWRCB-102, Impacts BIO-169 to BIO-175; pp. 12-3734 to 3757);
- wetlands and other waters of the United States (Exhibit SWRCB-102, Impacts BIO-176 and BIO-177; pp. 12-3757 to 12-3765);
- shorebirds and waterfowl (Exhibit SWRCB-102, Impacts BIO-178 to BIO-183; pp. 12-3765 to 12-3776);
- common wildlife and plants (Exhibit SWRCB-102, Impact BIO-184; pp. 12-3776 to 12-3778);
- wildlife corridors (Exhibit SWRCB-102, Impact BIO-185; pp. 12-3778 to 12-3779);
- invasive plant species (Exhibit SWRCB-102, Impact BIO-186; pp. 12-3779 to 12-3783); and
- compatibility with plans and policies (Exhibit SWRCB-102, Impact BIO-187; pp. 12-3783 to 12-3787).

Impacts on federal- and state-listed terrestrial species were also evaluated in the BA (Exhibit SWRCB-104), the 2081(b) Application (Exhibit DWR-1036), the USFWS BO (Exhibit SWRCB-105) and the ITP (Exhibit SWRCB-107). Impacts on specific terrestrial resources were further considered in the January 2018 Final EIR Addendum (Exhibit DWR-1295) and the June 2018 Administrative Draft Supplemental EIR/EIS. (Exhibit SWRCB-113, Chapter 12.)

III. THE CALIFORNIA WATERFIX WILL NOT UNREASONABLY INTERFERE WITH WILDLIFE MOVEMENT THROUGH HABITAT FRAGMENTATION OR THROUGH INDIRECT EFFECTS OF NOISE AND LIGHTING

In his testimony for the Local Agencies of the North Delta et al. (LAND), Dr. Shilling generally asserts that construction and operation of the CWF will interfere with wildlife

movement caused by roads and other linear features. (Exhibit LAND-135, p. 2:13-18.) Potential mechanisms for such interference suggested by Dr. Shilling include habitat fragmentation, direct mortality, and aversion effects as well as traffic/machinery light and noise-induced effects." (Id.) In particular, Dr. Shilling raises concerns regarding noise impacts on wildlife. (Exhibit LAND-135, pp. 2:8 to 4:5.)

Dr. Shilling cited no independent analysis of the impacts of the CWF in his direct testimony on wildlife and admitted, on cross examination, that he performed no quantitative analysis of the impacts of the CWF regarding noise and traffic. (Exhibit LAND-135, pp. 2:8 to 4:5; March 13, 2018 Transcript, vol. 14, p. 276:14-16.) Dr. Shilling also provided no evidence to support his assertion that habitat fragmentation and barriers to dispersal would result in disappearance of wildlife from affected areas. (Exhibit LAND-135, pp. 2:8 to 4:5.)

The FEIR/S evaluated the effects of increased traffic on local roads from construction vehicles that could increase wildlife mortality and impede wildlife movement. (Exhibit SWRCB-102, p. 12-3777). For all species of wildlife, the FEIR/S concluded that these effects would be less than significant. (Exhibit SWRCB-102, pp. 12-3777 to 12-3778.) The FEIR/S also evaluated the impact on wildlife from construction lighting, and likewise found that, for all species of wildlife, impacts would be less than significant, although minimization measures would be required to achieve this less-than-significant standard for many species (see e.g., Exhibit SWRCB-111, pp. 2-34 [MM Bio-166: bats]; pp. 4-36 to 4-37 [AMM20: Greater Sandhill Cranes]; and pp. 4-50 [AMM25: Riparian Woodrat and Riparian Brush Rabbit].)

The FEIR/S also evaluated impacts on wildlife from traffic and construction noise, and specified minimization measures sufficient to ensure that all such impacts would be less than significant. (See e.g., Exhibit SWRCB-111, pp. 2-131 to 2-132 [MM NOI-3]; 3-34 to 3-37 [EC: Develop and Implement Noise Abatement Plan & AMM31: Noise Abatement]; p. 4-30 [AMM18: Swainson's Hawk]; pp. 4-35 to 4-37 and 4-39 to 4-40 [AMM20: Greater Sandhill Crane]; p. 4-41 [AMM21: Tricolored Blackbird]; pp. 4-42 to 4-43 [AMM22: Suisun Song Sparrow, Yellow-Breasted Chat, Least Bell's Vireo, Western Yellow Billed Cuckoo]; p.

4-50 [AMM25: Riparian Woodrat and Riparian Brush Rabbit]; p. 4-53 to 4-54 [AMM38: California Black Rail]; and p. 4-55 [AMM39: White-Tailed Kite].)

Dr. Shilling also raised a number of specific issues regarding the evaluation of noise impacts on birds. Dr. Shilling first incorrectly asserted that the noise level considered as a threshold in the FEIR/S was 60 dBa; he advocated a threshold of around 50 dBA, citing a study for CalTrans. (Exhibit LAND-135, p. 3:19-22.) As the basis for his assertion, he cited page 12-3555 of the FEIR/S, which stated, "Crane habitat could potentially be affected by general construction noise above baseline level (50–60 dBA)." In fact, the analysis for the FEIR/S used a 50 dBA threshold to assess potential effects on birds. (Exhibit SWRCB-5, Appendix 5.J.D, pp. 5.J.D-3to 5.J.D-4.) The FEIR/S used a 50dBA threshold for measuring noise effects on all bird species[1].

For greater sandhill cranes, effects of construction noise on habitat were conservatively evaluated by calculating the distances from construction sites subject to noise above both 50 dBA and 60 dBA thresholds. (Exhibit SWRCB-102, p. 12-148). The 60 dBA threshold was included in the analysis because it is supported by the guidelines for DWR construction projects. (Exhibit SWRCB-5, Appendix 5.J.D, pp. 5J.D-4 to 5.J.D-4.) Having limited data on the effects of noise on the greater sandhill crane, the FEIR/S evaluated potential for significant adverse impacts using the more conservative threshold of 50 dBA at the recommendation of biologists. Moreover, AMM20 for greater sandhill crane uses a 50 dBA threshold for noise minimization. (Exhibit SWRCB-111, pp. 4-32 to 4-38.)

The 50 dBA threshold used for the effects analysis is very conservative, and likely overestimates effects on birds. Dooling and Popper 2007, cited by Dr. Shilling, states: "New

[1] The full list of bird species addressed in the FEIR/S (Exhibit SWRCB-102) included California black rail (p. 12-3525); California least tern (p. 12-3537); greater sandhill crane (p. 12-3552; Table 12-4A-29); least Bell's vireo and yellow warbler (p. 12:3576); Swainson's hawk (p. 12-3587); tricolored blackbird (p.12-3595); western burrowing owl (p. 12-3604); western yellow-billed cuckoo (p. 12-3611); white-tailed kite (p. 12-3595); yellow-breasted chat (p. 12-530); Cooper's hawk and osprey (p. 12-3638); golden eagle and ferruginous hawk (p. 12-3545); cormorants, herons, and egrets (p. 12-3652); short-eared owl and northern harrier (p. 12-3660); mountain plover (p. 12-3667); grasshopper sparrow and horned lark (p. 12-3673); least bittern and white-faced ibis (p. 12-3678); loggerhead shrike (p. 12-3687); and yellow-headed blackbird (p. 12-3704).

data would now suggest [the 60 dBA threshold level] should probably be 55 dBA for the typical bird (critical ratio of 27 dB). If we accept this level based on the typical bird, it means that 50% of the tested birds would fall above this level and 50% below. . . Based on our evaluations, and given the typical noise levels in a quiet suburban area, levels of highway noise approaching 50-60 dB(A) can reasonably be assumed to begin to measurably interfere with acoustic communication." (Exhibit LAND-148, pp. 46-47.)

A similar but qualitative analysis was used for other (non-bird) wildlife, an approach that had the concurrence of the fish and wildlife agencies.

Dr. Shilling also suggests that the FEIR/S should have considered not only absolute noise levels but also the frequency of the noise. (Exhibit LAND-135, pp. 2:25-27 and 3:22-24.) The main paper cited by Dr. Shilling, Dooling and Popper 2007, states, in regard to using absolute noise rather than factoring in frequency, " . . . overall level in dB(A) is a very conservative estimate of the effects of highway noise on communication in birds." (LAND-148, p. 14.) Thus consideration of noise frequency would not have improved the analysis.

Dr. Shilling also asserted that "…the method used by DWR for calculating traffic/construction noise propagation is entirely inadequate and does not correspond to even basic modeling approaches in GIS." Yet he provided no basis for this claim. In his oral testimony, he indicated that "the initial volume that is used is too low." (March 12, 2018 Transcript, volume 14, pp. 157:19 to 158:1). In his direct testimony, Dr. Shilling referenced the study by Dooling and Popper, 2007 (Exhibit LAND-148) in reference to noise thresholds and construction, and referred back to this citation in his oral testimony, in reference to a table providing information on pile driver impacts. (Exhibit LAND-135, p. 3:22; see also March 13, 2018 Transcript, volume 14, p. 189:22-25). Table 2 of LAND-148 (p. 14) indicates that pile drivers generate noise at 101 dB. This is the level used for the analysis for pile drivers in the FEIR/S. (Exhibit SWRCB-102, Appendix 11F, Table 5.J.D-4, p. 11F-212.). Thus the approach advocated by Dr. Shilling is essentially identical to the approach used in the FEIR/S.

In his testimony concerning the noise analysis, Dr. Shilling also refers to the noise

analysis in FEIR/S Appendix 11F (slide 5 of Exhibit LAND-127) and misinterprets the red zones around the intakes labeled as 80 dB, inferring that these red zones represent the construction sites. (March 13, 2018 Transcript, volume 14, p. 192:17-19.) These red lines, however, represent the distance from the noise sources at which noise levels will reach 80 dB as a result of pile driving. The analysis applied a very conservative approach, in that it did not consider the additional attenuation effects of trees, buildings, walls, and topographic features between the noise source and the noise receiver site even though there are many such features in the vicinity of the construction. As clearly shown in the figures Dr. Shilling cites (Exhibits LAND-137, slide 4; LAND-151 [FEIR/S, Figs. 23A-04 and 23A-11]), these noise effects would penetrate only a very small proportion of the entire Delta. Even if wildlife were averse to penetrating the 50 dBA contour boundaries delineated in Dr. Shilling's figures, the figures show that there are many gaps between areas having noise levels exceeding 50 dBA. More significantly, the literature cited by Dr. Shilling does not indicate that wildlife are averse to moving through areas where there are noise levels above 50 dBA.

Most of the Delta is already subject to noise from busy roads, residential areas, and agricultural equipment, and sandhill cranes and other species have become adapted to this acoustic background. (Exhibit SWRCB-5, BDCP Appendix 5.J, Attachment 5J.D, *Indirect Effects of the Construction of the BDCP Conveyance Facility on Sandhill Crane*, in Exhibit SWRCB-102, Appendix 11F.) The ambient sound levels in the affected areas likely range mostly from low values of 40-50 dBA in the more rural areas away from major roadways, to values as high or higher than 80-90 dBA adjacent to Interstate 5. (*Id.*). Rural residential portions of the project area are likely representative of quiet suburban areas, which would reach an estimated ambient sound level of 50 to 60 dBA. (Exhibit LAND-148, p. 33.) At noise levels at or below the ambient sound level, there is no potential for noise to mask the sounds of bird communication. (Exhibit LAND-148, p. 47.)

In summary, noise generated by the project would not create a barrier to wildlife movement. Although the existing data indicate that noise generated from the project will

increase above ambient sound levels in limited portions of the Delta, the FEIR/S fully assessed these effects and provided avoidance, minimization, and mitigation measures to address these effects and reduce them to less than a significant magnitude.

IV. THE CALIFORNIA WATERFIX EVALUATED AND ADDRESSED POTENTIAL IMPACTS TO CALIFORNIA BLACK RAIL

Dr. Fries and Dr. Pandolfino both raised general concerns regarding the CWF's analysis of impacts to California black rail. (See Exhibits DDJ-215, p. 9:14-26; SOSC-21 errata, pp. 5:5 to 6:20.) Dr. Fries asserts that the "Final EIR/EIS simply estimates, with no survey data, that no California Black Rails will be affected by the tunnel construction." (Exhibit DDJ-215, p. 9:22-26.) This is an inaccurate characterization of the approach for analyzing effects to this species, and is misleading because it omits to note measures that ensure black rails would be safe from harm.

The analysis in the FEIR/S acknowledges that California black rail habitat will be affected by the project and commits that those impacts will be mitigated to a level below significance through habitat restoration, which will be performed prior to the habitat loss. (Exhibit SWRCB-102, p. 12-3525:19-27). The project will result in no injury or mortality of California black rails because AMM38 requires avoidance of California black rail individuals. (Exhibit SWRCB-111, pp. 4-52 to 4-54.) This will be accomplished through site-specific surveys performed prior to construction, with project timing and design measures required to achieve complete avoidance of impacts to the birds, in the event that any black rails are found during the preconstruction surveys. (Exhibit SWRCB-102, p. 12-3524.)

Dr. Pandolfino raised a general concern that the California WaterFix analysis mischaracterized the transmission line collision risks for California black rail. (Exhibit SOSC-21 errata, pp. 5:5 to 6:6.) This is incorrect. The analysis of collision risk for California Black Rail is based on the analysis provided in the *Analysis of Potential Bird Collisions at Proposed BDCP Powerlines*. (Exhibit SWRCB-5, BDCP Appendix 5J, Attachment 5J.C, p. 8.) While the bird strike analysis states that California black rails are relatively sedentary,

spending most of their lives on the ground and hidden in the wetland and adjacent upland canopy (Id., p. 8:22-23), it also acknowledges that black rails engage in local, seasonal migration and juvenile dispersal (Id., p. 8:28-30), phenomena that would expose the birds to collision risks.

Dr. Pandolfino also argued that the combination of night migration and the physical attributes of black rails makes them highly susceptible to collisions with power lines, citing Bevanger 1998. (Exhibits SOSC-21 errata, p. 5:12 to 6:1-6; SOSC-34). The BDCP Appendix 5.J, Attachment 5J.C analysis acknowledges that, during migration, birds may collide with overhead wires; but also notes that collisions are more likely to be associated with taller structures such as communications towers or smoke stacks. (Exhibit SWRCB-5, Appendix 5J, Attachment 5J.C, p. 6.) While nocturnal migration is the most common contributing factor to migration-related collisions, most transmission line collisions occur during flights in daily use areas associated with commuting or foraging (Id. p. 7).

The BDCP Appendix 5.J, Attachment 5J.C analysis acknowledges that black rails are known to suffer mortality from transmission line collision, likely associated with transit between foraging areas and/or local, seasonal migration, and that rails are also vulnerable due to low to moderate flight maneuverability. (Id. pp. 7-8) The document also states, however, that there are relatively few occurrences of California black rail collisions with overhead wires, and other factors contribute to the relatively low collision susceptibility. (Id.) These factors include: black rails are not known to engage in long distance migrations; they do not have daily commuting patterns; and their local movements are likely short and low (less than 16 feet in height), making them less vulnerable to collisions than birds with long distance migration and/or frequent local flights at the height of the power lines. (Id.) Thus, black rails have lower susceptibility to transmission line collisions than the greater sandhill crane, and as discussed elsewhere in my direct testimony (Exhibit DWR-1014, pp. 9:1 to 12:11) and in Section VI.B below, I do not expect any greater sandhill crane mortality to result from California WaterFix construction and operations; therefore, the same conclusion applies to the California black rail. Based on the Appendix 5J, Attachment 5J.C analysis,

the FEIR/S concluded that the construction and operation of the power lines would result in a less-than-significant impact. (Exhibit SWRCB-102, p. 12-3526)

V. CALIFORNIA WATERFIX MITIGATION MEASURES ARE EFFECTIVE FOR POTENTIAL IMPACTS TO WHITE-TAILED KITES

In his testimony for Save Our Sandhill Cranes (SOSC), Dr. Pandolfino asserts that the impact analysis for white-tailed kite in the Final EIR/S is insufficient largely because it relies on mitigation for Swainson's hawk habitat to compensate for white-tailed kite habitat loss. (Exhibit SOSC-21 Errata, pp. 6:21-8:21.) Dr. Pandolfino correctly asserts that there are both significant similarities and differences between Swainson's hawk and white-tailed kite foraging habitat. Dr. Pandolfino states that the two species require very different grassland conditions for foraging and that white-tailed kite use of wetlands is high compared to limited use by Swainson's hawks.

The impact analysis in the FEIR/S uses a habitat model for white-tailed kite that includes all grasslands and most cultivated lands excluding permanent crop types (e.g. orchards and vineyards). (Exhibit SWRCB-5, Appendix 2A-26, pp. 2.A.26-6 to 2.A.26-16.) This is therefore a conservative model that substantially overestimates potential impacts to the white-tailed kite. Thus, although some mitigation lands may be less suitable than others for white-tailed kite due to management or crop type, the conservative habitat model also provides assurances that mitigation substantially exceeds impacts for this species. Moreover, the restoration of nontidal wetlands and the protection and enhancement of managed wetlands would further compensate for impacts on white-tailed kite foraging habitat by providing mitigation habitat that does not overlap with Swainson's hawk habitat. (Exhibit SWRCB-102, pp. 12-505 to 12-516.) Dr. Pandolfino correctly states that "much of the mitigation for Swainson's Hawk would be in cultivated crops such as sugar beets and tomatoes". However, "much" does not imply a majority. The CDFW ITP requires that at least 62.5% of mitigation lands for Swainson's hawk be maintained in alfalfa, pasture, and grasslands (with at least 37.5% maintained in alfalfa), all of which provide foraging habitat

for white-tailed kite. (Exhibit SWRCB-107, Attachment 4 [Covered Species-Specific Criteria for HM Lands Suitable for Compensatory Mitigation], p. 2.)

VI. CALIFORNIA WATERFIX POTENTIAL IMPACTS TO GREATER SANDHILL CRANES HAVE BEEN THOROUGHLY EVALUATED AND ADDRESSED

My direct testimony addressed CWF impacts on greater sandhill cranes. (Exhibit DWR-1014, pp. 19:1 to 21:16.) This rebuttal addresses additional specific concerns raised by several protestants[2] concerning (a) CWF impacts on Greater sandhill crane habitat and (b) risks of mortality from collisions with powerlines. I also discuss commitments made under CWF to address such impacts. As stated in my direct testimony, "[p]rotective measures implemented during project construction would require that project effects on cranes in the Delta are avoided or minimized. Protection and restoration of greater sandhill crane habitat would improve the overall condition of Greater Sandhill Crane Habitat in the Delta, relative to existing conditions. These measures together will reasonably protect the greater sandhill crane from effects of CWF." (Exhibit DWR-1014, p. 14:13-15.) Nothing in the June 2018 Administrative Draft Supplemental EIR/EIS changes this opinion. (Exhibit SWRCB-113, pp. 12-26 to 12:31.)

A. California WaterFix Restoration of Greater Sandhill Crane Habitat and Protective Measures during Project Construction will Reasonably Protect Greater Sandhill Cranes in the Delta

Protestants raised generalized concerns that the population of greater sandhill cranes in the Delta is in decline and that the amount of available habitat is limiting the population in the Delta, citing concerns such as urbanization and an increase in incompatible crops in the Delta such as vineyards and orchards threatening the continued existence of cranes in the Delta. (Exhibits DDJ-215, p. 7:11-12; FSL-21 errata, pp. 3:27 to 4:13.) Contrary to these statements, Dr. Ivey has previously written "it is likely that the sandhill crane population in the Delta region is higher today than in the 1980s." (Exhibit

[2] Exhibits DDJ-215 [Fries], pp. 7:6 to 8:17, FSL-21 errata [Ivey], pp. 4:15 to 11:10; SOSC-6 [Wirth], pp. 9:10 to 11:3; SOSC-21 errata [Pandolfino], pp. 1:23 to 5:4; ECOS-1 errata [Burness], pp. 8:16 to 9:27.

SOSC-17 [Ivey et al. 2014], p. 8.) Data are not available to detail historical populations of greater sandhill cranes (earlier studies did not distinguish between populations of the three sandhill crane subspecies), but aerial counts conducted by the California Department of Fish and Wildlife indicate the Delta population of sandhill cranes has increased, from 3,380 in 1983-1989 to 11,625 in 2001-2001. (Id.) More than 27,000 sandhill cranes were estimated to use the Delta in 2008, of which 2,000 to 3,000 birds were of the greater sandhill crane subspecies. (Id., pp. 8-9.) While use of crop types that do not provide crane habitat (e.g. orchards, vineyards) in the Delta is increasing and will likely have adverse population effects on greater sandhill cranes if more habitat is not protected, this trend is unrelated to the CWF. In fact, the CWF will protect at least 4584 acres of crane roosting and foraging habitat in perpetuity, a substantial improvement relative to current conditions. (Exhibit SWRCB-102, pp. 12-3562.)

Protestants also expressed concern regarding CWF habitat impacts and mitigation. (See Exhibits DDJ-215, p. 7:12-20; FSL-21 errata, pp. 4:9-12 and 9:17-24; ECOS-1 errata, pp. 8:16 to 9:27; SOSC-6, pp. 9:10 to 11:3.) CWF effects on crane habitat were addressed in my direct testimony. (Exhibit DWR-1014, pp. 14-10 to 16:2.) As noted there, all habitat impacts would be mitigated by restoration and protection of greater sandhill crane habitat as described in FEIR, Chapter 12. (Exhibit SWRCB-102, pp. 12-3542 to 12-3548; see also SWRCB-113, pp. 12-26 to 12:31.) The Administrative Draft Supplemental EIR/EIS identifies some further impacts to crane habitat (approximately 97 acres), but these impacts, if included in a Final Supplemental EIR/EIS, would likewise be minimized and mitigated as previously described. Thus it is my opinion that the minimization and mitigation commitments for sandhill crane would still be reasonably protective of this species. (Exhibit SWRCB-113, pp. 12-26 to 12-31.)

Dr. Ivey acknowledged that Environmental Commitment 3 and Environmental Commitment 10 include more acres of habitat than the greater sandhill crane habitat directly impacted by the CWF, but expressed concerns that unless the habitat conservation were implemented within the crane use landscape, it would not contribute to crane

objectives. (Exhibit FSL-21 errata, p. 9:16-24.) Dr. Fries also expressed concern over the location of habitat conservation. (Exhibit DDJ-215, p. 7:7-20.) These concerns are addressed by the Resource Restoration and Performance Principles for greater sandhill cranes, GSC1, GSC2, GSC3 and GSC4, which guide the habitat restoration and protection of the environmental commitments. (See Exhibits SWRCB-111, pp. 5-4 to 5-5; SWRCB-102, pp. 3561 to 3562.) The provisions of those Principles are as follows.

With regards to roosting habitat, up to 95 acres of roosting habitat would be created within 2 miles of 40 existing permanent roost sites, which would consist of active cornfields that are flooded following harvest to support roosting cranes and also provide the highest-value foraging habitat for the species. Individual fields would be at least 40 acres, could shift locations throughout the Greater Sandhill Crane Winter Use Area, and would be in place prior to roosting habitat loss. (Id.) In addition, 320 acres of roosting habitat would be created in minimum patch sizes of 40 acres within the Greater Sandhill Crane Winter Use Area in Conservation Zones 3, 4, 5, or 6. (Id.) Restoration sites would be identified with consideration of sea level rise and local seasonal flood events. (Id.) These wetlands would be created within 2 miles of existing permanent roost sites and protected in association with other protected natural community types at a ratio of 2:1 upland to wetland habitat to provide buffers that would protect cranes from the types of disturbances that would otherwise result from adjacent roads and developed areas (e.g., roads, noise, visual disturbance, lighting). (Id.) The creation of 180 acres of crane roosting habitat would be constructed within the Stone Lakes NWR project boundary and would be designed to provide connectivity between the Stone Lakes 11 and Cosumnes greater sandhill crane populations. (Id.) The large patch sizes of these wetland complexes would provide additional conservation to address the threats of vineyard conversion, urbanization to the east, and sea level rise to the west of sandhill crane wintering habitat. (Id.) These siting commitments, which are not mentioned by Dr. Ivey or Dr. Fries, provide high confidence that sandhill cranes would use the provided roosting habitat.

Regarding foraging habitat, at least 4,584 acres of cultivated lands that provide high-

to very high value foraging habitat for greater sandhill crane would be protected. (Id.) This habitat would occur within 2 miles of known roost sites and at least 80% of this acreage would be maintained in very high-value habitat types for greater sandhill crane in any given year (these would also function as high- to very high-value crop types for use by lesser sandhill cranes).

Finally, Mr. Wirth raised general concerns regarding avoidance and mitigation measures in AMM20 to avoid loss of roosting and foraging sites for greater sandhill crane. (Exhibit SOSC-6, pp. 9:10 to 11:3.) First, Mr. Wirth discusses the creation of temporary roost sites within one mile of the of the North Stone Lakes roost site. (Id.) Mr. Wirth acknowledges that the cranes would likely discovery the new roosting site within the first season but expresses a generalized concern that the cranes would not necessarily use the site in lieu of the original roost site. (Id.) Mr. Wirth also expresses concern about the creation of temporary wetlands one season before potential impacts by construction. (Exhibit SOSC-6, p. 11:4-15.) However, sandhill cranes are adapted to move around the landscape to find flooded roost sites to use. Winter water elevations in the floodplains they used historically would have varied widely depending on the amount of rainfall, so the location of roost sites would have varied widely as well. Currently, temporary roost sites move around on the landscape as farmers change flood regimes on agricultural lands to address management concerns. There is no evidence that seasonal variation in location of roost sites has had a negative effect on crane populations in the Delta. Cranes easily adjust to changing locations of roost sites. (See also, April 10, 2018 Transcript, vol. 27, p. 43:17-25.)

Mr. Wirth also advocates that enhanced foraging sites should be in place more than one year in advance of an expected impact. As with roost habitat, sandhill cranes are also adapted to move around the landscape to forage in varied locations as flooding regimes, land use and crops change from year to year. DWR's Cropshift Program illustrates how greater sandhill cranes can easily find resources on a varying landscape, data that obviates Mr. Wirth's concern. (Exhibit DWR-1297) For example, in that program, when crops were

shifted from summer irrigated to winter non-irrigated crops (corn to wheat) and both wheat and corn were left for waterfowl to offset the loss of corn, in one year, a six-fold increase in crane use occurred when wheat and corn were left behind at greater quantities. (Id., pp. 27-28.)

B. Required Avoidance and Minimization Measures Ensure that the CWF will Avoid Take of Greater Sandhill Cranes

My direct testimony addressed the measures taken by the CWF to protect birds and bats, including greater sandhill cranes, from collisions with electric transmission lines. (Exhibit DWR-1014, pp. 9:1 to 12:11.) Since that time, an Addendum has been issued to the FEIR (Exhibit DWR-1295) with the effect of a substantial reduction in the proposed length of new transmission lines; the project changes described in this addendum serve only to further reduce collision risks for birds, and thus, reinforces my prior opinion. This testimony rebuts a number of specific concerns raised by several protestants regarding estimated collision risk, the effectiveness of flight diverters, and the measures that would be taken to minimize the risk of night flushing from sandhill crane roosts. (See Exhibits FSL-21 errata [Ivey], pp. 4:15 to 9:15; SOSC-21 errata [Pandolfino], p. 2:9 to 4:14.)

Relying on a model developed by Dr. Ivey for the BDCP years ago, these protestants allege that the risk of collision has been underestimated. The Ivey collision model was developed in response to a request by BDCP proponents to understand how crane collisions with new CWF transmission lines could be reduced or avoided under an HCP/NCCP permitting scenario (Exhibit SWRCB-5, Appendix 5.J, Attachment 5J.C.) As acknowledged by Dr. Ivey, the model relies primarily on sandhill crane studies conducted in areas other than the Delta, where the cranes are subject to varying risk factors that include day length, weather conditions, and landscape. (Exhibit FSL-21 errata, p. 7:19-22.) The Ivey model is a simplistic, very conservative model. It was intended not to produce an estimate of bird mortality from collisions with new CWF powerlines, but to comparatively evaluate existing and proposed conditions for the purpose of determining the length of existing transmission lines that would need installation of bird flight diverters in order to

offset the risk generated by installing new transmission lines in the greater sandhill crane use area.

When the project changed from an HCP/NCCP to a Section 7/2081 permitting scenario early in 2015, the model and its conclusions were revisited in an effort to determine the quantitative risk to birds, particularly the greater sandhill crane (a fully protected species), posed by the proposed new transmission lines. The new assessment indicated that Dr. Ivey's BDCP collision model greatly overestimated potential collisions with transmission lines in the project area. Specifically, the model estimated collision by 48 greater sandhill cranes per year per 34 miles of transmission lines, or approximately 1.4 collisions per year per mile. This overestimation of collision risk stems from the following factors.

1. The model does not consider that many of the CWF lines will be constructed next to trees, houses, and barns; or at the toe of levees. These spatial factors will divert birds, greatly reducing the likelihood that cranes will fly into the lines. (April 9, 2018 Transcript, vol. 26, p. 241:11-14.)

2. The model does not consider the relationship between the locations of the lines, roost sites and foraging habitat, but rather assumes roost and foraging habitat immediately adjacent to all lines. Cranes won't cross many of the lines at all because, in accordance with required minimization measures, the lines have been sited in locations specifically chosen to avoid interfering with crane movement between roost sites and foraging habitat.

3. Though a study by Brown et al. 1987 (Exhibit DWR-1298, p. 134) found no strikes when roosts were greater than 1.6 km from transmission lines, Dr. Ivey's BDCP model does not consider that finding. None of the proposed new CWF lines would be adjacent to roosts.

4. The model could not consider the results of the January 2018 CWF Addendum to the FEIR that reduced the proposed new mileage of CWF transmission lines by 19 miles relative to the proposal stated in the FEIR/S. The new design meets transmission line needs through reconstruction of existing lines, making them safer for birds than they are currently.

Current conditions in the Delta make clear that Dr. Ivey's BDCP model overestimates collision risk. Approximately 2,000 to 3,000 greater sandhill cranes used the

Delta in 2008, and approximately 24,000 lesser sandhill cranes used the Delta in 2008. (Exhibit SOSC-17, pp. 8-9.) There are more than 1,000 miles of unmarked existing powerlines in Dr. Ivey's BDCP modeled greater sandhill crane risk area, many of which are located in areas of dense sandhill crane use. (Exhibit SWRCB-5, Appendix 5.J, Attachment 5J.C, p. 23, Table 5.0; Exhibit DWR-1300.) A simple extrapolation from the model's conclusion indicates that 1,411 greater sandhill cranes would die each year from flying into those unmarked lines, and as many as 11,294 lesser sandhill crane collisions would be expected, simply as a baseline condition, independent of the CWF. Any such event would be observed and reported. Yet, no mortality or collision events as severe as even 1% of these numbers has been reported. At the mortality rates predicted by Dr. Ivey's BDCP model, the entire crane population in the Pacific Flyway would disappear in just a few years. This finding alone clearly shows the gross overestimation of crane mortality predicted by Dr. Ivey's model.

Although Dr. Ivey's analysis does not report data on sandhill crane/transmission line studies in the Delta, such a study does exist and should be integral to the analysis of risk posed by CWF transmission lines. Yee (2008) monitored a 3.5-mile segment of transmission lines on Staten Island between November and February for 3 consecutive winters to estimate the effectiveness of flight diverters installed on those lines. (Exhibit SOSC-59.) Staten Island is heavily used by both greater and lesser sandhill cranes, with an average of almost 5,000 sandhill cranes roosting there per day during the 2007-2008 winter season (Exhibit SOSC-17, p. 6, Table 1). The existing transmission line on Staten Island poses a high risk of collision for sandhill cranes because it runs immediately adjacent to high use roosting and foraging habitat. Ivey's data would predict that 4 crossings per bird for 130 days for 5,000 birds (Exhibit SOSC-17 [Ivey et al. 2014]) would result in a total of 2,600,000 powerline crossings by sandhill cranes each year.

Ivey's model relied on Brown and Drewien's (1995) (Exhibit SOSC-35) calculated mortality rate for cranes in a high use area in the San Luis Valley in Colorado, which was 30.4 cranes per 100,000 powerline crossings. Using Brown and Drewein's mortality rate,

Staten Island should have experienced 790 crane mortalities per year. Yee (2008) (Exhibit SOSC-59) found 3 crane mortalities in 3 years, but based on Murphy et al. (2016) (Exhibit SOSC-44), he may have missed 2/3 of mortalities. The observed potential mortality of as many as 9 cranes in three years then, or 3 per year indicate that the Brown and Drewien (1995) mortality rate used in Ivey's model Exhibit (Exhibit FSL-21 errata, pp. 4:28 to 5:3.) exceeds estimates based on direct observation by a factor of 263x.

As described above, the risk of greater sandhill cranes colliding with transmission lines is low. The potential for greater sandhill cranes to collide with CWF transmission lines is much lower and no such collisions are expected to occur during the life of the project for the following reasons:

1. The observed mortality rate for existing Staten Island lines is 1 (3) per year, and this is one of the highest risk areas in the Delta because of its intensive use by both greater and lesser sandhill cranes, with normal use by 5,000 cranes per day and peak use by 11,000 cranes per day (Exhibit SOSC-17, p. 6, Table 1). Transmission lines on Staten Island are immediately adjacent to heavily used roost sites and foraging areas (Exhibits SOSC-35 and SOSC-44).
2. As prescribed by AMM20, no CWF transmission lines will be constructed in high use Sandhill Crane areas. (Exhibit SWRCB-111, p. 4-34.)
3. As prescribed by AMM20, no CWF transmission lines will be constructed immediately adjacent to roost sites. (Exhibit SWRCB-111, p. 4-34; Exhibit DWR-1301.)
4. Since 65% of bird strikes occur on the shield wire (Exhibit SOSC-44), no project powerlines will be constructed with an overhead shield wire (Exhibit DWR-1295, p. 18.)
5. Nineteen miles of formerly proposed new transmission lines were eliminated through the January 2018 Addendum to the FEIR; instead, the project will rebuild 14 existing miles of line and add diverters, which are estimated to lower collision risk for those existing lines by 60%. (Exhibits SOSC-59; SOSC-35; SOSC-22 errata, p. 2:22-28; Exhibit DWR-1301.) This risk reduction factor is more protective than leaving the existing lines as is, and is expected to achieve reduced overall collision risk for sandhill cranes relative to existing conditions.

Protestants raised concerns regarding flushing of sandhill cranes due to construction

and traffic noise, in particular at night. (Exhibits SOSC-21 errata, p. 4:7-14; FSL-21 errata, p. 9:1-15.) Cranes can be especially vulnerable to collision with transmission lines when they are flushed from their roost at night and the roost is adjacent to transmission lines. (SOSC-44). CWF minimizes that risk through commitments in AMM20 that must be implemented if construction and restoration are to occur during the greater sandhill crane wintering season (September 15 through March 15) in the Greater Sandhill Crane Winter Use Area. (Exhibit SWRCB-111, pp. 4-32 to 4:40.)

It is my opinion that required avoidance and minimization measures ensure that the CWF will not result in take of greater sandhill cranes as defined by Section 86 of the California Fish and Game Code.

VII. CWF MEASURES TO REDUCE BIRD COLLISIONS WITH TRANSMISSION LINES WOULD REASONABLY PROTECT THE LESSER SANDHILL CRANE

Testimony by Dr. Ivey (Exhibit FSL-21 errata, p. 10:9-21) stated that a transmission line collision analysis should have been done for the lesser sandhill crane, but using a longer flight distance. In the FEIR/S, the risk of collision with transmission lines was analyzed qualitatively based on species characteristics such as flight patterns and seasonal movement. A quantitative analysis would not alter the conclusion in the FEIR/S that the measures included in AMM20 Greater Sandhill Crane sufficiently address potential impacts from transmission lines on lesser sandhill crane.

VIII. ALL CALIFORNIA WATERFIX POTENTIAL IMPACTS TO SWAINSON'S HAWKS AND TO THEIR NESTING AND FORAGING HABITAT WOULD BE AVOIDED, MINIMIZED AND MITIGATED IN ACCORDANCE WITH REQUIREMENTS OF THE ITP

Testimony by Dr. Fries asserts that Swainson's hawk populations in the Delta have been experiencing sharp declines (Exhibit DDJ-215, p. 10:17-19). This assertion is incorrect. The species is common in the Delta and surrounding areas. (Exhibit SWRCB-102, Chapter 12, Figure 12-27.) The Swainson's hawk population in California has steadily increased and expanded in the last decades. For example, in 1980, the statewide population estimate was approximately 400 pairs. A statewide survey of nesting

Swainson's Hawks conducted in 2005 concluded there were more than 2000 nesting pairs. (Exhibit DDJ-222, pp. 17-20. [Five Year Status Review for Swainson's Hawk].)

Testimony by Mr. Pachl falsely asserts that "Project allows habitat preserves intended to mitigate for loss of SWH [Swainson's hawk] nesting and foraging to be located too far away to benefit the impacted SWH population." (Exhibit ECOS-27 errata, pp. 3:11 to 4:11.) Impacts to the Swainson's hawk were fully analyzed in the FEIR/S and the ITP application (Exhibit DWR-1036, pp. 4-845 to 4-860), and would be mitigated per ITP conditions (Exhibit SWRCB-107, pp. 93, 94, 209, and ITP attachment 4, p. 2). Mitigation foraging habitat will be provided to replace impacted foraging habitat, with a requirement to provide overall higher quality foraging habitat, based on Swainson's Hawk habitat value classes (described in ITP Application, Chapter 2, page 2-53). (Exhibit DWR-1036, p. 2-53.) As required under the ITP, nest habitat will be restored or protected at locations near the impact: "Establish replacement nest sites as close as possible to the impacted nest site, unless such location would have low long-term conservation value due to threats such as ongoing disturbance, seasonal flooding, or sea level rise." (Exhibit SWRCB-107, p. 214). Moreover, all mitigation for the Swainson's hawk must occur at sites approved by CDFW: "Obtain CDFW written approval of the HM [habitat mitigation] lands before acquisition and/or transfer of the land by submitting, at least three months before acquisition and/or transfer of the HM lands, a formal Proposed Lands for Acquisition Form (see Attachment 3B) identifying the land to be purchased or property interest conveyed to an approved entity as mitigation for the Project's impacts on Covered Species." (Exhibit SWRCB-107, p. 219.) All mitigation foraging habitat must also meet all criteria stated in ITP attachment 4. (Exhibit SWRCB-107, Attachment 4.)

Mr. Pachl also asserts "adverse impacts of operation of Delta Tunnels on Swainson's Hawk." (Exhibit ECOS-27 errata, p. 3:4-10) This speculation is not supported by any concerns identified in the ITP. The ITP covers operations and maintenance of the facility after it is constructed (Exhibit SWRCB-107, p. 93) and all avoidance and minimization measures and compensatory mitigation (Exhibit SWRCB-107, pp. 133 to 137

and 213 to 215) would apply to those activities. Briefly, no operational impacts to Swainson's hawk have been identified, and Mr. Pachl does not state any.

In summary, it is my opinion that all CWF impacts to Swainson's hawks and to their nesting and foraging habitat would be avoided, minimized and mitigated in accordance with requirements of the ITP.

IX. CALIFORNIA WATERFIX FULLY EVALUATED AND ADDRESSED ANY POTENTIAL IMPACTS TO BIRD SPECIES OF CONCERN IN THE DELTA

In his testimony, Dr. Fries asserts that the WaterFix EIR is deficient in its analysis of threatened and endangered bird species that would be affected by building the tunnels. (Exhibit DDJ-215, p. 7:21-22.) Dr. Fries mentions numerous bird species that may be impacted by the project without recognizing the mitigation commitments described in the FEIR/S, the ITP, and the Biological Opinion. (Exhibit DDJ-215, pp. 7:21 to 11:10.) With the avoidance, minimization, and mitigation measures in place, the CWF will not result in unreasonable adverse effects on these species, and Dr. Fries provides no evidence otherwise.

Effects on all the species Dr. Fries mentions, except white pelican (discussed below), have been evaluated, and all potentially significant effects identified would be less than significant with implementation of the required avoidance, minimization, and mitigation commitments. (Exhibit SWRCB-102, pp. ES-100 to ES-112, ES-117). As I noted in my direct testimony, my opinion is that this result indicates reasonable protection for the affected species. (Exhibit DWR-1014, pp. 3:1 to 4:14 [Overview of Testimony].) Moreover, CDFW analyzed the impacts on state listed bird species for which take may occur, and determined impacts would be minimized and fully mitigated for each of these species, which include Swainson's hawk (Exhibit DWR-1095, p. 51 to 85) and tricolored blackbird (Id. p. 86 to 130). USFWS determined that the project would not jeopardize the survival and recovery of any federally listed birds, including western yellow-billed cuckoo and least Bell's vireo. (Exhibit SWRCB-105, cover letter, p. 2.) USFWS also determined that the

conveyance facility construction and operation would not likely adversely affect California clapper rail. (Exhibit SWRCB-105, Biological Opinion, p. 2.) USFWS also concurred with DWR's finding that the impacts to least tern habitat would not likely adversely affect the species because least terns primarily forage in nearshore marine and estuarine environments and are not known to nest near Clifton Court Forebay (Exhibits SWRCB-111, p.29; SWRCB-105, Biological Opinion p.2). Also as noted in my direct testimony, it is my opinion that these findings by CDFW and USFWS indicate that the CWF would reasonably protect both state- and federally-listed wildlife species. (Exhibit DWR-1014, pp. p. 3:1 to 4:14.)

As Dr. Fries states, the American white pelican is a California special-status bird species that occurs in the Delta. (Exhibit DDJ-215, p. 11:2-17) He identifies concerns that "Diving birds such as terns, cormorants, and pelicans would lose surface area where they can feed, ingest toxins that are detrimental to their health, and would pass those toxins on through the food chain" (Exhibit DDJ-215 p. 3:22-24) and that "critical wetland habitat for these species [referring only to the pelican] would be destroyed by the WaterFix construction project." (Exhibit DDJ-215 p. 11:16-17.) Although the FEIR/S did not explicitly evaluate potential impacts to the American white pelican, it did evaluate impacts to a variety of other aquatic birds that live in wetlands and/or that forage by diving for fish. Examples include the cormorants, herons, and least tern (See e.g., Exhibit SWRCB-102, pp. 12-3647 to 12-3651 [Impact BIO-117: Loss or Conversion of Nesting Habitat for and Direct Mortality of Cormorants, Herons and Egrets].) These birds share habitat needs and/or foraging needs with the American white pelican and can reasonably be expected to show similar responses to project impacts. Accordingly, it is my opinion that the impacts to American white pelican alleged by Dr. Fries are not supported by analyses presented in the permitting documents prepared to date, as they are also not supported by any evidence put forward by Dr. Fries, and thus there is no basis to alter my opinions, stated in my direct testimony, that CWF is reasonably protective of wildlife, specifically including the American white pelican. With regard to Dr. Fries' assertion that "pelicans would lose surface area

where they can feed, ingest toxins that are detrimental to their health, and would pass those toxins on through the food chain," even if this were true, it would presumably be desirable to reduce opportunities for pelicans to ingest toxins, and thus would not constitute an adverse impact. However, both this assertion and the complementary statement that "critical wetland habitat for these species [referring only to the pelican] would be destroyed by the WaterFix construction project" (Exhibit DDJ-215, p. 11:16-17) are invalid because, as elaborated in my direct testimony, all habitat losses occasioned by the CWF would be mitigated, prior to the impact, by compensatory protection and creation of habitat. (Exhibit DWR-1014, p. 3:1 to 4:14.)

Dr. Fries incorrectly states that the FEIR/S falsely assumes yellow warbler nest sites do not exist in the CWF (Exhibit DDJ-215, p. 11:1-10). The FEIR/S states that breeding yellow warblers have been "largely extirpated" from the area, and that there are no confirmed breeding accounts, but also acknowledges that the species has been documented in the study area over the breeding season within the past 10 years, and provides a figure showing the occurrences. (Exhibit SWRCB-102, p. 12-83 and Figure 12-24). The FEIR/S also describes the potential for the project to affect yellow warbler nests, and commits to doing preconstruction surveys and avoiding any nests found. (Exhibit SWRCB-102, p. 12-3572.)

Finally, Dr. Fries indicates that there is a double-crested cormorant rookery just south of the proposed Bouldin Island staging area, and that this rookery will be disturbed by CWF construction activities (Exhibit DDJ-215, p. 10:6-7). He fails to note that the FEIR/S recognizes the potential for cormorant rookeries to occur in the area of effects, and commits to Mitigation Measure Bio-117 to avoid impacts on rookeries. (Exhibit SWRCB-111, pp. 2-28 to 2-29).

///

///

///

X. CALIFORNIA WATERFIX FULLY EVALUATED AND ADDRESSED ANY POTENTIAL IMPACTS ON GIANT GARTER SNAKE

In his testimony for Restore the Delta (Exhibit RTD-12), Mr. Stroshane recommended that conditions be placed on the project permits that implement giant garter snake (GGS) protection in the Legal Delta through the 2017 GGS Recovery Plan. (Exhibit RTD-12, pp. 30:8 to 31:20.) Mr. Stroshane requests that the project contribute its "fair share" to the recovery of the species, including protecting and storing habitat in "block pairs", protection of water quality, monitoring and adaptive management, reintroductions, additional studies, and contributing funding toward recovery. (Exhibit RTD-12, pp. 30:12 to 31:4.)

A working group of biologists representing DWR, USBR, USFWS, and CDFW coordinated very closely on the project during the preparation of the 2017 GGS Recovery Plan to ensure the project would be consistent with the GGS Recovery Plan. This biological working group discussed various ways the project could conform to the recovery plan, including contribution to "block pairing" of habitat as Mr. Stroshane discusses in his testimony. (Exhibit RTD-12, p. 30:12-20.) As a result, the USFWS biological opinion provides siting criteria for mitigation that is consistent with the recovery plan. The USFWS recognizes the project's contribution to recovery by saying, "Reclamation and DWR are proposing to promote the recovery of the affected species in a manner where the mitigation is commensurate with the adverse effect." (Exhibit SWRCB-105, p. 394.)

Although the project mitigates its effects on giant garter snake in the Delta in a manner that is consistent with the GGS Recovery Plan, it is not obligated to contribute further to the species' recovery as requested by Mr. Stroshane. CWF mitigation focuses on key areas that would contribute to recovery consistent with the GGS Recovery Plan (Exhibit RTD-198), while CWF impacts on the species are relatively low, as evidenced by the following.

- In their biological opinion, USFWS states that the number of giant garter snakes in the project's action area is relatively low compared to the populations in the Sacramento Valley and populations east of the Delta

Recovery Unit. (Exhibit SWRCB-105, p. 395.) USFWS concludes from its analysis in the biological opinion that the project will not appreciably affect giant garter snake reproduction in the action area, or reduce the range-wide reproductive capacity of the species, or appreciably reduce the number of giant garter snakes in the action area, or cause range-wide numbers to decline, or alter the species' distribution, or affect the species' range. (Exhibit SWRCB-105, p. 395.)

- Similarly, CDFW concludes in the CESA findings that impacts from the project are not likely to jeopardize the species because habitat impacts would be small relative to the extent of suitable habitat in its range, and occurrences of giant garter snake in the project area are limited. (Exhibit DWR-1095, p. 370). Furthermore, CDFW found that the project minimizes and *fully mitigates* impacts on giant garter snake. (Id., pp. 86 to 130.)

In his testimony for the Restore the Delta (Exhibit RTD-12), Mr. Stroshane also describes potential water quality related effects on giant garter snake, particularly from selenium. (Exhibit RTD-12, p. 28:21 to 29:16.) The FEIR/S analyzes project-related water quality effects on the types of wetlands giant garter snakes use in the project area, and concludes that loss of acreage or value of these wetlands would be small and would be offset by restoration and management of wetlands and waters. (Exhibit SWRCB-102, pp. 12-3425 and 12-3441 to 12-3443.)

The Section 7 biological assessment for CWF includes an analysis of potential project-related selenium effects on giant garter snake. (Exhibit SWRCB-104, pp. 6-249 to 6-253.) USFWS prepared their biological opinion based on the biological assessment, and concluded the project would not jeopardize the survival or recovery of giant garter snake (Exhibit SWRCB-105, pp. 393, 394). CDFW also described potential selenium impacts on giant garter snake in their CESA findings (Exhibit DWR-1095, pp. 117 to 119) and concluded that all identified impacts on the species would be minimized and fully mitigated with implementation of the conditions of approval. (Exhibit DWR-1095, p. 369).

Finally, in the cross examination of Eric Hansen, Mr. Hansen agreed that it is common for giant garter snakes to die on roads if struck by cars and that large increases in traffic through modeled giant garter snake would be of concern. (March 13, 2018 Transcript, vol. 14, p. 81:6-13.) The FEIR/S analyzed the effects of project-related traffic and road mortality on giant garter snakes, however, and concluded that impacts would be

less than significant. (Exhibit SWRCB-102, pp. ES-99 and 12-3507.)

Executed on this 9th day of July, 2018 in Sacramento, California.

Christopher Earle

References Cited

Brown, W.M., R.C. Drewien, and E.G. Bizeau. 1987. Mortality of cranes and waterfowl from powerline collisions in the San Luis Valley, Colorado. Pages 128-136 in J.C. Lewis, ed. Proc. 1985 crane workshop. Platte River Whooping Crane Maintenance Trust, Grand Island, Nebr. Exhibit DWR-1298

Brown, W. M. and R. C. Drewien. 1995. Evaluation of two power line markers to reduce crane and waterfowl collision mortality. Wildlife Society Bulletin 23: 217-227. Exhibit SOSC 35

California Department of Fish and Wildlife. 2016. Five-Year Status Review for Swainson's Hawk (*Buteo swainsoni*). Exhibit DDJ-222

California Department of Water Resources. 1995. Delta Crop Shift Demonstration Project Corn To Winter Wheat in the Sacramento- San Joaquin Delta, Wildlife and Mitigation Compliance Monitoring Final Report. Exhibit DWR-1297

Dooling, R.J. and A.N. Popper. 2007. The Effects of Highway Noise on Birds, California Department of Transportation, Division of Environmental Analysis. Exhibit LAND-148.

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. Exhibit SOSC-17.

Ivey, G.L., C.P. Herziger and D.A. Hardt. 2014. Conservation Priorities and Best Management Practices for Wintering Sandhill Cranes in the Central Valley of California. The Nature Conservancy. International Crane Foundation. Exhibit DWR-1299.

Littlefield, C.D. and G.L. Ivey. 2001. Conservation Assessment for Greater Sandhill Cranes wintering on the Consumnes River Floodplain and Delta Regions of California. The Nature Conservancy. Exhibit DWR-1296,

Murphy, R. K., E. K. Mojica, J. F. Dwyer, M. M. McPherron, G. D. Wright, R. E. Harness, A. K. Pandey, and K. L. Serbousek. 2016. Crippling and Nocturnal Biases in a Study of Sandhill Crane (*Grus canadensis*) Collisions with a Transmission Line. Waterbirds 39(3):312-317. Exhibit SOSC-44.

U.S. Fish and Wildlife Service. 2017. Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*). U.S. Fish and Wildlife Service, Pacific Southwest Region, Sacramento, California. Exhibit RTD-198

Yee, M. L. 2008. Testing the effectiveness of an avian flight diverter for reducing avian collisions with distribution power lines in the Sacramento Valley, California. California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2007-122. Exhibit SOSC-59