July 25, 2014

SENT VIA EMAIL (BDCP.comments@noaa.gov)

Mr. Ryan Wulff
National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

RE: Draft Bay Delta Conservation Plan and Associated Draft Environmental Impact Report/Environmental Impact Statement (BDCP EIR/EIS)

Dear Mr. Wulff:

These comments are submitted in relation to the Bay Delta Conservation Plan ("BDCP" or the "Project") and associated public review draft environmental documents (EIR/EIS) on behalf of the Friends of Stone Lakes National Wildlife Refuge ("FSL," formerly known as the Stone Lakes National Wildlife Refuge Association). FSL is a volunteer, nonprofit organization dedicated to the conservation, protection, enhancement and promotion of the Stone Lakes National Wildlife Refuge ("Stone Lakes NWR" or "Refuge"). The comments are solely those of FSL and are independent of Stone Lakes NWR staff and the U.S. Fish and Wildlife Service ("USFWS").

I. BACKGROUND

In 1994, following six years of study and public meetings, the USFWS established Stone Lakes NWR in southern Sacramento County within the Morrison Creek, Cosumnes River and Mokelumne River watersheds. Located in close proximity to the cities of Sacramento and Elk Grove, Stone Lakes NWR has a significant environmental education

program serving the 5th largest school district in California (> 60,000 students). The Congressionally authorized project boundary is 17,640 acres. Currently, the USFWS manages 6,550 acres. To date, over eight million dollars of private and public funds have been devoted to protect the ecosystem within the Stone Lakes NWR boundary.

Stone Lakes NWR is one of the largest complexes of wetlands, lakes and riparian areas remaining in the Sacramento-San Joaquin Delta and provides critical habitat for waterfowl and other migratory birds of international concern as well as a number of endangered plant and animal species. Stone Lakes NWR and the surrounding agricultural areas are home to several state and federal special status species, including greater sandhill cranes, Swainson's hawk, Western burrowing owl, long billed curlew, tri colored blackbird, white faced ibis, giant garter snake and valley elderberry longhorn beetle.

The Refuge is a vital part of the Pacific Flyway and an integral player in meeting the goals set forth in the North American Waterfowl Conservation Plan. For example, at Stone Lakes NWR, between 2001 to 2014, the greater sandhill crane population has gone from zero to over 700 birds while the greater white-fronted goose count increased from 30 to over 16,000 birds.

Despite this success, Stone Lakes NWR faces significant habitat challenges. In 2005, the Refuge was designated as one of the six most threatened refuges in the nation. (See "State of the System: An Annual Report on the Threats to the National Wildlife System, National Wildlife Refuge Association," 2005.) This designation was based primarily on impacts from surrounding urbanization. The Refuge is now even at greater risk due to the proposed tunnel conveyance system that is at the heart of the BDCP.

The Stone Lakes NWR and surrounding foraging acreage is "ground zero" for BDCP impacts. The primary proposed conveyance facility components, consisting of three massive pumping stations, the tunnels, new transmission lines and an intermediate forebay are all located either on or very close to the Refuge and have significant potential to degrade or threaten the Refuge's resources and habitat. Wildlife, staff and visitors will all be impacted by construction noise, lighting and extreme levels of truck traffic that will occur during the lengthy construction process.

Since the time FSL learned that the Project was proposed to traverse the Refuge, FSL has been engaged in the BDCP process, first expressing major concerns in Scoping

comments submitted in May 2008. We advocated for creation of a Stone Lakes working group to address the impacts of the Project specifically on the Refuge. A Stone Lakes Technical Working Group process subsequently began in June 2013, with eight meetings total. At these meetings, FSL has worked diligently with BDCP planning staff, USFWS, California Department of Fish and Wildlife ("DFW"), and Department of Water Resources ("DWR"), among others to reduce impacts on the Refuge. We appreciate the efforts of these agencies and the BDCP consultant staff in attempting to address our concerns with the project, but many concerns remain.

Over the course of these meetings, progress has been made in reducing the project's impacts on the Refuge and surrounding areas. (See Exhibit A, ICF Summary Status Report, April 18, 2014.) For example, the forebay is now smaller with a lower elevation (though it is now located within the Refuge boundary). Also, some inappropriate tunnel muck sites have been relocated out of primary bird habitat areas. The BDCP is also now committing to create a new wetland roosting area and associated uplands to better link the flyway route. As of this writing, however, not all of the issues identified by FSL have been resolved by the Stone Lakes Technical Working Group. (See Exhibit B, FSL Unresolved Issues, May 30, 2014; Exhibit C, Meeting Notes for June 5, 2014 Meeting by ICF.) As can be seen in Exhibit B and C, most of the remaining outstanding issues have now been delegated to the interagency Technical Terrestrial Team; we have been advised there may be no further Stone Lakes Technical Working Group meetings that include FSL. We are concerned that without our participation, these remaining issues may not ever be addressed. Though we have made significant progress with respect to improving treatment of the greater sandhill crane in the BDCP and EIR/EIS (see Exhibit D, Table of Remaining Crane Tasks by ICF, and Exhibit E, Crane Comments for Discussion), we still have outstanding concerns regarding protection of the Western Burrowing Owl and Swainson's Hawk that were not addressed in our Stone Lakes Technical Working Group meetings (see Exhibit F, Stone Lakes NWR Comments on Western Burrowing Owl Conservation Strategy, May 22, 2014).

Even with the progress that has been made on the BDCP and other mitigation efforts, FSL is concerned that impacts to species within and near the Refuge that are proposed for coverage in the plan from CM 1, the tunnel conveyance facility, still have not been adequately addressed. Moreover, we have outstanding concerns about the impacts of the other conservation measures – especially those that convert existing bird habitat to aquatic habitat –on the species the Refuge seeks to conserve. The missions of the Stone Lakes NWR as well as the missions of the BDCP approving agencies promote the protection and improvement of habitat within the Refuge. FSL still questions if the

BDCP's emphasis on construction of a tunnel conveyance system as a "conservation measure" is consistent with this mission. It is by no means clear that implementation of the BDCP will result in protection of listed species without significantly harming other species. Our specific concerns follow.

Our comments are organized into several major concerns regarding the BDCP and the draft EIR/EIS. We request written responses to each of the comments contained within this letter.[1] We have not included all of the materials from the Stone Lakes Technical Working Group, as those are already in the possession of the BDCP preparers. We have, however, attached several supporting exhibits to assist in describing the comments and concerns.

II. COMMENTS ON BDCP AND BDCP EIR/EIS

A. Overall Concern Regarding Scale of Impact of CM 1 on Refuge

1. Location of Forebay Facilities within Refuge Boundary Necessitates Permanent Protection of Zacharias Island

The forebay and tunnel entrance for the conveyance facility were originally planned to be located just west of South Stone Lake and close to the community of Hood. The location would have eliminated several hundred acres of prime waterfowl foraging area and had visual and other impacts on the Refuge, hunting activities and wildlife. DWR, recognizing our concerns, as well as design/cost issues, significantly reduced the size of the forebay and relocated the forebay and tunnel entrance to a location just north of Twin Cities Road, an area predominantly planted in grapes. The impacts on foraging area and on current Refuge managed lands were thereby reduced.

DWR presented the revised forebay location and design concept at a meeting of the Stone Lakes Technical Working Group on May 15, 2013. The new forebay would be located within the Refuge legislative project boundary just north of Twin Cities Road and east of the Sierra Pacific ("SP") Cut and levee. The forebay now requires 40 acres, with a

[1] To the extent any of the comments herein could be considered comments on the BDCP (the underlying HCP), they should be responded to as if they were comments on the project description under CEQA and NEPA. (See CEQA Guidelines, § 15088 and 40 CFR, § 1503.4.)

surrounding 200 acres for an overflow retention basin, for a total footprint of about 240 acres. Privately owned Zacharias Island, just to the west of the SP Cut and levee and within the Refuge legislative boundary, is now proposed to be included as part of the Project site, with the southern third of the island identified as a tunnel muck storage site. At the completion of project construction, Zacharias Island habitat would be restored. Zacharias Island, which currently provides waterfowl roosting habitat, is a primary conservation area, which is consistent with the Refuge's mission, and would be a very beneficial addition to the Refuge after successful habitat restoration. FSL believes the area should be incorporated into the Refuge.

DWR subsequently acknowledged the potential conservation opportunities of the new forebay location in an information sheet titled, "BDCP Refinements Respond to Community and Statewide needs," dated August 2013 and posted on the BDCP website:

> Relocating the smaller forebay away from the towns of Hood and Courtland and closer to Interstate 5 on the Glanville Tract also lessens the impacts to roads and bridges, creates conservation opportunities with the Stone Lakes National Wildlife Refuge, and makes it possible to utilize more publicly-owned land. (Emphasis added.)

The new location of the forebay within the Refuge project boundary will have a significant visual presence. We have not located any renderings of the forebay facility in the BDCP plan. It has been described to the Stone Lakes Technical Working Group as a steep-sloped earth structure 30 feet above grade. It will be a visually prominent intrusion on the rural landscape and will be adjacent to a potential recreation corridor along the old Southern Pacific railroad grade owned by the Refuge (the "SP right of way"). The EIR/EIS does not adequately evaluate the visual impact of the forebay either from Twin Cities Road or from the SP right of way. The EIR/EIS document must include and evaluate renderings that demonstrate the impact of the structure.

The new forebay location within the Refuge boundary, together with the construction and operation of the intake structures along the Sacramento River just to the north and the power lines supplying them, would significantly impact the Refuge and the wildlife it seeks to conserve, both during construction and after completion. These impacts are identified in the EIR/EIS and are discussed elsewhere in this comment letter. Among the more significant impacts:

- Tunnel muck material will be stored at several locations within the Refuge boundary, with uncertain long term consequences.
- Truck traffic will significantly increase during the multi-year construction period, increasing safety risks, adversely impacting the visitor experience and increasing wildlife mortality.
- New permanent high voltage power lines will be constructed within the Refuge boundary that will result in take of greater sandhill cranes and other large migratory waterfowl and will visually intrude into the rural landscape and affect the visitor experience.

These impacts result in loss of habitat values within the Refuge both during and after construction. The construction of the forebay and tunnel launch site will also create challenges in completing the Refuge concept of a complex of roosting and foraging areas for migratory waterfowl at an important location on the Pacific flyway while providing appropriate recreational opportunities as one of the few urban national wildlife refuges in the country.

The Project would introduce a land use that is incompatible with the purpose and function of the Refuge. These actions will also impede the ability to carry out the goals of the Final Comprehensive Conservation Plan ("CCP") to continue to better serve wildlife needs and those of the surrounding communities.[2] (CCP, pp. 71-92.) The Project may also have an upward impact on land prices and may influence willing sellers in ways that would make acquisitions to expand the refuge more difficult.

The USFWS has recently acquired the lineal parcel comprising the SP right of way. The Refuge has yet to incorporate the new acquisition into the Stone Lakes CCP, but the parcel offers potential for controlled recreational access. The security issues associated with the adjacent presence of a significant component of California's water delivery infrastructure could limit or preclude recreational access within the Refuge.

The FSL communicated concerns over the impacts of the forebay and associated facilities in a November 2, 2013 letter to Jerry Meral:

> While we do not oppose the new location as it appears at this time to be the 'least worse' site, we must recognize that the new location will

[2] Available at: http://www.fws.gov/stonelakes/ccp.htm.

> potentially complicate completing the refuge in ways that we cannot completely predict. Landowners may be less willing to cooperatively manage lands for wildlife benefit, enter into conservation easements or sell land to the Refuge at affordable prices. In addition, the Association's long term goal for public access along adjoining the old railroad grade may be compromised by forebay security concerns. We believe that the Tunnel Conveyance Facility project should include additional commitments to assisting the goal of completing the Refuge.

(Exhibit G, p. 3.)

As a consequence of these tangible and intangible adverse impacts on the Stone Lakes NWR -- and particularly because the BDCP plan preparers specifically proposed the long term conservation of Zacharias Island when the forebay and tunnel entrance were relocated to within the Refuge boundary -- it is appropriate and necessary that the BDCP commit to the permanent long term conservation of Zacharias Island. The BDCP and/or the EIS/EIR[3] should therefore include an enforceable requirement (in the form of an Avoidance and Mitigation Measure ("AMM" or mitigation measures) to commit the Project as follows: (1) BDCP agencies must restore Zacharias Island after project construction; (2) Stone Lakes NWR will receive first right of refusal for fee title or conservation easement of the surface estate of Zacharias Island at nominal cost; and (3) a sufficient endowment to manage the long term conservation of the property is included in any conveyance.[4] One approach would be for the BDCP implementing agencies to enter into an agreement with the USFWS prior to the initiation of CM 1 construction. These actions would appropriately reduce the cumulative impacts on the Stone Lakes NWR given the scale of the impact proposed by BDCP.

In addition to the ultimate disposition of Zacharias Island, we also remain concerned with management of the forebay to reduce ongoing operational impacts on

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[3] The requested commitments could alternatively be included in the Implementing Agreement for the BDCP.

[4] FSL further believes that the Project description in CM 1 in the BDCP must be amended to include the acquisition of Zacharias Island and make the commitment, as part of BDCP plan implementation, to restore Zacharias Island wildlife habitat, make it available to the USFWS for long term management as part of the Stone Lakes NWR and endow the cost of conservation management.

the Refuge. For example, to address forebay impacts, visual screening with native landscaping to reduce the visual, noise and glare impacts of the facility must also be included as part of the project or as mitigation measures. Also, plans on managing the spillway in a wildlife friendly manner should be included. We are still concerned about rodent control activities and would like to see methods that will not expose hawks, and other predators to poisons. Though these issues have now been deferred to the Terrestrial Technical Team, we request follow up to ensure that they are in fact addressed. (See Exhibit B, item 1.)

B. Concerns with Overall Conservation and Mitigation Approach

1. Placement of Habitat Not Well Planned

Although the Refuge CCP does not include management strategies for enhancing fish species, it is a protected resource included in the conservation goals for existing lakes and sloughs. (CCP, pp. 36-50 (discussing biological resources and species within the Refuge).) However, the BDCP continues to target the southern portion of the Refuge for conversion to tidal habitat. (See Exhibit H, Hypothetical Restoration Areas.)[5] BDCP should not assume major land use changes within the Refuge that would be inconsistent with the CCP. Moreover, having participated in the BDCP process since 2008, we would expect to be consulted on any major proposals within Refuge boundaries.

2. Timing of Habitat Replacement is Uncertain

We are also concerned that many of the benefits to species negatively impacted by the BDCP may never come to pass. In its present form, the BDCP proposes major disruption of greater sandhill crane and other habitat areas for both CM 1 (the Tunnels) as well as the other conservation measures, particularly those that involve flooding of terrestrial habitat to create aquatic habitat. While the construction of CM 1 appears more certain due to the funding to be provided by the state and federal water contractors, other aspects of the BDCP will only occur if other state and federal funding

[5] Though the Hypothetical Restoration Areas exhibit states that it is not for distribution, it was later released as a public document under the California Public Records Act, and therefore is no longer a confidential draft. These are the same restoration assumptions made for purposes of the BDCP effects analysis.

is provided. (BDCP, Table 8-37.) And, since approval of the BDCP by the USFWS is predicated on the BDCP's ability to assure that funding will be available to implement the actions and mitigations we need to know EXACTLY what the funding sources will be in order to evaluate their certainty. If they are not certain, the BDCP should not be approved, nor should take authority be issued.

While the BDCP attempts to claim that greater sandhill crane, for instance, will somehow be better off if the BDCP is implemented, reaching such a conclusion requires a number of assumptions. For instance, one must assume that public funding will be provided for CMs 2-22 in a timely and orderly manner. One must also assume that the "new" habitat and/or resources will be provided in advance or at the same time as impacts to existing habitat occurs. We have discussed this issue in the Stone Lakes Technical Working Group, but it has never been completely resolved.

An ongoing issue in the BDCP is the presentation of thousands of acres of "created habitat" without reference to the number of acres of habitat that is being destroyed. For instance, the BDCP states that it will create 533 acres of greater sandhill crane habitat. (BDCP, p. 5.6-48.) Yet the BDCP also destroys up to 7,250 acres of greater sandhill crane habitat (4% of its habitat in the plan area). (BDCP, Table 5.6-10.) The net habitat creation numbers for each species/habitat type should be presented in the plan to avoid confusion. Moreover, a higher than 1:1 mitigation ratio for destroyed habitat should be applied. Once this is done, it is difficult to see what the benefit of the plan will be with respect to the species.

Timing is especially concerning, given the scale of habitat destruction and no enforceable requirement to replace habitat before or at the time of destruction. BDCP Table 3-4 shows an Implementation Schedule, but it is not clear that there will be coordination between the destruction of wildlife habitat on one hand, and the creation of habitat on the other hand. For instance, CM 1 will destroy over one contiguous mile of area containing channel margin riparian habitat on the Sacramento River where the new intakes will be located. (BDCP, Table 4-2 (listing 6,360 linear feet for intakes and transition walls).) This destruction of riparian habitat is arguably more than has ever occurred under an individual project.

Under CM 6, 20 miles of channel margin habitat will be created within the first 30 years under the Plan. (BDCP, Tables 3-4, 6-2.) We understand from our Stone Lakes Technical Working Group meetings, however, that the focus of CM 6 will be on the west

side of the river, away from the area of impact. We would like to see replacement riparian habitat also occur on the east side of the river.

Similarly, hundreds of acres of riparian habitat will be directly destroyed by CM 1 construction (BDCP, Appendix 5J, Table 5.J-6.) Yet the 5,000 acres of "Riparian Natural Community Restoration" promised to be restored under CM 7 is provided over the course of 50 years. (BDCP, Tables 3-4, 6-2.) It does not appear that there is any connection between the areas of impact and where the restoration will occur. From what we have heard, we are concerned that much of this restoration will occur in areas far from the initial impact.

Incredibly, the BDCP and the EIR/EIS does not provide a detailed accounting of habitat loss by type (species), by year or an accounting of the type and quantity by year of fully functioning habitat restoration or mitigation, so a detailed analysis to quantify this shortfall is not possible. Though BDCP Table 6-2 suggests an implementation schedule, there does not appear to be any enforceable means to ensure this schedule is followed. Moreover, there is no indication that the pace of habitat loss will be matched by habitat creation. It appears that the pace of the amount of habitat lost to conveyance construction and aquatic habitat creation could occur at a much faster pace than the restoration and functional development of habitat restoration CMs. Since the purpose of the HCP/NCCP is to conserve and protect the covered species, the project should not be allowed to result in a net negative quantity and quality of habitat for the listed/covered species at any point in time during the BDCP project.

This problem applies to specific covered species, such as the greater sandhill crane. Here, the BDCP plans to "take" greater sandhill cranes each year (among other birds), for instance, with the new power transmission lines due to bird strikes. (BDCP, Appendix 5.J.D, Table 2 (estimating 138 deaths per year, which is estimated to be reduced to 48 deaths per year if the powerlines are marked according to a Colorado study indicating that a 66% reduction in bird strikes could be attained through marking).) A great deal of existing greater sandhill crane habitat is also proposed to be converted to other uses or otherwise affected by the BDCP actions. (BDCP, Table 5.6-10.) Yet, that take is not adequately minimized and mitigated, and is instead barely replaced. (16 U.S.C, § 1539, subd. (a)(2)(B); Fish & G. Code, § 2052.1.) For the impact of the taking to be minimized and mitigated (16 U.S.C, § 1539, subd. (a)(2)(B)(ii)), new habitat must be provided to replace the lost habitat in a timely manner. BDCP Chapter 6 does not explain when and how these measures will be carried out.

3. The Level of Detail of the HCP is Inadequate for Issuance of Take Authority

The level of measurable commitment to recovery of the covered species provided in the BDCP is inadequate for issuance of 50-year take authority. While it may be appropriate to conduct "programmatic" CEQA and NEPA review, the BDCP itself must contain sufficient detail in order to justify issuance of take authority for the covered activities. Yet, the discussion of the other CMs is very sketchy; the functionality and location of new habitat and other critical details of the Other Stressor CMs has not yet been defined. Moreover, the BDCP's own analysis indicates that acquisition of adequate lands to carry out the CMs may be difficult, and that many of the lands needed for tidal habitat are currently being used for terrestrial species conservation measures.[6] Even CM 1, as described below, is proposed to be served by a power transmission line whose design and location has not yet been determined. This level of detail is inadequate for issuance of take coverage. (See 50 CFR 17.22(b)(1), 17.32(b)(1), or 222.22; see also Habitat Conservation Planning and Incidental Take Permit Processing Handbook (1996) ("HCP Handbook"), p. 3-10.)

4. The Plan Area is Not Appropriate Given the Location and Impacts of the Project

FSL is not satisfied with progress made on adjustments to the plan area to ensure that impacts on the Refuge are avoided or mitigated as required by law. For instance, we have repeatedly requested that mitigation lands for impacts on the Refuge be available for placement to the east of the Refuge, toward Elk Grove. Such an expansion would be consistent with federal agency guidance on the appropriate plan area. "The HCP plan area might also include areas necessary for the mitigation. The exception to this general rule may be where the mitigation consists of reserves apart from the area in which incidental take is authorized." (HCP Handbook, p. 3-12.)

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[6] See Black & Veatch Corporation, Delta Habitat Conservation & Conveyance Program Creation of Up to 100,000 Acres of Intertidal and Associated Subtidal Habitat: Feasibility Level Assessment Based on Elevation & Land Acquisition Considerations Technical Memorandum. Prepared for California Department of Water Resources, DHCCP-Environmental. July 2012. (See p. 16 and Table E-5 and E-6.)

Additionally, the plan area must include the transmission lines that must be built to serve electricity to the project. BDCP EIR/EIS, Figure 3-29 clearly shows conceptual transmission line alignment extends outside of BDCP boundaries. This area has instead been designated as an "Area of Additional Analysis" rather than included in the Plan. Issuance of take authority outside the Plan area is not possible. According to the HCP Handbook, "HCP boundaries should encompass all areas within the applicant's project, land use area, or jurisdiction within which any permit or planned activities likely to result in incidental take are expected to occur." (HCP Handbook, p. 3-11.) The BDCP estimates the take of greater sandhill crane that would occur under the BDCP from the new transmission lines, yet a significant part of the area where take would occur is outside the plan area. (BDCP, Appendix 5.J.C, Figure 2.) The Plan area should thus be expanded to include the entire BDCP project, including the transmission lines. Moreover, the analysis of take and other environmental impacts of the transmission lines must occur now, within these documents, and cannot be deferred to some future date as the transmission lines are necessary to the construction and operation of CM 1 and do not have independent utility.

5. Compatibility with Other HCPs

FSL continues to be concerned that the BDCP will interfere with other existing and underway HCPs. Specifically, the BDCP is proposing to restore many of the same lands that are currently part of HCPs being developed by the delta counties, including the South Sacramento HCP. The BDCP is in direct and significant conflict with these other local and regional plans, and will compete for mitigation habitat. Because of this BDCP direct conflict with the HCPs, the BDCP may not be able to achieve its objectives and reduce the overall near- and mid-term conservation of these species because it will be competing with other plans for appropriate mitigation lands, or conversely, negatively impact the ability or other HCPs to achieve their objectives.

C. New Power Transmission Lines Will Have a Major Impact on Birds Within and Near the Refuge

The location and design of new transmission line corridors is of great concern to the FSL. The construction of new powerlines is an incompatible use within the Stone Lakes NWR and placement of new powerlines within and near the Refuge impedes the Refuge's core mission, the protection of vulnerable wildlife species such as the greater sandhill crane. These species are already under threat from widespread habitat degradation.

For this reason, a major focus of our time in the Stone Lakes Technical Working Group has been on the effects of the proposed transmission lines serving power to the new intakes and associated facilities. (See Exhibit A, item 5.) The BDCP and the EIR/EIS fails the basic test of reasonable good faith disclosure and analysis in several major respects in the discussion of the provision of electricity to construction and operation of the BDCP conveyance facilities. The EIR/EIS must properly describe this aspect of the project and all associated impacts of the necessary utilities that need to be constructed to serve the BDCP conveyance facilities under CM 1.

The power demands of the project are apparently enormous, purportedly especially during the construction phase, and a 230 kV transmission line is programmed to bisect the Refuge along Twin Cities Road and extend east to Highway 99. In all, 20 miles of permanent new transmission lines and 38 miles of temporary lines are proposed to be constructed.[7] (BDCP, Appendix 5.J.C, Table 1.)

In our Stone Lakes Technical Working Group, the possibility of obtaining power from three different and separate power providers (PG&E, SMUD, and WAPA) was discussed, but the BDCP does not disclose which organization or organizations will be the power supply provider for the project. There is no discussion of the capabilities of each provider to supply the power and no discussion of where each power provider's facilities that might be utilized are in relation to the Plan area so that the potential corridors for each power provider can be identified and alternative analyzed and compared. To the knowledge of FSL, DWR initiated discussions with the potential power providers only after the release of the Draft EIR/EIS. This renders the overall analysis of the impacts of the construction of the transmission lines flawed in that the alignment for the powerlines as set forth in the EIR/EIS is entirely speculative.

Similarly, the construction assumptions in the EIR/EIS for the provision of the power supply is called into question since it is unclear who will be constructing the powerlines and where the alignment will be. The EIR/EIS purports to be "project level" environmental analysis for the construction and operation of the conveyance facilities, but the lack of a specific location, design or commitment from a power provider at this late stage in the process results in a conjectural description of the location of the

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[7] While Table 1 refers to the transmission lines as within the Plan Area, (BDCP, Appendix 5.J.C, page 4), part of the permanent transmission lines would be in what is referred to as an "area of additional study" (see Exhibit I).

transmission lines potentially supplying power to the project. Even if the EIR/EIS was intended to be programmatic in nature, the EIR/EIS does not specify the process for additional environmental review based upon which of the three power providers is ultimately determined to be able to serve the facilities. If there is to be additional environmental review of the construction operations based upon the identity of the power provider, the scope and nature of that review must be disclosed.

The project description for analytical purposes is flawed because it fails to describe the location of the transmission lines. (See CEQA Guidelines, § 15124, subds. (a)-(c).) While the area to the east of the Refuge is generally referenced as the location where the transmission lines will be placed, the exact location has not been determined. (See BDCP, Appendix 5.J.C, Figure 2; see also BDCP, Appendix 5.J, Table 5.J-6, 5.J.-7, 5.J.-8, note 20 (noting "final alignment is unknown").) Moreover, the provision of power for construction is not even included as a covered activity. (BDCP, Table 4-3.) In addition to not disclosing the provider, the subsequent approvals necessary for the eventual construction of the new lines are not listed in the Executive Summary of the EIR. (See EIR/EIS, p. ES-6, Table ES-1 (listing Lead, Cooperating, Responsible and Trustee agencies).) Project-level detail clearly cannot be provided when the location and operator of this essential aspect of the project is not known.

The failure to adequately describe the transmission line portion of the project also constitutes impermissible piecemealing. Piecemealing results in a curtailed project description, which results in the EIR misstating the cumulative impacts "by separately focusing on isolated parts of the whole." (*San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 729-30.) Project descriptions must include integral parts of the project; otherwise their omission would result in important ramifications remaining hidden from public review. (*Santiago Water District v. County of Orange* (1981) 118 Cal.App.3d 818, 830.) Simply describing an undefined transmission line within a general area that is likely to change later is inadequate.

Even assuming that it could be permissible to analyze a conjectural location for the transmission lines, the analysis of effects and environmental impacts – especially with respect to bird strike deaths -- is incomplete and flawed. The area where the transmission lines will be placed is identified as crane foraging habitat. (Exhibit I, GSHC Area of Additional Analysis for Transmission Line Study Area, 2012.) FSL submitted technical comments on BDCP, Appendix 5.J.C on July 17, 2013. FSL has the following ongoing concerns regarding the conclusions of the Effects Analysis with respect to greater sandhill crane:

- Bird strike numbers are artificially low;
- Other birds besides greater sandhill cranes should have been analyzed;
- The effectiveness of marking transmission lines is likely overstated and lacks a credible basis;
- The report fails to address how other project impacts, such as light/sound/vibration/traffic and habitat fragmentation, could exacerbate the potential for bird strike deaths; and
- *Only bird diverters* are examined in this draft as a means to reduce bird mortality despite the probable feasibility of undergrounding at least the permanent transmission lines.

The minimization and **mitigation for transmission line bird strike deaths is inadequate**. One of the fundamental purposes of conducting an environmental review of a project is to identify potential mitigation measures which lessen the impacts of the project. (Pub. Resources Code, § 21002.1, subd. (b).) There is no dispute over the fact that the introduction of a large new transmission line through the heart of the Stone Lakes NWR and adjacent habitat areas will result in additional bird strikes, and particularly the loss of greater sandhill cranes. (BDCP, Appendix 5.J.C, Table 2.) Stone Lakes' population of greater sandhill cranes is smaller, more recently established, and more vulnerable to disruptive impacts. We also believe that other birds besides cranes will die as a result of the new transmission lines.

The EIR/EIS relies wholly upon the implementation of AMM 20 in which a powerline plan that results in a no net loss in the Plan Area is to be developed in the future. There is no assurance that such a plan can be developed, but more importantly, there is the very real possibility that the greater loss of greater sandhill cranes within the Stone Lakes NWR area might be "offset" by eliminating hazards to greater sandhill cranes somewhere else in the Plan Area. In meetings of the Stone Lakes Technical Working Group, there were modifications to the AMM to address this issue. We do not know if these modifications will be incorporated into the BDCP.

Additionally, discussions around how to verify that there is no net loss have been wholly unsatisfactory. There is no agreement, for instance, to include remote monitoring or other information gathering devices on the new powerlines. Rather, the BDCP apparently intends to rely on bird surveys conducted every 5 years to determine whether there has been a reduction in numbers of greater sandhill cranes. (See BDCP, Appendix 5.J.C, p. 17.) By the time a population level effect is found in bird counts, it

will be too late. Such a lackadaisical approach to monitoring effectiveness of the AMM does not meet minimum standards under the California Endangered Species Act ("CESA") in particular, since the greater sandhill crane is a state-listed species. At the very least, we suggest that no net loss be assessed on an annual basis during CM 1 construction.

We continue to be concerned that the feasibility of undergrounding transmission lines has not been adequately examined, and the documents continue to assume that there will be no undergrounding.[8] Our discussions of revisions to AMM 30 only would require the "evaluation" of undergrounding of powerlines to be considered as part of any such plan.[9] There is little dispute that the most effective way to prevent birds strikes from occurring with the development of new transmission line facilities is to eliminate the conflict – i.e., underground the lines. The BDCP and EIR/EIS must comprehensively analyze the environmental efficacy of undergrounding new powerlines within the Stone Lakes NWR to provide the highest level of protection possible to the biological resources utilizing the Refuge. Without such an analysis, it is not possible to determine if undergrounding of powerlines is a feasible mitigation measure.

DWR has prepared a "white paper" regarding undergrounding to "provide general information about the technical merits and challenges associated with placing high voltage transmission lines underground, compared with installing overhead lines." (DWR, Undergrounding High Voltage Transmission Lines, May 2014, Rev. 2.) In the context of the Stone Lakes Technical Working Group, FSL and the wildlife agencies have requested information regarding the feasibility of undergrounding the power lines serving the BDCP. Such analysis is necessary, for instance, to assess under CEQA whether feasible mitigation is available to avoid or reduce the significant effects on greater sandhill crane and other birds. (CEQA Guidelines, § 15126.4.) Such analysis is also required in the context of the ESA, in terms of "minimize[ing] and mitigate[ing] the impacts of such taking" to the "maximum extent practicable." (16 U.S.C., § 1539, subd. (a)(2)(B)(ii).) DWR's survey of undergrounding includes no information relevant to such an inquiry.

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[8] See, e.g., BDCP Appendix 3C-Construction Assumptions for Power Supply, p. 3C-52, Table 3C-6.

[9] See Appendix 3C, p. 3.C-70 (current AMM language).

The EIR/EIS also fails to analyze the growth inducing effects of constructing transmission lines to construct and operate CM 1. Pumps at intakes and at tunnel head works will require new transmission lines. Any new power generation facilities that are brought on line to supply the power demands of the BDCP are growth inducing. The impacts of bringing the additional power generation capacity to supply BDCP power requirements should have also been disclosed as an impact of the project.

There are already a significant number of transmission lines within and near the Refuge. The addition of more large above ground transmission lines will cause higher bird mortality will compromise the ability of the Refuge to complete its boundaries by introducing new wildlife risks into the area. Unfortunately, a good faith analysis of means to reduce impacts associated with these new structures has not been adequately undertaken. In particular, the analysis of the feasibility of undergrounding all or part of the needed transmission lines has still not been undertaken.

D. Project Implementation and Mitigation Monitoring are Not Adequately Defined

Even the best designed AMMs and more rigorous mitigation measures are effective only if there is assurance that they will be fully implemented and enforced. Mitigation obligations, which are adopted and then ignored, are not mitigation obligations at all. The Plan does not provide assurances that the mitigation obligations, whether AMMs or in the EIR/EIS, are funded or will be implemented

While it is permissible to incorporate mitigation obligations into the project in lieu of requiring the obligations as mitigation measures in the environmental documents, as the BDCP has done through the development of the AMMs, FSL is very concerned that through this process, the mitigation obligations such as greater sandhill crane habitat establishment prior to initiation of construction will get less attention than they should because of the multiplicity of obligations that the Implementation Office is required to perform, and will get "lost" in the scale of the overall habitat obligations for the BDCP Plan Area in its entirety. In this respect, because the EIR/EIS is intended to be "project level" with respect to the conveyance facilities, FSL believes a detailed and specific mitigation monitoring plan for the obligations associated with the actual construction of the conveyance facilities, with specificity as to which agency will be responsible for oversight of each mitigation obligation, must be developed to show how those obligations will be implemented, rather than relying upon the operations of the Implementation Office generally.

Further, mitigation obligations which cannot be implemented because of lack of funding are not mitigation measures at all. CM 2-22 depends on future funding authorizations by the state and federal governments as well as General Obligation bond funding from the state. The sources of the funding and the costs to mitigate the direct impacts to the Stone Lakes NWR should be specifically delineated in the cost projections for CM 1 and the AMMs in CM 2-22 within Chapter 8 of the BDCP. The Plan and the EIR/EIS must then identify the sources of secure funding to pay for all of the mitigation obligations relating to the Plan, whether or not they are part of CM 1.

Finally, the implementation structure as described in Chapter 7 of the BDCP and the draft Implementing Agreement in general does not provide for adequate public oversight of the overall implementation process by interested parties, such as FSL. The only place where a group such as FSL could participate in the oversight process is through the Stakeholder Council, where there are seats for only three conservation groups for the entirety of the Plan Area. The process for public oversight of implementation must be enhanced so that directly interested parties, such as FSL, are not relegated to "observer" status, and can participate in the oversight and active implementation of mitigation measures directly impacting the Stone Lakes NWR.

E. Traffic Impacts on Hood Franklin, Lambert and Twin Cities Road are Not Adequately Addressed

1. Projected Traffic Increases on Key Refuge Roads

Appendix 19A Attachment B of the EIR/EIS presents graphs depicting the traffic increases on various road segments due to construction of the CM 1. The graphs show modeled hourly roadway volumes and the level of service threshold ("LOS" C) for an entire day during the peak month of project generated traffic. The volume of traffic was developed from data on construction phasing and trip generation associated with various construction activities in Appendices 22A and B of the document.

The graphs in Appendix 19B and the data in Table 19-5 for Alterative 4 indicate that traffic will increase during the peak month of construction on roads through or adjacent the Refuge boundary as follows:

• Hood Franklin Rd	from I-5 to River Rd	900 trips/hr
• Lambert Rd	from River Rd to Franklin Blvd	950 trips/hr
• Twin Cities Rd	from I-5 to River Rd	180 to 200 trips/hr

Traffic on River Road near the Refuge between Scribner Road and Lambert Road will increase from between 750 to 900 trips per hour depending on the segment. These trip increases are the increment above baseline associated only with the project. Construction related traffic along these four segments will not exceed LOS C.

All of these graphs are flat for the duration of the day with no peak hour highs, meaning that almost all of the trips will be generated by trucks, and there will be minimal commute hour traffic by workers. It is not clear from the analysis what kinds of trucks will be using these roads, but the likelihood is that the large majority of them will be semi-trailers hauling material.

The truck traffic volumes disclosed in the EIS/EIR are a significant concern to FSL; 900 trips per hour is an enormous number of trucks under any scenario. This rate amounts to 15 trucks per minute all day long or one truck on average every 4 seconds. It is a level of truck traffic along two lane rural roads comparable to the volume of trucks using four-lanes on Interstate 5.

The traffic analysis does acknowledge that the assumptions used in the traffic study were conservative – they represent a worst case scenario. Nevertheless, the purpose and intent of the EIS/EIR process is to mitigate for the potential impact. And even if the peak level of trips turns out to be half of this conservative estimate, it is still A LOT OF TRUCKS.

The traffic impact analysis associated for Alternative 4 focuses on the road segments where traffic would exceed LOS C. (EIS/EIR, p. 19-164.) Because project traffic would not cause any of the roadways in and around the refuge to exceed LOS C, the discussion of impacts and mitigation in this section does not reference any of these roadway segments, nor do Mitigation Measures TRANS 1a to 1c. It is not clear to what extent Mitigation Measure TRANS 1a, which requires Site-Specific Construction Traffic Management Plans, would include non-LOS C impacted roadways.

The analysis of traffic impacts of Alternative 4 is inadequate in several ways. By focusing on traffic with respect to LOS, as is typical of traffic studies, the analysis fails to adequately discuss the nature and duration of truck traffic impacts. LOS is but one metric to analyze traffic impacts. Under SB 743 (Steinberg), the Office of Planning and Research is now in the process of promulgating regulations to provide guidance on non-LOS metrics for assessing traffic impacts within transit priority areas. (Pub. Resources

Code, § 21099, subd. (b)(1).) Non-LOS metrics for traffic impacts analysis may also be applicable outside of transit priority areas and should have been considered here.

Important information needed to assess traffic impacts is missing from the analysis. The mix of construction traffic, including the percentage of heavy trucks, is not indicated for each roadway, nor is the number of months that traffic will be at or near the peak -- and it is not possible to glean this information from the data in the EIR/EIS. This is essential information, and the EIS must present it in a graphically clear manner and then propose reasonable mitigation for the effects of this level of traffic on the adjacent property, including the Refuge.

2. Impacts on Wildlife from Truck Traffic are Not Addressed

The Stone Lakes Technical Working Group has discussed the impact of increased truck traffic along Hood Franklin Road and along the rerouted River Road around the intake construction site primarily in terms of disturbance to roosting greater sandhill cranes. (Exhibit B, FSL Unresolved Issues, Item 4.) This discussion has been in general terms, not in terms of the impacts of 900 truck trips per hour for extended periods of time. There have been some modifications to the AMM for cranes as a result of this discussion.

Notwithstanding this discussion, the analysis of impacts to wildlife of increased truck traffic on roads within and adjacent the Refuge boundary is inadequate and incomplete. Critically, FSL has not been able to determine yet from the documents or from the Stone Lakes Technical Working Group basic details about the scale and duration of traffic impacts on the Refuge. The EIS/EIR includes thousands of pages of impact analysis pertaining to listed species but we can find no discussion of the impact to construction truck traffic on non-listed species. The increased truck traffic will enhance the barrier effect of the roads through the refuge and will increase mortality for various species that are particularly active early and late in the day, including snakes, turtles, river otters, coyotes, mink and rabbits. This needs to be evaluated in the EIS/EIR along with consideration of the construction of safe wildlife crossings at key corridors as mitigation.

The noise impact of the truck traffic is discussed in Chapter 23 of the EIS. Table 23-63 indicates that the noise level for Hood Franklin and Lambert Roads will increase by 16 (51 to 67) and 22 (44 to 66) dBA, respectively. These are among the highest dBA increases along roads anywhere in the Delta project area. Noise levels along State

Route 160 will increase by 13 dBA. All of these projected noise impacts exceed the threshold level of significance of 12 dBA. Chapter 23 identifies the number of sensitive receptor parcels impacted by noise in Table 23-62, including 10 natural/recreation zoned parcels, but it is unclear whether these parcels are impacted by truck noise as well as construction site noise and whether any of these parcels include Refuge parcels. The analysis needs to identify the specific natural/recreation areas impacted by noise (as well as the residential parcels, for that matter) and clarify that traffic noise is included in the determination of impacted sensitive receptors.

3. Recreational Impacts from Truck Traffic are Not Addressed

The analysis of indirect impacts of construction traffic on recreation is also inadequate and incomplete. Impacts of project construction on recreation within the Stone Lakes NWR are discussed primarily on page 15-255 of the EIS/EIR. This analysis discusses the impact of intake construction and power transmission lines, but fails to discuss the impacts of one truck every four seconds (with attendant significantly increased noise levels) passing in front of the Refuge visitor facilities and the access to Sun River. The high level of truck traffic will significantly interfere with the visitors' experience at the Blue Heron Trails area. Hunter experiences at Sun River will also be impacted. The aesthetics of visiting the refuge will be significantly impacted both visually and audibly. It is also reasonably foreseeable that some truck drivers will turn into the Refuge parking area to use what will be the most convenient restroom facilities on the haul route. This will result in increased safety risks for staff, volunteers, school buses and visitors entering and leaving the Refuge.

4. Transportation Mitigation Measures are Inadequate

Finally, the proposed mitigation measures are inadequate and incomplete. Mitigation Measures TRANS-1a to 1c all appear to be applicable only where LOS C is exceeded. Measure Trans-1a, "Implement Site-Specific Construction Traffic Management Plans" should be modified to make it clear that all impacted road segments are subject to such plans and wording added that requires the opportunity for public input in the plan before it is finalized. More importantly, given the significant levels of heavy truck traffic on lightly travelled rural roads for lengthy periods during construction, additional mitigation is feasible and warranted. A new mitigation measure similar to Mitigation Measure TRANS-1c titled, "Make Good Faith Efforts to Enter into Mitigation Agreements to Improve Safety and Reduce Traffic Impacts on Rural Roadways Projected to Experience Dramatically Increased Truck Traffic for Extended

Periods during Project Construction" should be added to the DEIS. An example of an access safety improvement along Lambert Road would be the construction of a safer access point to the Sun River recreation site.

With respect to noise and visual impacts, NOI-1a, "Employ Noise-Reducing Construction Practices during Construction" should be modified or supplemented to also allow for the construction of noise reducing screening along heavily travelled roadway segments adjacent to sensitive receptors. In particular, fast-growing native screen plantings between Hood Franklin Road and Blue Heron Trails at Refuge Headquarters should be identified as a mitigation measure.

Finally, an additional mitigation measure to provide funding to extend Blue Heron Trails south to provide a recreation opportunity removed from the impacts of traffic along Hood Franklin Road should be included. Such a mitigation measure would help offset the impacts to recreation that will occur during (and potentially after) construction of the project.

F. Ongoing Concerns Regarding Tunnel Muck

FSL continues to have concerns regarding the disposal of tunnel muck in areas currently in use or planned for use as wildlife habitat, such as Zacharias Island, which is within the Refuge boundary. The project will generate a significant volume of tunnel muck (27 million cubic yards estimated from tunneling alone) that will need to be stored, used or disposed. We understand from our Stone Lakes Technical Working Group meetings that some analysis by DWR of muck has occurred indicating that it may be reusable.

According to DWR's Reusable Tunnel Material Testing Report (March 2014) ("RTM Report"), the muck may not require handling as hazardous waste. However, "exposure of people, wildlife and plants to conditioned soil has not been fully assessed under unrestricted-use conditions, creating an uncertainty for potential adverse effects." (See Exhibit J, RTM Report, p. 3-23.) Moreover, initial data developed by DWR from analysis conducted for vegetation suitability indicates that high levels of heavy metals may be found in the muck, making it potentially unsuitable for use in restoration projects or in other places that may expose wildlife and people. (See Exhibit J, RTM Report, pdf pp. 717-721 (Wallace Laboratories discussing planting unsuitability of muck with high levels of zinc).) The RTM Report claims that baseline levels of contaminants are similar to the conditioned soil samples. (RTM Report, p. 3-23.) This fact, however,

does not mean that the muck would be suitable for planned restoration uses. (BDCP, Appendix 3.C-26.)

It also appears that an insufficient number of samples were taken to come to any conclusions regarding the suitability of tunnel muck from the 35 mile tunnel route for the proposed uses. The RTM report was based on materials testing from only 19 boring locations. (Exhibit J, RTM Report, p. 2-1.) Given the lack of data regarding the composition of the muck that will actually be generated by the project, it is not reasonable for BDCP to assume that all muck will in fact be reusable. FSL is particularly concerned with adverse impacts from the muck that would be placed in the triangular parcels within the Refuge and on Zacharias Island.

The BDCP must account for the fact that the muck may not be reusable. Specifically, AMM 6 (Disposal and Reuse of Spoils) assumes that the muck will be reusable. (BDCP, Appendix 3.C, section 3.C.2.6.) AMM 6 should be modified to account for the very real possibility that the muck cannot be reused.

We also suggest that BDCP Chapter 6 (Implementation) include contingency planning for not being able to use tunnel muck for restoration and other plan purposes. The costs of this change in circumstance requiring offsite disposal (potentially at a hazardous waste landfill) should also be accounted for in BDCP Chapter 8 (Funding). Moreover, the documents do not appear to have a clear process (whether in mitigation measures or AMMs) to track the material properties of the muck to ensure that the muck is managed safely.

G. Impacts of Dewatering for CM 1 Construction on Groundwater within the Refuge are Not Adequately Disclosed

We continue to be concerned that the dewatering necessary for: (1) construction of the intakes (particularly the intake near Hood), (2) the forebay, and (3) tunnel construction that may have adverse impacts on the Refuge's water sources as well as trees and vegetation within the Refuge that rely on relatively shallow groundwater. Though it is not entirely clear from the BDCP and EIR/EIS, it appears that significant dewatering activities will be necessary for all three of these activities, which will occur within and near the Refuge. (See EIR/EIS, Figure 7-27 (showing a potential four foot reduction in groundwater levels in the vicinity of the intake near Hood).) We did not have adequate time to resolve this issue at the Stone Lakes Technical Working Group meetings and the EIR/EIS does not describe dewatering activities with particularity.

The Refuge uses the SP Cut Waterway as a water source and is concerned that this surface water diversion and other wells within the Refuge will be adversely impacted during, and potentially after, construction. The EIR/EIS states that "locations and construction details for existing production wells in the vicinity of the project are unknown at this time." (EIR/EIS, p. 7- 39.) The Refuge has invested public funds in enhancing habitat that should not be disturbed by a competing conservation plan. A good faith effort at full analysis would include having a detailed project description of the intended actions to construct CM 1, analyzing those impacts, and providing adequate mitigation.

Mitigation Measure GW-1 must be modified to include replacement of water supplies for wildlife and habitat uses, in addition to replacement of interrupted domestic and agricultural water supplies. Additionally more specificity is required on the steps that will be taken to avoid localized groundwater impacts in the first place. Moreover, FSL believes the "if feasible" language of this mitigation measure creates ambiguities with respect to what DWR is committed to do. Specifically, there is no enforceable performance standard in the mitigation measure as an alternative to a direct mitigation action.

H. Concrete Batch Plant Impacts are Not Disclosed

The BDCP includes an "approximately 40 acre concrete batch plant and 2 acre fuel station near Twin Cities Road and Interstate 5 (within a designated RTM storage site)." (BDCP, p. 4-15.) Due to the proximity of the Refuge to these activities, we are concerned about potential impacts on the Refuge and habitat in the surrounding vicinity. These impacts do not appear to have been disclosed in the BDCP or EIR/EIS.

Batch plants are a significant source of noise, dust and traffic. The content of the dust would likely be hazardous to humans, wildlife and vegetation. Dust generated by batch plants can contain asbestiform particles and crystalline silica, which are hazardous to the human respiratory system. The pH of many of these dusts may also be dangerous to vegetation and animals. The EIR/EIS must analyze these potential impacts, and specifically the impacts of placing a batch plant so close to sensitive biological resources. At a minimum, mitigation in the form of noise screens, limiting truck drum speeds, lining hoppers with a resilient surface, and routing trucks to avoid sensitive receptors should

be required. (See Exhibit K, Report on Noise Levels from Proposed Batching Plant, July 2008.)[10]

I. Noise Impacts on the Refuge Have Not Been Addressed

Noise levels above 60 dBA, which are expected during construction, may interfere with communication among birds and other wildlife. A baseline of 40 dBA is used to describe the existing ambient noise level in the study area. (EIR/EIS, p. 23-20.) The thresholds for construction indicate that, where existing ambient noise level is less than 60 dBA, impacts would be significant where construction noise levels are predicted to exceed the DWR standard of 60 dBA (50 dBA during nighttime hours). There is no analysis in the EIR/EIS relating to the impacts of this noise on wildlife.

Construction noise above background noise levels (greater than 50 dBA) could extend 1900 to 5250 feet from the edge of construction activities. (BDCP, Appendix 5.J, Attachment 5J.D, Indirect Effects of the Construction of the BDCP Conveyance Facility on Sandhill Crane, Table 4; see also BDCP, p. 12-1834.) Impacts may be similar among other bird species likely to be present in the area, which should also be analyzed in the BDCP and in the EIR/EIS.[11]

We also continue to be concerned that BDCP, Appendix 5.J.C treats the indirect effects on greater sandhill crane of noise from all construction activity and pile driving separately. The two types of noise should be aggregated so that the full impact on

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[10] Available at: http://www.idox.cotswold.gov.uk/WAM14/doc/Report-289934.pdf?extension=.pdf&id=289934&appid=&location=volume1&contentType=application/pdf&pageCount=1.

[11] See BDCP, p. 12-1546 (California Black Rail), 12-1557 (California Clapper Rail), 12-1568 (California Least Tern), 12- 1617 (Least Bell's Vireo and Yellow Warbler), 12-1627 (Suisun Song Sparrow and Saltmarsh Common Yellow Throat Sand), 12-1643 (Swainson's Hawk), 12-1659 (Tricolored blackbird), 12-1674 (Western Burrowing Owl), 12-1685 (Western Yellow-Billed Cuckoo), 12-1700 (White Tailed Kite), 12-1712 (Yellow Breasted Chat), 12-1722 Cooper's Hawk and Osprey), 12-1744 (Cormorants, Herons, and Egrets), 12-1758 (Short Eared Owl and Northern Harrier), 12-1769 (Mountain Plover), 12-1775 (Black Tern), 12-1787 (Grasshopper Sparrow and California Horned Lark), 12-1795 (Least Bittern and White Faced Ibis), 12-1808 (Loggerhead Shrike), 12-1818 (Modesto Song Sparrow), 12-1821 (Bank Swallow), and 12-1834 (Yellow Headed Blackbird).

cranes is disclosed. This issue was discussed in the Stone Lakes Technical Working Group but was not resolved. No credible explanation for the failure to aggregate all the noises from the Project has been provided.

With respect to noise impacts, we are especially concerned about the impacts on two pieces of property between the forebay site and the existing state owned triangle ponds slated for muck storage. These areas are currently in alfalfa and corn that provide foraging habitat for sandhill cranes; Refuge staff has observed upwards of 500 birds that were mostly lesser sandhill cranes in that area. This farmland will be impacted by the project. As mitigation for this impact, BDCP should replace the value if directly impacted (which is unclear where that is stated and how much) or indirectly by noise by enhancing 0.1 acre for every affected acre within a mile of the affected foraging habitat. This could be carried out in AMM20 - Foraging.

J. Conservation Actions for Greater Sandhill Crane and Other Species of Concern are Still Incomplete

Through the Stone Lakes Technical Working Group process we were able to secure several improvements in the conservation strategy for greater sandhill cranes. (See Exhibit L, FSL Comments on Greater Sandhill Crane Strategy and Effects with ICF Comments, February, 24, 2014, and Exhibit D and E.) To a lesser extent, we addressed concerns with other species, though that effort was not completed. We expect that these commitments will be reflected in later drafts of the BDCP and EIR/EIS.

With respect to greater sandhill crane, for instance, we secured a commitment for the creation of a temporary roost site and "super charged" foraging opportunities for the cranes that use the northern most roost site on the Refuge. These changes were in acknowledgement of the constraints from urbanization already impacting that roost site and as a result the greater likelihood that the roost site might be abandoned because of construction activities from CM 1. There has been no indication when these conservation actions would be undertaken in relation to the construction activities of CM 1. It is imperative that these conservation actions be undertaken at least one season in advance of the construction impacts in order to improve the chances for their effectiveness.

Similarly, FSL has concerns about the timing of crane conservation actions in general. There has been no specificity provided for when the two new roosting ponds, that will be created to connect the Cosumnes crane populations to those of the Refuge,

will be constructed. Beyond the concerns already expressed about funding certainty and timing of mitigations in relation to impacts, it is imperative to have the timing for these conservation actions mapped out to ensure that the Refuge can incorporate the presence of these actions into its own conservation management and monitoring schedule, and so that the timing can be analyzed in the context of the impacts from CM 1. When the conservation actions will be done, this needs to be as fully explicated as what they will be. To that end, a monitoring and management plan needs to be in place before construction begins, and the framework for that plan needs to be included in the BDCP so that it can be analyzed for completeness and appropriateness.

Of equal concern to the timing of mitigations, is the timing of CM 1 activities. Narrower construction windows would limit the impact on cranes but the "to the extent practicable" language would seem to greatly diminish the likelihood that any restrictions would be adhered to. We understand that there will be construction window limitations to protect greater sandhill crane populations on Staten Island, and request those same restrictions on construction in the vicinity of Stone Lakes NWR.

The Stone Lakes Technical Working Group meetings largely focused on greater sandhill crane and there was in the end inadequate time to discuss concerns about the adequacy of the conservation measures for either the Swainson's hawk or the burrowing owl. Please refer to Exhibit B, FSL Unresolved Issues with notes from ICF and Exhibit F, Western Burrowing Owl comments, for additional concerns related to these two species. In the realm of timing, the loss of riparian hawk nesting habitat will be significant, and though language has been added to require tree planting and foraging in the vicinity of impacts, FSL has not been able to discuss the specifics of these changes or their timing. We are also concerned that there are no AMMs relating to protection of hawks. The BDCP and EIR/EIS must be revised to include adequate protections for these species.

III. CONCLUSION

The Friends of Stone Lakes National Wildlife Refuge appreciates the opportunity it has had to work with the BDCP Project team to explore solutions to the impacts the BDCP Project will have on the Refuge. While some of the FSL's concerns may be somewhat ameliorated if all of the modifications to the Plan and the EIR/EIS are incorporated as discussed in the Stone Lakes Technical Working Group meetings, as explained above, FSL has significant remaining concerns that the Project, as currently designed and mitigated, will have enormous impacts on the Refuge that have not yet

been properly identified, analyzed or avoided/mitigated. Thus, FSL recommends that the BDCP and EIR/EIS be substantially revised to correct these deficiencies, and then recirculated for public review and comment. FSL remains ready and available to continue the dialogue to ensure that, should the BDCP be approved and constructed, that its impacts on the Refuge are fully mitigated.

Sincerely,

Dale Claypoole

Dale Claypoole
President, Friends of Stone Lakes
National Wildlife Refuge

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Exhibit List

A. ICF Summary Status Report April 18, 2014
B. FSL Unresolved Issues with ICF Notes, May 30, 2014
C. Notes for June 5, 2014 Meeting by ICF
D. Table of Remaining Crane Tasks by ICF, April 22, 2014
E. Crane Comments for Discussion with FSL and ICF Notes, April 18, 2014
F. Stone Lakes NWR Comments on Western Burrowing Owl Conservation Strategy, May 22, 2014
G. Letter to Jerry Meral re Status of Stone Lakes Working Group, November 2, 2013
H. Hypothetical Restoration Areas
I. GSHC Area of Additional Analysis for Transmission Line Study Area, 2012

J. DHCCP Reusable Tunnel Material Testing Report, March 2014 (excerpt)
K. Report on Noise Levels from Proposed Batching Plant, July 2008
L. FSL Comments on Greater Sandhill Crane Strategy and Effects with ICF Comments, February, 24, 2014

EXHIBIT A

Stone Lakes National Wildlife Refuge Association/BDCP

Summary

The following is a summary of concerns that have been raised at Stone Lakes National Wildlife Association/BDCP meetings, with responses to each of these concerns, and identification of action items.

1. Forebay size and location:

    a. Concerns: At many of the earlier meetings, SLNWRA expressed concern about the size and location of the forebay that was planned adjacent to the refuge.

    b. Response: Through the optimization exercise the forebay was reduced from 750 acres to 40 acres, and moved down to the Glanville Tract. Bart acknowledged that the Glanville option has less impact than the previous design, and responded favorably to the benefit of coupling of roads (I-5 access), power needs, etc. with the optimized alignment.

    c. To do: Nothing further.

2. Northern borrow/spoil site:

    a. Concerns: For the Admin Draft CM1 design, Bart expressed concerns about the northern borrow/spoil site and impact to sandhill cranes and waterfowl. He said cranes forage there and there's an NRCS conservation easement in that location. He also suggested that we look into the possibility of turning the borrow/spoil site into foraging habitat or roosting habitat. At a later meeting, there was a recommendation to consider creating a permanent roost area with adjacent foraging to off-set impacts from the borrow/spoil site.

    b. Response: We looked into the NRCS conservation easement, and the current footprint does not affect that easement. The crane AMM requires temporary supplemental foraging habitat for indirect effects to foraging habitat, and the overall crane conservation strategy includes mitigation for direct effects. Also, the AMM requires wetland roost site acreage but established for indirect effects to wetland roost sites.

    c. To do: We will further explore their recommendation to convert the borrow/spoil site into foraging or roosting habitat after its use.

3. Cosumnes-Mokelumne ROA:

a. Concerns: In meetings early in the process, SLNWRA expressed concern about the Cosumnes-Mokelumne ROA overlapping with the Stone Lakes planning boundary (Zacharias Island) and an area SLNWRA identified as a potential forebay site. Also, they commented that we should look into the feasibility of siting tidal restoration in the Cosumnes-Mokolumne ROA in a way that avoids crane high use areas (other than perhaps muted tidal) as identified in Gary Ivey's maps, and come up with language for CM4 in siting and design criteria.

b. Response: The ROA is still in the same location and now overlaps with the forebay and Zacharias Island (RTM site). But this should be okay because the ROA is a large area within which tidal restoration will be sited. Siting and design criteria were developed in CM4 to site tidal restoration away from crane high use areas. More specific siting will be addressed through subsequent project level CEQA process.

c. To do: We're looking at potentially modifying the ROA as part of the CM4 optimization exercise.

4. Mitigation and AMMs dealing specifically with impacts to Stone Lakes:

a. Concerns: SLNWRA expressed concern about not having mitigation measures dealing specifically with impacts to SLNWR, or sufficient avoidance and minimization measures to reduce impacts

b. Response: We refined the conservation strategy for the greater sandhill crane to identify lands in the refuge planning boundary for protection and restoration - in part to offset impacts to cranes in the refuge. We also refined the AMMs to address indirect effects to sandhill cranes in the refuge.

c. To do: Consider additional mitigation to address the real and quantifiable impacts of the project.

5. Conservation inside refuge planning boundary:

a. Concerns: Some conservation should be focused inside the refuge planning boundary in order to offset impacts to refuge. Objective 1.4 should be re-written to make sure it's specifying roost site creation within the refuge planning boundary.

b. Response: See #4. Crane objective 1.4 was revised to specify that conservation will be within the refuge planning boundary.

c. To do: Nothing further

6. Timing of mitigation relative to impacts:

a. Comment: Mitigation for CM1 should occur prior to or in concert with the loss of habitat associated with project construction. Should develop language regarding timing and location of foraging habitat protection relative to impacts.

b. Response: We described the "rough proportionality" and stepwise approach for timing of conservation, and that it is not tied to mitigation specifically to CM1 impacts in the vicinity of Stone Lakes. We added language to the AMM about setting up supercharged habitat prior to construction, and requirement to replace the Stone Lakes roost site, if impacted, in place at the time construction begins.

c. To do: Consider the timing issue further to determine whether additional specificity about timing of crane mitigation relative to CM1 impact would be appropriate.

7. Mitigation east of Plan Area:

a. Concerns: (Sean Wirth) concern that there may not be enough inventory to meet conservation objectives, with South Sac HCP and Elk Grove SOI expansion. Asked that we look at conservation within the urban services boundary. Mitigation for Conservation Measure 1 (CM1—the conveyance facility) must not be limited to the boundaries of the HCP/Delta. Mitigation should include lands to the east of Interstate 5. Should expand the Plan Area to serve as "land dam"

b. Response: We replied that mitigation for protected species under the NCCPA is limited to the HCP area, and we won't be revising the Plan boundary to accommodate conservation in the urban services area. The current plan area is based on the legal delta and increasing the overlap between the BDCP and South Sac HCP could create more potential conflicts.

c. To do: Nothing further

8. Undergrounding Powerlines:

a. Concerns: SLNWRA (and wildlife agencies) expressed concern that evaluation of the power lines does not include an underground option, including the possibility of separate underground power service to individual pump stations and the tunnel forebay facility. Suggested undergrounding the east-west line and any other lines that are permanent in the vicinity of cranes. They would like to see the undergrounding option seriously considered. They recommended writing into the plan that undergrounding will be comprehensively evaluated with respect to cost, operational risks, bird strike risks, and other relevant factors. They also asked for price per mile for undergrounding, and specifics regarding infeasibility.

b. Response: DWR agreed to prepare a report on feasibility of undergrounding. We added to the crane AMM that undergrounding will be comprehensively evaluated with respect to cost, operational risks, bird strike risks, and other relevant factors.

c. To do: Continue to analyze feasibility of undergrounding.

9. RTM Permanent vs. Temporary
    a. Concerns: The RTM sites should be evaluated as permanent sites and their impacts evaluated accordingly.

    b. Response: The RTM sites were evaluated as permanent impacts in the public review draft.

    c. Work left to do: . Nothing further, although we are considering modifications that would reduce the RTM footprint.

10. Indirect effects on cranes:

    a. Concerns: The issue of indirect effects on cranes was a major one for this group and was discussed at most of the meetings. In an early meeting, SLNWRA insisted that the indirect impact of 1300 feet for greater sandhill crane (used in the Admin Draft) was low and not consistent with Gary Ivey's work. Although Gary provided this distance recommendation in an email, they described the recommendation as a "back of the napkin" approach. They suggested that we re-evaluate the 1,300-foot indirect effect distance, and look at it in terms of type of disturbance – decibels and continuous versus intermittent. They also asked that we look at reverberations from pile drivings, and construction light impacts. After we prepared a more detailed indirect effect analysis, they said that we should include traffic from re-routed 160, and change the buffers for the noise analysis limit from 60dB to 50dB to address the uncertainty of how cranes will react to noise compared to vireos and gnatcatchers. They recommended shielding so lighting doesn't go upward over noise barriers. They asked that we evaluate potential effects of vibrations from pile drivers. They expressed concern about the roost site on Hood Franklin Road: it's not frequently travelled now and travel will significantly increase with project construction. (Gary said that cranes often avoid that area anyway because of existing trails, but Bart said some cranes are using the pond now and trails are closed at dusk.) Bart expressed concern that if there is a higher level of traffic during the dusk and evening period, this could be problematic for cranes coming in to roost. A noise wall was not recommended for along Hood Franklin Road because of visual impact to cranes. They suggested using an 800-meter buffer for all indirect effects.

    b. Response: A detailed indirect effects analysis, including an analysis of pile driving noise, was prepared and used to refine effects analysis and develop AMMs to avoid and minimize indirect effects on the crane. In response to SLNWRA and agency comments on the analysis, we added an analysis of noise from re-routed traffic and an analysis on lighting, and we changed the noise buffers from 60dB to 50dB.

We incorporated the noise analysis into the crane effects analysis, and developed AMMs to minimize indirect effects. We added a requirement for "supercharging" crane habitat proportional to the acreage that would be indirectly affected (See #19). We also added a requirement to create a flooded ag site within a mile of the roost site on the refuge that would be indirectly affected by traffic noise along Hood Franklin Road. This would just be during construction, and would be a landowner agreement. We added a requirement for shielding of lights.

c. Work left to do: We will further discuss the development of a monitoring and adaptive management program on Stone Lakes National Wildlife Refuge.

11. Permanent indirect effects, general:

    a. Concerns: They expressed concern about permanent effects to refuge from noise and lighting.

    b. Response: The forebay moved to Glanville Tract. Arnold explained to the group that the forebay probably wouldn't have an O&M center, only a small office, and there would be regular maintenance of the facility. Lighting would be available but wouldn't be on all of the time. There would be a 6'-high berm around the retention basin, which would be expected to further minimize indirect effects.

    c. To do: Consider permanent indirect effects on the refuge when finalizing CM1 design. Consider whether it would be appropriate to add measures to the crane AMM such as vegetative screening around facilities with permanent lighting.

12. Cosumnes connection for cranes:

    a. Concerns: We should connect Cosumnes to Stone Lakes seamlessly. Cranes feed within 6 km of roost sites, so we should have a series of roost sites no greater than 6 km apart from Cosumnes to Stone Lakes.

    b. Response: The conservation working group developed a crane objective to meet this need.

    c. To do: Nothing further

13. Hunting on crane roost sites:

    a. Concerns: No hunting should be allowed on crane roost sites

    b. Response: This requirement was added to the BDCP (CM11).

    c. To do: Nothing further

14. Seasonal flooding:

a. Concerns: We should insert language into the crane objectives about taking seasonal flooding into consideration as well as sea level rise.

b. Response: Language was added to the relevant objectives to address this. ("in consideration of seasonal flooding and sea level rise")

c. To do: Nothing further

15. AMM regarding abandoned roost sites:

a. Concerns: The crane conservation strategy in the Admin Draft called for creating new roost sites if sites are abandoned. If a site is abandoned, this would be too late.

b. Response: BDCP dropped this requirement for the Public Review Draft, added a requirement for creation of roost sites regardless of roost site abandonment, and added AMMs to reduce the risk of abandonment.

c. To do: Nothing further

16. Size and configuration of crane roost sites:

a. Concerns: The SLNWR supported creation of a managed seasonal wetland within the Refuge boundary under GSHC Objective 1.4. However, they didn't believe 40 acres was an adequate roost site size. Also, they asked to see an upland buffer around the roost sites. At a later meeting, they requested that the upland buffer language in the objectives and conservation measure be refined to more clearly describe configuration.

b. Response: The conservation working group worked with Gary Ivey to come up with a larger roost site size for preserves in the refuge planning boundary. Bart contributed to this. Later, the upland buffer language in the objectives and conservation measure were refined to more clearly describe the configuration.

c. To do: Nothing further

17. Construction windows:

a. Concerns: SLNWRA said that DWR should look into the feasibility of a requirement that construction must occur during the day only, in the vicinity of crane roost sites, in order to reduce indirect effect to cranes. FWS indicated that we need a defined work window and more details of work windows and operations for Section 7 Consultation.

b. Response: DWR engineers indicated that they cannot commit to this, but that the BDCP can say they will do this "to the extent feasible". We will need to assume

worst case scenario for the effects analysis (i.e., that construction can occur any time of year or day except restrictions on pile driving for fish).

c. To do: Nothing further.

18. "Supercharging":

a. Concerns: SLNWRA suggested looking into feasibility of developing an avoidance and minimization measure that involves agreements with farmers to "supercharge" foraging areas near the construction site whenever there's a potential direct or indirect impact to foraging habitat. They suggested a 1:1 ratio of foraging habitat. This wouldn't have to be a permanent conservation easement – it could be a temporary agreement during construction. However, it could be a permanent easement if the landowner agrees to do this and if it meets the criteria under crane objective 1.1. Supercharged foraging sites should be in place prior to construction, and located outside of the sound buffer.

b. Response: Requirements were written into the crane AMM, developed in coordination with the SLNWR conservation working group, to address this. Supercharging would only need to be 0.1:1 (0.1 acre of supercharged corn is equivalent to an acre of harvested corn, according to Gary). We added a stipulation that supercharged foraging sites must be in place prior to construction, and located outside of the sound buffer.

c. To do: A Consider whether it would be appropriate to develop a strategy for monitoring and adaptive management to be associated with it.

19. Transmission line alignment:

a. Concerns: This issue is a big one for the group, and has come up at nearly every meeting. The group (including the wildlife agencies) expressed concern about transmission lines and likelihood of sandhill crane bird strikes. They want to know the process for determining the final alignment for the powerlines, and how agencies would be involved in the process. They also asked that we differentiate between the different types of lines (69 kV and 230 kV). Bart expressed concern about the tie-in to the east: cranes are using agricultural lands around the dairies in this area, coming from roost sites on the Cosumnes Preserve. They also had questions about subsequent CEQA/NEPA compliance for final siting of the lines.

b. Response: We added language into the crane AMM requiring no net increase in bird strike risk, and requiring that the wildlife agencies sign off on the "no-net increase" determination prior to final line placement. In response to a concern they raised that undergrounding Staten would be all that is needed to meet this requirement and this would not help Stone Lakes, we agreed to have this performance standard

for both the northern and southern zones. We looked into language in the EIR/EIS about subsequent CEQA/NEPA analysis, and there was no requirement specifically for the transmission lines, although we noted that if the final alignment has different impacts than what was analyzed in the document, further CEQA/NEPA review will be required regardless. Gary Ivey looked into the difference between 69 kV and 230 kV lines and concluded that there would be no difference in terms of crane bird strike risk.

c. To do: DWR has asked the utilities to initiate their evaluation of common assumptions necessary for the power flow studies, the first of three studies (per utility) which will be conducted in order to determine the parameters and alignment of transmission and interconnection. DWR will analyze the study results and any environmental impacts of the proposed new transmission in the overall environmental assessment for the BDCP.

20. Bird strike analysis:

    a. Concerns: SLNWRA had concerns that the analysis didn't take sufficient account of strike frequencies for young, inexperienced cranes.

    b. Response: We believe the 60% effectiveness estimate is sufficient to account for this factor, based on the analysis provided by Gary Ivey.

    c. Work left to do: Nothing further.

21. SLNWR ROW across Zacharias Island access:

    a. Concerns: SLNWR expressed concern with a proposed alignment we presented during the optimization exercise that had a spillway on Zacharias Island, because a permanent easement would be needed across the railroad ROW owned by the refuge. Jim Monroe (FWS solicitor) said that it would be very difficult getting a permanent easement across this land. SLNWRA expressed concern that there could be a public access trail along that ROW and so there could be visual and access impacts. Jim Monroe brought up that it might also be a wildlife corridor, and the project would need to consider impacts to the corridor. Jim also brought up that if a Corps permit is needed, it may be difficult to make a LEDPA determination. SLNWR asked more information on the activities that would occur within the ROW, so they can make a consistency determination.

    b. Response: In response to comments during the optimization process, the design was changed to move the spillway off Zacharias Island and instead, the island would have an RTM storage site which would require only a temporary easement. Mike and Bart have been coordinating to get SLNWR the necessary information and on design of the crossing.

c. To do: Mike will continue to coordinate with engineers and SLNWR to resolve issues.

22. RTM toxicity:

    a. Concerns: SLNWR expressed concern about potential toxicity in the RTM. Bart explained that they cannot take on a site for the refuge if there are toxicity problems.

    b. Response: Gordon explained that additives consist of biodegradable polymers, but that a detailed analysis was being prepared with soil samples from geotechnical work in the Delta. The report was subsequently completed and forwarded to the agencies on March 17, 2014. FWS provided comments in an email dated March 19, 2014.

    c. To do: Continue discussions with the wildlife agencies in response to their March 19 comments. This will be done in the context of the TTT meetings.

23. Vineyard/orchard conversion:

    a. Concerns: SLNWR expressed concern about ongoing threats to cranes from conversion to orchards and vineyards. They were also concerned that our habitat maps show areas as habitat that had been converted to orchards or vineyards since the mapping was done.

    b. Response: ICF's GIS staff went through aerials to identify areas that had been converted to orchards and vineyards since the original mapping was done, and adjusted the mapping and crane model accordingly. ICF added to the BDCP document that orchards and vineyards are an ongoing threat to the species, and that rapid loss in the Stone Lakes area is driving the need for conservation in that area.

    c. To do: Nothing further.

24. Indirect effects of vineyards:

    a. Concerns: SLNWR expressed concern that grape farmers farm at night and make a lot of noise. Requested that we add to CM3 that roost sites be sited away from vineyards.

    b. Response: We indicated that we could add some language to CM3 to this effect.

    c. To do: Consider revisions to CM3 language. Revised language would retain flexibility in case the best possible roost location is in the vicinity of a vineyard.

25. Swainson's hawk:

a. Concerns: Concern about indirect effects to Swainson's hawks nesting in riparian along the railroad ROW near the intakes. Concern that impacts to hawks from CM1 would not be mitigated in Stone Lakes area.

b. Response: Added language to the hawk AMM that the near-term measures to reduce hawk impacts (tree planting, early establishment of foraging habitat) would be implemented in the vicinity of impacts.

c. To do: SLNWRA has indicated that they will likely provide further comments on Swainson's hawk in the future, which we will address at that time.

26. Monitoring:

a. Concerns: Bart suggested monitoring cranes within 1/2 mile of construction disturbance. Suggested we develop monitoring and adaptive management program on Stone Lakes National Widllife Refuge – that we fund biologists on the refuge. For bird strike monitoring, SLNWRA suggested using monitors on the transmission lines that register when there's a strike.

b. Response: We have indicated that we will develop monitoring details for the crane. We need to determine the practical reason for monitoring – what useful information would it give us and what would we do in response to the information? We told them that Gary Ivey would prepare a monitoring and adaptive management plan for implementing the crane AMM related to indirect effects. We said that we would look into the transmission line monitors.

c. To do: Discuss the kind of information that should be gleaned from monitoring and how it will be used. Gary Ivey will complete the monitoring and adaptive management plan for the AMM. Coordinate with Gary Ivey regarding monitors on transmission lines that register when there's a strike.

27. Burrowing owl:

a. Concerns: The group expressed that we should address impacts to burrowing owls that would be directly and indirectly affected by the construction. They are concerned that the "passive" relocation techniques aren't entirely effective. We should account for possible unaccounted inadvertent take of owls when one-way doors malfunction. Maybe use more active relocation instead of passive? Stricter avoidance? We shouldn't require one-way doors when any likelihood owls will remain. They want to further review the burrowing owl strategy and provide additional feedback.

b. Response: We told them we would investigate the issues they raised further and look into ways to improve the AMM. We also told them we would send them a compilation of language from the BDCP regarding owls for them to comment on.

c. To do: Investigate the issues they raised further and look into ways to improve the AMM. Send them a compilation of language from the BDCP regarding owls for them to comment.

28. Acquisition for refuge:

a. Concerns: The group expressed concern about lack of assurance that refuges will end up with the lands DWR acquires within the refuge boundary. Bart doesn't want to require that it be part of refuge, because refuges might not end up wanting it (e.g., contaminants issues). They also expressed concern that refuges may not be able to take land that has been acquired through eminent domain.

b. Response: We said that we will work on drafting language in the BDCP to address this.

To do: We will work with Bart and agency legal representatives on language to consider adding to the plan that addresses Stone Lakes concerns related to future acquisition within refuge project boundary. We may also develop criteria for the property prior to refuge acceptance of title and/or management.

EXHIBIT B

Bay Delta Conservation Plan and Peripheral Tunnel Project
Unresolved Issues, Stone Lakes Working Group
Friends of Stone Lakes NWR
May 30, 2014

The following is a brief synopsis of the unresolved issues for the Stone Lakes Working Group from the perspective of the Friends of Stone Lakes NWR. We have referenced the numbered summary of issues raised and discussed by the Stone Lakes Working Group prepared by Consultants ICF and dated April 22 2014. The statements below represent the position of the Friends of Stone Lakes NWR only.

1. Location of Forebay Facilities within Refuge Boundary

Background: The forebay and tunnel entrance for the conveyance facility were originally planned to be located just west of South Stone Lake. The location would eliminate several hundred acres of good waterfowl foraging area and have visual and other impacts on the refuge, hunting activities and wildlife. DWR, recognizing our concerns, design/cost issues, and other's concerns, significantly reduced the size of the forebay (750 to 40 acres) and relocated the forebay and tunnel entrance to just north of Twin Cities Road, an area predominantly planted in grapes. The impacts on foraging area and on refuge managed lands were reduced.

Reference: Items 1, 11, 26 and 28 of Stone Lakes Working Group Summary

Impacts: The facility is not a use consistent with the objectives of the refuge. Tunnel muck material is planned for storage on Zacharias Island, a key habitat within the Refuge boundary. The location of the facility within the legislative boundary may impact the ability of the FWS to complete the refuge. Tunnel muck will need to be conveyed across the railroad levee property owned by the Refuge. The EIR/S evaluates tunnel muck as if it will be permanently stored on site, but DWR anticipates there will be economic uses that will allow for reuse and removal of the material.

The forebay and tunnel entrances are an intrusion in the rural character of land within the Stone Lakes NWR boundary. The design of the forebay and tunnel entrances is not complete. The facility could have visual, noise and lighting impacts on the surrounding area.

Mitigation: To compensate for the location of the forebay and related facilities within the Refuge boundary and project impacts on the ability of the Refuge to carry out its Comprehensive Conservation Plan, DWR has proposed to the Working Group that Zacharias Island would be acquired as part of the project and ultimately protected and managed as part of the refuge for wildlife habitat.

Outstanding Issues: The details of how access to Zacharias Island will be provided across Refuge owned property have yet to be worked out. The greater concern, however,

is the lack of assurances that Zacharias Island ownership and management will ultimately be incorporated into the Refuge as mitigation for project impacts. We also want mitigation to include visual screening with native landscaping to reduce the visual, noise and glare impacts of the facility.

Position: There need to be commitments/assurances in the plan or the EIR/S that Zacharias Island will be acquired as part of the project, habitat restored after project construction is finished, and the property turned over to the USFWS or appropriate entity for management. The plan needs to specify that forebay and tunnel entrance facilities will be visually screened with appropriate native vegetation. Also, plans on managing the spillway in a wildlife friendly manner should be included. We are also concerned about rodent control activities and would like to see methods that will not expose hawks, and other predators to poisons.

2. Adequacy of Habitat Conservation Measures and Mitigation for Listed Species

Background: The BDCP is not just a plan to build a huge tunnel. It also is a plan to restore habitat and provide an aquatic environment that improves conditions for endangered fish species. Many of the same actions that the BDCP claims will benefit fish also destroy terrestrial wildlife habitat. The plan identifies goals, objectives and measures to compensate for the loss of terrestrial species of concern within the Delta associated with implementation of the BDCP. These include, among other species, the greater sandhill crane (gsc), lesser sandhill crane, western burrowing owl, Swainson's hawk and tri-colored blackbird. The primary focus of the Stone Lakes Working Group has been on gsc. We have had some discussion on western burrowing owl and Swainson's hawk but these have been not been concluded.

Reference: Items 6, 25 and 27 of Stone Lakes Working Group summary

Mitigation: A major commitment emerging from the Working Group discussions is the creation of a new wetland roosting area between Stone Lakes and the Cosumnes Preserve. This would enhance public resources spent to create roosting and foraging habitat for migratory species in southwest Sacramento County.

Outstanding Issues: We still have concerns about gsc impacts, as well as the adequacy of Swainson's hawk and burrowing owl conservation strategies. The loss of riparian hawk nesting habitat at the intakes will be very significant. Language has been added to require tree planting and foraging habitat mitigation to occur in the vicinity of the impacts, but we have yet to discuss the details of these changes. There remains a question as to whether indirect impacts on hawks have been adequately mitigated. With respect to the burrowing owl, we have raised concerns about the BDCP's reliance on passive relocation techniques as ineffective. The plan states that grasslands will be restored and preserved, but it does not adequately address how these grasslands will be restored and managed. A plan to reintroduce and establish fossorial mammals to the grassland habitats

Comment [RMS1]: [MB] Added vegetated screen around the forebay into draft MOA with USFWS, which will increase the width of existing riparian.

Comment [ANS2]: I think we already have this. See Chapter 17, Mitigation Measures AES-1b and AES-1g.

Comment [RMS3]: [MB] Can put language in the MOA for "first right of refusal" for Zacharias. Can add language in CM11 to prioritize CM1 lands within the planning boundary for refuge acquisition when construction and restoration is complete.

Comment [RMS4]: Already included, see Section 3.4.11.2.7 which reads: *An emergency spillway will be constructed in association with the intermediate forebay on the Glannvale tract. This spillway will prevent the intermediate forebay from overtopping by spilling into the approximately 125-acre inundation area. This area will only be flooded under emergency conditions, which are expected to be seldom if ever. Therefore, the basin will be cultivated and managed to provide roosting and foraging habitat for greater sandhill crane as described below in Enhancement and Management Guidelines and Techniques, Timing and Flooding for Sandhill Crane. Providing crane habitat in this area will not count toward the habitat targets under Objectives GSHC1.1 through GSHC1.5, because perpetual conservation cannot be guaranteed, as the spillway will be needed to prevent forebay overtopping in emergency situations. Rather, this additional greater sandhill crane habitat to be provided in the spillway will be above and beyond the minimum habitat requirements stipulated in the biological objectives for the crane.*

Comment [RMS5]: See *Ground Dwelling Mammals* portion of Section 3.4.11.2.6 which includes the following statement: *… some rodent control measures will likely remain necessary in certain areas where dense rodent populations may compromise important infrastructure (e.g., pond berms, road embankments, railroad beds, levees, dam faces). The use of rodenticides or other rodent control measures will be prohibited in reserves except as necessary to address adverse impacts on essential structures in or immediately adjacent to reserves, including recreational facilities incorporated into the reserve system.*

Comment [RMS6]: Details provided in AMM18, Section 3.C.2.18.2.2 Tree Replacement with Mature Trees.

Comment [RMS7]: Will address refuge concerns about the hawk through the TTT.

Comment [RMS8]: [MB] We will work through the TTT to address this concern.

Comment [RMS9]: BDCP Section 3.4.8 details Grassland Restoration actions; Section 3.4.2 details siting and design criteria for grassland protection and restoration; and Section 3.4.1l details management and enhancement actions to be performed on protected grasslands.

as well as managing them as short grass habitat would increase the likelihood of developing successful burrowing owl colonies.

Position: We hope to address these remaining concerns before the working group meetings conclude. In addition, there remain several follow-up commitments from DWR/ICF stemming from the Stone Lakes Working Group discussions regarding specific language in the Conservation Measures for listed species. We want a report back on the disposition of these items at a subsequent meeting after the comment period has concluded.

3. Construction Impacts on Wildlife

Background. This has been a major discussion topic for the Working Group. The project now includes strengthened mitigation measures and provides for advance creation of supercharged foraging areas for gsc.

Reference: Items 6, 10 and 18 of Stone Lakes Working Group Summary

Impacts: Stone Lakes Working Group focus has been on gsc impacts. Construction noise, particularly the pile driver at the intake construction site, will be significant. Lighting and traffic are additional impacts. See Item 10 reference above for more information.

Mitigation: Mitigation takes two forms: Avoidance and Mitigation Measures (AMM's) that are part of the BDCP plan and creation of "supercharged" alternative foraging sites. The AMMs focus on how construction will adapt to minimize impacts. The second type of mitigation is specific to gsc and represents an attempt to provide alternative foraging opportunities ("supercharging") in advance of construction to provide close by option for cranes disrupted by construction activity.

Outstanding Issues. With respect to the AMMs, we have asked for narrower construction windows and to minimize crane impacts, but DWR does not want to further limit construction flexibility. The Avoidance and Mitigation Measures are squishy—lots of "if feasible" language. The mitigation for the construction impacts is incorporated into the AMM"s of the plan—not specifically as mitigation measures of the EIS. We think the mitigation will be stronger if it is included in both the Plan and the EIS.

We still have some questions regarding Attachment 5JD to the plan "Indirect Effects of construction of the BDCP Conveyance Facility on Sandhill Crane". We need to try to address these questions at our next meeting. Regarding the "supercharged" advance-mitigation foraging sites, we still have questions about the specificity of the timing requirements. We hope to pin down timing in subsequent discussion.

Position: We believe that mitigation measures that include "if feasible" language are unenforceable and inadequate. We also request that AMMs listed in the BDCP also be

Comment [RMS10]: Cannot commit to relocating ground squirrels in cultivated lands, but can add language to consider this option in grasslands when and where natural recruitment is unlikely due to low connectivity.

Comment [RMS11]: Remaining issues will be addressed through the TTT.

Comment [RMS12]: We are carefully tracking all ICF tasks and will implement as described in response documents.

Comment [RMS13]: We will release a tracked changes version of the crane, hawk, and owl conservation strategy and effects analysis to the TTT and that can then be shared with the Friends of SLNWR.

Comment [RMS14]: "To the extent practicable" language is associated with construction actions and schedule commitments to which DWR engineers could not fully commit. This is one of the reasons that temporary replacement of foraging and roosting habitat was created. In some cases, additional measures are provided if the measure is not "practicable".

AMMs will not be carried forward as mitigation measures. They are considered part of the plan and not mitigation.

Comment [RMS15]: Remaining questions are compounded noise impacts and vibration, any others? These issues will continue to be worked on through the TTT.

identified as mitigation measures in the environmental document. We will continue to press the need for clear and detailed language on how and when "supercharged" sites will be created and a monitoring and adaptive management plan prior to commencement of construction. We remain concerned about the separation of pile driver and other construction noise impacts in the analysis of noise impacts on sandhill cranes and other species in BDCP Appendix 5JD.

Comment [RMS16]: How soon before construction should the sites be established? This will be addressed through the TTT.

Comment [RMS17]: We are looking into this concern and will address it through the TTT.

4. Truck traffic on Hood Franklin, Lambert and Twin Cities Roads

Background: This impact has only been discussed in passing with the working group in the context of impacts on roosting cranes near Hood Franklin Road.

Reference: Items 4 and 10 of Stone Lakes Working Group Summary

Impacts: The traffic analysis for the project predicts that during the peak month of construction traffic will increase on Hood Franklin Rd past the Refuge hq by over 900 trips per hour between 6 am and 6 pm. The trips are primarily truck trips. This represents an average of 15 one-way truck trips per minute all day long. The analysis notes that this is below Service level C, which represents the threshold level of significance. The increase in traffic along Lambert Rd is slightly more, about 950 trips per hour. The truck traffic increase on the River Road near the Refuge will be between 750 t0 900 trips per hour. Traffic along Twin Cities Road will increase much less significantly, on the order of 180 to 200 trips per hour. Predicted truck traffic levels on two-lane Lambert and Hood Franklins is likely to be roughly equivalent to traffic on four lane Interstate 5 during high truck traffic periods along the interstate.

We note however: the study does acknowledge that the assumptions used in the traffic study were conservative—they represent a worst case scenario. Nevertheless, the purpose and intent of the EIS process is to mitigate for the worst case scenario.

The length of time that these peak volumes will last is unclear from reading the document. The information may be there but it is hard to ferret out. The traffic likely consists largely of dredged and excavated material from the intake construction sites. It could very well be that high traffic levels will last from 1 ½ to 2 years, possibly longer. The tunnel digging operation will not contribute significantly to the ongoing traffic increases since material will be transferred to the nearby storage areas by conveyor belt.

We have as yet not found specific acknowledgment of the traffic impacts in other chapters of the EIS. There is only general reference to the impacts of traffic on recreation. Modeling for noise level impacts presumably took traffic volumes in the traffic study into account.

The impact to wildlife of increased truck traffic on Lambert and Hood Franklin road is not acknowledged specifically (that we have found so far). Foraging and roosting birds will likely adjust to the traffic as they do for traffic along Interstate 5. The increased truck traffic will enhance the barrier effect of the roads through the refuge and will likely

increase mortality for various species that are particularly active early and late in the day, including snakes, turtles, river otters, coyotes, mink, rabbits. Also truck traffic will increase as a result of maintenance activities at the three intakes. Although some of the activities will be done in the river itself, there will be an increase in vehicular traffic for operations and maintenance that has not been addressed..

We think that the high level of truck traffic will significantly interfere with the visitor's experience at the Blue Heron Trails area. Hunter experiences at Sun River will also be impacted. The aesthetics of visiting the refuge will be impacted both visually and audibly. There is a reasonable expectation that some truck drivers will turn into the Refuge parking area to use what will likely be the most convenient restroom facilities on the haul route. There will also be increased safety risks for staff,volunteers, school buses and visitors entering and leaving the Refuge.

Mitigation: The EIR/S proposes as mitigation measures traffic mgmt plans that appear to be applicable only where LOS C is exceeded. No specific mitigation has been discussed with the Working Group.

Position: The EIR/S is deficient in looking at truck traffic levels primarily as a LOS issue. Guidance on LOS not being the only metric is being developed at the state level by the Office of Planning and Research that may be helpful on this point. We want to know the extent and duration of increased truck traffic on key roads through the Refuge boundary. We want a discussion on the impacts of truck traffic on refuge operations and visitor experience. We recommend considering wildlife corridor construction as a mitigation measure. We recommend funding or contributing to funding of native screen tree planting along Hood Franklin Road opposite Blue Heron Trails, construction of an additional trail south of Blue Heron Trails and farther from the noise impacts of the road, and construction of a safer access point to the Sun River recreation site as mitigation measures to reduce truck traffic impacts on the Refuge.

Comment [ANS18]: The extent of increased traffic on these segments is reported in Table 19-25.

Second, in addition to LOS, effects were reviewed from the perspective of pavement conditions, safety hazards, and effects on other modes including marine traffic, rail traffic, transit service, and bicycle routes.

Regarding the proposed mitigation measures, this is something that DWR would have to consider.

5. Impacts of Power Transmission Lines

Background: Information regarding the location and sizing of power transmission lines has evolved slowly. The current plan is for a permanent 230 kv line that would bring power along Lambert Road from a tie-in east of Interstate 5 to a substation somewhere west of the railroad levee/borrow pit west of South Stone Lake. Temporary (10 or so years) 69 kv lines would run north from the substation to supply power to the intake construction sights.

Reference: Items 8, 19 and 20 of Stone Lakes Working Group Summary

Impacts: The primary wildlife impact of the transmission lines will be bird strikes. Gary Ivey has done an analysis of bird strike risks and concluded that greater sandhill cranes are the only species of concern that will be exposed to significant bird strike risk. He has quantified the loss of gsc to bird strikes on project transmission lines. There are also

visual impacts and construction impacts associated with power lines, but these have not been a focus of discussion with the Working Group.

Comment [ANS19]: These have been assessed in the EIR/EIS (Chapter 17 for visual, Chapter 22 for air quality, Chapter 23 for noise).

Mitigation: The BDCP proposed to put bird diverters on new and existing power lines and to eliminate some power lines in high risk areas (primarily around Staten Island) to mitigate for gsc take.

Outstanding Issues: Stone Lakes Friends' concern is that the mitigation for cranes bird strikes will occur outside of the Stone Lakes area where most of the impact will occur. Stone Lakes' population of gsc is smaller, more recently established, and more vulnerable to disruptive impacts. We also believe that other birds besides cranes will die as a result of the new transmission lines.

Comment [RMS20]: AMM20 will be modified to make sure performance standard is met in Stone Lakes area as well as on Staten Island.

Comment [RMS21]: Bird strike analysis concluded strike potential was not significant for any other covered species.

More importantly, we have argued that the transmission line alignment selection process is inadequate and has not yet evaluated colocation and/or undergrounding of power lines. The evaluation of transmission lines by the three potential power suppliers (SMUD, PGE and WAPA) has just begun and substantial changes in alignment and design are possible. It is uncertain whether additional environmental analysis will be required.

Position: We continue to stress the significance of new major power lines as incompatible use in and around a NWR. We believe that bird diverters alone are not adequate mitigation and that other birds besides gsc will also be impacted. We advocate that the EIR/S not be approved until utilities that will be providing power to the project have prepared alternative alignment studies and evaluated their comparable impacts.

Comment [RMS22]: AMM20 allows for a number of minimization and mitigation measures to meet the performance standard, including removal of existing lines and undergrounding. Regarding powerline process, that will be a DWR decision.

6. Mitigation is Limited to the Bay Delta Legislative Boundary

Background: From the start of their process the BDCP planning team has limited consideration of impacts to the legislative boundary of the Delta, which is the boundary of the BDCP. However, this HCP includes major infrastructure projects at the edge of—and, in the case of the power transmission lines—outside of the plan area. The peripheral tunnel will have spillover impacts outside of its planning area.

Reference: Items 5 and 7 of Stone Lakes Working Group Summary

Outstanding Issues: the Stone Lake Friends have argued that the impacts of the peripheral tunnel (CM-1) are concentrated at the northwest corner of the Delta around the Refuge and that mitigation needs to be proportionately located near the Refuge. We have also argued that the acquisition of fee/easement habitat to mitigate for the BDCP is in direct competition with the South Sac HCP, that both plans should be designed to work in concert, and that both plans would benefit by greater flexibility in protecting land outside the Delta boundary. We have gained some commitment to additional habitat protection in the Stone Lakes area but DWR is unwilling to consider any allowance of mitigation outside the Delta boundary.

Position: We continue to argue that the power line transmission component of CM-1 is outside the Delta Boundary and that either the plan area should be expanded or mitigation should be allowed outside the boundary, at a minimum for any impacts attributable to the transmission line corridor.

Comment [RMS23]: We do not know the exact location of powerlines and therefore cannot determine where an expansion would be. However, impacts will be addressed, whether in the BDCP or in a separate environmental document.

7. Monitoring and Implementation Follow Through

Background: The BDCP is a very complicated document with many thousands of acres of habitat being converted to other uses and then other lands protected and changed to allegedly meet a wide variety of species habitat requirements. We have not discussed or examined the details of implementation and monitoring, yet this remains a potential critical weak link in the BDCP.

Comment [RMS24]: Will be addressed through the TTT.

Reference: Item 26 of Stone Lakes Working Group Summary.

Impacts: Not relevant

Outstanding issues: Availability of funding to implement the plan is a critical weak link in the whole scheme. While the multi-billion dollar tunnel project will be funded by the water contractors with revenue bonds that don't require voter approval, the multi-billion dollar habitat component of the plan will require voter approval and other state and federal funding allocations that are highly uncertain. It is reasonable to expect that plan approving agencies (DFW and USFWS) will not have the political will to halt the tunnel construction and operation even if habitat measures are not adequately funded.

Comment [RMS25]: Table 8-41 details the percent of restoration funding that will come from water contractors. The conservation contribution of NCCPs is typically funded by state and federal dollars.

Implementation monitoring is proposed to be a multi-level process that will undoubtedly get bogged down in bureaucracy. The contracting agencies will have a major role in monitoring. The overall effectiveness of monitoring is questionable.

With respect to wildlife impact monitoring, Refuge staff have suggested that local managing agencies, where appropriate, be given specific wildlife monitoring responsibilities and funding.

Position: As previously mentioned, we will recommend that all AMMs that address CM1 impacts be included also as mitigation measures. We also recommend that it be clear that funding of AMM's and their monitoring will be by the water contractors. We advocate that the Refuge (and other wildlife management entities in the Delta) be given specific monitoring responsibilities and funding to undertake them.

Comment [RMS26]: AMMs are considered part of the plan and will not be included as mitigation measures in the EIR/EIS.

Comment [RMS27]: See Table 8-41.

Comment [RMS28]: BDCP monitoring framework will identify existing monitoring programs with whom BDCP can partner, and possibly fund, to perform BDCP compliance, effectiveness, and research-related monitoring. As monitoring relates specifically to the refuge, that conversation will continue with the TTT as monitoring and adaptive management are discussed.

8. Other Issues of Concern:

Background: We have discussed a number of other issues during the course of the Stone Lakes Working Group meetings that DWR/ICF has committed to explore further. These include the suggestion that the borrow/spoil site be converted to foraging or roosting habitat after its use (Issue 2), Overlap of the Restoration Opportunity Area for creating

tidal wetlands with the Zacharias Island property (Issue 3), and additional provisions for locating new roosting sites away from incompatible activities associated with vineyards (Issue 24).

We have yet to discuss groundwater impacts, and these remain a concern: maximum impacts are stated as -40 foot elevation change (Mr. Centerwall). The impacts are concentrated around the intakes, and will likely impact SP Cut Waterway. Although impacts to wells are addressed, impacts to the level of water in SP Cut and Refuge wetlands, are not addressed in the document. Pumping structures that are within the zone of impact include: Lewis Tract, North Irrigated Pasture, South Irrigated Pasture, and possibly BLMB. Are there no dewatering impacts associated with the construction of the forebay?

Finally, we would like to see an evaluation of air quality, water quality and water availability impacts associated with concrete batch plants at intake locations and on Twin Cities and I-5.

Reference: Items 2, 3 and 24 of Stone Lakes Working Group Summary

Position: We don't want to leave these issues hanging before completion of the working group's effort.

Comment [RMS29]: As mentioned above, will add language to CM11 to prioritize CM1-related lands within the Stone Lakes boundary for restoration and then transfer to Stone Lakes for management.

Comment [RMS30]: We have committed to adding this language to CM3.

Comment [ANS31]: Will work with DWR to better understand the need to address this issue.

Comment [ANS32]: Concrete batch plants are included in the air quality evaluation, but are not broken out as specific effects from each individual facility.

Water quality impacts resulting from construction related activities, including concrete batch plants, are described in Chapter 8 (Impact WQ-31).

Water availability impacts were assessed in Chapter 20 (Impact UT-4).

EXHIBIT C

SLNWR June 2014 Technical Workgroup Meeting Agenda
June 5, 9:00-12:00
ICF Offices (630 K Street), 2nd floor conference rooms (Rainier and Lassen)
Call in: 1-877-423-6338 Passcode: 761845#

1. Introductions
2. Review responses to "Unresolved Issues" document
3. Discuss approach for addressing hydrological impacts
4. Discuss approach for addressing Swainson's Hawk and Western Burrowing Owl comments
5. Status of Changes to GSC Conservation Strategy and Impacts
6. Need for and timing of additional meetings

Attendees:
Ellen Berryman (ICF), Rachel Gardiner (ICF), Michael Rushton (ICF), Laura Cholodenko (CDFW), Ann Stine (USBR), Erin Aquino-Carhart (CDFW), Randi Logsdon (CDFW), Sean Wirth (SOC), James Monroe (USFWS), Osha Meserve (Friends of SL), Beatrix Treiterer (USFWS), Bart McDermott (USFWS), Robert Burness (Friends of Stone Lakes), Scott Finley (Friends of Stone Lakes), Sean Wirth (Sierra Club/ECOS/SOSC), Jim Pachl (Friends of Swainson's hawk), Jude Lamare (Frineds of the Swainson's hawk), Mike Bradbury (DWR), Osha Meserve (Friends of Stone Lakes), Lori Rinek (USFWS), Rebecca Sloan (ICF)

Notes
1. Stone Lakes MOA: If the project is found to be "compatible", then we can move forward with the MOA process. If incompatibility is found, then the compatibility decision goes to the regional director.
2. Rob Burness: Forebay was going to be 40 feet height, 2:1 slopes, surrounded by a spillway with a 6 foot berm. We don't know exactly what facilities will be within or outside the berm. We don't have the project detail to understand what impacts there will be. Mike: Muck will come out at the forebay. OSHA: AES-1b and AES-1g do not address the specific concern, which is the visual character of the permanent structures, particularly the forebay; it's tall. Rob: We don't know what material the forebay will be made of, will it be vegetated? Mike: We understand the need for screening and will look into adding language to the EIR/EIS. Rob: Would be good to include the requirement for a visual screening plan to be reviewed by the Wildlife Agency and Stone Lakes staff. Also, there is nothing in the Plan that indicates Zacharias will be acquired into the refuge and that was part of the benefit of placing the RTM on Zacharias. Mike: Zacharias owners are not willing to wait for BDCP to sell the property. Lori: We would like to see something in the EIR/EIS and the BDCP to require screening for both the cranes and Stone Lakes visitors. Follow up: Consider adding language requiring a vegetative screen to both the plan and the EIR/EIS.

3. Osha: We would like to see language before MOA. Rebecca: We will add language to CM3 noting that CM-1 related lands within the Planning Boundary that will be restored will be prioritized for acquisition in the refuge. Jim Monroe: MOA has to be a "special condition", it's outside the scope of the permit. You will want to have a commitment in the HCP. Including it as a mitigation measure would be the easiest way to include the commitment. Follow up: Follow up with Jim to better understand what we will need to include in the plan to make this commitment.
4. Beatrix: Is there language that stipulates that label instructions for rodenticides must be followed? Erin: Yes, it is used throughout the document.
5. Sean: Best to use the spillway for just foraging and should be some consideration for shooing the crane. Follow up: Remove roosting language from spillway use section.
6. Jude: I wonder if the indirect effects concerns related to the hawk have to do with the large loss of hawk habitat to tidal restoration. Rebecca: Those are direct effects. It's true, most of the hawk habitat loss is due to the conversion of cultivated lands to tidal restoration. That is why cultivated land conservation is such a major component of the hawk conservation strategy.
7. OSHA: There were supposed to be a couple of draft easements attached to the IA, has anyone seen them? Ellen: The ag land easement is "tricky" but natural lands is straight forward. There is a lot specific requirements in the BDCP for cultivated lands. Osha: There is some misunderstanding regarding what is included in the easement, we would like to have input on the templates. Jim: The Service templates might be a good place to start. The service standard agreement does not include covenants. Service documents are a pure easement setting forth "rights". Management plans can be incorporated into easements. Encourage property owners to engage in wildlife-friendly practices. Suggested they talk to San Joaquin JPA. Lori: CDFW and the service will follow up with Ellen regarding easements.
8. Randi: Is "if practicable" defined? Lori: Looking into what was done for DRECP, they apparently defined this statement and provided alternative options if any one action was determined not practicable. Randi: Direction of the DRECP was to require agency approval in the "determination" of "not practicable". Follow up: We will need to work on defining this and any additional requirements if an action is found not "practicable" through the TTT. Jim: Practicability, as defined by the Corps, is typically related to cost, logistics, and technology. Corps says practicability will be determined by the agency and their ability to pay. Should be defined, perhaps in the IA. Lori: need to define "if feasible" as well. Osha: For CEQA there is a definition for feasibility, but that likely doesn't apply to the plan. Jim: "if practicable" comes from the statute but it is not defined. Osha: When minimization measure states "if practicable" how does the CEQA document handle that? Does it assume they are commitments? Osha: We are also concerned about implementation, for the EIR/EIS there is a MMP. For the plan, there is no commensurate document that allows tracking of AMM implementation. Follow up: Coordinate with Chris Earle on compliance monitoring tracking/reporting. What will this process be? Can we add language to make it clear how the public will be able to track implementation of AMMs? Potentially expanding section 6.3 to refer to the AMMs. Osha: Section 6.3 could be expanded to specifically refer to the AMMs.
9. Osha: The indirect effects analysis doesn't include construction-related noise, such as batch plant noise and back-up beepers. Find out from Scott Fleury what track noise was included, were beepers included? Make sure noise analysis also included traffic through the refuge. Also concerned about pile driving and construction noise combined. Follow up: We will address this issue through the TTT. How was the noise

appendix cross referenced with the phasing, how long will the noise be an impact at the intakes? EIR/EIS does not make clear the duration of the noise impact. Follow up: Look into adding language on duration of noise in EIR/EIS and BDCP. Will the intakes be constructed all at one time or phased? Osha: Make sure noise impacts in 5J.D include the traffic noise driving through the refuge.

10. Regarding "supercharging" timing, this has been discussed in prior meetings. Follow up: Insert language that requires the sites be established one season prior to construction. What about two seasons? Follow up: Discuss this with TTT.
11. Osha: What is the level of traffic through the refuge? We were trying to understand how many trucks per hour. EIR/EIS shows an increase of 900 trucks per hour on Hood/Franklin road for "peak month". Rob: It's not clear if it's just one or two months, or if it will be ongoing for years. It is a significant impact, especially if it will be going on for years. The EIR/EIS analysis needs to detail the duration of the impact. Bea: Was maintenance traffic addressed in the EIR/EIS? Rob: Assume DWR will provide funds for road maintenance, etc. Osha: Most of the details are deferred to a traffic management plan. Follow up: Check on traffic numbers for Hood/Franklin road and look into adding language that better describes duration/frequency of the increased traffic. Mike: Not even sure what activity is generating this traffic. Rob: Concerned about significant traffic impacts on recreation, especially on Blue Heron Trail and to Sun River area access. We have to use the EIR/EIS analysis and it is so conservative that is hard to understand exactly what will happen.
12. Osha: What is status of transmission line discussions? Mike: White paper that evaluates pros versus cons regarding undergrounding and alignment was released and will be distributed to the Friends of Stone Lakes. We are still in the "impact study" phase for providing transmission. Scott: Can you provide more information on status of transmission provider discussions? Mike: Companies are currently performing impact study which will take about 6 moths. There will be additional environmental review for the final transmission line alignment. Osha: How do we provide take coverage for transmission lines when the alignment isn't finalized. Erin: We have the "no net loss" AMM to address this concern. Bea: Can we make the same statement about traffic, is it a worse-case scenario? Rachel: It's not clear. The traffic numbers are very high. We'll need to look into it.
13. Sean: When looking at effects of traffic, consider loss of bicycle riding and the resulting increase in air pollutants as a result. Roads are not designed for heavy truck traffic. There is no shoulder for pedestrians or bicyclists. Truck drivers will overwhelm the one Refuge bathroom on this road. Follow up: Forward bicycling and traffic comments to EIR/EIS team. Rob: Traffic mitigation needs to be looked at more carefully. How will increased traffic affect the local community?
14. Jude: My understanding is that the frequency of monitoring for large bird carcasses is lower so not as costly. Gary: Most of the strikes are at night and the carcasses disappear very quickly and based on experience have found monitoring for carcasses is not effective. Have experience trying to find radio tagged birds that were lost to coyotes and there was no evidence found of those birds. The method we use to estimate loss from bird strike is based on crane densities, and (Gary) considers it a good method. Model will be updated with recent population data from monitoring. Osha: How do we monitor the long-term effectiveness of "no net loss"?
15. Lori, follow up: We need to make sure the plan includes detail on how compliance and effectiveness monitoring will be tracked. Osha: Because there are two offices, one for construction and one for restoration, there are concerns that some measures will get overlooked.

16. Rob: What is the expectation that the contractors will pay for conservation? Jim: Concerned that mitigation/conservation will happen far after the impact. Jim: There is currently a placeholder in the recently-drafted IA for funding. Rebecca: Table 8-41 provides the current thinking on contractor cost share.
17. Osha: There is no dewatering described for the tunnel. Mike: The tunnel does not need to be dewatered. Bea: The concern is in the northern portion of the refuge, we've noticed that the wetlands won't hold water when the ground water table is low, until the water table fills. So if BDCP lowers groundwater table levels, could affect refuge ability to fill their wetlands. Rob: Mitigation measure mentions ag and urban use, but not refuge. Might at the least consider requiring the replacement of pumps if the well drops below the pump's elevation? Follow up: Forward comment to EIR/EIS team.
18. Rob: Would like DWR to consider a meeting down the road to check in after tracked changes version is released.

<u>Follow Up</u>

1. Consider adding language requiring a vegetative screen to both the plan and the EIR/EIS.
2. Contact Jim to better understand what we will need to include in the plan to make a commitment to transfer any conservation lands within the Stone Lakes planning boundary to the refuge.
3. Remove roosting language from spillway use section.
4. Lori: CDFW and the service will follow up with Ellen regarding easements.
5. We will need to work on defining "if practicable" through the TTT. Will need to also identify additional requirements if an action is found not "practicable".
6. Coordinate with Chris Earle on compliance monitoring tracking/reporting. We need to make sure the plan includes detail on how compliance and effectiveness monitoring will be tracked.
7. We will address noise analysis concerns (compounding construction/pile driving noises; ensuring all traffic noise was included) through the TTT.
8. Look into adding language on duration of noise in EIR/EIS and BDCP. Will the intakes be constructed all at one time or phased?
9. Insert language that requires the sites be established one season prior to construction.
10. Check on traffic numbers for Hood/Franklin road and look into adding language that better describes duration/frequency of the increased traffic.
11. Forward bicycling and traffic comments to EIR/EIS team.
12. Forward comments and concerns about well water levels dropping in response to dewatering to EIR/EIS team.

EXHIBIT D

Table of Remaining Crane Tasks by ICF 4/22/14

Language	Comments and response	Status
Objective GSHC1.5: Create an additional 95 acres of roosting habitat within 2 miles of existing permanent roost sites. The habitat will consist of active cornfields that are flooded following harvest to support roosting cranes and that provide highest-value foraging habitat. Individual fields will be at least 40 acres and can shift locations throughout the Greater Sandhill Crane Winter Use Area, but will be sited with consideration of the location of roosting habitat loss and will be in place prior to roosting habitat loss.	RE 2 miles: 1 mile would be better. And there should be a minimum one-year overlap, i.e. new roost area should be in place 1 year before loss of existing roost area. [eb] will discuss this modification with the TTT RE active cornfields: What is definition of "active cornfield. Cranes utilize cornfields harvested for grain, but there is little left for cranes in silage fields. [eb] this level of detail will be developed in CM11	
Objective GSHC1.2 Rationale: Achieving this objective will enhance or create foraging habitat by requiring that 10% of the lands protected under GSHC1.1 be converted from an initial low- or no-value crop type to a high- or very high-value crop type (**Error! Reference source not found.**). Requiring that 10% (730 acres) of the crane reserves be created or enhanced by converting unsuitable crops to high-value crops will help to redress the past conversion from high-value to low-value crop types. The strategy involves targeting lands least vulnerable to sea level rise in Conservation Zones 3, 4, 5, and/or 6, which are zones in the Plan Area that are include the Winter Use Area and do not include the lands most vulnerable to sea level rise. Sea level rise and local seasonal flood events will be considered when identifying siting conservation lands because crane foraging habitat is likely to become unsuitable at lower elevations with sea level rise as these areas become flooded due to sea level rise. Additionally, crane habitat may periodically become unsuitable as a result of large flood events (100 year events) within river floodplains.	Does this really accomplish anything when so much conversion is occurring? In the end, is not the goal to have the greatest number of acres of high value habitat in proximity to roosting? Has anyone analyzed if using the additional expense for re-conversion would be better spent acquiring more land to begin with? What is gained if a lot of money is spent to re-convert when perfectly suitable high quality habitat is simultaneously being converted by others to vineyards? Vineyards and orchards should be purchased and re-converted when no other suitable acres are available. [eb] will discuss with TTT SLNWRA added "100 year events". I questioned whether this was what we were going for.	See notes from 4/22/2014 meeting
Objective GSHC1.5 Rationale: This objective addresses the loss	It also equally important to allow cranes a second opportunity to feed on the same land as fossorial prey are flushed out because of the	

from covered activities of winter-flooded corn fields that serve as both roosting habitat and highest-value foraging habitat within the Greater Sandhill Crane Winter Use Area. This type of crane roosting habitat is usually temporary as a result of seasonal changes in farm practices, crop rotational changes, or other management. This habitat type supplements the more static managed wetlands that serve as the primary roosting areas for cranes. These temporary roosting/foraging habitats allow cranes to vary their seasonal movement patterns and spread out into otherwise underused areas of the Delta; it also would help reduce excessively dense roosting concentrations. Objective GSHC1.5 is designed to provide similar function by allowing fields to rotate through the crane use area within protected cultivated lands. This will serve as a secondary source of high-value crane roosting/foraging habitat and provide a dynamic element to the crane conservation program. This objective is intended to offset loss of crane roosting habitat, and the compensatory roosting habitat will be in place prior to loss of roosting habitat as a result of water conveyance facility construction.	flooding. In general, the prey base is ignored in this analysis and the primary production is overemphasized. [eb] These sections are just providing rationale for the objectives. Detail about prey base and land management will be provided in CM11, although this detail has not yet been fully developed.	
Greater sandhill crane roosting habitat management. Wetland roosts for greater sandhill crane will be managed as follows. Water depth will be maintained throughout the winter season at an average depth of 10 centimeters, but should range across the roost site between 5 and 10 centimeters (Ivey et al. in prep.). Flood-up of roosts will begin by September 1 and drawdown will begin no earlier than March 15.	The cranes are arriving increasingly early – August 7th this year. Some adaptive management should be employed here to accommodate earlier arrival times if the trend continues. [eb] will discuss with crane experts MB: The early arrival was a single event thus far, and should not influence the definition of the normal winter season. If in the future the normal winter season changes, adaptive management will be used to adjust.	
Alfalfa, irrigated pasture, wheat	New data indicate that GSHC rarely use alfalfa (Ivey, pers. Comm.)Recommend moving alfalfa to Medium category. Why was dry pasture of a minimum size not included? [eb] consulting with species experts.	See 4/22/2014 meeting notes

Other irrigated crops, idle cropland, blueberries, asparagus, clover, cropped within the last 3 years, grain sorghum, green beans, miscellaneous truck, miscellaneous field, new lands being prepped for crop production, nonirrigated mixed pasture, nonirrigated native pasture, onions, garlic, peppers, potatoes, safflower, sudan, sugar beets, tomatoes (processing), melons squash and cucumbers all types, artichokes, beans (dry)	What is the difference between native pasture and grassland? [eb] good question. We never got a satisfactory answer to this from SAIC. It may be worth re-evaluating this classification as it relates to crane.	See 4/22/2014 meeting notes
Bulrush/cattail vegetation will be burned, mowed, or disced every 2 to 5 years to remove dead growth and encourage the development of new vegetative structure.	What about invasive weed management? [eb] we will add detail in this regard, as needed, based on input from species experts.	
The area outside the Stone Lakes National Wildlife Refuge but within the refuge project boundary (the area for which the refuge has authority to acquire land or easements) has largely been converted to vineyards, which do not provide habitat for cranes. Additional areas within the Project Boundary and surrounding lands are threatened by future conversions to vineyards as well. These past conversions have created an approximately 4-mile gap between wintering crane roost and foraging sites in the Stone Lakes and Cosumnes areas. Creating two wetland complexes no more than 2 miles apart in this area will expand roosting and foraging opportunities for cranes provide thus improving habitat connectivity between the Stone Lakes Basin and Cosumnes crane populationsRiver Preserve. These wetland complexes It will also ensure that conservation occurs in the vicinity of conveyance facility impacts, to offset disturbance losses that might otherwise cause some cranes to leave abandon the area, and in an area where the crane population is already constrained by urbanization to the east and sea level riseland conversion and future sea level rise to the west. Conserved lands within the refuge project boundaryStone Lakes NWR Project Boundary will be transferred to the refuge to ensure	Do we need to address issue of reverter clauses, etc. that may potentially be in deed documents. What about endowments to manage the land? [eb] the reverters clause issue can be discussed at future Stone Lakes meeting. A regional HCP/NCCP doesn't have endowments for individual properties - instead, the overall funding mechanism for the HCP/NCCP will be used to fund management of the lands. USFWS needs to make a finding that sufficient funding is assured before they can approve the plan.	See 4/22/2014 meeting notes

management consistent with the rest of the refuge lands, therefore contributing to a regional management strategy for the crane.		
Crops with minimum acquisition requirements will need to be rotated to other crops types periodically. Based on previous use patterns, the reserve system is expected to always have enough land in nonessential crops (e.g., irrigated crops other than alfalfa, rice, or corn) to allow for rotation into essential crops to ensure that minimum standards for these essential crops are met. Land cultivation patterns will be monitored to determine the extent to which the needs of each covered species are being met at any point in time.	The feasibility of this approach should be vetted with farmers. [eb] agreed. This may occur in the context of the crane TAC.	

Emergency Spillway Associated with Glannvale Tract Forebay An emergency spillway will be constructed in association with the intermediate forebay on the Glannvale tract. This spillway will prevent the intermediate forebay from overtopping by spilling into the approximately 125-acre inundation area. This area will only be flooded under emergency conditions, which are expected to be seldom if ever. Therefore, the basin will be cultivated and managed to provide roosting and foraging habitat for greater sandhill crane as described below in *Enhancement and Management Guidelines and Techniques, Timing and Flooding for Sandhill Crane*. Providing crane habitat in this area will not count toward the habitat targets under Objectives GSHC1.1 through GSHC1.5, because perpetual conservation cannot be guaranteed, as the spillway will be needed to prevent forebay overtopping in emergency situations. Rather, this additional greater sandhill crane habitat to be provided in the spillway will be above and beyond the minimum habitat requirements stipulated in the biological objectives for the crane. Enhancement and Management Guidelines and Techniques	Seems fine for foraging, but under what conditions could this impact cranes roosting? [eb] Will discuss with crane experts.	
In addition to the presence of water, food availability, and loafing opportunities, selection of roosting sites by greater sandhill cranes is based in part on predator avoidance. Therefore, the development of the ponds and checks will consider the ability of predators to access roosting cranes along checks and levees.	These factors are correct; how will the checks and levees not be highways for foxes and coyotes? [eb] will discuss with crane experts.	See 4/22/2014 meeting notes
If covered activities are to occur during greater sandhill crane wintering season (September 15 through March 15) in the Greater Sandhill Crane Winter Use Area (Appendix 2.A, Figure 2.A-19-2), the following avoidance and minimization measures	With the last couple years yielding very early arrivals, this date may need to be re-visited. Also given potential climate change seasonality. [eb] will discuss with crane experts.	See 4/22/2014 meeting notes

will be implemented.		
Manage habitat to shift cultivated land roost site locations away from risk zones created by new transmission lines. This can be accomplished by not flooding past or current roosting sites located in the vicinity of the new transmission line, thereby eliminating the sites' attractiveness as roosting habitat; and establishing new roost site equal or greater in size at new location in a lower risk zone but within 1 mile of the affected site. The relocated roost site will be established prior to commencement of the wintering season that occurs prior to construction of new transmission lines. The existing roost site will be flooded during the wintering season prior to construction; it will not be flooded during the wintering season that occurs during the year construction begins. A wildlife agency–approved, qualified biologist familiar with crane biology and experienced with crane habitat management will design the new roost site and direct implementation of the roost site establishment. Monitoring should be incorporated into the management practices.	This is a new and unanalyzed impact on the GSC. This can cause more harm and lead to greater loss of habitat use. [eb] habitat loss can't exceed take limits, but we can discuss further with Gary Ivey.	See 4/22/2014 meeting notes

Final transmission line design will be determined in coordination with the wildlife agencies and the approved/qualified crane biologist to achieve the performance standard and ensure the measures described herein are incorporated.	Inclusion of wildlife experts in the transmission line negotiation process with the power provider should be required. [eb] The development of this process is in progress	
Powerline Plan and Analysis Prior to powerline construction, the approved/qualified crane biologist will coordinate with the Implementation Office to develop a plan for achieving the performance standard (no net increase in bird strike hazard to greater sandhill crane populations in the Plan Area) using a combination of the measures described above. The plan will include an analysis, using the method described in Attachment 5.J.C, *Analysis of Potential Bird Collisions at Proposed BDCP Powerlines*, to demonstrate that this standard has been met. The plan and analysis will be subject to review and approval by the wildlife agencies prior to its implementation. Powerline construction will be implemented consistent with this plan.	Approved or and/or qualified, by whom: DFW, the Lead Agency? See two bullets above. Please be consistent with nomenclature or identify the change in standard. [eb] This is referring to the biologist described above: "A wildlife agency–approved, qualified biologist familiar with crane biology and experienced with crane habitat management". But to add clarity, we will stipulate this here. The 800 lb gorilla here that is not mentioned is that process to date has not included a feasibility or cost analysis for the various options, including undergrounding. DWR has simply decided that it need not underground the lines and has not supported that with any analysis. [eb] undergrounding feasibility and cost analysis is in progress.	
Use of construction equipment greater than 50 feet in height will be minimized to the extent practicable in light of project schedule and cost and logistical considerations.	No avoidance and minimization requirements. And, not enforceable, so meaningless. [eb] we could remove this. Gary Ivey said construction equipment isn't really an issue and that this measure isn't needed.	
Avoid direct construction-related loss of roost sites. Activities will be designed to avoid direct loss of crane roost sites. This can be accomplished by siting activities outside identified crane roost sites or by relocating the roost site if it consists of cultivated lands (roost sites that consist of wetlands rather than cultivated lands will not be subject to relocation). A cultivated land roost site can be relocated by not flooding the site where the impact will occur during years when construction will occur and by establishing a new roost site equal or greater in size at a new location away from the disturbance (outside the 50 dBA L_{eq} [1 hour] noise	This is still unclear in terms of when relocation will be implemented. There is also not clear evidence that relocation of roost sites will be successful. The creation and reoccupancy of new sites can take several years if it happens at all. [eb] further detail is being developed. Will discuss this comment with Gary Ivey, who has indicated that cranes will readily shift their roosting locations to where habitat is suitable, if it's in the near vicinity.	See 4/22/2014 meeting notes

contour) but within 1 mile of the affected site. The relocated roost site will be established prior to construction activities affecting the original roost site. A qualified biologist familiar with crane biology and experienced with crane habitat management will design the new roost site and direct implementation of the roost site establishment. Efforts to identify and monitor potential sites should be conducted prior to establishment.		
Avoid and minimize construction-related noise effects on roost sites. Activities within 0.75 mile of crane roosting habitat will reduce construction noise during nighttime hours (from 1 hour before sunset to 1 hour after sunrise) such that construction noise levels do not exceed 50 dBA L_{eq} (1 hour) at the nearest temporary or permanent roosts during periods when the roost sites are available (flooded). This can be accomplished by limiting construction activities that could result in noise levels above 50 dBA L_{eq} (1 hour) at the roost site to day time only (from 1 hour after sunrise to 1 hour before sunset); siting nighttime project activities at a sufficient distance from crane roost sites to ensure that construction noise levels do not exceed 50 dBA L_{eq} (1 hour) at the roost site; relocating cultivated land roost sites as described above; and/or installing noise barriers between roost sites within the 50 dBA L_{eq} (1 hour) contour and the primary construction noise source areas, such that construction noise levels at the roost site do not exceed 50 dBA L_{eq} (1 hour). The installation of noise barriers will be used only if the first three options cannot be implemented to the extent that noise levels do not exceed 50 dBA L_{eq} (1 hour) at the roost site.	See above. 50 rolling-averaged over an hour is not a protective measure by any definition. Substantiation for this measure based on GSC biology would be necessary to support its effectiveness. [eb] see response above. But perhaps we can discuss using peak noise but at a higher dBA than 50?	
Screen all lights and direct them down toward work activities and away from the night sky and nearby roost sites.	The typical temporary construction lights have several problems that need to be addressed here. The first is generator noise, the second is the lack of light control on the fixtures, and the third is the ease by which these can be misdirected. This section needs much greater detail and enforceable specificity. [eb] noise will be addressed through the above measures. Regarding light misdirection, we can stipulate that biological construction monitor will monitor to ensure	

	lights are properly directed at all times.	
Install a visual barrier along portions of access routes where screening would prevent excessive light spill toward roost sites from truck headlights being used during nighttime construction activities. These visual barriers will meet the following performance criteria: The visual barrier will be a minimum of 5 feet high and will provide a continuous surface impenetrable by light. This height may be obtained by installing a temporary structure, such as fencing (e.g., chain link with privacy slats) or a semipermanent structure, such as a concrete barrier (e.g., a roadway median barrier or architectural concrete wall system) retrofitted with an approved visual screen, if necessary, to meet the required height. These barriers will not be installed immediately adjacent to crane foraging habitat, and placement will be coordinated with a qualified crane biologist approved by the wildlife agencies.	This is a good attempt at a measure. It need more substantive protection, slats on chain link provide some glare protection but almost no abatement. Five feet needs to be from above the surface of the road, given the typical elevated position of the Delta roads. Otherwise the measure provides no protection. [eb] we will be further developing this measure prior to the final draft. What is minimum distance to habitat? [eb] we will be further developing this measure, including minimum distance, prior to the final draft.	
Remove RTM from Staten Island periodically during construction to minimize the RTM footprint.	Muck should be moved only outside of GSC use season. [eb] will discuss with DWR and crane experts.	
(Staten Island) Prioritize placement of facilities and RTM in areas of no or low crane use. For example, the very northern end of Staten Island is an area of low crane use that would be a high priority for placement of facilities and RTM.	Footnote underestimates impacts based on lighting and noise. Averages and trend analysis need to use appropriate statistics to make loss calculations. [eb] conservative estimates will be used and monitoring will be conducted during construction to assess actual effects. We will be further developing the monitoring and adaptive management program to provide assurance that standard will be met.	

Water Conveyance Facility Construction The water conveyance facility and associated features as designed would result in the permanent removal of approximately 2,728 acres of greater sandhill crane habitat, including 29 acres of temporary roosting and foraging habitat and 2,699 acres of foraging habitat (**Error! Reference source not found.**). The temporary roosting and foraging habitat that would be permanently lost is located on Zacharias Island; the loss is a result of installation of a transmission line and associated access road. However, *AMM20 Greater Sandhill Crane* (Appendix 3.C) requires that the final transmission line alignment be designed to avoid crane roost sites; therefore, there will be no loss of crane temporary roosting and foraging habitat as a result of water conveyance facility construction once the facility is fully designed.	Fully constructed or designed? [eb] this speaks to the fact that the design will be modified between public review and final, and that the current footprint doesn't meet this standard but the AMMs require that it will. This language will change for the final.	
Effects in the Cosumnes/Mokelumne ROA associated with tidal wetland restoration activities occur in low-value cultivated lands that are restored to become tidal wetlands. To be conservative, these effects are counted as a permanent loss of sandhill crane habitat. However, tidal wetland restoration may in some cases provide habitat value for cranes.	Both of these arguments seem unsubstantiated. How many acres score as low value, and how would tidal have any value to cranes? [eb] We can quantify the amount that is low value. Jim Estep indicated that cranes might use muted tidal. We'll confer with other crane experts.	See 4/22/2014 meeting notes

Temporary Habitat Loss Covered activities are expected to temporarily remove 985 acres of modeled habitat (less than 1% of this habitat in the Plan Area). Nearly all the affected habitat is cultivated land. This includes 24 acres of roosting and foraging habitat (16 acres of which is temporary roosting habitat), and 778 acres of foraging habitat. Of the 985 acres, establishment and use of borrow and spoil areas associated with construction of water facilities will result in temporary removal of approximately 183 acres of modeled greater sandhill crane winter foraging habitat (**Error! Reference source not found.**). Although this habitat will be restored within 1 year following construction, it will not necessarily be restored to its original topography and areas that were originally cultivated lands may be restored as grasslands.	This describes permanent losses as temporary, which is it? What is the diminution of value and how does that get mitigated? [eb] we might want to do a net effects analysis for each value category. I'm fairly certain this will result in disproportionate increase in protected high value habitat, based on the protection objectives.	I don't think my response is appropriate here – must have misinterpreted comment. Need to discuss with species experts
Marking transmission lines with devices that make the lines more visible to birds has been shown to dramatically reduce the incidence of bird mortality, including for sandhill cranes. Brown and Drewien (1995) estimated that marking devices in the Central Valley would reduce crane mortality by 66%. Using this assumption, by incorporating line-marking devices into the designs the annual mortality rate is estimated to decrease to 6 deaths per year for the permanent lines and 42 deaths per year for the temporary lines.	Need to include placement of diverters and maintenance of diverters [eb] this will be in AMM	
Marsh and floodplain restoration also has the potential to increase exposure to methylmercury. Mercury is transformed into the more bioavailable form of methylmercury in aquatic systems, especially areas subjected to regular wetting and drying such as tidal marshes and flood plains. Thus, restoration activities that create newly inundated areas could increase bioavailability of mercury. Increased methylmercury associated with natural community and floodplain restoration may indirectly affect the greater sandhill crane via uptake in lower tropic levels (Appendix 5.D, *Contaminants*). In general, the highest methylation rates are	This section is confusing and potentially inaccurate. Tidal marsh is lost habitat, seasonally flooded areas have very few and limited BMPs for MeHg, despite assertions here. [eb] disagree with inaccurate, but agree that we need to provide further analysis of mercury effects in seasonally flooded areas.	

associated with high tidal marshes that experience intermittent wetting and drying and associated anoxic conditions (Alpers et al. 2008). The potential mobilization or creation of methylmercury in the Plan Area varies with site-specific conditions and will need to be assessed at the project level. The Suisun Marsh Plan (Bureau of Reclamation et al. 2010) anticipates that tidal wetlands restored under the plan will generate less methylmercury than the existing managed wetlands. Along with minimization and mitigation measures and adaptive management and monitoring, *CM12 Methylmercury Management* is expected to reduce the amount of methylmercury resulting from the restoration of natural communities and floodplains.		
Covered activities are expected to permanently remove up to 7,136 acres of modeled habitat for greater sandhill crane representing 4% of the total habitat in the Plan Area, including 71 (less than 1%) of its modeled temporary roosting and foraging habitat. While cultivated lands will be affected, this and other adverse habitat effects resulting in take are not expected to adversely affect the species' long-term survival and conservation because the affected areas represent a small proportion of habitat in the Plan Area impacts are quantified in areas that will be converted to usable habitat for the crane, and much of the affected habitat has relatively low value.	This is the critical occupied core habitat for the crane and this section ignores that fact, despite introducing the concept at the beginning. It has very high value and functions to provide the last major refugia for the species. Protection of additional acreage does not replace the functional core area for the crane given its biology. This species is very slow to use new roosting habitat and the "analysis' simply assumes they are interchangible. [eb] impacts in the highest value areas will primarily be temporary and the performance standard assures no population effects as a result of the construction activity. This part of the analysis will be reworded to reflect this fact.	
Overall, the BDCP will provide a net benefit to the greater sandhill crane through the increase in available roosting habitat, the maintenance of existing or enhanced foraging habitat as well as an increase in extent of habitat in protected status. These protected areas will be managed and monitored to support the species. Collision mortality will be offset by implementation of minimization and mitigation measures with an expected no net loss of cranes due to bird strikes. Therefore, the BDCP will minimize and mitigate impacts, to the maximum extent practicable, and provide for the conservation and management of	Incorporation of monitoring concerns is still needed. What entity will be responsible for monitoring effectiveness and making changes as needed. [eb] agreed. We are still developing these details.	

the greater sandhill crane in the Plan Area.		

EXHIBIT E

The following are excerpts from the GSHC conservation strategy and effects analysis with SLNWRA comments to discuss:

Assigned Greater Sandhill Crane Foraging Habitat Value Classes for Agricultural Crop Types

Foraging Habitat Value Class	Agricultural Crop Type
Very high	Corn, rice
High	Alfalfa, irrigated pasture, wheat
Medium	Other grain crops (barley, oats, sorghum)
Low	Other irrigated field and truck crops
None	Orchards, vineyards

Comment [TB1]: New data indicate that GSHC rarely use alfalfa (Ivey, pers. Comm.)Recommend moving alfalfa to Medium category. Why was dry pasture of a minimum size not included? [eb] consulting with species experts.

Comment [SLNWRA2]: Note that GSC does not use alfalfa. [eb] They do use alfalfa, but maybe not high value. Consulting with species experts.

ation resulting from each of these activities are described below.

Table 5.6-10. Total Amount of Greater Sandhill Crane Habitat Lost from Covered Activities

Foraging Habitat Value Class[a]	Cultivated Land Crops and Other Cover Types[b]	Acres Affected[c] (% of Total Impact)
Very High	Corn, rice	2,663 (37%)
High	Alfalfa and alfalfa mixtures, mixed pasture, native pasture, wheat, other pasture, irrigated pasture, managed wetlands, native vegetation[d]	1,901 (26%)
Medium	Grain and hay crops, miscellaneous grain and hay, mixed grain and hay, nonirrigated mixed grain and hay, other grain crops, miscellaneous grasses, grassland, alkali seasonal wetlands, vernal pool complex	1,499 (21%)
Low	Other irrigated crops, idle cropland, blueberries, asparagus, clover, cropped within the last 3 years, grain sorghum, green beans, miscellaneous truck, miscellaneous field, new lands being prepped for crop production, nonirrigated mixed pasture, nonirrigated native pasture, onions, garlic, peppers, potatoes, safflower, sudan, sugar beets, tomatoes (processing), melons squash and cucumbers all types, artichokes, beans (dry)	1,188 (16%)
Totals		**7,250**

[a] See Appendix 2.A, *Covered Species Accounts*, for description of foraging habitat values.

[b] This is based on land crop and other cover types mapped in 2008 (see Appendix 2B for mapping methodology).

[c] Total includes permanent, permanent – reusable tunnel material, and temporary borrow and spoil effects.

[c] Native vegetation is a land use designation within the California Department of Water Resources (2007) crop type dataset. For the purposes of incorporating native vegetation classes into the correct species models, and, when applicable, assigning habitat foraging values, the management of these lands most resembles that of native pasture, an irrigated pasture type.

Comment [TB3]: These types should be moved to medium because of recent data. [eb] will discuss with species experts.

Comment [TB4]: What is the difference between native pasture and grassland? [eb] good question. We never got a satisfactory answer to this from SAIC. It may be worth re-evaluating this classification as it relates to crane.

Objective GSHC1.2 Rationale: Achieving this objective will enhance or create foraging habitat by requiring that 10% of the lands protected under GSHC1.1 be converted from an initial low- or no-value crop type to a high- or very high-value crop type (

). Requiring that 10% (730 acres) of the crane reserves be created or enhanced by converting unsuitable crops to high-value crops will help to redress the past conversion from high-value to low-value crop types. The strategy involves targeting lands least vulnerable to sea level rise in Conservation Zones 3, 4, 5, and/or 6, which are zones in the Plan Area that include the Winter Use Area and do not include the lands most vulnerable to sea level rise. Sea level rise and local seasonal flood events will be considered when identifying siting conservation lands because crane foraging habitat is likely to become unsuitable at lower elevations with sea level rise as these areas become flooded due to sea level rise. Additionally, crane habitat may periodically become unsuitable as a result of large flood events (100 year events) within river floodplains.

The area outside the Stone Lakes National Wildlife Refuge but within the refuge project boundary (the area for which the refuge has authority to acquire land or easements) has largely been converted to vineyards, which do not provide habitat for cranes. Additional areas within the Project Boundary and surrounding lands are threatened by future conversions to vineyards as well. These past conversions have created an approximately 4-mile gap between wintering crane roost and foraging sites in the Stone Lakes and Cosumnes areas. Creating two wetland complexes no more than 2 miles apart in this area will expand roosting and foraging opportunities for cranes provide thus improving habitat connectivity between the Stone Lakes Basin and Cosumnes crane populationsRiver Preserve. These wetland complexes It will also ensure that conservation occurs in the vicinity of conveyance facility impacts, to offset disturbance losses that might otherwise cause some cranes to leave abandon the area, and in an area where the crane population is already constrained by urbanization to the east and sea level riseland conversion and future sea level rise to the west. Conserved lands within the refuge project boundaryStone Lakes NWR Project Boundary will be transferred to the refuge to ensure management consistent with the rest of the refuge lands, therefore contributing to a regional management strategy for the crane.

- In addition to the presence of water, food availability, and loafing opportunities, selection of roosting sites by greater sandhill cranes is based in part on predator avoidance. Therefore, the development of the ponds and checks will consider the ability of predators to access roosting cranes along checks and levees.

If covered activities are to occur during greater sandhill crane wintering season (September 15 through March 15) in the Greater Sandhill Crane Winter Use Area (Appendix 2.A, Figure 2.A-19-2), the following avoidance and minimization measures will be implemented.

- Manage habitat to shift cultivated land roost site locations away from risk zones created by new transmission lines. This can be accomplished by not flooding past or current roosting sites located in the vicinity of the new transmission line, thereby eliminating the sites' attractiveness as roosting habitat; and establishing new roost site equal or greater in size at new location in a lower risk zone

Comment [SLNWRA5]: Does this really accomplish anything when so much conversion is occurring? In the end, is not the goal to have the greatest number of acres of high value habitat in proximity to roosting? Has anyone analyzed if using the additional expense for re-conversion would be better spent acquiring more land to begin with? What is gained if a lot of money is spent to re-convert when perfectly suitable high quality habitat is simultaneously being converted by others to vineyards? Vineyards and orchards should be purchased and re-converted when no other suitable acres are available. [eb] will discuss with TTT

Comment [EB6]: Is this the event we're targeting for avoidance? My impression was that the idea was to avoid protection of areas that flood more frequently than every 100 years.

Comment [TB7]: Do we need to address issue of reverter clauses, etc. that may potentially be in deed documents. What about endowments to manage the land? [eb] the reverters clause issue can be discussed at future Stone Lakes meeting. A regional HCP/NCCP doesn't have endowments for individual properties - instead, the overall funding mechanism for the HCP/NCCP will be used to fund management of the lands. USFWS needs to make a finding that sufficient funding is assured before they can approve the plan.

Comment [SLNWRA8]: These factors are correct; how will the checks and levees not be highways for foxes and coyotes? [eb] will discuss with crane experts.

Comment [SLNWRA9]: With the last couple years yielding very early arrivals, this date may need to be re-visited. Also given potential climate change seasonality. [eb] will discuss with crane experts.

Comment [SLNWRA10]: This is a new and unanalyzed impact on the GSC. This can cause more harm and lead to greater loss of habitat use. [eb] habitat loss can't exceed take limits, but we can discuss further with Gary Ivey.

but within 1 mile of the affected site. The relocated roost site will be established prior to commencement of the wintering season that occurs prior to construction of new transmission lines. The existing roost site will be flooded during the wintering season prior to construction; it will not be flooded during the wintering season that occurs during the year construction begins. A wildlife agency–approved, qualified biologist familiar with crane biology and experienced with crane habitat management will design the new roost site and direct implementation of the roost site establishment. Monitoring should be incorporated into the management practices.

- Avoid direct construction-related loss of roost sites. Activities will be designed to avoid direct loss of crane roost sites. This can be accomplished by siting activities outside identified crane roost sites or by relocating the roost site if it consists of cultivated lands (roost sites that consist of wetlands rather than cultivated lands will not be subject to relocation). A cultivated land roost site can be relocated by not flooding the site where the impact will occur during years when construction will occur and by establishing a new roost site equal or greater in size at a new location away from the disturbance (outside the 50 dBA L_{eq} [1 hour] noise contour) but within 1 mile of the affected site. The relocated roost site will be established prior to construction activities affecting the original roost site. A qualified biologist familiar with crane biology and experienced with crane habitat management will design the new roost site and direct implementation of the roost site establishment.

Effects in the Cosumnes/Mokelumne ROA associated with tidal wetland restoration activities occur in low-value cultivated lands that are restored to become tidal wetlands. To be conservative, these effects are counted as a permanent loss of sandhill crane habitat. However, tidal wetland restoration may in some cases provide habitat value for cranes.

Comment [SLNWRA11]: This is still unclear in terms of when relocation will be implemented. There is also not clear evidence that relocation of roost sites will be successful. The creation and reoccupancy of new sites can take several years if it happens at all. [eb] further detail is being developed. Will discuss this comment with Gary Ivey, who has indicated that cranes will readily shift their roosting locations to where habitat is suitable, if it's in the near vicinity.

Comment [SLNWRA12]: Both of these arguments seem unsubstantiated. How many acres score as low value, and how would tidal have any value to cranes? [eb] We can quantify the amount that is low value. Jim Estep indicated that cranes might use muted tidal. We'll confer with other crane experts.

EXHIBIT F

Biological Goals and Objectives -

3.3.1.1 Western Burrowing Owl

Western burrowing owl (*Athene cunicularia hypugaea*) is found in open, well-drained grasslands, agricultural and range lands, and desert habitats often associated with burrowing animals (Klute et al. 2003). The species also occupies golf courses, airports, road and levee embankments, and other disturbed sites where there is sufficient friable soil for burrows (Haug et al. 1993). Because they typically use the burrows created by other species, particularly the California ground squirrel, presence of these species is usually a key indicator of potential occurrence of the western burrowing owl.

The breeding range of the western burrowing owl extends south from southern Canada throughout most of the western half of the United States and south to central Mexico. The winter range extends from central California southeastward through Arizona, New Mexico, and Texas and south into northern and central Mexico and coincides with southern breeding range where the species is resident year-round (Haug et al. 1993). In California, the species is distributed primarily throughout the lowland portions of the state, including the Central Valley, Imperial Valley, the southern desert region, the southern California coast, and the San Francisco Bay Area.

Reported occurrence data indicate that, within the Plan Area, western burrowing owls are concentrated mostly in the grassland and pastureland areas west of the Sacramento DWSC in Yolo and Solano Counties, and in the grasslands along the western edge of the Plan Area between roughly Brentwood/Antioch and Tracy (Figure 2A.24-2). These mostly uncultivated areas support larger and more stable populations of California ground squirrels and are less likely to be disturbed by regular cultivation and other ground disturbances. The species is a year-round resident in the Plan Area; however, local migratory patterns and the extent to which migrants occupy the Plan Area during the nonbreeding season are unclear. Western burrowing owls occur locally in the vicinity of Stockton where they are typically found along levees, canals, field edges, and also in the grasslands in the vicinity of Stone Lakes. Few western burrowing owls have been reported from the central portion of the Delta and the northern Delta east of the Sacramento DWSC. Western burrowing owls persist in low numbers in grassland habitats around the perimeter of Suisun Marsh. Gervais et al. (2008) note that populations in the vicinity of Suisun Marsh and San Pablo Bay are declining.

Conversion of grasslands and pasturelands to incompatible crop types and the destruction of ground squirrel colonies have been the main factors causing the decline of the western burrowing owl population (Zarn 1974). Assimilation of poisons applied to ground squirrel colonies may also affect western burrowing owl populations (James et al. 1990). Although California has a significant western burrowing owl population, development pressures and recent population trends suggest that the species may continue to be extirpated from large portions

of its range in California during the next decade (DeSante et al. 2007). While western burrowing owls in the Central Valley have exhibited strong site fidelity even with increasing habitat fragmentation, the species has been extirpated from many historically occupied areas due to increasing urbanization and related causes. Populations in the Plan Area face similar threats from land use changes.

Western burrowing owl is covered by the *East Contra Costa County HCP/NCCP*, *San Joaquin County MSCP*, *Yolo Natural Heritage Program Plan*, and *Solano HCP*, all of which overlap with the Plan Area. The *East Contra Costa County HCP/NCCP* is expected to result in substantial conservation for this species in areas near Conservation Zone 8, and will potentially result in conservation for this species within this zone.

The conservation strategy for the western burrowing owl involves protecting and restoring large areas of grassland natural communities, managing cultivated lands to support foraging habitat, reducing the threat of habitat loss and fragmentation, and managing a landscape that supports ground squirrels, which are critical for creating cover and nesting habitat for western burrowing owls. The conservation measures that will be implemented to achieve the biological goals and objectives discussed below are described in Section 3.4, *Conservation Measures*. Error! Reference source not found.~~Table 3.3-1~~ lists the conservation measures that support each objective. AMM23 in Appendix 3.C, *Avoidance and Minimization Measures*, will be implemented to avoid and minimize adverse effects on this species.

3.3.1.1.1 Applicable Landscape-Scale Goals and Objectives

While the landscape-scale goals and objectives will provide broad-based benefits to the ecosystems upon which western burrowing owls depend, none are integral to the conservation strategy for this species.

3.3.1.1.2 Applicable Natural Community Goals and Objectives

Natural community biological goals and objectives integral to the conservation strategy for the western burrowing owl are stated below.

Goal GNC1: Extensive grasslands composed of large, interconnected patches or contiguous expanses.
• **Objective GNC1.1:** Protect 8,000 acres of grassland with at least 2,000 acres protected in Conservation Zone 1, at least 1,000 acres protected in Conservation Zone 8, at least 2,000 acres protected in Conservation Zone 11, and the remainder distributed among Conservation Zones 1, 2, 4, 5, 7, 8, and 11. • **Objective GNC1.2:** Restore 2,000 acres of grasslands to connect fragmented patches of protected grassland and to provide upland habitat adjacent to riparian and tidal and nontidal natural communities for wildlife foraging and upland refugia.

Comment [TB1]: Consider adding language to existing Objective or add objective that CAGS will be reestablished or not removed from areas where BUOW are being established. The best way to create high quality BUOW habitat is through establishing CAGS colonies in grassland settings. Establishing CAGS colonies in low value habitats may be a way of creating high value habitat if there is sufficient acreage. Grasslands must be managed through grazing of cattle, sheep, goats to meet optimum grass height and density. What is the definition of "restore" does that mean plant to native grasslands, nonnatives or a mix? Does this include weed control?

Goal ASWNC1: A reserve system including alkali seasonal wetland complex within a mosaic of grasslands and vernal pool complex.
• **Objective ASWNC1.1:** Protect 150 acres of alkali seasonal wetland in Conservation Zones 1, 8, and/or 11 among a mosaic of protected grasslands and vernal pool complex. • **Objective ASWNC1.2:** Restore or create alkali seasonal wetlands in Conservation Zones 1, 8, and/or 11 to achieve no net loss of wetted acres (up to 72 acres of alkali seasonal wetland complex restoration, assuming all anticipated impacts occur).

Goal VPNC1: Vernal pool complexes that are managed and enhanced to sustain populations of native vernal pool species.
• **Objective VPNC1.1:** Protect 600 acres of existing vernal pool complex in Conservation Zones 1, 8, and 11, primarily in core vernal pool recovery areas identified in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (U.S. Fish and Wildlife Service 2005). • **Objective VPNC1.2:** Restore vernal pool complex in Conservation Zones 1, 8, and/or 11 to achieve no net loss of vernal pool acreage (up to 67 acres of vernal pool complex restoration, assuming that all anticipated impacts [10 wetted acres] occur and that the restored vernal pool complex has 15% density of vernal pools).

Objectives GNC1.1, ASWNC1.1, and VPNC1.1 Benefits: Urbanization, including residential and commercial development and infrastructure development, and conversion of grasslands to incompatible agricultural lands uses are among the principal causes of habitat loss for western burrowing owls and is a continuing threat to remaining northern California populations (Appendix 2.A, *Covered Species Accounts*). Conservation of western burrowing owl is directed at maintaining a landscape of suitable nesting and foraging habitat across the Plan Area and adjacent lands. However, the protection of grasslands, which occur primarily along the western edge of the Plan Area, are key to protecting high-value burrowing owl habitat and sustaining existing populations in the Plan Area. Objective GNC1.1 will protect a large amount of grassland from any future threats of land conversion and reduce the effects of current levels of habitat fragmentation. Additionally, Objectives ASWNC1.1 and VPNC1.1 will protect alkali seasonal wetland and vernal pool complexes, and the grassland component of these natural communities will provide habitat for western burrowing owl. Grasslands, alkali seasonal wetland complex, and vernal pool complex natural communities will be protected together as contiguous mosaics in Conservation Zones 1, 8, and 11. These objectives will expand the amount of protected high-value habitat in the Plan Area and support existing western burrowing owl populations that occur to the west of Conservation Zone 8 in Contra Costa County and in the areas surrounding Conservation Zones 1 and 11 in Solano County, which would especially benefit declining populations in the vicinity of Suisun Marsh and San Pablo Bay.

Objectives GNC1.2, ASWNC1.2, and VPNC1.2 Benefits: Restoration of grasslands, alkali seasonal wetland complexes, and vernal pool complexes will focus on connecting fragmented patches of other protected grasslands, alkali seasonal wetland complexes, and vernal pool complexes to provide contiguous mosaics of these natural community types, effectively increasing the size of intact grassland landscapes

(including the grassland components of the alkali seasonal wetland and vernal pool complexes). This will contribute to reducing the effects of habitat fragmentation that have occurred from development impacts and agricultural conversions, and may facilitate movement of burrowing owls into currently unoccupied areas.

Goal ASWNC2: Alkali seasonal wetlands that are managed and enhanced to sustain populations of native alkali seasonal wetland species.
• **Objective ASWNC2.3:** In grasslands surrounding alkali seasonal wetlands within restored and protected alkali seasonal wetland complex, increase burrow availability for burrow-dependent species. • **Objective ASWNC2.4:** In grasslands surrounding alkali seasonal wetlands within restored and protected alkali seasonal wetland complex, increase prey, especially small mammals and insects, for grassland-foraging species.

Goal VPNC2: Vernal pool complexes that are managed and enhanced to sustain populations of native vernal pool species.
• **Objective VPNC2.4:** In grasslands surrounding vernal pools within restored and protected vernal pool complex, increase burrow availability for burrow-dependent species. • **Objective VPNC2.5:** In grasslands surrounding vernal pools within restored and protected vernal pool complex, increase prey, especially small mammals and insects, for grassland-foraging species.

Goal GNC2: Biologically diverse grassland managed to enhance native species and sustained by natural ecological processes.
• **Objective GNC2.3:** Increase burrow availability for burrow-dependent species. • **Objective GNC2.4:** Increase prey abundance and accessibility, especially small mammals and insects, for grassland-foraging species.

Objectives ASWNC2.3, ASWNC2.4, VPNC2.4, VPNC2.5, GNC2.3, and GNC2.4 Benefits: The distribution of burrowing owls is in part determined by the presence of ground squirrels that initially excavate burrow systems burrowing owls will later inhabit. While grasslands remain relatively abundant along the western edge of the Plan Area and a large amount of grassland will be protected under Objectives GNC1.1, ASWNC1.1, and VPNC1.1 (including the grassland components of alkali seasonal wetland and vernal pool complexes), most of these grasslands are currently not occupied by burrowing owls. Incorporating lands adjacent to Plan Area that have established burrowing owls and squirrel colonies will improve these objectives success. This is due in part to burrow availability. To facilitate expansion of the burrowing owl population in the Plan Area, Objectives GNC2.3, ASWNC2.3, and VPNC2.3 will increase burrow availability on protected grasslands by encouraging ground squirrel occupancy and population expansion. This will be done through the creation of berms, mounds, edges, and other features designed to attract and encourage burrowing activity and by prohibiting ground squirrel control programs (i.e., poisoning) in the reserve system, as described in *CM11 Natural Communities Enhancement and Management*. Will these efforts also include

relocating squirrels to establish colonies? It would be wise to identify which agricultural practices have a greater concern for ground squirrel impacts on crops (probably cultivated lands). Increasing small mammal and insect prey populations in the reserve system, consistent with GNC2.4, ASWNC2.4, and VPNC2.4, will also contribute to the expansion of the existing burrowing owl population; these objectives will be achieved through management and enhancement as described in *CM11 Natural Communities Enhancement and Management*.

Goal CLNC1: Cultivated lands that provide habitat connectivity and support habitat for covered and other native wildlife species.
• **Objective CLNC1.1:** Protect 48,625 acres of cultivated lands that provide suitable habitat for covered and other native wildlife species. • **Objective CLNC1.3:** Maintain and protect the small patches of important wildlife habitats associated with cultivated lands that occur in cultivated lands within the reserve system, including isolated valley oak trees, trees and shrubs along field borders and roadsides, remnant groves, riparian corridors, water conveyance channels, grasslands, ponds, and wetlands.

Objective CLNC1.1 Benefits: At least 64% of the Plan Area is cultivated land. While relatively few cultivated cover types are suitable as burrowing owl habitat, certain types, such as irrigated pasture, alfalfa and other hay crops, and even some row and grain crops, can provide foraging habitat for burrowing owls, at least some portion of the year. Burrowing owls occur in agricultural habitats in much lower density than in grassland landscapes and only where suitable edge habitats (e.g., levees, roadside berms, edges of permanent water conveyance canals) are available as burrow habitat. Most cultivated lands are therefore considered low-value habitat, although pasture is considered high-value habitat. Still, these low-value habitats, particularly those supporting low vegetation structure and those that are tilled less frequently (e.g., alfalfa hay) do support breeding and wintering burrowing owls. Cultivated lands can, therefore, contribute to the conservation of burrowing owls under appropriate management regimes. With the extent of cultivated lands protected under Objective CLNC1.1, there are likely to be many opportunities to enhance and manage these reserves to support burrowing owl habitat and encourage burrowing owl occurrence and use. For example, maintaining berms around irrigated pastures, short grasses on levee slopes, and selectively prohibiting ground squirrel control programs can facilitate burrowing owl use of some agricultural lands. An unknown portion of the protected cultivated lands are expected to support burrowing owl habitat that could be further enhanced to expand and support populations in the Plan Area.

Objective CLNC1.3 Benefits: Achieving this objective will support western burrowing owls by maintaining and protecting patches of habitat within cultivated areas that may support western burrowing owl prey species (insects and small mammals) and that may provide suitable burrow habitat, such as berms and other edge habitats. Implementation of this objective may allow western burrowing owls to establish a greater presence in the central portion of the Delta.

3.3.1.1.3 Species-Specific Goals and Objectives

The landscape-scale and natural community biological goals and objectives, and associated conservation measures, discussed above, are expected to protect, restore, and enhance suitable habitat for western burrowing owl within the reserve system. The goal and objective below address additional species-specific needs that will not otherwise be met at the landscape or natural community scale.

Goal WBO1: Contribute to the sustainability of the burrowing owl population by protecting cultivated lands suitable for burrowing owl foraging.
• **Objective WBO1.1:** Of the 48,625 acres of cultivated land protected under Objective CLNC1.1, protect at least 1,000 acres and establish CAGS colonies in Conservation Zones 1 and 11 that support high-value burrowing owl habitat and are within 0.5 mile of high-value grassland habitat or occupied low-value habitat.

Objective WBO1.1 Rationale: Western burrowing owls in Conservation Zones 1 and 11 are associated with a landscape that includes a matrix of grasslands and cultivated lands. Much of the cultivated land is high-value burrowing owl habitat consisting of pasture. These lands are used for cattle grazing and for production of hay feed and silage. Burrowing owls that occur in these areas use both the grassland and adjacent cultivated land for foraging and many nesting burrows are in or adjacent to pasturelands, which are uncultivated or infrequently cultivated. In addition to protection of grasslands under Objective GNC1.1, it is important to protect adjacent cultivated lands in this portion of the Plan Area, particularly those that are known to be occupied by nesting and wintering burrowing owls. Protection of 1,000 acres of adjacent cultivated land will substantially increase the extent of connectivity of burrowing owl habitats protected in Conservation Zones 1 and 11, further protect lands that are occupied by burrowing owls, and maintain the matrix of habitats that support this subpopulation. The protection of burrowing owl habitat in Conservation Zones 1 and 11 is also consistent with cultivated land protection for Swainson's hawk, white-tailed kite, and tricolored blackbird.

The western burrowing owl will be conserved in cooperation and in conjunction with neighboring and overlapping HCP/NCCPs to ensure that actions are implemented where they provide the greatest benefit to the regional western burrowing owl population and where they are compatible with conservation of other species associated with grasslands and cultivated lands. The conservation strategy for western burrowing owls is expected to sustain the species' existing population and provide for future increases in its abundance and distribution in and adjacent to the Plan Area.

Conservation Measures

Conservation Measure #3 – Protection and Restoration

Table Error! No text of specified style in document.**-1. Natural Community Siting and Reserve Design Requirements**

ID	Type	Protection		Restoration	
		Amount (Acres)	Location and Other Requirements	Amount (Acres)	Location and Other Requirements
Tidal Natural Communities					
#2	Transitional uplands to accommodate sea level rise (CM4)	#1 restoration and #2 protection collectively total 65,000	Adjacent to restored tidal natural communities. Sufficient acreage to meet the 65,000-acre requirement for tidal restoration plus sea level rise accommodation.	As needed	Cultivated lands within a 200-foot-wide band adjacent to restored emergent wetland, within the transitional uplands will be restored to natural uplands such as grassland or riparian. The restored grassland will not count toward the 2,000-acre grassland restoration objective (GNC1.2), but restored riparian will count toward the 5,000-acre riparian restoration objective (VFRNC1.1).
Grasslands and Associated Vernal Pool and Alkali Seasonal Wetland Complexes					
#8	Grasslands (CM8)	8,000	At least 2,000 acres in Conservation Zone 1; 1,000 acres in Conservation Zone 8; and 2,000 acres in Conservation Zone 11, and the remainder distributed among Conservation Zones 1, 2, 4, 7, 8, and 11. See also #11, #12, #13, #14, #16, and #17.	2,000	See also #11, #12, and #14.
#9	Vernal Pool Complex (CM9)	600	Conservation Zones 1, 8, and/or 11, primarily in core vernal pool recovery areas identified in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (U.S. Fish and Wildlife Service 2005). See also #15, #16, #17, #18, and #19.	As needed to meet requirement (Approx. 67)	Sufficient vernal pool complex will be restored in Conservation Zones 1, 8, or 11 to achieve no net loss of vernal pool wetted acres, for up to 10 wetted acres.
#10	Alkali Seasonal Wetland Complex (CM9)	150	Conservation Zones 1, 8, and/or 11 among a mosaic of protected grasslands and vernal pool complex. See also #16, #17, #19, and #20.	As needed to meet requirement. (Approx. 72)	Sufficient alkali seasonal wetland complex will be restored to achieve no net loss of alkali seasonal wetland wetted acres.
#12	Tidal brackish marsh wildlife habitat, adjacent upland habitat	As needed to meet requirement	Subset of #8. Grassland protection or restoration within 200 feet of transitional uplands (beyond sea level rise accommodation).	As needed	See "Protection" column. Subset of #8. Upland habitat may be met through grassland protection, restoration, or a combination of both.

ID	Type	Protection		Restoration	
		Amount (Acres)	Location and Other Requirements	Amount (Acres)	Location and Other Requirements
					Also see #26 and #27.
Cultivated Lands					
#31	Cultivated lands	48,625	See species-specific requirements, below. See also #37–#39.	0	N/A
#36	Western burrowing owl habitat	At least 1,000	Subset of #31. May overlap with species-specific cultivated land requirements for other species. Pasture within 0.5 mile of grasslands, or within 0.5 mile of other burrowing owl habitat that is occupied by western burrowing owl.	0	N/A
Other Species-Specific Requirements					
N/A = not applicable					

Conservation Measure #11: Management and Enhancement –

Enhancement and Management Actions

Vegetation management. Vegetation will be enhanced and managed to reduce fuel loads for wildfires, reduce thatch, minimize nonnative competition with native plant species, increase biodiversity and provide suitable habitat conditions for covered species (see *Enhancement and Management Guidelines and Techniques*, below).

- **Burrow availability.** Grasslands (including the grassland natural community and grasslands within vernal pool complex and alkali seasonal wetland complex natural communities) will be enhanced and managed to increase the availability of overwintering and nesting burrows for western burrowing owl, California red-legged frog, and California tiger salamander; and to increase prey availability for San Joaquin kit fox, Swainson's hawk, white-tailed kite, and other native wildlife predators (see *Enhancement and Management Guidelines and Techniques, Ground-Dwelling Mammals*, below).
- **Artificial nesting burrows and structures.** Where appropriate, artificial nesting burrows will be installed or elevated berms, mounds, or debris piles will be created for western burrowing owl to facilitate use of unoccupied areas (see below, *Enhancement and Management Guidelines and Techniques, Structures for Covered Wildlife*). Perching structures will be installed to facilitate use by western burrowing owl, Swainson's hawk, and white-tailed kite (see below, *Enhancement and Management Guidelines and Techniques, Structures for Covered Wildlife Species*).

- **Woody debris in stock ponds.** Woody debris will be installed in stock ponds to provide cover and basking opportunities for western pond turtle (see below, *Enhancement and Management Guidelines and Techniques, Structures for Covered Wildlife Species*).
- **Vernal pool, alkali seasonal wetland, and stock pond hydrology.** The hydrology of vernal pool complex and alkali seasonal wetland complex natural communities and stock ponds will be enhanced and managed as described below in *Enhancement and Management Guidelines and Techniques, Hydrologic Functions of Vernal Pools, Seasonal Wetlands, and Stock Ponds*.
- **Invasive wildlife.** Bullfrogs and other nonnative predatory species that limit the abundance of covered amphibians in vernal pools, alkali seasonal wetlands, and ponds will be controlled (see below, *Enhancement and Management Guidelines and Techniques, Bullfrogs and Nonnative Predatory Fish*).
- **Vernal pool pollinators.** Vernal pool complexes will be enhanced and managed to sustain suitable conditions for vernal pool pollinators (see *Enhancement and Management Guidelines and Techniques, Vernal Pool Pollinators*).

Avoidance and Minimization Measures

This AMM incorporates survey, avoidance, and minimization guidelines taken primarily from CDFW's *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012). Also see AMM37 for measures to avoid and minimize recreation-related effects on this species.

Western burrowing owl habitat surveys will be required where burrowing owl habitat (or sign) is encountered within and adjacent to (within 150 meters) a proposed project area. Species surveys in suitable habitat are required in both breeding and nonbreeding seasons. If the project site falls within potential burrowing owl habitat, a qualified biologist will survey the project area and map areas with burrows (i.e., areas of highest likelihood of burrowing owl activity) and record all burrows that may be occupied (as indicated by tracks, feathers, egg shell fragments, pellets, prey remains, cast pellets, whitewash, or decoration) on the project site. This mapping will be conducted while walking transects throughout the entire project footprint, plus all accessible areas within a 150-meter radius of the project footprint. The centerlines of these transects will spaced 7 to 20 meters apart and will vary in width to account for changes in terrain and vegetation that can preclude complete visual coverage of the area. For example, in hilly terrain with patches of tall grass, transects will be closer together, while in open areas with little vegetation they can be 20 meters apart. Surveyors will stop at least every 100 meters along each transect to scan the entire visible area for presence of burrowing owls.

This methodology is consistent with the current accepted survey protocol for this species (California Burrowing Owl Consortium 2012). The Implementation Office may update this protocol during the permit term, based on changes to the accepted protocol, with the concurrence of CDFW and USFWS. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas.

If burrowing owls or suitable burrowing owl burrows are identified during the habitat survey, and if the project does not fully avoid direct and indirect impacts on the suitable habitat, preconstruction surveys will be required. Prior to any ground disturbance related to covered activities, a qualified biologist will conduct preconstruction surveys in areas identified in the habitat surveys as having suitable burrowing owl burrows. The purpose of the preconstruction surveys is to document the presence or absence of western burrowing owls on the project site. Preconstruction surveys may be conducted up to 14 days before construction. Suitable habitat is fully avoided if the project footprint does not impinge on a designated nondisturbance buffer around the suitable burrow. For occupied burrowing owl nest burrows, this nondisturbance buffer could range from 50 to 500 meters (**Table** Error! No text of specified style in document.-**24**~~Table 3.C-4~~) depending on the time of year and the level of disturbance based on current guidelines (Scobie and Faminov 2000). Construction of the water conveyance facilities and construction-related restoration activities that involve heavy equipment would be expected to constitute medium to high levels of disturbance for the species. However, buffer size may be reduced based on existing vegetation, human development, and land use, after consultation with CDFW (California Burrowing Owl Consortium 2012).

Table Error! No text of specified style in document.-**24. Recommended Restricted Activity Dates and Setback Distances by Level of Disturbance for Burrowing Owls**

Location	Time of Year	Level of Disturbance (meters)		
		Low	Medium	High
Nesting Sites	April 1–August 15	200	500	500
Nesting Sites	August 16–October 15	200	200	500
Nesting Sites	October 16–March 31	50	100	500
Source: Scobie and Faminov 2000				

Breeding season surveys (February 1–August 31) will consist of four visits, and will include at least one survey between 15 February and April 15, and a minimum of three surveys, at least 3 weeks apart, between April 15 and July 15, with at least one visit after June 15. Surveys conducted during the nonbreeding season (September 1–January 31) will consist of at least four surveys, spread evenly over the nonbreeding season. To maximize the likelihood of detecting owls, the preconstruction survey will last a minimum of 3 hours. The survey will begin 1 hour before sunrise and continue until 2 hours after sunrise (3 hours total) or begin 2 hours before sunset and continue until 1 hour after sunset. All owls observed will be counted and their location will be mapped.

If evidence of western burrowing owls is found during the breeding season (February 1–August 31), the project proponent will avoid all nest sites that could be disturbed by project construction during the remainder of the breeding season or while the nest is occupied by adults or young (occupation includes individuals or family groups foraging on or near the site following fledging). Avoidance will include establishment of a 50- to 500-meter nondisturbance buffer around nests. Construction may occur outside of the nondisturbance buffer. Construction may occur inside of the disturbance buffer, during the breeding season, if the nest is not disturbed and the project proponent

develops an avoidance, minimization, and monitoring plan that will be reviewed by the Implementation Office and the fish and wildlife agencies prior to project construction based on the following criteria.

- The Implementation Office and the fish and wildlife agencies approve of the avoidance and minimization plan provided by the project proponent.
- A qualified biologist monitors the owls for at least 3 days prior to construction to determine baseline nesting and foraging behavior (i.e., behavior without construction). The biological monitor will also conduct training of construction personnel on the avoidance procedures, buffers, and protocols in the event that a burrowing owl flies into an active construction zone.
- The same qualified biologist monitors the owls during construction and finds no change in owl nesting and foraging behavior in response to construction activities.
- If there is any change in owl nesting and foraging behavior as a result of construction activities, these activities will cease within the nondisturbance buffer. Construction cannot resume within the buffer until the adults and juveniles from the occupied burrows have moved out of the project site.
- If monitoring indicates that the nest is abandoned prior to the end of nesting season and the burrow is no longer in use by owls, the nondisturbance buffer may be removed. If necessary because the burrow cannot be avoided by construction activity, the biologist will excavate and collapse the burrow to prevent reoccupation after receiving approval from the fish and wildlife agencies.

If evidence of western burrowing owl is detected during the nonbreeding season (September 1–January 31), the project proponent will establish a 50- to 500-meter nondisturbance buffer around occupied burrows as determined by a qualified biologist. Construction activities outside of this buffer are allowed. Construction activities within the disturbance buffer are allowed, if the following criteria are met to prevent owls from abandoning important overwintering sites.

- A qualified biologist monitors the owls for at least 3 days prior to construction to determine baseline foraging behavior (i.e., behavior without construction).
- The same qualified biologist monitors the owls during construction and finds no change in owl foraging behavior in response to construction activities. How often will be biologist monitor the owls? Daily, every other day?
- If there is any change in owl nesting and foraging behavior as a result of construction activities, these activities will cease within the buffer.
- An artificial burrow will be constructed outside the construction zone within XXX feet of existing burrow.
- If the owls are gone for at least 1 week, the project proponent may request approval from the Implementation Office that a qualified biologist excavate and collapse usable burrows to prevent owls from reoccupying the site, if the burrow cannot be avoided by construction activities. After all usable burrows are excavated, the buffer will be removed and construction may continue.
- Monitoring must continue as described above for the nonbreeding season as long as the burrow remains active.

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Comment [TB2]: Could we recommend that an artificial structure be constructed a certain distance away if the owls are occupying a burrow within a construction area that will be monitored?

- During construction, the nondisturbance buffers will be established and maintained, if applicable (Under what circumstance would a buffer not be applicable?). A qualified biologist will monitor the site consistent with the requirements described above to ensure that buffers are enforced and owls are not disturbed. The biological monitor will also conduct training of construction personnel on the avoidance procedures, buffers, and protocols in the event that a burrowing owl flies into an active construction zone.

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The passive relocation of owls has been used in the past in the Plan Area to remove and exclude owls from active burrows during the nonbreeding season. Exclusion and burrow closure will not be conducted during the breeding season and will not be proposed until all possible avoidance and minimization measures are considered. If passive relocation is deemed necessary and is approved by the fish and wildlife agencies, a burrowing owl exclusion plan will be developed with consultation from CDFW biologists, and methodology will be designed as described in the species monitoring guidelines (California Burrowing Owl Consortium 2012). This may include the installation of one-way doors in burrow entrances by a qualified biologist during the nonbreeding season. These doors will be in place for 48 hours, and monitored twice daily to ensure owls have left the burrow, after which the biologist will excavate the burrow to prevent reoccupation. Burrows will be excavated using hand tools. During excavation an escape route will be maintained at all times. This may include inserting an artificial structure such as piping into the burrow to prevent collapsing until the entire burrow can be excavated and it can be determined that no owls are trapped inside the burrow. Other methods of passive relocation, based on best available science, may be approved by the fish and wildlife agencies. Artificial burrows will be used where burrowing owls must be excluded from existing burrows if such artificial burrows can be created less than 100 meters from the existing burrows on lands that are protected as part of the reserve system, or on Stone Lakes National Wildlife Refuge lands (in coordination with the refuge manager).

Effects Analysis –

Western Burrowing Owl

This section describes the adverse, beneficial, and net effects of the covered activities, including conservation measures, on the western burrowing owl. The methods used to assess these effects are described in Section 5.2.8, *Effects Analysis for Wildlife and Plants*, and more specific assessment methods are described below. The habitat model used for the western burrowing owl includes vegetation and land cover types used by the species for nesting and foraging characterized as high-and low-value habitat depending on reported use patterns from the literature. Vegetation types were assigned to a suitability category based on the species requirements as described in Appendix 2.A, *Covered Species Accounts*. Further details regarding the habitat model, including assumptions on which the model is based, are also provided in Appendix 2.A. Factors considered in assessing the value of affected habitat for the western burrowing owl, to the extent that information is

available, include vegetation type and structural characteristics, topographical and other land form characteristics, potential for ground squirrels, and cultivation practices.

Adverse Effects

Permanent Habitat Loss, Conversion, and Fragmentation

Covered activities will result in the permanent loss of up to 43,969 acres[1] of modeled habitat (11% of the modeled habitat in the Plan Area) for the western burrowing owl (**Error! Reference source not found.**~~Table 5.6-1~~), of which 12,450 acres is of high value and 31,519 acres is of low value. Most of the loss will result from tidal natural communities restoration.

Most burrowing owl occurrences in the Plan Area are associated with the high-value habitat category, and thus the large number of acres of low-value habitat affected represents marginally suitable but unoccupied habitat. Western burrowing owl habitat will be permanently lost due to tidal restoration, water conveyance facility construction, bypass improvements, floodplain restoration, riparian restoration, nontidal marsh restoration, grassland restoration, and construction of conservation hatcheries.

Water Conveyance Facility Construction

The construction of the conveyance facility and associated infrastructure will result in the permanent loss of 3,894 acres of modeled burrowing owl habitat in Conservation Zones 3, 4, 5, 6, and 8, the majority of which is low-value cultivated land (3,013 acres). An estimated 881 acres of high-value grassland habitat will be removed, the majority of which is associated with the construction of the Byron Forebay. There are several occurrences of western burrowing owls in the vicinity of the conveyance facilities near the forebay. Removal of high-value habitat in this area from construction of project facilities could remove occupied habitat, displace nesting and wintering owls, and fragment occupied habitats.

An estimated 2,865 of the 3,894 acres of burrowing owl habitat (2,324 acres of which are low-value habitat) will be lost due to placement of reusable tunnel material. The material will likely be moved to other sites for use in levee build-up and restoration, and the affected area will likely be restored. While this effect is categorized as permanent, because there is no assurance that the material will eventually be moved, the effect will likely be temporary. Furthermore, the amount of storage area needed for reusable tunnel material is flexible, and the footprint used in the effects analysis is based on a worst-case scenario; the actual area to be affected by reusable tunnel material storage will likely be less than the estimated acreage.

[1] Habitat or natural community loss acreage estimates are based on hypothetical footprints and models rather than detailed project-level design and represent the maximum allowed under the permit. Actual losses will be tracked through compliance monitoring to ensure that they do not exceed estimates.

Fremont Weir/Yolo Bypass Improvements

These activities will permanently remove an estimated 979 acres of modeled burrowing owl habitat in Conservation Zone 2, the majority of which is of high value (882 acres).

Tidal Natural Communities Restoration

This activity will result in the permanent removal of an estimated 29,668 acres of modeled burrowing owl habitat from Conservation Zones 1, 2, 3, 4, 5, 6, 7, 8, 10, and 11. The majority of removed acres (19,739 acres) are low-value cultivated land; however, some of the loss (9,929 acres) will consist of high-value grassland habitat. Tidal restoration will directly remove and fragment remaining high-value grassland habitat just north of Rio Vista in and around French and Prospect Islands, and in an area south of Rio Vista around Three mile Slough. Tidal natural communities restoration will affect one extant record of burrowing owl just northeast of Oakley along Dutch Slough and one possibly extirpated occurrence in Suisun Marsh. Because the estimates of the habitat loss resulting from tidal inundation are based on projections of where restoration may occur, actual effects are expected to be lower because sites will be selected to minimize effects on western burrowing owl occupied habitat.

Floodplain Restoration

Levee construction associated with floodplain restoration will result in the permanent removal of an estimated 1,594 acres of modeled burrowing owl habitat in Conservation Zones 2, 4, and 7 for the western burrowing owl (**Error! Reference source not found.**~~Table 5.6-1~~). Most of the acres removed (1,452 acres) are low- value cultivated lands. Only 142 acres are high-value grasslands, occurring in small patches along the San Joaquin, Old, and Middle Rivers in Conservation Zone 7.

Riparian Restoration

This activity will result in the permanent loss of an estimated 4,962 acres of burrowing owl habitat, most of which is low value (4,951 acres) (**Error! Reference source not found.**~~Table 5.6-1~~). Most of this loss will occur in Conservation Zone 7, in areas with no known burrowing owl occurrences.

Nontidal Marsh Restoration

This activity will result in the permanent loss of about 952 acres of low-value burrowing owl habitat in Conservation Zones 2 and 4 and 159 acres of high-value habitat (**Error! Reference source not found.**~~Table 5.6-1~~).

Grassland Restoration

This activity will affect an estimated 1,675 acres of burrowing owl habitat, most of which is low value (1,314 acres) (**Error! Reference source not found.**~~Table 5.6-1~~). However, the restoration of grasslands in modeled burrowing owl habitat constitutes habitat conversion

rather than permanent loss, since the restored grassland will provide high value for the species. Grassland restoration in cultivated lands will convert low-value habitat to high-value habitat for the species.

Conservation Hatcheries Facilities

This activity will result in the permanent loss of about 35 acres of high-value burrowing owl habitat in Conservation Zone 1.

Periodic Inundation

Yolo Bypass Operations

Appendix 5.J, *Effects on Natural Communities, Wildlife, and Plants,* provides the method used to estimate periodic inundation effects in the Yolo Bypass. Based on this method, periodic inundation could affect western burrowing owls occupying areas ranging from an estimated 2,912 acres of modeled habitat during a notch flow of 1,000 cfs to an estimated 6,231 acres during a notch flow of 4,000 cfs. The inundation could affect western burrowing owls in 1,390 to 3,303 acres of high-value habitat and 1,522 to 2,927 acres of low-value habitat (**Error! Reference source not found.**~~Table 5.6-3~~). However, project-associated inundation of areas that would not otherwise have been inundated is expected to occur in no more than 30% of all years, since Fremont Weir is expected to overtop the remaining estimated 70% of all years, and during those years notch operations will not typically affect the maximum extent of inundation. In more than half of all years under existing conditions, an area greater than the project-related inundation area already inundates in the bypass. Therefore, habitat conditions in the bypass are not expected to change substantially as a result of Yolo Bypass operations and effects on the western burrowing owl, if any, are expected to be minimal. If CAGS colonies are present with the owls, and the CAGS colonies are flooded to the point they do not reestablish themselves, then the impact to the owls would be more than minimal and they would likely be extirpated from the area, even though flooding only occurs once every three-four years.

Floodplain Restoration

Floodplain restoration could result in periodic inundation of up to 6,941 acres of western burrowing owl habitat. The majority of this habitat (6,162 acres) is low-value habitat. No CNDDB occurrences of western burrowing owls will be affected by these actions.

Construction-Related Effects

Direct and permanent effects of construction are described in Section 5.6.13.1.1, *Permanent Habitat Loss, Conversion, and Fragmentation*. Additional construction-related effects on the western burrowing owl include short-term temporary effects from water conveyance facility construction and long-term temporary effects from establishment of borrow and spoils sites. Construction-related injury and mortality and associated indirect effects are also described. Effects are described collectively for all covered activities and are also described for specific covered activities to the extent that this information is pertinent to assessing the value of affected habitat or the specific nature of the effect.

Covered activities are expected to temporarily remove a total of 2,339 acres of modeled burrowing owl habitat (**Error! Reference source not found.**~~Table 5.6-1~~). Nearly all of the affected modeled habitat is cultivated land. Most of the affected modeled habitat (1,659 acres) is low-value cultivated land. Approximately 679 acres represent high-value grassland habitat.

Temporary Habitat Loss

Construction-related effects will temporarily disturb 2,339 acres of habitat for the western burrowing owl (**Error! Reference source not found.**~~Table 5.6-1~~). Of this, 1,659 acres (71%) is low-value, cultivated habitat, and 679 acres (29%) is high-value grassland habitat. Temporarily disturbed areas will be restored in kind as western burrowing owl habitat within 1 year following completion of construction and management activities.

Of the 2,339 acres of modeled burrowing owl habitat to be temporarily removed, establishment and use of borrow and spoil areas associated with water facility construction will result in temporary removal of an estimated 102 acres (low value habitat) of modeled habitat for this species in Conservation Zones 4, 5, and 8 (**Error! Reference source not found.**~~Table 5.6-1~~).

Construction-Related Injury or Mortality

Construction will not likely cause injury or mortality to the western burrowing owl; however, under *AMM23 Western Burrowing Owl* (Appendix 3.C, *Avoidance and Minimization Measures*), preconstruction surveys, construction monitoring, and no-disturbance buffers will be implemented to avoid and minimize injury or mortality of this species during construction.

Indirect Construction-Related Effects

Construction activities, including conveyance construction, tidal restoration, Yolo Bypass enhancement, and floodplain restoration could cause noise and visual disturbances, which could in turn affect burrowing owl nesting and foraging behavior adjacent to activity areas. Any disturbance in the vicinity of a burrow occupied by burrowing owl will potentially displace winter owls or cause abandonment of active nests. A total of 15,260 acres of modeled burrowing owl habitat, 5,807 acres of which is high-value habitat within 500 feet of covered activities will temporarily be made less suitable as a result of construction noise and visual disturbances (**Error! Reference source not found.**~~Table 5.6-1~~). Construction noise above background noise levels (greater than 50 dBA) is expected to extend 500 to 5,250 feet from the edge of construction activity (Table 4, *Estimated Impacts on the Delta Wintering Population of Greater Sandhill Cranes from Collisions with Proposed BDCP Power Lines*, in Appendix 5.J, Attachment 5J.D, *Indirect Effects of the Construction of the BDCP Conveyance Facility on Sandhill Crane*). There are no available data to determine the extent to which these noise levels could affect the western burrowing owl. Potential effects of these disturbances on western burrowing owls will be minimized with implementation of AMM23, which requires surveys to determine the presence of active sites and the establishment of no-disturbance set-backs around active sites.

Effects of Ongoing Activities

Transmission Lines

New transmission lines will increase the risk for bird strikes, which could result in injury or mortality of the western burrowing owl. This species is expected to be at low risk of bird strike mortality based on factors assessed in the bird strike vulnerability analysis (Appendix 5.J, Attachment 5J.C, *Analysis of Potential Bird Collisions at Proposed BDCP Powerlines*), including wing morphology, flight altitude and timing, foraging behavior, social behavior. The species is large bodied but with relatively long and rounded wings, making it moderately maneuverable. While burrowing owls may nest in loose colonies, they do not flock or congregate in roosts or foraging groups. Collectively, the species' keen eyesight and largely ground-based hunting behavior make it a relatively low risk species for transmission line collision. While the species in not widespread in the Plan Area, it may become more widely distributed as grassland enhancement improves habitat for the species. Even so, the risk of impacts to the population are low, given its physical and behavioral characteristics. Transmission line poles and towers also provide perching substrate for raptors, which could result in increased predation pressure on local western burrowing owls. The existing network of transmission lines in the Plan Area currently poses this risk for western burrowing owls, and any incremental risk associated with the new transmission line corridors (up to an estimated 9.3 miles in the Plan Area) is expected to be low.

Facilities Operation and Maintenance

Activities associated with ongoing operation and maintenance of facilities could result in localized loss of western burrowing owl habitat, injury or mortality of burrowing owls, and temporary noise and disturbance effects over the term of the BDCP. These activities may include road, levee, and facilities maintenance that remove or disturb active burrows, and rodent abatement programs around conveyance facilities. These effects will be minimized to the extent possible with the implementation of AMM23, which requires surveys to determine presence or absence and the establishment of no-disturbance set-backs around active sites.

Habitat Enhancement and Management

Activities associated with habitat enhancement and management intended to maintain and improve habitat functions in protected habitats could result in localized loss of western burrowing owl habitat, injury or mortality of burrowing owls, and temporary noise and disturbance effects over the term of the BDCP. These effects will be minimized with implementation of AMM23, which requires surveys to determine presence or absence and the establishment of no-disturbance set-backs around active sites. Over the term of the BDCP, enhancement and management actions on conservation lands are expected to result in a net benefit because these actions are intended to improve habitat functions for the western burrowing owl and other covered species.

Management of the 5,000 acres of managed wetlands to be protected for waterfowl and shorebirds is not expected to result in overall adverse effects on the western burrowing owl. Management actions that will improve diversity on managed wetlands include control and eradication of invasive plants and maintenance of a diversity of vegetation types and elevations including upland areas. These management

actions will potentially benefit the western burrowing owl. The 5,000 acres of protected managed wetlands will be monitored and adaptively managed to ensure that management options are implemented to avoid adverse effects on the western burrowing owl.

Recreation

Passive recreation in the reserve system, where that recreation is compatible with the biological goals and objectives, could result in disturbance of burrowing owl nest sites in the vicinity of trails. *AMM37 Recreation* (Appendix 3.C) prohibits new trails within 200 meters of active western burrowing owl nests. Rodent control will be prohibited in the vicinity of trails, including equestrian-access areas, within 200 meters of burrowing owl burrows, except as necessary to protect important infrastructure. With implementation of these measures, recreation-related effects on the western burrowing owl are expected to be minimal.

Impact of Take on Species

The breeding range of the western burrowing owl extends south from southern Canada throughout most of the western half of the United States and south to central Mexico. The winter range extends from central California southeastward through Arizona, New Mexico, and Texas and south into northern and central Mexico and coincides with southern breeding range where the species is resident year-round (Haug et al. 1993). Burrowing owls were once widespread and generally common over western North America in treeless, well-drained grasslands, steppes, deserts, prairies, and agricultural lands (Haug et al. 1993). Owl population throughout the species' North American range are reportedly declining (James and Espie 1997; Klute et al. 2003).

There are an estimated 401,550 acres of modeled habitat for the western burrowing owl in the Plan Area; however an estimated 251,767 acres of this habitat (roughly 63%) is low-value cultivated land. Permanent loss of habitat can be described based on the proportion of low- and high-value habitat removed. Due to the distribution of burrowing owls in the Plan Area and the species' preference for grassland and pastureland (high value) land cover types, the loss of these habitat categories are more directly associated with direct effects on the species. The removal of most modeled cultivated land (low value) is not expected to affect the distribution or abundance of the species and in most cases is unlikely to affect individual active burrow sites. An estimated 8% of the modeled high-value habitat t will be permanently removed by covered activities. The loss of this habitat is more likely to affect the local distribution and abundance of the species. Therefore, to more effectively address the loss of high-value habitats, the primary conservation elements are also directed at the conservation of high-value habitat types. Recommend also protecting and improving land surrounding known breeding and wintering populations for increasing distribution. Is there a map of owl occurrences?

The species is a year-round resident in the Plan Area; however, local migratory patterns and the extent to which migrants occupy the Plan Area during the nonbreeding season are unclear. A population of burrowing owls that nest in Eastern Washington have been tracked to the Central Valley where they over winter (Global Owl Project 2009-2011). Stone Lakes NWR supports both breeding owls occupying natural squirrel burrows and artificial burrows that are occupied primarily over the winter. Data from CNDDB and surveys conducted by DWR in 2009, 2010, and 2011 (California Department of Water Resources 2012) indicate that almost all burrowing owls that occur in the Plan Area

nest in the southeast portion in grassland habitat. No burrowing owls were found on Delta islands or in seasonal wetlands. This area also corresponds with the distribution of moderate to high-value habitat. Therefore, the removal of high-value habitat also has a substantially greater likelihood of directly affecting active nesting or wintering burrows. In this region, which includes primarily Conservation Zones 1, 8, 9, and 11, the largest proportion of the known nesting population with potential to be affected by covered activities is in the vicinity of Clifton Court Forebay in Conservation Zone 8. Occupied habitats in Conservation Zones 1, 9, and 11 will be less affected by covered activities.

Although BDCP implementation will result in permanent, temporary, and indirect effects on the western burrowing owl as discussed above, take resulting from these actions will not have an adverse population-level effect on the species. Implementation of the BDCP will result in loss of one extant and two possibly extirpated burrowing owl occurrences in the Plan Area; however, there may be others. Ten of the 128 documented burrowing owl occurrences in the Plan Area are in locations that already have some degree of protection from development or other adverse effects.

Beneficial Effects

Assuming the restored and protected grassland, alkali seasonal wetland complex, vernal pool complex, and managed wetland natural communities will provide suitable western burrowing owl habitat proportional to the amount of modeled habitat that currently exists in these natural communities in the Plan Area (76%, 83%, 88%, and 10%, respectively), implementation of the BDCP will result in the protection of an estimated 7,589 acres of high-value habitat and 25,177 acres of low-value burrowing owl habitat consisting of these natural communities. Based on the same assumptions, implementation of the BDCP will result in the restoration of an estimated 1,642 acres of high-value and 3 acres of low-value burrowing owl habitat consisting of these natural communities. Additionally, Objective WBO1.1 calls for protection of at least 1,000 acres of cultivated lands in Conservation Zones 1 and 11 that support high-value burrowing owl habitat and are within 0.5 mile of high-value grassland habitat or occupied low-value habitat. Full implementation of the BDCP is therefore expected to result in an estimated 33,766 acres of total western burrowing owl habitat (8,589 acres high-value and 25,177 acres low-value habitat) and restoration of 1,645 acres of total western burrowing owl habitat (1,642 acres high-value and 3 acres low-value habitat) (**Error! Reference source not found.**~~Table 5.6-7~~).

Protection of natural communities used by burrowing owls will protect these lands from future threats of land conversion and reduce the effects of current levels of fragmentation, expand the amount of suitable protected habitat in the Plan Area. Protected grasslands, in particular, will support existing western burrowing owl populations that occur to the west of Conservation Zone 8 in Contra Costa County (linkage #2, Figure 3.2-16, *Landscape Linkages*, in Chapter 3) and in the areas surrounding Conservation Zones 1 and 11 in Solano County (linkage #1, Figure 3.2-16), which will especially benefit declining populations in the vicinity of Suisun Marsh and San Pablo Bay. Grassland protection will also take place in Conservation Zones 2, 4, 5, and 7.

The BDCP will further benefit the western burrowing owl by increasing the amount of burrows in protected and restored grasslands (*CM11 Natural Communities Enhancement and Management*), which will open opportunities for dispersing western burrowing owls to establish

new territories, and by increasing the diversity of prey options (CM11) and thus minimizing the effect that population swings of any one prey species will have on western burrowing owls.

Although cultivated lands are in the low suitability category for burrowing owl use, western burrowing owls are known to use road, canal, and levee embankments that have ground squirrel burrows or culverts, and thus the management of cultivated lands for western burrowing owl foraging habitat may further expand and support populations in the Plan Area in the long term. At least 1,000 acres of pasture lands and other highly valued foraging habitat for the western burrowing owl will be protected in Conservation Zones 1 and 11 near or adjacent to occupied grassland habitats (*CM3 Natural Communities Protection and Restoration*). Patches of habitat in cultivated lands that may support western burrowing owl prey species (insects and small mammals) will be protected (CM3). Implementation of this objective may allow western burrowing owls to establish a greater presence in the central portion of the Delta.

The BDCP will provide for the conservation and management of the western burrowing owl in cooperation and in conjunction with neighboring and overlapping HCP/NCCPs. Conservation actions will occur where they most benefit the regional western burrowing owl population and where they are compatible with the conservation of other species associated with grassland and cultivated land. The western burrowing owl conservation strategy is expected to sustain the existing population of western burrowing owls and provide for future increases in the species' abundance and distribution in and adjacent to the Plan Area.

Net Effects

Including both the habitat loss described in Section 5.6. 13.1, *Adverse Effects*, and the habitat restoration and protection described in Section 5.6.13.2, *Beneficial Effects*, implementation of the BDCP will result in an estimated net decrease of at least 42,425 acres (11%) of habitat for the western burrowing owl, mostly of low-value unoccupied habitat, and an estimated net increase of at least 25,859 acres (30%) of western burrowing owl habitat, mostly of high-value habitat, in conservation lands (**Error! Reference source not found.**~~Table 5.6-7~~).

Specific covered activities are expected to adversely affect burrowing owls through the permanent removal of 43,969 acres of modeled burrowing owl habitat, including 12,450 acres of high-value habitat. While this will result in a net loss of high-value modeled habitat, the loss represents only a small percentage of the available high-value habitat in the Plan Area and the majority of affected acres are lands that are unoccupied by burrowing owls. With the exception of the area in the vicinity of the Clifton Court Forebay, most of the loss of modeled burrowing owl habitat will not affect current breeding or wintering sites. Therefore, most of the loss of burrowing owl habitat will not affect the distribution or abundance of the species in the Plan Area. The remaining high-value habitat is expected to sustain the current population.

The loss of high-value western burrowing owl habitat is offset by three key conservation objectives: protection of 8,000 acres of grassland in Conservation Zones 1, 2, 4, 5, 7, 8, and 11; protection of an additional 1,000 acres of high-value pastureland with the grassland-pastureland matrix of Conservation Zones 1 and 11, and restoration of 2,000 acres of grassland. Other conservation objectives that target cultivated-land protection will be sufficient to sustain and expand existing burrowing owl populations in low-value habitat areas. Therefore, although the total acreage of available high-value habitat will decrease in the Plan Area, the protection, enhancement, and management of 11,000 acres of

habitat in key areas known to be occupied by burrowing owls will increase the extent of burrowing habitat under protected status in the Plan Area by at least 37% (**Error! Reference source not found.**~~Table 5.6-7~~), and will provide sufficient habitat for the protection and expansion of the burrowing owl population.

Overall, the BDCP will provide a net benefit to the western burrowing owl through the protection, management, and enhancement of high-value habitats in the Plan Area where the species is known to occur, and the increase in extent of habitat in protected status. These protected areas will be managed and monitored to support the species. Therefore, the BDCP will minimize and mitigate impacts, to the maximum extent practicable, and provide for the conservation and management of the western burrowing owl in the Plan Area.

EXHIBIT G

November 2, 2013

Stone Lakes National Wildlife Refuge Association
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Ek Grove, CA 95757

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Teresa Olsen, Chief
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Bay-Delta Office, US Bureau of Reclamation
810 I Street, Suite 140
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Dear Sirs and Madam:

I am writing on behalf of the Stone Lakes National Wildlife Refuge Association (Association) to provide an update on recent discussions of the Stone Lakes Conservation Working Group. Our Association, and the staff of the Stone Lakes National Wildlife Refuge (Refuge), have met several times with members of the BDCP planning team. The Association is a volunteer nonprofit public benefit corporation and comprised of interested citizens founded in 1995 with the purpose of supporting the Refuge and its goals. Among its activities, the Association works to ensure that the Refuge is protected from adverse impacts on the Refuge and its wildlife and resources. The Association is operated by a volunteer Board of Directors.

As you know, the Refuge is a large complex of natural wetlands, lakes and riparian areas within the Sacramento-San Joaquin Delta that provides critical habitat for waterfowl and other migratory birds of international concern, as well as a number of endangered plant and animal species. The Refuge and the surrounding agricultural areas are home to several special status species, including the tri-colored blackbird, greater sandhill crane, white-faced ibis, long-billed curlew, Swainson's hawk, burrowing owl, giant garter snake and valley elderberry longhorn beetle. The Refuge Boundary incorporates 18,000 acres, of which approximately 6400 acres are managed by the United States Fish and Wildlife Service (USFWS).

The Refuge, together with the Cosumnes River Preserve represents significant public investment to protect wetlands and foraging habitat near an urban area. Yet the Refuge remains one of most impacted refuges in country. In a 2005 annual report on threats to the National Wildlife System, the Refuge was identified as one of the six most threatened refuges in the nation. Since 2005, vineyard conversions, encroaching urban development, new transmission lines, wind and solar power facilities and urban runoff have only increased the many challenges facing the Refuge.

The Refuge is ground zero for major components of the Bay Delta Conservation Plan's (BDCP) proposed Conservation Measure 1, the Tunnel Conveyance Facility. The three large water intake plants, the tunnel entrance and forebay and the permanent and temporary transmission lines serving them are all proposed to be within or adjacent to the Refuge. The Refuge will experience significant direct and indirect impacts from the project, and the Association is an affected stakeholder.

The USFWS and California State Department of Fish and Wildlife (DFW), as cooperating agencies on the BDCP, must consider whether to issue take permits to the California State Department of Water Resources (DWR) for the tunnels. They must take into account species impact, both terrestrial and aquatic, in considering permit issuance.

The Association has been engaged in the BDCP from the outset, expressing major concerns as early as May 2009. We have pushed for a Stone Lakes Working Group since March 2011. Beginning in 2013 we have been working with BDCP planners and USFWS and DWR staff to address our concerns at several working group meetings

Changes to the project over the last several months have reduced the scale of project impacts on Stone Lakes. The forebay location is now near Twin Cities Road on less sensitive habitat with less impact to sensitive species. The forebay is now smaller, with a lower elevation. The BDCP is now committing to create new wetland roosting and associated uplands to better link the flyway route. The Avoidance and Mitigation Measures (AMM's) are stronger. Transmission line mitigation and route adjustments are in the works.

The Association appreciates the commitment that BDCP planners have made to address our concerns. We appreciate the efforts to improve mitigation for impacted terrestrial species. We appreciate that mitigation may increase wetland roost and foraging acres

managed by the Refuge, although we are certainly cognizant that the peripheral tunnel project is not the preferred way to implement the Stone Lakes NWR.

Even with these mitigation efforts, the Association is concerned that the CM1 Optimal Alignment proposal—the Tunnel Conveyance Facility--has not adequately addressed all the impacts to the affected species covered in the plan. In part this is because the project has been continually changing and the project description remains uncertain and incomplete. We hope that the upcoming Public Review Draft will provide the necessary and required design details and additional proposed mitigation to better assist us in understanding the impacts and issues related to this project. In summary, our remaining concerns are:

1) The new forebay and tunnel entrance, even though it reduces foraging habitat loss and offers other advantages, is still within the Refuge Boundary. The tunnel crosses Refuge land and right of way and temporary permits will be required for the conveyor belt.

2) While we do not oppose the new location as it appears at this time to be the "least worse" site, we must recognize that the new location will potentially complicate completing the refuge in ways that we cannot completely predict. Landowners may be less willing to cooperatively manage lands for wildlife benefit, enter into conservation easements or sell land to the Refuge at affordable prices. In addition, the Association's long term goal for public access along adjoining the old railroad grade may be compromised by forebay security concerns. We believe that the Tunnel Conveyance Facility project should include additional commitments to assisting the goal of completing the Refuge.

3) The planned transmission lines cross or are adjacent to Refuge lands, and their size and location remain subject to change as DWR negotiates with power providers. DWR remains reluctant to seriously consider undergrounding of permanent transmission lines.

4) We remain concerned about the mitigation of noise, light and facilities impacts on sensitive species. The greater sandhill crane is a flagship species for the Refuge and has high roost fidelity. It is not at all clear how well the species will tolerate the major intrusion of construction activity. The mitigation language in the plan is replete with "to the extent feasible" language. These potential impacts deserve continued study and attention to efforts to tighten the mitigation measures.

5) Muck storage on Zacharias Island, its placement and content, remain a concern. DWR describes the tunnel drilling lubricants as organic and vegetative based, but that could still very well include chemicals that are harmful to wildlife. DWR cites efforts to reduce storage and find beneficial uses for the muck, but there is no assurance that these will materialize. Quantitative commitments to muck minimization should be incorporated into the project.

6) Truck traffic will substantially increase along roads around the Refuge during the 10 year construction period. Traffic will significantly increase along Hood Franklin in front of Refuge Headquarters and adjacent to Blue Heron Trails which also is an identified greater sandhill crane roost area.

7) Staten Island's significant sandhill crane population is threatened by the new project alignment with muck storage and transmission lines crossing a major roost area. We will continue to be engaged in efforts to eliminate or greatly reduce these impacts.

8) There needs to be greater clarification and detail about the amount, timing and funding of new sandhill crane habitat.

9) It is increasingly evident that the overall project's conservation and mitigation measures are many and complex and will require vigilance in implementation. We are concerned that the proposed governance structure does not provide adequate assurances and balance to ensure that measures will be implemented. We believe there needs to be

    - Verification of how AMM's are intended to be implemented within the plan

    - Verification that the implementation of the AMMs are subject to credible oversight, especially during the intake/tunnel construction process

    - Verification that AMM implementation costs are included within the Plan

    - Verification that there is a place for the Association as part of the ongoing Plan oversight to ensure effectiveness of mitigation measures and adaptive mgmt responses

We will continue to review the governance portion of the project and provide input and recommendations just as we will continue to engage the BDCP process and work to ensure that the project, if it goes forward, will protect the Refuge's viability as a significant migratory waterfowl wetland.

While the Association will remain primarily concerned with the specifics of this project's impacts on the Refuge, sthe Association is aware of the large scale questions and issues associated with the project that deserve attention in the larger public interest. These questions include:

- Is the project is the best solution for meeting California's long term water needs?
- Will the proposed conservation measures to benefit impacted fish species be successful in increasing threatened populations?
- Will the project operate as proposed?
- Will it improve the long term viability of Delta lands?

- Is it the most economically viable and ultimately affordable solution to the state's water challenges?
- Who will ultimately pay for it?
- Are there adequate assurances that the project will not serve as a conduit for increased water transfers to the south at the expense of northern California needs?
- And perhaps most important: How much water is available to meet the needs of Californians and protect its native habitat and species, how will that availability change with climate change, and at what point may water availability issues become a limiting factor in California's growth?

The Association supports a comprehensive and unbiased effort to address these concerns, and urges that state and federal participants proceed with care and diligence. We, and all Californians, need and deserve careful and thoughtful deliberation before a decision is made to move forward with the largest construction project in State history.

If you have any questions, please don't hesitate to contact me at ellen@tech-hero.com, or Robert Burness, Association Conservation Committee chair, at rmburness.@comcast.net. Thank you for your attention to these concerns.

Sincerely,

Ellen Carlson, President
Stone Lakes NWR Association

C: David Murillo Regional Director Mid Pacific Region US Bureau of Reclamation
Susan Fry, Manager, Bay-Delta Office, US Bureau of Reclamation
Ellen Berryman, ICF
Lori Rinek, Section 10 Coordinator, San Francisco Bay-Delta Fish and Wildlife Office, USFWS
Laura Cholodenko, California Department of Fish and Wildlife
Osha Merserve, Soluri & Meserve

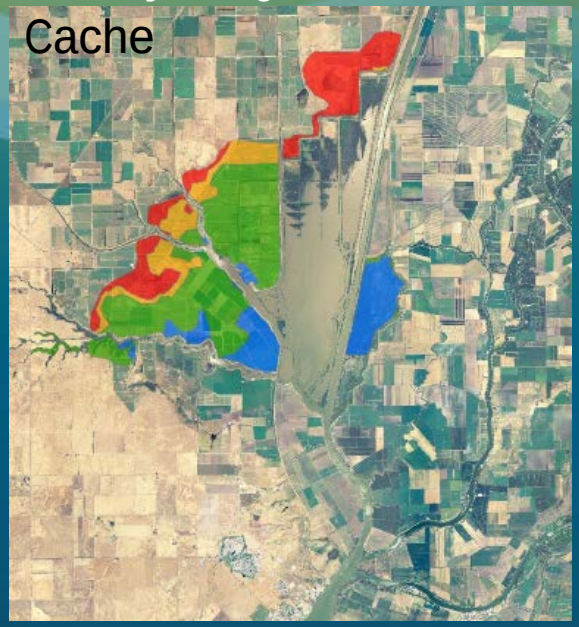
EXHIBIT H

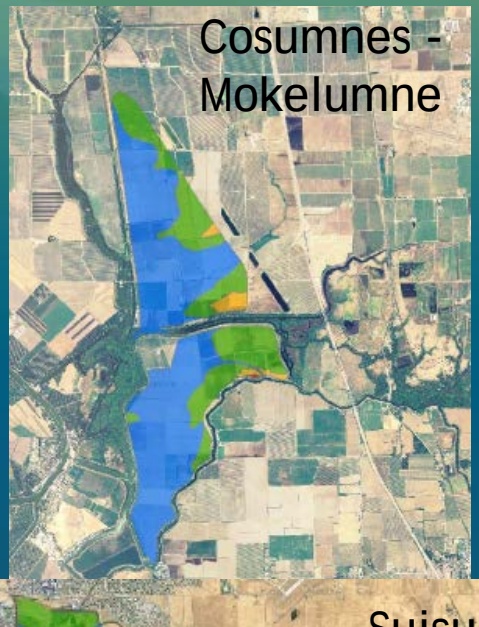
"Hypothetical" Restoration Assumptions for BDCP Modeling – ELT

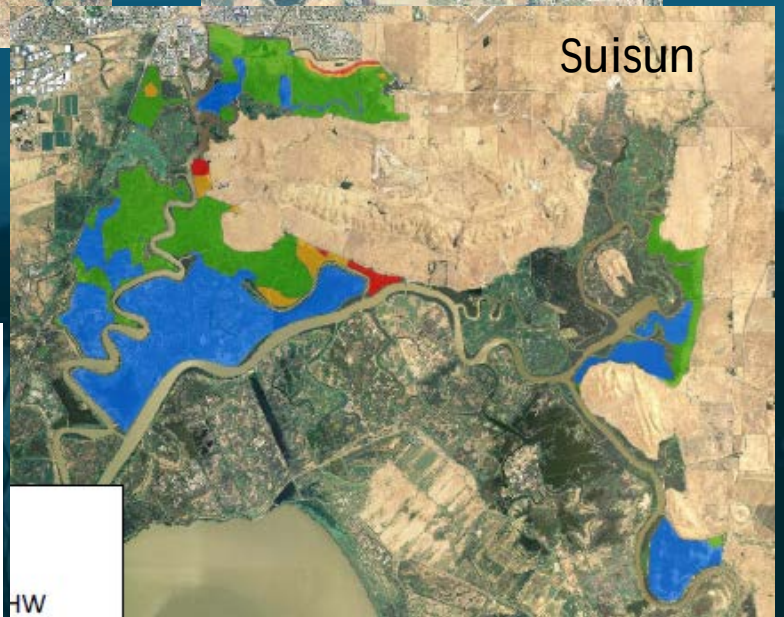
BDCP
BAY DELTA CONSERVATION PLAN

LAND-70

- **Early Long-Term: ~25000 acres of tidally connected open water areas in the Delta**







FOR 3/13/14 BECT MEETING
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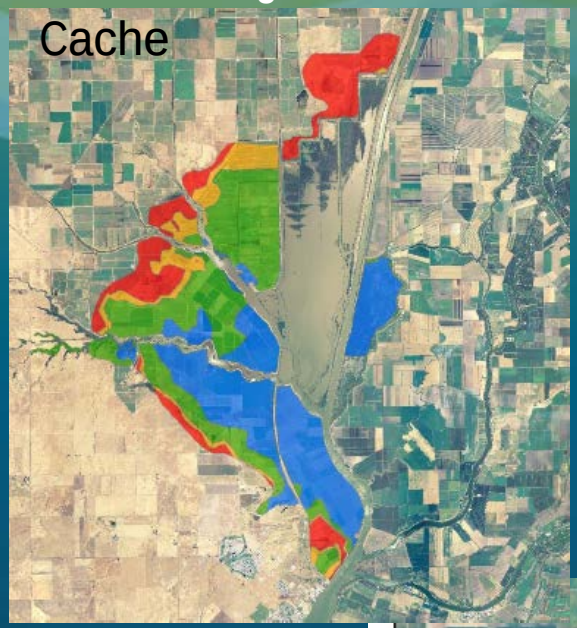
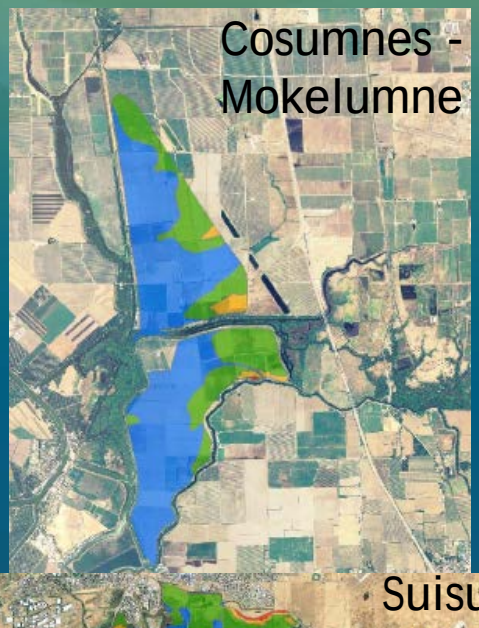
"Hypothetical" Restoration Assumptions for BDCP Modeling – LLT

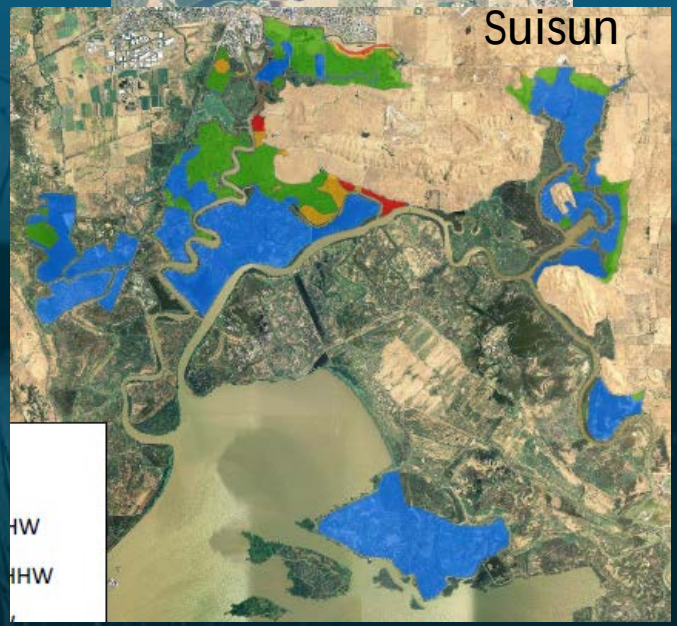
BDCP
BAY DELTA CONSERVATION PLAN

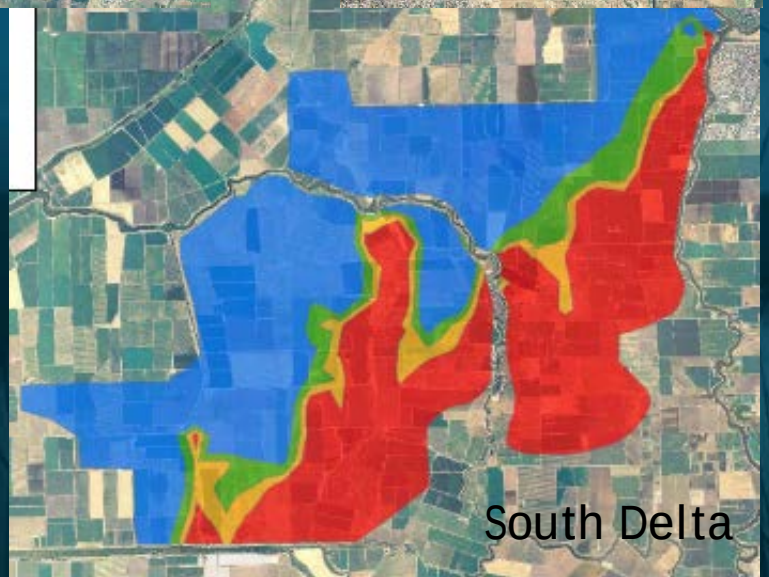
LAND-70

- **Late Long-Term: ~65000 acres of tidally connected open water areas in the Delta**



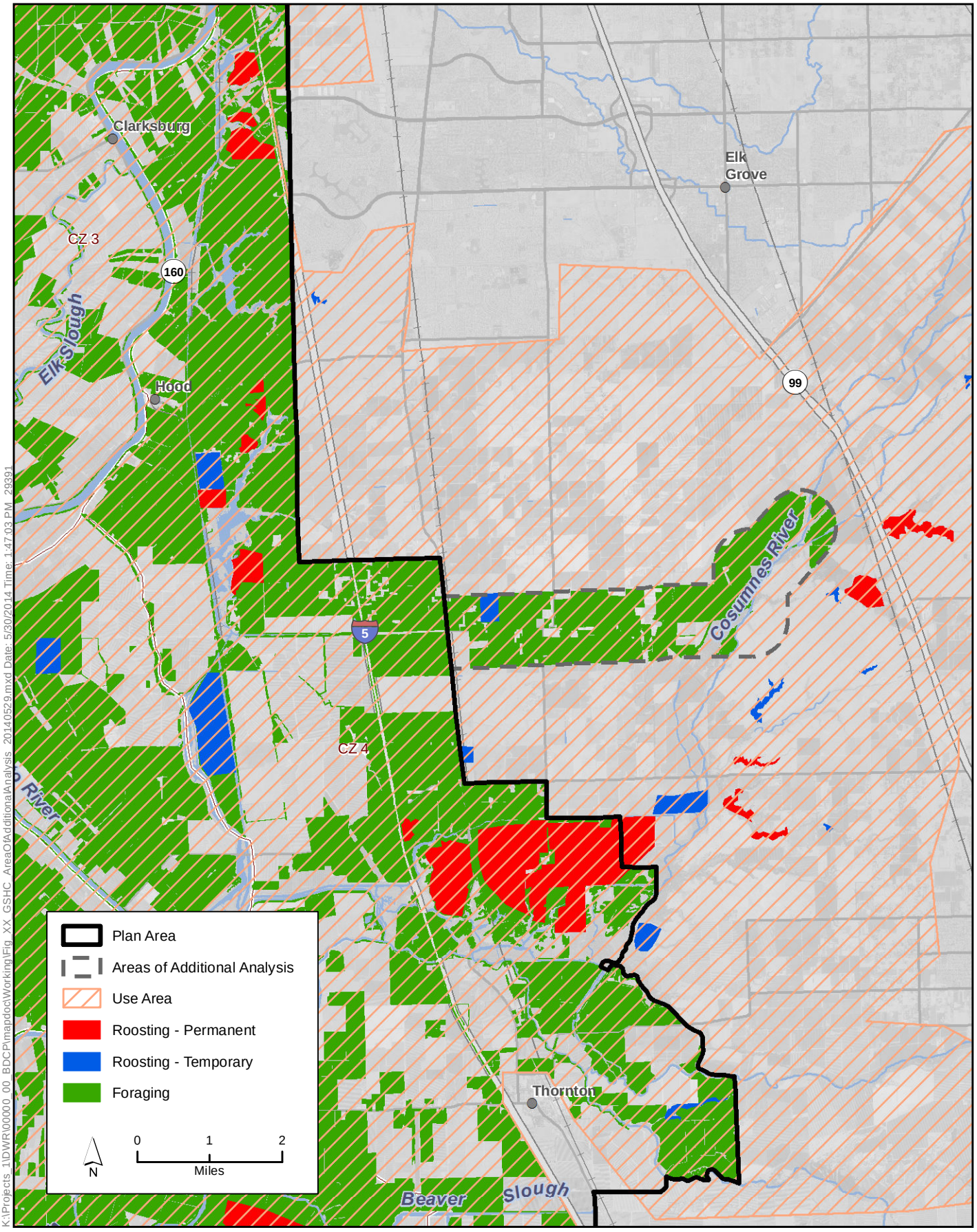






FOR 3/13/14 BECT MEETING DISCUSSION PURPOSES ONLY--DO NOT DISTRIBUTE

EXHIBIT I



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GIS Data Source: Conservation Zones, SAIC 2012; Plan Area, ICF 2012;
Hydrological Subregions, ICF 2012; Restoration Opportunity Area, SAIC 2011.

EXHIBIT J

REUSABLE TUNNEL MATERIAL TESTING REPORT

Delta Habitat Conservation and Conveyance Program
Standard Agreement 4600008104, Task Order WGI 14

March 2014

Prepared for:

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
Division of Engineering
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URS

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In Association with:

California Department Of Water Resources
Advancing the Bay Delta Conservation Plan
Delta Habitat Conservation & Conveyance Program

DHCCP Team

2.0 TESTING PROGRAM

2.1 Soil Sample Selection

Table 2-1 lists a combination of the soil type data shown on Figure 1-3 and laboratory test results on proposed tunnel zone soil samples collected during geotechnical investigations from 2009 through 2012 (URS, 2013b). Statistical evaluation of subsurface data collected to date indicates that an average mixture of tunnel zone soils would classify as sandy lean clay according to the Unified Soil Classification System.

Table 2-1. Summary of 2009 through 2012 Investigation Results

Soil Index Properties	Test Method	Average Values in Tunnel Zone
Moisture Content (%)	ASTM D2216	33
Liquid Limit (%)	ASTM D4318	44
Plasticity Index (%)	ASTM D4318	23
Fines Content (%)*	ASTM D422	56
Sand Content (%)	ASTM D422	44
Gravel Content (%)	ASTM D422	0
Soil Classification	ASTM D2487	Sandy Lean Clay (sCL)

*Fines = percent passing a #200 sieve (silt and clay)

DHCCP soil core sample boxes are currently stored at the DWR warehouse in West Sacramento. DWR and URS representatives reviewed soil core samples, and specific samples within the proposed tunnel zone (ranging in elevation from -100 to -170 feet) were chosen for this RTM testing program. Figure 1-1 shows 19 boring locations along the proposed tunnel alignment where samples were obtained. Soil core samples were mixed together with the intention of generating uniform baseline soil samples representative of average tunnel zone material. Subsequent testing demonstrated that the baseline soil samples were uniform and classified as sandy lean clay. Appendix A contains a description of the baseline soil sample generation process.

2.2 Soil Conditioning

2.2.1 Typical Construction Procedures

Soil conditioners such as foams and polymers are typically added in front of the TBM cutterhead, in the working chamber, and sometimes along the screw conveyor (see Figure 2-1) to increase soil workability and facilitate transportation of soil cuttings outside of the tunnel excavation. Soil conditioner products vary and are typically selected by the tunneling contractor.

3.2.5 Environmental Property Conclusions

Based on the test results in Table 3-3 and 3-4, there is no indication that RTM would require handling as hazardous waste material. RTM would be expected to meet conditions acceptable for unrestricted land uses, with or without added soil conditioners.

However, exposure of people, wildlife and plants to conditioned soil has not been fully assessed under unrestricted-use conditions, creating an uncertainty for potential adverse effects. If RTM is to be placed in the environment where people could contact the soil, either directly (e.g., through skin contact) or indirectly (e.g., as airborne particulate, or as leachate in surface or drinking water), then human health risk assessment(s) will need to be developed. Development of appropriate exposure scenarios for evaluation in the risk assessment will depend on the specific environmental context; for example, uses as surficial landscape fill for a residential area or subsurface use at a construction site. Determination of appropriate exposure scenarios, and the specific risk-assessment details, is a collaborative process with regulatory agency and/or permitting agency authorities (e.g., the California RWQCB, the United States Army Corps of Engineers (USACE), or the DTSC), depending on the re-use option. The scoping process would be used to determine if additional evaluation efforts are necessary to meet agency requirements for allowing re-use (e.g., benthic invertebrate bioassays if spoils are intended for wetland fill, or phytotoxicity testing if spoils are intended for upland re-use).

3.3 Planting Suitability Properties

3.3.1 Conditioner Effects on Soil Properties

A comparison between the planting suitability test results on baseline and conditioned soil samples are presented in Table 3-6. Except for sample 3B-1 that was lime-treated, there does not appear to be a consistent trend between the baseline and conditioned soil test results. Sample 3B-1 exhibited an elevated pH value; therefore, lime-treated soil should be kept away from areas where plant growth is desirable. To increase planting suitability, RTM would require soil amendments as the native soils within the tunnel zone have a low organic content.

3.3.2 Planting Suitability Conclusions

The soil conditioner application rates used for this RTM testing program were purposefully higher than industry typical values that were recommended by the conditioner manufacturers. As a result, the effects of adding conditioners on the soil's planting suitability properties are likely to be higher than would be expected for RTM. Even with increased rates of conditioner application, the testing performed indicates that the conditioner products do not appear to pose a significant threat to planting suitability.

Although the tests performed indicate favorable results for reusability of RTM, if conditioned soil is to be placed in the environment for large-scale uses then additional plant growth tests may be required by regulatory agency and/or permitting agency authorities. These tests are unique and specific to certain conditions, and therefore should be scoped in collaboration with pertinent agencies (e.g., California State Water Resources Control Board (SWRCB) and/or Central Valley Regional Water Quality Control Board (CVRWQCB), California Office

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October 17, 2013

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URS
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833

RE: DHCCP Testing, Job No. WBS014.7
Revised

Dear Rob & Chris,

Our ID No.	Sample
13-281-12	1C-1
13-287-15	2B-1

These two samples have moderate alkalinity. The pH values are 7.75 and 7.87, respectively. Salinity is moderate at 1.72 and 2.14 millimho/cm, respectively.

Nitrogen is modest. Phosphorus is low. Potassium, sulfur, iron, manganese and copper are sufficient. Zinc is high at 56 parts per million in sample 1C-1. The high concentration of zinc may be from the Hobart blender. Boron is moderate in 1C-1 and is low in sample 2B-1. Magnesium is high. Total available sodium is moderately high. SAR (sodium adsorption ratio) is 4.6 and 5.2, respectively.

The optimal level for zinc is several parts per million. Sensitive plants such as woody plants need plant available zinc below about 30 parts per million. Herbaceous plants need plant available zinc below about 50 parts per million. Excessive zinc causes poor growth, stunting, dieback and discoloration. It interferes with root functions. High zinc restricts the uptake of potassium and other micronutrients. Grasses are fairly tolerant of high zinc. Since heavy metals do not normally migrate through the soil profile, deeper soil is expected to be more suitable. Over time growth may improve as plants root into deeper soil with lower levels of heavy metals.

The concentrations of non-essential heavy metals are low. A low amount of plant-available lead and vanadium are present.

Cation Exchange Capacity are 25.71 and 24.44 milliequivalents per 100 grams, respectively. Exchangeable potassium is modest at 1%. Exchangeable magnesium is high at 27%. High magnesium limits the uptake of potassium and calcium. Exchangeable calcium is modest and ranges from 62% to 56%, respectively. Exchangeable sodium is slightly high at 6%.

The rates are water percolation is moderately slow at inches per hour for sample 1C-1 and is slow at 0.08 inches per hour for sample 2B-1. Excess sodium reduces soil porosity and decreases the rate of drainage.

The soil textures are clay loam.

Recommendations

Use zinc-tolerant plants for sample 1C-1 or a more suitable soil. Evaluate clean soil and the possible contamination from the Hobart blender.

General soil preparation on a square foot basis for a 6-inch lift. Broadcast the following materials uniformly. The rates are per 1,000 square feet. Incorporate them homogeneously 6 inches deep:

Potassium sulfate (0-0-50) - 6 pounds
Triple superphosphate (0-45-0) – 4 pounds
agricultural gypsum - 50 pounds
Organic soil amendment – about 3 cubic yards, sufficient for 3% to 6% soil organic matter on a dry weight basis

For the preparation on a volume basis, homogeneously blend the following materials into clean soil. Rates are expressed per cubic yard:

Potassium sulfate (0-0-50) - 1/4 pound
Triple superphosphate (0-45-0) – 1/4 pound
agricultural gypsum – 2.5 pounds
Organic soil amendment – about 15% by volume, sufficient for 3% to 6% soil organic matter on a dry weight basis

Organic soil amendment:

1. Humus material shall have an acid-soluble ash content of no less than 6% and no more than 20%. Organic matter shall be at least 50% on a dry weight basis.
2. The pH of the material shall be between 6 and 7.5.
3. The salt content shall be less than 10 millimho/cm @ 25° C. in a saturated paste extract.
4. Boron content of the saturated extract shall be less than 1.0 part per million.
5. Silicon content (acid-insoluble ash) shall be less than 50%.
6. Calcium carbonate shall not be present if to be applied on alkaline soils.
7. Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, peat mosses etc. low in salts, low in heavy metals, free from weed seeds, free of pathogens and other deleterious materials.
8. Composted wood products are conditionally acceptable [stable humus must be present]. Wood based products are not acceptable which are based on red wood or cedar.
9. Sludge-based materials are not acceptable.
10. Carbon:nitrogen ratio is less than 25:1.
11. The compost shall be aerobic without malodorous presence of decomposition products.
12. The maximum particle size shall be 0.5 inch, 80% or more shall pass a No. 4 screen for soil amending.

Maximum total permissible pollutant concentrations in amendment in parts per million on a dry weight basis:

arsenic	20	copper	100	selenium	50
cadmium	15	lead	200	silver	10
chromium	300	mercury	10	vanadium	500
cobalt	50	molybdenum	20	zinc	200
		nickel	100		

The soil physical properties are expected to improve with deep irrigation and leaching of sodium. Apply ammonium sulfate (21-0-0) at 5 pounds per 1,000 square feet afterwards.

For site maintenance, apply ammonium sulfate (21-0-0) at 5 pounds per 1,000 square feet about once per quarter. Apply gypsum at 10 pounds per 1,000 square feet several times a year or as needed to reduce the effects of high exchangeable magnesium. Monitor the site with periodic soil testing. Adjust the fertility program as needed.

Suitable Import, Borrow Topsoil or Reclaimed soil

General - Topsoil shall be free of roots, clods, stones larger than 1-inch in the greatest dimension, pockets of coarse sand, noxious weeds, sticks, lumber, brush and other litter. It shall not be infested with nematodes or other undesirable disease-causing organisms such as insects and plant pathogens.

Topsoil shall be friable and have sufficient structure in order to give good tilth and aeration to the soil.

Gradation limits - soil shall be a sandy loam, loam, or clay loam. The definition of soil texture shall be the USDA classification scheme. Gravel over 2 millimeters in diameter shall be less than 20% by weight.

Permeability Rate - Hydraulic conductivity rate shall be not less than one inch per hour nor more than 20 inches per hour when tested in accordance with the USDA Handbook Number 60, method 34b or other approved methods.

Fertility - The range of the essential elemental concentration in soil shall be as follows:

	Ammonium Bicarbonate/DTPA Extraction parts per million (mg/kilogram dry weight basis
phosphorus	10 - 40
potassium	100 - 220
iron	5 - 35
manganese	0.6 - 6
zinc	1 - 8
copper	0.3 - 5
boron	0.2 – 1.0
magnesium	50 - 150
sodium	0 - 100
sulfur	25 - 500
molybdenum	0.1 – 1.0

Acidity - The soil pH range measured in the saturation extract (Method 21a, USDA Handbook Number 60) shall be 6.5 - 7.9.

Salinity - The salinity range measured in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 0.5 - 2.5 dS/m.

Chloride - The maximum concentration of soluble chloride in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 150 mg/l (parts per million).

Boron - The maximum concentration of soluble boron in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 1.0 mg/l (parts per million).

Sodium Adsorption Ratio (SAR) - The maximum SAR shall be 3 measured per Method 20b, USDA Handbook Number 60.

Aluminum – Available aluminum measured with the Ammonium Bicarbonate/DTPA Extraction shall be less than 3 parts per million.

Soil Organic Matter Content - Sufficient soil organic matter shall be present to impart good physical soil properties but not be excessive to cause toxicity or cause excessive reduction in the volume of soil due to decomposition of organic matter. The desirable range is 3% to 6% on a dry weight basis.

Calcium Carbonate Content - Free calcium carbonate (limestone) shall not be present for acid-loving plants.

Heavy Metals - The maximum permissible elemental concentration in the soil shall not exceed the following concentrations:

	Ammonium Bicarbonate/DTPA Extraction parts per million (mg/kilogram) dry weight basis
arsenic	1
cadmium	1
chromium	10
cobalt	2
lead	30
mercury	1
nickel	5
selenium	3
silver	0.5
vanadium	3

If the soil pH is between 6 and 7, the maximum permissible elemental concentration shall be reduced 50%. If the soil pH is less than 6.0, the maximum permissible elemental concentration shall be reduced 75%. No more than three metals shall be present at 50% or more of the above values.

Phytotoxic constituent, herbicides, hydrocarbons etc. - Germination and growth of monocots and dicots shall not be restricted more than 10% compared to the reference soil. Total petroleum hydrocarbons shall not exceed 50 mg/kg dry soil measured per the modified EPA Method No. 8015. Total aromatic volatile organic hydrocarbons (benzene, toluene, xylene and ethylbenzene) shall not exceed 0.5 mg/kg dry soil measured per EPA Methods No. 8020.

Sincerely,

Garn A. Wallace, Ph. D.
GAW:n

EXHIBIT K

REPORT ON NOISE LEVELS FROM PROPOSED CONCRETE BATCHING PLANT AT FAIRFORD CONCRETE LTD, WHELFORD LANE, FAIRFORD, GLOUCESTERSHIRE, GL7 4DS

Stan Simpson BSc (Hons), MSc(Acoustics), MIOA
33 Walsingham Road,
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BS6 5BU
0117 9426235

JULY 2008

RECOMMENDATIONS

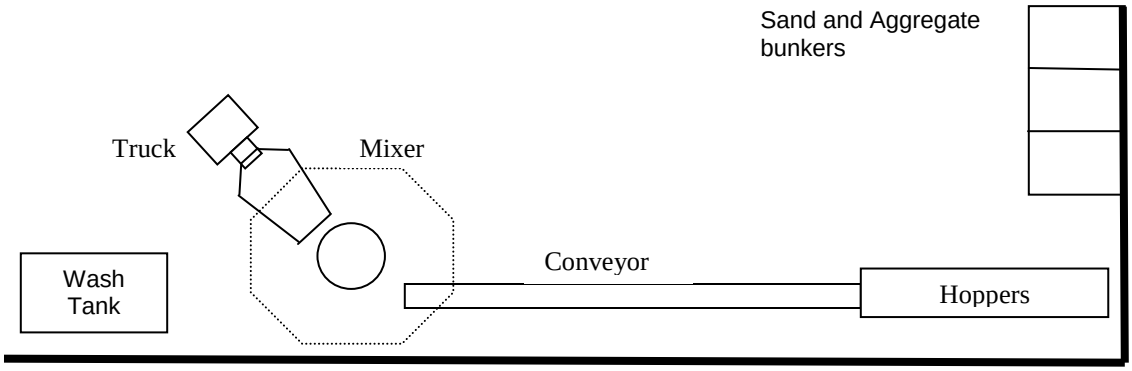
1. **The batching plant should be enclosed along its southern and eastern edges by a three metre high noise screen. It should be designed to screen the aggregate bunkers, and to minimise noise propagation in the south and east directions.**

2. **Concrete truck drum speeds must be limited to 9 rpm either through management procedures or by fitting a limiter to the drum speed control.**

3. **The hoppers should be lined with a resilient surface or constructed from damped steel sheet to reduce impact noise (this should reduce the noise generated at high level by at least 5 dB).**

4. **The concrete trucks should use the suggested route to avoid movements close to the eastern boundary.**

Layout may be different to this example so long as the noise sources are as close as possible to the noise screen



3 m High Noise Screen Wall

EXHIBIT L

3.3.1.1 Greater Sandhill Crane

3.3.1.1.1 Applicable Natural Community Goals and Objectives

Natural community biological goals and objectives integral to the conservation strategy for the greater sandhill crane are stated below.

Goal CLNC1: Cultivated lands that provide habitat connectivity and support habitat for covered and other native wildlife species.

- **Objective CLNC1.1:** Protect 48,625 acres of cultivated lands that provide suitable habitat for covered and other native wildlife species.
- **Objective CLNC1.2**: Target cultivated land conservation to provide connectivity between other conservation lands.
- **Objective CLNC1.3**: Maintain and protect the small patches of important wildlife habitats associated with cultivated lands that occur in cultivated lands within the reserve system, including isolated valley oak trees, trees and shrubs along field borders and roadsides, remnant groves, riparian corridors, water conveyance channels, grasslands, ponds, and wetlands.

Objective CLNC1.1 Benefits: The key to sustaining greater sandhill crane populations in the Plan Area is the sustainability of an economically viable and compatible cultivated landscape. This objective will protect sufficient suitable habitat in the Plan Area for covered species associated with cultivated lands, including the greater sandhill crane. Achieving this objective will offset the loss of cultivated land values from construction actions and the conversion of cultivated lands to tidal restoration. Combined with other conservation lands in the Plan Area and assuming that cultivated land uses will otherwise continue to provide habitat value to covered species in the Plan Area, achieving this objective will address the effects of covered activities on cultivated land values and conserve greater sandhill crane and other covered species associated with cultivated lands. Recommend including some efforts toward monitoring to support and guide these goals and objectives.

Objective CLNC1.2 Benefits: Achieving this objective will promote connectivity of suitable cultivated lands to provide for larger parcels of suitable greater sandhill crane wintering habitat. Greater sandhill cranes are highly traditional to roosting sites within the Greater Sandhill Crane Winter Use Area and suitable cultivated land foraging habitat must be in close proximity to these sites to sustain long-term use patterns. Therefore, protecting lands that are adjacent or near traditional crane roosts or foraging habitats will help to sustain and expand these existing use patterns. For example, with the increase in crane use of lands on and surrounding the Stone Lakes National Wildlife Refuge (Appendix 2.A, *Covered Species Accounts*), protecting and managing adjacent lands may help to increase use of this area and expand the cranes' winter distribution within Conservation Zone 4.

Comment [TB1]: The document needs consistency when referring to the Stone Lakes NWR, Cosumnes and the Project Boundary. Suggestions: Stone Lakes National Wildlife Refuge (Stone Lakes NWR), Cosumnes River Preservere (Cosumnes RP), Stone Lakes NWR Project Boundary (SLNWR Project Boundary)
[eb] okay

Comment [SLNWRA2]: How is connectivity a factor for GSC other than in terms of placing the lines on the routes? [eb] connectivity is a factor because GSC typically travels within only a mile between roosting and foraging site.

Comment [TB3]: Currently provide or have potential to provide? [eb] both. This is elaborated upon further in CMs 3 and 11.

Comment [SLNWRA4]: (Here and later.) What is the ecological relationship to these lands, the GSC species' requirements, and the 7,300 ac, the 700

Comment [TB5]: Is "reserve system" defined elsewhere in the document. May want to define

Comment [SLNWRA6]: Objectively how is this a targeted ecosystem or suite of ecosystem values? How can we measure the success or failure of thi

Comment [TB7]: Wintering populations of greater sandhill cranes.... [eb] okay, revised.

Comment [SLNWRA10]: Another way to state benefits: sustaining annually cropped open lands and assuring that a substantial portion of this

Comment [TB8]: Recommend adding target population that protected lands will support

Comment [EB9]: Compliance monitoring will be used to track this objective. This is described in th

Comment [SLNWRA11]: Have high fidelity.
[eb] okay, revised.

Comment [TB12]: ...GSHC utilize the same roost sites year after year therefore suitable cultivated

Comment [TB13]: And protect [eb] okay, revised

Objective CLNC1.3 Benefits: Achieving this objective will retain existing noncultivated habitat elements on protected cultivated lands through the retention of seasonal wetlands and upland edges that sometimes occur in association with cultivated lands.

3.3.1.1.2 Species-Specific Goals and Objectives

The landscape-scale and natural community biological goals and objectives, and associated conservation measures, discussed above, are expected to protect, restore, and enhance suitable habitat for greater sandhill crane within the reserve system. The goals and objectives below address additional species-specific needs that will otherwise not be met at the landscape or natural community scale.

Goal GSHC1: Protection and expansion of greater sandhill crane winter range.

- **Objective GSHC1.1**: Within the 48,625 acres of cultivated lands protected under Objective CLNC1.1, protect 7,300 acres of high- to very high-value habitat for greater sandhill crane, with at least 80% maintained in very high-value types in any given year, as defined in *CM3 Natural Communities Protection and Restoration*. This protected habitat will be within 2 miles of known roosting sites in Conservation Zones 3, 4, 5, and/or 6 and will consider sea level rise and local seasonal flood events, greater sandhill crane population levels, and the location of foraging habitat loss. Patch size of protected cultivated lands will be at least 160 acres.
- **Objective GSHC1.2:** To create additional high-value greater sandhill crane winter foraging habitat, at least 10% of the habitat protected under Objective GSHC1.1 will involve acquiring low-value habitat or nonhabitat areas and converting it to high- or very high-value habitat. Created habitat will be within 2 miles of known roosting sites in Conservation Zones 3, 4, 5, and/or 6 and will consider sea level rise and local seasonal flood events, greater sandhill crane population level, and the location of habitat loss.
- **Objective GSHC1.3:** Create 320 acres of managed wetlands consisting of greater sandhill crane roosting habitat in minimum patch sizes of 40 acres within the Greater Sandhill Crane Winter Use Area[1] in Conservation Zones 3, 4, 5, or 6, with consideration of sea level rise and local seasonal flood events. The wetlands will be located within 2 miles of existing permanent roost sites and protected in association with other protected natural community types (excluding nonhabitat cultivated lands) at a ratio of 2:1 upland to wetland to provide buffers around the wetlands.
- **Objective GSHC1.4:** In addition to the 320 acres of created managed wetland greater sandhill crane roosting habitat (Objective GSHC1.3), create two wetland complexes approximately 180- 270 acres in size within the Stone Lakes National Wildlife Refuge ~~p~~Project ~~b~~Poundary~~project boundary~~[2]. The complexes will be no more than 2 miles apart and will help provide connectivity between the Stone Lakes and Cosumnes River Preserve greater sandhill crane populationshabitat. Each complex will consist of at least three wetlands totaling 90 acres of greater sandhill cranethat meet criteria for roosting habitat, and will be located within protected in association with other protected natural community types (excluding non-habitat~~nonhabitat~~ cultivated lands) at a ratio of at least 2:1 uplands to wetlands (i.e., two sites with 90 acres of wetlands each). One of the 90-acre wetland complexes may be replaced by 180 acres of cultivated lands (e.g., rice or cornfields) that are flooded to suitable depths following harvest to support roosting cranes and provide highest-value foraging habitat, provided such substitution is consistent with the long-term conservation goals of Stone Lakes National Wildlife Refuge for the greater sandhill crane.
- **Objective GSHC1.5:** Create an additional 95 acres of roosting habitat within 2 miles of existing

[1] Important geographically defined greater sandhill crane wintering areas in the Central Valley (Pogson and Lindstedt 1988; Littlefield and Ivey 2000; Ivey pers. comm.) (Figure 2A.19-2).

[2] The P~~p~~roject Bproject boundary delineates the area surrounding the existing refuge for which the refuge has authority to acquire land or easements.

Comment [SLNWRA14]: Not necessarily a bad idea, but if the best outcome is to preserve as much high quality forage land within the 2 mile zone around existing roost sites, it might make more sense to use the funds to buy already suitable land if it is cheaper and more can be acquired. With the amount of conversion to vineyards, we need to ask ourselves what approach will yield the most preserved habitat for the cranes. It may be better to up the acreage rather than stipulate the 10% conversion. [eb] this language is meant to address the conversion of crane habitat to vineyards and orchards. Vineyards and orchards will be targeted for conversion to crane habitat.

Comment [EB15]: Wetland complex size is now stipulated in CM10, consistent with discussions we had at the December 2013 SLNWR meeting

Comment [EB16]: Our editors prefer not to use capitalization.

Comment [EB17]: Okay, revised

Comment [EB18]: ?? Comment below specifies that it's not just about habitat but about populations. No change – since the objective calls for creating habitat, this is a given. The intended outcome is to connect populations.

Comment [EB19]: This is specified in CM10

Comment [EB20]: ?

Comment [SLNWRA21]: 1 mile would be better. And there should be a minimum one-year overlap, i.e. new roost area should be in place 1 year before loss of existing roost area. [eb] will discuss this modification with the TTT

permanent roost sites. The habitat will consist of active cornfields that are flooded following harvest to support roosting cranes and that provide highest-value foraging habitat. Individual fields will be at least 40 acres and can shift locations throughout the Greater Sandhill Crane Winter Use Area, but will be sited with consideration of the location of roosting habitat loss and will be in place prior to roosting habitat loss.

Objective GSHC1.1 Rationale: While Objective CLNC1.1 protects cultivated lands throughout the Plan Area to support covered species associated with these lands, Objective GSHC1.1 establishes the proportion of this overall protection that will be applied to the conservation of the species within the Greater Sandhill Crane Winter Use Area. Because the most important stressor on this species is the conversion of suitable crops in the Winter Use Area to unsuitable crops, the key to long-term conservation of the winter population is sustaining sufficient amounts and types of suitable cultivated lands.

The cultivated land base in the Winter Use Area has remained relatively stable; however, because crop patterns are subject to agricultural economic influences, the extent of the landscape that provides suitable habitat for the crane is less stable and uncertain over time. Additionally, many of the cultivated lands in the Winter Use Area have been converted from crop types that provide habitat for the species to unsuitable vineyards. Therefore, the strategy for the greater sandhill crane is focused on conserving cultivated lands that provide high-value habitat for the crane, to increase the stability and certainty of compatible crops in the Winter Use Area.

The strategy involves targeting lands in Conservation Zones 3, 4, 5, and/or 6 (areas in the Plan Area that are within the Winter Use Area and excluding lands most vulnerable to sea level rise), where they are needed most because of rapid conversion to nonhabitat land cover types, and managing those lands as high-value foraging habitat for cranes. Objective GSHC1.1 requires that conservation lands providing foraging habitat be within 2 miles of known roost sites: This is because the highest levels of use are typically within approximately 2 miles of known roosts, and use (measured as a function of observed crane density) decreases beyond approximately 2 miles of a roost (Ivey pers. comm.). Objective GSHC1.1 also specifies that 80% of this foraging habitat will be managed at the highest habitat value in any given year (Table Error! No text of specified style in document.-1~~Table Error! No text of specified style in document. 1~~). Waste corn is the key food item for greater sandhill cranes in the Delta; therefore corn is considered the highest-value crop type. Rice is also a very high-value type, but only a relatively small proportion of the Winter Use Area is capable of supporting rice agriculture. Because crane reserves will represent a relatively small proportion of the available habitat within the Winter Use Area, managing the majority of this area to maximize food value for cranes could be important in sustaining the winter population. Therefore, 80% of the crane reserve acreage will be maintained in the highest-value crop types. The remaining 20% will be managed as at least high-value habitat (Table Error! No text of specified style in document.-1~~Table Error! No text of specified style in document. 1~~), which allows for crop rotations and other factors that could influence agricultural productivity. Sea level rise and local seasonal flood events will be considered when siting conservation lands, because crane foraging habitat is likely to become unsuitable at lower elevations with sea level rise as these areas become flooded. Additionally, crane habitat may become unsuitable as a result of large flood events within river floodplains. The minimum patch size is relatively large (160 acres) to minimize the potential effects of human-associated visual and noise disturbances.

Comment [TB22]: What is definition of "active cornfield. Cranes utilize cornfields harvested for grain, but there is little left for cranes in silage fields. [eb] this level of detail will be developed in CM11

Comment [SLNWRA23]: Another decent idea, but consideration should be given to the flooding of the cornfields for roosting in the overall context of the amortized schedule of flooding cornfields, and other high value forage fields, to maximize the forage benefit to cranes by ensuring forage availability throughout their entire stay. Basically, fields should be flooded anyway on an amortized schedule to allow the cranes access to fossorial prey after they have consumed the available waste grain left over from harvest. [eb] agreed. Objective will not be revised, but this detail will be provided in CM11.

Comment [TB24]: and orchards [eb] agreed. Revised.

Comment [SLNWRA25]: Is the 80% based on crop rotation requirements to maintain soil fertility or prescriptive solely for cranes? Long term soil viability needs to be maintained and if the 80% is prescriptive, then greater acres may be required to accomplish what is needed here while maintaining soil health. [eb] the 48,625 acres of cultivated lands to be conserved will have crop rotations and shifts, with assurance that on a yearly basis each of the species specific objectives is met. So there will be more than 7,300 acres to work with.

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Comment [TB26]: During [eb] revised

Table Error! No text of specified style in document.**-1. Assigned Greater Sandhill Crane Foraging Habitat Value Classes for Agricultural Crop Types**

Foraging Habitat Value Class	Agricultural Crop Type
Very high	Corn, rice
High	Alfalfa, irrigated pasture, wheat
Medium	Other grain crops (barley, oats, sorghum)
Low	Other irrigated field and truck crops
None	Orchards, vineyards

This objective will conserve cultivated lands sufficient to address the loss of cultivated land habitat value, and additional enhancement provided through GSHC1.2, as described below, will provide for the conservation and management of greater sandhill crane in the Plan Area.

Objective GSHC1.2 Rationale: Achieving this objective will enhance or create foraging habitat by requiring that 10% of the lands protected under GSHC1.1 be converted from an initial low- or no-value crop type to a high- or very high-value crop type (Table Error! No text of specified style in document.-1~~Table 3.3-6~~). Requiring that 10% (730 acres) of the crane reserves be created or enhanced by converting unsuitable crops to high-value crops will help to redress the past conversion from high-value to low-value crop types. The strategy involves targeting lands least vulnerable to sea level rise in Conservation Zones 3, 4, 5, and/or 6, which are zones in the Plan Area that are include the Winter Use Area and do not include the lands most vulnerable to sea level rise. Sea level rise and local seasonal flood events will be considered when identifying siting conservation lands because crane foraging habitat is likely to become unsuitable at lower elevations with sea level rise as these areas become flooded due to sea level rise. ~~,~~ Additionally, crane habitat may periodically become unsuitable as a result of large flood events ~~(~~100 year events~~)~~ within river floodplains.

Objective GSHC1.3 Rationale: Managed wetlands provide suitable foraging habitat and potential roosting habitat for greater sandhill cranes. Achieving this objective may increase the number and distribution of crane roost sites in the Greater Sandhill Crane Winter Use Area by creating 320 acres of greater sandhill crane roosting habitat within on managed seasonal wetlands~~wetland~~. Currently, the Plan Area contains 7,340 acres of greater sandhill crane habitat, 86% of which is within existing conservation lands. Creation of at least 320 acres of managed wetlands~~wetland~~ will increase the extent of protected habitat to 91%. The new crane roosts, each at least 40 acres in size, will supplement the existing network of roosts in the Winter Use Area. The rationale for conservationing lands in Conservation Zones 3, 4, 5, or 6, with consideration of sea level rise and local flood events, within 2 miles of existing permanent roost sites, is provided in Objective GSHC1.2, above. The managed wetlands will be conserved in association with other natural community types at a ratio of 2:1 upland to wetland to provide buffers around the wetlands that will protect cranes from the types ofvarious disturbances that would otherwise result from adjacent roads and developed areas (e.g., roads, noise, visual disturbance, lighting, domestic animals).~~.~~ This is the average upland to wetland ratio for crane roosting habitat on Stone Lakes National Wildlife Refuge (McDermott pers. comm.).

Comment [TB27]: New data indicate that GSHC rarely use alfalfa (Ivey, pers. Comm.)Recommend moving alfalfa to Medium category. Why was dry pasture of a minimum size not included? [eb] consulting with species experts.

Comment [SLNWRA28]: Note that GSC does not use alfalfa. [eb] They do use alfalfa, but maybe not high value. Consulting with species experts.

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Comment [SLNWRA29]: Does this really accomplish anything when so much conversion is occurring? In the end, is not the goal to have the greatest number of acres of high value habitat in proximity to roosting? Has anyone analyzed if using the additional expense for re-conversion would be better spent acquiring more land to begin with? What is gained if a lot of money is spent to re-convert when perfectly suitable high quality habitat is simultaneously being converted by others to vineyards? Vineyards and orchards should be purchased and re-converted when no other suitable acres are available. [eb] will discuss with TTT

Comment [EB30]: Not necessarily targeting the lands least vulnerable to sea level rise. Sea level rise will be a consideration, in addition to the other criteria. There will be further discussion in this regard at the crane TAC meetings.

Comment [TB31]: …included in

Comment [EB32]: Incorporated this revision

Comment [mb33]: Too specific

Comment [EB34]: Is this the event we're targeting for avoidance? My impression was that …

Comment [EB35]: revised

Comment [EB36]: revised

Comment [EB37]: revised

Comment [EB38]: I don't think this really adds anything. Did not revise.

Comment [EB39]: Revised (pets)

Objective GSHC1.4 Rationale: Objective GSHC1.4 ensures that 180270-450 acres of crane roosting habitat will be constructed within the Stone Lakes National Wildlife Refuge Pproject bBoundary~~project boundary~~[3] (Figure 3.3-7) (the area for which the refuge has authority to acquire land or easements). Achieving this objective will promote continued use and expanded use by cranes onto in the Stone Lakes National Wildlife Refuge and surrounding lands and will provide additional connectivity between these lands and the Cosumnes River Preserve. Creating roosting habitat near the Greater Sandhill Crane Winter Use Area within the Stone Lakes National Wildlife Refuge Project Boundary refuge will improve access to facilitate use of underused underutilized cultivated land foraging habitat in thate area with the goal of expanding and expand the winter distribution of the wintering population. The strategy includes using newly created roosting sites as a management tool to attract cranes to higher elevation zones less prone to periodic flooding due to sea level rise, large flood events and/or levee failure. out of low-elevation zones that have greater uncertainty to exist in the future, due to the potential for levee failure or flooding.

The area outside the Stone Lakes National Wildlife Refuge but within the refuge project boundary (the area for which the refuge has authority to acquire land or easements) has largely been converted to vineyards, which do not provide habitat for cranes. Additional areas within the ~~p~~Project ~~b~~Boundary~~project boundary~~ and surrounding lands are threatened by future conversions~~conversion~~ to vineyards as well. These p~~P~~ast conversions has~~ve~~. ~~Past conversion has~~ created an approximately 4-mile gap between wintering crane roost and foraging sites~~cranes~~ in the Stone Lakes and Cosumnes areas. Creating two wetland complexes no more than 2 miles apart in this area will expand roosting and foraging opportunities for cranes provide thus improv~~ed~~ing~~improved~~ habitat connectivity between the Stone Lakes Basin and Cosumnes crane populationsRiver Preserve. These wetland complexes. It will also ensure that conservation occurs in the vicinity of conveyance facility impacts, to offset disturbance losses that might otherwise cause some cranes to leave abandon the area, and in an area where the crane population is already constrained by urbanization to the east and sea level riseland conversion and future sea level rise to the west. Conserved lands within the refuge project boundaryStone Lakes NWR Project Boundary will be transferred to the refuge to ensure management consistent with the rest of the refuge lands, therefore contributing to a regional management strategy for the crane.

Creating several (3 to 5)a complex of 3-5 wetlands in association with each other provides the ability to apply different management regimes to the wetlands, with different depths, timing, and duration of flooding. A diversity of conditions maximizes opportunities for establishing and retaining roosting cranes (McDermott pers. comm.). The wetland blocks provided in this objective are larger than the minimum block size stipulated in Objective GSHC1.3 because of the added need for conservation in this critical area where land conversion, to vineyards, urbanization to the east, and sea level rise to the west threaten the wintering crane population.

Objective GSHC1.5 Rationale: This objective addresses the loss from covered activities of winter-flooded corn fields that serve as both roosting habitat and highest-value foraging habitat within the Greater Sandhill Crane Winter Use Area. This type of crane roosting habitat is usually temporary as a result of seasonal changes in farm practices, crop rotational changes, or other management. This habitat type supplements the more static managed wetlands that serve as the primary roosting areas for cranes. These temporary roosting/foraging

[3] The project boundary delineates the area surrounding the existing refuge for which the refuge has authority to acquire land or easements.

Comment [EB40]: ?

Comment [mb41]: It's 180-270 depending on types of roost provided, correct.

Formatted: Underline

Comment [EB42]: See comment above. No change.

Comment [EB43]: added

Comment [SLNWRA44]: It is not just land connectivity that is involved here. It is connecting the two winter use populations of the refuge and the preserve. [eb] okay, edits below have been incorporated to address this.

Comment [TB45]: Are you referring to existing roosting and foraging areas within the Refuge?

Comment [EB46]: These edits were made, except that "underused" wasn't changed because it's synonymous with "underutilized", so the simpler term was retained.

Comment [SLNWRA47]: This gets to the idea of maintaining and expanding the core habitat

Comment [TB48]: Recommendation: About 90% of the lower third of lands within the Stone

Comment [mb49]: The lower third is nowhere near 90% non-crane habitat. "has largely been

Comment [TB50]: Capitalize [eb] our editors prefer not to

Comment [mb51]: This definition should be following the first time SLNWR project boundary

Comment [EB52]: Revisions made, except "The wetland complexes" – not sure how that fits in.

Comment [TB53]: Do we need to address issue of reverter clauses, etc. that may potentially be in

Comment [EB54]: Revisions made

Comment [SLNWRA55]: This section conflates roosting with feeding in a way that infers that the

Comment [SLNWRA56]: It also equally important to allow cranes a second opportunity t

habitats allow cranes to vary their seasonal movement patterns and spread out into otherwise underused areas of the Delta; it also would help reduces ~~opportunities for~~ excessively dense roosting concentrations. Objective GSHC1.5 is designed to provide similar function by allowing fields to rotate through the crane use area within protected cultivated lands. This will serve as a secondary source of high-value crane roosting/foraging habitat and provide a dynamic element to the crane conservation program. This objective is intended to offset loss of crane roosting habitat, and the compensatory roosting habitat will be in place prior to loss of roosting habitat as a result of water conveyance facility construction.

Comment [EB57]: This terminology isn't used for an HCP – the term "would" is more appropriate for an EIR/EIS.

Comment [TB58]: What is the issue with dense roosting? Is this to keep disease from spreading? [eb] yes, language was added to clarify.

Comment [SLNWRA59]: But aren't we really talking about a hedge against abandonment rather than the physical loss of roosting sites? [eb] Both. This acreage is based on the acreage of roosting/foraging habitat removed as a result of the Plan. This will be permanent protection – not the temporary measures that will happen to prevent abandonment during construction.

Conservation Measure 3

Table 3.3.2-2. Natural Community Siting and Reserve Design Requirements

ID	Type	Protection		Restoration	
		Amount (Acres)	Location and Other Requirements	Amount (Acres)	Location and Other Requirements
Managed Wetland					
#23	Managed wetland	8,100	Suisun Marsh At least 1,500 acres to be managed for salt marsh harvest mouse and the remaining 6,600 acres to be managed for managed wetland biodiversity, including waterfowl and shorebirds overwintering and breeding. 6,600 acres will comprise existing seasonal, semipermanent, and permanent wetlands. Protection of semipermanent and permanent wetlands will target areas adjacent to suitable upland nesting habitat, preferably those upland sites known to already support waterfowl and shorebird breeding. For waterfowl, semipermanent and	500	320 acres in Conservation Zones 3, 4, or 6, to provide roosting habitat for greater sandhill crane (CM10 Nontidal Marsh Restoration). Minimum patch sizes of 40 acres within the Greater Sandhill Crane Winter Use Area[4] in Conservation Zones 3, 4, 5, or 6, with consideration of sea level rise and local seasonal flood events. The wetlands will be located within 2 miles of existing permanent roost sites and protected in association with other protected natural community types (excluding nonhabitat cultivated lands) at a ratio of 2:1 upland to wetland to provide buffers around the wetlands. 180 acres consisting of two wetland complexes within the Stone Lakes National Wildlife Refuge project boundary[5], no more than 2 miles apart to help

Comment [SLNWRA60]: This section is confusing. Why is this here given its low value to GSC? [eb] this is an excerpt from CM3 and includes all the measures for managed wetlands. You may want to look at the entire CM3 to see the context. The 6,600 acres in Suisun Marsh will be for shorebirds and salt marsh harvest mouse.

[4] Important geographically defined greater sandhill crane wintering areas in the Central Valley (Pogson and Lindstedt 1988; Littlefield and Ivey 2000; Ivey pers. comm.) (Figure 2.A.19-2, *Greater Sandhill Crane Habitat Model and Recorded Occurrences*, in Appendix 2.A).

[5] The project boundary delineates the area surrounding the existing refuge for which the refuge has authority to acquire land or easements.

ID	Type	Protection		Restoration	
		Amount (Acres)	Location and Other Requirements	Amount (Acres)	Location and Other Requirements
			permanent wetlands will have the greatest benefit when located in proximity to upland areas within the Grizzly Island Wildlife Area.		provide connectivity between the Stone Lakes and Cosumnes greater sandhill crane populations. Each complex will consist of at least three wetlands totaling 90 acres of greater sandhill crane roosting habitat, and will be protected in association with other protected natural community types (excluding nonhabitat cultivated lands) at a ratio of at least 2:1 uplands to wetlands (i.e., two sites with at least 90 acres of wetlands each). One of the 90-acre wetland complexes may be replaced by 180 acres of cultivated lands (e.g., cornfields) that are flooded following harvest to support roosting cranes and provide highest-value foraging habitat, provided such substitution is consistent with the long-term conservation goals of Stone Lakes National Wildlife Refuge for greater sandhill crane.
Cultivated Lands					
#31	Cultivated lands	48,625	See species-specific requirements, below. See also #37–#39.	0	N/A

ID	Type	Protection		Restoration	
		Amount (Acres)	Location and Other Requirements	Amount (Acres)	Location and Other Requirements
#32	Swainson's hawk foraging habitat	At least 43,325	Subset of #31. May overlap with species-specific cultivated land requirements for other species. Moderate, high, or very high value foraging habitat for Swainson's hawk, 50% of which is of very high value foraging habitat. See **Error! Reference source not found.** for habitat values by crop type. Up to 1,500 acres may be located in Conservation Zone 5 and 6, but must be at a land surface elevation at or greater than -1 foot (NAVD88).	0	N/A
#33	Greater Sandhill Crane foraging habitat and cultivated lands roosting habitat	7,300 foraging habitat. 95 cultivated lands roosting habitat.	Subset of #31. Foraging habitat: May overlap with species-specific cultivated land requirements for other species. High and very high value foraging habitat within 2 miles of a known roost site, 80% of which must be of very high value and 10% of which must be converted from a land cover type that is currently incompatible with greater sandhill crane foraging. Reserve siting will consider the location of habitat loss and, if appropriate and feasible, be sited in proximity to that loss. Reserve lands will be sited to minimize the potential effects of sea level rise by considering the land surface elevation of the site, the potential threat of catastrophic levee failure, and the resulting flooding of the reserve. They will also be sited to minimize the potential threat of seasonal flooding that is incompatible with management goals for the species.	0	N/A

ID	Type	Protection		Restoration	
		Amount (Acres)	Location and Other Requirements	Amount (Acres)	Location and Other Requirements
			See **Error! Reference source not found.** for habitat values by crop type. Cultivated lands roosting habitat: Located within 2 miles of existing permanent roost sites. Consist of active corn fields that are sequentially flooded following harvest to support roosting cranes and provide highest-value foraging habitat. Individual fields will be at least 40 acres and can move throughout the Greater Sandhill Crane Winter Use Area. Roosting habitat will be in place prior to removal of roosting habitat from construction of water conveyance facilities.		
Other Species-Specific Requirements					
N/A = not applicable					

Comment [SLNWRA61]: This is much improved.

Cultivated Lands

Cultivated lands will be secured by the Implementation Office to achieve the requirements described in Table 3.3.2-2~~Table 3.4.3-1~~. Additionally, acquisition of lands for protection of cultivated lands will be prioritized based on the following characteristics.

- Proximity to greater sandhill crane roost sites.
- Location of lands within the Greater Sandhill Crane Winter Use Area[6].

[6] The Greater Sandhill Crane Winter Use Area is a geographic extent created by Gary Ivey specifically for BDCP planning purposes (Pogson and Lindstedt 1988; Littlefield and Ivey 2000; Ivey pers. comm.) (Figure 2A.19-2). This area is based on known, current distribution of greater sandhill cranes in the Plan Area. If future research informs an expanded winter use area, this will result in additional opportunity for preservation. If the winter use area contracts, the Implementation Office will confer with wildlife agency staff to determine what changes to future acquisitions are needed to meet the biological goals and objectives for this species, consistent with the adaptive management and monitoring program described in Section 3.6.

Greater Sandhill Crane

The Implementation Office will secure and protect lands (per the location requirements described in **Table 3.3.2-2**~~**Table 3.4.3-1**~~) to be restored, enhanced, and/or managed as greater sandhill crane roosting and foraging habitat.

Greater sandhill crane foraging habitat values are described in **Table 3.3.2-3**~~Table 3.4.3-2-3~~.

Table 3.3.2-3. Greater Sandhill Crane Habitat Values

Foraging Habitat Value Class	Assigned Agricultural Crops/Habitats
Very high	Corn, rice
High	Alfalfa, irrigated pasture, wheat, managed wetland
Moderate	Other grain crops (barley, oats, sorghum), grasslands
Low	Other irrigated field crops, natural seasonal wetland, idle cropland

For a discussion of the enhancement and management requirements and considerations for greater sandhill crane roosting and foraging habitat see *CM11 Natural Communities Enhancement and Management.*

Conservation Measure 10

This conservation measure also provides for creation of 500 acres (Are these in addition to the 640 acres provided in GSHC 1 Objectives?) of managed wetlands consisting of greater sandhill crane roosting habitat in the Greater Sandhill Crane Winter Use Area (Figure 2.A.19-3, *Greater Sandhill Crane Foraging Habitat and Associated Value Rankings*, in Appendix 2.A) in Conservation Zones 3, 4, 5, or 6 by year 10 (250 acres during years 1 through 5 and 250 acres during years 6 through 10).

Creation of greater sandhill crane roosting habitat is necessary to offset adverse effects to roosting habitat resulting from covered activities, and to further contribute to the conservation of this species. In the Delta region, the conversion of suitable roosting habitat to unsuitable cover types, particularly orchards and vineyards, has altered the distribution and behavior of wintering greater sandhill cranes.

Comment [TB62]: What agency will be in charge of the implementation office? [eb] will be managed by a Program Manager and governed by the Authorized Entities through the Authorized Entity Group. Program Manager will report to the Authorized Entity Group, which will consist of the Director of DWR, the Regional Director for Reclamation, and a representative of the participating state contractors and a representative of the participating federal contractors, if they are issued permits pursuant to the Plan. See Chapter 7 of the BDCP for additional detail.

Comment [SLNWRA63]: Note that GSC does not use alfalfa. See above. [eb] see above

Comment [EB64]: No, Conservation Measure 10 describes how the objectives related to managed wetland creation will be implemented. The 500 acres includes the 320 acres from Objective GSHC 1.3 and the 180 acres from Objective GSHC 1.4

Comment [SLNWRA65]: Is this an offset, a mitigation measure, an actual conservation measure intended to improve the available habitat, or something else? [eb] This is Conservation Measure 10. The conservation measures provide the detail for implementing the plan to acheive the biological objectives.

Comment [SLNWRA66]: What and where is the loss of suitable (by inundation depth and sightline) roosting habitat from these two factors? [eb] this detail is provided under the rationale for the goals and objectives. The language here is simply a brief introduction to the following section to provide context.

Managed Wetlands

At least 500 acres of managed wetlands will be created for greater sandhill crane to meet requirements under Objectives GSHC1.3 and GSHC1.4. The restored wetlands will be protected in association with other protected natural community types (excluding nonhabitat cultivated lands) at a 2:1 upland-to-wetland ratio to provide buffers around the wetlands. The protected uplands will count toward protection requirements for other natural communities. Sites for restoration will be selected that are not expected to be affected by sea level rise. Sites will also be selected to avoid areas that experience local seasonal flood events that may be incompatible with the habitat management needs for greater sandhill crane.

At least 320 of the 500 acres of managed wetlands will be created to meet Objective GSHC1.3. These will consist of greater sandhill crane roosting habitat in minimum patch sizes of 40 acres within the Greater Sandhill Crane Winter Use Area (Figure 2.A.19-3, *Greater Sandhill Crane Foraging Habitat and Associated Value Rankings*, in Appendix 2.A) in Conservation Zones 3, 4, 5, or 6.

At least 180 of the 500 acres of managed wetlands will be created to meet Objective GSHC1.4. This will consist of two 90-acre wetland complexes within the Stone Lakes National Wildlife Refuge ~~p~~Project ~~b~~Boundary~~project boundary~~[7] (Figure 3.3-6). The complexes will be no more than 2 miles apart and will help provide connectivity between the Stone Lakes and Cosumnes greater sandhill crane populations. Each complex will consist of at least three wetlands totaling at least 90 acres of greater sandhill crane roosting habitat. One of the 90-acre wetland complexes may be replaced by 180 acres of cultivated lands (e.g., cornfields) that are flooded following harvest to support roosting cranes and provide highest-value foraging habitat, provided such substitution is consistent with the long-term conservation goals of Stone Lakes National Wildlife Refuge for greater sandhill crane.

Managed Wetlands

Greater sandhill crane roost sites will be created as managed seasonal wetlands using the following specifications. A site-specific management plan will be prepared for each roost site, which will include details on water management, plant composition, timing of flood-up and drawdown, vegetation management and control, access, and spring-summer management. Recommend including a requirement that the wetlands are monitored for crane use each season to inform management actions.

- Roost sites will be developed as a series of shallow~~,~~ (3-8 inches deep), open ponds separated by a system of checks and levees. Small upland islands can also be created within the ponds. Cranes often congregate to roost or loaf on the checks and other areas of higher ground and forage in the shallow water contained within the ponds.
- The checks, levees, and other upland sites will be designed with sloping banks, which allow cranes to walk from the flooded pond to the adjacent uplands.

[7] The project boundary delineates the area surrounding the existing refuge for which the refuge has authority to acquire land or easements.

Comment [TB67]: Inundated due to sea level rise? [eb] okay, revision made.

Comment [SLNWRA68]: Where is this double counting for habitat reconciled? The idea is good to maintain the supporting upland habitat and buffers, but it lacks detail and scientific foundation as described. [eb] I don't understand this comment – what is meant by double counting? These uplands are for conservation, not mitigation, and they are not counted in the total acreage that will be protected under the Plan. This measure only requires that the roost sites be buffered by protected lands that do not have uses that will indirectly affect cranes at created roost sites.

Comment [SLNWRA69]: This section is confusing. Created wetlands or managed wetlands and then cultivated? [eb] this section will be expanded upon. An option is given to provide 180 acres of cultivated land instead of one of the 90-acre wetland complexes. This way, if SLNWR wants to acquire Zacharias Island through BDCP, and use it as a cultivated land roost site, they may do this.

Comment [SLNWRA70]: Should this heading be "Roost Sites"? [eb] I should have included the higher level headers from the excerpt to minimize confusion. The section above is a subsection under "Restoration Actions", while this one is a subsection under "Siting and Design Considerations"

Comment [EB71]: Monitoring will be addressed under the monitoring and adaptive management section of the CM and Appendix 3E. We are currently developing this monitoring program.

Comment [EB72]: added

- In addition to the presence of water, food availability, and loafing opportunities, selection of roosting sites by greater sandhill cranes is based in part on predator avoidance. Therefore, the development of the ponds and checks will consider the ability of predators to access roosting cranes along checks and levees.
- Selected roost sites will have direct access to sufficient irrigation water to maintain required water depths.
- The wetlands will be maintained as described in *CM11 Natural Communities Enhancement and Management.*

Comment [SLNWRA73]: These factors are correct; how will the checks and levees not be highways for foxes and coyotes? [eb] will discuss with crane experts.

Comment [SLNWRA74]: How many are "selected" and why not all roost sites? [eb] This is meant to say that sites will be selected for conservation that have access to sufficient water. Re-worded to clarify.

Table 3.3.2-4. Effectiveness Monitoring Relevant to CM10

ID #	Monitoring Action(s)	Metric	Success Criteria	Timing and Duration
CM10-2	Monitor greater sandhill crane use of roost sites in vicinity of covered activities	Presence of roosting cranes	Cranes have not abandoned roost sites	During construction activities in vicinity of roost sites, annually for 3 years after construction is completed, and during the season of expected occupancy every 5 years thereafter.

Conservation Measure 11

Access Control

Access to lands in the reserve system will be controlled in areas that are vulnerable to disturbance by humans and pets. In particular, human and pet access will be restricted in vernal pool and alkali seasonal wetland complexes, nontidal marsh restored for giant garter snake, greater sandhill crane roost sites, and locations that support rare plant populations. Signs will be posted to inform the public of the access restrictions. Access to areas that support nesting covered bird species will be restricted during the nesting season. As noted above note that monitoring efforst should be conducted during the crane wintering season.

- **Greater sandhill crane roosting habitat management.** Wetland roosts for greater sandhill crane will be managed as follows.
  - Water depth will be maintained throughout the winter season at an average depth of 10 centimeters, but should range across the roost site between 5 and 10 centimeters (Ivey et al. in prep.).
  - Flood-up of roosts will begin by September 1 and drawdown will begin no earlier than March 15.

Comment [SLNWRA75]: This seems like generic text, which may not apply to GSC. [eb] correct. This paragraph isn't exclusive the GSC. I excerpted sections that are pertinent to GSC, but these sections may also address other species or generic requriements.

Comment [EB76]: See response above. Monitoring will be covered in different sections, but we are developing.

Comment [SLNWRA77]: The cranes are arriving increasingly early – August 7th this year. Some adaptive management should be employed here to accommodate earlier arrival times if the trend continues. [eb] will discuss with crane experts

Comment [mb78]: The early arrival was a single event thus far, and should not influence the definition of the normal winter season. If in the future the normal winter season changes, adaptive management will be used to adjust.

- Vegetation at roosting sites will be managed to ensure no more than 50% cover of tall emergent plants, such as tules (*Schoenoplectus* spp.), cattails (*Typha* spp.), trees, and large shrubs.
- To enhance food value, moist soil management techniques will be employed to achieve and maintain substantial stands of high-value plants such as native smartweed (*Polygonum* spp.) and swamp timothy (*Crypsis schoenoides*). A variety of other plant species may also be used, including grasses and clovers. A menu of plant species will be included in each site-specific management plan. Moist soil management may also require occasional irrigation during the dry spring and summer months as well as periodic summertime discing.
- Bulrush/cattail vegetation will be burned, mowed, or disced every 2 to 5 years to remove dead growth and encourage the development of new vegetative structure.

Crop type maintenance and timing. Crop types will be maintained to provide the required habitat acreages and values for covered species that use cultivated lands, consistent with species-specific objectives (see *Cropping Patterns* below). Foraging opportunities and habitat values for wintering sandhill cranes, waterfowl, and shorebirds will be enhanced through timing the flooding of corn fields (see *Timing and Flooding* below).

Cropping Patterns

Cropping patterns within the reserve system will be managed to address habitat requirements for greater sandhill crane, Swainson's hawk, and tricolored blackbird. These habitat requirements are set forth in the biological goals and objectives (Table 3.3-1) and summarized for each relevant species in Table 3.3.2-2~~Table 3.4.3-1~~. The specific habitat values are described for greater sandhill crane, Swainson's hawk, and tricolored blackbird in Table 3.3.2-3~~Table 3.4.3-2~~, **Error! Reference source not found.**, and **Error! Reference source not found.**, respectively. Cropping patterns will be managed on an annual basis to meet the acreage and habitat requirements set forth in the biological goals and objectives (Table 3.3-1), siting and reserve design requirements (Table 3.3.2-2~~Table 3.4.3-1~~), and to be in rough proportionality with impacts (Chapter 6, Section 6.1.2, *Maintaining Rough Proportionality*).

Crops with minimum acquisition requirements will need to be rotated to other crops types periodically. Based on previous use patterns, the reserve system is expected to always have enough land in nonessential crops (e.g., irrigated crops other than alfalfa, rice, or corn) to allow for rotation into essential crops to ensure that minimum standards for these essential crops are met. Land cultivation patterns will be monitored to determine the extent to which the needs of each covered species are being met at any point in time.

Emergency Spillway Associated with Glannvale Tract Forebay

An emergency spillway will be constructed in association with the intermediate forebay on the Glannvale tract. This spillway will prevent the intermediate forebay from overtopping by spilling into the approximately 125-acre inundation area. This area will only be flooded under

Comment [SLNWRA79]: 50% cover seems high given the sightline requirements. [eb] yes, this was changed to 15%

Comment [SLNWRA80]: What about invasive weed management? [eb] we will add detail in this regard, as needed, based on input from species experts.

Comment [SLNWRA81]: Confusing section given the impacts are one element, but the need to improve conditions for species is additional. How does this CM achieve that? [eb] chapter 6 provides the acreages to be protected in 5 year increments. This is based on the total conservation requriements and but is proportional to the rate of impacts. See Chapter 6 of BDCP for more explanation.

Comment [SLNWRA82]: The feasibility of this approach should be vetted with farmers. [eb] agreed. This may occur in the context of the crane TAC.

emergency conditions, which are expected to be seldom if ever. Therefore, the basin will be cultivated and managed to provide roosting and foraging habitat for greater sandhill crane as described below in *Enhancement and Management Guidelines and Techniques, Timing and Flooding for Sandhill Crane*. Providing crane habitat in this area will not count toward the habitat targets under Objectives GSHC1.1 through GSHC1.5, because perpetual conservation cannot be guaranteed, as the spillway will be needed to prevent forebay overtopping in emergency situations. Rather, this additional greater sandhill crane habitat to be provided in the spillway will be above and beyond the minimum habitat requirements stipulated in the biological objectives for the crane.

Enhancement and Management Guidelines and Techniques

Timing and Flooding for Greater Sandhill Cranes

Habitat management in areas conserved as foraging habitat for greater sandhill crane will include deferring the tilling of corn and grain fields until later in the fall to increase the amount and availability of forage for this species. Also, where feasible, a portion of corn or grain fields will be left unharvested to increase the quantity of forage available to greater sandhill cranes (forage gradually becomes available as senescent plant stalks fall over as a result of weathering).

To increase the foraging and roosting value of cultivated lands for greater sandhill cranes, some corn, grain, and irrigated pastures will be shallowly flooded during fall and winter. This will also improve foraging conditions for waterfowl and shorebirds. Cultivated land roosting habitat to meet Objective GSHC1.4 will consist of blocks of at least 180 acres that will be sequentially flooded to maintain a minimum of 40 acres of roosting habitat at any given time during the winter when cranes are present. This is intended to minimize disturbance and provide not only the roost water, but also new foraging opportunities throughout the season in close proximity to the roosting habitat. For example, if the field block is divided into two 90-acre parcels (180 acres total), half of one field may be flooded early in the fall and half of the other field may be flooded and maintained from mid-winter until the end of the season, while the first is drained or left to evaporate. Birds will benefit from having new foraging area close to the roost while it is being converted.

Comment [SLNWRA83]: Seems fine for foraging, but under what conditions could this impact cranes roosting? [eb] Assume this is for preceding paragraph. Will discuss with crane experts.

Comment [SLNWRA84]: The ambiguous and unenforceable element of "where feasible" moots this section. Please define an actual quantity/area. [eb] This is now written flexibly as a management tool. We expect the conservation will be sufficient without requiring portions to be unharvested. The use of unharvested areas will be a bigger tool under the AMMs, to prevent cranes from abandoning areas. That isn't covered under Conservation Measure 11.

Avoidance and Minimization Measures

○ Temporary Storage Area Determination

Spoils, RTM, and dredged material will be temporarily or permanently stored in designated storage areas. Selection of designated storage areas will be based upon, but not limited to, the following criteria.

- Placement of material in greater sandhill crane foraging habitat will be minimized as described in AMM20.
- Placement of material in greater sandhill crane roost sites will be avoided as described in AMM20.

- Storage sites on Staten Island will be sized and located in coordination with USFWS, CDFW, and greater sandhill crane experts to minimize direct and indirect effects on greater sandhill crane.

Comment [SLNWRA85]: Or removed immediately if necessary. [eb] that is addressed below. This sentence is more related to footprint planning, and will hopefully be accomplished between the public review and final.

AMM20 Greater Sandhill Crane

If covered activities are to occur during greater sandhill crane wintering season (September 15 through March 15) in the Greater Sandhill Crane Winter Use Area (Appendix 2.A, Figure 2.A-19-2), the following avoidance and minimization measures will be implemented.

Comment [SLNWRA86]: With the last couple years yielding very early arrivals, this date may need to be re-visited. Also given potential climate change seasonality. [eb] will discuss with crane experts.

Timing

- Construction will be minimized during the sandhill crane wintering season to the extent practicable in light of project schedule and cost and logistical considerations. For example, construction of some project facilities such as vent shafts may be accelerated so that they occur outside of the crane wintering season. The loudest construction activities, such as pile driving, that need to occur for only limited time periods should be scheduled for periods outside the crane wintering season to the extent practicable.
- To the extent practicable, construction that cannot be completed prior to commencement of the wintering season will be started before September 15 or after March 15, such that no new sources of noise or other major disturbance that could affect cranes will be introduced after the cranes arrive at their wintering grounds.

Comment [SLNWRA87]: This hardly seems like it meets avoidance and minimization requirements. And, not enforceable, so meaningless. For purposes of the review it will need to be assumed that it is never practicable for determining potential impacts. [eb] agreed that for the purpose of analysis we assume it's not practicable. But we're leaving the language in to guide planning so that they do implement it when and if practicable. Otherwise they don't even have to try.

Comment [SLNWRA88]: Again, not enforceable and therefore not really an AAM. [eb] see above

Bird Strike Hazard

- **Performance Standard: No net increase in bird strike hazard to greater sandhill crane populations in the Plan Area**

  The BDCP will be implemented in a manner that will not result in a net increase in bird strike risk to greater sandhill cranes in the Plan Area, as measured by the methodology described in Attachment 5.J.C, *Analysis of Potential Bird Collisions at Proposed BDCP Powerlines*. The methodology entails measuring risk level based on geographic risk zones, which are rated based on proximity to roosting and foraging habitat and location relative to daily movement patterns between roosting and foraging sites. This performance standard may be accomplished through any combination of the following, with preference given to alignment of lines and removal, relocation, or undergrounding of existing lines.

Comment [SLNWRA89]: This is significantly better in terms of description. The performance standard is vague and unenforceable. [eb] disagree. This will be based on Gary Ivey's bird strike analysis and these findings will need to be met, with agency concurrence, before they can install the lines.

- Design the transmission line alignment to minimize risk. When locating powerlines, choose specific site locations that are in low risk zones or outside of the Greater Sandhill Crane Winter Use Area.
- Remove, relocate or underground existing lines. Reduce the number of existing lines in risk zones to offset placement of new lines in risk zones. Prioritize elimination or reduction of existing lines and avoidance of new lines in the highest risk zones. Undergrounding existing and new lines is the most effective means for achieving the standard and should be the initial measure implemented.
- Install bird strike diverters on existing and new lines in risk zones. For installation of diverters on existing lines, prioritize lines in the highest risk zones. (Bird diverters will be required on all new lines.)
- Manage habitat to shift cultivated land roost site locations away from risk zones created by new transmission lines. This can be accomplished by not flooding past or current roosting sites located in the vicinity of the new transmission line, thereby eliminating the sites' attractiveness as roosting habitat; and establishing new roost site equal or greater in size at new location in a lower risk zone but within 1 mile of the affected site. The relocated roost site will be established prior to commencement of the wintering season that occurs prior to construction of new transmission lines. The existing roost site will be flooded during the wintering season prior to construction; it will not be flooded during the wintering season that occurs during the year construction begins. A wildlife agency–approved, qualified biologist familiar with crane biology and experienced with crane habitat management will design the new roost site and direct implementation of the roost site establishment. Monitoring should be incorporated into the management practices. .
- Final transmission line design will be determined in coordination with the wildlife agencies and the approved/qualified crane biologist to achieve the performance standard and ensure the measures described herein are incorporated.

Powerline Plan and Analysis

Prior to powerline construction, the approved/qualified crane biologist will coordinate with the Implementation Office to develop a plan for achieving the performance standard (no net increase in bird strike hazard to greater sandhill crane populations in the Plan Area) using a combination of the measures described above. The plan will include an analysis, using the method described in Attachment 5.J.C, *Analysis of Potential Bird Collisions at Proposed BDCP Powerlines*, to demonstrate that this standard has been met. The plan and analysis will be subject to review and approval by the wildlife agencies prior to its implementation. Powerline construction will be implemented consistent with this plan.

Required Measures

Consistent with, and in furtherance of, the performance standard of no net increase in bird strike risk to greater sandhill cranes in the Plan Area, the following measures will also be implemented to minimize bird strike hazard. While any combination of the measures described under *Performance Standard*, above, may be implemented to meet the powerline performance standard, all of the following measures are required.

Comment [TB90]: Should include language for long term maintenance of diverters. [eb] okay, we will do this.

Comment [SLNWRA91]: This is a new and unanalyzed impact on the GSC. This can cause more harm and lead to greater loss of habitat use. [eb] habitat loss can't exceed take limits, but we can discuss further with Gary Ivey.

Comment [SLNWRA92]: This does nothing to address strikes resulting from birds flying from roost sites to forage sites in the fog. [eb] correct, but it does reduce risk.

Comment [SLNWRA93]: The obvious best design, as already admitted, is undergrounding the lines, period. Consultation would not be needed to determine this. [eb] noted

Inclusion of wildlife experts in the transmission line negotiation process with the power provider should be required. [eb] The development of this process is in progress

Comment [SLNWRA94]: Approved or and/or qualified, by whom: DFW, the Lead Agency? See two bullets above. Please be consistent with nomenclature or identify the change in standard. [eb] This is referring to the biologist described above: "A wildlife agency–approved, qualified biologist familiar with crane biology and experienced with crane habitat management". But to add clarity, we will stipulate this here.

Comment [SLNWRA95]: The 800 lb gorilla here that is not mentioned is that process to date has not included a feasibility or cost analysis for the various options, including undergrounding. DWR has simply decided that it need not underground the lines and has not supported that with any analysis. [eb] undergrounding feasibility and cost analysis is in progress.

- During the final powerline design process, undergrounding of new permanent powerlines north of Glannvale Tract will be comprehensively evaluated with respect to cost, operational risks, bird strike risks, and other relevant factors.
- Upon approval by the power providers, bird diverters will be installed on all new temporary and permanent powerlines, following Avian Power Line Interaction Committee protocols. This may contribute toward meeting the performance standard of no net increase in crane bird strike hazard (described above). Powerlines will avoid all crane roost sites within the Stone Lakes National Wildlife Refuge project boundary. Permanent powerlines will avoid crane roost sites.
- New permanent powerlines will avoid all areas with a bird strike risk index of 1.0 or greater as shown on Figure 2, Appendix 5.J, Attachment 5J.C, *Analysis of Potential Bird Collisions at Proposed BDCP Powerlines*.
- Use of construction equipment greater than 50 feet in height will be minimized to the extent practicable in light of project schedule and cost and logistical considerations.

See also *AMM30 Transmission Line Design and Alignment Guidelines*.

Effects on Greater Sandhill Crane Foraging and Roosting Habitat Resulting from CM1 Water Facilities and Operation

The following measures will be implemented to avoid and minimize effects on greater sandhill crane resulting from implementation of the final design of the water conveyance features (*CM1 Water Facilities and Operation*).

Comment [SLNWRA96]: While this is certainly appreciated, the idea of protecting GSC corridors is a primary objective, yet ignored in the practical sense. That objective needs to pass through all of the measures or it simply is not supported. [eb] A number of available measures will be used to meet the performance objective of no net increase in bird strike risk

Comment [SLNWRA97]: New roost sites are contemplated in this Plan and they would need to be avoided as well even though they do not as yet exist. This type of planning consideration needs to be integrated throughout the whole of the Plan area where cranes are involved. [eb] Avoiding conflict between new roost sites and power line alignment is now written into CM10

Comment [SLNWRA98]: No avoidance and minimization requirements. And, not enforceable, so meaningless. [eb] we could remove this. Gary Ivey said construction equipment isn't really an issue and that this measure isn't needed.

Foraging Habitat

- Minimize direct loss of foraging habitat. CM1 final design will minimize construction-related loss of greater sandhill crane foraging habitat to the extent practicable.
- Minimize construction-related noise effects on foraging habitat. The Implementation Office will minimize the area of crane foraging habitat to be affected during the day (from 1 hour after sunrise to 1 hour before sunset) by construction noise exceeding 50 dBA L_{eq} (1 hour)[8]. Construction-related noise levels will be estimated prior to commencement of construction using the methods described in Attachment 5J.D, *Indirect Effects of Construction of the BDCP Conveyance Facility on Greater Sandhill Crane*, incorporating site-specific information related to equipment to be used and existing noise barriers such as levees. Artificial noise barriers may be installed to decrease noise levels at foraging habitat below 50 dBA L_{eq} (1 hour). However, the visual effects of noise barriers on sandhill cranes are unknown; therefore, all other options to reduce noise will be implemented before installing noise barriers in close proximity to crane habitat.
- Enhance foraging habitat to avoid loss of foraging values that could otherwise result from unavoidable noise-related effects. The Implementation Office will enhance 0.1 acre of foraging habitat for each acre of foraging habitat to be indirectly affected within the 50 dBA L_{eq} (1 hour) construction noise contour. The enhanced foraging habitat will be established prior to the impact and will be maintained until the construction causing the indirect noise effect is completed. The enhanced habitat will consist of corn fields that will not be harvested, and will be managed to maximize food availability to greater sandhill cranes. A management plan for the enhanced habitat will be completed prior to establishing the habitat, in coordination with a biologist with at least 5 years of experience managing greater sandhill crane habitat on cultivated lands, or experience directing such management. The enhanced habitat will be located outside the construction-related 50 dBA L_{eq} (1 hour) noise contour and within 1 mile of the affected habitat.

Roosting Habitat

Preconstruction surveys will be conducted for greater sandhill crane roost sites within 0.75 mile of the construction area boundary. Surveys will be conducted during the winter prior to project implementation, over multiple days within the survey area by a qualified biologist with experience observing the species. Alternatively, roost sites within 0.75 mile of the construction area boundary can be identified by a qualified greater sandhill crane biologist familiar with roost sites in the Plan Area. If a greater sandhill crane roost site is located within 0.75 mile of the construction area boundary, then to the extent practicable, nighttime (1 hour before sunset to 1 hour after sunrise) project activities will be relocated to maintain a 0.75-mile nondisturbance buffer. If this is not practicable, the following measures will be implemented to avoid and minimize effects on roosting greater sandhill cranes.

- Avoid direct construction-related loss of roost sites. Activities will be designed to avoid direct loss of crane roost sites. This can be accomplished by siting activities outside identified crane roost sites or by relocating the roost site if it consists of cultivated lands (roost sites that consist of wetlands rather than cultivated lands will not be subject to relocation). A cultivated land roost site can be relocated by not flooding the site where the impact will occur during years when construction will occur and by establishing a new roost site equal

[8] 50 decibels averaged over a 1-hour period.

Comment [SLNWRA99]: Again, this is language that allows much latitude in performance and requires nothing. [eb] We could remove all language that says to minimize where we don't have strict standards, but I think it would be preferable to leave in so that they are required to at least consider this.

Comment [SLNWRA100]: 50 dBA is meaningless for bird disturbance. Use a maximum peak as well as an average dBA. [eb] 50 dBA is highly conservative given that this is simply the level that's above baseline, there is no data on noise levels and effects on cranes, and the standard is usually 60 dBA for bird species. See the indirect effects analysis for further explanation as to how our methodology takes a conservative approach.

Comment [SLNWRA101]: This ratio is not based on any evidence of its effectiveness. 1:1 is typically the minimum. The ratio of enhanced acres to directly impacted foraging habitat is also as much a temporal consideration as a spatial one. The amount of land contemplated for enhancement needs to be correlated to the length of the disturbance AS WELL AS the spatial dimension of that disturbance on the landscape. A long temporal exclusion from use of a foraging habitat would need to be mitigated by greater enhancements. [eb] This ratio was developed by Gary Ivey based on estimated value of un-harvested fields compared with harvested fields. I don't think there is a typical minimum for this type of impact minimization, and 1:1 would be excessive because the value of un-harvested areas is far higher than the value of un-harvested. Furthermore, cranes wouldn't be ...

Comment [SLNWRA102]: Again, not enforceable avoidance/mitigation. [eb] same response as above.

Comment [SLNWRA103]: This is still unclear in terms of when relocation will be implemented. There is also not clear evidence that relocation of roost sites will be successful. The creation and reoccupancy of new sites can take several years if it happens at all. [eb] further detail is being developed. Will discuss this comment with Gary Ivey, who has indicated that cranes will readily sh ...

or greater in size at a new location away from the disturbance (outside the 50 dBA L_{eq} [1 hour] noise contour) but within 1 mile of the affected site. The relocated roost site will be established prior to construction activities affecting the original roost site. A qualified biologist familiar with crane biology and experienced with crane habitat management will design the new roost site and direct implementation of the roost site establishment. Efforts to identify and monitor potential sites should be conducted prior to establishment.

- Avoid and minimize construction-related noise effects on roost sites. Activities within 0.75 mile of crane roosting habitat will reduce construction noise during nighttime hours (from 1 hour before sunset to 1 hour after sunrise) such that construction noise levels do not exceed 50 dBA L_{eq} (1 hour) at the nearest temporary or permanent roosts during periods when the roost sites are available (flooded). This can be accomplished by limiting construction activities that could result in noise levels above 50 dBA L_{eq} (1 hour) at the roost site to day time only (from 1 hour after sunrise to 1 hour before sunset); siting nighttime project activities at a sufficient distance from crane roost sites to ensure that construction noise levels do not exceed 50 dBA L_{eq} (1 hour) at the roost site; relocating cultivated land roost sites as described above; and/or installing noise barriers between roost sites within the 50 dBA L_{eq} (1 hour) contour and the primary construction noise source areas, such that construction noise levels at the roost site do not exceed 50 dBA L_{eq} (1 hour). The installation of noise barriers will be used only if the first three options cannot be implemented to the extent that noise levels do not exceed 50 dBA L_{eq} (1 hour) at the roost site.
- If the roost site to be indirectly affected within the 50 dBA L_{eq} (1 hour) noise contour is a wetland site rather than cultivated land, then the existing wetland site will not be removed. A new, cultivated land roost site will be temporarily established at a new location away from the disturbance (outside the 50 dBA L_{eq} (1 hour) noise contour) but within 1 mile of the affected site, at a ratio of 1 acre created for each acre of roost site within the 50 dBA L_{eq} (1 hour) noise contour. The new roost site will be established prior to commencement of the wintering season that occurs prior to construction of new powerlines affecting the original roost site, and will be maintained until the activities creating the indirect disturbance are completed. A qualified biologist familiar with crane biology and experienced with crane habitat management will design the new roost site and direct implementation of the roost site establishment.

Measures to Avoid and Minimize Potential Effects from Lighting and Visual Disturbance

The Implementation Office will implement the following measures to avoid and minimize potential lighting and visual effects that could result from construction or operation and maintenance.

- Route truck traffic to reduce headlight impacts in roosting habitat.
- Install light barriers to block the line-of-sight between the nearest roosting areas and the primary nighttime construction light source areas.
- Operate portable lights at the lowest allowable wattage and height, while in accordance with the National Cooperative Highway Research Program's *Report 498: Illumination Guidelines for Nighttime Highway Work.*
- Screen all lights and direct them down toward work activities and away from the night sky and nearby roost sites.

Comment [EB104]: Added: "Potential sites will be identified and monitored prior to establishment."

Comment [SLNWRA105]: See above. 50 rolling-averaged over an hour is not a protective measure by any definition. Substantiation for this measure based on GSC biology would be necessary to support its effectiveness. [eb] see response above. But perhaps we can discuss using peak noise but at a higher dBA than 50?

Comment [SLNWRA106]: See above. [eb] see above

Comment [SLNWRA107]: The typical temporary construction lights have several problems that need to be addressed here. The first is generator noise, the second is the lack of light control on the fixtures, and the third is the ease by which these can be misdirected. This section needs much greater detail and enforceable specificity. [eb] noise will be addressed through the above measures. Regarding light misdirection, we can stipulate that biological construction monitor will monitor to ensure lights are properly directed at all times.

- Limit the number of nighttime lights used to the greatest extent practicable in light of worker safety requirements.
- Install a visual barrier along portions of access routes where screening would prevent excessive light spill toward roost sites from truck headlights being used during nighttime construction activities. These visual barriers will meet the following performance criteria: The visual barrier will be a minimum of 5 feet high and will provide a continuous surface impenetrable by light. This height may be obtained by installing a temporary structure, such as fencing (e.g., chain link with privacy slats) or a semipermanent structure, such as a concrete barrier (e.g., a roadway median barrier or architectural concrete wall system) retrofitted with an approved visual screen, if necessary, to meet the required height. These barriers will not be installed immediately adjacent to crane foraging habitat, and placement will be coordinated with a qualified crane biologist approved by the wildlife agencies.

Staten Island Performance Standard

Because of the density of greater sandhill cranes wintering on Staten Island and the importance of Staten Island to the existing population of the greater sandhill crane in the Plan Area, the final placement of conveyance facilities and RTM at this site will be minimized to the extent practicable, except where the use of RTM on the island affirmatively contributes to the sustainability of the population. BDCP-related construction will not result in a net decrease in crane use on Staten Island as determined by deriving greater sandhill crane use days for the entire winter period.[9] This standard will be achieved through some combination of the following (and including the above required avoidance and minimization measures for CM1).

- Minimize and/or shift the footprint of activities on Staten Island. The RTM footprint identified on Staten Island is a worst-case scenario. It is expected that the RTM footprint on Staten Island will need to be reduced substantially from shown on the current conveyance facility footprint in order to meet the Staten Island performance standard. Some combination of the following measures will be implemented to achieve this reduction.
  - Stockpile RTM higher than 6 feet to reduce the amount of land affected by RTM stockpiles.
  - Remove RTM from Staten Island periodically during construction to minimize the RTM footprint.
  - Stage the storage and reuse of RTM such that the size of the storage area is minimized at any given time.
  - Reduce RTM storage areas and associated activities during the crane wintering season.

Comment [SLNWRA108]: This is a good attempt at a measure. It need more substantive protection, slats on chain link provide some glare protection but almost no abatement. Five feet needs to be from above the surface of the road, given the typical elevated position of the Delta roads. Otherwise the measure provides no protection. [eb] we will be further developing this measure prior to the final draft.

Comment [TB109]: What is minimum distance to habitat? [eb] we will be further developing this measure, including minimum distance, prior to the final draft.

Comment [SLNWRA110]: See above. [eb] see above

Comment [SLNWRA111]: "To the extent practicable" continues the problem with too much latitude in performance. [eb] see above

Comment [SLNWRA112]: These are not enforceable standards and the issue of whether the muck will be suitable for use in sensitive environments like Staten is not addressed. [eb] the standard is enforceable, and the monitoring and adaptive management necessary to ensure this standard is met will be further developed prior to final.

Comment [SLNWRA113]: Muck should be moved only outside of GSC use season. [eb] will discuss with DWR and crane experts.

[9] Expected loss of crane use will be estimated by using data on crane use days/acre by habitat type on Staten Island from past studies and future monitoring before construction begins (using averages among available years). These will be used to predict the number of lost crane use days within the footprint of the habitat loss and within the 50 dBA L_{eq} (1 hour) construction noise contour. Preproject crane surveys will provide additional data on crane use day densities per habitat type to improve the prediction. Use day densities will be used to guide decisions regarding crop habitat needed to be maintained on Staten Island to maintain this performance standard during construction.

- Prioritize placement of facilities and RTM in areas of no or low crane use. For example, the very northern end of Staten Island is an area of low crane use that would be a high priority for placement of facilities and RTM.

- Minimize noise, lighting, and visual disturbances during construction (See measures described above for CM1).
- Minimize construction activity and RTM storage during the crane wintering season to the extent practicable.
- Supplemental feeding/foraging habitat enhancement. The enhanced habitat will consist of corn fields that will not be harvested, and will be managed to maximize food availability to greater sandhill cranes. A management plan for the enhanced habitat will be completed prior to establishing the habitat, in coordination with a qualified crane biologist (with at least 5 years of experience managing greater sandhill crane habitat on cultivated lands, or experience directing such management). The enhanced habitat will be located outside the construction-related 50 dBA L_{eq} (1 hour) noise contour and within 1 mile of the affected habitat.
- Maintain flooding and irrigation capacity. Stage CM1 activities on Staten Island such that they do not disrupt flooding and irrigation to the extent that greater sandhill crane habitat will be reduced during the crane wintering season.
- In determining any long-term uses of RTM on Staten Island, priority will be given to uses that are consistent with the sustainability of greater sandhill crane habitat on the island. RTM will be moved off the island after short-term use or storage unless a determination is made that long-term use of the RTM on Staten Island will not be detrimental to the crane population on the island.

Prior to construction on Staten Island, the qualified, wildlife agency–approved crane biologist will coordinate with the Implementation Office to develop a strategy for achieving the Staten Island performance standard using a combination of the measures described above, and prepare a plan based on the final construction design on Staten Island that includes all avoidance and minimization measures necessary for achieving the performance standard. This plan will be subject to review and approval by the wildlife agencies prior to its implementation. All avoidance and minimization measures will be in place, consistent with the plan, prior to project construction on Staten Island.

AMM30 Transmission Line Design and Alignment Guidelines

The location and design of the proposed new transmission lines will be conducted in accordance with electric and magnetic field guidance adopted by the California Public Utility Commission (2006) *EMF Design Guidelines for Electrical Facilities*. The guidelines describe the routine magnetic field reduction measures that all regulated California electric utilities will consider for new and upgraded transmission line and transmission substation construction.

The alignment of proposed transmission lines will be designed to avoid sensitive terrestrial and aquatic habitats when siting poles and towers, to the maximum extent feasible. Lines will be co-located where feasible, when such co-location would minimize effects on greater sandhill cranes and other sensitive resources. In cases where this is not feasible, the Implementation Office will ensure that impacts are minimized to the greatest degree feasible, and disturbed areas will be returned as near as reasonably and practically feasible to preconstruction conditions, by reestablishing surface conditions through carefully grading, reconstructing features such as irrigation and

Comment [EB114]: added

Comment [SLNWRA115]: Footnote underestimates impacts based on lighting and noise. Averages and trend analysis need to use appropriate statistics to make loss calculations. [eb] conservative estimates will be used and monitoring will be conducted during construction to assess actual effects. We will be further developing the monitoring and adaptive management program to provide assurance that standard will be met.

Comment [SLNWRA116]: This is not a monitoring process, a AM process, or an enforceable measure. Grossly inadequate. [eb] this in addition to the above measures will be used to meet the performance standard. No net loss in crane use days means no net population effect on the island, so we believe this on top of the long-term strategy for the crane is more than adequate.

Comment [SLNWRA117]: Immediate removal needs to be included as an available alternative if this is determined by the best science to be the appropriate option. [eb] immediate removal is an available option.

Comment [SLNWRA118]: These guidelines provide lowest protection for Agriculture, and Undeveloped land. They are simple models and do not use measurements and are not applicable for 50 kV. The Guidelines are so vague contextually as to not have any applicability in terms of cranes. For example they state:
"Low-cost magnetic field reduction measures will not be considered for undeveloped land such as open space,..." [eb] these guidelines are only one of a number of measures. Not adequate in an of itself,

Comment [SLNWRA119]: Unenforceable. [eb] see responses above

drainage facilities, and replanting vegetation and crops and/or compensating farmers for crops losses. Temporary transmission lines will be designed to avoid removal of wetted acres of vernal pools and alkali seasonal wetlands. Transmission lines will avoid greater sandhill crane roost sites as described in AMM20.

Comment [TB120]: What about other types of wetlands? [eb] no need for the BDCP, although this may come up in the context of the 404 permitting process. We've accounted for impacts to other wetlands, but the strategy for vernal pools and alkali seasonal wetlands calls for higher standard of avoidance.

3.3.2 Greater Sandhill Crane Effects

This section describes the adverse, beneficial, and net effects of the covered activities, including conservation measures, on the greater sandhill crane. The general methods used to assess these effects are described in Section 5.2.8, *Effects Analysis for Wildlife and Plants*, and Table 5.J.1, *Quantitative Effects Analysis Methods and Assumptions*, in Appendix 5.J, *Effects on Natural Communities, Wildlife, and Plants*. The habitat model used to assess effects to the species includes vegetation and land cover types associated with greater sandhill crane winter roosting and foraging habitat. Further details regarding the habitat model, including assumptions on which the model is based, are provided in Appendix 2.A, *Covered Species Accounts.* Factors considered in assessing the value of affected habitat for the greater sandhill crane include the relative habitat value of specific crop or land cover types in the crane's winter use area and proximity to known roosting sites.

Greater sandhill cranes in the Plan Area are almost entirely dependent on privately owned cultivated lands for foraging. Supporting a matrix of crop types that provide suitable foraging habitat and maintaining compatible agricultural practices, while sustaining and increasing the extent of other essential habitat elements such as night roosting habitat, will promote the species in the Plan Area over the long term. The habitat model for the greater sandhill crane includes "roosting and foraging" as well as "foraging" habitat, in the Plan Area. This includes certain agricultural types, specific grassland types, irrigated pastures and hays, and many managed seasonal wetland types. Roosting and foraging habitat includes known, traditional roost sites that also provide foraging habitat (Appendix 2.A). Foraging habitat supports foraging activity but does not include traditional roost sites. Further detail is provided in Appendix 2.A.

3.3.2.1 Adverse Effects

3.3.2.1.1 Permanent Habitat Loss, Conversion and Fragmentation

Based on the current conveyance facility footprint and hypothetical restoration footprints, covered activities would result in the permanent loss, conversion, or fragmentation of up to 7,136 acres[10] of modeled greater sandhill crane habitat (4% of its habitat in the Plan Area), including an estimated 71 acres of temporary roosting and foraging habitat and 7,065 acres of foraging habitat. There would be no loss of permanent roosting habitat as a result of BDCP. As explained in *Water Conveyance Facility Construction*, below, these impact estimates represent a worst-case scenario; the actual acreage of habitat loss for this species is expected to be less. *AMM6 Disposal and Reuse of Spoils, Reusable Tunnel Material, and Dredged Material* and *AMM30 Transmission Line Design and Alignment Guidelines*, described in Appendix 3.C, *Avoidance and Minimization Measures*, require that the final conveyance facility and transmission line footprints avoid loss of greater sandhill crane roosting habitat during the winter when cranes are present. With the implementation of these avoidance and minimization measures, the total maximum loss of temporary roosting and foraging habitat would be 41 acres, and the total maximum loss of foraging habitat would be 7,107 acres.

Table 5.6-10 provides the breakdown of foraging habitat loss by habitat value class. Covered activities resulting in adverse effects on the greater sandhill crane include conveyance facility construction, tidal and nontidal natural communities restoration, and grassland restoration. Habitat loss, conversion, and fragmentation resulting from each of these activities are described below.

Comment [SLNWRA121]: How does this reconcile with the protection/net increase of a mere 533 ac? [eb] The net increase in protected acreage is 4,174 acres. The net increase is expected to go up significantly between public review and final because it currently treats all the RTM on Staten as permanent loss of protected land, and we know that the RTM will be removed and habitat restored and protected at this site. The 533 acres (actually should be 575 acres) represents the net change in permanent roosting habitat acreage).

[10] Habitat or natural community loss acreage estimates are based on hypothetical footprints and models rather than detailed project-level design and represent the maximum allowed under the permit. Actual losses will be tracked through compliance monitoring to ensure that they do not exceed estimates.

Table 5.6-10. Total Amount of Greater Sandhill Crane Habitat Lost from Covered Activities

Foraging Habitat Value Class[a]	Cultivated Land Crops and Other Cover Types[b]	Acres Affected[c] (% of Total Impact)
Very High	Corn, rice	2,663 (37%)
High	Alfalfa and alfalfa mixtures, mixed pasture, native pasture, wheat, other pasture, irrigated pasture, managed wetlands, native vegetation[d]	1,901 (26%)
Medium	Grain and hay crops, miscellaneous grain and hay, mixed grain and hay, nonirrigated mixed grain and hay, other grain crops, miscellaneous grasses, grassland, alkali seasonal wetlands, vernal pool complex	1,499 (21%)
Low	Other irrigated crops, idle cropland, blueberries, asparagus, clover, cropped within the last 3 years, grain sorghum, green beans, miscellaneous truck, miscellaneous field, new lands being prepped for crop production, nonirrigated mixed pasture, nonirrigated native pasture, onions, garlic, peppers, potatoes, safflower, sudan, sugar beets, tomatoes (processing), melons squash and cucumbers all types, artichokes, beans (dry)	1,188 (16%)
Totals		**7,250**

[a] See Appendix 2.A, *Covered Species Accounts*, for description of foraging habitat values.

[b] This is based on land crop and other cover types mapped in 2008 (see Appendix 2B for mapping methodology).

[c] Total includes permanent, permanent – reusable tunnel material, and temporary borrow and spoil effects.

[c] Native vegetation is a land use designation within the California Department of Water Resources (2007) crop type dataset. For the purposes of incorporating native vegetation classes into the correct species models, and, when applicable, assigning habitat foraging values, the management of these lands most resembles that of native pasture, an irrigated pasture type.

Comment [TB122]: These types should be moved to medium because of recent data. [eb] will discuss with species experts.

Comment [TB123]: What is the difference between native pasture and grassland? [eb] good question. We never got a satisfactory answer to this from SAIC. It may be worth re-evaluating this classification as it relates to crane.

Water Conveyance Facility Construction

The water conveyance facility and associated features as designed would result in the permanent removal of approximately 2,728 acres of greater sandhill crane habitat, including 29 acres of temporary roosting and foraging habitat and 2,699 acres of foraging habitat (**Error! Reference source not found.**). The temporary roosting and foraging habitat that would be permanently lost is located on Zacharias Island; the loss is a result of installation of a transmission line and associated access road. However, *AMM20 Greater Sandhill Crane* (Appendix 3.C) requires

Comment [SLNWRA124]: See above. Impacts greatly outweigh any protection and mitigation. [eb] see above. Protection and restoration exceed impacts.

that the final transmission line alignment be designed to avoid crane roost sites; therefore, there will be no loss of crane temporary roosting and foraging habitat as a result of water conveyance facility construction once the facility is fully designed.

An estimated 2,347 acres (85%) of the affected foraging habitat would be lost due to placement of reusable tunnel material. The material will likely be moved to other sites for use in levee build-up and restoration, and the affected area will likely be restored. While this effect is categorized as a permanent impact, because there is no assurance that the material will eventually be moved, the effect will likely be temporary. Furthermore, the amount of storage area needed for reusable tunnel material is flexible (dependent on storage pile height and other factors), and the footprint used in the effects analysis is based on a worst-case scenario; the actual area to be affected by reusable tunnel material storage will likely be less than the estimated acreage. Additionally, AMM6 requires that the area used for reusable tunnel material storage be minimized in crane foraging habitat and that these areas completely avoid crane roost sites.

An estimated 1,283 of the 2,699 acres (47%) of the foraging habitat to be permanently lost as a result of conveyance facility construction would be at Staten Island, which is among the most significant crane use areas in the Delta (Littlefield and Ivey 2000). However, 1,257 acres (97%) of this loss would be a result of reusable tunnel material storage, and as described above, AMM6 requires this acreage to be minimized in crane foraging habitat. AMM6 also specifically requires that reusable tunnel material storage on Staten Island be sized and located in coordination with greater sandhill crane experts, USFWS, and CDFW, to reduce effects on greater sandhill crane.

Tidal Natural Communities Restoration

Based on the hypothetical tidal restoration footprint, this activity will result in the permanent conversion of an estimated 2,754 acres of greater sandhill crane habitat, including 2,713 acres of foraging habitat and 41 acres of roosting and foraging habitat. This loss will occur in the Cosumnes-Mokelumne River and West Delta ROAs (**Error! Reference source not found.**).

Effects in the Cosumnes/Mokelumne ROA associated with tidal wetland restoration activities occur in low-value cultivated lands that are restored to become tidal wetlands. To be conservative, these effects are counted as a permanent loss of sandhill crane habitat. However, tidal wetland restoration may in some cases provide habitat value for cranes.

Fragmentation of habitat is expected to be minimal because the majority of the affected acres are outside of the core occupied portion of the winter use area (based on modeled roosting and foraging habitat shown in Figure 2.A.-2, *Greater Sandhill Crane Habitat Model and Recorded Occurrences*, in Appendix 2.A, *Covered Species Accounts*) and because most effects are associated with tidal restoration. In Conservation Zone 5, loss of modeled habitat will occur along the western edge of the crane winter use area and therefore will not result in fragmentation of traditional crane habitats. In Conservation Zone 4, tidal wetland restoration may occur between the high crane use areas of the central Delta and the Cosumnes River Preserve. However, conversion to tidal wetlands in this area will not prohibit crane movement or reduce use of these important crane use areas.

Comment [TB125]: Fully constructed or designed? [eb] this speaks to the fact that the design will be modified between public review and final, and that the current footprint doesn't meet this standard but the AMMs require that it will. This language will change for the final.

Comment [SLNWRA126]: Both of these arguments seem unsubstantiated. How many acres score as low value, and how would tidal have any value to cranes? [eb] We can quantify the amount that is low value. Jim Estep indicated that cranes might use muted tidal. We'll confer with other crane experts.

Nontidal Marsh Natural Communities Restoration

This activity will result in the permanent conversion of an estimated 1,350 acres of modeled foraging habitat for the greater sandhill crane (roosting and foraging habitat is not affected) (**Error! Reference source not found.**). This is an estimated 1% of the modeled foraging-only habitat in the Plan Area. This activity includes effects from nontidal marsh restoration for the giant garter snake. The restored nontidal marsh is expected to continue to provide roosting and foraging habitat for the greater sandhill crane. However, a portion of the restored nontidal marsh is expected to be unsuitable for the crane as it will consist of open water that lacks emergent vegetation and is too deep to provide roosting or foraging habitat for this species.

Comment [SLNWRA127]: How much is open water then? [eb] exact proportion unknown. This discussion in only qualitative, However, to be on the conservative side, the quantitative net effects analysis assumes none of the restored nontidal marsh is crane habitat.

Grassland Natural Communities Restoration

This activity will result in the permanent conversion of an estimated 300 acres of modeled foraging habitat for the greater sandhill crane (roosting and foraging will not be affected) (**Error! Reference source not found.**). This is less than 1% of the modeled foraging habitat for the greater sandhill crane in the Plan Area. The restored grasslands are expected to continue to provide value as foraging habitat for the crane.

Comment [SLNWRA128]: How much relative value in what category? [eb] moderate value.

3.3.2.1.2 Periodic Inundation

No periodic inundation effects on the greater sandhill crane will occur as a result of covered activities, since these activities are expected to occur outside modeled habitat areas for the species.

3.3.2.1.3 Construction-Related Effects

Direct and permanent effects of construction are described above in the Section 5.6.8.1.1, *Permanent Habitat Loss, Conversion, and Fragmentation*. Additional construction-related effects on the greater sandhill crane include temporary effects from water conveyance facilities construction and establishment of borrow and spoils sites, as well as indirect construction-related effects. Effects on the species are described below for each effect category. Effects are described collectively for all covered activities and are also described for specific covered activities to the extent that this information is pertinent for assessing the value of affected habitat or specific nature of the effect.

Temporary Habitat Loss

Covered activities are expected to temporarily remove 985 acres of modeled habitat (less than 1% of this habitat in the Plan Area). Nearly all the affected habitat is cultivated land. This includes 24 acres of roosting and foraging habitat (16 acres of which is temporary roosting habitat), and 778 acres of foraging habitat. Of the 985 acres, establishment and use of borrow and spoil areas associated with construction of water facilities will result in temporary removal of approximately 183 acres of modeled greater sandhill crane winter foraging habitat (**Error! Reference source not found.**). Although this habitat will be restored within 1 year following construction, it will not necessarily be restored to its original topography and areas that were originally cultivated lands may be restored as grasslands.

Comment [SLNWRA129]: This describes permanent losses as temporary, which is it? What is the diminution of value and how does that get mitigated? [eb] we might want to do a net effects analysis for each value category. I'm fairly certain this will result in disproportionate increase in protected high value habitat, based on the protection objectives.

Indirect Construction-Related Effects

Construction-related noise and visual disturbances outside the project footprint are indirect effects that could temporarily affect the use of 11,554 acres (6%) of modeled greater sandhill crane habitat in the Plan Area (**Error! Reference source not found.**), assuming that all habitat within 1,300 feet of construction activities is indirectly affected. These construction activities include water conveyance facilities construction and tidal restoration activities.

A detailed analysis of potential indirect effects of conveyance facility construction on greater sandhill crane is provided in Appendix 5.J, Attachment 5J.D, *Indirect Effects of the Construction of the BDCP Conveyance Facility on Sandhill Crane*. The analysis addresses potential noise effects on cranes, and concludes that as much as 9,646 acres (5%) of crane habitat in the Plan Area would potentially be affected by noise above baseline level (50 to 60 dBA), including 1,085 acres of temporary crane roosting habitat, 548 acres of permanent crane roosting habitat, and 8,013 acres of crane foraging habitat. The analysis was conducted based on the assumption that there was direct line-of-sight from sandhill crane habitat areas to the construction site, and therefore is a worst-case estimate of effects. In many areas, existing levees and other structures will partially or completely block the line-of-sight to cranes and will function as effective noise barriers, substantially reducing noise transmission. Data is lacking to assess the effects that these increased noise levels will have on sandhill crane behavior.

Appendix 5.J, Attachment 5J.D, also addresses lighting effects on the species. Construction of each intake structure, dewatering near intakes, pumping plants, and certain pipeline construction areas would occur day and night, requiring bright lighting. Little data is available on the effects of artificial lighting on roosting birds. Direct light from automobile headlights has been observed to cause roosting cranes to flush, and it is thought that they may avoid roosting in areas where lighting is bright (Ivey pers. comm. [B]). However, roost site fidelity may cause cranes to still use a brightly lit site. If the birds do use a brightly lit roosting site, they may be vulnerable to sleep-wake cycle shifts and reproductive cycle shifts. Potential risks include a reduction in the cranes' quality of nocturnal rest, and effects on their sense of photo-period, which might cause them to shift their physiology towards earlier migration and breeding (Ivey pers. comm.). Such effects could reduce cranes' overall fitness and reproductive success, which could in turn have population-level impacts. A change in photo-period interpretation may also cause cranes to fly out earlier from roost sites to forage; this could increase their risk of transmission line collisions, if they leave roosts before dawn (Ivey pers. comm.).

Nighttime construction could also result in headlights flashing into roost sites when construction vehicles are turning onto or off of construction access routes. Proposed surge towers would require the use of safety lights that would alert low-flying aircraft to the presence of these structures because of their height. Such safety lighting could also disturb cranes.

These effects will be minimized through implementation of AMM20 (Appendix 3.C), which requires setback buffers from crane use areas during construction; installation of noise and visual barriers between construction areas and crane habitat; seasonal and timing restrictions; avoiding use of lighting in the highest use areas for cranes; shielding lights; directing lights away from crane habitat; establishing buffers between

construction and crane roost sites; and creating high-value roosting and foraging habitat to attract cranes into areas away from construction disturbance. With these measures in place, indirect effects of construction activities are not expected to reduce the greater sandhill crane population in the Plan Area.

AMM20 requires that both direct and indirect effects on greater sandhill cranes on Staten Island be minimized to the extent practicable and that surrounding habitat on Staten Island, outside the area of potential indirect effects, be enhanced to achieve a performance standard of no net loss of crane use on Staten Island (see AMM20 for a definition of crane use and how it will be measured).

3.3.2.1.4 Effects of Ongoing Activities

Operation and Maintenance

Operations and maintenance activities within 1,300 feet of construction could permanently, indirectly affect 8 acres of modeled greater sandhill crane habitat (**Error! Reference source not found.**). Maintenance of the aboveground water conveyance facilities could result in ongoing but periodic post construction~~postconstruction~~ noise and visual disturbances that could affect greater sandhill crane use of surrounding habitat. These effects may include periodic vehicle use along the conveyance corridor, and inspection and maintenance of above-ground facilities. These potential effects will be minimized with implementation of AMM20, described in Appendix 3.C.

Comment [SLNWRA130]: What about emergency conditions, do all of these apply?

Transmission Lines

Greater sandhill cranes are known to be susceptible to collision with overhead wires, including electrical distribution lines (Avian Power Line Interaction Committee 1994; Brown and Drewien 1995; Manville 2005). Both permanent and temporary electrical transmission lines will be constructed to supply construction and operational power to BDCP facilities. Typically, higher-voltage (230-kilovolt) lines vary in height from 90 to 110 feet, while “sub” transmission (69-kilovolt) lines vary from 50 to 70 feet (Avian Power Line Interaction Committee 2006). Temporary lines will be removed after construction of the water conveyance facilities, within 10 years.

To further investigate the risk of collision, a variety of morphological and behavioral risk factors to were analyzed to assess the relative susceptibility of covered bird species with overhead wire collision (Appendix 5.J, Attachment 5J.C, *Analysis of Potential Bird Collisions at Proposed BDCP Powerlines*). Based on this analysis, several aspects of the species’ behavior and morphology make greater sandhill cranes particularly susceptible to collisions with overhead wires. Most importantly, flight altitudes during daytime movements are within the range of heights for the proposed lines (50 to 110 feet [15 to 33.5 meters]). This increases collision potential. Because most crane movement occurs within 2 miles (3.2 kilometers) of their primary roost, the proximity of the current proposed alignment is a key issue in evaluating collision risk for cranes. Several known roosting sites are less than 2 miles (3.2 kilometers) from the current proposed alignment and are known to intersect

with traditional flight patterns (Appendix 5.J, Attachment 5J.C, *Analysis of Potential Bird Collisions at Proposed BDCP*). Delta wintering cranes are also regularly exposed to dense fog and are known to fly in the fog. This increases their transmission line collision mortality risk.

To quantify potential transmission line-collision mortality from the proposed lines, a collision risk map was developed for greater sandhill crane (Appendix 5.J, Attachment 5J.C). Risk factors derived from this map were used in conjunction with estimates of transmission line crossings and collision mortality from Brown and Drewien (1995). Using assumptions of crane mortality rates developed for similar situations in Colorado (Brown and Drewien 1995), it is estimated for unmarked lines that there is a potential for an estimated 16 deaths per year from the permanent lines and 122 deaths per year from the temporary lines.

Marking transmission lines with devices that make the lines more visible to birds has been shown to dramatically reduce the incidence of bird mortality, including for sandhill cranes. Brown and Drewien (1995) estimated that marking devices in the Central Valley would reduce crane mortality by 66%. Using this assumption, by incorporating line-marking devices into the designs the annual mortality rate is estimated to decrease to 6 deaths per year for the permanent lines and 42 deaths per year for the temporary lines.

Comment [TB131]: Need to include placement of diverters and maintenance of diverters [eb] this will be in AMM

Additional measures will be implemented, consistent with AMM20 (Appendix 3.C) to achieve no net increase in bird-strike risk for greater sandhill cranes in the Plan Area. This will be achieved by implementing any combination of the following.

- Site new transmission lines in lower bird-strike risk zones.
- Remove, relocate or underground existing lines.
- Install and maintain flight diverters on existing lines in the Greater Sandhill Crane Winter Use Area.
- For areas outside of the Stone Lakes National Wildlife Refuge project boundary[11], shift locations of flooded areas that provide crane roosts to lower risk areas.

This is expected to reduce existing mortality and thus fully offset the overall population effects of new transmission lines.

With these AMMs and the proposed mitigation, there is expected to be no net adverse effect on crane survival. There may be a positive effect on crane survival, because the bird flight diverters on existing lines and the undergrounded lines (if used) will remain in place after the temporary powerline (used for construction) is removed, thereby reducing mortality risk to cranes to a level below the baseline.

[11] The project boundary delineates the area surrounding the existing refuge for which the refuge has authority to acquire land or easements.

Recreation

Passive recreation in the reserve system, where that recreation is compatible with the biological goals and objectives, could result in disturbance of roost sites in the vicinity of trails. *AMM37 Recreation*, described in Appendix 3.C, limits construction of trails adjacent to crane use areas to spring and summer (outside the winter season when cranes are present). No hunting will be allowed at sites with temporary or permanent crane roost sites. Where feasible, no fall or winter hunting will be allowed on adjacent fields. Recreation on sites with crane roosts will be limited to public roadways and overlook areas, and no pets will be allowed onsite. With implementation of these measures, recreation-related effects on the greater sandhill crane are expected to be minimal.

Comment [SLNWRA132]: Where are the descriptions of habitat fragmentation, predator increases, dogs, weeds and other indirect but consequential effects of the project? [eb] since the line will be undergrounded, we don't expect significant fragmentation effects. The only effect of dogs would be from recreation, and dogs will not be permitted in crane use areas. We wouldn't expect weeds to be an issue in the cultivated lands, and construction will not occur close enough to the wetlands for weeds to be an issue.

3.3.2.1.5 Other Indirect Effects

Mercury

Covered activities have the potential to increase exposure to mercury in covered species that feed in aquatic environments, including the greater sandhill crane. The operational impacts of new flows under *CM1 Water Facilities and Operation* were analyzed using a DSM-2-based model to assess potential effects on mercury concentration and bioavailablity resulting from new flows. Subsequently, a regression model was used to estimate fish-tissue concentrations in striped bass under these future conditions. Results indicated that changes in total mercury levels in water and fish tissues under future conditions with the BDCP were insignificant (Appendix 5.D, Attachment 5D.A, *Bioaccumulation Model Development for Mercury Concentrations in Fish*, Tables 5.D.A-1, 5.D.A-2, 5.D.A-3, and 5.D.A-4).

Comment [SLNWRA133]: Is this an analysis of the mainstem Sacramento River? GSC are not cormorants. [eb] indicative of levels in water and bioaccumulation.

Marsh and floodplain restoration also has the potential to increase exposure to methylmercury. Mercury is transformed into the more bioavailable form of methylmercury in aquatic systems, especially areas subjected to regular wetting and drying such as tidal marshes and flood plains. Thus, restoration activities that create newly inundated areas could increase bioavailability of mercury. Increased methylmercury associated with natural community and floodplain restoration may indirectly affect the greater sandhill crane via uptake in lower tropic levels (Appendix 5.D, *Contaminants*). In general, the highest methylation rates are associated with high tidal marshes that experience intermittent wetting and drying and associated anoxic conditions (Alpers et al. 2008). The potential mobilization or creation of methylmercury in the Plan Area varies with site-specific conditions and will need to be assessed at the project level. The Suisun Marsh Plan (Bureau of Reclamation et al. 2010) anticipates that tidal wetlands restored under the plan will generate less methylmercury than the existing managed wetlands. Along with minimization and mitigation measures and adaptive management and monitoring, *CM12 Methylmercury Management* is expected to reduce the amount of methylmercury resulting from the restoration of natural communities and floodplains.

Comment [SLNWRA134]: This section is confusing and potentially inaccurate. Tidal marsh is lost habitat, seasonally flooded areas have very few and limited BMPs for MeHg, despite assertions here. [eb] disagree with inaccurate, but agree that we need to provide further analysis of mercury effects in seasonally flooded areas.

The potential indirect effects of increased mercury exposure are likely low for the greater sandhill crane for the following reasons.

- Greater sandhill cranes occur in the Plan Area only during the nonbreeding winter months.
- In the Plan Area, cranes forage primarily on cultivated crops.

- Cranes will likely have limited use of restored tidal wetlands compared to seasonal managed wetlands.

3.3.2.1.6 Impact of Take on Species

The Central Valley population of greater sandhill cranes breeds from British Columbia to northern California and winters in the Central Valley. A portion of the Plan Area (the greater sandhill crane winter use area) is one of two important greater sandhill crane winter use areas in the Central Valley, the other being the Butte Basin. In the Plan Area, the winter use area includes lands in Conservation Zones 3, 4, 5, and 6, which includes the central Delta and northern Delta east of the Stockton Deep Water Ship Channel and incorporates nearly all of the lands traditionally used by wintering greater sandhill cranes in the Delta.

The estimated total population of greater sandhill cranes is 62,600 (Littlefield and Ivey 2000). Although there is no recent population estimate for the Central Valley population of greater sandhill cranes, the most recent counts of summering cranes in California, Oregon and Washington total approximately 4,200 (Ivey and Herziger 2000, 2001), and a recent estimate of the summering cranes in interior British Columbia total an additional 4,000 (Breault pers. comm.), giving a total population estimate of 8,200 for the west coast of North America.

Covered activities are expected to permanently remove up to 7,136 acres of modeled habitat for greater sandhill crane representing 4% of the total habitat in the Plan Area, including 71 (less than 1%) of its modeled temporary roosting and foraging habitat. While cultivated lands will be affected, this and other adverse habitat effects resulting in take are not expected to adversely affect the species' long-term survival and conservation because the affected areas represent a small proportion of habitat in the Plan Area impacts are quantified in areas that will be converted to usable habitat for the crane, and much of the affected habitat has relatively low value.

Comment [SLNWRA135]: This is the critical occupied core habitat for the crane and this section ignores that fact, despite introducing the concept at the beginning. It has very high value and functions to provide the last major refugia for the species. Protection of additional acreage does not replace the functional core area for the crane given its biology. This species is very slow to use new roosting habitat and the "analysis' simply assumes they are interchangible. [eb] impacts in the highest value areas will primarily be temporary and the performance standard assures no population effects as a result of the construction activity. This part of the analysis will be reworded to reflect this fact.

As described in Appendix 5.J, Attachment 5J.C, *Analysis of Potential Bird Collisions at Proposed BDCP Powerlines*, without mitigation the proposed BDCP transmission lines could have an adverse effect on the Central Valley greater sandhill crane population. For unmarked lines, the alignment has the potential to cause declines in the Central Valley population that exceed the rate of population increase (1.4%), which could reduce population growth and inhibit the conservation of the species. For the Delta wintering population alone, the alignment results in a projected population decrease at both marked and unmarked lines. Minimization and mitigation described above will offset this ongoing impact and result in no net adverse change to regional mortality risk from transmission lines.

3.3.2.2 Beneficial Effects

The Plan requires protection of 7,300 acres of high- to very high-value habitat for greater sandhill crane, with at least 80% maintained in very high-value types in any given year (Objective GSHC1.1). The Plan requires creation of additional high-value greater sandhill crane winter foraging habitat by enhancing 10% of the habitat protected under Objective GSHC1.1 through acquiring low-value habitat or nonhabitat areas and converting them to high- or very high-value habitat (Objective GSHC1.2). The Plan also requires creation of 500 acres of wetlands providing high-

value roosting and foraging habitat for greater sandhill crane (Objectives GSHC1.3 and GSHC1.4), and creation of an additional 95 acres of foraging habitat consisting of flooded agricultural fields that will be sited with consideration of the location of roosting habitat loss and that will be in place prior to roosting habitat loss (Objective GSHC1.5). As part of the 500 acres of created wetlands, 180 acres of wetland roosting habitat will be created in association with uplands at a 2:1 ratio of uplands to wetlands, providing buffers around created wetlands: these wetlands will consist of two sites between the Cosumnes Preserve and Stone Lakes National Wildlife Refuge to provide habitat connectivity in this area (linkage #10, Figure 3.2-16, *Landscape Linkages*, in Chapter 3). Finally, some portion of the freshwater tidal wetland natural community that is created will provide foraging, loafing, or roosting value to the greater sandhill crane and may facilitate the expansion of the greater sandhill cranes into currently unoccupied areas, particularly in Conservation Zone 7.

3.3.2.3 Net Effects

Implementation of the BDCP will may result in a net permanent gain of modeled roosting and foraging habitat in the Plan Area of 533 acres. Creation of roosting habitat will offset losses of this essential habitat element and facilitate use of other modeled foraging habitat. Implementation of the BDCP will result in an estimated net decrease of 7,248 acres (4%) of foraging habitat for the greater sandhill crane. This impact would occur throughout most of the Delta and gradually over 40 years as tidal natural communities restoration occurs, ensuring that impacts are not concentrated geographically or in any one season. Most foraging habitat in the Plan Area is unoccupied in any given year, suggesting that the amount of foraging habitat is not limiting the population. The amount of foraging habitat to be permanently removed will be reduced further by reducing the footprint of reusable tunnel material storage areas in crane habitat prior to construction and restoring these areas after the material is relocated to other areas.

The extent of crane habitat in the Plan Area is declining as suitable crops are being converted to unsuitable crops (e.g., orchards, vineyards, row crops) or other land uses. The BDCP will help to arrest that decline by increasing protected habitat in the Plan Area by 10% (4,174 acres) (**Error! Reference source not found.**). The BDCP will maintain the conserved foraging habitat as high to very high value habitat for the crane, with at least 80% maintained as very high value habitat.

In addition to effects on the location and quality of modeled habitat, the proposed transmission lines have the potential to cause mortality through collision strike. However, adverse effects are reduced by an estimated 65% through installation of bird flight diverters on all new lines. Additional measures will be implemented, as described in AMM20, to reduce and offset bird-strike risk for cranes in the Plan Area. The net effect will be no net change of mortality risk to cranes from transmission line collision, and potentially a slight net reduction in mortality risk once the temporary transmission lines are removed.

The net effect of covered activities on the greater sandhill crane is expected to be beneficial for the following reasons.

Comment [TB136]: No Guarantees of "if they build it, they will come". [eb] Species experts have a high level of confidence that they will, especially if they are in vicinity of areas already used by cranes (and the objectives do require conservation to happen in vicinity of areas used by cranes)

Comment [SLNWRA137]: Without an identified funding source for the non-tunnel aspects of the plan, it is not clear this net increase in acreage will occur. Even if funding is found, the habitat may not be in place for 50 or more years. [eb] USFWS cannot issue the permit without funding assurances.

Comment [SLNWRA138]: By exchanging occupied core area for theoretical new habitat. [eb] Untrue. The occupied core areas will not be lost. The protected foraging habitat will consist of habitat used by cranes (except the 10% that will involve conversion from non-habitat to habitat)

Comment [SLNWRA139]: Not clear how the "10% increase" is derived. [eb] 4,174 acres is approximately 10% of the acreage of land currently protected for the crane in the Plan Area.

Comment [SLNWRA140]: Not clear that the project will not increase mortality due to new lines or that bird diverters will be as effective as claimed. [eb] AMMs and monitoring and adaptive management will be employed to ensure the performance standard is met.

- A large proportion of the crane use area, while modeled as suitable crane habitat, is unoccupied by cranes in any given year. Therefore, the amount of foraging habitat in the Plan Area is not considered limiting to the local population.
- A small proportion (4%) of the total available modeled crane habitat will be permanently removed.
- The amount of habitat to be permanently removed will be further reduced by reducing the footprint of reusable tunnel material storage areas in crane habitat, and restoring these areas after the material is relocated to other areas.
- The BDCP will maintain a standard of no net loss of crane use on Staten Island resulting from BDCP-related construction activity by minimizing the direct and indirect effect footprints and enhancing crane habitat on Staten Island.
- The agricultural habitat value that will be permanently lost will be replaced in equal proportion by protecting and enhancing other agricultural habitat and maintaining its high value for cranes.
- At least 80% of all protected greater sandhill crane habitat will be maintained each year in land cover types of the highest value with the remainder in land cover types of moderate to high value.
- Because agricultural habitat values change over time based largely on economically driven agricultural practices, protecting crane habitat will enhance the stability of agricultural habitat values in the crane use area.
- The creation and management of 595 acres of crane roosting habitat will increase the extent of roosting habitat in the crane use area and facilitate use of surrounding lands that may be currently unoccupied or underused due to the lack of proximity to roost sites.
- Marking all new transmission lines with bird flight diverters and implementing additional measures to reduce bird-strike risk, as described in AMM20, will result in no net increase in mortality risk for cranes from collisions with transmission lines in the region, ensuring no adverse population level effects.
- Indirect effects on greater sandhill crane from construction activities will be reduced through project design improvements; creating high-value roosting and foraging habitat to attract cranes into areas away from construction activities; restricting the season and timing of activities near roost sites were feasible; shielding lights and directing lighting away from habitat; and installing noise and visual barriers between construction activities and crane habitat.

Overall, the BDCP will provide a net benefit to the greater sandhill crane through the increase in available roosting habitat, the maintenance of existing or enhanced foraging habitat as well as an increase in extent of habitat in protected status. These protected areas will be managed and monitored to support the species. Collision mortality will be offset by implementation of minimization and mitigation measures with an expected no net loss of cranes due to bird strikes. Therefore, the BDCP will minimize and mitigate impacts, to the maximum extent practicable, and provide for the conservation and management of the greater sandhill crane in the Plan Area.

Comment [SLNWRA141]: Not clear how much reduction will actually occur since language is not mandatory in AAMs. [eb] there is quite a bit of mandatory language in the AMMs.

Comment [SLNWRA142]: The project actually destroys and disturbs good habitat and then promises to replace it later. Not clear there is a net or any benefit. [eb] conservation will run ahead of impacts. Benefits of long-term protection of highest value habitat, creation of roost sites, and long term monitoring and management are very clear benefits.

Comment [SLNWRA143]: Incorporation of monitoring concerns is still needed. What entity will be responsible for monitoring effectiveness and making changes as needed. [eb] agreed. We are still developing these details.

Page 1: [1] Comment [SLNWRA2] **SLNWRA** **1/20/2014 11:04:00 AM**

How is connectivity a factor for GSC other than in terms of placing the lines on the routes? [eb] connectivity is a factor because GSC typically travels within only a mile between roosting and foraging site.

What is the substantive biological basis for this acreage number, and how will the management be optimized for cranes, in what spatial sequence, in what kind of water years? [eb] To which acreage number is this referring? For cultivated lands, it's based on the acreage that needs to be protected to meet all the species specific BGOs.

Page 1: [2] Comment [SLNWRA4] **SLNWRA** **1/20/2014 11:13:00 AM**

(Here and later.) What is the ecological relationship to these lands, the GSC species' requirements, and the 7,300 ac, the 700 ac and the 500 ac. Areas? The 48k number conflates many acres that have no value to those that have high value. Are these rotating acres or fixed areas? [eb] The format presented here follows a nested approach recommended by CDFW for the NCCP. It starts with all the goals and obectives related to the natural communities used by the species, then gets more specific at the species level. The species specific objectives for cultivated lands are a subset of the natural community objectives, and provide more specificity to ensure that species needs are met within the larger natural community conservation requirements.

Page 1: [3] Comment [TB5] **Treiterer, Beatrix** **1/20/2014 11:14:00 AM**

Is "reserve system" defined elsewhere in the document. May want to define again. [eb] yes, it is defined elsewhere in the document and in the glossary.

Page 1: [4] Comment [SLNWRA6] **SLNWRA** **1/20/2014 11:16:00 AM**

Objectively how is this a targeted ecosystem or suite of ecosystem values? How can we measure the success or failure of this objective and its biological relevance to the species? [eb] this will involve compliance monitoring. When a agricultural property is targeted for conservation, the remnants of wildlife habitat on these lands will be retained.

Page 1: [5] Comment [SLNWRA10] **SLNWRA** **1/20/2014 11:23:00 AM**

Another way to state benefits: sustaining annually cropped open lands and assuring that a substantial portion of this acreage is in grains in any given year as well as assuring suitable roost areas in relationship to these forage areas. [eb] these benefits are described below for the species specific objectives.

Page 1: [6] Comment [EB9] **Ellen Berryman** **1/20/2014 11:45:00 AM**

Compliance monitoring will be used to track this objective. This is described in the monitoring and adaptive management of CM3, and in Appendix 3E.

Page 1: [7] Comment [TB12] **Treiterer, Beatrix** **1/20/2014 11:31:00 AM**

...GSHC utilize the same roost sites year after year therefore suitable cultivated land foraging habitat... [eb] okay, revised accordingly (also incorporating SLNWRA10)

Page 5: [8] Comment [EB34] **Ellen Berryman** **1/20/2014 12:27:00 PM**

Is this the event we're targeting for avoidance? My impression was that the idea was to avoid protection of areas that flood more frequently than every 100 years.

Page 6: [9] Comment [SLNWRA47] **SLNWRA** **1/20/2014 1:08:00 PM**

This gets to the idea of maintaining and expanding the core habitat areas. Given the massive potential impacts on a species with high site fidelity, the protection and enhancement needs to happen as close as possible to the existing uses. [eb] okay, revisions made as suggested.

Page 6: [10] Comment [TB48] **Treiterer, Beatrix** **1/20/2014 1:19:00 PM**

Recommendation: About 90% of the lower third of lands within the Stone Lakes Project Boundary have been converted to uses not utilized by cranes (e.g. solar farms, vineyards, orchards, etc.). [eb] Okay, added

Page 6: [11] Comment [mb49] **mbradbur** **2/24/2014 2:04:00 PM**

The lower third is nowhere near 90% non-crane habitat. "has largely been converted" is accurate.

Page 6: [12] Comment [mb51] **mbradbur** **2/24/2014 1:52:00 PM**

This definition should be following the first time SLNWR project boundary is listed, and not after.

Page 6: [13] Comment [TB53] **Treiterer, Beatrix** **1/20/2014 1:21:00 PM**

Do we need to address issue of reverter clauses, etc. that may potentially be in deed documents. What about endowments to manage the land? [eb] the reverters clause issue can be discussed at future Stone Lakes meeting. A regional HCP/NCCP doesn't have endowments for individual properties - instead, the overall funding mechanism for the HCP/NCCP will be used to fund management of the lands. USFWS needs to make a finding that sufficient funding is assured before they can approve the plan.

Page 6: [14] Comment [SLNWRA55] **SLNWRA** **1/20/2014 1:44:00 PM**

This section conflates roosting with feeding in a way that infers that the GSC can readily find and use suitable roosting sites. This is not accurate for roosting site selection and fidelity, although it appears to be true for feeding. [eb] not sure this is relevant here - the 95 acres in this objective will have to provide roosting/foraging habitat (that is, habitat that is used by cranes for both roosting and foraging).

Page 6: [15] Comment [SLNWRA56] **SLNWRA** **1/20/2014 1:38:00 PM**

It also equally important to allow cranes a second opportunity to feed on the same land as fossorial prey are flushed out because of the flooding. In general, the prey base is ignored in this analysis and the primary production is overemphasized. [eb] These sections are just providing rationale for the objectives. Detail about prey base and land management will be provided in CM11, although this detail has not yet been fully developed.

Page 19: [16] Comment [SLNWRA101] **SLNWRA** **1/22/2014 3:55:00 PM**

This ratio is not based on any evidence of its effectiveness. 1:1 is typically the minimum. The ratio of enhanced acres to directly impacted foraging habitat is also as much a temporal consideration as a spatial one. The amount of land contemplated for enhancement needs to be correlated to the length of the disturbance AS WELL AS the spatial dimension of that disturbance on the landscape. A long temporal exclusion from use of a foraging habitat would need to be mitigated by greater enhancements. [eb] This ratio was developed by Gary Ivey based on estimated value of un-harvested fields compared with harvested fields. I don't think there is a typical minimum for this type of impact minimization, and 1:1 would be excessive because the value of un-harvested areas is far higher than the value of un-harvested. Furthermore, cranes wouldn't be expected to leave most of the areas within the 50dBA noise contour., so those areas would retain at least partial value (i.e., not 100% loss)

Page 19: [17] Comment [SLNWRA103] **SLNWRA** **1/22/2014 3:57:00 PM**

This is still unclear in terms of when relocation will be implemented. There is also not clear evidence that relocation of roost sites will be successful. The creation and reoccupancy of new sites can take several years if it happens at all. [eb] further detail is being developed. Will discuss this comment with Gary Ivey, who has indicated that cranes will readily shift their roosting locations to where habitat is suitable, if it's in the near vicinity.