FINAL

Mitigation Monitoring and Reporting Program for the California WaterFix

PREPARED FOR:

State of California, Department of Water Resources
1416 Ninth Street
Sacramento, CA 94814
Contact: Marcus Yee

PREPARED BY:

ICF International
630 K Street, Suite 400
Sacramento, CA 95814

July 2017

4.13 Avoidance and Minimization Measure 20: Greater Sandhill Crane

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM20 Greater Sandhill Crane	DWR and Construction Contractors	Prior to, during, and after construction	Impact BIO-58, BIO-68, BIO-69, BIO-70, BIO-71, BIO-72, BIO-77, BIO-84, BIO-88, BIO-92, BIO-101, BIO-106, BIO-110, BIO-114, BIO-118, BIO-122, BIO-126, BIO-131, BIO-135, BIO-139, BIO-149, BIO-182

Commitment: If conveyance construction and restoration are to occur during greater sandhill crane wintering season (September 15 through March 15) in the Greater Sandhill Crane Winter Use Area (2013 Public Draft BDCP Appendix 2.A, Figure 2.A-19-2), the following avoidance and minimization measures will be implemented.

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 feasible, 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.

Bird Strike Hazard

Performance Standard: No take**, as defined by Section 86 of the California Fish and Game Code,** of greater sandhill crane associated with new facilities.

The project will be implemented in a manner that will not result in take of greater sandhill cranes as defined by Section 86 of the California Fish and Game Code . This performance standard will be accomplished by one of, or any combination of, the following:

- 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.
- Underground new lines in high-risk zones of the greater sandhill crane winter use area.
- Use natural gas generators in lieu of transmission lines in high-risk zones of the greater sandhill crane winter use area to provide power for the construction of the water conveyance facilities.

- Install bird strike diverters on existing lines in high-risk zones. Bird strike diverters will be placed on existing lines within the crane use area. The length of existing line to be fitted with bird strike diverters will be equal to the length of new transmission lines constructed as a result of the project, in an area with the same or higher greater sandhill crane strike risk to provide a net benefit to the species. Bird diverters will also be required on all new lines. For optimum results, the recommended spacing distance for bird flight diverters is 15 to 16.5 feet (4.5 to 5 meters) (Avian Power Line Interaction Committee 1994). Bird strike diverters will be installed on project and existing transmission lines in a configuration that research indicates will reduce bird strike risk by at least 60% or more. Bird strike diverters placed on new and existing lines will be periodically inspected and replaced as needed until or unless the project or existing line is removed, or are otherwise no longer a strike risk for greater sandhill cranes. The most effective and appropriate diverter for minimizing strikes with greater sandhill crane on the market according to best available science will be selected.
- 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 cultivated land roost site will be established prior to commencement of the wintering season that occurs prior to construction of new transmission lines. The existing cultivated land 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 will design the new roost site and direct implementation of the roost site establishment.
- Final transmission line design will be determined in coordination with the wildlife agencies and wildlife agency–approved, qualified biologist familiar with crane biology (as described above), to achieve the performance standard and ensure the measures described herein are incorporated.

Powerline Plan and Analysis

Prior to powerline construction, the wildlife agency-approved, qualified crane biologist familiar with crane biology will coordinate with DWR to develop a plan for achieving the performance standard (no take of greater sandhill crane associated with the new facilities) using one or a combination of the measures described above. The plan will include an analysis, using the method described in BDCP Appendix 5.J, Attachment 5.J.C, Analysis of Potential Bird Collisions at Proposed BDCP Powerlines, of the 2013 Public Draft BDCP to demonstrate that this standard has been met for the final transmission line alignment. The best available science will be used to estimate bird strike reduction associated with powerline diverters installed on existing lines in highest risk zones for the species and to design and implement roost site surveys as described in Section 3B.4.20.6 of the 2013 Public Draft BDCP, Surveys to Inform Avoidance and Minimization. To ensure greater sandhill crane habitat loss is avoided and minimized to the maximum extent practicable, wildlife agency staff will be involved in discussions with the powerline provider regarding technical constraints on powerline placement and undergrounding. The final powerline plan and analysis will be subject to review and approval by the wildlife agencies prior to its implementation to ensure that birdstrike risk is minimized and take, as defined by Section 86 of the California Fish and Game Code, is avoided. Powerline construction will be implemented consistent with this plan.

Required Measures

Consistent with the performance standard of no take of greater sandhill crane associated with new facilities, 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 performance standard, all of the following measures are required.

- During the final powerline design process, undergrounding of all new permanent powerlines 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. These diverters will be maintained for the entire period that the lines are in place. This may contribute toward meeting the performance standard of no take of greater sandhill crane associated with the new facilities (described above).
- All new above-ground powerlines will be at least 300 feet from all crane roost sites. This can be accomplished through alignment design or through crane roost site relocation. For relocation of cultivated land roost sites, both the existing[23] and new roost site will be flooded a year prior to construction; and the existing roost site will not be flooded during the wintering season that occurs during the year construction begins. For relocation of wetland roost sites, the relocated site will be flooded one year prior to construction; and during construction, both roosting sites will be flooded. A wildlife agency–approved, qualified biologist familiar with crane biology will design new roost sites and direct implementation of roost site establishment. Potential sites will be identified and monitored prior to establishment. Relocated roost sites will be maintained until construction is complete in the affected region.
- New[24] permanent powerlines will be placed outside of areas with a bird strike risk index of 1.0 or greater as shown on Figure 2 in, Appendix 5.J, Attachment 5J.C, Analysis of Potential Bird Collisions at Proposed BDCP Powerlines, of the 2013 Public Draft BDCP.
- 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 Water Conveyance Features

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.

[23] "Existing" roost habitat is that which is designated by the crane roost model at the time of water conveyance plan finalization. The crane roost model will be based on recent survey data as described in Section 3B.4.20.6, *Surveys to Inform Avoidance and Minimization*.

[24] New powerlines are those that did not previously exist, that is, if a powerline is replaced along the same alignment as one that previously existed, then that is not considered a "new" powerline, but a "replacement" powerline.

Foraging Habitat

- Minimize direct loss of foraging habitat. Water conveyance facility final design will minimize pile driving and general construction-related loss of greater sandhill crane foraging habitat to the extent practicable.
- Minimize pile driving and general construction-related combined noise effects on foraging habitat. DWR 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 Leq (1 hour) [25]. Combined pile driving and general construction-related noise levels will be estimated prior to commencement of construction using the methods described in Appendix 11F of the FEIR/FEIS, BDCP Appendix 5.J, 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 Leq (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. DWR will enhance 0.1 acre of foraging habitat for each acre of foraging habitat to be indirectly affected within the 50 dBA Leq (1 hour) construction noise contour. The enhanced foraging habitat will be established one crane wintering season (September 1 to March 15) prior to construction and will be maintained until the activities 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 (e.g., corn stalks will be knocked down or mulched to make grain available to foraging 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 Leq (1 hour) noise contour and within 1 mile of the affected habitat.

Roosting Habitat

Preconstruction surveys will be conducted for greater sandhill crane temporary and permanent roost sites within 0.75 mile of the construction area boundary where access is available. 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

[25] 50 decibels averaged over a 1-hour period.

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 Leq [1 hour] pile driving and general construction noise contour) but within 1 mile of the affected site. The relocated roost site will be established one year prior to construction activities affecting the original roost site. A qualified biologist familiar with crane biology will design the new roost site and direct implementation of the roost site establishment. Potential sites will be identified and monitored prior to establishment. Relocated roost sites will be maintained until construction is complete in the affected region. Combined pile driving and general construction-related noise levels will be estimated prior to commencement of construction using the methods described in BDCP Appendix 5.J, Attachment 5J.D, Indirect Effects of Construction of the BDCP Conveyance Facility on Greater Sandhill Crane (see Appendix 11F of the FEIR/FEIS), incorporating site-specific information related to equipment to be used and existing noise barriers such as levees.

- Avoid and minimize pile driving and general construction-related noise effects on roost sites. Activities within 0.75 mile of crane roosting habitat will reduce pile driving and general construction noise during nighttime hours (from 1 hour before sunset to 1 hour after sunrise) such that pile-driving and general construction noise levels do not exceed a combined 50 dBA Leq (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 pile-driving and general construction noise levels above 50 dBA Leq (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 pile-driving and general construction noise levels do not exceed a combined 50 dBA Leq (1 hour) at the roost site; relocating cultivated land or wetland roost sites as described above; and/or installing noise barriers between roost sites within the 50 dBA Leq (1 hour) contour and the pile-driving and general construction noise source areas, such that construction noise levels at the roost site do not exceed 50 dBA Leq (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 Leq (1 hour) at the roost site.

If the roost site to be indirectly affected within the 50 dBA Leq (1 hour) pile-driving and general construction combined 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 Leq (1 hour) noise contour) but within 1 mile of the affected site, at a ratio of 1 acre created for each acre of temporary or permanent roost site within the pile-driving and general construction 50 dBA Leq (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 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

DWR 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. A biological construction monitor will ensure that 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 vegetation screen or other noise and visual barrier along the south side of Hood Franklin Road along the length of Stone Lake National Wildlife Refuge's property to reduce disturbance to sandhill cranes. The noise and visual barrier will be a minimum of 5 feet high (above the adjacent elevated road, if applicable) 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. This barrier 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. Project-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[26]. This standard will be achieved through some combination of the following (and including the above required avoidance and minimization measures for water conveyance facilities).
- 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.

[26] 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) pile-driving and general 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.

- 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.
- Prioritize placement of facilities and RTM in areas of low or no 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 water conveyance facilities).
- 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 Leq (1 hour) noise contour and within 1 mile of the affected habitat.
- Maintain flooding and irrigation capacity. Stage water facility construction 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 DWR 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.

Surveys to Inform Avoidance and Minimization

The modeling method used to inform the placement of diverters on existing lines in high-risk zones of the greater sandhill crane winter use area and to evaluate the acres of foraging and roosting habitat affected by the 50 dB noise contour requires spatially explicit roosting and foraging habitat and population density models. The GIS-based methods used to determine the total effected and compensatory habitat will be performed once, at the time of water conveyance facilities plan finalization. The greater sandhill crane roosting and survey data used to evaluate habitat loss, and to

identify lands in fulfillment of minimization requirements, at the time of water conveyance facilities plan finalization will be no more than two wintering seasons old at the time of the evaluation. This allows for avoidance and minimization requirements to be quantified using up-to-date information. DWR chooses to phase avoidance and minimization quantification along with construction phasing, the roosting and foraging habitat and population data must be updated so that it is never more than five years old. The greater sandhill crane roosting and foraging habitat and population models will be updated using on-the-ground surveys performed by a wildlife agency–approved, qualified biologist familiar with crane biology and experienced with crane population-level survey techniques. The greater sandhill crane foraging habitat model can be updated using agricultural land-use data or a combination of land-use and survey data.

Responsible Parties: DWR and its construction contractors will be responsible for implementing this AMM.

Regulating/Permitting Agencies: CDFW

Location: Greater Sandhill Crane Winter Use Area

Timing: AMMs will be implemented if project activities are to occur during greater sandhill crane wintering season (September 15 through March 15) in the Greater Sandhill Crane Winter Use Area (2013 Public Draft BDCP Appendix 2.A, Figure 2.A-19-2).

Monitoring: DWR will be responsible for reviewing project designs to ensure the measures described herein are incorporated. DWR will also incorporate the above measure into contracts with construction contractors as appropriate. A construction monitor will monitor implementation of appropriate measures by DWR and perform inspections post-implementation.

DWR will deploy a wildlife agency-approved, qualified crane biologist familiar with crane biology to manage all surveys and construction monitoring required as part of this mitigation measure. DWR will consult with the crane biologist during the design phase to incorporate measures during design. In coordination with DWR, the crane biologist will develop a monitoring plan for surveys to be conducted before, during, and after construction. Prior to powerline construction, the crane biologist familiar will coordinate with DWR to develop a plan for achieving the performance standard (no take of greater sandhill crane associated with the new facilities) using one or a combination of the measures described above. The crane biologist will also coordinate with DWR 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.

During construction the crane biologist will manage a team of qualified biologists to monitor construction activities for compliance with appropriate measures as well as inspect completed construction activities to ensure incorporation of effective avoidance measures.

Reporting Requirements: Survey plans developed by DWR and the crane biologist will determine site-specific reporting requirements for all survey efforts. All plans will be developed by DWR in consultation with the wildlife agencies. After completion of activities with the potential to cause take of greater sandhill crane and/or a temporary loss of the value of foraging and/or roosting habitat due to unavoidable noise effects, DWR shall prepare a report explaining how all such activities were implemented consistent with the requirements of this AMM (20). The report shall explain, at a minimum, the following: how take of greater sandhill cranes, as defined by Section 86 of the

California Fish and Game Code, was avoided; how DWR minimized the effects of noise on foraging habitat and enhanced any foraging habitat indirectly affected within the 50 dBA Leq (1 hour) construction noise contour at a ratio of 0.1 acre enhanced per 1.0 acre affected; how DWR avoided and minimized effects on roost sites and created an acre of new temporary cultivated land roosting habitat for every acre of existing roosting habitat indirectly affected within the 50 dBA Leq (1 hour) construction noise contour; and how construction activities within Staten Island were conducted so as to avoid a net decrease in crane use on Staten Island as determined by deriving greater sandhill crane use days for the entire winter period.

4.14 Avoidance and Minimization Measure 21: Tricolored Blackbird

Avoidance and Minimization Measure	Responsible Party/Parties	Timing	Associated Resource Area Impact
AMM21 Tricolored Blackbird	DWR and Construction contractors	Prior to and during Construction	Impact BIO-87, BIO-89

Commitment: Prior to implementation of project activities, a qualified biologist with experience surveying for and observing tricolored blackbird will conduct a preconstruction survey to establish use of suitable habitat by tricolored blackbird colonies. Surveys will be conducted in suitable habitat within 1,300 feet of proposed construction areas, where access allows, during the nesting season (generally March 15 to July 31) 1 year prior to, and then again the year of, construction. During each year, surveys will be conducted monthly in March, April, May, June, and July. If construction is initiated at a site during the nesting season, 3 surveys will be conducted within 15 days of construction with one of the surveys within 5 days of the start of construction. The CDFW Suisun Marsh Unit tracks tricolored blackbird colonies yearly in Suisun Marsh as part of the University of California, Davis /USFWS tricolored blackbird portal project; these records will also be searched and staff at the portal project consulted for recent colony information. If active tricolored blackbird nesting colonies are identified, minimization requirements and construction monitoring will be required.

Project activities will avoid active tricolored blackbird nesting colonies and associated habitat during the breeding season (generally March 15–July 31). Avoidance measures will include relocating project activities away from the nesting colonies and associated habitat to the maximum extent practicable.

Projects (construction and restoration) will be designed to avoid construction activity to the maximum extent practicable up to 1,300 feet, but not less than a minimum of 300 feet, from an active tricolored blackbird nesting colony. This minimum buffer may be reduced in areas with dense forest, buildings, or other habitat features between the construction activities and the active nest colony, or where there is sufficient topographic relief to protect the colony from excessive noise or visual disturbance as determined by a biologist experienced with tricolored blackbird.

Project activities potentially affecting a nesting colony will be monitored by a qualified biologist to verify that the activity is not disrupting the colony. If it is, the activity will be modified, as practicable, by either delaying construction until the colony abandons the site or until the end of the breeding season, whichever occurs first, temporarily relocating staging areas, or temporarily