From: Shawn Smallwood <puma@dcn.org>
Sent: Tuesday, July 29, 2014 12:20 AM
To: BDCP.comments@noaa.gov
Subject: Comments on EIR/EIS prepared for Bay Delta Conservation Plan
Attachments: Smallwood comments on Delta Tunnels_072114.docx

I would like to submit my comments on the EIR/EIS that was prepared for the BDCP. My comments are attached in a Word file.

Thank you,

Shawn Smallwood

BDCP1631

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21 July 2014

RE: Comments on the Bay Delta Conservation Plan EIR/EIS

I would like to comment on the draft Environmental Impact Report and Environmental Impact Statement (EIR/EIS) prepared for the Bay Delta Conservation Plan (BDCP). My qualifications for preparing expert comments are the following. I earned a Ph.D. degree in Ecology from the University of California at Davis in 1990, where I subsequently worked for four years as a post-graduate researcher in the Department of Agronomy and Range Sciences. My research has been on animal density and distribution, habitat selection, habitat restoration, interactions between wildlife and human infrastructure and activities, conservation of rare and endangered species, and on the ecology of invading species. I have authored numerous papers on special-status species issues, including "Using the best scientific data for endangered species conservation," published in Environmental Management (Smallwood et al. 1999), and "Suggested standards for science applied to conservation issues" published in the Transactions of the Western Section of The Wildlife Society (Smallwood et al. 2001). I served as Chair of the Conservation Affairs Committee for The Wildlife Society – Western Section. I also served on the Alameda County Scientific Review Committee (SRC) for five years which oversaw monitoring and research of wildlife impacts with wind turbines in the Altamont Pass Wind Resource Area. I am a member of The Wildlife Society and the Raptor Research Foundation, and I've been a part-time lecturer at California State University, Sacramento. I was also Associate Editor of wildlife biology's premier scientific journal, The Journal of Wildlife Management, as well as of Biological Conservation, and I was on the Editorial Board of Environmental Management.

For 25 years I have performed research and consulting on wildlife ecology and conservation, mostly in the Great Central Valley. I have worked on many of the special-status species that will be affected by the BDCP, and I have spent a lot of time in and around the San Joaquin Delta. I also live on the edge of the Delta, in Davis, California. In my research efforts, I have examined the impacts on wildlife caused by land conversions, electric distribution lines, wind turbines, and soil degradation. I have also researched how wildlife interact with agricultural and how agricultural practices can be modified to conserve wildlife.

IMPACTS ASSESSMENT

The EIR/EIS often refers to modeled habitat when referring to impacts to or special-status species. However, the "models" are nothing more than GIS map layers of vegetation cover that someone classified into "natural communities" and onto which someone applied habitat suitability ratings. The modeling was explained in the Bay Delta Conservation Plan, Chapter 5 and Appendix 5J, but details were missing on who took these steps and at what resolution habitat suitability ratings were applied. The modeling was very simplistic and highly dependent on untested assumptions.

According to the BDCP (page 5.2-23), habitat areas were weighted for suitability by using a rating approach known as a Habitat Suitability Index, or HSI. However, none of these weightings were shared in the BDCP or the EIR/EIS or any of the accompanying documents, as far as I could determine. As far as I can tell, some anonymous person(s) assigned HSI values to acreages within the study area for each special-status species, but did not explain the reasons for HSI assignments. The modeling appears to be a black box that the public is expected to trust. Having performed indicator-level assessments myself, I do not trust unidentified personnel to have accurately and consistently assigned habitat values to lands throughout the study area on behalf of special-status species. Not only does this approach misrepresent the operational terms used by ecologists and wildlife biologists, as explained below, but it lacks transparency and conveys over-confidence in the results.

I have performed similar assessments using GIS, including what used to be the foundation of the Yolo County Habitat Conservation Plan before it transitioned into the Yolo County Natural Heritage Program (Smallwood et al. 1998). A key difference between what I did and what has been done in the BDCP is that my characterizations of "ecological integrity" and "conservation opportunity" were intended to identify the places in the study area where mitigation might achieve the greatest gains, whereas the mapping of "habitat" in the BDCP was intended to estimate both project impacts and conservation benefits on a balance sheet. I made no attempt quantify impacts or conservation benefits with such indicator-level maps because doing so would have been scientifically indefensible and legally inappropriate. The BDCP approach was scientifically indefensible and legally inappropriate, and just downright misleading, as I will explain.

The BDCP has misapplied operational terms from the fields of ecology and wildlife biology to minimize project impacts and to maximize predictions of conservation benefits. For example, *natural communities* are defined by ecologists as associations of interacting populations, usually defined by the nature of their interaction or the place in which they live. Ecologists delineate and characterize natural communities by studying species' interactions within defined areas or within sampling plots, and then they compare what they find by using a suite of metrics. The BDCP's use of the term is a vegetation cover type that is readily recognizable by someone viewing aerial photos (e.g., cultivated versus riparian versus grassland) and that is bounded by digital lines that are rarely if ever seen by ecologists when considering natural communities. The BDCP's use of the term is a distortion of the term's original meaning, and results in a convenient

tool for eliminating all of the beautiful complexity of species' interactions that are intrinsic to each place. Yes, there are species' interactions that transcend a place and that can be found commonly in other environmental settings that appear similar to a particular place, but there are many more unique interactions – species' interactions that will be found no place else. The BDCP's use of the term, *natural communities*, glosses over this intrinsic value and so diminishes the project's impacts on, for example, vernal pools and their special-status species assemblage by lumping the vernal pools in the project's path with those far away on the outer fringe of the project's vast study area.

Another term misapplied in the BDCP was *habitat restoration*. To improve its balance sheet of project impacts against conservation benefits, the BDCP relied heavily on habitat restoration, which was never defined in terms of individuals or breeding pairs of the special-status species that are supposed to benefit from habitat restoration. The balance sheet's metric was acreage, so the BDCP assumed that restoring an acre of a given natural community would equal the habitat value of that same natural community that was destroyed by the project. This assumption would be inconsistent with both the terms *habitat* and *habitat restoration*. According to the BDCP's assumptions and approach, habitat is defined by people on behalf of the species at issue, whereas wildlife biologists and ecologists define habitat as that portion of the environment used by the species. Ecologists and wildlife biologists do not attempt to inform the species of its habitat, but rather allow the species to inform us. We, as ecologists, measure the distribution and abundance of biological species and relate those measurements to our measures of other environmental variables so that we can infer the species' habitat affinities (Smallwood 2002). Habitat restoration is therefore an attempt to reproduce the environmental conditions that matched our inferences of the species' habitat, so that we can restore the distribution, abundance and social interactions that normally would occupy such conditions (Smallwood 2001). The BDCP's characterization of habitat restoration lacked measurable thresholds of success in terms of the species' use the environment. In my experience this approach will not work.

Habitat restoration is also specific to the places where habitat was destroyed, but the BDCP generally conflates its plan to "create" habitat in other locations with the concept of habitat restoration. Creating habitat at Site B to replace habitat destroyed at Site A will not truly restore the destroyed habitat because it is in the wrong place. There is no chance that habitat can be restored at a different place from where individuals of a particular special-status species used to live. Furthermore, creating habitat at Site B will likely result in destroying or degrading the habitat of individuals already occurring at Site B unless the conditions at Site B were so degraded that the enhancements would benefit the local individuals of the species. But proceeding with habitat restoration, habitat creation, habitat enhancements, or whatever the BDCP wants to call it, would be irresponsible without first demonstrating that the conservation site is in need of the action and will measurably benefit the special-status species at issue.

For example, Swainson's hawks are known to nest in the highest densities within the central portion of the Central Valley, closer to the Sacramento River as it flows into the Delta. The riparian forest in the extreme western portion of the BDCP study area should not be given the same value as the riparian forest nearest the north-south axis of the

Central Valley. In another example, giant garter snakes also occur near the north-south axis of the Central Valley, so the BDCP's balance sheet should not give equal weight to the wetlands and grasslands in the extreme western portion of the study area as compared to those that are going to be destroyed by the project. The same would be true for sandhill cranes and probably many other special-status species.

Even very close to the site of project impacts, habitat restoration can often fail. I helped "restore" habitat of Valley Elderberry Longhorn Beetle (VELB) in what appeared to be a perfect setting from our point of view (Morrison et al. 2003). Along the Merced River near Livingston, California, we translocated mature elderberry shrubs with bore holes made by the beetle, so we knew that we had inoculated the restored site with not only the beetle's key plant species but probably with the beetle itself. We managed and monitored the site for three years using the US Fish and Wildlife Service protocol. Whereas the elderberry shrubs thrived, the VELB failed to occupy the site (an all-too common outcome). Using the BDCP's acreage metric for its balance sheet, we can say we succeeded in restoring habitat of the beetle and having achieved no net loss of VELB habitat, but from the species point of view we failed. This is what is going to transpire writ large if the BDCP's impacts and mitigation approach is allowed to proceed.

Returning to my earlier caveat that habitat restoration should be regarded as legitimate only where the special-status species was known to occur but where habitat conditions had deteriorated, I must add another caveat. One of my efforts to restore habitat was directed toward the Fresno kangaroo rat (*Dipodomys nitratoides*) in a grassland environment over 14 years. Even though Fresno kangaroo rats resided on this grassland, it proved extremely difficult to identify the environmental resources that the species used to rely on before conditions degraded to the level that existed when I began my restoration efforts. It was unknown which food plants were preferred by the species, or whether the varieties of these food plants continued to exist or had gone extinct. We surmised that the species was disturbance-adapted, but we could not determine the nature of the disturbances upon which the species thrived because those disturbances had disappeared from the landscape for a century or longer. In my experience, it is impossible to truly restore the habitat of any special-status species. Nevertheless, sufficient resources should be directed toward efforts to learn which resources are missing from the species' environment, and these efforts should be made using appropriate experimental designs. Without detailing appropriate experimental design and promising sufficient resources, it is misleading to promise habitat restoration over vast acreages for multiple species.

Even worse than promising habitat restoration in the wrong places or without proper experimental design and other resources, would be efforts to restore habitat on piles of bore spoils. I did not see where the EIR/EIS stated that habitat restoration would be attempted on bore spoils, but neither did I see it stated that this would not happen. In fact, the bore spoils were referred to as "*Reusable Tunnel Material,*" which could conceivably mean reusable as acreage for habitat restoration. The EIR/EIS (page 12-139) admitted to having no willing sellers of land that would be used for habitat restoration, so it seems plausible that the Reusable Tunnel Material Areas would be targeted for habitat restoration. Attempting habitat restoration on bore spoils would

certainly fail because the soils would be unsuitable for growing the appropriate plants, and because the ground elevation would be eight to ten feet higher than the original ground elevation, so would experience a new, different suite of ecosystem processes. Having performed surveys for wildlife in many environmental settings, such as on silt-filled gravel-mining pits that were retired from mining since one to thirty years earlier, and having intensively studied fossorial mammal ecology, I can predict with considerable certainty that using bore spoils as the substrate for habitat restoration would result in anemic environments of low species diversity. The Reusable Tunnel Material Areas should be regarded as areas of permanent direct impacts, and as having no potential for habitat restoration.

Lack of Precautionary Principle

The foremost principle of impacts assessment and of risk analysis in general is the Precautionary Principle. In the face of high uncertainty when assessing impacts to rare environmental resources, the accepted standard is to err on the side of caution (National Research Council 1986, Shrader-Frechette and McCoy 1992, O'Brien 2000). Instead of adopting the Precautionary Principle in its impacts assessment, however, the EIR/EIS relied on assumptions and an assessment approach that glossed over likely project impacts and exaggerated the conservation benefits of its proposed mitigation measures.

One assessment approach that was contrary to the Precautionary Principle was relating the acreages of habitat impacts to the alleged availability of those habitats across the vast extent of the study area. For example, according to the EIR/EIS (page 12-2046), "*The loss of this combined 403 acres* [of vernal pools] *would represent approximately 3% of the 12,133 acres of the community that is mapped in the study area.*" This conclusion was misleading because most of the vernal pools in the study area are part of the Jepson Prairie complex, which is far from the vernal pools that will be destroyed and which support a different set of special-status species. The impact metric should not have been 3% of the mapped vernal pool acreage in the study area, but rather 100% of the 403 acres that would be destroyed by the project.

Following up on this same example, the EIR/EIS (page 12-2048) claimed, "*However, 600 acres* [of vernal pools] *would be protected (CM3) and up 19 to 67 acres would be restored (CM9) through the course of Alternative 4 implementation.*" A precautionary approach would have assumed that, unfortunately, it would be unrealistic to expect that the destroyed vernal pools could be restored, so there would be no claim that 19 to 67 acres over vernal pools would be restored. A precautionary approach would also reveal whether there are 600 acres of vernal pools in need of protection (that are not already protected), and that if there are this many acres, then there are willing sellers of fee title or conservation easements on the acreage.

The Precautionary Principle would also include appropriate assignments of uncertainty to impacts conclusions and to assumptions underlying the impacts assessment. For example, none of the habitat models appeared to be accompanied by any statements of uncertainty. The model output, which consisted merely of some unidentified person(s) assignment of HSI ratings to digitized GIS map layers of vegetation cover, was either

habitat or not habitat, or "high value" habitat or "low value" habitat, or "primary" habitat or "secondary" habitat, judging from the figures in chapter 12. With these designations, there were no error terms, no confidence ranges, nor any cautionary statements warning that the designations could be wrong sometimes. The habitat models, which appeared to be derived from a black box, were presented as 100% accurate.

In another example of the Precautionary Principle missing from the impacts assessment, a key set of assumptions underlying predictions of water outflows and changes in outflows was relied upon without fully considering the uncertainty of those assumptions. Outflows and changes in outflows would substantially affect the impact assessments of biological resources. Therefore, it was no surprise to me to see climate change scenarios considered in projections of outflows and changes in outflows (EIR/EIS page 5.2-10), "*Over the implementation period, regional climate likely will change in response to global changes in 4 climate (Pachauri and Reisinger 2007). While the expectations of climate change are robust, 5 predictions of changes must depend on model projections that may differ from what actually occurs.*" However, even though the EIR/EIS acknowledged that what will actually occur might differ from model projections, this uncertainty failed to translate to the outflow projections relied upon in the EIR/EIS.

According to the EIR/EIS (page 5-64),"*Average annual Delta exports ... under the No Action Alternative would be reduced by about 703 TAF (14%) compared to Existing Conditions (Table 5-5) because of sea level rise and climate change, increased outflows to meet Fall X2 in wet and above normal years, increased projected urban water demands, and other changes explained previously in this section...*" To be consistent with the Precautionary Principle, the outflow projects should have been based not only on this 14% flow reduction, but also on a 0% flow reduction. In other words, the EIR/EIS should have also considered the possibility that the climate change projection will turn out to be wrong. Wrong projections are not unheard of when it comes to climate change, so it would have been reasonable to consider a 0% flow reduction in the No Project Alternative. Another way to do this would have been to assign an uncertainty range to the 14% value, but the tables of outflow projections in Chapter 5 failed to include confidence ranges or error terms.

Reliance on CNDDB Records

The EIR/EIS was over-reliant on data managed at the California Natural Diversity Data Base (CNDDB). The habitat models appeared to be based on them and my reading of the EIR/EIS gave me the impression that whoever did the habitat modeling assigned HSI values to mapped habitat areas based on whether these areas included CNDDB records (e.g., EIR/EIS page 12-140). However, CNDDB records are voluntarily reported and many were not derived from scientific sampling, which means that lack of CNDDB records does not equal species absence. CNDDB records cannot be relied upon to determine the extent of habitat. To help get this message across, the California Department of Fish and Wildlife posts a disclaimer on its California Natural Diversity Data Base web site: "*We work very hard to keep the CNDDB and the Spotted Owl Database as current and up-to-date as possible given our capabilities and*

resources. However, we cannot and do not portray the CNDDB as an exhaustive and comprehensive inventory of all rare species and natural communities statewide. Field verification for the presence or absence of sensitive species will always be an important obligation of our customers." Similarly, the California Native Plant Society's Inventory of Rare and Endangered Species states the following: "***A reminder:*** *Species not recorded for a given area may nonetheless be present, especially where favorable conditions occur.*" All conclusions that species were unlikely to occur due to their absences from CNDDB were invalid. Species should be considered likely to occur in the project area if habitat is present and their geographic range maps overlap the project area, or preferably if they were documented in the area by appropriate field surveys.

Transmission Line Impacts

Whereas the EIR/EIS mentioned avian collisions with transmission lines, I did not see any predictions of fatality rates. Without predicting fatality rates due to transmission line collisions the EIR/EIS is deficient.

Hartman et al. (1992) provided an empirical basis for estimating fatality rates of birds caused by collisions with transmission lines. Hartman et al. monitored bird collisions with a transmission line strung across Mare Island, California, and they also performed searcher detection and scavenger removal trials, which are necessary for adjusting fatality rates for the proportions of birds killed but never detected. Hartman et al. reported 85.3 bird fatalities per mile of transect per year along the portion of the circuit overlying hayfields (this line included 3 circuits). Bird mortality was eleven times greater along that portion of the circuit overlying salt ponds, so transmission lines crossing wetland areas posed a much greater hazard to birds than lines crossing upland areas on Mare Island. An appropriate impact estimate would consider the Mare Island findings to be the minimum impact estimate for the BDCP.

I was unable to locate a description of the transmission lines that included length of line, except for a depiction of the lines in the figures. I used a ruler to measure the length of permanent transmission line and I estimated the length of temporary line. I measured 18.8 miles of perment line and guessed about 50 miles of temporary line. On the low end, assuming all of the line spans hayfields or similar crops, multiplying 85.3 birds per transect line per year (Hartman et al. 1992) against 18.8 miles of transmission line yields a predicted fatality rate of 1,604 birds per year, some of which will undoubtedly include sandhill cranes (Yee). Over wetlands, 18.8 miles of transmission line would cause >17,000 fatalities per year. Obviously, the fatality rate extended from the Hartman et al. study would fall somewhere between 1,604 and 17,000 fatalities per year, depending on the distribution of wetlands versus other cover types under the lines. The EIR/EIS should address these impacts and mitigate for them.

Indirect Impacts of Energy Demand

Nine years of construction under Alternative 4 would require annually 2,549 GWH of electricity, according to the EIR/EIS, and project operations would subsequently require 175 GWH annually. This energy will have to come from somewhere, and it will have environmental costs that were not addressed in the EIR/EIS. If it was to come from wind energy, for example, then

assuming the wind turbines operated with a 35% capacity factor, then 831 MW of wind energy capacity would be needed to complete the construction and the nine years of construction 57 MW would be needed to run the pumps annual. Based on the average annual fatality rates at California's four major wind resource areas (8 collision fatalities/MW/year), the 831 MW of capacity needed for construction would cause 6,648 bird collisions annually for nine years, or 59,832 birds. The wind energy capacity of 57 MW needed to operate the pumps would cause 456 fatalities per year for as many years as the pumps would operate, or indefinitely. The number of bat fatalities caused by construction would be at least 16,620 bats per year for nine years of construction, or 149,580 bats. Afterwards, operating the pumps would cause 1,140 bat fatalities per year indefinitely. Of course, the source of energy could come from natural gas, hydro, or industrial solar, but these energy sources also have their associated environmental impacts that should be estimated in the EIR/EIS.

MITIGATION

The mitigation promised for reducing or offsetting impacts to most terrestrial special-status species would require willing sellers of fee title or conservation easements of properties that would total large acreages. However, the EIR/EIS (page 12-139) admitted that willing sellers had yet to be identified. This lack of willing sellers is a fundamental flaw of the EIR/EIS.

I was involved in the Natomas Basin HCP during the 1990s, so I remember how that HCP was certified in the absence of a sufficient number of willing sellers (Smallwood 2000) and how a federal judge subsequently ruled the HCP illegal and the associated incidental tale permit invalid due to too few willing sellers that were needed for the promised mitigation. I had warned that willing sellers would be difficult to find, and they were. The EIR/EIS needs to identify where habitat will be protected and where restoration would occur, and it needs to prove that the promised levels of protection and restoration will be feasible.

Another fundamental flaw of the mitigation plan is the EIR/EIS's deferral of the formulation of the details of the plan to some unspecified, later date. According to the EIR/EIS (page 12-139), "*Detailed plans for restoration, enhancement, and preservation actions have not been prepared for multiple reasons: (1) because the habitat restoration and enhancement would be implemented, if feasible, in areas with willing sellers, none of whom has been identified; (2) to maintain flexibility in the BDCP for adaptive management; and (3) because BDCP implementation has a long timeframe.*" Whichever the reason, this deferral of the formulation of the mitigation measures effectively prevents me and other members of the public from participating meaningfully with this important aspect of the environmental review of a project that will destroy many thousands of acres of habitat of special-status species.

Impact BIO-44: Red-legged frog

The following mitigation measures were proposed for California red-legged frog (EIR/EIS page 12-2114). My comments in normal font follow each measure in *italics*.