From: Chelsea Tu <ctu@biologicaldiversity.org>
Sent: Tuesday, July 29, 2014 5:28 PM
To: BDCP.Comments@noaa.gov
Cc: 'Adam Keats'
Subject: Center for Biological Diversity comments re: draft BDCP documents
Attachments: 7-29-14 CBD BDCP and DEIR Comments_Final.pdf; CBD BDCP Comments Attachment B_Center letter supporting TCBB emergency listing 7 24 14.pdf

Dear Mr. Wulff:

Please find attached comments by the Center for Biological in response to the draft Bay Delta Conservation Plan, the draft EIR/EIS, and accompanying documents.

Thank you for your attention, and please let me know if you have any questions.

Sincerely, Chelsea Tu

BDCP 1734

CENTER *for* BIOLOGICAL DIVERSITY

via email to: BDCP.Comments@noaa.gov

July 29, 2014

BDCP Comments
Ryan Wulff, NMFS
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

RE: Comments on the Draft Bay Delta Conservation Plan, Draft Environmental Impact Report/Environmental Impact Statement, and Draft Implementation Agreement

Dear Mr. Wulff:

The Center for Biological Diversity ("Center") is writing to provide comments on the Draft Environmental Impact Report/Environmental Impact Statement ("DEIR/EIS") for the draft Bay Delta Conservation Plan ("BDCP"). When finalized, this DEIR/EIS and the BDCP will be used as an application to obtain an incidental take permit ("ITP") and a Natural Community Conservation Planning ("NCCP") permit. If the ITP and NCCP permit are issued they will result in the killing of significant members of endangered and threatened aquatic species, which have already suffered drastic population declines due to ongoing water diversions from the Delta since the 1940s, as well as a decrease in the critical habitats they depend on. The BDCP will also result in the killing of significant members of endangered and threatened terrestrial species. Agencies' approval of the BDCP will violate federal and state laws including the Federal Endangered Species Acts ("ESA"), the California Endangered Species Act ("CESA"), the Natural Community Conservation Planning Act ("NCCPA"), and the National Environmental Policy Act ("NEPA"), and the California Environmental Quality Act ("CEQA").

I. Legal Standards.

The draft Bay Delta Conservation Plan ("BDCP") lays out strategies that aim to protect and restore water supply, water quality, and ecosystem health in the Delta. If finalized, the BDCP would serve as a habitat conservation plan under the federal Endangered Species Act ("ESA") and a natural community conservation plan under California's Natural Community Conservation Planning Act ("NCCPA"). The purpose of the BDCP is to support the issuance of take permits from the U.S. Fish and Wildlife

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Service ("FWS"), the National Marine Fisheries Service ("NMFS"), and the California Department of Fish and Wildlife ("CDFW").[1]

A. Endangered Species Act

The ESA was created with the purpose of providing a program to conserve endangered and threatened species. 16 U.S.C. § 1531(b). To conserve within the ESA means to bring an endangered or threatened species to the point in which it no longer needs protection under the act, by whatever means necessary. 16 U.S.C. § 1532(3). To achieve the goal of conservation, section 9 of the ESA prohibits any person from "taking" any endangered or threatened species. 16 U.S.C. § 1538(a)(1). "Take" is broadly defined under the ESA to include shooting, trapping, wounding, hunting, harassing, harming, collecting, or pursing, or to attempt any such conduct. 16 U.S.C. § 1532(19). It is also unlawful for any person to solicit a third party to commit a taking or cause a taking to be committed. 16 U.S.C. § 1538(g). A "person" includes any private entity and any instrumentality of a local, state, or federal government. 16 U.S.C. § 1532(13).

Exceptions to the prohibitions on "take" are found in section 10 of the ESA. The U.S. Fish and Wildlife Service is authorized to issue Incidental Take Permits ("ITPs") to any "person" when the taking is "otherwise prohibited by section 1538(a)(1)(B) of this title if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." 16 U.S.C. § 1539(a)(1)(B).

An applicant seeking an ITP must submit a Habitat Conservation Plan ("HCP") to the FWS prior to approval of the application. 16 U.S.C. § 1539(a)(2)(A). An HCP is required to include, at a minimum, the following information: (1) a complete description of the activity sought to be authorized; (2) the common and scientific names of the species sought to be covered by the permit, and if known, also the number, age, and sex of such species; (3) the impact that will likely result from the taking; (4) the applicant's plan to monitor, minimize, and mitigate the impacts; (5) what funding will be available to implement such a plan; (6) what procedures are will be used to handle unforeseen circumstances; and (7) what actions alternative to take the applicant has considered, and the reasons why such alternatives are not planning to be utilized. 50 C.F.R. § 17.22(b)(1)(i)-(iii); 16 U.S.C. § 1539(a)(2)(A)(i)-(iv).

The FWS and NMFS (collectively "the Services") must make the following findings before issuing the ITP: (1) the taking will be incidental; (2) the applicant will minimize and mitigate the impacts of the taking to the maximum extent practicable; (3) the applicant will ensure adequate funding for the conservation plan will be provided; (4) the taking will not appreciably reduce the likelihood of the recovery and survival of the species in the wild; (5) any additional measures, if any, required by the Services will be met; and (6) the Services have received additional assurances as it requires that the conservation plan will be implemented. 16. U.S.C. § 1539(a)(2)(B)(i)-(v); 50. C.F.R. §

[1] Draft BDCP, at 1-1.

17.22(b)(2)(i). If the Services have made all of the requisite findings, it shall issue the ITP. 16 U.S.C. § 1539(a)(2)(B)(v). The Services can include any terms and conditions in the permit that it deems necessary or appropriate. *Id.* If the Services find the permittee is not complying with the terms and conditions of the permit, the agencies will revoke the permit. *Id.*

B. Natural Community Conservation Planning Act

The NCCPA was created in response to the continuing population growth in California that has resulted in an increasing demand for natural resources and a decline in the state's wildlife. Cal. Fish & Game Code § 2801. The goal of the NCCPA is to protect the natural diversity in California while easing the conflict between using the state's natural resources for economic development and protecting the state's wildlife heritage. *Id.*

The California Department of Fish and Wildlife ("CDFW") may enter into an agreement with any person for the purpose of preparing a natural community conservation plan ("NCCP"). Cal. Fish & Game Code § 2810. The agreement is to provide comprehensive conservation and management of multiple wildlife species. *Id.* The agreement must meet the following conditions: (1) the agreement must be binding upon CDFW, any participating government agencies, and participating landowners; (2) the agreement must define the geographic scope of the conservation planning area; (3) the agreement must identify the natural communities that are intended to be in the initial focus of the plan, along with a list of endangered, threatened, candidate, or other species known, or reasonably expected to be found, in the communities; (4) the agreement must identify preliminary conservation objectives for the planning area; (5) the agreement must identify a process to include independent scientific input to assist the plan participants and CDFW; (6) the agreement must coordinate with federal wildlife agencies to act pursuant to the ESA; (7) the agreement must encourage planning for wetlands and waters of the United States; (8) the agreement must establish an interim process for review of projects within the plan that are subject to CEQA and may potentially conflict with conservation objectives in the planning agreement to take place prior to the project application being completed or as soon as possible; the CDFW may recommend mitigation measures or project alternatives to help achieve conservation objectives; and (9) the agreement must create a process for public participation throughout the development of the plan. *Id.*

There are several findings the CDFW must make before it approves a NCCP for implementation. Based on substantial evidence in the record, the CDFW must find the following: (1) the plan was developed pursuant to the requirements in section 2810 of the NCCPA [listed above]; (2) the plan integrates adaptive management[2] strategies that are

[2] "Adaptive management" means "to use the results of new information gathered through the monitoring program of the plan and from other sources to adjust management strategies and practices to assist in providing for the conservation of covered species." Cal. Fish & Game Code § 2805(a).

continually evaluated and modified based on new information to assist in providing for the conservation of covered species and ecosystems in the plan area; (3) the plan provides conservation measures that protect habitat, natural communities, and species diversity within the plan area; (4) the development of reserve systems and conservation measures; (5) the plan identifies activities allowed within the reserve areas that are compatible with the conservation measures, along with restrictions on those activities; (6) the plan provides specific conservation measures, based on the best available scientific information, that meet the biological needs of covered species; (7) the plan includes a monitoring program; (8) the plan includes an adaptive management program; (9) the plan contains the estimated timeframe and process by which the reserves and other conservation measures are to be implemented, along with obligations of landowners and plan signatories and consequences of the failure to acquire land in a timely manner; and (10) the plan includes provisions that ensure adequate funding to carry out the conservation measures provided in the plan. Cal. Fish & Game Code § 2820.

If CDFW approves the NCCP, it may also issue a permit authorizing the taking of any covered species. Cal. Fish & Game § 2835. The taking authorized by the permit includes species designated as fully protected species (pursuant to sections 3511, 4700, 5050, or 5515 of the Fish & Game Code) or species whose conservation and management is provided for in a NCCP approved by the CDFW. *Id.* The CDFW may suspend or revoke any take permit, in whole or in part, if the continued take of the species would jeopardize the continued existence of the species. Cal. Fish & Game Code § 2823.

C. California Endangered Species Act

The California Endangered Species Act ("CESA") was created to conserve, protect, restore, and enhance threatened and endangered species and their habitat. Cal. Fish & Game Code § 2052. To conserve within the ESA means to bring an endangered or threatened species to the point in which it no longer needs protection under the act, by whatever means necessary. Cal. Fish & Game Code § 2061. To achieve the goal of conservation and protection, CESA prohibits any person from taking, possessing, selling, or purchasing any species determined to be endangered or threatened. Cal. Fish & Game Code § 2080. An attempt to commit any of those actions is equally prohibited. *Id.* The CESA does not define "taking" or "person" as the ESA does.

If any person receives an ITP from the FWS pursuant to section 1539 of the ESA that authorizes the taking of an endangered or threatened species, the person does not need any additional authorization under CESA. Cal. Fish & Game Code § 2080.1. However, the person seeking the take still has the following requirements to fulfill: (1) notify the director in writing that he has received an ITP pursuant to the ESA; and (2) include a copy of the ITP in the notice. *Id.*

Although CESA and NCCPA are separate statutes, they share the common objective to minimize take impacts on threatened and endangered species. *Environmental Protection Information Center v. California Dept. of Forestry and Fire*

Protection, 44 Cal.4th 459, 510 (S.C. Cal. 2008). The BDCP is purportedly designed to meet the requirements of CESA and comply with section 2081 in addition to the ESA and NCCPA.[3]

II. Covered Species.

Covered fish species are species that are currently listed as endangered or threatened, or are at risk of being listed as endangered or threatened during the BDCP permit term.[4] The BDCP discusses the effects on covered fish species in Chapter 5, Effects Analysis, while the DEIR/EIS discusses the impacts on covered fish species in Chapter 11, Fish and Aquatic Resources. The methods used to analyze the impacts on covered fish species in Chapter 11 of the DEIR/EIS rely on the models and data discussed in Chapter 5 of the BDCP.[5] Because of this reliance, flaws in the BDCP's Effects Analysis affect the quality of the analysis in the DEIR/EIS.

There are eleven covered fish species discussed in both the BDCP and the DEIR/EIS: Delta smelt, longfin smelt, winter-run Chinook salmon, spring-run Chinook salmon, fall-run/late fall-run Chinook salmon, Central Valley steelhead, Sacramento splittail, Southern green sturgeon, white sturgeon, Pacific lamprey, and river lamprey.[6] The BDCP also includes forty-five other covered species ranging from mammals, birds, reptiles, amphibians, invertebrates, to plants.[7]

The BDCP includes fifteen proposed alternatives and a no-action alternative.[8] Alternative 4 is the Preferred Alternative and many alternatives are remarkably similar to Alternative 1A.[9] Therefore, the following analysis will primarily focus on the effects and impacts that will result if Alternative 4 or Alternative 1A (or a similar alternative) is chosen.

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[3] Draft BDCP, at 1-6.
[4] DEIR/EIS, at 11-1.
[5] DEIR/EIS, at 11-2.
[6] DEIR/EIS, at ES-14.
[7] DEIR/EIS, at ES-15 to ES-16.
[8] DEIR/EIS, at 3-2.
[9] DEIR/EIS, at 3-3.

III. The draft BDCP documents and the chosen Preferred Alternative fail to meet its goals and objectives and existing legal standards, and would fail to recover the Delta ecosystem if implemented.

A. The purposes of the BDCP must be consistent with the overriding objective of the ESA to ensure recovery of endangered and threatened species since it is a habitat conservation plan established under Section 10 of the Act.

The draft BDCP is a HCP developed pursuant to the ESA, and therefore must be consistent with the objective of the ESA as well as satisfy the requirements of Section 10 of the ESA.[10]

The purpose of the ESA is to conserve endangered and threatened species and the ecosystems they depend on.[11] "Conserve" and "conservation" are broadly defined as "the use of *all* methods and procedures which are necessary to bring any endangered species and threatened species to the point at which the measures provided [by the ESA] are no longer necessary."[12] Courts have liberally interpreted the ESA, finding that Congress enacted the ESA in order to "halt and reverse the trend toward species extinction, no matter the cost,"[13] in order "to allow species to recover to the point it may be delisted."[14]

However, the overarching goals of the BDCP are to "advance the restoration of the ecological functions and productivity in the Delta" as well as "restore and protect water supplies provided by the State Water Project ("SWP") and Central Valley Project ("CVP").[15] The draft purpose and needs statements for the draft EIR/EIS present similar versions of the co-equal goals of restoring the Delta ecosystem while providing a more reliable water supply for California.[16] It is clear that the overriding objective of the ESA to conserve and recover species using all methods at any cost leaves no room for the goal of increasing reliable water supply since increasing water supply according to the Preferred Alternative will result in the killing instead of conservation of imperiled species.

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[10] Habitat Conservation Plan Guidance Document, at 2-1.
[11] 16 U.S.C. § 1531(b).
[12] 16 U.S.C. § 1532(3) (emphasis added).
[13] *Tennessee Valley Authority v. Hill*, 437 U.S. 153, 184 (1978).
[14] *Alaska v. Lubchenko*, 723 F.3d 1043, 1054 (9th Cir. 2013), citing *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Serv.*, 378 F.3d 1059, 1070 (9th Cir. 2004).
[15] Draft BDCP, at 1-5. The co-equal goals originate from the legislative intent and policy of the state Delta Reform Act of 2009. *See* California Water Code §§ 85001(c) and 85020.
[16] The purpose statement of the EIR pursuant to CEQA states "The purpose of the BDCP is to "make physical and operational improvements to the SWP system in the Delta necessary to restore and protect ecosystem health, water supplies of the SWP and CVP south-of-Delta, and water quality within a stable regulatory framework, consistent with statutory and contractual obligations." DEIR/EIS, at ES-8. The purpose statement of the EIS pursuant to NEPA states "The purpose of the actions under the BDCP are to consider the application for ITPs for the covered species, improve the ecosystem of the Delta, as well as restore and protect the ability of the SWP and CVP to deliver up to full contract amounts." DEIR/EIS, at ES-9 and ES-10.

Federal agencies also have a mandatory duty to "afford first priority to the declared national policy of saving endangered species" in their actions."[17] Thus federal agencies cannot collaborate with non-federal actors in pursuing both ecosystem restoration and water reliability equally without violating their mandate to prioritize species conservation. Federal agencies' inclusion of coequal goals of the draft BDCP and EIS are thus also inconsistent with and violate the sweeping purpose of the ESA to conserve endangered and threatened species.

B. The DEIR/EIS alternatives analysis does not consider a reasonable range of alternatives since it only analyzes alternatives that include new water conveyance facilities.

A lead agency must consider a reasonable range of feasible alternatives to the project, or to the location of the project, which would achieve most of the basic objectives of the project avoid or substantially lessen any of the significant impacts of the proposed project.[18] Although the agency is responsible for choosing the range of project alternatives and must publicly disclose its reasoning for doing so, even though it does not need to consider every alternative.[19] The project applicants interpret this to mean that the DEIR/EIS needs to assess only those alternatives necessary to permit a reasonable choice and "to foster meaningful public participation and informed decision making."[20] However, each alternative must also be evaluated at an equal level of detail and must not be so inadequate to preclude meaningful analysis.[21]

Since the inception of the BDCP in 2006 its primary objective has been to develop alternatives with respect to the construction and operation of new conveyance facilities for the movement of water entering the Delta from the Sacramento Valley watershed.[22] Currently, all fifteen alternatives in the DEIR/EIS would allow the building of at least one new water conveyance structure. Nowhere does the DEIR/EIS discuss the feasibility for achieving the coequal goals of the BDCP *without* building new water conveyance facilities—which would substantially lessen the significant impacts the BDCP would have on species. The DEIR/EIS includes a disproportionately detailed analysis on alternatives that contain water conveyances, compared to a passing evaluation of the No Action Alternative, violating the requirement to evaluate all alternatives equally.

We support including a new alternative based on the "Responsible Exports Plan" developed by the Environmental Water Caucus. The plan proposes a comprehensive

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[17] *Tennessee Valley Authority v. Hill*, 437 U.S. 153, 185 (1978) (citing 16 U.S.C. § 1531(c)(1)).
[18] CEQA Section 15126.6(a); State CEQA Guidelines Section 15126.69(a); NEPA Section 1501.1(e).
[19] CEQA Section 15126.6(a).
[20] State CEQA Guidelines Section 15126.6(f).
[21] C.F.R. 1502.14(b); 40 C.F.R. Sec. 1502.9(a).
[22] DEIR/EIS, at 3-6.

strategy including conservation, recycling, stormwater capture, etc.[23] The Responsible Exports Plan additionally prioritizes the need for a water availability analysis and protection of public trust resources rather than a mere continuation of the status quo that has led the Delta into these dire circumstances. Only this alternative is consistent with the conclusion that more outflow is needed to protect aquatic resources and fish populations, as determined by several state and federal agencies.[24] The EWC Responsible Exports Plan is feasible and accomplishes project objectives and therefore should be fully analyzed in the final EIR/EIS for the BDCP. Unfortunately, this plan has not been analyzed and must be by analyzed the DEIR as a feasible/reasonable alternative.

C. The BDCP's stated purpose is inadequate for obtaining ITPs for endangered and threatened species since fulfilling this purpose would appreciably reduce the likelihood of survival and recovery of covered species in the wild.

Section 10 of the ESA allows the Services to issue ITPs that would authorize non-federal entities to take endangered and threatened species when the taking is incidental to an otherwise lawful activity.[25] Non-federal entities apply for an ITP by developing a HCP according to statutory requirements laid out in Sections 10(a)(2)(A) and 10(a)(1)(B) of the ESA.[26] There is no legal right to an ITP, and the Secretary must deem the HCP sufficient before issuing the ITP.[27] Issuance of an ITP must not "appreciably reduce the likelihood of the survival and recovery of the species in the wild."[28] Taking this

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[23] Responsible Exports Plan (May 2013), http://www.ewccalifornia.org/reports/responsibleexportsplanmay2013.pdf .

[24] State Water Resources Control Board's, 2010 Flows Report, p.2. "Interior remains concerned that the San Joaquin Basin salmonid populations continue to decline and believes that flow increases are needed to improve salmonid survival and habitat." USFWS May 23, 2011 Phase I Scoping Comments, available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/cmmnts052311/amy_aufdemberge.pdf "Inadequate flow to support fish and their habitats is directly and indirectly linked to many stressors in the San Joaquin river basin and is a primary threat to steelhead and salmon." NMFS February 4, 2011 Phase I Scoping Comments, available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/cmmnts020811/010411dpowell.pdf; "...current Delta water flows for environmental resources are not adequate to maintain, recover, or restore the functions and processes that support native Delta fish." Executive Summary in 2010 CDFG Flow Criteria.
"a strong majority of scientists prioritizes habitat and flow management actions that would restore more natural processes within and upstream of the delta" (p. 2) , *available at*: http://www.ppic.org/content/pubs/report/R_413EHR.pdf.

[25] 16 U.S.C. § 1539(a).

[26] 16 U.S.C. § 1539(a)(2)(A) & (2)(B).

[27] *Southwest Diversified, Inc. v. City of Brisbane*, 652 F. Supp. 788, 796 n.9 (N.D. Cal. 1986).

[28] 16 U.S.C. § 1539(a)(1)(B)(iv); HCP Guidance, at 3-16.
See, e.g., Sierra Club v. Babbitt, 15 F. Supp.2d 1274, 1279 (S.D. Ala. 1998) (invalidating two HCPs for inadequate mitigation but characterizing the overall standard as "not appreciably reduce the likelihood of survival"); Friends of Endangered Species v. Jantzen, 760 F.2d 976, 982 (9th Cir. 1985) (upholding the San Bruno Mountain HCP and stating that the Act's requirement is to "not appreciably reduce the likelihood of the survival of the species"). Although the Services have promulgated through notice and comment

requirement into account with the overarching purpose of the ESA, courts have established the standard that HCPs must comply with the ESA and conserve list species by ensuring both their survival and recovery.[29]

However, as part of its purpose to "improve the ecosystem of the Delta" the BDCP merely aims to take actions that would "contribute" to the recovery of covered species; protect, restore, and enhance certain natural communities and ecosystems, and reduce the adverse effects of water diversions on certain listed species.[30] These statements reflect the BDCP's intent to address species but fail to actually articulate its obligations to *ensure* the survival and recovery of species so they no longer need to be listed. Thus the draft BDCP is insufficient to obtain an ITP in compliance with the ESA.

D. The applicants should exclude the purpose of the BDCP to deliver water for up to "full contract amounts" given that the quantity of water allocated under current contracts far outweighs physical/structural capability of California's water system, and that it is not consistent with the purpose of the ESA and co-equal goals under the Delta Reform Act.

The draft EIR/EIS also states that the BDCP its purpose is to "[r]estore and protect the ability of the SWP and CVP to deliver up to *full* contract amounts" when there is sufficient water to do so, consistent with state and federal laws and the conditions of applicable agreements including those held by SWP and CVP contractors.[31] Although the draft EIR/EIS qualifies that the alternatives do not need to be capable of delivering "full contract amounts" on average in order to meet BDCP's purposes,[32] the fact that its stated purpose is to potentially satisfy the full contract amounts perpetuates the myth that California's water infrastructure has the capability to do so.

In fact, while water contractors and the Department of Water Resources ("DWR") formerly referred to so-called "entitlements" of 4.23 million acre-feet of water per year the reality is that, due to several factors including several dams not being built and several northern rivers being protected as "wild and scenic,", the SWP can only supply up to half this level.[33] Satisfying these "entitlements" would require doubling the reliable capacity of the current system. The California Court of Appeals for the Third District

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rulemaking only some provisions of the handbook, courts have begun to rely on it in interpreting the permit program. See, e.g., Sierra Club v. Babbitt, 15 F. Supp.2d at 1282.

[29] An HCP "must satisfy the ESA goal of conservation, which will allow the species to recover in order to 'reverse the trend to extinction.'" Sw. Ctr. for Biological Diversity, 470 F. Supp. 2d 1118, 1129 (S.D. Cal. 2006) (quoting *Tennessee Valley,* 437 U.S. at 153, 98 S.Ct. 2279 and citing *Sierra Club v. Babbitt,* 15 F.Supp.2d at 1278 n. 3 ("Pursuant to section 10, the FWS may issue a permit for the 'incidental take' of some members of the species, if the applicant for the permit submits a 'conservation plan' that will—as its name plainly connotes—help 'conserve' the entire species by facilitating its survival and recovery.')).

[30] DEIR/EIS, at ES-8 and ES-10.

[31] DEIR, EIS, at ES-8 and ES-10.

[32] DEIR, EIS, at ES-10 (emphasis added).

[33] *PCL v. DWR* (2000) 83 Cal.App.4th at 908.

openly criticized this paper water illusion in recognizing the "huge gap between what is promised and what can be delivered."[34] The draft EIS/EIR therefore establishes false expectations and authorizes unrealistic demands for water by contractors in the future. Thus, coordinating agencies must come to terms with and explicitly recognize the inability of the state's water infrastructures to meet water entitlements in the final draft of the BDCP.

The applicants' explicit goal to achieve full contract amounts also emphasizes its intent to satisfy contractor demands for a more reliable water supply. The BDCP does not offer a similar guarantee for species protection, for instance by conserving listed species to the point of full recovery, as discussed above. Thus these statements contradict its mandate to treat its goals of creating a more reliable water supply and restoring and enhancing the Delta with equal weight.

E. The Preferred Alternative does not provide sufficient information on operational requirements and flows necessary for recovering the Delta ecosystem and restoring fisheries.

Existing law provides that the BDCP will not be incorporated into the Delta Plan unless it includes a reasonable range of flow criteria, rates of diversion, and other operational requirements and flows necessary for recovering the Delta ecosystem.[35] However, the Preferred Alternative, or Alternative 4, does not provide sufficient information regarding operational requirements and flows necessary for recovering the Delta system and restoring fisheries. Although Alternative 4 would establish flow criteria for the north Delta diversion bypass and the south Delta channel,[36] it would defer the development of quantitative Delta outflow criteria in the spring (March-May) and fall (September-November) to a later time using a decision tree process.[37] The DEIR/EIS admits that various outflow scenarios for spring and fall have the potential to cause differences in upstream conditions or in-Delta flows in summer and winter as well, in addition to affecting ecological conditions in the spring and fall.[38] However, it offers no quantitative range of flow criteria, rates of diversion, and other operational requirements as mandated by Section 85320(b)(2)(A) of the California Water Code.

In addition, the DEIR/EIS explains the potential outcomes of the decision tree process "will be aggressively investigated," and Delta outflow criteria would be

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[34] *PCL v. DWR* (2000) 83 Cal.App.4th at 903 (stating that "Paper water always was an illusion. "Entitlements" is a misnomer, for contractors surely cannot be entitled to water nature refuses to provide or the body politic refuses to harvest, store and deliver").

[35] Cal. Water Code § 85320(b)(2)(A)) states that the BDCP must provide "a reasonable range of flow criteria, rates of diversion, and other operational requirements and flows necessary for recovering the Delta ecosystem and restoring fisheries under a reasonable range of hydrologic conditions [that] will identify the remaining water available for export and other beneficial uses."

[36] DEIR/EIS, at 3-202.

[37] DEIR/EIS, at 3-206 and 3-207.

[38] DEIR/EIS, at 11-51.

developed some time before water operations begin.[39] However, nowhere does the DEIR/EIS provide a specific timeline by which the criteria would be developed or whether they would be subject to public review before they are implemented. The only indication of a time frame within which the decision tree process will take place is where the draft IA states that the outflow hypotheses will be tested "over the next approximately ten years using the best available information."[40] Additionally, the DEIR/EIS states that even when established, initial project operating criteria "will be subject to a new determination by the fish and wildlife agencies, consistent with the adaptive management process for the BDCP, based on best available science developed . . . ."[41] Without a timeline or transparency regarding the development of these criteria it is impossible for any member of the public to determine whether they would establish flows necessary for recovering the Delta ecosystem and restoring fisheries.

Furthermore, it is apparent that whatever outflow criteria is adopted will most likely not achieve biological objectives for other aquatic species since the draft Implementation Agreement to the BDCP concludes "it is expected" that the fish and wildlife agencies will issue permits including operational and flow criteria related to the high-outflow scenario in the application.[42] The BDCP cannot pretend that biologically sufficient outflow criteria will be established based on vigorous vetting through objective scientific evidence when in fact the agencies and the applicants have already determined the outflow in the draft IA. The high-outflow scenario will most likely fail the BDCP's purpose and legal obligation to recover the Delta ecosystem.

The limited biological information that the decision-tree process proposes to take into account also clearly demonstrates that the BDCP, if implemented, will be unable to restore the Delta on an ecosystem scale. The DEIR/EIS states that the decision-tree process is "a focused form of adaptive management that will be used to determine, at the start of new operations the fall and spring, outflow criteria that are required to achieve the conservation objectives of the BDCP for delta smelt and longfin smelt and to promote the water supply objectives of the BDCP."[43] We are extremely alarmed that Alternative 4's decision-tree process would only require establishing flow criteria based on conservation objectives only for two species: the Delta smelt and longfin smelt. Although the DEIR/EIS recognizes that other covered fish including salmonids and sturgeon may also be impacted by Delta outflow changes, it does not guarantee that outflow criteria will be developed to meet their biological needs. Instead, the DEIR/EIS merely states that other covered species' outflow needs "will also be investigated as part of the decision tree process.[44]

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[39] DEIR/EIS, at 3-207.
[40] Draft IA, at 25.
[41] DEIR/EIS, at 3-207.
[42] Draft IA, at 25.
[43] DEIR/EIS at 3-207; *see also* draft IA, at 25.
[44] DEIR/EIS, at 3-207.

We find it unacceptable that the outflow criteria created under the Preferred Alternative would be limited to only the delta smelt and the longfin smelt in addition to promoting water supply reliability. This minimum standard, if adopted, would fail to meet the co-equal goal of protecting not only these two species but to restore the entire Delta ecosystem. It would also likely fail to meet the biological needs of other aquatic species that require higher flow criteria to survive and in turn violate Section 2820(a)(6) of the California Fish and Game Code.

The DEIR/EIS fails to acknowledge behavioral and regulatory uncertainty that have continuously resulted in rollbacks of environmental protections for the Bay/Delta and rescinding or suspension of legal assurances intended to protect fisheries and water quality during drought years. The decision-tree structure to determine Delta freshwater outflows is a guarantee that continuous political pressures will be exerted on fishery agencies to relax promised BDCP ecological benefits. None of the assurances in the BDCP can be taken at face value. The current three-year drought demonstrates that agencies will reflexively abandon "assured" fisheries flow protections under political pressure.

The BDCP thus must establish specific flow criteria that meet the conservation objectives for all species in order to satisfy its co-equal goals as well as the legal requirements set out in Sections 2820(a)(6) and 85320(b)(2)(A).

F. The ability of the BDCP to achieve the co-equal goals of restoring the Delta ecosystem and providing reliable water supply is highly questionable since the plan would authorize disproportionate decision-making power to the DWR, USBR, and state and federal water contractors.

The draft BDCP, supplemented by the draft implementation agreement ("IA"), proposes a governance structure for the Delta that is significantly different from the current structure. Although as of the writing of this comment USBR is not a party to the draft IA, it purportedly will enter into a memorandum that would set out its roles and responsibilities pursuant to the BDCP.[45] Since USBR plays a critical role in the implementation of the BDCP we do not believe it is possible to make fully informed comments on how BDCP would be implemented until the memorandum mentioned is established and released to the public. Nevertheless, we provide comments on the proposed implementation structure according to the draft BDCP and the draft IA as they are currently described.

Currently the SWP and CVP coordinate water diversion operations in the Sacramento River and the Delta under a Coordinated Operating Agreement. Water operations are overseen by the Operations ("Ops") Group, which operates on consensus at the lowest level to operate the Delta cross-channel, and adjust diversion or export limits for species protections or to make up lost water supply caused by previous changes

[45] Draft IA, at 1, 15.

to improve fishery conditions.[46] The Ops Group consists of representatives from the Department of Fish and Wildlife ("DFW"), Department of Water Resources ("DWR"), the California State Water Resources Control Board ("SWRCB"), U.S. Fish and Wildlife Service ("FWS"), National Marine Fisheries Service ("NMFS"), U.S. Bureau of Reclamation ("USBR"), and the Environmental Protection Agency ("EPA").[47]

By contrast, the BDCP would be organized around a newly created Implementation Office ("IO") lead by the Program Manager, who would manage, coordinate, and oversee all aspects of BDCP implementation including administering program funding, managing water project operations, and implementing conservation measures.[48] In reality, however, the IO would be held under the control of the Authorized Entity Group ("AEG"), which would be a four-member body consisting of the Director of DWR, the Regional Director of USBR, a representative from state water contractors, and a representative from participating federal water contractors.[49]

Although the AEG would express a single position regarding a matter under its consideration each member would still retain its individual statutory or regulatory authority.[50] The BDCP would allow the AEG to select the Program Manager,[51] who would be subject to exclusive oversight by the AEG.[52] Specifically, the BDCP states that the Program Manager, through the IO and "under the direction of the Authorized Entity Group, will manage the implementation of the BDCP and ensure that such implementation proceeds in compliance with the Plan, the Implementing Agreement, and the associated regulatory authorizations."[53] Similarly, the draft IA states the AEG "will provide oversight and direction to the Program Manager on matters concerning the implementation of the BDCP."[54] In essence, the AEG—comprised of only state and federal water export interests—will dominate the implementation of the BDCP even though it is drafted as a habitat conservation plan. More importantly, most of the AEG's decision-making would not be subject to review or oversight by other entities under the proposed BDCP.[55] For instance, the BDCP would give the AEG exclusive authority to

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[46] *Description of CALFED Ops*, available at: http://www.water.ca.gov/swp/operationscontrol/calfed/calfedgrpdesc.cfm (last updated July 1, 2009).
[47] *Description of CALFED Ops*, available at: http://www.water.ca.gov/swp/operationscontrol/calfed/calfedgrpdesc.cfm (last updated July 1, 2009).
[48] Draft BDCP, at 7-2, 7-5, 7-7, 7-8, 7-28 (The Implementation Office will work with the Delta Conservancy and other supporting entities on implementing conservation measures associated with habitat protection and restoration), and 7-30 (DWR and Reclamation are responsible for implementing conservation measure 1: water facilities and operations; and water operations aspects of CM2: Yolo Bypass fisheries enhancement.).
[49] Draft IA, at 58.
[50] Draft IA, at 51 (noting that the operation of SWP and CVP will continue to be under the control and responsibility of the DWR and Reclamation, respectively).
[51] Draft BDCP, at 7-5.
[52] Draft BDCP, at 7-2.
[53] Draft BDCP, at 7-13.
[54] Draft IA, at 58.
[55] See draft BDCP, at 7-3 and 7-4.

implement all conservations measures save real-time water operations without providing an opportunity for review by the EPA and wildlife agencies.[56]

Although the BDCP also proposes to establish a Permit Oversight Group ("POG") consisting of CDFW, USFWS, and NMFS that would collaborate with the AEG, its role is mainly to provide input and concurrence regarding the IO and AEG's actions.[57] Like the AEG, the roles and level of involvement by the various wildlife agencies are defined by existing statutory and regulatory mandates and provisions of the BDCP.[58] However, the BDCP would allow less decision-making by the POG and member wildlife agencies compared to the AEG.[59] For instance, the POG would determine major adaptive changes, monitoring, and research matters jointly with the AEG before it could make a final decision if the two entities disagree.[60]

Additionally, if the AEG and POG disagree on a matter they may agree to seek non-binding review process of the matter, and the entity with the final decision-making authority over the matter may merely consider those recommendations in making its final decision.[61] This process is problematic as it would encourage disagreeing parties to adopt disjointed or even conflicting decisions.

The proposed BDCP governance structure also provides the opportunity for decision-makers to make real-time water operations adjustments for water conveyance facilities under CM1 and CM2. The Real Time Operations Team ("RTOT") would consist of one representative from FWS, NMFS, CDFW, USBR, and DWR as voting members.[62] The RTOT would also contain one representative from SWP and one representative from CVP, who would serve as non-voting members.[63]

We are encouraged to see that the RTOT will operate by consensus and that the DWR, and that if the RTOT does not reach consensus on an issue it would be elevated to seek concurrence among representatives of Reclamation, CDFW, and the relevant federal fish and wildlife agency.[64] However, the draft IA also provides that new voting members could be added by consensus, thus SWP and CVP or any other representatives could become voting members.[65] Thus we are very concerned that the current RTOT structure that allows SWP and CVP participation, whether as nonvoting or voting members, will influence the agencies' decision-making involving real-time operations to favor additional water exports. If the BDCP truly abides by the co-equal goals of water

[56] Draft BDCP, at 7-3.
[57] Draft BDCP, at 7-13 and 7-14.
[58] Draft BDCP, at 7-3, 7-4, and 7-14.
[59] Draft BDCP, at 7-3, 7-4, and 7-14.
[60] Draft BDCP, at 7-11, 7-13.
[61] Draft BDCP, at 7-17.
[62] Draft IA, at 27.
[63] Draft IA, at 27.
[64] Draft IA, at 28.
[65] Draft IA, at 27.

reliability and Delta ecosystem protection we urge it to eliminate the SWP and CVP contractor representatives from a seat at the RTOT table, or include representatives from the conservation community as non-voting members to balance out interests in the RTOT.

We are also concerned that the IO and AEG's actions are not subject to binding review by other stakeholders. The Stakeholder Council ("SC"), which would meet with the Program Manager at least quarterly and be expected to make reasonable efforts to provide input to the Program Manager and the AEG, would only object to actions taken by the Program Manager through non-binding alternative resolution mechanisms.[66] Thus while the SC can suggest changes it would have no legal authority to serve as a check to the IO's decision-making process. While the BDCP indicates that all meetings of various groups would be conducted in public,[67] it does not state whether the meetings would be subject to requirements of California's public record laws.

Finally, it is important to note that the draft IA states that "in the event of a direct conflict between the terms of this Agreement and the BDCP, the terms of this Agreement *shall* control.[68] This clause in the IA is especially concerning since it would allow the implementation structure and governance of the BDCP to be virtually unchallengeable if it is finalized or amended after potential approval of the BDCP.

We believe the ability of the BDCP to achieve the co-equal goals of restoring the Delta ecosystem and providing reliable water supply is highly questionable since the plan would authorize disproportionate decision-making power to the DWR, USBR, and state and federal water contractors.

G. The monitoring and adaptive management process for the BDCP is incomplete and will likely not be used to fully implement the Plan even if becomes complete.

The BDCP's monitoring and adaptive management process is incomplete. The draft BDCP and DEIR/EIS has been heavily criticized by an analysis of the draft BDCP and the DEIR/EIS conducted by an Independent Science Board.[69] In particular, the Panel concluded that "Details of how adaptive management will be implemented are left to a future management team without explicit prior consideration of (a) situations where adaptive management may be inappropriate or impossible to use, (b) contingency plans in case things do not work as planned, or (c) specific thresholds for action."[70]

We agree with the Independent Science Board that the BDCP does not make clear the connections between monitoring and adaptive management, does not describe criteria

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[66] Draft BDCP, at 7-20, 7-21.
[67] Draft BDCP, at 7-12, 7-16, 7-20.
[68] Draft IA, at 15.
[69] DELTA INDEPENDENT SCIENCE BOARD, REVIEW OF THE DRAFT EIR/EIS AND DRAFT BDCP (May 2014) [hereinafter INDEPENDENT SCIENCE BOARD REVIEW].
[70] INDEPENDENT SCIENCE BOARD REVIEW, at 3 and 8.

for success or explicit triggers to reverse negative impacts, and does not incorporate uncertainties of the Conservation Measures ("CMs") into the adaptive management process.[71]

The BDCP treats the negative effects of climate change as impacts beyond the control of the project, despite the fact that project operations will magnify the effects of climate change such as warmer water temperatures and reduced freshwater flows. The claims that the plan's "Conservation Measures" will constitute an adaptation to climate change are not supported by any quantitative data. A prime example of the BDCP spurious and utterly unsupported claims: "Because the BDCP already anticipates the effects of climate change, no additional actions will be required to remediate climate change effects on covered species and natural communities."[72]

The BDCP will establish an Adaptive Management Team ("AMT") that will be responsible for administering and adaptive management and monitoring for the, where information obtained from monitoring and research activities will be used to improve the effectiveness of the conservation measures to achieve the biological goals and objectives.[73] The AMT will be chaired by the Science Manager, and will include a voting representative from FWS, NMFS, CDFW, DWR, USBR, the SWP contractors, and the CVP contractors, respectively. [74] We are very concerned that the decisions that the AMT makes will be biased toward water export to further reduce Delta outflows since the Science Manager reports to Program Manager, who is subject to direction from AEG as discussed above.

Similarly, we are also extremely concerned that the AMT will include SWP and CVP contractors as voting members, which means that the contractors will be involved in determining available scientific information that would affect the implementation of the BDCP including altering Delta outflows.[75] Under the current makeup of the AMT FWS, NMFS, and CDFW could easily become the minority voice whereas SWP, CVP, the water contractors, and the Science Manager who will be directed by the water exporting agencies and contractors will dominate adaptive management.

This concern is heightened by the BDCP's designating the IEP Lead Scientist, the Delta Science Program Lead Scientist, and the Science and Research Director of NOAA Fisheries' Southwest Fisheries Science Center as nonvoting members.[76] As we stated in our comments regarding the Real Time Operations Team, we believe that the only way the BDCP can abide by its co-equal goals is to provide equal decision-making power to both conservation and water export interests. This balancing is especially critical in the AMT since adaptive management of the BDCP will require a fair representation of voting

[71] INDEPENDENT SCIENCE BOARD REVIEW, A-15, A-16
[72] Draft BDCP, at 6-43.
[73] DEIR/EIS, at 3-23.
[74] Draft IA, at 30.
[75] Draft IA, at 26.
[76] Draft IA, at 5.

members with both scientific and management expertise. Therefore the final BDCP should include fish and wildlife representatives as voting members of the AMT.

The working draft IA provided that upon issuance of take permits the Permittees have the "legal obligation to fully implement the BDCP" under the biological goals and objectives section.[77] However, the phrase was deleted from this section and does not appear elsewhere in the current draft of the IA. Instead, the current draft IA added new language that would allow the AMT to alter, add, or even eliminate entirely CMs and biological objectives to "improve the effectiveness" of the Plan.[78] The criteria of effectiveness, however, have not been developed and will be developed under the direction of the AMT.[79] It is clear from comparing the two IAs that the implementation of the BDCP will be entirely in the discretionary hands of the state and federal contractors, DWR, and USBR.

In contrast to the water contractors' ability to control the adaptive management process, the public will not be able to directly participate in the AMT decision-making process. Whereas the July 2013 draft IA required the AMT to at least review proposals for changes in the adaptive management of the BDCP by any interested party, the current draft IA explicitly provides that the AMT may, at its discretion, review any such proposals.[80] The current draft IA effectively shuts out the public's ability for its recommendations to be considered on their own merits or in opposition to proposed changes by the AMT itself. In summary, the draft IA would create a closed-door adaptive management process that will not be mandated to fully implement the BDCP and in fact will have power to eliminate critical elements of the Plan.

The BDCP proposes insufficient and does not guarantee funds to produce an effective adaptive management process. The BDCP and the draft IA state the parties will set up a $450 million "supplemental adaptive management fund" that only guarantees it would be applied to support implementation of adaptive changes made to CM1 and would only support changes to other CMs "as determined to be necessary."[81] This language in the draft IA demonstrates yet again that not only funding for other CMs is uncertain but the parties have not committed to achieving other CMs that are the only potential justifications for why BDCP should possibly move forward. Even if it is applied to other CMs, this fund would be insufficient to support the monitoring and research necessary to carry out all of the CMs.[82]

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[77] Working Draft IA, at 25.
[78] Drat IA, at 29.
[79] Draft IA, at 39.
[80] Working Draft IA, at 30; Draft IA, at 31.
[81] Draft IA, at 37; Draft BDCP, at 3.5-356.
[82] INDEPENDENT SCIENCE BOARD REVIEW, A-21.

IV. The BDCP would fail to meet the biological needs of covered aquatic species.

The BDCP must contain specific conservation measures that meet the biological needs of covered species best on the best available scientific information regarding the species.[83] The DEIR/EIS admits that that Delta outflow in Alternative 4 would likely decrease or remain similar compared to the conditions without the project.[84] Additionally, the DEIR/EIS expects average annual Delta exports to increase by 269, 504 TAF, and 814 TAF (under Scenarios H1, H2, and H3, respectively), and would only decrease by 27 TAF under Scenario H4.[85] Since the draft IA to the BDCP concludes "it is expected" that the fish and wildlife agencies will issue permits including operational and flow criteria related to the high-outflow scenario, the likely decrease in Delta outflow is at least 814 TAF.[86] Although the DEIR/EIS acknowledges that implementing Alternative 4 would generally increase water exports and reduce or maintain current Delta outflows, it concludes that changes in water flow under Alternative 4 would result in take of species that would "typically be either beneficial or not adverse/less than significant."[87] Despite this promise the BDCP, as prepared, demonstrates that the Project will bring significant negative impacts to and will not facilitate the survival and recovery of covered fish species.

A. The BDCP fails to demonstrate that conservation measures would minimize or mitigate adverse effects to the maximum extent practicable.

Despite that conservation measures will directly and indirectly result in impact covered species as discussed above, the BDCP proposes activities that would result in significant adverse impacts on covered species that would not be adequately minimized or mitigated. By law the BDCP must include measures that would, to the maximum extent practicable, minimize and mitigate adverse effects on the covered species from implementation of the covered activities, where mitigation would occur through the protection, restoration, creation, and/or enhancement of habitat for covered species.[88] The Services will assess whether the BDCP is consistent with the maximum extent practicable standard by evaluating whether levels of minimizing and mitigating adverse effects is appropriate for the particular project at issue.[89] The BDCP has failed to minimize and mitigate adverse effects, as we discuss below.

One of the most impactful covered activities is the proposed construction of new water intake, forebays, and conveyance facilities (Conservation Measure 1, or CM1), which would permanently alter between 3,500 and 20,000 acres of habitat in north

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[83] Cal. Water Code § 85320(b)(2)(A); Cal. Fish & Game Code Sec. 2820(a)(6).
[84] DEIR/EIS, at 11-52.
[85] DEIR/EIS, at 11-52.
[86] Draft IA, at 25.
[87] DEIR/EIS, at 11-53.
[88] 16 U.S.C. § 1532(a)(2)(B)(ii); *see also* DEIR/EIS, at 3-40.
[89] *See* Sierra Club v. Babbitt, 15 F.Supp.2d 1274, 1279-81 (S.D. Ala. 1998).

Delta.[90] Yet the BDCP does not adequately disclose how it would minimize and mitigate these impacts and instead relies on proposed habitat protection, restoration, and enhancement (habitat conservation or conservation reserve) activities to address these impacts. In fact, the availability of funding, feasibility, and success of many conservation or mitigation measures are highly uncertain, as we discuss below. Additionally, the implementing habitat conservation activities would also permanently alter thousands of acres of habitat and negatively affect certain species while bringing purported benefits to other species that highly speculative.[91]

The BDCP allows construction of the Twin Tunnels before ecosystem restoration, and in fact before funding for restoration has actually been secured. In addition, conservation measures would only be implemented within the 50-year proposed permitting timeline of the BDCP. However, only 3,400 would be restored within the first 10 years in accordance with the construction timeline of CM1.[92] The Delta ecosystem gets the impacts of reduced freshwater flows before the success of untested and discredited restoration actions can be evaluated, despite uncertainties expressed by the scientific community.

B. Loss of aquatic habitat

Habitat for covered fish species will be lost as a result of BDCP. All eleven covered fish species will suffer from habitat loss or a change in habitat conditions for any of the alternatives, including Alternatives 1A and 4.[93] However, the BDCP fails to adequately explain how the covered fish species will survive habitat loss. The failure to adequately explain how habitat loss authorized by an HCP would prevent jeopardizing the survival and recovery of a species could lead to a finding that approval of the HCP was arbitrary and capricious. *National Wildlife Federation v. Babbitt*, 128 F.Supp.2d 1274. 1295 (E.D. Cal. 2000).

The total shoreline habitat that will be permanently affected by BDCP ranges from 2,050 feet to 11,900 feet depending on the alternative chosen; nine of the fifteen alternatives, if implemented, would affect at least 10,000 feet of shoreline habitat.[94] Offshore habitat that will be dredged ranges from 4.7 acres to 56.9 acres depending on the alternative chosen; ten of the fifteen alternatives would affect at least 20 acres.[95]

The positive benefits assumed to occur as a result of habitat restoration are overstated for many fish populations. The conclusions reached in the BDCP are not adequately supported and often highly uncertain (see low levels of certainty associated with each covered fish species, discussed below). Thus the DEIR/EIS violates its legal

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[90] DEIR/EIS, at 31-5.
[91] See other covered activities at DEIR/EIS, at 3-17.
[92] DEIR/EIS, at 12-1992.
[93] DEIR/EIS, at 11-238; 11-1289.
[94] DEIR/EIS, at 11-11.
[95] DEIR/EIS, at 11-11.

duty to disclose significant effects of the project. Cal. Pub. Res. Code § 21002.1. Additionally, many of the stated positive benefits will involve a long process that could take years to determine if any beneficial effects occurred, but by that point it could be too late.[96]

Since the BDCP fails to adequately explain how habitat loss would prevent jeopardizing the populations of each covered fish species, approval by the Services will likely be arbitrary and capricious.

The BDCP would not minimize or mitigate adverse effects to aquatic species to the maximum extent practicable. Under Alternative 4 CM1 would permanently destroy 178 acres of aquatic habitat from construction of the three intakes and temporarily remove 2,101 acres of tidal perennial aquatic community from dredging Clifton Court Forebay.[97] CM2 would adversely affect 18 acres of tidal perennial aquatic activity.[98]

The BDCP justifies this significant habitat loss by stating that 65,000 acres of tidal wetlands and traditional uplands would be restored (27,000 acres would be tidal perennial aquatic habitat) under CM4, and concludes that the construction activities associated with CM1, 2, 4, and 6 would result in net long-term benefits to the acreage of sensitive natural communities.[99] Although the BDCP attempts to offset amount of habitat lost by offering approximate amount of habitat to be restored. However, it is incorrect to only take into account the areas and types of land in implementing these measures since it takes more time for natural ecosystems to be fully restored to serve the desired ecosystem functions than it does to destroy existing aquatic habitats that already provide these functions. The BDCP project is so focused on keeping Delta exports at excessively high levels desired by water exporters that it relies on the discredited hypothesis that restored habitat can substitute for freshwater flows. The BDCP's concept of restoring physical habitat to subsidize food pelagic webs relies on improving riparian and subtidal habitat to create an aquatic food supply for the Delta as an offset for increased and excessive fresh water diversions. This substitute has no basis in science and has been red-flagged repeatedly by federal agencies. Mount et al. (2013) found that the BDCP restoration of marshes and floodplains is unlikely to improve smelt rearing habitat conditions.[100]

Many of the BDCP putative salmonid benefits rely on proposed seasonal floodplain inundation of the Yolo Bypass, yet the EIR/EIS fails to evaluate the potential impacts of stranding, entrainment, predation and mercury methylization risks in the Yolo Bypass and weigh them against potential benefits.

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[96] INDEPENDENT SCIENCE BOARD REVIEW, at 7.
[97] DEIR/EIS, at 12-1990, 12-1991.
[98] DEIR/EIS, at 12-1990, 12-1991.
[99] DEIR/EIS, at 12-1993.
[100] Mount et al. (2013).

C. Loss of food for aquatic species

Several fish populations will experience a decline in abundance due to BDCP activities, even if only temporary due to construction activities. A decline in populations will undoubtedly affect the food web, leading to a decrease in food available for predators or an increase in the organisms eaten by the covered fish species. Additionally, the relationship between habitat loss, habitat restoration, and food production isn't clearly stated in the BDCP. The Effects Analysis does contain a conceptual model of aquatic food webs, but the model is based on several uncertain assumptions. The DEIR/EIS must also fully assess and disclose impacts to food loss in addition to and in relationship with habitat loss due to the implementation of the BDCP.

D. Effects of flow changes on aquatic species

The BDCP also does not adequately disclose how the flow changes will affect covered fish species.

The DEIR/EIS justifies its conclusion that a decrease in Delta outflow for a period of 50 years would not result in significant adverse effects on aquatic species based on "the flexibility provided by the sub-scenarios and the primary intent of the decision tree to test operational scenarios to achieve results that are not adverse and are less than significant."[101] However, the DEIR/EIS fails to adequately address how conservation measures would meet the biological needs of covered species. In particular, the BDCP fails to assess the impacts on each covered species from the anticipated decrease in Delta outflow under Alternative 4.[102] For instance, the DEIR/EIS itself even states that additional assessments will be needed to confirm that adverse effects are not reasonably expected to occur to Chinook salmon species and steelhead.[103] Therefore, the reliance on the decision tree process by the DEIR/EIS without further analysis on how outcomes decided by the process will impact imperiled species violates CEQA/NEPA.

The DEIR/EIS claims that the flow impacts on key fish species migration cannot be determined.[104] The DEIR/EIS reached this conclusion despite that the project-level document claims to use more than sixty different computer-based modeling techniques, and a wealth of published and available scientific literature on the impacts of increased water exports and diversions on the ecology of the Estuary and special-status fish species. The public cannot properly assess the validity of a document addressing impacts on endangered fish when a determination cannot be made on critical environmental impacts to the very species the plan is allegedly intended to recover.

In fact, the BDCP uses computer models to describe fresh water flow conditions

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[101] DEIR/EIS, at 11-53.
[102] See Table 11-4-SUM1: Results of Flow-Related Effects on Fish. DEIR/EIS, at 11-55.
[103] DEIR/EIS, at 11-54.
[104] DEIR, at 11-55.

in the estuary and disingenuously compares them to "baseline" conditions that are worse ecologically than actual existing conditions and existing regulatory constraints on water diversions. The DEIR/EIS thus misrepresents the biological impacts of the project and attempts to mask the fact that the BDCP would substantially increase water exports and further degrade environmental conditions.

Several federal and state agencies have already underscored the fact that current Delta outflows are insufficient to meet the biological needs of listed and sensitive species, and have resulted in significant adverse effects these species, especially salmon and steelhead.[105] Since current water flows are insufficient to support listed and other protected species any further decrease in in-stream flow and Delta outflow will inevitably result in further significant adverse effects on aquatic species. Thus an increase in Delta outflow is necessary to protect aquatic species.[106]

In particular, the State Water Resources Control Board ("SWRCB") determined in 2010 that the Bay-Delta ecosystem and native fisheries require minimum freshwater outflows to preserve public trust values, specifically: 75% of unimpaired Delta outflow from January through June; 75% of unimpaired Sacramento River inflow from November through June; and 60% of unimpaired San Joaquin River inflow from February through

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[105] State Water Resources Control Board's, 2010 Flows Report, p.2. "Interior remains concerned that the San Joaquin Basin salmonid populations continue to decline and believes that flow increases are needed to improve salmonid survival and habitat." USFWS May 23, 2011 Phase I Scoping Comments, available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/cmmnts052311/amy_aufdemberge.pdf "Inadequate flow to support fish and their habitats is directly and indirectly linked to many stressors in the San Joaquin river basin and is a primary threat to steelhead and salmon." NMFS February 4, 2011 Phase I Scoping Comments, available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/cmmnts020811/010411dpowell.pdf; "...current Delta water flows for environmental resources are not adequate to maintain, recover, or restore the functions and processes that support native Delta fish." Executive Summary in 2010 CDFG Flow Criteria.
"a strong majority of scientists prioritizes habitat and flow management actions that would restore more natural processes within and upstream of the delta" (p. 2)
http://www.ppic.org/content/pubs/report/R_413EHR.pdf

[106] State Water Resources Control Board's, 2010 Flows Report, p.2. "Interior remains concerned that the San Joaquin Basin salmonid populations continue to decline and believes that flow increases are needed to improve salmonid survival and habitat." USFWS May 23, 2011 Phase I Scoping Comments, available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/cmmnts052311/amy_aufdemberge.pdf "Inadequate flow to support fish and their habitats is directly and indirectly linked to many stressors in the San Joaquin river basin and is a primary threat to steelhead and salmon." NMFS February 4, 2011 Phase I Scoping Comments, available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/cmmnts020811/010411dpowell.pdf; "...current Delta water flows for environmental resources are not adequate to maintain, recover, or restore the functions and processes that support native Delta fish." Executive Summary in 2010 CDFG Flow Criteria.
"a strong majority of scientists prioritizes habitat and flow management actions that would restore more natural processes within and upstream of the delta" (p. 2)
http://www.ppic.org/content/pubs/report/R_413EHR.pdf

June.[107] The SWRCB found that over the past two decades Delta outflows have only been 30% of unimpaired flows in drier years, and average of about 50% of unimpaired flows from April to June for Sacramento River inflows, and 20% in drier years to almost 50% in wetter years for San Joaquin River inflows. Nowhere does the BDCP target these required outflows.

Yet the BDCP acknowledges that already-impaired Delta freshwater outflows to San Francisco Bay will decrease further under the project's operations, a diminution that will be exacerbated by climate change. Delta freshwater outflows critical to the survival of native fish will be sacrificed under the BDCP in order to maintain water exports at a high level. The EIR/EIS absolutely fails to analyze the significant effects of reduced Delta outflow to San Francisco Bay on all native fish species. Instead, a final determination on the magnitude of Delta outflows is delayed by the plan's "Decision Tree," even though federal fishery agencies have stated unequivocally that the low outflow scenario cannot be supported by legal permits.

The BDCP Twin Tunnels project will increase contract-based water deliveries in wetter years, and will increase Delta water exports in dry and drought years as the tunnels increase water transfer opportunities for California's water market. The BDCP will exacerbate reductions of freshwater flow to the estuary during critical life stages for protected fish species, and could lead to the outright extinction of many native fish species.

Sacramento River inflow will decrease directly from the operations of the BDCP. The effect of continued high water diversions from the Delta combined with movement of the salinity barrier eastward due to climate change will have a damaging effect on salmon and steelhead and further reduce smolt survival. Mount et al. found that the new north Delta facility will cause significant losses of out-migrating winter-run and spring-run Chinook salmon, and that most of the BDCP's proposed mitigation approaches have high levels of uncertainty.[108]

Additionally, BDCP analysis shows that the SWP and CVP South Delta export pumping plants will continue to operate during below-normal, dry, and critically-dry years, while the North Delta Intakes and the Twin Tunnels facilities will be used primarily in wet and above-normal years. This ongoing dependence on the South Delta pumps means that delta smelt and longfin smelt will continue to be killed at the South Delta pump stations. Drier years already occur up to 40% of the time, a trend that will only intensify with climate change. Yet there is no plan by the BDCP to improve fish screens and salvage operations or mitigate reverse flow impacts on fisheries at the existing South Delta export pumping facilities.

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[107] SWRCB 2010.
[108] Mount et al. (2013).

E. Flawed science

A peer-review by the National Research Council in 2011 slammed the BDCP for flawed scientific analysis of the project's impacts on listed fish species.[109] Those flaws have not been adequately addressed in the DEIR/EIS.

In 2012, The Bay Institute ("TBI") published a briefing paper on the flaws of the Effects Analysis for the BDCP.[110] TBI found that the BDCP would not only fail to contribute to the recovery of protected fish species, but that it would actually increase the risk of extinction for many native fish species. TBI also found that the BDCP underestimates the negative effects of the project on endangered fish species and their habitats, by ignoring known and likely negative impacts and overestimating potential benefits. TBI found that the technical appendices the BDCP relies upon "employ non-standard or questionable analytic approaches while ignoring proven scientific tools and metrics; "cherry-pick" data to support a particular outcome; tailor the presentation of model outputs to reflect most favorably on the project; and misrepresent current scientific research and the professional judgment of experts." We do not see that these inadequacies have been corrected in the DEIR/EIS.

F. Covered fish species will be significantly impacted by the BDCP.

Both the BDCP and the DEIR/EIS include detailed analyses discussing how the project will impact each of the covered fish species. The BDCP must contain "specific conservation measures that meet the biological needs of covered species and that are based upon the best available scientific information regarding the status of covered species and the impacts of permitted activities on those species." Cal. Water Code § 85320(b)(2)(A); Cal. Fish & Game Code Sec. 2820(a)(6).

However, despite the level of detail, the analyses do not adequately address how the BDCP will impact each covered fish species. The BDCP and the DEIR/EIS also overestimates the positive benefits that DWR does predict, misinforming the public of the true impacts caused by the project.

i. Delta smelt

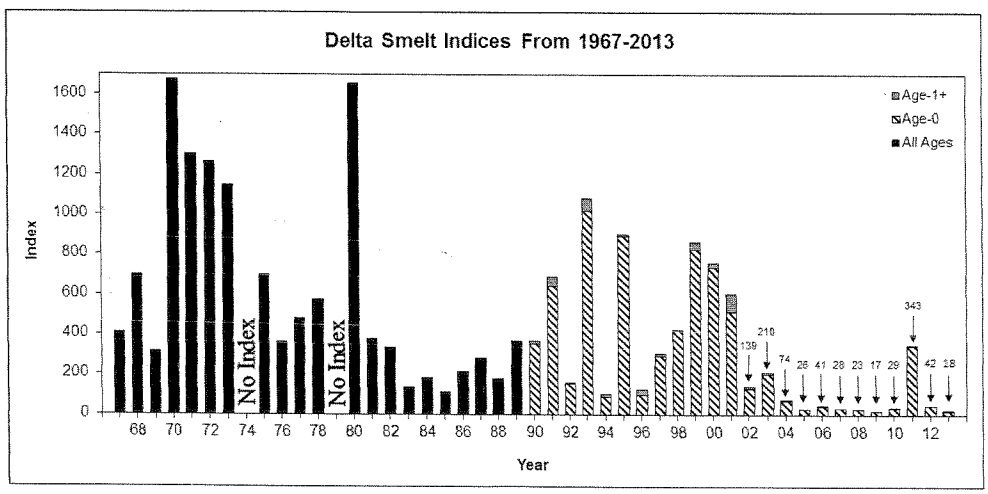
The Center has been working to conserve delta smelt since 2007, filing petitions to change the federal and state listing status of delta smelt to endangered, and restricting pesticide uses harmful to smelt.

Large areas of historic delta smelt habitat in the Delta have been rendered unsuitable for juvenile stages of delta smelt by the operations of the state and federal water projects, correlated with installation of south Delta tidal gate barriers, substantial

[109] NRC (2011).
[110] TBI (2012).

increases in fresh water exports, and increases in high-volume export operations. Increased fresh water exports are having significant negative effects on Delta smelt abundance. Higher water export rates are correlated with significantly lower delta smelt population abundance.[111] The trend of increases in water exports from the Delta and high-volume water exports during periods of low freshwater inflow delays migrating adult smelt, impairs downstream transport of larval and juvenile delta smelt from upper estuary spawning habitat to brackish water rearing habitat, and lethally entrains all life stages of smelt at the SWP and CVP pumps. The fish screens at the SWP and CVP pumps are known to be inadequate to protect Delta smelt.[112] The invasive clam *Corbula amurensis* has reduced the abundance of the zooplankton food supply in the Estuary for both longfin smelt and delta smelt.

Delta smelt are extremely endangered. Delta smelt numbers have been below the "effective population size" (the population level below which a species is subject to inbreeding and genetic drift; 9 of the last 10 years, since 2004.[113] See the Delta smelt abundance indices from CDFW fall midwater trawl below.



Given the delta smelt's fragile ecosystem, any negative impacts from take could far outweigh positive ones. The BDCP claims that the impact of take would be minimal, but the evidence suggests otherwise.[114] Section 2820(f) of the NCCPA requires the CDFW to find that the plan made use of best available science to analyze the impacts of take prior to approving the plan. The high uncertainty suggests best available science was not used here, violating the NCCPA.

The BDCP asserts the plan will result in no net change in several attributes for delta smelt as compared to existing conditions but that assertion violates the basic

[111] Swanson (2005), CBD et al. (2006).
[112] Bowen et al. (2004).
[113] Bennett (2003).
[114] *See* Draft BDCP, at 5-234.

purpose of an HCP.[115] The BDCP should be facilitating survival and recovery instead of maintaining the status quo, not trying to keep things the same – especially when the existing conditions are leading the species to extinction.

The applicants do not provide adequate support for many of its conclusions in the DEIR/EIS regarding several fish species, starting with the delta smelt. For example, the DEIR/EIS states that turbidity increases will negatively alter habitat conditions for the delta smelt, but then asserts that Delta smelt has adapted to life in turbid waters, so an increase in turbidity will improve habitat conditions.[116] The applicants do not cite to any scientific studies, however, explaining how this conclusion was reached or supporting the assertion that delta smelt have actually adapted to turbid waters.

The certainty of the effects of the BDCP on the Delta smelt is moderate to low.[117] Despite the uncertainty that restoration and conservation measures will actually result in the positive impacts hoped for, the BDCP plays up the beneficial effects and downplays the adverse effects.[118] The BDCP relies on the restoration of tidal wetlands as the primary driver of benefits to the delta smelt, but restoration of the tidal wetlands is highly uncertain.[119] Relying on such an uncertain restoration measure to carry the benefit of BDCP for delta smelt misleads the public into believing the positive benefits are greater than they actually are.

ii. Longfin smelt

The longfin smelt was once one of the most abundant open-water fishes in the San Francisco Bay Estuary, but it has undergone two catastrophic declines in the past 20 years.[120] The Center has long been fighting to prevent the longfin smelt from continuing in its decline. On August 8, 2007, the Center for Biological Diversity petitioned the FWS to list the longfin smelt as an endangered species under the ESA.[121] The FWS determined, in 2012, that the longfin smelt warranted consideration for protection but instead of listing the species as endangered or threatened the FWS added the longfin smelt to the list of candidates for ESA protection.[122]

Similar to the Delta smelt longfin smelt are also vulnerable to lethal entrainment into the federal and state pumps during spawning. The steady decline of The San Francisco Bay-Delta population of longfin smelt coincides with significant increases in Delta water exports, particularly during the sensitive winter and early spring periods when adult longfin smelt and their larvae are concentrated in the freshwater and low

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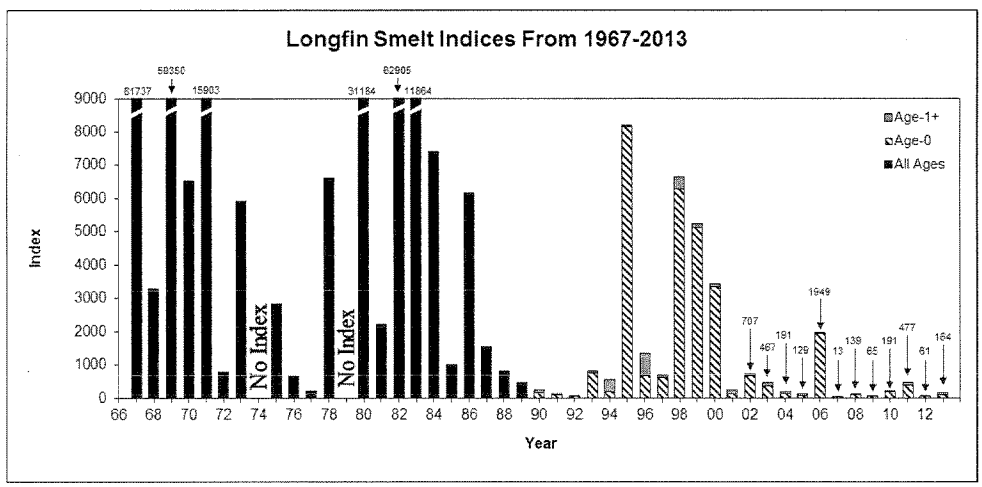
[115] *See* Draft BDCP, at 5-237.
[116] DEIR/EIS at 11-239.
[117] Draft BDCP, at 5-234.
[118] Draft BDCP, at 5-236, 5-237.
[119] Draft BDCP, at 5-240, 7.
[120] Center (2014).
[121] Center (2007).
[122] FWS (2011).

salinity regions of the Estuary. Hydrodynamic analyses of Delta flows indicate that under recent water inflow and export conditions all larval and juvenile longfin smelt present in the central and southern regions of the Delta are likely to be entrained and killed. Analyses have demonstrated a statistically significant negative relationship between longfin smelt population abundance and Delta water exports as a fraction of Delta inflow: high export ratios during the winter and early spring consistently correspond to low longfin smelt abundance.[123] The invasive clam *Corbula amurensis* has reduced the abundance of the zooplankton food supply in the Estuary for both longfin smelt and delta smelt.

The San Francisco Bay-Delta population of longfin smelt has declined to record low levels of population abundance, and has been at almost continuous, unprecedented low numbers since 2001. See the longfin smelt abundance indices from CDFW fall midwater trawl below.



Viable populations of delta smelt and longfin smelt are dependent upon sufficient freshwater outflows during critical life stages for migration to seasonal habitats and to prevent entrainment at water project pumps. The BDCP does not provide those needed flows as discussed above.

The BDCP determined that the plan may result in incidental take of longfin smelt.[124] Additionally, the plan has also predicted that if the longfin smelt's population size manages to increase, take could also increase.[125] This prediction is a clear violation of the purpose of an HCP – to help a species *recover* – as discussed previously. The BDCP also claims the magnitude of take and vulnerability to predation mortality of

[123] *See* literature cited in TBI et al. (2007).
[124] Draft BDCP, at 5-263.
[125] Draft BDCP, at 5-264.

longfin smelt will vary depending on a variety of factors, suggesting the take could be even greater than predicted.[126]

The certainty of the effects of the BDCP on the longfin smelt is moderate to low.[127] The BDCP asserts that the main beneficial effect of the plan will be an increase in food production due to tidal natural community restoration, but then later points out the extent to which export of food resources may occur is uncertain.[128] The BDCP and DEIR/EIS are relying on the potential for increased food production to outweigh the adverse effects of project, but the conclusions that adverse effects have low importance are made with low certainty, suggesting that DWR cannot accurately conclude anything regarding how the project will affect longfin smelt.[129] The BDCP and DEIR/EIS also do not make clear exactly how an increase in food production is going to help the longfin smelt population.

iii. Salmonids

The Center has been working to conserve Central Valley and Sacramento River salmon and steelhead since 1999, filing litigation that resulted in the designation of critical habitat and protective regulations for Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead.

Sacramento River winter-run Chinook salmon are extremely endangered and are now represented by a single naturally spawning population within 44 miles of the Sacramento River, that has been displaced from its historic spawning habitat by the construction of Shasta and Keswick Dams. Numbers of spawning Chinook in this population have declined in recent years to an estimated 1,349 wild fish in 2010.[130] Threatened Central Valley spring-run Chinook salmon inhabit the Sacramento River basin below major dams, and only 3 of 19 historic runs still survive. Adult escapement has averaged about 16,000 fish in recent years.[131]

NMFS cites juvenile losses at the CVP and SWP Delta pumping facilities and reverse flows in portions of the Delta as significant factors in the decline of listed salmon species. The tendency to increase pumping in the winter at SWP and CVP pumps may further increase salmon mortality rates from entrainment.[132] Water diversions at the Delta pumps also drastically alter the hydrology, salinity and turbidity and thus the habitat conditions in the lower Delta where juvenile salmon rear.

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[126] Draft BDCP, at 5-264.
[127] Draft BDCP, at 5-265.
[128] Draft BDCP, at 5-265.
[129] Draft BDCP, at 5-261, 262.
[130] NMFS (2011).
[131] NMFS (2011).
[132] Kimmerer (2008).

There are three salmon populations that will be affected by the BDCP: Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley fall-run/late fall-run Chinook salmon. The runs are identified based on when adult Chinook salmon enter freshwater to begin their spawning migration.[133]

The BDCP contains more detailed analysis for the three salmonids than the other covered fish species, likely because salmonids have a complex life history. The complex life history, however, creates greater uncertainty in the overall net effect of the BDCP. As with other covered fish species, the BDCP relies heavily on habitat restoration as a beneficial effect on salmonids; but unlike the other covered fish species, the BDCP does not even what level of certainty it has for concluding the project would benefit salmonids.[134] Without even a low level of certainty that the beneficial effects will actually be a success, the BDCP cannot accurately conclude that the net effect is expected to be a positive change.

Another difference between salmonids and other covered fish species—a difference not always made clear in the BDCP—is the presence of hatchery salmonids in the Delta. More than 32 million young Central Valley fall-run Chinook salmon and nearly four million Sacramento River Chinook salmon are released every year.[135] The BDCP analysis does not distinguish between wild salmonids and hatchery salmonids, an important distinction to make because wild salmonids are a higher priority species under the ESA. The BDCP and DEIR/EIS' failure to distinguish between wild and hatchery salmonids violates the ESA and NCCPA by not specifying survival of the species specifically covered under the law.

a. Effects of flow changes on salmon

Delta inflow and outflow affects the migration patterns of Chinook salmon, no matter the run or population segment.[136] The DEIR/EIS acknowledges that Delta outflow would likely decrease, or remain similar to existing conditions, with the implementation of Alternative 4.[137] Decreased flows could lead to a decrease in the migration rate of juvenile salmonids moving downstream.[138] If that occurs, juvenile salmonids would be exposed to increased exposure time in unsuitable water temperatures, entrainment in water diversions and the interior Delta, predation, and contaminants.[139] Chinook salmon have higher survival rates with higher flows, which means decreasing flows would lead to a decrease in the salmon population, and this is the exact opposite purpose of an

[133] NOAA Fisheries (2014).
[134] Draft BDCP, at 5-310, 5-315, 5-336, 5-370, and 5-393.
[135] CDFW (2014).
[136] CDFG (2010).
[137] DEIR/EIS, at 11-52.
[138] CDFG (2010).
[139] CDFG (2010).

HCP/NCCP.[140]

If Delta flows decrease, the juvenile salmonids that do survive will still have trouble spawning. There is a clear correlation with flow patterns and populations: spawning salmon are distributed in proportion to flow from the rivers, which means total inflow reflects general conditions in the spawning and nursery areas.[141] In fact, abundance of young Chinook salmon is significantly correlated with flow during several monthly periods throughout the year.[142]

The BDCP also acknowledges that there is potential for increased frequency in reverse flows in the Sacramento River.[143] Reverse flows cause confusion among salmon and can divert them away from main migration routes.[144] Such migration changes or delays would expose juvenile salmon to the same mortality factors listed above, decreasing their survival.

The BDCP and DEIR/EIS need more clarification and disclosure as to how all of these flow changes will impact the covered fish species; many, not just salmon, will be affected by flow changes within the Delta. Although there are a few CMs in place to try to mitigate the impacts of flow effects as discussed below, the analyses aren't detailed enough or clear enough to adequately explain how the BDCP will accomplish its goals of survival and recovery; as it stands, the BDCP appears to do the opposite.

iv. Central Valley steelhead

The Center has been working to conserve Central Valley steelhead since 1999, filing litigation that resulted in the designation of critical habitat and protective regulations for the species.

The analysis for Central Valley steelhead is divided into two regions: Sacramento River region and San Joaquin River region.[145] The BDCP concludes that the positive effects will outweigh the negative effects, but then states there is even less certainty regarding the benefits of the plan for steelhead than there was for the Chinook salmon – there was *no* certainty for the Chinook salmon.[146]

The concerns addressed above regarding the effects of flow changes on salmon also apply to steelhead. Steelhead have similar life histories to salmon, and therefore it is very likely that a decrease in Delta flow will have the same detrimental impact on steelhead as it would on salmon.

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[140] CDFG (2010).
[141] Stevens and Miller (1983).
[142] CDFG (2010).
[143] Draft BDCP, at 5-288.
[144] Brandes and McLain (2001).
[145] Draft BDCP, at 5-396, 5-412.
[146] Draft BDCP, at 5-411.

v. Sacramento splittail

The Sacramento splittail was once prevalent in the Delta, but water diversions and alteration of spawning and rearing habitat have driven the species to near extinction.[147] The Center's 1998 lawsuit, filed along with the Sierra Club, forced the FWS to take action and resulted in the Sacramento splittail finally being listed as threatened.[148] In 2003 FWS removed the Sacramento splittail from the ESA list of protected species; despite another lawsuit from the Center in 2009 demanding re-evaluation, the Sacramento splittail remains unlisted.[149] The Center refuses to give up its fight in protecting Sacramento splittail, and is determined not to let the BDCP continue the species' decline.

The BDCP activities are expected to result in take of the Sacramento splittail, primarily because of entrainment at the south Delta SWP/CVP facilities.[150] Shortly after making such a statement, the BDCP then concludes that new diversions and new fish screen facilities will decrease entrainment if not completely offset entrainment at the new facilities.[151] This seems contradictory and leads the reader to believe avoidance and minimization measures will prevent entrainment. If that's true, then how would take still occur? This is yet another example of how the BDCP fails to address project impacts or adequately weigh the positive versus adverse effects due to the project.

vi. Green and white sturgeon

Green sturgeon is a rare species of fish that has been around for almost 200 million years, but is now on the brink of extinction thanks to habitat change and overharvesting.[152] The green sturgeon has two distinct populations: southern DPS, found in the Delta, and northern DPS, found north of California.[153] The Center petitioned in June 2001 requesting NFMS list the green sturgeon as endangered or threatened under the ESA.[154] In 2006 NMFS listed the southern DPS as threatened.[155] Thanks to a lawsuit filed by the Center in 2007, the green sturgeon was also granted 8.6 million acres of critical habitat.[156] The Center has fought hard to save the green sturgeon and does not want to see the BDCP destroy the few fish remaining.

The southern population of green sturgeon spawns only in the Sacramento River basin, with as few as 50 pairs of spawning fish estimated to remain. Production of young

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[147] Center (2014).
[148] Center (2014).
[149] Center (2014).
[150] Draft BDCP, at 5-441.
[151] Draft BDCP, at 5-442.
[152] Center (2014).
[153] NOAA (2013).
[154] Center (2001).
[155] Center (2014).
[156] Center (2014).

sturgeon in the Sacramento River system is strongly correlated with high freshwater outflow, by transporting larvae past the Delta pumps and to available habitat and sources of food abundance. Adult sturgeon also appear to spawn in greater numbers in high outflow years. Changes in hydrology in the Delta due to water diversions and the SWP and CVP pumps subject juvenile sturgeon to the same diversion, entrainment, disruption of migration, and poor habitat quality conditions that affect salmon.

The white sturgeon is not currently listed under the ESA or CESA, but its populations have also been rapidly declining. The number of white sturgeon has declined from around 114,000 adults in 1994 to merely 10,000 adults in 2005--that's almost a 90% decline in population in only 11 years.[157] If the BDCP moves forward as planned, the white sturgeon will very likely find a place on the ESA list of endangered species as well.

The BDCP predicts that the project could result in small net increases in the sturgeon populations, but then admits the number of juveniles entrained at south Delta facilities could also increase.[158] Increasing the population just to end up with several fish dead completely defeats the purpose of trying to revive the sturgeon. Just like the discussion regarding the Sacramento splittail, the BDCP highlights contradictory conclusions on the project's effects on the green and white sturgeon. The BDCP fails to provide any support on how the implementation of CMs would result in net benefits and recovery for the species.

The BDCP also admits there is a high level of uncertainty when it comes to how the change in flows in the Delta will affect sturgeon.[159] Since the analysis above (see *Effects of flow changes on salmon*) applied primarily to salmon and steelhead, there is still a concern of flow changes will affect all covered fish species, including green and white sturgeon.

vii. Pacific and river lamprey

Pacific and river lamprey are two additional species that the Center has tried to save. Along with several other organizations, in 2003 the Center filed a petition with the FWS to list both species as either threatened or endangered, and to designate critical habitat.[160] The FWS determined the following year that neither species warranted listing under the ESA.[161] The BDCP focuses its discussion on the effects the project will have on Pacific lamprey due to a lack of information regarding the river lamprey.[162] However, using the excuse that "very little is known about the river lamprey" is unacceptable.[163] The BDCP and DEIR/EIS would be violating both the ESA and NCCPA if the project

[157] Draft BDCP, at 5-447.
[158] Draft BDCP, at 5-472.
[159] Draft BDCP at 5-475.
[160] Center (2003).
[161] FWS (2004).
[162] Draft BDCP, at 5-478.
[163] Draft BDCP, at 5-478.

moves forward on the project without understanding all of the covered fish species' biological needs and what the ramifications will be on those needs.

Although there is more information available regarding the Pacific lamprey, the BDCP is still fairly uncertain with regards to a lot of issues. The BDCP claims there are no population estimates available to determine if the take at the south Delta facilities will be significant.[164] Although the FWS decided not to list either lamprey, scientific evidence demonstrates their numbers are much lower than they used to be--and neither species can afford to lose more numbers.[165] By relying on a claim that it is impossible to detect significance, when in fact patterns of population decline are evident, the BDCP documents fail to adequately disclose how BDCP will affect lamprey.

The BDCP will resulted in significant adverse effects these species that it must adequately address and mitigate.

V. The BDCP will fail to meet the biological needs of covered terrestrial species.

A. The BDCP's conservation measures aim to primarily benefit aquatic species and has failed its purpose to protect all covered species.

The BDCP has identified and proposed measures (CMs 12-21) to reduce other stressors that affect the survival of covered fish species.[166] However, the BDCP does not explain why it would implement conservation measures that would alleviate stressors primarily for covered fish species even though the BDCP alternatives are required to minimize and mitigate adverse effects on all covered species including both aquatic as well as terrestrial species.

B. The BDCP fails to demonstrate that conservation measures would minimize or mitigate adverse effects to the maximum extent practicable.

Despite that conservation measures will directly and indirectly result in impact covered species as discussed above, the BDCP proposes activities that would result in significant adverse impacts on covered species that would not be adequately minimized or mitigated. By law the BDCP must include measures that would, to the maximum extent practicable, minimize and mitigate adverse effects on the covered species from implementation of the covered activities, where mitigation would occur through the protection, restoration, creation, and/or enhancement of habitat for covered species.[167] The Services will assess whether the BDCP is consistent with the maximum extent

[164] Draft BDCP, at 5-485.
[165] Center (2003); FWS (2012).
[166] *See* DEIR/EIS, at 3-39, 3-68.
[167] 16 U.S.C. § 1532(a)(2)(B)(ii); *see also* DEIR/EIS, at 3-40.

practicable standard by evaluating whether levels of minimizing and mitigating adverse effects is appropriate for the particular project at issue.[168]

One of the most impactful covered activities is the proposed construction of new water intake, forebays, and conveyance facilities (Conservation Measure 1, or CM1), which would permanently alter between 3,500 and 20,000 acres of habitat in north Delta.[169] Yet the BDCP does not adequately disclose how it would minimize and mitigate these impacts and instead relies on proposed habitat protection, restoration, and enhancement (habitat conservation or conservation reserve) activities to address these impacts. In fact, the availability of funding, feasibility, and success of many conservation or mitigation measures are highly uncertain, as we discuss below. Additionally, the implementing habitat conservation activities would also permanently alter thousands of acres of habitat and negatively affect certain species while bringing purported benefits to other species that highly speculative.[170]

The DEIR/EIS documents large-scale, permanent habitat loss for covered and other terrestrial species in the Delta from the implementation of various conservation measures without adequately addressing how the habitat loss would be minimized or mitigated. For instance, under Alternative 4 the construction and inundation of tidal wetlands (CM 4) would permanently remove 29,668 acres of burrowing owl habitat (including 9,929 acres of high-value habitat), 14,732 acres of tri-colored blackbird habitat, 2,519 acres of the giant garter snake habitat, 913 acres of valley elderberry longhorn beetle habitat, 545 acres of the endangered Least Bell's Vireo habitat, as well as 517 acres of terrestrial cover for the threatened CA tiger salamander.[171]

In addition, CM11 would integrate recreation plans as a component of each conservation reserve unit management plan, which would identify sites where recreational use is compatible with the biological goals and objectives.[172] However, the anticipated construction of recreational facilities under Alternative 4 would result in the permanent habitat loss of 24 acres for the threatened CA red-legged frog and 40 acres for the CA tiger salamander.[173] Anticipated recreational facilities would also result in 50 acres of foraging habitat loss for the western burrowing owl and the tricolored blackbird.[174] We highlight specific concerns for certain terrestrial species below.

C. Western burrowing owl

The Center has been working to conserve burrowing owls throughout California since 2003, challenging numerous development projects that would harm burrowing owl

[168] *See* Sierra Club v. Babbitt, 15 F.Supp.2d 1274, 1279-81 (S.D. Ala. 1998).
[169] DEIR/EIS, at 31-5.
[170] See other covered activities at DEIR/EIS, at 3-17.
[171] DEIR/EIS, at 12E-103 and 12E-104.
[172] DEIR/EIS, at 3-149.
[173] DEIR/EIS, at 12E-104.
[174] DEIR/EIS, at 12E-103.

habitat and trying to make industrial wind turbines less deadly for burrowing owls. In 2003, the Center petitioned for CESA protection for the western burrowing owl in California.

Statewide surveys estimated 595[175] to 600 pairs[176] of burrowing owls remaining in the Delta region of the Central Valley in the mid 1990s (thinly distributed in Yolo, Solano, Sacramento, Contra Costa, San Joaquin, Stanislaus, and Merced Counties). Resurveys in 2006-2007 found an estimated 545 pairs in the same region, with most of those pairs in the lowlands of Yolo, Solano, Sacramento, Contra Costa and San Joaquin Counties.[177] Burrowing owls have been in serious decline particularly in Yolo County; with 70-80 pairs in 1985;[178] 40-60 pairs over the whole of Yolo and Solano Counties from 2000-2005;[179] and only 30-40 pairs in 2000;[180] with continued declines over the past 15 years.

Many of the "conservation zones" for the BDCP are in exactly these areas currently used by nesting burrowing owls in the Delta region, and would occur in the flat lowland areas preferred by burrowing owls. The BCDP would result in the loss of 12,451 acres of high-value habitat and 31,519 acres of low-value habitat for burrowing owls. Much of these impacts to high value burrowing owl habitat would be due to construction of water facilities (particularly at Clifton Court Forebay where there is a high concentration of burrowing owls), conversion of grasslands to tidal marsh, construction of setback levees that would allow seasonal inundation of floodplains, and modification of levees that may be inhabited by burrowing owls.

One of the proposed mitigations for these impacts is passive relocation of owls from known breeding habitats. Passive relocation always results in a reduction in the number of breeding owls. It does not address the significant loss of extant breeding populations and there is no way of knowing where the evicted owls will go or whether they are able to breed successfully in other areas. Eviction or relocation of owls does not in any way mitigate for the habitat loss, habitat fragmentation, and reduced owl survivorship it will cause.

The EIR/EIS claims that 8,000 acres of grasslands and 1,000 acres of cultivated lands with habitat value for burrowing owls will be "protected" but does not compare and contrast the known breeding populations of burrowing owls on the lands that will be lost with these "protected" lands. Setting aside lands as "protected" does not create any more burrowing owl habitat, whereas the construction and "restoration" impacts guarantee that known burrowing owl habitat will be lost. Burrowing owls have strong site fidelity and

[175] DeSante and Ruhlen (1995).
[176] Kemper (1996).
[177] Wilkerson and Siegel (2010).
[178] PHBA (2002).
[179] Widdicombe (2007).
[180] PHBA (2002).

there is little evidence that burrowing owls in California are able to reestablish viable breeding populations once they are passively evicted.

The proposed restoration of 2,000 acres of grasslands is the only conservation measure that could be construed as creating additional burrowing owl habitat, but it is speculative as to whether burrowing owls will actually use these restored grassland for breeding. The EIR/EIS claims that small mammal and insect prey items could be increased and burrow availability increased by encouraging ground squirrel occupancy on protected lands, but offers no examples where this type of effort has succeeded in the past. Such habitat would have to be managed in perpetuity as burrowing owl habitat, with maintenance of short grass height, control of predators, limited public access, and no persecution of ground squirrels to have enduring habitat value for burrowing owls.

Finally, most of the conservation measures promised in the BDCP for burrowing owls would come far after the construction impacts and floodplain and tidal marsh "restoration" have altered suitable and occupied owl habitat - and there is no guarantee that they will actually occur, since funding for many BDCP measures has not yet been secured.

The conservation measures in the BDCP are not sufficient to conclude no adverse impact or a less than significant impact on the declining population of burrowing owls in the Delta region.

D. California red-legged frog

The Center has been working to conserve California red-legged frogs and their habitats since 1992. The Center won protection of the red-legged frog as a threatened species under the Endangered Species Act in 1996, and subsequent designation of critical habitat. The Center has long fought to protect California red-legged frogs from harmful pesticide uses. The Center has also challenged dozens of development projects that jeopardized red-legged frog habitat throughout California.

The BDCP study area overlaps with 3,321 acres of designated red-legged frog critical habitat. The conservation measures in the BDCP are not sufficient to conclude no adverse impact or a less than significant impact on the declining population of burrowing owls in the Delta region. Please see further comments attached as Exhibit A Re: Comments on the Bay Delta Conservation Plan EIR/EIS by Shawn Smallwood.

E. Giant garter snake

The Center has worked to conserve giant garter snakes and their habitats since 2008, challenging water transfers that would eliminate giant garter snake habitat in Yolo County and challenging Army Corps of Engineers policy that would clear vegetation used by garter snakes from levees in California. The conservation measures in the BDCP are not sufficient to conclude no adverse impact or a less than significant impact on the

species in the Delta region. See further comments attached as Exhibit A Re: Comments on the Bay Delta Conservation Plan EIR/EIS by Shawn Smallwood.

F. Valley elderberry longhorn beetle

The Center has worked to conserve Valley elderberry longhorn beetles and their habitats since 2007, challenging development projects and pesticide use that would harm longhorn beetles, and successfully challenging Army Corps of Engineers policy that would have cleared elderberry vegetation used by longhorn beetles from levees in California. The Center is also opposing the premature proposed delisting of the Valley elderberry longhorn beetle. The conservation measures in the BDCP are not sufficient to conclude no adverse impact or a less than significant impact on the species in the Delta region. See further comments attached as Exhibit A Re: Comments on the Bay Delta Conservation Plan EIR/EIS by Shawn Smallwood.

G. San Joaquin kit fox

The Center has worked to conserve San Joaquin kit foxes and their habitats since 2002, challenging numerous development projects that would harm kit fox habitat, preventing use of pesticides and rodenticides harmful to kit foxes, and challenging oil and gas leases in kit fox habitat. The Center has also petitioned for critical habitat for the species.

The BDCP is proposed to cover the current northern-most part of the federally and State endangered San Joaquin kit fox habitat. The San Joaquin kit fox has been under CESA protection for over 43 years and under ESA protection for over 47 years. Despite the intervening years of conservation efforts, kit fox populations and amount of habitat continue to decline. Modeling suggests that the San Joaquin kit fox is threatened with extinction in the San Joaquin Valley by 2022,[181] making the peripheries of its range - areas like the bay delta where the BDCP is proposed - even more important for the survival of this imperiled and declining species. U.S. Fish and Wildlife Service reconfirmed that only three remaining core areas for the San Joaquin kit fox ("SJKF") occur in the species range.[182] While, studies have shown that the most cost-efficient protection for the San Joaquin kit fox is protecting habitat the core areas rather than in other remaining areas of the species range,[183] significant development continues in these core areas, including two massive solar projects – Topaz on 4,700 acres and California Valley Solar Ranch also on 4,700 acres - being built in the Carrizo Plain; a massive solar proposal – Panoche Solar Farm on 4,717 acres - in the Panoche Valley; and ongoing oil and gas development in the Western Kern core. Despite the fact that the Recovery Plan for the Upland Species of the San Joaquin Valley, also points out the importance of these

[181] McDonald-Madden et al. (2008).
[182] USFWS (2010).
[183] Haight et al. (2004).

three key areas for recovery,[184] continuing development in these cores elevates the importance of conservation of habitat in the satellite areas including the satellite area in the BDCP planning area. Based on this dire situation, the Center has submitted a petition[185] to the U.S. Fish and Wildlife Service identifying critical habitat for the San Joaquin kit fox and includes all the core areas, the satellite areas and the linkages within that proposal.

This iconic and valuable species and its habitat is clearly in significant decline, and the BDCP by nature will allow for more habitat destruction with off-setting conservation opportunities. With climate models indicating a hotter and drier climate for interior California, the kit fox adaptation to a warming drying climate may result in latitudinal movement into the northern parts of its current range. Therefore strategic durable conservation for the San Joaquin kit fox in this northern part of its range is key to safeguard the species from extinction by providing recovery opportunities.

The BDCP proposes to conserve the kit fox through conservation of grasslands in Conservation Area 8 only, however the specific requirements for grassland management to benefit the kit fox are lacking (height of vegetation, composition [shrubs vs. forbs/grasses], etc.). In addition other key management strategies are also missing including banning rodenticides to prevent secondary poisoning, the construction of artificial and escape dens, the placement of SJKF passages through fencing and other strategies.

The proposed numbers of acres impacted and conserved are very confusing and it is unclear exactly what the proposal is for conserving grassland habitat for the kit fox. For example, the Executive Summary states that "Species Habitat in the Plan Area - 5,327 acres of habitat / 1,073 acres protected,"[186] however, further down that page it states "Benefits from Conservation Measures - 1,011 acres of habitat protected / 132 acres of habitat restored" and then "Adverse Effects from Covered Activities – up to 214 acres of habitat removed or converted" followed by "BDCP Implementation Net Effects – 82 acre net decrease of habitat / 1,016- acre net increase of habitat protected."[187] Based on those numbers, the plan may result in a total of 2,089 acres of conserved grassland habitat, but that still leaves a majority (3,238 acres [5,327 acres – 2,089 acres] or 60%) of the kit fox habitat in the plan area still out of conservation. Much clearer information on conservation acres and conservation strategy needs to be included in the plan for this critically endangered and declining species, especially in light of climate change.

[184] USFWS (1998).
[185] Center (2010).
[186] DEIS, at ES-65.
[187] DEIS, at ES-65.

H. California tiger salamander

The Center has been working to conserve California tiger salamanders and their habitats since the 1990s. The Center won protection for several tiger salamander populations under the Endangered Species Act, and subsequent designation of critical habitat. The Center also petitioned for the state listing under CESA. The Center has fought to protect California tiger salamanders from harmful pesticide uses. The Center has also challenged numerous development projects that jeopardized tiger salamander habitat in the Bay Area.

I. Swainson's hawk

The conservation measures in the BDCP are not sufficient to conclude no adverse impact or a less than significant impact on the species in the Delta region. See further comments attached as Exhibit A Re: Comments on the Bay Delta Conservation Plan EIR/EIS by Shawn Smallwood.

J. Tri-colored blackbird

The Center has been working to conserve tricolored blackbirds throughout California for more than a decade. In 2004, the Center petition for federal and California Endangered Species Act protections for the tricolored blackbird. Recently in July 2014 the Center wrote a letter to California Fish and Game Commission requesting the adoption of emergency regulation to add tri-colored blackbird to the list of endangered species list. See Exhibit B: Center for Biological Diversity, Possible Adoption of Emergency Regulation to Add Tricolored Blackbird to the List of Endangered Species; August 6, 2014 Commission Agenda Item #11 (July 24, 2014) (separately attached).

A 2014 Statewide Survey was held from April 18-20, 2014. It appears to have been the most comprehensive Statewide Survey ever, with 143 participants surveying for tricolors at 802 locations in 41 counties. The California population estimate derived from the Survey was 145,000 birds. This is a 44% reduction from the 258,000 birds seen during the 2011 Survey and a 63% reduction from the 395,000 birds seen during the 2008 Survey. Thus, the number of tricolors in California continues a rapid decline.

The number of birds declined most markedly in the San Joaquin Valley, where there were 78% fewer birds seen in 2014 than in 2008 (73,482 vs. 340,703), and along the Central Coast, where there were 91% fewer birds seen in 2014 than in 2008 (627 vs. 7014). The number of birds in the Sierra Nevada foothills was up 145% compared to 2008 (54,151 vs. 22,586), and the number of birds seen in southern California was up 126% compared to 2008 (12,386 vs. 5,487).

Based on the DEIR's failure to provide essential data, subsequent analysis of project impacts and adequate mitigation (including an analysis if full mitigation can even be accomplished) for these imperiled and declining aquatic and terrestrial species, we

strongly urge the County to comprehensively address these issues in a supplemental or revised draft EIR.

VI. The BDCP's habitat protection, enhancement, and restoration actions are highly uncertain.

A. Specific habitat conservation areas and projects have not been designed.

The proposed CMs have not been designed and full environmental effects have not been considered.

qThe DEIR/EIS states that up to 83,659 acres of land would be restored, and up to 40 linear miles of channel margin habitat would be enhanced.[188] However, the DEIR/EIS also states that restoration actions have not been designed and specific locations for all conservation components have not been identified.[189] For instance, the DEIR/EIS and BDCP propose to build conservation hatcheries (CM 2) for delta longfin smelt; however, hatcheries have not been designed and BDCP does not guarantee when funding would be available for the project.[190] In addition, CM10 proposes to restore 1200 acres of nontidal marsh designated conservation zones to primarily support the giant garter snake and the western pond turtle, and would create 500 acres of managed wetlands of greater sandhill crane roosting habitat.[191] Again, however, these freshwater marshes and managed wetlands have not yet been designed.[192]

As the DEIR/EIS fully recognizes it is not possible to assess the change in land use and therefore the full impacts of these actions at this point of the proposal.[193]

A. The feasibility of many habitat conservation actions is highly uncertain.

The feasibility of individual conservation projects is also highly uncertain. Specifically, the proposed restoration of 145,000 acres of Delta habitats (Conservation Measures 2-11) has been described by scientists as rife with uncertainties. As documented by an independent expert panel retained by American Rivers and The Nature Conservancy, focusing on impacts to federally listed fish species, there is no science that shows that habitat restoration without increased flows will restore native fisheries.[194] For instance, CM2 would improve floodplain inundation and fish passage at Yolo Pass in order to benefit covered species (Yolo Bypass Fisheries Enhancement Program, or YBFEP).[195] However, a YBFEP evaluation and EIR/EIS will only be completed by year

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[188] DEIR/EIS, at 31-5.
[189] DEIR/EIS, at 3-121; 31-5.
[190] DEIR/EIS, at 3-161.
[191] DEIR/EIS, at 3-147.
[192] DEIR/EIS, at 3-147.
[193] DEIR/EIS, at 31-5.
[194] Mount et al. (2013).
[195] DEIR/EIS, at 3-123 to 3-124.

4 of the implementation of BDCP,[196] and if the evaluation does not support the implementation of the Program's proposed projects they will not be implemented.[197] The DEIR/EIS presents numerous potential reasons that would render this project infeasible include unacceptable negative on land use, covered and non-covered native species, or if landowner agreement cannot be achieved.[198] Further permitting and environmental documentation would also be necessary to implement the CM even if it is found feasible.[199] In essence, there is no guarantee that CM 2 would ever occur if the BDCP is implemented due to the multiple challenges it would need to overcome in order for the action to even become feasible. The feasibility study must be done prior to the final EIR/EIS in order to accurately assess whether and how CM2 may affect covered species.

The implementation and success of many CMs hinge on coordination by agencies that are not part of the draft IA, thus bringing additional uncertainty as the process and implementation of the project.

Most importantly, the BDCP would need to acquire tens of thousands of acres of land before it would be able to implement site-specific restoration projects, including acquiring 48,625 acres of cultivated land for the implementation of a reserve system under CM 3.[200] The BDCP does not guarantee and may not be able to acquire sufficient land that would satisfy its acreage goals in order to restore the Delta ecosystem.

How could the BDCP conclude that habitat restoration efforts would bring net benefits to the Delta ecosystem given that there is virtually no certainty in the feasibility, location, duration, or impacts of these actions?

As discussed above, habitat conservation actions, if implemented, would only occur over the term of the BDCP, and many actions would not take place until decades after the water conveyance facilities become operational.[201] Only restored vernal pools under CM9 would be protected and managed in perpetuity;[202] however, an equivalent amount of vernal pool restoration could still be purchased in lieu of actual on-site vernal pool conservation.[203] The short duration in which the habitat conservation actions would be implemented is not sufficient to restore the Delta ecosystem.

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[196] DEIR/EIS, at 3-124.
[197] DEIR/EIS, at 3-125.
[198] DEIR/EIS, at 3-125.
[199] DEIR/EIS, at 3-161.
[200] Draft BDCP, at 3.4-72,
[201] DEIR/EIS, at 31-5.
[202] DEIR/EIS, at 3-144.
[203] DEIR/EIS, at 3-145

B. Conservation Measures seeking to benefit aquatic species are uncertain or unenforceable.

Many CMs targeting covered aquatic species would unlikely benefit these species if they are implemented since they are either unenforceable or their effects are not known to be beneficial to a high level of certainty. The BDCP includes non-project diversions as a covered activity. There are in fact over 1,500 of such diversions in the Delta. CM 21 would provide for the funding of voluntary remediation of nonproject diversions involving reduction/elimination of fish entrainment or impingement,[204] and does not establish metrics for success or a goal for remediation that would help meet the BDCP's goals. Similarly, the BDCP states that the Implementation Office would provide grants to entities that improve relevant stormwater management plans under CM 19 but does not include any specific criteria for management or measures for tracking the success of implementing these plans that would contribute to achieving the BDCP's goals.[205] Without including a mandatory program, metrics, or even program objectives the implementation of CMs 19 & 21 is virtually unaccountable.

Other CMs would be implemented without any certainty. CM16 Would create a combination of sound, light, and bubble barriers at various waterways to deter out-migrating juvenile salmonids from channels and river reaches in which survival is lower than in alternate routes. [206] However, he DEIR/EIS fails to even address the certainty of success for this CM, stating that uncertainty will be resolved as the CM is implemented on an individual project level.[207] Even though BDCP applicants would fund additional personnel and monitoring support to increase enforcement of fishing regulations with the goal of reducing illegal harvests of covered salmonids and fishing regulations under CM 17. However, it is important to note that the BDCP recognizes one of the uncertainties of implementing this measure is whether increased enforcement would actually reduce illegal harvest or would benefit anadromous fish stocks.[208] In other words, the BDCP applicants do not have any confidence that increasing fisheries enforcement would contribute to recovering fish species.

The BDCP's conservation measures would not minimize adverse effects to species to the greatest extent practicable since many of the proposed CMs are uncertain and/or voluntary or non-enforceable.

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[204] DEIR/EIS, at 3-165.
[205] DEIR/EIS, at 3-162.
[206] DEIR/EIS, at 3-159.
[207] DEIR/EIS, at 3-159.
[208] DEIR/EIS, at 3-160.

C. The BDCP fails to ensure the success of habitat restoration and enhancement measures by providing inadequate contingency measures especially in light of the high level of uncertainty that surround these conservation measures.

Many CMs are uncertain to be implemented and are uncertain to be successful even if they are implemented. Yet the BDCP's proposed contingency actions in the event of unsuccessful restoration projects are woefully inadequate. The BDCP provides no timeline for how contingency measures would be developed and implemented in more detail. The final BDCP must provide clear, detailed descriptions of how it would offset habitat loss for covered species that would result from the implementation of habitat conservation actions by designing, assessing the feasibility of and success rates of CMs and specific projects, and detailed contingency plans if CMs do not succeed.

D. The avoidance and minimization measures are inadequate to protect species and the Delta ecosystem from adverse effects that would result from Conservation Measures, in particular CM 1.

The primary purpose of *CM22 Avoidance and Minimization Measures*, is to "incorporate measures into BDCP activities that will avoid or minimize direct take of covered species and minimize impacts on natural communities that provide habitat for covered species." Site surveys and preparation would only be required in some case, which would include identifying, avoiding impact on, or transplanting covered species.[209] Pre-construction surveys should be required for ALL projects implemented within the BDCP in order to ensure activities truly minimize and avoid impacts to covered and other species.

VII. The BDCP currently relies on speculative funding to carry out the project, failing its statutory requirements to secure adequate funding for full implementation of the Project.

The BDCP has not presented legally required funding assurances that would allow it to achieve its co-equal goals of improving the Delta ecosystem and water supply reliability. By law, an HCP must specify the funding that will be available to implement each step the applicant will take to minimize and mitigate impacts on species.[210] In addition, the applicant must "ensure that adequate funding for the plan will be provided."[211] Thus the Services' granting of an ITP is arbitrary and capricious if the applicant has failed to commit to being responsible for making up potential funding shortfalls, or if the applicant relies on unnamed third-parties to make up for funding

[209] Draft BDCP, 3.C-6 and 3.C-8.
[210] 16 U.S.C.A. § 1539(a)(2)(A).
[211] 16 U.S.C.A. § 1539(a)(2)(B)(iii).

shortfalls.[212] The BDCP's applicants have failed to meet these criteria for ensuring adequate funding for the Plan as they do not specify what funding will be available and instead relies on speculative funding avenues; do not guarantee to make up funding shortfalls; and depend in part on unnamed third-parties to contribute to funding shortfalls in habitat restoration and monitoring activities. Funding uncertainties for these conservation measures not only highlight the fact this Project is infeasible, it will also make it impossible for the Services to comply with their ESA obligations to ensure the BDCP minimize and mitigate the effects of the Project to the maximum extent practicable.[213] Thus the Services cannot grant ITPs for the BDCP as it currently stands without violating the law.

A. Funding for CM 1 remains highly uncertain.

The only conservation measures the applicants have committed to funding are the construction, operation, and maintenance of CM 1 and mitigation measures associated with these measures.[214] However, the BDCP does not specify the funding that will be available to fully implement CM 1 and instead projects that sufficient funding would be collected from water contractors and rate payers.

The BDCP suggests that DWR "could" pay for new water facilities through revenue bonds collected from participating state water contractor project revenues.[215] The BDCP assumes contractors would agree to the bonds given the projected economic benefits from implementing the Project, stating that "it is anticipated that most SWP contractors and members of the San Luis & Delta-Mendota Water Authority would participate in the issuance of necessary revenue bonds."[216] Furthermore, the BDCP concludes that "[t]he financing plan is considered viable because it funds a project that provides value statewide and all proposed participating water contractors have sufficient financial capacity to fund their portions."[217] The BDCP applicants falsely equate the capacity to pay with the willingness to pay and the likelihood that sufficient funding to fully implement the Project. In reality, the list of participating water contractors has not been presented in the draft BDCP.[218] There is no guarantee that a sufficient number of contractors will participate and come to an agreement with the DWR to provide adequate funding since the BDCP states that contracts for water supply will need to be amended to include BDCP costs.[219]

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[212] Sierra Club. v. Babbitt, 15 F. Supp. 2d 1274, 1282 (S.D. Ala. 1998); Nat'l Wildlife Fed'n v. Babbitt, 128 F. Supp. 2d 1274, 1294-95 (E.D. Cal. 2000).
[213] 16 U.S.C.A. § 1539(a)(2)(B)(ii); *see* 15 F. Supp. 2d, at 1282.
[214] The draft BDCP states that Federal and state water contractors will be the sole funders of CM 1 and CM2. Draft BDCP, at 8-74 (Table 8-41).
[215] Draft BDCP at 8-71.
[216] Draft BDCP, at 8-78.
[217] Draft BDCP, at 8-79.
[218] Draft BDCP, at 8-79.
[219] Draft BDCP, at 8-71; LEGISLATIVE ANALYST'S OFFICE, FINANCING THE BAY DELTA CONSERVATION PLAN 7 (Feb. 2014), *available at*: http://www.lao.ca.gov/handouts/resources/2014/Financing-the-BDCP-02-12-14.pdf [hereinafter LAO Report].

In fact, it appears that the applicants do not know how CM 1 costs would be funded among SWP contractors since the DEIR/EIS also states that options for funding include charging SWP water agencies under existing contracts, amending the contracts, or negotiating new agreements with water agencies.[220] Even if the contractors agree to revenue bonds the amount of funding that would be available through these bonds is entirely unknown. The BDCP itself recognizes the amount of funding that can be raised would be limited by project revenue.[221]

The BDCP would also seek funding from general obligation bonds where only $168 million was available as of 2011 and further distribution is limited by voter-approved bond acts.[222] Thus despite these two payment systems discussed as being the primary avenues DWR has proposed to provide assurances to fund CM 1 the ultimate implementation as well as the adequacy of secured funding from revenue and general obligation bonds is highly uncertain.

The BDCP also anticipates that "the CVP water contractors will also have necessary funding agreements" for funding CM 1.[223] Again, just like with the SWP contracts the BDCP does not provide assurance that the CVP reach an agreement with contractors to fund CM 1.

B. The BDCP applicants claim that the Project is affordable through the single cost estimate only takes into account costs and benefits of implementing CM1.

The BDCP proponents anticipate that the BDCP is likely to be a project that contractors have an economic incentive to implement and finance since its estimated economic benefits of $18 billion to state and federal water contractors will outweigh the cost of $13.5 billion assigned to the contractors.[224] This analysis presents a single cost estimate instead of a range of reasonable costs. Only by studying and presenting a range of reasonable costs will allow applicants to assess adequate funding needs and accurately predict the capacity of contractors and ratepayers to satisfy those needs. This is especially important given that bridge and tunnel projects exceed projected costs by 34% on average.[225] Furthermore, the BDCP appears to contradict itself in estimating CM 1 funding commitments by federal and state contractors, providing that $16 million in a table summary of BDCP funding provided by participating contractors.[226] This analysis also does not include the costs and benefits of implementing all other conservation

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[220] DEIR/EIS, at 3-2.
[221] Draft BDCP at 8-71.
[222] Draft BDCP at 8-72.
[223] Draft BDCP at 8-73.
[224] Draft BDCP, at 8-82.
[225] LAO Report, at 5.
[226] Draft BDCP, at 8-74.

measures and in effect turns a blind eye on accounting for the estimated $8.7 million that will be needed in order to implement them.[227]

C. The BDCP does not provide funding assurances for the habitat restoration and conservation portions of the plan.

The BDCP fails to specify and assure funding to pay for the $8.7 billion[228] estimated for implementing CMs 2-22, including habitat restoration and conservation measures that underpin the HCP's co-equal goal to improve the Delta ecosystem. The draft IA also does not provide further clarity on how funding for habitat restoration and conservation measures would be obtained. The BDCP would rely on a series of water bonds to fully fund the implementation of natural community restoration and other stress conservation measures.[229] However, the BDCP does not present any confidence on the timing and amount of a water bond, or even whether one will be introduced in the future. In fact, the BDCP itself acknowledges that it has no visibility on when the next water bond would be introduced, and only speculates that the water bond would likely occur by year 15 of the permit term.[230] Even if the BDCP become finalized in 2015, funding from the potential water bond would not be distributed until 2030 according to the BDCP's assumptions. The final BDCP must include specific estimated costs for each conservation measure and list assurances by participating entities for all anticipated costs for the CMs in order to ensure that adequate funding will be provided according to existing law as discussed above.

D. The BDCP applicants refuse to commit additional funding for the Project in case of funding shortfalls.

The draft BDCP has calculated a small buffer for contingency funding of 20, 10, and 20% for the Plan's habitat restoration, management, and monitoring components, respectively.[231] However, it also makes clear that SWP and CVP will not pay additional costs or forgo water in the event of a funding shortfall.[232] Specifically, the BDCP states that "Authorized Entities will not be required to provide land, water, or monetary resources beyond their commitments in the Plan in the event of a shortfall in state or federal funding."[233] Although local, state, and federal agencies, including any of the Parties to the draft IA may pursue additional funding they "shall not directly, or otherwise charge or pass such costs to the SWP/CVP contractors."[234]

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[227] LAO Report, at 4.
[228] *Id.*
[229] Draft BDCP, at 8-85.
[230] Draft BDCP, at 8-85.
[231] Draft BDCP, at 8-121.
[232] Draft BDCP, 8-122.
[233] Draft BDCP, at 8-122; Draft IA, at 47-48.
[234] Draft IA, at 46-47.

Yet the BDCP applicants fully anticipate funding shortfalls for implementing conservation measures related to habitat restoration and conservation, acknowledging that costs may still exceed estimates. As the BDCP itself points out the costs of potential actions for each CM are incomplete, many of these specific actions and their costs cannot be estimated until specific monitoring and research actions are determined during implementation of the Plan.[235] However, upon analysis of the proposed CMs we find that the draft BDCP fails to account for a wide range of reasonable costs that should have been included in the current assessment. For instance, the BDCP estimates land acquisition alone will cost $1 billion, but does not account for rising real estate prices. Water pollution and other impacts from water diversions onto species will also likely be larger than estimated. Economic analyses of the cost of implementing the BDCP demonstrate it will most certainly exceed the projected contingency funding for restoration, management, and monitoring actions. Since the BDCP greatly underestimates the cost of the Project whatever assurances it provides in even the limited measures it has committed to funding is meaningless. Tax payers will most likely foot the bill for the most crucial components that determine the successful outcome of the Plan.

Additionally, the BDCP states that if costs of restoration, management, or monitoring are predicted to exceed revenue on a long-term basis, then the Implementation Office may seek additional funding by identifying new funding sources, adjust funding sources, adjust management or monitoring activities consistent with the goals of the Plan, or defer restoration, management, and monitoring actions until funding is available.[236] In addition, the Implementation Office may adjust the scope of the Plan in proportion to any public funding shortfall, beginning with amending the terrestrial components of the Plan.[237]

First, the BDCP's relying on unidentified potential third-parties to fund restoration, management, and monitoring activities violates established law.[238] Second, we find it unacceptable that the BDPC would defer the implementation of these activities if they undermine profits anticipated by state and federal contractors. While we recognize the "no surprises rule" applies, it is unlawful for the applicants to forgo any responsibility to fund habitat restoration, monitoring, and management measures whenever they deem it a bad investment. Most importantly without restoration, management, and monitoring actions, the lynchpins for the proper implementation of the entire BDCP, the Project will fail at reaching its co-equal goal of restoring the Delta system. The result is the permanent loss of already imperiled species and their habitats. Why should tax payers bear the externalities caused by the building and operation of new water facilities so long as contractors benefit from the Project, including not only the adverse impacts on species from new water conveyances but also potentially the entire

[235] Draft BDCP, at 8-55.
[236] Draft BDCP, 8-121.
[237] Draft BDCP, at 8-122.
[238] *Nat'l Wildlife Fed'n v. Babbit*, 128 F.Supp.2d, at 1294-95.

bill for restoring the Delta ecosystem when it no longer economically benefit the contractors?

VIII. Conclusion.

The Center encourages the County to deny the proposed project or adopt the Responsible Exports Plan. Thank you for the opportunity to submit comments on the draft Bay Delta Conservation Plan and associated documents. Please do not hesitate to contact the Center with any questions at the number listed above. We look forward to reviewing any further environmental documentation on this project. Please place us on the notice list for all future project meetings.

Sincerely,

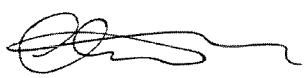

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EXHIBIT A

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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 permanent 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*.

"*Increase native species diversity and relative cover of native plant species, and reduce the introduction and proliferation of nonnative species (Objective L2.6, associated with CM11, CM13, and CM20).* How would native species diversity be increased? I work in the areas where California red-legged frogs occur to the west and south of the Clinton Forebay, and in fact I have contributed many of the CNDDB records of California red-legged frogs in this area, so I am familiar with the wildlife and plant community there. I am perplexed by this proposed measure to increase species diversity in the area, which is mostly annual grassland. Exactly what would be done to increase species diversity while somehow not damaging the local flora and fauna? I am very skeptical that species diversity could or even should be increased to benefit the frog.

It would be helpful if the EIR/EIS would explain why increased species diversity would benefit California red-legged frog. In all of my research and survey work with this species, I have never encountered evidence to suggest that species diversity was a limiting factor for this species. I have performed research on the possible impact of methylated mercury in the streams. I have performed research on the siltation of breeding ponds, and I developed a management plan to restore pond function for the frog. I have, during the course of my surveys, found ponds that were choked out by cattails, and stream pools that were isolated by severe streambed incision or degraded by riprap. I have noted that California red-legged frogs occur where ground squirrels were relatively abundant in the upland areas adjacent to streams and ponds. But never in 20 years of surveys and research on this species have I noticed or seen reference to species diversity having anything to do with the abundance and distribution of California red-legged frogs.

Whereas I have seen it hypothesized that non-native species might be detrimental to California red-legged frogs, I have yet to see evidence that bullfrogs or other exotic species have limited the distribution of California red-legged frogs. I would not rule out bullfrogs as a limiting factor, but neither would I gamble that eradicating bullfrogs would help conserve red-legged frogs.

Protect 8,000 acres of grassland (Objective GNC1.1, associated with CM3). This measure lacks any meaningful details that would translate to conserving California red-legged frogs. There are large tracks of annual grassland that are devoid of the species because they are outside the current range of California red-legged frog or because they lack any suitable water features where the frog would spend part of its life. The specific portion of the study area that hosts California red-legged frog is west and south of Clinton Forebay, which appears to be targeted for dumping bore spoils. Dumping bore spoils in this area will destroy the only California red-legged frogs that occur in the project area, although the species also occurs to the west along the southwestern fringe of the study area. Other than this southwestern fringe, there is no other place within the study area where protecting grasslands will also conserve California red-legged frogs. Within the southwestern fringe, there is no threat to California red-legged frogs other than poisoning to control California ground squirrels, which construct burrows used by the frog. Therefore, due to the plan to dump bore spoils in the only portion of the project area where California red-legged frogs could be protected, and due to the habitat to the west being under no threat of conversion to other uses, the proposed mitigation measure will be ineffective.

Protect stock ponds and other aquatic features within protected grasslands to provide aquatic breeding habitat for native amphibians and aquatic reptiles (Objective GNC1.3, associated with CM3). Protecting stock ponds seems unnecessary because cattle ranchers will either protect their stock ponds or not based on their needs. Is the plan to commit ranchers to protecting stock ponds? And how would such protection be carried out? By excluding cattle? If so, cattle are the reason stock ponds exist.

Again, the only portion of the study area that hosts California red-legged frog is west and south of Clinton Forebay, which appears to be targeted for dumping bore spoils. Protecting stock ponds in this area would be ridiculous because they will be covered by bore spoils. Protecting stock ponds along the southwest fringe of the study area would also be ridiculous because the ranchers already maintain their ponds for use by cattle.

Increase burrow availability for burrow-dependent species (Objective GNC2.3, associated with CM11). Having worked with fossorial mammals for nearly 30 years, I can conclude with high confidence that this measure is an empty promise. I have mapped the dimensions of burrows and I have mapped the distribution and abundance of mammal burrows across large areas (Smallwood and Erickson 1995; Smallwood and Geng 1997; Smallwood and Morrison 1997; Smallwood et al. 1997; Smallwood et al. 1998a; Smallwood et al. 1999a,b; Smallwood et al. 2001a,b;), including across hundreds of hectares of grassland west of Clinton Forebay (Smallwood et al. 2009). Burrow availability cannot be increased through artificial means, as attempts to do so have proven cost-ineffective and have failed. I would be curious to learn how the preparers of the EIR/EIS might think that natural burrows might be increased. In summary, this mitigation measure is an empty promise; even if it was implemented, it would not succeed.

Maintain and enhance aquatic features in grasslands to provide suitable inundation depth and duration and suitable composition of vegetative cover to support breeding for covered amphibian and aquatic reptile species (Objective GNC2.5, associated with CM11)." This measure appears to suggest that some portion of existing grasslands would be destroyed so that ponds could be created. Such a measure would add to project impacts in the near term but would face high uncertainty over whether any benefits would be realized in the long term. The EIR/EIS should identify where and under what circumstances this measure would be implemented. It should also quantify the number of California red-legged frogs that would be able to occupy the created habitat (Smallwood 2001).

Impact BIO-46: California Tiger Salamander

The following mitigation measures were proposed for California tiger salamander (EIR/EIS page 12-2122). My comments follow each measure.

"*Increase the size and connectivity of the reserve system by acquiring lands adjacent to and between existing conservation lands (Objective L1.6, associated with CM3).* Those portions of the study area where California tiger salamander occurs do not appear to me to lack for connectivity or habitat patch size, which might be reasons why the species has persisted there. The EIR/EIS needs to explain how increased size and connectivity would be achieved, and it would be achieved without harming the salamanders that already live there. The EIR/EIS needs to explain where and under exactly which circumstances this measure would be implemented, and how the implementation would translate into meaningful units of demography that will be conserved (Smallwood 2001). The acreage basis of success that is used in the EIR/EIS is meaningless unless those acreages can be linked directly to numbers and demography of California tiger salamander.

Increase native species diversity and relative cover of native plant species, and reduce the introduction and proliferation of nonnative species (Objective L2.6, associated with CM11). As I commented for California red-legged frog, I have yet to see the hypothesis or any evidence that species diversity has anything to do with the distribution and abundance of California tiger salamander. The EIR/EIS should explain the relationship between species diversity and conserving the salamander; else this measure is empty rhetoric.

Protect and improve habitat linkages that allow terrestrial covered and other native species to move between protected habitats within and adjacent to the Plan Area (Objective L3.1, associated with CM3, CM8, and CM11). How is this measure any different from the first one listed? The EIR/EIS should provide details of this measure, which is so vague that it carries absolutely no value.

Protect 150 acres of alkali seasonal wetland in CZ 1, CZ 8, and/or CZ 11 among a mosaic of protected grasslands and vernal pool complex (Objective ASWNC1.1, associated with CM3). This measure should specify exactly where 150 acres of alkali

seasonal wetland will be protected, and its benefits should be predicted in terms of meaningful demographic units (Smallwood 2001). I assume the 150 acres of alkali seasonal wetland already exists, so it ought to be explained how protecting them will make any difference to the local salamanders. Are these 150 acres under threat of development?

Provide appropriate seasonal flooding characteristics for supporting and sustaining alkali seasonal wetland species (Objective ASWNC2.1, associated with CM3 and CM11). The seasonal flooding characteristics already exist, or else the alkali seasonal wetland would not exist. I am familiar with the alkali seasonal wetland in CZ8 because I have performed research next to it for 15 years. I have not seen any threat to the seasonal flooding of this wetland, nor do I see any means of providing any different or the same flooding regime. This measure appears to be an empty promise.

Increase burrow availability for burrow-dependent species in grasslands surrounding alkali seasonal wetlands within restored and protected alkali seasonal wetland complex (Objective ASWNC2.3, associated with CM11). Having worked with fossorial mammals for nearly 30 years, I can conclude with high confidence that this measure is an empty promise. I have mapped the dimensions of burrows and I have mapped the distribution and abundance of mammal burrows across large areas (Smallwood and Erickson 1995; Smallwood and Geng 1997; Smallwood and Morrison 1997; Smallwood et al. 1997; Smallwood et al. 1998a; Smallwood et al. 1999a,b; Smallwood et al. 2001a,b;), including across hundreds of hectares of grassland west of Clinton Forebay (Smallwood et al. 2009). Also, the hills around this wetland support ample numbers of California ground squirrels that are under no threat other than the occasional dispensing of poisoned bait to reduce squirrel numbers. This mitigation measure is an empty promise.

Protect 600 acres of existing vernal pool complex in in CZ 1, CZ 8, and/or CZ 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 VPNC1.1, associated with CM3). The vernal pool complexes in CZ1 and CZ8 do not appear to be in need of protection, nor will protecting them offset the number of California tiger salamanders that will be killed by dumping bore spoils on them west and south of Clinton Forebay.

Restore vernal pool complex in in CZ 1, CZ 8, and/or CZ 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) (Objective VPNC1.2, associated with CM3 and CM9). Restoring the vernal pools in CZ1, CZ8, and CZ11 would likely damage the existing vernal pools. The EIR/EIS needs to explain why these vernal pools are in need of being restored. Otherwise, this measure seems both vague and potentially reckless.

Increase the size and connectivity of protected vernal pool complex within the Plan Area and increase connectivity with protected vernal pool complex adjacent to the Plan Area

(Objective VPNC1.3, associated with CM3). This is the third iteration of the same measure listed for this species. Repeating the same measure seems like an attempt to add filler text or to give the appearance that there is more offered in mitigation than truly intended. Again, the EIR/EIS needs to identify where and under what circumstances this measure would be implemented and how it would translate into specific numbers or meaningful demographic units of the species (Smallwood 2001).

Protect the range of inundation characteristics that are currently represented by vernal pools throughout the Plan Area (Objective VPNC1.4, associated with CM3). This measure is absurd. How will the range of inundation characteristics be protected? Will someone insert a flow regulator? The EIR/EIS, if it is serious, needs to explain how vernal pool management will improve on nature.

Protect 8,000 acres of grassland (Objective GNC1.1, associated with CM3). As I commented on the same measure proposed for California red-legged frog, this measure needs detail on how it will translate into numbers or meaningful demographic units of California tiger salamanders that will be conserved. The EIR/EIS needs to demonstrate that willing sellers exist in sufficient number to achieve the protection of 8,000 acres of grassland, and it needs to explain why the particular grasslands need to be protected. Currently there are large tracts of grassland south of Byron that are being converted to wine grapes. Given that wine grapes are high-value crops, is the mitigation fund going to be large enough to afford buying out whatever might be left of this grassland acreage?

Restore 2,000 acres of grasslands to connect fragmented patches of protected (Objective GNC1.2, associated with CM3 and CM8). This measure is too vague to be taken seriously. Where are these 2000 acres? Why would restoring these grasslands not destroy the habitat value that these grasslands already have? The EIR/EIS needs to demonstrate the need for the restoration, as well as the measurable objectives; otherwise 2000 acres of brome grasses lacking California tiger salamanders might result.

Protect stock ponds and other aquatic features within protected grasslands to provide aquatic breeding habitat for native amphibians and aquatic reptiles (Objective GNC1.3, associated with CM3). As explained in response to the same measure promised for red-legged frogs, protecting stock ponds seems unnecessary because cattle ranchers will either protect their stock ponds or not based on their needs. Committing ranchers to stock ponds seems impractical and unlikely to succeed. And how would such protection be carried out? By excluding cattle? If so, cattle are the reason stock ponds exist.

Increase burrow availability for burrow-dependent species (Objective GNC2.3, associated with CM11). This is the second time this measure appeared as mitigation for California tiger salamander. I already commented on it.

Maintain and enhance aquatic features in grasslands to provide suitable inundation depth and duration and suitable composition of vegetative cover to support breeding for covered amphibian and aquatic reptile species (Objective GNC2.5, associated with

CM11)." This is the second time this measure appeared as mitigation for California tiger salamander. I already commented on it.

Impact BIO-49: Giant Garter Snake

The following mitigation measures were proposed for giant garter snake (EIR/EIS page 12-2231). My comments follow each measure.

"*Increase native species diversity and relative cover of native plant species, and reduce the introduction and proliferation of nonnative species (Objective L2.6, associated with CM11).* This same measure was listed for California red-legged frog and California tiger salamander, and my comment on it is the same – the EIR/EIS needs to explain the relationship between species diversity and giant garter snake numbers or success. Why is species diversity important to the persistence of giant garter snakes? How does it translate to meaningful units of demography? I have never encountered the hypothesis that species diversity is a limiting factor to giant garter snake. If it was, then surely it would have been a topic of discussion during the environmental review of the Natomas Basin HCP, but this factor never came up. This measure lacks foundation and is vague in how it would be implemented.

Within the 65,000 acres of tidal natural communities (L1.3), restore or create 24,000 acres of tidal freshwater emergent wetland in CZ 1, CZ 2, CZ 4, CZ 5, CZ 6, and/or CZ 7 (Objective TFEWNC1.1, associated with CM3 and CM4). The EIR/EIS needs to provide details about where and under what circumstances this measure would be implemented. If it was along the shoreline of the Yolo Flood Control Basin, for example, then it would be useless because giant garter snakes do not, and apparently cannot, live in this Basin. Giant garter snakes require ample availability of hibernacula above 100-year flood stage (Smallwood 2001), which does not occur in the Yolo Flood control Basin except for the levees which are too narrow and barren to support the snake.

Create at least 1,200 acres of nontidal marsh consisting of a mosaic of nontidal perennial aquatic and nontidal freshwater emergent wetland natural communities, with suitable habitat characteristics for giant garter snake and western pond turtle (Objective NFEW/NPANC1.1, associated with CM3 and CM10). The EIR/EIS needs to identify where these 1200 acres are to be created.

Protect 48,625 acres of cultivated lands that provide suitable habitat for covered and other native wildlife species (Objective CLNC1.1, associated with CM3 and CM11). This measure reminds of the Natomas Basin HCP, which had promised to protect 8,000 acres of rice fields. One of the problems with the Natomas Basin HCP was the lack of willing sellers of rice fields, and another was the notion that such protections could overcome agricultural market conditions. Is this measure going to force the production of alfalfa, for example? If the market is not right for alfalfa, then it would be foolish to require the farmers to grow alfalfa. This measure is empty in value, unless the EIR/EIS can explain how it would work.

Target cultivated land conservation to provide connectivity between other conservation lands (Objective CLNC1.2, associated with CM3). This measure is extremely vague. How would this measure translate to conservation of giant garter snakes? Would it replace the number of snakes or snake populations that would be destroyed by the project? The EIR/EIS needs to provide much more detail before such a measure can be taken seriously.

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 CLNC1.3, associated with CM3 and CM11). This measure needs more detail in both where it would be implemented and how it would conserve giant garter snakes.

Of the at least 1,200 acres of nontidal marsh created under (Objective NFEW/NPANC1.1), create 600 acres of aquatic habitat giant garter snake aquatic habitat that is connected to the 1,500 acres of rice land or equivalent-value habitat described below in Objective GGS1.4 (Objective GGS1.1, associated with CM3, CM4, and CM10). The EIR/EIS needs to identify where this measure would be implemented and how it would translate into giant garter snake conservation.

Of the 8,000 acres of grassland protected under Objective GNC1.1 and 2,000 acres restored under Objective GNC1.2, create or protect 200 acres of high-value upland giant garter snake habitat adjacent to the at least 600 acres of nontidal perennial habitat being restored and/or created in CZ 4 and/or CZ 5 (Objective GGS1.2, associated with CM3 and CM8). Creating and protecting high-value upland habitat are two different actions and have very different costs. The EIR/EIS needs to identify where this measure would be implemented and how many more giant garter snakes could live within the study area compared to how many live there now. Also, it needs to be explained what is meant by "high-value" habitat.

Protect giant garter snakes on restored and protected nontidal marsh and adjacent uplands (Objectives GGS1.1 and GGS1.2) from incidental injury or mortality by establishing 200-foot buffers between protected giant garter snake habitat and roads (other than those roads primarily used to support adjacent cultivated lands and levees). Establish giant garter snake reserves at least 2,500 feet from urban areas or areas zoned for urban development (Objective GGS1.3, associated with CM3). The EIR/EIS needs to identify where this measure would apply or where it would benefit giant garter snakes, or otherwise it seems like an empty promise. Where is there a need for this measure?

Create connections from the White Slough population to other areas in the giant garter snake's historical range in the Stone Lakes vicinity by protecting, restoring, and/or creating at least 1,500 acres of rice land or equivalent-value habitat (e.g., perennial wetland) for the giant garter snake in CZ 4 and/or CZ 5. Any portion of the 1,500 acres

may consist of tidal freshwater emergent wetland and may overlap with the 24,000 acres of tidally restored freshwater emergent wetland if it meets specific giant garter snake habitat criteria described in CM4. Up to 500 (33%) of the 1,500 acres may consist of suitable uplands adjacent to protected or restored aquatic habitat (Objective GGS1.4, associated with CM3 and CM4). This measure proposed to force rice cultivation on landowners or farmer who may not wish to grow rice or who may have to abandon rice production should market conditions dictate. Furthermore, the notion that rice fields are important to giant garter snakes is false (Smallwood 2001). The giant garter snake occurs in agricultural irrigation canals and ditches, and they rarely occur in rice fields, although there is no evidence these areas are anything but ecological sinks for the giant garter snake. There is no convincing evidence that the giant garter snake benefits from rice cultivation in any way, and there is ample evidence that it is harmed by rice cultivation. Using Wylie's (1998) telemetry data, I conducted a use and availability analysis and found that the giant garter snake avoids using rice fields based on the availability of rice (Smallwood 1999).

The giant garter snake has declined to the brink of extinction while rice cultivation expanded in the Sacramento Valley. Prior to rice cultivation, the Sacramento Valley produced more alfalfa hay and other crops, and more wetlands were available to the giant garter snake. At this point in time, it is scientifically unfounded to conclude that rice fields serve as suitable giant garter snake habitat. Based on the scientific evidence, the opposite conclusion should have been reached – rice cultivation is helping to drive the giant garter snake toward extinction. To focus recovery efforts on maintenance of rice cultivation is to assist in the extinction of the giant garter snake.

Of the at least 1,200 acres of nontidal marsh created under Objective NFEW/NPANC1.1, create 600 acres of connected aquatic giant garter snake habitat outside the Yolo Bypass in CZ 2 (Objective GGS2.1, associated with CM3 and CM10). The EIR/EIS needs to be more specific about where these 600 acres of habitat are to be created. It needs to identify success criteria, and it needs to explain why creating habitat next to an unoccupied flood control basin would be a good idea for conserving giant garter snakes. Creating habitat would mean that some other habitat or land use would need to be destroyed, so the EIR/EIS should explain what will be sacrificed for this created habitat. Also, if it is grassland or fields used for alfalfa production, then this created habitat might come at the cost of Swainson's hawk habitat, so the EIR/EIS needs to be transparent about his measure's impacts on Swainson's hawk and on agricultural production in the region.

Of the 8,000 acres of grasslands protected under Objective GNC1.1 and the 2,000 acres restored under Objective GNC1.2, create or protect 200 acres of high-value upland habitat adjacent to the 600 acres of nontidal marsh created in CZ 2 outside of Yolo Bypass (GGS2.1) (Objective GGS2.2, associated with CM3 and CM8). My comments above also apply to this measure.

To expand upon and buffer the newly restored/created nontidal perennial habitat in CZ 2, protect 700 acres of cultivated lands, with 500 acres consisting of rice land and the remainder consisting of compatible cultivated land that can support giant garter snakes. The cultivated lands may be a subset of lands protected for the cultivated lands natural community and other covered species (Objective GGS2.3, associated with CM3). My comments on this measure are the same as my comments above. Forcing rice cultivation seems ridiculous because market conditions will change and because rice cultivation more likely harms rather than helps giant garter snakes.

Protect giant garter snakes on created nontidal marsh (Objective GGS2.1) and created or protected adjacent uplands (Objective GGS2.2) from incidental injury or mortality by establishing 200-foot buffers between protected giant garter snake habitat and roads, and establishing giant garter snake reserves at least 2,500 feet from urban areas or areas zoned for urban development (Objective GGS2.4, associated with CM...) I already commented on this same measure, which appears above.

Protect, restore, and/or create 2,740 acres of rice land or equivalent-value habitat (e.g., perennial wetland) for the giant garter snake in CZ 1, CZ 2, CZ 4, or CZ 5. Up to 500 acres may consist of tidal freshwater emergent wetland and may overlap with the at least 5,000 acres of tidally restored freshwater emergent wetland in the Cache Slough ROA if this portion meets giant garter snake habitat criteria specified in CM4. Up to 1,700 acres may consist of rice fields in the Yolo Bypass if this portion meets the criteria specified in CM3, Reserve Design Requirements by Species. Any remaining acreage will consist of rice land or equivalent-value habitat outside the Yolo Bypass. Up to 915 (33%) of the 2,740 acres may consist of suitable uplands adjacent to protected or restored aquatic habitat (Objective GGS3.1, associated with CM3, CM4, and CM10)." This measure needs to be more specific about where some of these acreages would be located. Also, giant garter snakes do not routinely live in the Yolo Bypass because it lacks suitable hibernacula and refugia. Protecting rice cultivation in the Yolo Bypass will not conserve the snake for this reason and for reasons explained earlier. Rice is not suitable giant garter snake habitat, despite a few snakes having been found in rice fields. This snake needs natural wetland environments with ample adjacent uplands.

Impact BIO-83: Swainson's Hawk

The following mitigation measures were proposed for Swainson's hawk (EIR/EIS page 12-2255). My comments follow each measure.

"Restore or create at least 5,000 acres of valley/foothill riparian natural community, with at least 3,000 acres occurring on restored seasonally inundated floodplain (Objective VFRNC1.1, associated with CM7). The EIR/EIS needs to provide more detail about this measure, such as where the restoration or creation of habitat will occur and which types of existing environments will have to be destroyed or modified to accommodate this measure. The EIR/EIS needs to explain why restoring or creating

habitat on 3000 acres of seasonally inundated floodplain would benefit Swainson's hawk. This measure, as described is vague and inadequate.

Plant and maintain native trees along roadsides and field borders within protected cultivated lands at a rate of one tree per 10 acres (Objective SH2.1, associated with CM11). This measure might be effective, but the EIR/EIS needs to identify willing sellers of the cultivated lands that are to be "protected." Also, it needs to be explained how the loss of crop yields due to shading from trees will be compensated, if at all, and how trees will be managed when planted under or near electric distribution lines. I have performed many surveys for Swainson's hawk (Smallwood 1995, Smallwood et al. 1996, and Smallwood, unpublished data), and during these surveys I have seen many trees that could have been used by nesting Swainson's hawks lose their value to Swainson's hawks because the utilities severely trimmed the trees to prevent line interference.

Establish 20- to 30-foot-wide hedgerows along fields and roadsides to promote prey populations throughout protected cultivated lands (Objective SH2.2, associated with CM11). This measure might help conserve Swainson's hawk, but it should be accompanied by an experimental design and monitoring to test whether the hedgerows do provide Swainson's hawks with increased prey, and if so, then to want extent. Planting hedgerows seems like a good idea, but the EIR/EIS cited no evidence that it will be effective. The EIR/EIS also needs to present the costs of implementing this measure, including a maintenance plan and its cost.

Increase prey abundance and accessibility for grassland-foraging species (Objectives ASWNC2.4, VPNC2.5, and GNC2.4, associated with CM11). The EIR/EIS should explain how prey abundance would be increased. Are bread crumbs going to be fed to the mice in grasslands? If the EIR/EIS is to be taken seriously, then it needs to include realistic mitigation measures and it needs to tie the measures to measureable objectives related to conserving the special-status species.

Conserve at least 1 acre of Swainson's hawk foraging habitat for each acre of lost foraging habitat (Objective SH1.1, associated with CM3 and CM11). Whereas this measure is consistent with mitigation requirements of the California Department of Fish and Wildlife, the cost of it will be very high. The EIR/EIS needs to show where willing sellers will enable the conservation of this size of an area.

Protect at least 42,275 acres of cultivated lands as Swainson's hawk foraging habitat with at least 50% in very high-value habitat in CZs 2, 3, 4, 5, 7, 8, 9, and (Objective SH1.2, associated with CM3 and CM11). The EIR/EIS needs to explain what composes "high-value" habitat, and as stated above, it needs to demonstrate that 42,275 acres are available to be protected. The EIR/EIS needs to clarify whether protecting cultivated lands means locking in the production of certain crops even when market conditions or water availability might change. This measure seems unrealistic.

Of the at least 42,275 acres of cultivated lands protected as Swainson's hawk foraging habitat under Objective SH1.2, up to 1,500 acres can occur in CZs 5 and 6, and must have land surface elevations greater than −1 foot NAVD88 (Objective SH1.3, associated with CM3). The EIR/EIS should explain the justification of this measure and why it will adequately conserve Swainson's hawk.

Protect at least 10,750 acres of grassland, vernal pool, and alkali seasonal wetland as Swainson's hawk foraging habitat (Objective SH1.4, associated with CM3). The EIR/EIS should identify where these acres will be protected, and it should demonstrate why protecting these acres will conserve Swainson's hawks any more effectively than had these acres not been protected.

Protect and enhance at least 8,100 acres of managed wetland, at least 1,500 acres of which are in the Grizzly Island Marsh Complex (Objective MWNC1.1, associated with CM3). Unless something has changed recently, Swainson's hawks have not lived within the Grizzly Island Marsh Complex. There is only one CNDDB record of Swainson's hawk occurring in this Marsh. This measure appears to be empty and will do very little if anything to conserve Swainson's hawk.

Maintain and protect the small patches of important wildlife habitats associated with 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 CLNC1.3, associated with CM3." The EIR/EIS needs to identify where these patches of habitat occur and it needs to explain how protecting these patches will translate into nesting pairs of Swainson's hawks that will benefit.

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Exhibit B: Center for Biological Diversity, Possible Adoption of Emergency Regulation to Add Tricolored Blackbird to the List of Endangered Species; August 6, 2014 Commission Agenda Item #11 (July 24, 2014) (Separately Attached).

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CENTER for BIOLOGICAL DIVERSITY Because life is good.

working through science, law and creative media to secure a future for all species, great or small, hovering on the brink of extinction.

VIA ELECTRONIC MAIL

July 24, 2014

California Fish and Game Commission
1416 Ninth Street, Room 1320
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Re: POSSIBLE ADOPTION OF EMERGENCY REGULATION TO ADD TRICOLORED BLACKBIRD (*Agelaius tricolor*) TO THE LIST OF ENDANGERED SPECIES (PURSUANT TO SECTION 2076.5, FISH AND GAME CODE); August 6, 2014 Commission Agenda, Item #11.

Dear Commissioners:

This letter provides comments from the Center for Biological Diversity ("Center") on behalf of our members, staff and online activists regarding Item #11 on the August 6, 2014 Commission Agenda, "POSSIBLE ADOPTION OF EMERGENCY REGULATION TO ADD TRICOLORED BLACKBIRD (*Agelaius tricolor*) TO THE LIST OF ENDANGERED SPECIES (PURSUANT TO SECTION 2076.5, FISH AND GAME CODE) (hereinafter "emergency listing for the Tricolored Blackbird").

The Center strongly supports emergency listing for the Tricolored Blackbird in light of the continuing decline in the species populations. Recent survey results show that declines in the number of tricolored blackbirds in California have continued unabated despite voluntary conservation efforts. As reported on the statewide portal hosted by U.C. Davis:

> **Results of the 2014 Tricolored Blackbird Statewide Survey**
> Date: July 18, 2014
>
> The 2014 Statewide Survey was held from April 18-20, 2014. It appears to have been the most comprehensive Statewide Survey ever, with 143 participants surveying for tricolors at 802 locations in 41 counties.
>
> The California population estimate derived from the Survey was 145,000 birds. **This is a 44% reduction from the 258,000 birds seen during the 2011 Survey and a 63% reduction from the 395,000 birds seen during the 2008 Survey.** Thus, **the number of tricolors in California continues a rapid decline.**

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The number of birds declined most markedly in the San Joaquin Valley, where there were 78% fewer birds seen in 2014 than in 2008 (73,482 vs. 340,703), and along the Central Coast, where there were 91% fewer birds seen in 2014 than in 2008 (627 vs. 7014). The number of birds in the Sierra Nevada foothills was up 145% compared to 2008 (54,151 vs. 22,586), and the number of birds seen in southern California was up 126% compared to 2008 (12,386 vs. 5,487).

The 143 participants in the 2014 Statewide Survey deserve a great measure of thanks for their time and efforts. A special thanks to the 38 county coordinators for assembling survey teams with tremendous local knowledge and experience.

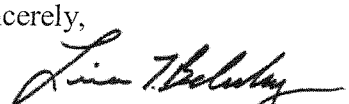
A final report for the 2014 Statewide Survey is in preparation and will be posted to the Portal at the end of July. [1]

As the Commission is aware, the Center petitioned[2] for an emergency listing of the Tricolored Blackbird in 2004 under both the California Endangered Species Act ("CESA") and the Federal Endangered Species Act ("ESA") based on then-already precarious status of the species due to declining populations. The new survey results combined with other factors detailed in the Center's 2004 petition as well as other recent documents, clearly show that the Tricolor Blackbird indisputably warrants listing under CESA and that its status is so precarious an emergency listing is needed. Therefore, the Center fully supports the proposed emergency listing for the Tricolored Blackbird pursuant to CESA and urges the Commission to immediately adopt emergency regulations to list the tricolored blackbird as endangered under California Fish and Game Code Section 2076.5.

Thank you for acting proactively to put this important matter on the Commission agenda for August 6, 2014. We hope to have a representative from the Center at that meeting to speak in support of the emergency listing and who will be available to answer any questions from the Commission.

Please do not hesitate to contact me directly if you have any questions about this matter.

Sincerely,



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1 http://tricolor.ice.ucdavis.edu/content/results-2014-tricolored-blackbird-statewide-survey (emphasis added).
2 (attached and available at http://www.biologicaldiversity.org/species/birds/tricolored_blackbird/pdfs/petition.pdf)

BDCP1734

CENTER FOR BIOLOGICAL DIVERSITY

Protecting endangered species and wild places through science, policy, education, and environmental law.

VIA FEDERAL EXPRESS AND FACSIMILE

April 8, 2004

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Ms. Sandra Morey, Branch Chief
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Re: Petition to list Tricolored Blackbird under the State and Federal Endangered Species Acts and Request for Emergency Action to Protect the Species

This request for immediate protection of the Tricolored Blackbird ("Tricolor;" *Agelaius tricolor*) is submitted on behalf of the Center for Biological Diversity ("Center"). The Center is a non-profit organization dedicated to protecting imperiled species and their habitats by combining scientific research, public organizing, and strategic litigation. The Center has over 9,000 members, many of whom reside and own property in the Central Valley of California, where the largest numbers of Tricolors annually attempt to breed. The Center is extremely concerned about the continued destruction of Tricolor nests on dairy farms and other agricultural lands in the Central Valley and the failure of the responsible agencies to protect active nests and birds in this critical Tricolor nesting habitat. As a result, through this letter, the Center is requesting immediate action by the U.S. Fish and Wildlife Service ("FWS") and California Fish & Game Commission ("FGC") prohibiting or at a minimum delaying harvesting and plowing activities on private lands used for Tricolor breeding during the nesting season. These activities are in clear violation of not only the federal Migratory Bird Treaty Act but also California's Unfair Competition Law, Business & Professions Code Section 17200. Furthermore, these activities are in large part responsible for current precipitous decline of the species that necessitates immediate listing under the state and federal Endangered Species Acts as discussed in detail below.

The Center acknowledges that FWS and California Department of Fish and Game ("DFG") have occasionally engaged in "public/private cooperation" to address the ongoing violations of the applicable statutes and the resultant large-scale nesting failures. For example, in 2000 the agencies

arranged to compensate the Tevelde Farm to delay harvesting on approximately 50 acres in order to permit Tricolors to nest and approximately 20,000 young to fledge (FWS News Release, June 16, 2000), with similar voluntary efforts in other years (Beedy and Hamilton 1997at 20-21). However, while laudable, these measures are only acceptable mitigation measures if they are consistently negotiated and proven effective at significantly reducing Tricolor nest failures. Given that FWS and DFG take the position that crop purchases or reimbursements for delayed harvest are not a feasible long-term solution for Tricolor habitat management on private agricultural lands, the Center is not optimistic that these cooperative methods will be sufficient to reverse the Tricolor's steady decline. Consequently, unless you demonstrate concrete measures will be implemented immediately to protect critical nesting sites on private lands beginning this breeding season (2004), and permanently establish such protective measures in the long-term, other courses of action will be necessary.

In addition, with or without public/private cooperation this nesting season, the Tricolor indisputably warrants listing under both the federal and state Endangered Species Acts as discussed more fully below. As a result, and as described in depth below, pursuant to the Endangered Species Act of 1973, 16 U.S.C. §§ 1531 *et seq.* and the California Endangered Species Act, California Fish & Game Code §§ 2070, *et seq.*, the Center hereby formally petitions the FWS and FGC to list the Tricolored Blackbird, a state and federal species of concern, as "endangered" under the federal and state ESAs, respectively. In addition, the Center hereby requests that FWS and FGC immediately adopt emergency regulations to list the Tricolored blackbird as endangered under 16 U.S.C. Section1533(b)(3)(C)(iii) and (b)(7) and California Fish and Game Code Section 2076.5, respectively.

I. SUMMARY OF LEGAL VIOLATIONS OCCURRING ON PRIVATE AGRICULTURAL LANDS

The Tricolor is declining at an alarming rate in large part due to the harvest of grain dairy silage and other agricultural grain crops and routine plowing of weedy fields throughout most of its range. Every year, thousands of pairs of Tricolors unsuccessfully nest on agricultural lands because their eggs and nests are destroyed during harvest or weed abatement activities. This wholesale destruction of Tricolor nests is threatening the survival of this species. Because these activities are contributing annually to significant breeding failure, efforts to reduce and reverse population decline necessitate that FGC, DFG, FWS, and citizen enforcers ensure that private parties comply with the governing laws.

While the Tricolor is considered a non-game bird of management concern by FWS, this designation does not provide any specific legal protection to the species. The Tricolor is also designated a species of special concern by DFG and theoretically must be considered during project actions subject to the California Environmental Quality Act ("CEQA"). However, this status does not protect the species from activities that do not trigger CEQA's environmental review requirements, and even when considered, CEQA's substantive mandates for environmental protection have not been implemented with regards to protection of the Tricolor.

Furthermore, while the species is theoretically afforded protection under the federal Migratory Bird Treaty Act ("MBTA"), the statute is rarely if ever enforced against private property owners who are in blatant violation of its provisions. Congress enacted the MBTA for the express purpose of making protections afforded migratory birds "effective and enforceable by the courts." H.R. Rep. No. 65-243, at 1 (1918). The statute was intended to protect the birds from all forms of unauthorized harm. *See, e.g.*, 56 Cong. Rec. 7448 (June 6, 1918) (Statement of Rep. Robbins). The statute implements this intent by strictly prohibiting all "taking" of migratory birds unless authorized by a permit issued

pursuant to Department of Interior regulations. *See* 50 C.F.R. § 10.13 (list of migratory birds protected by MBTA). The language of Section 703 of the MBTA is unequivocal:

> Unless and except as permitted by regulations made as hereinafter provided in this subchapter, it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill . . . any migratory bird . . . included in the terms of the [conventions between the United States and Great Britain, Mexico, Japan, and Russia].

16 U.S.C. § 703. "Take" is defined as to "pursue, hunt, shoot, wound, kill, capture, or collect," or attempt to do so. 50 C.F.R. § 10.12. By crushing Tricolor nests, private property owners are in clear violation of the MBTA and its implementing regulations.

Private property owners are not only violating the MBTA, but those with dairies or other commercial agricultural operations on their property also are in violation of the California Business & Professions Code Section 17200, *et seq*. The Code defines "unfair competition" to include "unlawful, unfair or fraudulent business practice and unfair, deceptive, untrue or misleading advertising." A business practice constitutes unfair competition if it is forbidden by any law, whether civil or criminal, federal, state, or municipal, statutory, regulatory, or court-made. As the California Supreme Court has determined, Business & Professions Code Section 17200 treats other laws committed pursuant to a business activity as unlawful practices independently actionable under Section 17200 and subject to the distinct remedies provided by the Code. The remedies authorized for violation of Section 17200 are cumulative to each other and to any other remedies available elsewhere in the law. Business & Professions Code Section 17200 serves a completely different purpose than the underlying statutory or regulatory violation upon which the Section 17200 claim is based. As a result, private business owners who are destroying Tricolor nests are vulnerable to enforcement actions under both the MBTA and the California Business & Professions Code.

II. THE TRICOLORED BLACKBIRD WARRANTS LISTING UNDER THE FEDERAL AND CALIFORNIA ENDANGERED SPECIES ACTS

The Tricolor is a colonial-nesting passerine largely endemic to California. The geographic range of Tricolors is generally restricted to California's Central Valley and surrounding foothills, and sparsely throughout coastal and inland locations north of the Central Valley and in southern California (Beedy and Hamilton 1999). California supports more than 99% of the population, but the species has also been reported in small numbers in southern Oregon and northernmost western coastal Baja California with rare reports in western Nevada, and central Washington (Beedy and Hamilton 1997, 1999; DeHaven 2000).

The Tricolor is sympatric with and morphologically similar to the Red-winged Blackbird ("Red-wing;" *A. phoeniceus*). However, unlike Red-wings, Tricolors breed in dense colonies, often traveling long distances to forage for their chicks, and males defend relatively smaller territories within their colonies, mating with one to several females per year (Beedy and Hamilton 1999). The overall distribution and location of nesting sites vary from year to year, and Tricolors are itinerant breeders (i.e., they may nest more than once at different locations during the breeding season) (Hamilton 1998).

Tricolors form the largest colonies of any North American land bird, and breeding colonies may consist of tens of thousands of birds at a single site. While Tricolor colonies can number in the thousands giving an appearance of high abundance to casual observers, the status of the bird is of

concern because the overall population has declined dramatically over the past 70 years, its geographical range is restricted, and its gregarious nesting behavior renders colonies vulnerable to large-scale nesting failures due to widespread destruction of active nests in its agricultural habitats and high levels of predation in its little remaining native emergent marsh habitat (predominately cattails (*Typha* spp.) and bulrushes (*Scirpus* spp.)). Every year, Tricolors experience large losses of reproductive effort to crop-harvesting and other agricultural activities, and predation, and suffer habitat losses to land conversions from rangeland to vineyards, orchards, and urban development and possibly to direct efforts to remove the birds from private property (Liz Cook, pers. comm.). These serious threats continue today.

Beginning in the 1930s and continuing until 2000, five major studies have estimated population abundance of Tricolors (Neff 1937; DeHaven et al.1975; Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000). These studies clearly and unequivocally demonstrate a precipitous decline in the population of Tricolors in the Central Valley, the historical stronghold of the species, and elsewhere. The population of Tricolors in the Central Valley declined by at least 50% between the 1930's and early 1970's (DeHaven et al. 1975), and an additional decline of approximately 56% of the remaining population was reported from 1994 to 2000 (Hamilton 2000). Population censuses sponsored by FWS and DFG in the 1990's and 2000 indicate that within a decade, the Tricolor declined from an estimated 370,000 in 1994 to 240,000 in 1997 and 162,000 in 2000 (Hamilton 2000).

A. Description, Taxonomy, and Natural History

1. Species Description

The Tricolor is medium-sized and sexually dimorphic, breeding in dense colonies largely in California's Central Valley, Coast Ranges, and southern California (Beedy and Hamilton 1999). Total length ranges from 18-24 cm, and body mass ranges from 40-70 g depending on the season (Beedy and Hamilton 1999).

The sexes of the Tricolor differ in size, plumage and behavior. Beedy and Hamilton (1999) offered a detailed description of the species:

> "In general, males are larger than females; have striking red, white, and black plumage; and display when breeding. Adult males are entirely black with a blue gloss in full sunlight, with bright brownish-red lesser wing coverts forming a red patch on the epaults (wing shoulder), and median coverts buffy (August-February) to pure white (February-July), depending on the season. Adult females are mostly black with grayish streaks, relatively whitish chin and throat (rarely with faint pinkish or peach wash), and small but distinct reddish shoulder patch. Immature males are similar to adult males but with duller black plumage mottled with gray (August-March), becoming almost entirely dull black (April-June), and with shoulder patch mixed with black (August-March only). Immature females are similar to adult females but the wing lacks the reddish patch. Immatures of both sexes usually retain some brownish or grayish underwing coverts, which contrast with newer adjacent black feathers. Juveniles of both sexes (April-August) are similar to adult females, but much paler gray and buff."

The plumage of the Tricolor and Red-wing is so similar that museum specimens are sometimes misidentified (Orians 1961a). The adult male Tricolor has a bluish luster to its black plumage, and the red of the epaults is a dull crimson in contrast to the bright scarlet of the male Redwing (Orians 1961a). Both sexes of Tricolors are distinguished from Red-wings by bill shape, tail shape, and primary

feathering formula; the outermost primary (P9) is longer than P6 in Tricolors and shorter in Red-wings (Beedy and Hamilton 1999). In addition, Tricolors have longer outer primaries, creating a narrower and more pointed wing shape than other blackbirds (Beedy and Hamilton 1999). The most conspicuous feature of the male plumage is the broad white border to the middle wing coverts (Orians 1961a). In most races of the Red-wing these feathers are tipped with buffy, but in those races occupying the central Coast Ranges and Central Valley of California, where the Tricolor is most abundant, these feathers are black so that the wing lacks the light-colored stripe (Orians 1961a). Orians (1961a) noted that "...This plumage difference between males is not only conspicuous to the human observer, it is the most important means of species identification used by the birds themselves. Occasional Redwings in a flock of Tricolors are singled out for special attack by a resident male Redwing in whose territory the flock lands." Orians (1961a) also described the difference between female Tricolors and Red-wings: "...In general, female Tricolors are more uniformly sooty than female Redwings, there being less contrast between throat and breast. In the autumn, female Redwings are strongly tinged with rusty on the back, a feature never shown by the female Tricolor." Females of both species are more difficult to distinguish because, although female Tricolors are darker than most races of the female Red-wing, female Red-wings are actually the darkest in the region of distributional overlap. Interestingly, there appears to be a convergence of female plumage where the two species overlap, in contrast to a divergence of plumage in the males (Orians 1961a).

Sexual dimorphism in size is less in the Tricolor than in the Red-wing. Male Tricolors are smaller than male Red-wings in wing, tail, tarsus, and bill depth, but are larger in culmen, whereas female Tricolors are larger than female Red-wings in wing, tail, tarsus, and culmen, but are smaller in bill depth (Orians 1961a). This longer, narrow bill of the Tricolor is one of the most reliable morphological differences between the species (Orians 1961a).

Flight of the Tricolor consists of long, shallow undulations and flocks tend to be compact (Beedy and Hamilton 1999).

2. Taxonomy

Mitochondrial DNA (cytochrome *b*) studies indicate that the nine *Agelaius* species are a polyphyletic assemblage of ecologically similar species (Beedy and Hamilton 1999). Red-winged and Tricolors were found to be sister taxa; in turn these species are sister to Tawny-shouldered blackbirds (*A. humeralis*) and Yellow-shouldered Blackbird (*A. xanthomus*) found in the Caribbean (Beedy and Hamilton 1999).

3. Habitat Use and Home Range

Within the Central Valley, DeHaven et al. (1975) documented breeding colonies in the rice-growing regions of the Sacramento Valley and in the pasturelands of the lower Sacramento Valley and San Joaquin Valley. In the rice lands, the annually flooded rice was the dominant crop, but small grains, hay, safflower, sugar beets, corn, and beans were also grown. The pasturelands consisted largely of irrigated fields of introduced grasses, alfalfa, hay, and small grains. In both areas, insects in flooded fields probably provide the primary food for breeding Tricolors. Colonies outside the Central Valley were found in a diverse array of habitat types, including within chaparral covered hills (Riverside and Colusa Counties), orange and avocado groves interspersed with grass-covered hills (San Diego County), sagebrush grasslands (Siskiyou County), and salt-marsh habitat of San Francisco Bay (Alameda County) (DeHaven et al. 1975).

Historically, nesting substrate consisted mostly of native emergent marsh vegetation (Table 1). Neff (1937) documented about 93% of nests in cattails, bulrushes and willows (*Salix* spp.). Orians (1961a) found 64% of colonies in the Sacramento Valley nesting in cattails and other emergent vegetation; other nests were in agricultural fields, and one colony nested in trees along a river. DeHaven et al. (1975) reported that about 69% of colonies had nests built in marsh vegetation including cattails, bulrushes, willows, or some combination, and 49% were in cattails only.

TABLE 1. Proportions of colonies and individuals of Tricolored Blackbirds by predominately used nesting substrates in the 1930's, 1970's, 1994 and 2000. Source: Cook and Toft (in review)

	1932-34		*1968-72*		*1994*		*2000*	
	Percent of							
nesting substrate	*colonies*	*birds*	*colonies*	*birds*	*colonies*	*birds*	*colonies*	*birds*
emergent marsh	94.8	92.7	69.7	[a]	47.4	25.7	59.6	54.0
Himalayan blackberry	1.3	0.1	16.1	[a]	31.4	20.8	20.2	11.5
silage	0.0	0.0	0.0	[a]	5.1	40.2	5.8	16.7

Data from 1932-1934 are from Neff (1937), Sacramento Valley and northern San Joaquin Valley. Data from 1968-1972 are from DeHaven et al. (1975), statewide. When nesting substrate vegetation was mixed, the predominant vegetation was used to categorize the nesting substrate. Percent of colonies and birds are for all colonies located throughout the breeding season.

[a] *Data are not available*

In recent decades some of the largest Tricolor colonies have been found in silage and other grain fields in the San Joaquin Valley (Collier 1968; Hamilton et al. 1995; Beedy and Hamilton 1999). In 1994 approximately 40% of all breeding birds located throughout the nesting season were found in silage (Cook and Toft, in review) (Table 1). Approximately 47% nested in native emergent marshes and 31% in thickets of the introduced Himalayan blackberry (*Rubus discolor*). Approximately 17% of the breeding effort of the much smaller 2000 population occurred in silage. During this year about 54% of nesting was in emergent marsh and 12% in Himalayan blackberry. Additional colonies nested in other flooded and upland habitats.

Tricolors are nomadic and highly colonial, and males defend relatively small territories within the colony (Orians and Collier 1962). Territories average about 35 square feet, or 1.8 m^2 to 2.35 m^2 in size, and one to three females construct nests within these small territories (Orians and Collier 1962; Beedy and Hamilton 1999). Unlike Red-wings, who gather food on and adjacent to their territories which average about 500-30,000 square feet in size, Tricolors do not forage on their territories but exploit the area around the colony (Orians and Collier 1962; *see* "Food Habits" below).

Itinerant breeding of Tricolors suggests that they may be philopatric to more than one nesting site (Beedy and Hamilton 1999). Hamilton et al. (1995) found that 19 of 72 (26%) colonies used the same nesting sites during surveys conducted between 1992 and 1994. Eleven (15%) colonies in 1994 repeated either their 1992 or 1993 nesting location but not both. These results may indicate a low to moderate degree of site tenacity and/or that suitable breeding habitat is limited (Cook and Toft, in review). The yearly shifts in breeding distribution of Tricolors are likely related to insect supplies and other, unknown, breeding requirements (DeHaven et al. 1975).

4. *Food Habits*

Tricolors are opportunistic foragers, taking any locally abundant insect including grasshoppers (Orthoptera), beetles and weevils (Coleoptera), caddis fly larvae (Trichoptera), moth and butterfly larvae (Lepidoptera), dragonfly larvae (Odonata), and lakeshore midges (Diptera), as well as grains, snails, and small clams (Beedy and Hamilton 1999). In earlier studies Tricolors were described as grasshopper followers (Orians 1961b; Payne 1969) and losses of grasslands and reduced grasshopper abundance may have contributed to the decline of the Tricolor population observed between the 1930s and 1970s (Crase and DeHaven 1977). Recently, however, grasshoppers have been abundant enough locally to support some large Tricolor colonies. Grasshoppers appeared to be the predominant food fed to nestlings in every year of studies in Sacramento County after about April (Liz Cook, pers. comm.). Notably, foraging distances were shorter and reproductive success was highest on average there compared to other regions in the state during the early 1990s prior to the near extirpation of Tricolors from the area.

Tricolors forage in all seasons in pastures, dry seasonal pools, agricultural fields including alfalfa with continuous mowing schedules, rice fields, feedlots, and dairies (Beedy and Hamilton 1997). The birds will also forage in riparian scrub, saltbush (*Atriplex* spp.) scrub, borders of marshes, and grasslands. They do not forage regularly in weed-free row crops and intensively managed orchards and vineyards (Beedy and Hamilton 1997). Rangeland that is not heavily grazed is also important foraging habitat for Tricolors in some portions of their range (Cook 1996).

During nesting, Tricolors tend to forage away from their nest sites, at distances usually ranging from within sight of the colony up to 5 km away (Orians 1961a), with occasional forays of up to 13 km from the colony (Beedy and Hamilton 1997), although sustained short-distance foraging within sight of the colony is also observed (Cook 1996). There are some indications that the size of the foraging arena may correlate to nestling starvation as adults travel longer distances to find food (Liz Cook, pers. comm.).

Only a portion of the area within commuting distance from the nest is used for foraging. Many unsuitable areas, including cultivated row crops, orchards, vineyards, and heavily grazed grasslands, are associated with high-quality Tricolor foraging habitat such as irrigated pastures, lightly grazed rangelands, dry seasonal pools, mowed alfalfa, fields, feedlots, and dairies (Beedy and Hamilton 1999). Wintering Tricolors in the Sacramento Valley appear to forage heavily on the seeds of plants such as rice, grains, and weeds (Crase and DeHaven 1978).

Orians (1961a) demonstrated that the Tricolor's colonial social structure is more energetically demanding than the territorial structure of the Red-wing due to the high energetic requirements of flying back and forth from distant feeding sites when foraging for young. Tricolors require food supplies that can be rapidly exploited once they reach the feeding site. Thus, the species has an unpredictable breeding distribution and has poorer reproductive success than the Red-wing in unfavorable years (Orians and Collier 1962).

5. *Reproduction*

Males begin singing as early as late February. Nesting is initiated in late March to early April, primarily in the San Joaquin Valley, and again in May to June in the rice-growing region of Sacramento Valley and foothill areas (Hamilton 1998, Beedy and Hamilton 1999). Male Tricolors may arrive before females at the colony sites, but sometimes by less than one day, and sometimes both

sexes arrive together and begin breeding activity the same day (Beedy and Hamilton 1999). Dense concentrations of birds will gather and suddenly fly to another place, changing locations frequently and then returning to potential nest sites. This is described as "prospecting behavior" (Beedy and Hamilton 1999). Requirements for breeding colony sites are accessible water, protected nesting sites such as flooded or spiny, urticating, or otherwise armored vegetation, and adequate amounts of suitable foraging areas within a few kilometers of the nesting colony (Beedy and Hamilton 1997). Most adults at a colony site begin nesting 12–17 days after prospecting begins. When Tricolors arrive at a breeding site, previously established breeding Red-wings and Yellow-headed (*Xanthocephalus xanthocephalus*) blackbirds may be excluded from territories by extremely large numbers of Tricolors.

Females construct their nest within the small territory of the male, and one male will breed with 1–4 females (Beedy and Hamilton 1999). Extreme synchrony is characteristic of most colonies of Tricolors — even in colonies of up to 100,000 nests, all eggs may be laid within one week (Orians 1961a). Males do not assist with nest construction or incubation, but do assist with food gathering and feeding of the young.

During the breeding season, Tricolors exhibit itinerant breeding; individuals often move after their first nesting attempts and breed again at a different geographical location (Hamilton 1998). At some colonies a second wave of nesting follows fledging of the initial cohort (Beedy and Hamilton 1999).

6. Survival and Mortality

Band recovery data suggest that Tricolors live at least 13 years, although no studies of annual survival rates have been conducted (Beedy and Hamilton 1997). Causes of mortality include exposure to inclement weather (Cook 1996); predation (see "Disease and Predation," *supra*); starvation and possible brood reduction via removal of live chicks from nests by females (Hamilton et al. 1995); competition with other species, including Great-tailed Grackles (*Quiscalus mexicanus*) which are aggressive towards Tricolors and may represent a serious future threat (Beedy and Hamilton 1999); agricultural contaminants (see "Other Natural or Anthropogenic Factors," *infra*); and wide-spread destruction of nesting substrate during the nesting season that results in direct mortality of nestlings (see "Present Or Threatened Destruction, Modification, Or Curtailment Of Habitat Or Range," *infra*).

B. Range and Distribution

1. Species Range

The range of the Tricolor has largely been restricted to southernmost Oregon and the Modoc Plateau of northeastern California, south through the lowlands of California west of the Sierra Nevada to northwestern Baja California (Neff 1937; Orians 1961a; DeHaven et al. 1975; Beedy and Hamilton 1999; *see* Figure 1). Beedy also notes some rare reports from Nevada and Washington (Beedy and Hamilton 1999). The elevational range of the Tricolor is documented to extend from sea level to approximately 4,000 ft in Shasta County to 4,200 ft on Klamath Lake (Neff 1937).

Within its range, the species is nomadic and highly colonial; large flocks appear suddenly in areas from which they have been absent for months, they breed, and then quickly withdraw (Orians 1961a). In one season nesting colonies have been found widely scattered, and in another there have been great concentrations in relatively restricted districts (Neff 1937). The size and location of colonies vary from year to year, although certain sites are regularly used (Orians 1961a, Hamilton et al.

1995, Cook 1996, Hamilton 2000).

2. Historical Distribution

Historically, rivers flowing into the Central Valley would flood and create extensive marshes, providing abundant breeding habitat for Tricolors and other wetland-dependent species. In the 19th century, autumn flocks of thousands of Tricolors were described in the Shasta area, and a wintering flock observed in Solano County "...numbering so many thousands as to darken the sky for some distance by their masses," (Baird 1870 *in* Beedy and Hamilton 1999). J. G. Cooper noted that the Tricolor was "the most abundant species near San Diego and Los Angeles, and not rare at Santa Barbara," (Baird 1870 *in* Beedy and Hamilton 1999).

The first systematic range-wide surveys of the population status and distribution of the Tricolor were conducted by Neff (1937). These surveys found Tricolor breeding colonies in at least 26 counties in California, although the survey of the range was still incomplete. Neff (1937) estimated abundance at 252 colonies, mostly associated with freshwater emergent wetlands in rice-growing areas of California, and numerous very large colonies were reported (see "Population Status and Trends," *infra*).

Population surveys and banding studies carried out from 1969–1972 by DeHaven et al. (1975) found 168 breeding colonies at 113 locations, each at least 1.6 km apart. About 78% (131) of the colonies were in the Central Valley, with 80 in the Sacramento Valley and 51 in the San Joaquin Valley. The remaining 22% (37) of colonies were in other parts of California and in southern Oregon. The counties where the most colonies were found in a single season were Sacramento, Merced, Stanislaus, Glenn, and Colusa.

The survey results from DeHaven et al. (1975) indicated that the geographic range and major breeding areas of the species had not changed since the first surveys were conducted by Neff in 1937. However, DeHaven et al. (1975) found fewer colonies, fewer non-breeding Tricolors, no nesting areas even approaching the size of some of the previously reported colonies, fewer birds in the largest colonies, and fewer total Tricolors. These results are discussed in detail under "Population Status and Trends," *infra*.

It is worth noting that even the earliest surveys had been conducted after most of the Central Valley's wetlands were already lost. Thus, the historical distribution and population abundance of Tricolors prior to the profound and widespread loss of their native wetland and grassland habitats are unknown.

3. Current Distribution

Since 1980, active Tricolor breeding colonies have been observed in 46 counties in California, and most of the largest colonies are still located in the Central Valley (Beedy and Hamilton 1999). The species currently breeds throughout the Central Valley west of the Cascade Range and east of the Sierra Nevada (into the foothills), and southeastern deserts from Humboldt and Shasta Counties, south to extreme southwestern San Bernardino County, western Riverside County, and western and southern San Diego County. Breeding also occurs in marshes of the Klamath Basin in Siskiyou and Modoc Counties, Honey Lake Basin in Lassen County and in some central California coastal counties.

Outside California, the Tricolor has bred in southern Klamath and southern Jackson Counties and in northeast Portland (Multnomah County), near Clarno and Wamic (Wasco County), at the John Day Fossil Beds National Monument (Wheeler County), near Stanfield (Umatilla County), and at Summer Lake (Lake County). A small colony reportedly nested in Grant County, Washington in 1998, and small colonies were identified in Douglas County, Nevada and in northern Baja California (Beedy and Hamilton 1999). Few, if any, reports of Tricolors nesting outside of California have been submitted since 1999.

In 1991 researchers at the University of California at Davis (UCD) initiated a large-scale study of Tricolors, investigating size and location of colonies, nesting habitat characteristics, behavior, reproductive success as correlated with habitat type and patterns of land ownership. This study was expanded in 1994 to include a FWS and DFG sponsored range-wide population census led by the UCD researchers and including a volunteer base of experienced local ornithologists. The results of this census and additional season long survey data are reported in Hamilton et al. (1995). Census participants located an estimated 369,359 individuals nesting in 74 colonies in 32 California counties, with breeding occurring in 26 counties (Figure 2). In 1994, the largest Tricolor colonies were found in Merced, Colusa, Tulare, Glen, Kern, Sacramento, and Yuba Counties (Beedy and Hamilton 1997).

Annual population censuses were henceforth attempted in 1995 and 1996 but efforts and methods were not comparable to those of 1994. A second comparable census and additional season long surveys were conducted in 1997 using the same coverage, methods, and surveyors as in 1994 (Beedy and Hamilton 1997). Census results included a total of 232,960 breeding and non-breeding Tricolors in 32 California counties, including 50 non-breeding adults in Klamath County, Oregon, and 950 breeding adults in northwestern Baja California.

In 1997, the largest Tricolor colonies were found in Colusa, Tulare, Kings, Riverside, Kern, Sacramento, and San Joaquin Counties (Beedy and Hamilton 1997). The two largest observed colonies during the 1997 breeding season were found in Colusa and Tulare Counties. The Colusa County colony formed in May, after the volunteer survey ended, by birds that probably nested elsewhere earlier on in the season. Interestingly, in 1997, a wetland created in 1994 in Hemet, Riverside County, hosted a colony of about 23,300 nests, representing a large increase in the southern California total compared with the 1994 survey.

The last comparable census and additional season long survey work, including methods and effort comparable to those of 1994 and 1997, was conducted in 2000. During the 2000 census, 162,508 individual Tricolors and 25 colonies were located with the largest colonies occurring in Tulare, Merced and Riverside counties. The largest colonies located throughout the breeding season were in Tulare, Merced, Riverside and Colusa counties. It is notable that the large colonies that formed in Sacramento county in the early 1990s (including 1994) have been absent in surveys conducted between 1997 and 2003 (Liz Cook, pers. comm.).

Table 2 below describes the distribution and population estimates of breeding and non-breeding individual Tricolors throughout their range during the population censuses of 1994, 1997 and 2000.

TABLE 2. Summary Comparison of Tricolored Blackbird Censuses Conducted in Late April 1994, 1997 and 2000. Sources: Beedy and Hamilton 1997 and Hamilton 2000.

	1994			1997			2000		
Region and County	Breeding	Non-breeding	Total	Breeding	Non-breeding	Total	Breeding	Non-Breeding	Total
Sacramento Valley									
Colusa	25	2	27	100	4,075	4,175	2,500	0	2,500
El Dorado	0	0	0	200	0	200	0	0	0
Glenn	2,000	0	2,000	0	0	0	0	0	0
Placer	1,000	0	1,000	430	228	4	6,200	0	6,200
Sacramento	93,225	803	94,028	25,730	5,608	31,338	12,275	4,108	16,383
Sutter	35	200	235	0	0	0	200	0	200
Tehama	0	0	0	35	0	35	0	0	0
Yolo	400	75	475	200	0	200	880	0	80
Yuba	0	597	597	0	950	950	0	0	0
Butte	N/a	N/a	N/a	N/a	N/a	N/a	5,035	399	5,434
Subtotal	96,685	1,677	98,362	26,695	10,861	37,556	26,290	4,507	30,797
San Joaquin Valley									
Calaveras	0	0	0	8,253	60	8,313	260	500	760
Fresno	21,150	0	21,150	2,500	50	2,550	5,046	15	5,061
Kern	70,600	1,655	72,255	16,950	50	17,000	10,600	50	10,650
Kings	0	10,000	10,000	33,300	0	33,300	10,000	0	10,000
Merced	60,100	19,000	79,100	12,500	500	13,000	25,980	1,120	27,100
San Joaquin	13,750	2,228	15,978	11,750	107	11,857	7,008	65	7,073
Stanislaus	2,500	1,428	3,928	150	0	150	0	15	15
Tulare	50,000	0	50,000	53,500	2,000	55,500	53,300	0	53,300
Subtotal	218,100	34,311	252,411	138,903	2,767	141,670	112,194	1,765	113,959
San Francisco Bay and Delta									
Alameda	20	4	24	1,200	0	1,200	0	0	0
Contra Costa	400	0	400	0	0	0	0	0	0
Marin	0	400	400	0	0	0	0	0	0
Napa	11	0	11	350	50	400	104	0	104
Santa Clara	3,350	150	3,500	550	0	550	0	0	0
Solano	0	5	5	37	38	75	0	0	0
Subtotal	3,781	559	4,340	2,137	88	2,225	104	0	104
North Coast									
Humboldt	100	0	100	32	0	32	0	0	0
Lake	0	0	0	0	60	60	0	0	0
Mendocino	0	0	0	12	0	12	0	0	0
Sonoma	0	30	30	0	0	0	0	0	0
Subtotal	100	30	130	44	60	104	0	0	0
Central Coast									
Monterey	2,200	20	2,220	5,500	400	5,900	955	63	1,018
San Luis Obispo	0	0	0	660	0	660	500	500	1,000
Santa Barbara	2,000	0	2,000	0	0	0	0	0	0
San Benito	0	0	0	460	318	778	702	718	1,420
Santa Cruz	N/a	N/a	N/a	N/a	N/a	N/a	200	0	200
Subtotal	4,200	20	4,220	6,620	718	7,338	2,357	1,281	3,638

Southern California									
Los Angeles	755	60	815	430	0	430	510	100	610
Orange	1,000	34	1,034	231	0	231	490	5	495
Riverside	2,100	75	2,175	37,950	406	38,356	10,000	0	10,000
San Bernardino	0	0	0	300	0	300	0	0	0
San Diego	2,000	0	2,000	3,178	58	3,236	1,310	711	2,021
Ventura	90	0	90	0	0	0	0	0	0
Subtotal	5,945	169	6,114	42,089	464	42,553	12,710	991	13,701
Northeast Interior									
Lassen	0	0	0	0	6	6	300	9	399
Modoc	0	250	250	0	250	250	0	0	0
Shasta	2,500	85	2,585	0	0	0	0	0	0
Siskiyou	400	547	947	250	0	250	0	0	0
Subtotal	2,900	882	3,782	250	256	506	300	9	399
Oregon									
Klamath	0	0	0	0	50	50	N/a	N/a	N/a
Nevada									
Douglas	0	0	0	8	0	8	N/a	N/a	N/a
Mexico									
Baja California	0	0	0	950	0	950	N/a	N/a	N/a
TOTAL	**331,711**	**37,648**	**369,359**	**217,696**	**15,264**	**232,960**	**153,955**	**8,553**	**162,508**

The largest numbers of breeding Tricolors were historically found in the Central Valley; Orians (1961a) and DeHaven et al. (1975) reported that the species' center of breeding abundance and the largest colonies were in this region. In 1994 and 1997, more than 75% of all breeding adults were located there (Beedy and Hamilton 1997). In 2000 approximately 70% of the population was located in the Central Valley (Hamilton 2000). A comparison of historical and current distribution of the species shows that in some portions of their range, Tricolors have declined or been eliminated (Beedy and Hamilton 1997). Local near or complete extirpation has occurred in portions of the Central Valley where the species was once abundant, such as Yolo County and Sacramento County, and many historical sites in coastal southern California counties, including Santa Barbara, Ventura, Los Angeles, Orange, and San Diego Counties (Beedy and Hamilton 1997).

C. Population Status and Trends

Beginning in the 1930s and continuing until 2000, five major studies have estimated population abundance of Tricolors, providing a clear assessment of a dramatic population decline over time (Neff 1937; DeHaven et al.1975; Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000). DeHaven et al. (1975) concluded that population size of Tricolors in the Central Valley had declined by at least 50% during the 1970s compared to the 1930s. The population censuses sponsored by FWS and DFG between 1994 and 2000 indicate that the Tricolor population has continued to decline; numbers of birds fell from an estimated 370,000 in 1994 to 240,000 in 1997 and 162,000 in 2000 (Hamilton 2000; Table 2).

1. Historical Population Estimates

As stated *supra*, the first surveys and population estimates for Tricolors were instigated by Neff in the early 1930s. During the 1960s, other researchers focused their studies on ecology and behavior

of the species (e.g., Orians 1960, 1961a, 1961b; Orians and Collier 1962; Payne 1969), but did not provide range-wide population estimates. DeHaven et al. (1975) conducted a second set of more comprehensive range-wide surveys to determine changes in the population status of Tricolors since Neff's work in the 1930s. Results from these surveys are reported in detail below.

Neff (1937) — From 1930 to 1936, Neff (1937) estimated the population of Tricolors using several methods. The author and cooperators checked the active population of colonies numerous times by conducting flight-line counts (i.e., counting the birds flying in or out across a base line for five minutes); checking distance from base line to feeding ground or nesting site, and estimating probable time required for each trip. Nests were counted by walking into a colony at random and counting each nest that could be seen, and then extrapolating to the colony size. Generally, numbers of nests rather than adult population size were reported.

Based on number of nests reported and multiplying by 1.5 (mean estimated sex ratio of 2 females per male), Beedy and Hamilton (1997) calculated that the surveyors in the 1930s observed as many as 736,500 adults per year in just 8 counties. Neff (1937) documented numerous large colonies, including one in 1934 in Glenn County that contained about 200,000 nests (300,000 breeding adults), over an area greater than 24 ha. Several other colonies in Sacramento and Butte Counties contained more than 100,000 nests. Hamilton et al. (1995) calculated that Neff observed at about 1,105,100 individual Tricolors. Neff, however, concentrated most of his effort in the Sacramento Valley so many have underestimated total population size at the time.

DeHaven et al. (1975) — In 1969 and 1970, DeHaven et al. (1975) surveyed the Central Valley Tricolor breeding range by car; in 1971, the entire breeding range (excluding Baja California) was surveyed. In 1972, the authors surveyed from the northern San Joaquin Valley to southern Oregon. Additional information was provided to the authors by volunteer ornithologists. Population estimates were made by counts and by projections based on research findings that each Tricolor female attends one active nest and the colony supports on average two females for every male, depending on timing within the breeding season.

DeHaven et al. (1975) estimated the number of breeding birds at 157 colonies. Of these, 40 colonies (25%) had fewer than 1,000 birds, 97 colonies (62%) had from 1,000 to 10,000 birds, and 20 colonies (13%) had more than 10,000 birds. All colonies outside the Central Valley contained fewer than 10,000 Tricolors. As stated *supra* in "Range and Distribution," DeHaven et al. (1975) found fewer colonies, fewer non-breeding Tricolors, no nesting areas even approaching the size of some of the previously reported colonies, fewer birds in the largest colonies, and fewer total Tricolors than Neff (1937). Overall, DeHaven et al. (1975) concluded that the population of Tricolors has likely been reduced by more than 50% below levels reported in the 1930s, and that downward trajectory was continuing.

2. Recent Population Estimates

Beedy et al. (1991) summarized all historical and recent breeding accounts, including unpublished observer reports from a variety of sources. Based upon this information they concluded that the Tricolor had declined further from population estimates by DeHaven et al (1975), and that this decline was coincident with continuing losses of wetland habitats in the Central Valley. They reported a range of about 35,000-110,000 breeding adults per year in the 1980s, with an approximate average of 52,000 breeding adults reported per year in that decade (from Beedy and Hamilton 1997).

Unfortunately their population estimates were not based well enough on field surveys so can not be considered adequate for evaluating the population for the period addressed.

The most reliable recent, range-wide population estimates for breeding Tricolors are from the three comprehensive censuses conducted in 1994, 1997, and 2000 (Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000). Each of these censuses employed similar methodology: Tricolors were intensively surveyed on the third weekend in April throughout the breeding range of the species. As mentioned under "Range and Distribution," *supra*, this research was cosponsored by FWS and DFG to study Tricolor population status, including investigating size and location of colonies, nesting habitat characteristics, behavior, reproductive success as correlated with habitat type, patterns of land ownership, and total population size and distribution. The censuses were coordinated by experienced Tricolor researchers at UCD and included these researchers in addition to numerous local volunteer ornithologists and agency personnel as participants. UCD researchers often provided follow-up confirmation of the larger volunteer-reported colonies.

Census results indicate that the number of Tricolors plummeted from an estimated 370,000 in 1994, to 240,000 in 1997, and 162,000 in 2000 (Hamilton 2000). These population data suggest a decline of 56% during the 1990s alone. Fewer colonies were located in 2000 than in 1994 (Hamilton 2000) and colonies were smaller on average in 2000 compared to 1994 (Cook and Toft, in review). Results from the 1994, 1997 and 2000 censuses are reported in detail below.

Hamilton et al. (1995) — The total number of Tricolors located during the 1994 census was estimated to be 369,359 individuals (Table 2). This suggests a decrease in population abundance of at least 50% (and probably more) based on Neff's (1937) results between the 1930's and early 1990's. The ten largest colonies located during the census and additional full season range-wide surveys in 1994 included 60.5% of all breeding individuals, pointing to the importance of protecting large breeding colonies and their nesting and foraging habitat, if the species is to be conserved. Importantly, full season survey results indicated that 70% of all Tricolor nests and 86% of all foraging by nesting birds occurred on private agricultural land in 1994 (Hamilton et al. 1995). Approximately 54% of all observed Tricolor nesting efforts were associated with crops (primarily silage at dairies) (Beedy and Hamilton 1997).

Beedy and Hamilton (1997) — The total number of Tricolors located during the 1997 census was estimated to be 232, 960 individuals (Table 2). This suggests a decrease in the population by approximately 37% between 1994 and 1997. Population declines were most apparent in the species' historical stronghold in the Central Valley, including Sacramento, Fresno, Kern, and Merced Counties. Approximately 75% of all breeding adults located during the census were concentrated within the 10 largest colonies.

Hamilton (2000) — The total number of Tricolors located during the 2000 census was estimated to be 162,508 individuals (Table 2). This suggests an additional decrease in the population by approximately 30% between 1997 and 2000 and an overall decline of approximately 56% between 1994 and 2000. Reliability of the censuses to estimate the Tricolor population almost certainly increased over time because the number of participants grew and participants were better informed about colony locations in each succeeding year (Hamilton 2000). Hamilton (2000) states "...the method of the Census and the survey, to reinvestigate all known breeding places and to search for new ones, has become an increasingly complete assessment of Tricolored Blackbird distribution and abundance. The 2000 Census probably located a greater proportion of the entire population that did censuses in previous years."

More than 40% of all Tricolor reproductive effort in 2000 was associated with dairies in the San Joaquin Valley and southern California (Hamilton 2000). Hamilton (2000) pointed out that conditions were more favorable for breeding Tricolors in 2000 than 1999, including the buyout of the Tevelde and George Colonies in Tulare County (*see* "Destruction of Grain Silage Nesting Habitat," *infra*) and the success of the Delevan NWR and Hills Duck Club (Colusa County) and Merced NWF (Merced County) colonies. However, at least four large colonies, one in Fresno County, two in Kings County, and one in Tulare County, were lost to crop harvest in 2000.

Despite the favorable conditions in 2000, Hamilton (2000) stated that "...the central conclusion of the Census and survey is that tricolors are continuing to decline precipitously in numbers ... The conclusion that tricolor numbers are plummeting is based not only upon these data, but also on the collective experience of local experts throughout California who have observed tricolors over long intervals."

3. Summary

Reported Tricolor colony size estimates in 1994 compared to the total count in 1997 indicated that the total Tricolor population declined by about 37%, and the greatest declines occurred in Sacramento, Fresno, Kern, and Merced Counties, which hosted about 72% of the total adults observed in April 1994 (Beedy and Hamilton 1997). Between 1997 and 2000, Tricolor numbers declined by an additional 30% (Hamilton 2000). Overall the population is estimated to have declined by approximately 56% between 1994 and 2000.

A census of the population has not been conducted since 2000, although a volunteer based survey was sponsored by FWS and conducted by the Point Reyes Bird Observatory (PRBO) in 2001. The PRBO effort did not entail a true census, but rather included citing reports submitted by participants over several months (Humple and Churchwell 2002). Hence, the data are not comparable to the census data gathered in 1994, 1997 and 2000 and are not considered in this letter. If they were to be, however, they would indicate that the population declined by approximately 10% more between 2000 and 2001.

Every major study of *A. tricolor* published since the 1970s has sounded the alarm bell regarding the dramatic population decline of the species:

> "Further research is needed to determine whether this downward trend, which may have reduced the Central Valley population by more than 50%, is continuing, and whether it has yet reached the point of concern...." (DeHaven et al. 1975)

> "Reported tricolor colony size estimates in 1994 compared to the total count in 1997...indicated that the total tricolor population declined by about 37%, and the greatest declines occurred in Sacramento, Fresno, Kern, and Merced Counties, which hosted about 72% of the total adults observed in April 1994...In some portions of their range, tricolors have definitely declined or been eliminated, including local extirpation in portions of the Central Valley where they were once abundant...and many historical sites in coastal southern California counties." (Beedy and Hamilton 1997)

> "The central conclusion of the Census and survey is that tricolors are continuing to decline precipitously in numbers, from millions in the 1930s...to an estimated 750,000 in 1975...,

370,000 as of the 1994 Census and 162,000 in this account for 2000. The conclusion that tricolor numbers are plummeting is based not only upon these data, but also on the collective experience of local experts throughout California...Tricolors are a diminished natural spectacle in the Central Valley and in Southern California, the former strongholds of this species." (Hamilton 2000)

"The long-term population trends and patterns in reproduction reported in this study reveal that the Tricolored Blackbird possesses most of the traits that ultimately led to the extinction of the Passenger Pigeon in the same ecological circumstances. These factors include the loss of vast areas of native wetland along with the increasing loss of upland, non-native vegetation favorable for nesting, the trend of decreasing colony size in a highly social breeder, a habit of itinerant breeding, and wholesale mowing down of the largest breeding colonies in agricultural harvest." (Cook and Toft, in review)

Extensive range-wide surveys for the Tricolor provide clear and unequivocal evidence that the species has experienced and is continuing to experience a precipitous population decline. Further, there is no evidence that the factors causing this decline are being prevented or alleviated, including ongoing destruction of grain silage colonies; failure to protect highly productive nesting substrates (i.e. Himalayan blackberry thickets and other productive upland breeding habitats); permanent loss of nesting and foraging habitat due to increasing urbanization and vineyard and orchard deployment in the Central Valley and southern California; continued high levels of predation in marsh nesting habitats by herons and other predators; and spraying of agricultural contaminants throughout the range of the species. Without the legal protection offered by the Federal and California Endangered Species Acts, current trends are likely to continue and the Tricolor is likely to become extinct in the foreseeable future.

D. Satisfaction of Federal and State ESA Petition and Listing Factors

The purpose of the federal ESA is to "provide a means whereby the ecosystems on which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of [such species]." 16 U.S.C. § 1531(b). An "endangered" species is one that is in danger of extinction throughout all or a significant portion of its range. 16 U.S.C. § 1532(6). A "threatened" species is one that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. 16 U.S.C. § 1532(20). Any person may submit a petition to the Secretary to list a species. *See* 16 U.S.C. § 1533(b)(3). FWS is charged with listing species as threatened or endangered based "solely on the basis of the best scientific and commercial data available . . .," *id.* § 1533(b)(1)(A), and whenever listing is warranted based on any one of the following five listing factors: (1) the present or threatened destruction, modification, curtailment of its habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) the inadequacy of existing regulatory mechanisms; or (5) other natural or manmade factors affecting its continued existence. *Id.* § 1533(a)(1).

Under the California ESA, a petition must include information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce (*see supra*). The petition must also include information about the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, the availability and sources of information, information regarding the kind of habitat necessary for species survival, and a detailed distribution map, all of which are both satisfied below. Cal. Fish & Game Code § 2072.3.

1. Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

The vast majority of the native habitat for Tricolors has been lost or degraded. Only 560,500 of an original 4,000,000 acres (about 14%) of wetlands in the Central Valley were extant in 1939 (Beedy and Hamilton 1997). By the mid-1980s, an estimated 480,000 acres of freshwater emergent marshes, or 85% of the total remaining freshwater wetlands in 1939, were reduced by one-half to about 243,000 acres (Beedy and Hamilton 1997). Further, native perennial grasslands — prime Tricolor foraging habitat — have been reduced by more than 99% in the Central Valley and surrounding foothills (Beedy and Hamilton 1997). Remaining marsh nesting habitat has been reduced to small isolated patches of habitat that also support high densities of Tricolor predators.

Tricolors have been flexible in their choice of nesting substrates and have shown an increasing trend towards use of upland substrates for nesting following the 1930s (Table 1). More recent important nesting substrates have included agricultural fields (especially grain silage) and Himalayan blackberry (DeHaven et al. 1975; Hamilton et al. 1995; Cook 1996). The most commonly used substrates today include native emergent marshes, grain silage at dairies and Himalayan blackberry (Table 3).

TABLE 3. Numbers of Tricolored Blackbird colonies and proportions of colonies and individuals nesting by substrate during the years 1994, 1997 and 2000 combined among identified regions in California. Source: Cook and Toft, in review.

	emergent marsh			*Himalayan blackberry*			*silage*			*other flooded vegetation*			*other protecting vegetation*		
Region	*No. col.*	*Percent of col.*	*birds*	*No. col.*	*Percent of col.*	*birds*	*No. col.*	*Percent of col.*	*birds*	*No. col.*	*Percent of col.*	*birds*	*No. col.*	*Percent of col.*	*birds*
San Joaquin Valley	52	15.0	12.6	14	4.0	2.3	17	4.9	29.6	7	2.0	3.4	16	4.6	5.2
Sacramento Valley	40	11.6	20.8	18	5.2	2.7	0	0	0.0	5	1.4	1.2	1	0.3	2.1
Sacramento County	7	2.2	1.6	48	13.9	9.5	0	0	0.0	0	0.0	0.0	0	0.0	0.0
Southern California	59	17.0	5.4	2	0.6	0.1	0	0	0.0	2	0.6	0.1	8	2.3	1.1
Other	30	8.7	1.2	5	1.4	0.4	0	0	0.0	3	0.9	0.3	12	3.5	0.6

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DeHaven et al. (1975) pointed out that many marshes and other "apparently suitable" nesting sites were unused by Tricolors each year. As an example, Tricolors have largely been extirpated from Sacramento County in recent years as traditional nesting sites there have been lost, despite the remaining presence of habitat that appears similar but is not used (Liz Cook, pers. comm.). Suitable Tricolor habitat must, therefore, be more than meets the human eye: factors such as insect availability or other specific unknown habitat characteristics may also provide crucial breeding requirements for Tricolors in addition to suitable nesting substrates. Therefore, it is critical at present to protect the habitat that is documented to be used by Tricolors, rather than assuming that protecting habitat that superficially appears suitable but is not actually used (i.e., relying solely on currently protected public lands that do not currently support breeding Tricolors) will be sufficient to conserve the species.

a. Destruction of Native Habitats

Destruction of Tricolor breeding habitat has been documented as far back as the first published population studies on the species. Neff (1937) stated "...the destruction of nesting habitats by man is of most importance. Reclamation and drainage have destroyed many favorable habitats. Areas in the vicinity of San Francisco and Los Angeles are now so highly developed that it is doubtful whether or not any colonies could exist there. Other habitats have been destroyed by the dredging or cleaning of reservoirs, marshes, and canals in order to destroy the growths of cattails and tules." The surveyors documented specific instances of destruction of known colony sites, including draining and burning of some surveyed localities.

DeHaven et al. (1975) also noted the loss of breeding habitat leading to the loss of colonies where they formerly occurred. Colonies studied near Davis in Yolo County during the 1960s were not located again due to the near-complete loss of nesting habitat. No nesting habitat was found near Riego Road in Sacramento County where Orians (1961a) found colonies, and at Cache Creek in Kern County where Collier (1963) found colonies.

b. Colony Destruction by Agricultural Activities

The relatively recent phenomenon of Tricolors nesting in grain silage fields at dairies was not mentioned by DeHaven et al. (1975) (but see Collier 1968), however silage is well documented as a primary attribute of present day Tricolor nest site selection (Beedy and Hamilton 1997; Beedy and Hamilton 1999). Harvest of grain silage is conducted in relation to moisture content of the forage, the timing of which coincides with Tricolors using the crops for nesting (USFWS 2000). This causes nest destruction and direct mortality, which in turn is threatening much of the remaining breeding population of the species (USFWS 2000). In addition, many former agricultural areas within the range of the Tricolor are now being urbanized, and the trend is projected to continue (Beedy and Hamilton 1997).

Dairy grain silage consists of varieties of wheat, often triticale, but also barley, oats, and other crops. Crops can be monocultures or mixtures of grain plants and may also be infested with weeds such as prickly lettuce (*Lactuca serriola*) and thistles (*Cirsium* spp.). These plants may grow to 3–4 ft in height and appear to provide some protection against predators on Tricolor nests because of their dense growth, somewhat spiny/irritating character and typically monotonous relief in the landscape.

Silage fields around dairies are probably highly attractive to breeding Tricolors because of relative protection from predators but also because crops at a single location may cover tens of acres or

more. Because they are intensely colonial, tens of thousands of Tricolors can potentially occupy a silage field as small as 20–40 acres in size. Nest densities in these fields are often not as great as in some other upland substrates but approximately one nest per square meter is not uncommon (Liz Cook, pers. comm.). In addition to providing a suitable nesting substrate, dairies typically provide abundant grain sources at their feedlots for settling adult Tricolors, large amounts of nearby foraging habitat for insects (e.g. alfalfa), and reliable water supplies.

Silage is grown to be an early cut green feed. Crops are planted in late winter/early spring and mature to harvest stage usually between about mid April and the first week in May. Harvest stage occurs when the plants contain the highest amount of moisture in their seed heads (milk stage). This stage may last about a week within which time the plants are most valuable as silage feed. The crop is chopped, often in a single day, into fine pieces and allowed to ferment into the final product that is fed to dairy cows. Fields that grew silage are almost immediately turned over to a second crop such as corn (Liz Cook pers. comm. with David Hardt, refuge manager, Kern National Wildlife Refuge).

Tricolors begin establishing nesting colonies in grain silage in late March/April when the plants are tall and sturdy enough to support nests. This means that the timing of silage harvest usually coincides closely with the late nestling/early fledgling stage of Tricolor offspring. The timing of silage harvest and the Tricolor nesting cycle is such that colonies in silage are always lost unless there is intervention on their behalf or for some other unlikely reason that the crop is not harvested (Liz Cook, pers. comm.).

The concentration of most of the Tricolor reproductive effort into a few large colonies that are selecting grain silage as a nesting substrate has greatly increased the risk of extinction should the annual destruction of such a large proportion of nests continue unabated (Cook and Toft, in review). Table 4 below provides some examples of recent breeding failures because of harvest of grain silage. Note that approximately half of the last documented Tricolor population (2000 census results) nested in two silage fields in 2003 and that the vast majority of this breeding effort was destroyed. All of it would almost certainly have been lost without the concerted effort of a couple of individuals from the public sector (Liz Cook, pers. comm.).

TABLE 4. Some examples of distinct colonies nesting in dairy silage whose nests were lost to crop harvesting. This is not a complete list and does not necessarily represent all silage colonies lost to harvesting in the period indicated. Specific locations of dairies are not provided but are available. Sources: Hamilton 1993; Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton et al. 1999; Hamilton 2000; Liz Cook unpublished data.

Year	County	Number of Breeding Birds
1993	Tulare	48,000
1994	Fresno	70,000
1994	Kern	11,600
1994	Tulare	50,000
1995	Fresno	50,000
1995	Tulare	50,000
1996	Fresno	50,000
1996	Tulare	50,000

1997	Fresno	52,500
1997	Tulare	40,000
1998	Fresno	40,000
1998	Tulare	40,000
1999	Tulare	14,000
2003	Tulare	20,000
2003	Kern	50,000*

* nests of approximately 20000 of these birds saved by crop by-out

c. Destruction of Other Suitable Upland Breeding Substrates and Surrounding Habitats

Himalayan blackberry supports the highest densities of nesting Tricolors among all used substrates and reproductive success is significantly higher in these than other most commonly used substrates (emergent marsh and silage) (Table 5). However, Himalayan blackberry nesting sites are currently not protected and many important traditionally used sites have been lost in recent years (Cook and Toft, in review). Other important upland nesting substrates, including thistles and prickly lettuce, are likewise not protected because they are considered to be non-native plants and often occur on private property.

Tricolors nesting in Himalayan blackberry had greater reproductive success than those nesting in grain silage, but colonies in grain silage were far larger than those in any other upland nesting substrate, and where nests were not destroyed by silage harvest, number of fledglings per nest was higher than in native marsh habitat (Table 5) (Cook and Toft, in review). These results suggest that the annual loss of nests due to harvest of grain silage during the Tricolor breeding season is an extremely significant factor contributing to the decline of the species.

TABLE 5. Mean reproductive success (# of chicks per nest at 8 days after first egg hatched) of colonies by substrate and study region from 1992 – 2003. Source: Cook and Toft, in review.

	Number of chicks per nest		
	n	Mean	SE
Nesting Substrate			
emergent marsh	40	0.5	0.09
Himalayan blackberry	23	2.0	0.16
Silage – all	26	0.2	0.08
silage [a]	4	1.0	0.26

[a] *Excluding colonies that were lost to crop harvesting.*

2. *Inadequacy of Existing Regulatory Mechanisms*

The Tricolored Blackbird is not protected by existing regulatory mechanisms. Although the Yolo Audubon Society submitted a petition to the California Fish and Game Commission to list this species as endangered under the state Endangered Species Act in 1991, the petition was withdrawn in 1992. Beedy and Hamilton (1997), at 19-20.

Based on concerns about the Tricolor's population status, FWS included this species as a Category 2 candidate for federal listing as either threatened or endangered. *See, e.g.,* 59 Fed. Reg. 58992 (November 15, 1994).[1] However, FWS later decided to discontinue the practice of maintaining a list of Category 2 candidates. 61 Fed.Reg. 64,481 (December 5, 1996). Currently, the Tricolored Blackbird is only considered a FWS non-game bird of management concern (species are of concern because of (1) documented or apparent population declines, (2) small or restricted populations, or (3) dependence on restricted or vulnerable habitats) and a species of special concern by DFG (animals not listed under the federal Endangered Species Act or the California Endangered Species Act, but which nonetheless (1) are declining at a rate that could result in listing, or (2) historically occurred in low numbers and known threats to their persistence currently exist). These designations do not provide any specific legal protection to the bird aside from the requirement that project's triggering CEQA review must analyze the impacts of the proposed action on the Tricolor. *See, e.g.,* 14 Cal. Code Regs. §§ 15065, 15380. However, its special status does not protect the species from activities that do not trigger CEQA review. Furthermore, while the species is arguably afforded protection under the MBTA, *see supra* at 2-3, enforcement agencies have turned a blind eye to the annual violations of the MBTA by private property owners during Tricolor nesting season.

3. *Overutilization for Commercial, Recreational, Scientific, or Educational Purposes*

Neff (1942) reported that:

> "Market hunting of blackbirds in the interior valleys of California became a thriving business in about 1928 or 1929, and a dependable market for them was developed largely through Italian produce firms in the larger cities. During the depression years the number of men so engaged increased markedly, but decreased by 1936 or 1937. Using automatic shotguns and firing into dense masses of blackbirds feeding on rice stubble, these market hunters killed large numbers of all species of blackbirds; one group of market hunters shipped nearly 400,000 dressed blackbirds from one Sacramento Valley shipping point in five seasons, and during the winter season of 1935-1936 they shipped about 88,000 birds."

In addition, blackbirds were reportedly shot in great numbers by ranchers in order to drive the flocks away from crops, or by pleasure hunters utilizing blackbirds for target practice, and poison to regulate blackbird damage to crops was a major source of adult mortality (Neff 1942). Beedy and Hamilton (1997) noted that this practice continued until the 1960s, during which thousands of Tricolors were killed in the Central Valley. Reduction in numbers of blackbirds and improved

[1] Category 2 candidates are species for which information in the possession of FWS indicates that proposing to list as endangered or threatened is possibly appropriate, but for which persuasive data on biological vulnerability and threat are not currently available to support proposed rules.

harvesting methods have resulted in the termination of blackbird extermination programs in the region. Nonetheless, a history of widespread persecution of blackbird species likely has contributed to the Tricolor population decline documented over the past century.

4. Disease or Predation

Tricolors construct nests in flooded or spiny, urticating or otherwise armored vegetation to protect them from terrestrial predators (Beedy and Hamilton 1999). Emergent vegetation such as cattails, bulrushes, and willows are the most often used flooded substrates while Himalayan blackberry, silage and other grain crops, thistles, prickly lettuce, and native nettle (*Urtica dioica*) are among the most important upland nesting substrates.

Historically terrestrial predators have probably included wolves (*Canis lupus*), coyotes (*Canis latrans*), gray foxes (*Urocyon cinereoargenteus*), raccoons (*Procyon lotor*), mink (*Mustela vison*), striped skunks (*Mephitis mephitus*) and spotted skunks (*Spilogale gracilis*), gopher snakes (*Pituophis catenifer*), non-native rats (*Ratus ratus*), western rattlesnakes (*Crotalus viridis*), and king snakes (*Lampropeltis getulus*). Avian predators are reported to be Black-crowned Night-Herons (*Nycticorax nycticorax*), Great Blue Herons (*Ardea herodias*), Common Raven's (*Corvus corax*), Cooper's Hawks (*Accipter cooperii*), Burrowing Owls (*Athene cunicularia*), American Crows (*Corvus brachyrhynchos*), Swainson's Hawks (*Buteo swainsoni*), Northern Harriers (*Circus cyaneus*), Barn Owls (*Tyto alba*), Short-eared Owls (*Asio flammeus*), Yellow-billed Magpies *(Pica nuttalli*), and Merlins (*Falco columbarius*). Predation by feral cats (*Felis catus*) has recently been reported (Beedy and Hamilton 1997). Tricolors respond to predators by sitting silently when rather than attempting to attack them, as do Red-wings (Beedy and Hamilton 1997, 1999).

Predation is a major cause of large-scale nesting failures in many Tricolor colonies, especially those nesting in native emergent marshes (Hamilton et al. 1995; Beedy and Hamilton 1997; Hamilton 2000). Cook and Toft (in review) found that reproductive success was significantly lower in native emergent marshes than other substrates, excluding silage that was not lost to harvesting operations (Table 5). Heron and raccoon predation upon colonies nesting in marshes, especially, can destroy all or nearly all nests within colonies (Hamilton et al. 1995; Hamilton 2000). For example, Tricolor nesting at Kern NWR, Kern County and at Maxwell I and Maxwell II colonies in Colusa County failed due to night-heron predation. Black-crowned Night Heron predation — which often results in the nest failure of an entire colony — is particularly troubling at national wildlife refuges, which are becoming increasingly important nesting sites for both Night Herons and Tricolors as private range and dairy lands are converted to vineyards and orchards or urban uses, and as grain silage fields are subject to harvest during nesting season.

5. Other Natural or Anthropogenic Factors

Beedy and Hamilton (1997) document evidence of Tricolor mortality due to contaminants. A large Tricolor breeding colony of nearly 50,000 birds at Kesterson Reservoir in Merced County experienced a complete nesting failure in 1986 (Beedy and Hayworth 1992). Some of the dead nestlings had club feet; other shorebirds and water birds collected at the reservoir had similar deformities. Pathological examinations of the Tricolor nestlings indicated heart muscle degeneration, and liver sampled showed higher concentrations of selenium than in Red-wing nestlings collected in an uncontaminated area at Merced NWR (Beedy and Hayworth 1992). The cause of the 1986 Tricolor nestling deaths was suspected to be selenium toxicosis (Beedy and Hamilton 1997).

Hamilton observed a colony sprayed by mosquito abatement operators in Kern County, and all sprayed eggs failed to hatch, and the loss of at least two Tricolor colonies was attributed to herbicide applications (Beedy and Hamilton 1999). While the link between environmental contaminants and nesting failure of Tricolors is largely unstudied, enormous amounts of chemicals are introduced into the environment every year by the California agriculture industry, particularly in the Central Valley, which is the historical stronghold of the Tricolor and the most intensive agricultural region in the state. Table 5 shows amount and type of pesticides applied in five of the counties that support the some of the greatest numbers of breeding Tricolors.

Table 5. Type and Amount of Pesticides Used in Fresno, Merced, Sacramento, San Joaquin, and Tulare Counties. Source: California Department of Pesticide Regulation 2002.

County	Chemical	Pounds Applied	Chemical	Pounds Applied
Fresno	Aluminum Phosphide	15,080.9830	Metam-Sodium	1,981,875.2816
	Bacillus Thuringiensis I	1,690.3241	Methoprene	15.6594
	Chlorophacinone	0.1511	Methyl Bromide	417,510.3194
	Chlorpyrifos	321,888.9509	Oryzalin	11,850.1164
	Copper Sulfate	115,084.1100	Petroleum Oil	2,329,338.9000
	Diazinon	70,289.4242	Phosmet	95,969.6584
	Diphacinone	0.7339	Pyrethrins	162.6464
	Malathion	43,158.9558	Strychnine	40.7266
	Mancozeb	37,528.9088	Zinc Phosphide	35.7129
Merced	Aluminum Phosphide	2,971.6662	Metam-Sodium	422,398.3113
	Bacillus Thuringiensis I		Methoprene	157.8358
	Chlorophacinone	1.1929	Methyl Bromide	131,116.9563
	Chlorpyrifos	61,795.4767	Oryzalin	2,594.6929
	Copper Sulfate	105,569.4900	Petroleum Oil	569,390.7400
	Diazinon	23,995.9920	Phosmet	9,044.3520
	Diphacinone	0.8929	Pyrethrins	590.9544
	Malathion	17,868.8865	Strychnine	89.1223
	Mancozeb	8,991.6591	Zinc Phosphide	265.5314
Sacramento	Aluminum Phosphide	1,957.8636	Metam-Sodium	34,853.1512
	Bacillus Thuringiensis I	77.9603	Methoprene	278.8712
	Chlorophacinone	0.1346	Methyl Bromide	9,339.2350
	Chlorpyrifos	29,307.3649	Oryzalin	6,544.5375

	Copper Sulfate	49,294.402	Petroleum Oil	223,652.1400
	Diazinon	14,780.1577	Phosmet	8,031.6110
	Diphacinone	0.3048	Pyrethrins	71.4711
	Malathion	2,852.0994	Strychnine	0.8122
	Mancozeb	11,154.9237	Zinc Phosphide	60.1408
San Joaquin	Aluminum Phosphide	2,362.2914	Metam-Sodium	10,122.7993
	Bacillus Thuringiensis I	562.7223	Methoprene	95.2427
	Chlorophacinone	0.1439	Methyl Bromide	176,519.4093
	Chlorpyrifos	52,076.1370	Oryzalin	6,757.1516
	Copper Sulfate	100,613.6600	Petroleum Oil	534,153.4400
	Diazinon	17,664.0315	Phosmet	10,195.7060
	Diphacinone	0.3140	Pyrethrins	260.5963
	Malathion	11,265.6954	Strychnine	35.1823
	Mancozeb	23,385.1615	Zinc Phosphide	12.6028
Tulare	Aluminum Phosphide	2,786.4064	Metam-Sodium	117,861.9303
	Bacillus Thuringiensis I	198.8293	Methoprene	0.6954
	Chlorophacinone	0.2265	Methyl Bromide	123,817.5579
	Chlorpyrifos	202,428.6137	Oryzalin	6,219.4719
	Copper Sulfate	267,978.4700	Petroleum Oil	2,978,688.3000
	Diazinon	43,560.2082	Phosmet	81,260.5161
	Diphacinone	1.1976	Pyrethrins	46.7505
	Malathion	25,292.3724	Strychnine	57.4777
	Mancozeb	16,267.6174	Zinc Phosphide	1.6000

While Tricolors were not studied directly, many of the chemicals used within the breeding range of the Tricolor are known to be highly toxic to birds. For example, malathion, chylorpyrifos, and diazinon are organophosphorus pesticides that bind with cholinesterase in animals and disrupt neural functioning. Chlorpyrifos is moderately to very highly toxic to birds (EXOTOXNET 2004). Birds are quite susceptible to diazinon poisoning: in 1988, the EPA concluded that the use of diazinon in open areas poses a "widespread and continuous hazard" to birds. Bird kills associated with diazinon use have been reported in every area of the country and at all times of the year. Birds are significantly more susceptible to diazinon than other wildlife (EXOTOXNET 2004).

Malathion is moderately toxic to birds. The reported acute oral LD50 values are 167 mg/kg in blackbirds and starlings (EXOTOXNET 2004). The precise oral or inhalation median lethal doses for aluminum phosphide or phosphine in birds are not known, but exposure of turkeys and hens to 211 and

224 mg/meters cubed for 74 and 59 minutes respectively resulted in labored breathing, swelling of organs, tonic-clonic convulsions and death (EXOTOXNET 2004).

Methoprene is slightly toxic to birds, but non-lethal effects that may affect survival of the birds appeared at acute oral doses of 500 mg/kg, and included slowness, reluctance to move, sitting, withdrawal, and incoordination (EXOTOXNET 2004). These effects may decrease bird survival by making them temporarily more susceptible to predation (EXOTOXNET 2004).

Phosmet is documented to be highly toxic in Red-wings, with a reported acute oral LD50 of 18 mg/kg (EXOTOXNET 2004). Zinc phosphide is highly toxic to wild birds, although blackbirds were found to be less sensitive than other taxa (EXOTOXNET 2004).

Hamilton et al. (1995) suggested that chemical use in agricultural areas does not appear to be inducing a serious population problem for Tricolors. However, some mortality has been documented due to toxic chemicals, and this source of mortality could become more significant if the number of birds continues to dwindle.

6. Suggestions for Future Management

Management objectives for Tricolors include maintaining a viable, self-sustaining population throughout the geographic range of the species; avoiding the losses of the colonies and their associated habitats; increasing the breeding population on suitable public and private lands managed for this species; and enhancing public awareness and support for protection of habitat and active colonies (Beedy and Hamilton 1999). Measures have been taken at times to protect the nesting activities of Tricolors, including purchasing portions of crops to preserve some large colonies, or delaying harvest to avoid impacting nests during the active breeding season. These actions and participation by landowners resulted in additions of an estimated 37,000 to 44,000 first-year adults to the 1994 and 1995 breeding seasons, and should be aggressively pursued and funded.

Another suggested protective measure includes the creation of low-risk nesting substrates such as marshes and blackberries within key dairy regions of the San Joaquin and Sacramento Valleys, to provide alternative nesting sites to grain silage fields (USFWS 2000). Any newly created nesting substrates must be evaluated for their successful use by nesting Tricolors. Once such areas are determined to be contributing positively to the reproductive success of Tricolors, they should be preserved and managed in perpetuity. Given the perilous status of the species, the creation and use of alternative nest sites by some Tricolor colonies must not be considered a rationale for allowing destruction of silage fields concurrently used by other colonies during the breeding season.

Other activities that result in Tricolor nesting losses include mowing, plowing, or burning of marsh areas within duck clubs and reservoirs or wetland maintenance of reservoirs containing occupied habitat. These losses are temporal and could easily be avoided by delaying the activity until after the colony completes the breeding cycle (Beedy and Hamilton 1999). In addition, the protection and enhancement of an important Tricolor breeding site known as Toledo Pit in Tulare County should be prioritized (DeHaven 2000).

Any effort to conserve the Tricolor must include adequate funding to monitor population status and habitat use. Research priorities include but are not limited to: continuing and expanding annual range-wide censuses; initiating mark-recapture and ratio-telemetry studies to determine demographic rates such as survival, reproduction, and population growth, and site fidelity as related to reproductive

success; and conducting studies of foraging ecology to determine key characteristics and possibilities to enhance foraging habitat.

III. REQUEST FOR EMERGENCY ACTION

For the reasons provided above, the Center requests that FWS and FGC take immediate action on this petition and issue emergency regulations to list the Tricolored Blackbird. The federal ESA's emergency listing provision gives FWS the authority to issue a regulation to protect a species from "any emergency posing a significant risk to the well-being of any species of fish or wildlife or plants." 16 U.S.C. §§ 1533(b)(3)(C)(iii) and (b)(7). Emergency listing is not subject to the normal listing process and procedures. An "emergency listing" may take effect immediately upon publication of the regulation in the Federal Register, and is effective for 240 days thereafter. 16 U.S.C. § 1533(b)(7). Similarly, California Fish and Game Code Section 2076.5 permits FGC to issue emergency listing rules to provide imperiled species with immediate substantive protection. As discussed above, the Tricolor is in immediate need of protection from the severe nesting failures caused each year by agriculture harvesting and plowing activities.

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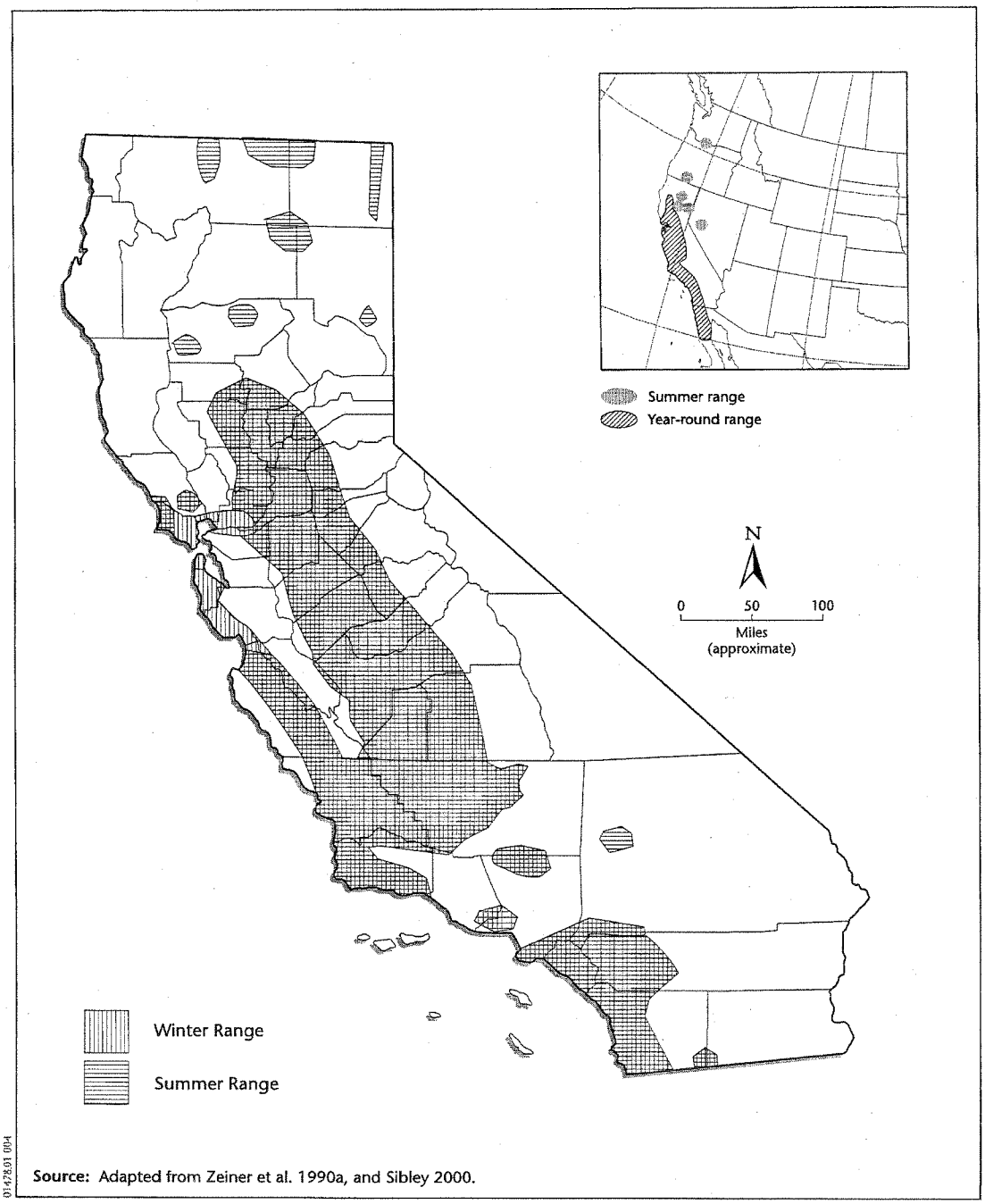

Figure 1. Distribution of the Tricolored Blackbird. Source: Eastern Contra Costa County HCP, http://www.cocohcp.org/draft-hcp/app_figs/AppD-03b_Tricolored_Blackbird.pdf.

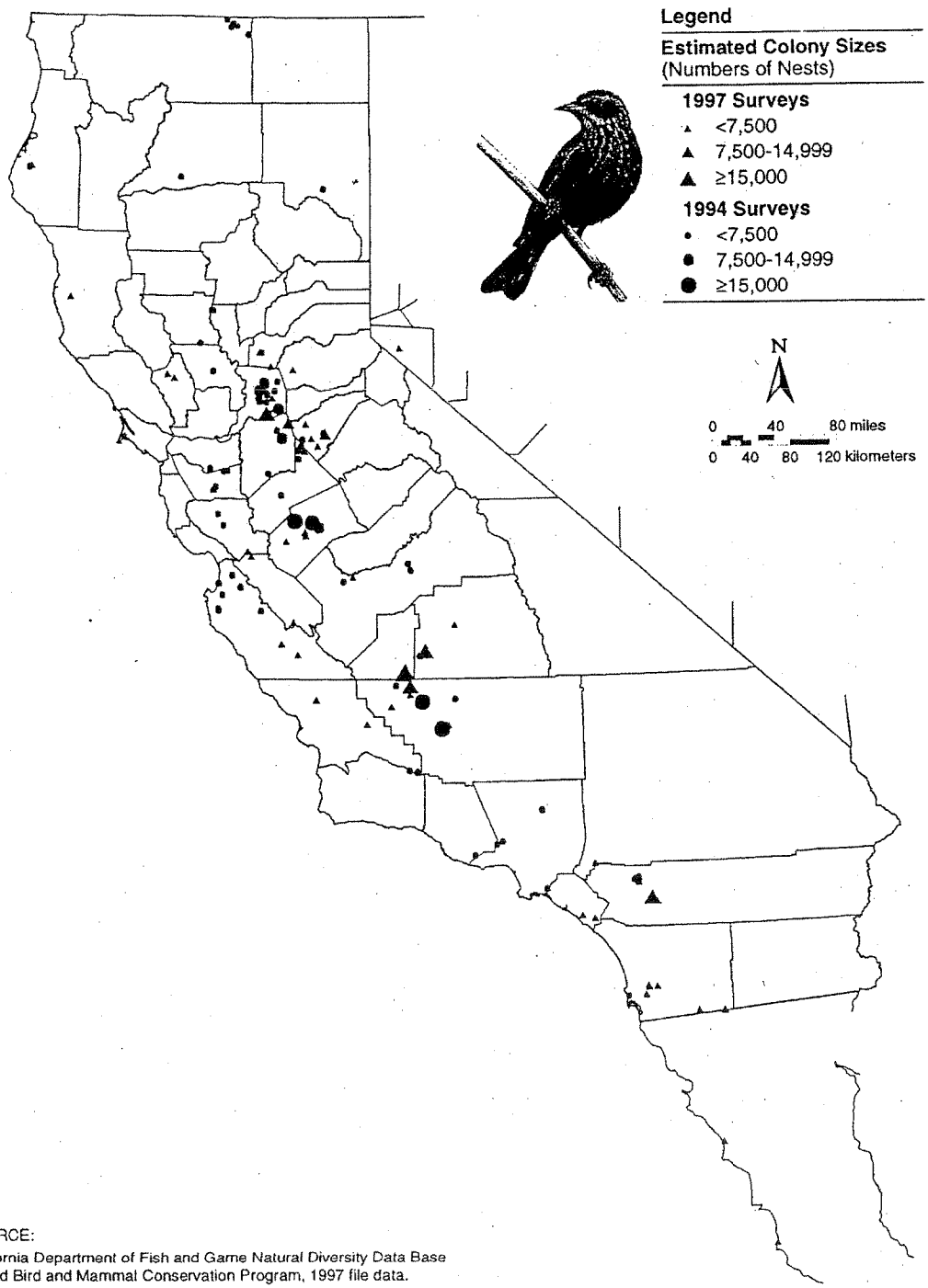

Figure 2. Locations of Tricolored Blackbird nesting colonies, April 1994 and 1997. Source: Beedy and Hamilton 1997.