Planning Commission

October 4, 2023

Information Packet

ITEMS

File ID 23-1438

Consideration of Development Permit Application No. P22-04122, and related Environmental Assessment No. P22-04122 pertaining to approximately 8.0 acres of property located on the east side of North Abby Street, between East Minarets/East Alluvial and East Spruce Avenues (Council District 6).

Contents of Supplement:

Supplemental Exhibit L – Public Comment Received After 09/08/2023

Supplemental Information:

Any agenda related public documents received and distributed to a majority of the Commission after the Agenda Packet is printed are included in Supplemental Packets. Supplemental Packets are produced as needed. The Supplemental Packet is available for public inspection in the City Clerk's Office, 2600 Fresno Street, during normal business hours (main location pursuant to the Brown Act, G.C. 54957.5(2). In addition, Supplemental Packets are available for public review at the Planning Commission meeting in the City Council Chambers, 2600 Fresno Street. Supplemental Packets are also available on-line on the City Clerk's website.

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Supplemental Exhibit L

Public Comment Received
After September 8, 2023

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October 3, 2023

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Re: Supplemental Comment in Support of LIUNA's Appeals of the City of Fresno Planning and Development Department Director's Decision to Approve the Development Permit Application No. P22-04122 and Related Environmental Assessment No. P22-04122, Including the Mitigated Negative Declaration for the Living Spaces Retail Project (October 4, 2023 Planning Commission Agenda Item VIII-A)

Dear Chairperson Vang, Vice Chair Hardie, Honorable Members of the City of Fresno Planning Commission, Director Clark, Mr. Holt, and Mr. Siegrist:

I am writing on behalf of Laborers International Union of North America, Local Union 294 and its members living in the City of Fresno ("LIUNA"), regarding the Environmental Assessment No. P22-04122 and Development Permit Application No. P22-04122, submitted by Living Spaces (the "Applicant"), and prepared for the proposed development of an approximately 104,867 square-foot Living Spaces furniture retail store and showroom and associated parking, to be located upon an approximately 8-acre site at the east side of North Abby Street between East Alluvial and East Spruce Avenues, in Fresno, California (the "Project"), which is scheduled to be heard on appeal by the City of Fresno ("City") Planning Commission on October 4, 2023.

LIUNA submitted comments on the original Initial Study and Mitigated Negative Declaration ("IS/MND" or "MND") on May 26, 2023. On July 24, 2023, Planning and Development Department Director, pursuant to Fresno Municipal Code (FMC) Section 15-5009, approved the Development Permit Application No. P22-04122 and Environmental Assessment No. P22-04122 filed by Living Spaces. On August 8, 2023, LIUNA timely appealed the Director's July 24, 2023 approval decisions.

As noted in LIUNA's May 26, 2023 comment letter and July 24, 2023 appeal, LIUNA is concerned that the IS/MND prepared for the Project is legally inadequate. After reviewing the MND, we conclude that it fails as an informational document, and that there is a fair argument that the Project may have adverse environmental impacts. Therefore, we request that the City of Fresno (the "City") prepare an environmental impact report ("EIR") for the Project pursuant to the California Environmental Quality Act ("CEQA"), Public Resources Code ("PRC") section 21000, et seq. This supplemental comment on the IS/MND has been prepared with the expert assistance of wildlife biologist Dr. Shawn Smallwood, Ph.D. Mr. Smallwood's comment and his resume are attached as Exhibit A hereto and incorporated herein by reference in their entirety.

DISCUSSION

I. The MND Fails to Adequately Analyze and Mitigate the Potential Adverse Impacts of the Project on Wildlife.

After review of the IS/MND, wildlife biologist Dr. Shawn Smallwood, Ph.D., concludes that the Project may have significant impacts on several special status species. An EIR is required to mitigate these impacts.

Dr. Smallwood's conclusions were informed by his site visits in June 2023. Dr. Smallwood visited the site for 1.75 hours from 18:25 to 20:10 hours on June 5, 2023. He visited again the next day on June 6, 2023 for 3 hours from 05:36 hours to 08:36 hours. During the site visits, Dr. Smallwood "saw and photographed osprey (Photos 3 and 4) and double-crested cormorants (Photo 5), both species of which are on California Department of Fish and Wildlife's Taxa to Watch List." (Ex. A, pp. 2-3.) He also observed "many American crows, a black-crowned night-heron and a pair of Canada geese (Photos 6-8), California scrub-jays and northern mockingbirds (Photos 9 and 10), mourning doves (Photos 11 and 12), western kingbirds (Photos 13 and 15), Anna's hummingbirds (Photo 14), California ground squirrels (Photos 16 and 17), and desert cottontails (Photo 18), among other species. Some of the species of birds were breeding on site, including California scrub-jay and killdeer (Photos 19 and 20)." (*Id.*, pp. 4-11 & Table 1.) Dr. Smallwood "detected 21 species of vertebrate wildlife at the site and another 2 species nearby, and altogether [he] detected 3 special-status species of wildlife (Table 1)." (*Id.*, p. 4.)

Additionally, based on database reviews and site visits, Dr. Smallwood found that 86 special-status species of wildlife are known to occur near enough to the site to warrant analysis of occurrence potential (*Id.*, p. 15; *see also id.*, pp. 17-20 (Table 2).) Of these 86 species, Dr. Smallwood confirmed 2 on site through his survey, "and another 46 (53%) have been documented within 1.5 miles of the site ('Very close'), 8 of which were recently reported, and another 13 (15%) within 1.5 and 4 miles ('Nearby'), and another 19 (22%) within 4 to 30 miles ('In region'). More than two-thirds (71%) of the species in Table 2 have been reportedly seen within 4 miles of the project site." (*Id.*) Therefore, Dr. Smallwood concludes that the project site "supports multiple special-status species of wildlife and carries the potential for supporting many more special-status species of wildlife based on proximity of recorded occurrences." (*Id.*, p. 15.)

A. <u>The wildlife baseline relied upon by the MND is woefully inadequate.</u>

Wildlife biologist Dr. Smallwood's review of the potential impacts to wildlife from the Project concluded that the Project may have significant impacts on several special-status species. An EIR is therefore required to analyze these impacts.

Dr. Smallwood reviewed the IS/MND and he Biological Resources Assessment it relies on ("BRA") and found the following issues related to the wildlife baseline that the MND and BRA relied upon:

- [The BRA] fails to report the time the survey began and how long it lasted. Without knowing the level of survey effort, the reader cannot interpret whether the survey detected the typical species or the typical number of species, or whether it detected fewer or more than the usual number of species. Without this critical information about the survey, the findings carry no comparative value. The reporting of the field survey is deficient. (Ex. A, p. 13.)

- [The BRA] reports having detected 7 species of vertebrate wildlife at the project site. This finding suggests … [that the City's biologist] spent very little time on the site. [Dr. Smallwood] spent only 4.75 hours at the site, and detected the occurrences of 3 times the number of vertebrate wildlife species…, and…saw two more species nearby. City of Fresno needs a better accounting of how much survey effort was directed to the project site. (*Id.*, p. 14.)

- Reporting in the IS/MND is unsupportable by [the BRA] field survey. For example, the IS/MND (p. 37) states, "None of the burrows observed in the project site exhibited features typical of occupied burrowing owl burrows at the time of the survey..." However, burrowing owls typically leave little to no sign of their presence at burrows that they occupy over winter. That no sign was found has no bearing on the occurrence likelihood of burrowing owls. Furthermore, no protocol-level detection surveys have been completed for burrowing owls at this site. (Ex. A, p. 14.)

- [T]he IS/MND reports "...only limited habitat for tree, shrub and ground-nesting birds exists on the project site..." In reality, the site includes expansive substrate for ground-nesting birds, and is surrounded by hedges of shrubs and trees in which birds nest. Not only is all of this nest substrate amply available, but it was in use by nesting birds while [Dr. Smallwood] surveyed the site from the site's periphery. I watched as California scrub-jays fed their begging fledglings right on the project site (Photo 19) and as killdeer nested on site (Photo 20). [He] also observed fledgling northern mockingbirds and western kingbirds being fed on the project site by their parents. The IS/MND is inaccurate. (Ex. A, p. 14.)

- Of the 86 special-status species of wildlife that appear in [Dr. Smallwood's] Table 2, [the BRA] addresses only 3 (4%) of them, determining only one of these 3 to have "suitable habitat" on the site…. [The BRA] refers to an Appendix D, which might have been a more expansive analysis of occurrence likelihoods of special-status species, but Appendix D is missing from the copy of [the BRA] that is circulated with the IS/MND. Of the species that are analyzed in [the BRA], Swainson's hawk is assigned marginal occurrence potential and burrowing owl is assigned low potential, but both have been reported within only 1.5 miles of the project site. [The BRA] does not provide an adequate analysis of the occurrence likelihoods of special-status species. (Ex. A, p. 15.)

In conclusion, the MND's insufficient baseline fails to adequately evaluate the significance of the impacts to special-status species of wildlife. As a result, Dr. Smallwood's expert observations are substantial evidence of a fair argument that wildlife impacts may occur as a result of the Project. Thus, the Project requires an EIR to properly mitigate wildlife impacts of the Project.

B. The MND fails to address the Project's potential significant impact on loss of breeding capacity.

Neither the IS/MND nor the BRA assess the lost breeding capacity of birds that would result from the Project. (*See* Ex. A, pp. 16, 21.) In so doing, the IS/MND fails to analyze the impact of habitat loss, or the loss of productive capacity on bird species likely to nest on the ground and in trees within the 8-acre project site. (*Id.*) While habitat loss results in the immediate numerical decline of birds and other animals, it also results in a permanent loss of productive capacity. (*Id.*, p. 16.) Dr. Smallwood cites a recent study that documented a "29% decline in overall bird abundance across North America over the last 48 years," a decline which he says was "driven by multiple factors, but principally attributed to habitat loss and habitat fragmentation." (*Id.* (citing Rosenberg et al. 2019).)

Dr. Smallwood cites two studies that show bird nesting densities that were between 32.8 and 35.8 bird nests per acre, for an average of 34.3 bird nests per acre. (*Id.* (citing Young (1948) and Yahner (1982), respectively.) Assuming nesting density at the Project site is a fifth of the 34.3 average reported, then 6.8 bird nests per acre multiplied by the Project's 8 acres of habit, Dr. Smallwood predicts that 55 bird nests produce new birds at the site annually. (*Id.*) Based on an average of 2.9 fledglings per nest, the Project would prevent the production of 182 new birds per year. (*Id.*, p. 21 (citing Young (1948)).) The potential loss of 182 birds in California annually following construction of this Project easily qualifies as a significant and substantial impact that has not been analyzed. An EIR is required to fully analyze the Project's impact on lost breeding capacity, and to mitigate that impact.

C. **The MND fails to address the Project's potential significant impacts on wildlife movement.**

The IS/MND fails to address impacts to wildlife movement, and instead looks for impacts to a wildlife corridor. (*See* Ex. A, pp. 21-22.) Instead, the IS/MND improperly dismisses the Project's potential to significantly impact wildlife movement by reasoning that:

> The project site does not possess any characteristics that would indicate a locally significant stopover point for migratory species including raptors or waterfowl. No known wildlife movement corridors occur within the project site or in the immediate vicinity. (IS/MND, p. 5.)
>
> The project site does not contain any features that would function as wildlife movement corridors for resident or migratory wildlife species. (*Id.,* p. 39.)

However, as Dr. Smallwood points out, "[e]xactly what characteristics would indicate locally significant stopover is unidentified. Nor is it explained what qualifies as a known wildlife movement corridor." (Ex. A, p. 21.) The IS/MND also speculates, "[a]dditionally, existing chain-link fencing surrounding the project site limits the movement of wildlife species on the site." (IS/MND, p. 39.) But as Dr. Smallwood notes, "the chain-link fence incompletely surrounds the site and is broken in many places." (Ex. A, p. 21.) As a result, "wildlife movement appeared to [Dr. Smallwood] to be completely unaffected by the fence." (*Id.*)

The MND's conclusions regarding effects on wildlife movement rely on a false CEQA standard. (*Id.*) As Dr. Smallwood states, "[t]he primary phrase of the CEQA standard goes to wildlife movement regardless of whether the movement is channeled by a corridor." (*Id.*; *see also* CEQA Guidelines, App. G, pp. 333-34 (stating that the CEQA significance threshold is whether, among other things, a project will "[i]nterfere substantially with the movement of any native resident or migratory fish or wildlife species….").) Impacts to wildlife movement may occur with or without the presence of a wildlife corridor. (Ex. A, p. 21.) Dr. Smallwood writes:

> A site such as the proposed project site is critically important for wildlife movement because it composes an increasingly diminishing area of open space within a growing expanse of anthropogenic uses, forcing more species of volant wildlife to use the site for stopover and staging during migration, dispersal, and home range patrol (Warnock 2010, Taylor et al. 2011, Runge et al. 2014). In fact, I observed wildlife using the site as part of their travel routes, including osprey, Canada goose, American crows and black-crowned night-heron.

(Ex. A, p. 21.) Hence, the Project "would cut wildlife off from one of the last remaining stopover and staging opportunities in the project area, forcing volant wildlife to travel even farther between remaining stopover sites." (*Id.*) Therefore, Dr. Smallwood concludes that "[t]his impact would be significant, and as the project is currently proposed, it would be unmitigated." (*Id.*) Because the Project would interfere with wildlife movement in the region, an EIR needs to be prepared to address the Project's impacts on wildlife movement in the region.

Lastly, Dr. Smallwood notes that the BRA:

> … implemented no methodology in its reconnaissance survey to determine whether or to what degree the project site might be used in support of wildlife movement in the region. There was no reported program of observation of behaviors related to movement. There was no sampling that would inform of wildlife movement at and around the project site. There was no search for sign of wildlife movement. Nothing was done that would provide information in support of the IS/MND's assertions that the project site is unimportant to wildlife movement in the region.

(Ex. A, p. 22.) Given that there is evidence that the Project could have indirect and direct impacts that may significantly affect wildlife movement, the City should prepare an EIR to address such impacts and mitigate those impacts accordingly. Dr. Smallwood recommends, at a minimum, substantial compensatory mitigation is needed in response to the Project's impacts from interference with wildlife movement, including impacts to birds and bats using the site as stop-over or staging during migration. (*Id.*, p. 27.)

D. The MND fails to address the Project's potential significant impacts on wildlife from additional traffic generated by the Project.

Dr. Smallwood identifies the serious impacts that increased traffic has on wildlife. (Ex. A, pp. 22-24.) Analyzing the potential impact on wildlife due to vehicle collisions is especially important because "traffic impacts have taken devastating tolls on wildlife," across North America. (*Id.*, p. 22 (citing Forman et al. 2003).) In the United States alone, estimates for "avian mortality on roads is 2,200 to 8,405 deaths per 100 km per year, or 89 million to 340 million total per year." (*Id.* (citing Loss et al. 2014).) As Dr. Smallwood explains:

> Vehicle collisions have accounted for the deaths of many thousands of amphibian, reptile, mammal, bird, and arthropod fauna, and the impacts have often been found to be significant at the population level (Forman et al. 2003).

(Ex. A, p. 22.) Furthermore, a recent study conducted on traffic-caused wildlife mortality found "1,275 carcasses of 49 species of mammals, birds, amphibians and reptiles over 15 months of searches" "along a 2.5 mile stretch of Vasco Road in Contra Costa County, California."(*Id.*, p. 23 (citing Mendelsohn et al. 2009).) Hence, as Dr. Smallwood points out, an analysis is needed to determine whether increased traffic generated by the Project would result in impacts to local wildlife. (*Id.*)

Based on the IS/MND's estimate that the Project will result in 667,848 annual VMT, Dr. Smallwood predicts that "project-generated traffic would cause 183 wildlife fatalities per year," which "would qualify as a substantial and highly significant project impact." (Ex. A, p. 24.) Therefore, he concludes that "[t]here is at least a fair argument that can be made for the need to prepare an EIR to analyze this impact." (*Id.*)

Additionally, Dr. Smallwood notes that "mitigation measures to improve wildlife safety along roads are available and are feasible," and therefore, "need exploration for their suitability with the proposed project." (*Id.*) Specifically, Dr. Smallwood suggests compensatory mitigation in the form of "funding research to identify fatality patterns and effective impact reduction measures such as reduced speed limits and wildlife under-crossings or overcrossings of particularly dangerous road segments," and "donations to wildlife rehabilitation facilities." (*Id.*, p. 27.)

The IS/MND fails to recognize at all this potential significant impact of the Project. Because a fair argument exists that the Project may have a significant impact on wildlife in the vicinity, an EIR must be prepared to assess this impact and identify appropriate mitigation.

E. <u>The MND fails to adequately address the Project's potential cumulative impacts on wildlife.</u>

The IS/MND fails to adequately analyze the cumulative impacts to wildlife from the Project by improperly implying that cumulative impacts are in reality only residual impacts as a result of incomplete mitigation from project-level impacts. (Ex. A, p. 24.) For example, the IS/MND states that "[t]he proposed project's impacts would be individually limited and not cumulatively considerable due to the site-specific nature of the potential impacts." (IS/MND, p. 118.) However, the IS/MND's implied standard is not the standard of cumulative effects required under CEQA. (Ex. A, p. 24.) CEQA defines cumulative impacts, and it outlines two general approaches for performing the required cumulative analysis. (*See* 14 CCR § 15130; PRC § 21083(b)(2).)

Here, the IS/MND's cumulative "analysis" is based on flawed logic. The conclusion that the Project will have no cumulative impact because each individual impact has been reduced to a less-than-significant level relies on the exact argument CEQA's cumulative impact analysis is meant to protect against. The entire purpose of the cumulative impact analysis is to prevent the situation where mitigation occurs to address project-specific impacts, without looking at the bigger picture. This argument, applied over and over again, has resulted in major environmental damage, and is a major reason why CEQA was enacted. As the Court stated in *CBE v. CRA*:

> Cumulative impact analysis is necessary because the full environmental impact of a proposed project cannot be gauged in a vacuum. One of the most important environmental lessons that has been learned is that environmental damage often occurs incrementally from a variety of small sources. These sources appear insignificant when considered individually, but assume threatening dimensions when considered collectively with other sources with which they interact.

(*CBE v. CRA*, 103 Cal.App.4th at 114 (citations omitted).) As such, the MND misrepresented the standard and failed to perform an appropriate analysis.

The IS/MND further claims that the cumulative impacts to biological resources would be avoided through implementation of recommended mitigation measures. (IS/MND, p. 118.) Dr. Smallwood explains that "this claim is fallacious because mitigation measures for direct project impacts do not necessarily mitigate the sorts of incremental effects to other similar projects that CEQA is concerned about." (Ex. A, p. 24.) According to Dr. Smallwood,

> An example that is highly relevant to the proposed project is the site's existing place in ongoing habitat fragmentation. Habitat fragmentation is the reduction of connectivity of remaining habitat patches on a landscape, and which can further diminish the productive capacity of wildlife in the region (Smallwood 2015). The project would further fragment habitat in an environmental setting in which the wildlife that persist are persisting on one of the very last margins of open space. The very late stage of habitat fragmentation represented at the project site warrants concern. The project's furtherance of habitat fragmentation on such a highly fragmented landscape easily qualifies as a significant cumulative impact that has not been analyzed nor mitigated in the IS/MND.

(*Id.*) Thus, an EIR must be prepared to include an adequate, serious analysis of the Project's cumulative impacts on wildlife.

F. <u>The pre-construction surveys identified in the MND are not sufficient to address potential impacts to birds that may be present at the site.</u>

Dr. Smallwood has reviewed the proposed wildlife impact mitigation identified in the IS/MND related to pre-construction surveys for nesting birds and roosting bats (i.e. **Mitigation Measures BIO-1** and **BIO-2**). (*See* Ex. a, pp. 25-26.) Although Dr. Smallwood agrees with the need for pre-construction surveys for birds and bats at the Project site, he notes that pre-construction surveys will come too late either to disclose the Project's anticipated impacts or to fully mitigate impacts to birds and bats. (*Id.*) As Dr. Smallwood explains:

> Preconstruction surveys are not designed to detect the target species with anywhere close to the same likelihood as are protocol-level detection surveys, and so are intended as follow-up surveys to detection surveys, the latter of which are needed to inform the CEQA impacts analysis and to identify feasible mitigation measures to reduce the project's significant impacts on this species (CDFW 2012).
>
> Furthermore, den excavation and passive relocation of burrowing owl burrows would be inconsistent with the CDFW (2012) mitigation guidelines. In fact, CDFW (2012) warns that excavation and passive relocation can be interpreted as take.

(Ex. A, p. 25.) By failing to determine the actual baseline of bird's and bat's reliance on the site for roosting, nesting, and foraging and instead waiting within seven days prior to the start of construction to determine what roosts, nests, birds, and bats may suffer impacts from the Project, the IS/MND fails to evaluate and mitigate the Project's potential significant impacts to nesting birds and bats.

Dr. Smallwood recommends that detection surveys be implemented for the Project before pre-construction surveys are performed. (*Id.*, p. 26.) In addition to detection surveys and preconstruction surveys being performed, an EIR should be prepared detailing how the results of preconstruction surveys will be reported.

CONCLUSION

For the foregoing reasons, the IS/MND for the Project should be withdrawn, an EIR should be prepared, and the draft EIR should be circulated for public review and comment in accordance with CEQA. Thank you for considering these comments.

Sincerely,

Victoria Yundt
LOZEAU | DRURY LLP

EXHIBIT A

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29 September 2023

RE: Living Spaces Development Permit Application No. P22-04122

Dear Mr. Holt,

I write to comment on the Initial Study/Mitigated Negative Declaration ("IS/MND") prepared for Permit Application No. P22-04122 -- a Living Spaces furniture retail building with 104,867 square-foot floor space on 8 acres at 7354 N Abby St, Fresno (APN: 303-201-27). I also removed the biological resources report (LSA 2023). The IS/MND characterizes the site of the proposed project as "vacant," but I wish to comment on the wildlife that make use of the site. My comments that follow refute the City's determination that the project would cause no significant impacts to biological resources.

My qualifications for preparing expert comments are the following. I hold a Ph.D. degree in Ecology from University of California at Davis, where I also worked as a post-graduate researcher in the Department of Agronomy and Range Sciences. My research has been on animal density and distribution, habitat selection, wildlife interactions with the anthrosphere, and conservation of rare and endangered species. I authored many papers on these and other topics. I served as Chair of the Conservation Affairs Committee for The Wildlife Society – Western Section. I am a member of The Wildlife Society and Raptor Research Foundation, and I've lectured part-time at California State University, Sacramento. I was 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. I have performed wildlife surveys in California for thirty-seven years. My CV is attached.

SITE VISIT

I visited the site of the proposed project for 1.75 hours from 18:25 to 20:10 hours on 5 June 2023 and for 3 hours from 05:36 hours to 08:36 hours on 6 June 2023. I performed visual-scan surveys for wildlife with the use of binoculars at two locations around the periphery of the site. The sky was overcast on the 5th and partly cloudy with lightning on the 6th. There were no winds, and temperatures ranged 63° F to 85° F. The site was covered by annual grassland, and bordered on the north and south by hedges of shrubs and ornamental trees (Photos 1 and 2).

I saw and photographed osprey (Photos 3 and 4) and double-crested cormorants (Photo 5), both species of which are on California Department of Fish and Wildlife's Taxa to Watch List.

Photos 1 and 2. *Views of the site of the proposed project 6 June 2023.*

Photos 3 and 4. *Osprey flew over the project site at 06:03 hours (left), and returned 20 minutes later with a fish (right), 6 June 2023.*

Photo 5. *Double-crested cormorants flew over the project site on 6 June 2023.*

I also saw many American crows, a black-crowned night-heron and a pair of Canada geese (Photos 6-8), California scrub-jays and northern mockingbirds (Photos 9 and 10), mourning doves (Photos 11 and 12), western kingbirds (Photos 13 and 15), Anna's hummingbirds (Photo 14), California ground squirrels (Photos 16 and 17), and desert cottontails (Photo 18), among other species. Some of the species of birds were breeding on site, including California scrub-jay and killdeer (Photos 19 and 20). I detected 21 species of vertebrate wildlife at the site and another 2 species nearby, and altogether I detected 3 special-status species of wildlife (Table 1).

Photo 6. *Sixty-six American crows flew over the project site, 5 June 2023.*

Photos 7 and 8. *Black-crowned night-heron (left) and Canada goose (right) flying over the project site, 5-6 June 2023.*

Photo 9
California scrub-jay on the project site, 6 June 2023.

Photo 10.
Northern mockingbird wing-flashing on the project site, 5 June 2023. Wing-flashing is performed to startle arthropod prey items into revealing themselves.

Photos 11 and 12. *Mourning doves forage on the project site, 6 June 2023.*

Photo 13. *Western kingbird hovers as a foraging strategy on the project site, 6 June 2023.*

Photos 14 and 15. *Annas's hummingbird (left) and western kingbird (right) on the project site, 6 June 2023.*

Photo 16. *California ground squirrel pups under the watchful eye of a parent (standing in grass at left) on the project site, 6 June 2023.*

Photos 17 and 18. *Ground squirrel pup (top) and desert cottontail (bottom) on the project site, 5-6 June 2023.*

Photo 19. *California scrub-jay fledgling (left) begs a parent for food on the project site, 5 June 2023.*

Photo 20. *Killdeer on its nest on the project site, 5 June 2023.*

Table 1. *Species of wildlife I observed during 4.75 hours of survey on 5-6 June 2023.*

Common name	***Species name***	**Status[1]**	**Notes**
Canada goose	*Branta canadensis*		Pair flew over, low
Killdeer	*Charadrius vociferus*		On site
Great egret	*Ardea alba*		Very close to site
Great blue heron	*Ardea herodias*		Flew over
Cattle egret	*Bubulcus ibis*	Range expansion	Pair flew over, low
Black-crowned night heron	*Nycticorax nycticorax*		Flew over
Double-crested cormorant	*Nannopterum auritum*	TWL	3 flew over, low
Mourning dove	*Zenaida macroura*		Multiple pairs
Rock pigeon	*Columba livia*	Non-native	
Eurasian collared-dove	*Streptopelia decaocto*	Non-native	
White-throated swift	*Aeronautes saxatalis*		Foraged over site
Anna's hummingbird	*Calypte anna*		Along hedges
Osprey	*Pandion haliaetus*	TWL, BOP	3 flyovers, 1 with fish
Northern harrier	*Circus hudsonius*	BCC, SSC3, BOP	Nearby
Western kingbird	*Tyrannus verticalis*		Pair and fledglings
European starling	*Sturnus vulgaris*	Non-native	
House finch	*Haemorphous mexicanus*		Pairs
California scrub-jay	*Aphelocoma californica*		Pairs and fledglings
American crow	*Corvus brachyrhynchos*		66 flew over in evening
Cliff swallow	*Petrochelidon pyrrhonota*		Foraging
Northern mockingbird	*Mimus polyglottos*		Pairs and fledglings
Desert cottontail	*Sylvilagus audubonii*		Out in evening
California ground squirrel	*Otospermophilus beecheyi*		Pups and adults

[1] Listed as BCC = U.S. Fish and Wildlife Service Bird of Conservation Concern, SSC3 = California Species of Special Concern priority level 3 (Shuford and Gardali 2008), TWL = Taxa to Watch List (Shuford and Gardali 2008), and BOP = Birds of Prey (California Fish and Game Code 3503.5).

A couple of reconnaissance surveys, such as those I completed at the project site, cannot support species' absence determinations, but they can be useful for confirming presence of species and for learning something about what wildlife are doing there. Such surveys can also be useful for estimating the number of species that were not detected, thereby revealing the degree to which the local wildlife community was sampled. One way to do this is to compare my survey outcomes relative to my survey efforts both at the project site and at a research site where I spent hundreds of hours at many survey stations to quantify the levels of sampling of the wildlife community that I could achieve from more extensive survey effort.

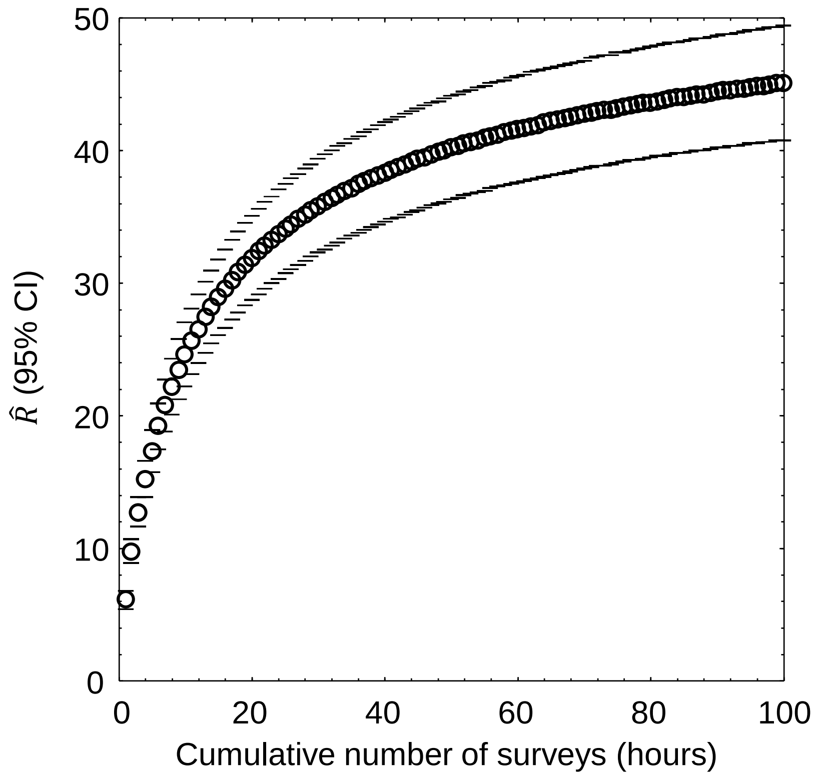
By use of an analytical bridge, I applied a model developed from a much larger, more robust data set at a research site to predict the number of wildlife species that would make use of the project site over the longer term. As part of my research, I completed a much larger survey effort across 167 km^2 of annual grasslands of the Altamont Pass Wind Resource Area, Alameda County, where from 2015 through 2019 I performed 721 1-hour visual-scan surveys, or 721 hours of surveys, at 46 stations. I used binoculars and otherwise the methods were the same as the methods I used at the project site. At each of the 46 survey stations at my research site, I tallied new species detected with each sequential survey at that station, and then related the cumulative species detected to the hours (number of surveys, as each survey lasted 1 hour) used to accumulate my counts of species detected. I used combined quadratic and simplex methods of estimation in Statistica to estimate least-squares, best-fit nonlinear models of the number of cumulative species detected regressed on hours of survey (number of surveys) at the station: $\hat{R} = \frac{1}{1/_{a} + b \times (Hours)^{c}}$, where $\hat{R}$ represented cumulative species richness detected. The models' coefficients of determination, r^2, ranged 0.88 to 1.00, with a mean of 0.97 (95% CI: 0.96, 0.98); or in other words, the models were excellent fits to the data.

I projected the predictions of each model to thousands of hours to find predicted asymptotes of wildlife species richness. The mean model-predicted asymptote of species richness was 57 after 11,857 hours of visual-scan surveys among the 46 stations. I also averaged model predictions of species richness at each incremental increase of number of surveys, i.e., number of hours (Figure 1). On average I detected 16.8 species over the first 4.75 hours of surveys in the Altamont Pass (4.75 hours to match the number of hours I surveyed at the project site), which composed 29.47% of the total predicted species I would detect with a much larger survey effort. Given the example illustrated in Figure 1, the 21 species I detected after my 4.75 hours of survey at the project site likely represented 29.47% of the species to be detected after many more visual-scan surveys over another year or longer. With many more repeat surveys through the year, I would likely detect $^{21}/_{0.2947} = 71$ species of vertebrate wildlife at the site. Assuming my ratio of special-status to non-special-status species was to hold through the detections of all 71 predicted species, then continued surveys would eventually detect 7 special-status species of vertebrate wildlife.

Again, however, my prediction of 71 species of vertebrate wildlife, including 7 special-status species, is derived from a visual-scan survey during the daytime, and would not detect nocturnal birds and mammals. The true number of species composing the wildlife community of the site must be larger. A couple of reconnaissance surveys should serve only as a starting point toward characterization of a site's wildlife community, but it certainly cannot alone inform of the inventory of species that use the site.

Considering the number of wildlife species known and predicted to occur at the site of the proposed project, and considering the number of special-status species known and predicted to occur at the site, a fair argument can be made for the need to prepare an EIR to appropriately characterize the wildlife community as part of the existing environmental setting.

Figure 2. *Mean (95% CI) predicted wildlife species richness, $\hat{R}$, as a nonlinear function of hour-long survey increments across 46 visual-scan survey stations across the Altamont Pass Wind Resource Area, Alameda and Contra Costa Counties, 2015–2019.*



EXISTING ENVIRONMENTAL SETTING

The first step in analysis of potential project impacts to biological resources is to accurately characterize the existing environmental setting, including the biological species that use the site, their relative abundances, how they use the site, key ecological relationships, and known and ongoing threats to those species with special status. A reasonably accurate characterization of the environmental setting can provide the basis for determining whether the site holds habitat value to wildlife, as well as a baseline against which to analyze potential project impacts. For these reasons, characterization of the environmental setting, including the project's site's regional setting, is one of CEQA's essential analytical steps (§15125). Methods to achieve this first step typically include (1) surveys of the site for biological resources, and (2) reviews of literature, databases and local experts for documented occurrences of special-status species. In the case of this project, these steps remain incomplete.

Environmental Setting informed by Field Surveys

LSA (2023) names a biologist who surveyed for wildlife on the project site on 19 January 2023. However, LSA (2023) fails to report the time the survey began and how long it lasted. Without knowing the level of survey effort, the reader cannot interpret whether the survey detected the typical species or the typical number of species, or whether it detected fewer or more than the usual number of species. Without this critical information about the survey, the findings carry no comparative value. The reporting of the field survey is deficient.

LSA (2023) reports having detected 7 species of vertebrate wildlife at the project site. This finding suggests to me that LSA spent very little time on the site. I spent only 4.75 hours at the site, and detected the occurrences of 3 times the number of vertebrate wildlife species as seen by LSA (2023), and I saw two more species nearby. City of Fresno needs a better accounting of how much survey effort was directed to the project site.

Reporting in the IS/MND is unsupportable by LSA's (2023) field survey. For example, the IS/MND (p. 37) states, "None of the burrows observed in the project site exhibited features typical of occupied burrowing owl burrows at the time of the survey…" However, burrowing owls typically leave little to no sign of their presence at burrows that they occupy over winter. That no sign was found has no bearing on the occurrence likelihood of burrowing owls. Furthermore, no protocol-level detection surveys have been completed for burrowing owls at this site.

In another example, the IS/MND reports "…only limited habitat for tree, shrub and ground-nesting birds exists on the project site…" In reality, the site includes expansive substrate for ground-nesting birds, and is surrounded by hedges of shrubs and trees in which birds nest. Not only is all of this nest substrate amply available, but it was in use by nesting birds while I surveyed the site from the site's periphery. I watched as California scrub-jays fed their begging fledglings right on the project site (Photo 19) and as killdeer nested on site (Photo 20). I also observed fledgling northern mockingbirds and western kingbirds being fed on the project site by their parents. The IS/MND is inaccurate.

Environmental Setting informed by Desktop Review

The purpose of literature and database review, and of consulting with local experts, is to inform the reconnaissance-level survey, to augment it, and to help determine which protocol-level detection surveys should be implemented. Analysts need this information to identify which species are known to have occurred at or near the project site, and to identify which other special-status species could conceivably occur at the site due to geographic range overlap and site conditions. This step is important because the reconnaissance-level survey is not going to detect all of the species of wildlife that make use of the site. This step can identity those species yet to be detected at the site but which have been documented to occur nearby or whose available habitat associations are consistent with site conditions. Some special-status species can be ruled out of further analysis, but only if compelling evidence is available in support of such determinations (see below).

In this part of the review, the IS/MND is again misleading. On page 38, it reports, "no special-status species have been identified within the project site or in the vicinity of the site." This reporting is misleading because the City of Fresno has not actually looked for special-status species at the project site. No protocol-level detection surveys have been completed. And species occurrence databases need to be interpreted more carefully.

The desktop review is biased by a curtailed list of potentially occurring special-status species, which resulted from a query of occurrence records within the nearest CNDDB quadrangles. LSA (2023) and the IS/MND screen out many special-status species from further consideration in their characterization of the wildlife community as a component of the baseline environmental setting. CNDDB is not designed to support absence determinations or to screen out species from characterization of a site's wildlife community. As noted by CNDDB, "*The CNDDB is a positive sighting database. It does not predict where something may be found. We map occurrences only where we have documentation that the species was found at the site. There are many areas of the state where no surveys have been conducted and therefore there is nothing on the map. That does not mean that there are no special status species present*." LSA (2023) and the IS/MND misuse CNDDB.

CNDDB relies entirely on volunteer reporting from biologists who were allowed access to whatever properties they report from. Many properties have never been surveyed by biologists. Many properties have been surveyed, but the survey outcomes never reported to CNDDB. Many properties have been surveyed multiple times, but not all survey outcomes reported to CNDDB. Furthermore, CNDDB is interested only in the findings of special-status species, which means that species more recently assigned special status will have been reported many fewer times to CNDDB than were species assigned special status since the inception of CNDDB. The lack of many CNDDB records for species recently assigned special status had nothing to do with whether the species' geographic ranges overlapped the project site, but rather the brief time for records to have accumulated since the species were assigned special status. And because negative findings are not reported to CNDDB, CNDDB cannot provide the basis for estimating occurrence likelihoods, either.

In my assessment based on database reviews and site visits, 86 special-status species of wildlife are known to occur near enough to the site to warrant analysis of occurrence potential (Table 2). Of these 86 species, I confirmed 2 on site by my survey, and another 46 (53%) have been documented within 1.5 miles of the site ('Very close'), 8 of which were recently reported, and another 13 (15%) within 1.5 and 4 miles ('Nearby'), and another 19 (22%) within 4 to 30 miles ('In region'). More than two-thirds (71%) of the species in Table 2 have been reportedly seen within 4 miles of the project site. The site therefore supports multiple special-status species of wildlife and carries the potential for supporting many more special-status species of wildlife based on proximity of recorded occurrences.

Of the 86 special-status species of wildlife that appear in my Table 2, LSA (2023) addresses only 3 (4%) of them, determining only one of these 3 to have "suitable habitat" on the site (the quotes are there because suitable habitat is redundant; there is no such thing as unsuitable habitat). LSA (2023) refers to an Appendix D, which might have been a more expansive analysis of occurrence likelihoods of special-status species, but Appendix D is missing from the copy of LSA (2023) that is circulated with the IS/MND. Of the species that are analyzed in LSA (2023), Swainson's hawk is assigned marginal occurrence potential and burrowing owl is assigned low potential, but both have been reported within only 1.5 miles of the project site. LSA (2023) does not provide an adequate analysis of the occurrence likelihoods of special-status species.

LSA (2023:7) defends its inadequate analysis with the following statement: "The evaluation of special-status animal species occurrence within the project site was based on a habitat suitability analysis. It did not include exhaustive surveys to determine their presence or absence, but did include direct observation of on-site and off-site conditions and a review of the available recorded occurrence data from the area to conclude whether or not a particular species could be expected to occur. Based on this analysis, it is unlikely that the remaining special-status wildlife species listed in Attachment D would occupy or otherwise utilize the habitat present within the project site." LSA's defense is flawed. The mere visiting of a site for a brief period and the inappropriate use of species occurrence databases cannot substitute for protocol-level detection surveys, which by the way, are not exhaustive survey efforts. LSA (2023) lacks the basis for making absence determinations or absence insinuations for special-status species of wildlife at the project site.

POTENTIAL BIOLOGICAL IMPACTS

An impacts analysis should consider whether and how the proposed project would affect members of a species, larger demographic units of the species, the whole of a species, and ecological communities. In the following I introduce several types of impacts likely to result from the project, and which need to be analyzed in an EIR.

HABITAT LOSS

The project would contribute further to habitat fragmentation, which poses serious problems to wildlife in the region. Habitat fragmentation and habitat loss have been recognized as the most likely leading causes of a documented 29% decline in overall bird abundance across North America over the last 48 years (Rosenberg et al. 2019). Habitat loss not only results in the immediate numerical decline of wildlife, but it also results in permanent loss of productive capacity. That the site is productive to birds was made obvious by the breeding behaviors exhibited by birds I saw there.

In the case of birds, two methods exist for estimating the loss of productive capacity that would be caused by the project. One method would involve surveys to count the number of bird nests and chicks produced. The alternative method is to infer productive capacity from estimates of total nest density elsewhere. Two study sites in grassland-wetland-woodland complexes had total bird nesting densities of 32.8 and 35.8 nests per acre (Young 1948, Yahner 1982) for an average 34.3 nests per acre, but the project site is in vineyard, orchard and ornamental trees of two homes. Total nesting density at the project site is probably lower than at the cited study sites. Assuming the 8-acre project site supports only a fifth of the total nesting density of the above-referenced study sites, one can predict a loss of 55 bird nests. Based on the species I saw at the site, 55 nests seems plausible to me.

Table 2. *Occurrence likelihoods of special-status bird species at or near the proposed project site, according to eBird/iNaturalist records (https://eBird.org, https://www.inaturalist.org) and on-site survey findings, where 'Very close' indicates within 1.5 miles of the site, "nearby" indicates within 1.5 and 4 miles, and "in region" indicates within 4 and 30 miles, and 'in range' means the species' geographic range overlaps the site. Entries in bold font indicate the species I detected during my surveys.*

Common name	***Species name***	**Status**[1]	**Occurrence potential (LSA 2023)**	**Database records, Site visits**
Monarch	*Danaus plexippus*	FC		Nearby
Crotch's bumble bee	*Bombus crotchii*	CCE		Nearby
California tiger salamander	*Ambystoma californiense*	FT, CT, WL		Nearby
Western spadefoot	*Spea hammondii*	SSC		In region
Western pond turtle	*Emys marmorata*	SSC		Nearby
Cackling goose (Aleutian)	*Branta hutchinsii leucopareia*	WL		Very close
Redhead	*Aythya americana*	SSC2		Very close
Barrow's goldeneye	*Bucephala islandica*	SSC		Very close
Western grebe	*Aechmophorus occidentalis*	BCC		Very close
Clark's grebe	*Aechmophorus clarkii*	BCC		Very close
Black swift	*Cypseloides niger*	SSC3, BCC		In region
Vaux's swift	*Chaetura vauxi*	SSC2, BCC		Very close
Costa's hummingbird	*Calypte costae*	BCC		Nearby
Rufous hummingbird	*Selasphorus rufus*	BCC		Very close
Snowy plover	*Charadrius nivosus*	BCC		In region
Whimbrel[2]	*Numenius phaeopus*	BCC		Very close
Long-billed curlew	*Numenius americanus*	WL		Very close
Marbled godwit	*Limosa fedoa*	BCC		In region
Red knot (Pacific)	*Calidris canutus*	BCC		In region
Short-billed dowitcher	*Limnodromus griseus*	BCC		Nearby
Willet	*Tringa semipalmata*	BCC		In region
American avocet[2]	*Recurvirostra americana*	BCC		Very close
California gull	*Larus californicus*	BCC, WL		Very close
Black tern	*Chlidonias niger*	SSC2, BCC		In region
Common loon	*Gavia immer*	SSC		Very close

Common name	***Species name***	**Status[1]**	**Occurrence potential (LSA 2023)**	**Database records, Site visits**
Double-crested cormorant	*Phalacrocorax auritus*	WL	No suitable nest habitat	**On site**
American white pelican	*Pelacanus erythrorhynchos*	SSC1, BCC		Very close
White-faced ibis	*Plegadis chihi*	WL		Very close
Turkey vulture	*Cathartes aura*	BOP		Very close
Osprey	*Pandion haliaetus*	WL, BOP		**On site**
White-tailed kite	*Elanus luecurus*	CFP, BOP		Very close
Golden eagle	*Aquila chrysaetos*	BGEPA, CFP, BOP, WL		Very close
Northern harrier	*Circus cyaneus*	BCC, SSC3, BOP		**Very close**
Sharp-shinned hawk	*Accipiter striatus*	WL, BOP		Very close
Cooper's hawk	*Accipiter cooperii*	WL, BOP		Very close
Bald eagle	*Haliaeetus leucocephalus*	CE, BGEPA, CFP		Very close, recent
Red-shouldered hawk	*Buteo lineatus*	BOP		Very close
Swainson's hawk	*Buteo swainsoni*	CT, BOP	Marginal	Very close, recent
Red-tailed hawk	*Buteo jamaicensis*	BOP		Very close, recent
Ferruginous hawk	*Buteo regalis*	WL, BOP		Very close
Rough-legged hawk	*Buteo lagopus*	BOP		Nearby
Barn owl	*Tyto alba*	BOP		Very close
Western screech-owl	*Megascops kennicotti*	BOP		Nearby
Great horned owl	*Bubo virginianus*	BOP		Very close
Burrowing owl	*Athene cunicularia*	BCC, SSC2, BOP	Low	Very close
Lewis's woodpecker	*Melanerpes lewis*	BCC		Very close
Nuttall's woodpecker	*Picoides nuttallii*	BCC		Very close, recent
American kestrel	*Falco sparverius*	BOP		Very close, recent
Merlin	*Falco columbarius*	WL, BOP		Very close
Peregrine falcon	*Falco peregrinus*	CFP, BOP		Very close
Prairie falcon	*Falco mexicanus*	WL, BOP		Very close
Olive-sided flycatcher	*Contopus cooperi*	BCC, SSC2		Very close
Willow flycatcher	*Empidonax trailii*	CE		Very close
Vermilion flycatcher	*Pyrocephalus rubinus*	SSC2		Very close

Common name	***Species name***	**Status[1]**	**Occurrence potential (LSA 2023)**	**Database records, Site visits**
Loggerhead shrike	*Lanius ludovicianus*	SSC2		Very close, recent
Yellow-billed magpie	*Pica nuttalli*	BCC		Nearby
Oak titmouse	*Baeolophus inornatus*	BCC		Nearby
California horned lark	*Eremophila alpestris actia*	WL	Suitable	Very close
Bank swallow	*Riparia riparia*	CT		In region
Purple martin	*Progne subis*	SSC2		In region
Wrentit	*Chamaea fasciata*	BCC		In region
California thrasher	*Toxostoma redivivum*	BCC		Very close
Cassin's finch	*Haemorhous cassinii*	BCC		Nearby
Lawrence's goldfinch	*Spinus lawrencei*	BCC		Very close
Grasshopper sparrow	*Ammodramus savannarum*	SSC2		In region
Bell's sparrow	*Amphispiza b. belli*	WL		In region
Oregon vesper sparrow	*Pooecetes gramineus affinis*	SSC2, BCC		Very close
Yellow-breasted chat	*Icteria virens*	SSC3		Nearby
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	SSC3		Very close
Bullock's oriole	*Icterus bullockii*	BCC		Very close, recent
Tricolored blackbird	*Agelaius tricolor*	CT, BCC, SSC1		Very close
Yellow warbler	*Setophaga petechia*	SSC2		Very close, recent
Pallid bat	*Antrozous pallidus*	SSC, WBWG:H		In region
Townsend's big-eared bat	*Corynorhinus townsendii*	SSC, WBWG:H		In region
Canyon bat	*Parastrellus hesperus*	WBWG:L		In region
Big brown bat	*Episticus fuscus*	WBWG:L		In region
Silver-haired bat	*Lasionycteris noctivagans*	WBWG:M		In range
Western red bat	*Lasiurus blossevillii*	SSC, WBWG:H		In region
Hoary bat	*Lasiurus cinereus*	WBWG:M		In region
Western small-footed myotis	*Myotis cililabrum*	WBWG:M		In range
Fringed myotis	*Myotis thysanodes*	WBWG:H		In range
Yuma myotis	*Myotis yumanensis*	WBWG:LM		In range

Common name	***Species name***	**Status[1]**	**Occurrence potential (LSA 2023)**	**Database records, Site visits**
California myotis	*Myotis californicus*	WBWG:L		In region
Fresno kangaroo rat	*Dipodomys nitratoides exilis*	FE, CE		In range
Tipton kangaroo rat	*Dipodomys nitratoides nitratoides*	FE, CE		In range
American badger	*Taxidea taxus*	SSC		Nearby

[1] Listed as FT or FE = federal threatened or endangered, FC = federal candidate for listing, BCC = U.S. Fish and Wildlife Service Bird of Conservation Concern, CT or CE = California threatened or endangered, CCT or CCE = Candidate California threatened or endangered, CFP = California Fully Protected (California Fish and Game Code 3511), SSC = California Species of Special Concern (not threatened with extinction, but rare, very restricted in range, declining throughout range, peripheral portion of species' range, associated with habitat that is declining in extent), SSC1, SSC2 and SSC3 = California Bird Species of Special Concern priorities 1, 2 and 3, respectively (Shuford and Gardali 2008), WL = Taxa to Watch List (Shuford and Gardali 2008), and BOP = Birds of Prey (CFG Code 3503.5), and WBWG = Western Bat Working Group with priority rankings, of low (L), moderate (M), and high (H).

[2] Uncertain if BCC based on 2021 Bird of Conservation Concern list.

The loss of 55 nest sites of birds would qualify as a potentially significant project impact, but the impact does not end with the immediate loss of nest sites as nest substrate is removed and foraging grounds graded in preparation for impervious surfaces. The reproductive capacity of the site would be lost. The average number of fledglings per nest in Young's (1948) study was 2.9. Assuming Young's (1948) study site typifies bird productivity, the project would prevent the production of 160 fledglings per year. Assuming an average bird generation time of 5 years, the lost capacity of both breeders and annual fledgling production can be estimated from an equation in Smallwood (2022): {(nests/year × chicks/nest × number of years) + (2 adults/nest × nests/year) × (number of years ÷ years/generation)} ÷ (number of years) = 182 birds per year denied to California. In the face of a potential project impact of this magnitude, a fair argument can be made for the need to prepare an EIR to appropriately analyze potential project impacts to the productive capacity of birds.

WILDLIFE MOVEMENT

One of CEQA's principal concerns regarding potential project impacts is whether a proposed project would interfere with wildlife movement in the region. An analysis is required. But what is reported is a series of unfounded assertions, such as on page 5 of the IS/MND: "The project site does not possess any characteristics that would indicate a locally significant stopover point for migratory species including raptors or waterfowl. No known wildlife movement corridors occur within the project site or in the immediate vicinity." Exactly what characteristics would indicate locally significant stopover is unidentified. Nor is it explained what qualifies as a known wildlife movement corridor. And on page 39, the IS/MND asserts, "The project site does not contain any features that would function as wildlife movement corridors for resident or migratory wildlife species." Again, the IS/MND fails to reveal the nature of these features; examples would help. And on page 39, the IS/MND speculates, "Additionally, existing chain-link fencing surrounding the project site limits the movement of wildlife species on the site." However, the chain-link fence incompletely surrounds the site and is broken in many places; wildlife movement appeared to me to be completely unaffected by the fence.

Most of the IS/MND's assertions regarding potential impacts to wildlife movement were premised on whether the site is located within a wildlife movement corridor or whether it serves as part of a corridor. The IS/MND's premise for its assertions represents a false CEQA standard, and is therefore inappropriate to the analysis. The primary phrase of the CEQA standard goes to wildlife movement regardless of whether the movement is channeled by a corridor. A site such as the proposed project site is critically important for wildlife movement because it composes an increasingly diminishing area of open space within a growing expanse of anthropogenic uses, forcing more species of volant wildlife to use the site for stopover and staging during migration, dispersal, and home range patrol (Warnock 2010, Taylor et al. 2011, Runge et al. 2014). In fact, I observed wildlife using the site as part of their travel routes, including osprey, Canada goose, American crows and black-crowned night-heron. The project would cut wildlife off from one of the last remaining stopover and staging opportunities in the project area, forcing volant wildlife to travel even farther between remaining stopover sites. This impact would be significant, and as the project is currently proposed, it would be unmitigated.

Furthermore, LSA (2023) implemented no methodology in its reconnaissance survey to determine whether or to what degree the project site might be used in support of wildlife movement in the region. There was no reported program of observation of behaviors related to movement. There was no sampling that would inform of wildlife movement at and around the project site. There was no search for sign of wildlife movement. Nothing was done that would provide information in support of the IS/MND's assertions that the project site is unimportant to wildlife movement in the region.

TRAFFIC IMPACTS TO WILDLIFE

The IS Form neglects to address one of the project's most obvious, substantial impacts to wildlife, and that is wildlife mortality and injuries caused by project-generated traffic. Project-generated traffic would endanger wildlife that must, for various reasons, cross roads used by the project's traffic (Photos 21–24), including along roads far from the project footprint. Vehicle collisions have accounted for the deaths of many thousands of amphibian, reptile, mammal, bird, and arthropod fauna, and the impacts have often been found to be significant at the population level (Forman et al. 2003). Across North America traffic impacts have taken devastating tolls on wildlife (Forman et al. 2003). In Canada, 3,562 birds were estimated killed per 100 km of road per year (Bishop and Brogan 2013), and the US estimate of avian mortality on roads is 2,200 to 8,405 deaths per 100 km per year, or 89 million to 340 million total per year (Loss et al. 2014). Local impacts can be more intense than nationally.

Photo 21. *A Gambel's quail dashes across a road* on *3 April 2021. Such road crossings are usually successful, but too often prove fatal to the animal. Photo by Noriko Smallwood.*

Photo 22. *Great-tailed grackle walks onto a rural road in Imperial County, 4 February 2022.*

Photo 23. *Mourning dove killed by vehicle on a California road. Photo by Noriko Smallwood, 21 June 2020.*

Photo 24. *Raccoon killed on Road 31 just east of Highway 505 in Solano County. Photo taken on 10 November 2018.*

The nearest study of traffic-caused wildlife mortality was performed along a 2.5-mile stretch of Vasco Road in Contra Costa County, California. Fatality searches in this study found 1,275 carcasses of 49 species of mammals, birds, amphibians and reptiles over 15 months of searches (Mendelsohn et al. 2009). This fatality number needs to be adjusted for the proportion of fatalities that were not found due to scavenger removal and searcher error. This adjustment is typically made by placing carcasses for searchers to find (or not find) during their routine periodic fatality searches. This step was not taken at Vasco Road (Mendelsohn et al. 2009), but it was taken as part of another study next to Vasco Road (Brown et al. 2016). Brown et al.'s (2016) adjustment factors for carcass persistence resembled those of Santos et al. (2011). Also applying searcher detection rates from Brown et al. (2016), the adjusted total number of fatalities was estimated at 12,187 animals killed by traffic on the road. This fatality number over 1.25 years and 2.5 miles of road translates to 3,900 wild animals per mile per year. In terms comparable to the national estimates, the estimates from the Mendelsohn et al. (2009) study would translate to 243,740 animals killed per 100 km of road per year, or 29 times that of Loss et al.'s (2014) upper bound estimate and 68 times the Canadian estimate. An analysis is needed of whether increased traffic generated by the project site would similarly result in local impacts on wildlife.

For wildlife vulnerable to front-end collisions and crushing under tires, road mortality can be predicted from the study of Mendelsohn et al. (2009) as a basis, although it would be helpful to have the availability of more studies like that of Mendelsohn et al. (2009) at additional locations. My analysis of the Mendelsohn et al. (2009) data resulted in an estimated 3,900 animals killed per mile along a county road in Contra Costa County. Two percent of the estimated number of fatalities were birds, and the balance was composed of 34% mammals (many mice and pocket mice, but also ground squirrels, desert cottontails, striped skunks, American badgers, raccoons, and others), 52.3% amphibians (large numbers of California tiger salamanders and California red-legged frogs, but also Sierran treefrogs, western toads, arboreal salamanders, slender salamanders and others), and 11.7% reptiles (many western fence lizards, but also skinks, alligator lizards, and snakes of various species). The metric, annual Vehicle Miles Traveled (VMT), is useful for predicting wildlife mortality because I was able to quantify miles traveled along the studied reach of Vasco Road during the time period of the Mendelsohn et al. (2009), hence enabling a rate of fatalities per VMT that can be projected to other sites, assuming similar collision fatality rates.

Predicting project-generated traffic impacts to wildlife

The IS/MND predicts 667,848 annual VMT. During the Mendelsohn et al. (2009) study, 19,500 cars traveled Vasco Road daily, so the vehicle miles that contributed to my estimate of non-volant fatalities was 19,500 cars and trucks × 2.5 miles × 365 days/year × 1.25 years = 22,242,187.5 vehicle miles per 12,187 wildlife fatalities, or 1,825 vehicle miles per fatality. This rate divided into the predicted annual VMT above would predict 366 vertebrate wildlife fatalities per year. Assuming the commercial/residential landscape of the project site supports only half of the number of animals crossing roads as animals cross Vasco Road where the Mendelsohn et al. (2009) study occurred in annual grassland, the project-generated traffic would cause 183 wildlife fatalities per year, but even this number would qualify as a substantial and highly significant project impact.

There is at least a fair argument that can be made for the need to prepare an EIR to analyze this impact. Mitigation measures to improve wildlife safety along roads are available and are feasible, and they need exploration for their suitability with the proposed project.

CUMULATIVE IMPACTS

The IS'MND (page 118) claims, "The proposed project's impacts would be individually limited and not cumulatively considerable due to the site-specific nature of the potential impacts." What the IS/MND means by "site-specific nature" is unclear, but it does not comport with the definition of cumulative impacts in the CEQA Guidelines. The IS/MND further claims that cumulative impacts to biological resources would be avoided through implementation of recommended mitigation measures. But this claim is fallacious because mitigation measures for direct project impacts do not necessarily mitigate the sorts of incremental effects to other similar projects that CEQA is concerned about. An example that is highly relevant to the proposed project is the site's existing place in ongoing habitat fragmentation. Habitat fragmentation is the reduction of connectivity of remaining habitat patches on a landscape, and which can further diminish the productive capacity of wildlife in the region (Smallwood 2015). The project would further fragment habitat in an environmental setting in which the wildlife that persist are persisting on one of the very last margins of open space. The very late stage of habitat fragmentation represented at the project site warrants concern. The project's furtherance of habitat fragmentation on such a highly fragmented landscape easily qualifies as a significant cumulative impact that has not been analyzed nor mitigated in the IS/MND.

MITIGATION MEASURES

Mitigation Measure BIO-1: *A preconstruction clearance survey shall be required for burrowing owl no more than 30 calendar days prior to initiation of project activities. … If an active burrowing owl burrow is found within the project site, … Specific avoidance, den excavation, passive relocation, and compensatory mitigation activities shall be performed as required by CDFW.*

Whereas I concur that preconstruction, take-avoidance surveys should be completed, the IS/MND proposes preconstruction surveys where detection surveys have yet to be completed. Preconstruction surveys are not designed to detect the target species with anywhere close to the same likelihood as are protocol-level detection surveys, and so are intended as follow-up surveys to detection surveys, the latter of which are needed to inform the CEQA impacts analysis and to identify feasible mitigation measures to reduce the project's significant impacts on this species (CDFW 2012).

Furthermore, den excavation and passive relocation of burrowing owl burrows would be inconsistent with the CDFW (2012) mitigation guidelines. In fact, CDFW (2012) warns that excavation and passive relocation can be interpreted as take.

Mitigation Measure BIO-2: *If vegetation removal, construction, or grading activities are planned to occur within the active nesting bird season (February 15 through September 15), a qualified biologist shall conduct a preconstruction nesting bird survey no more than 5 days prior to the start of such activities. … For any active nest(s) identified, the qualified biologist shall establish an appropriate buffer zone around the active nest(s). The appropriate buffer shall be determined by the qualified biologist based on species, location, and the nature of the proposed activities.*

This mitigation language allows a single individual to make a subjective decision, outside the public's view, to determine the buffer area for any given species. This measure lacks objective criteria, and is unenforceable.

The avian breeding season represented in the IS/MND is outdated. It is recognized by the California Department of Fish and Wildlife as 1 February through 15 September.

Regardless of the appropriate characterization of the avian breeding season, which in my opinion never truly starts and ends on any particular dates other than the birth and death dates of a bird,[1] this measure would not avoid impacts to sensitive avian species. It might prevent the direct destruction of the few nests found by biologists at the immediate time of the preconstruction survey, but it would not prevent the loss of avian breeding capacity and a regional decline of birds.

[1] No bird can successfully breed without surviving through the non-breeding seasons, nor without finding sufficient forage and finding or maintaining a reproductive partner during the non-breeding seasons. The activities of birds during the non-breeding season, and the locations of birds – the habitats they occupy – are no less critical to breeding success than the activities and locations of birds during the breeding season.

The vast majority of bird nests would not be found by biologists assigned to the survey. I have surveyed for avian nest sites many times, including an intensive survey effort that began in February 2023 and is ongoing. In the ongoing study, I have surveyed my study site 25 times, spending 4 to 5 hours at the study site each time. Even after all this effort, I have located the exact nest sites of only a small fraction of all the nest sites that I know exist based on behavior patterns. I know which pairs of birds are nesting, and I know generally where they are nesting, but not exactly where their nests are located. Of the nest sites I have found, most are cavity nests that are most effectively defended against predators. But most of the nest sites are cup nests or ground nests whose owners cannot allow to be revealed to potential predators. Based on my experience, it is highly likely that the preconstruction survey would fail to find any of the nests of ground-nesting birds that truly occur on the project site, and few of the shrub- and tree-nesting bird nests. The IS/MND's implication that preconstruction survey would avoid potential impacts to nesting birds to a less-than-significant level is unsubstantiated and unrealistic. Even assuming the biologists managed to find all of the nest sites of breeding birds, which would be highly unlikely, this measure would fail to avoid the takings of 8 acres of avian breeding habitat, thereby denying Californians another 182 birds per year (see earlier comment under Habitat Loss).

RECOMMENDED MEASURES

Detection Surveys: If the project goes forward, species detection surveys are needed to (1) support negative findings of species when appropriate, (2) inform preconstruction surveys to improve their efficacy, (3) estimate project impacts, and (4) inform compensatory mitigation and other forms of mitigation. Detection survey protocols and guidelines are available from resource agencies for most special-status species. Otherwise, professional standards can be learned from the scientific literature and species' experts. Survey protocols that need to be implemented include CDFW (2000) for Swainson's hawks. The guidelines call for multiple surveys throughout the breeding season.

Detection Surveys for Bats: Multiple special-status species of bats likely occur on and around the project site. A qualified bat biologist should be tasked with completing protocol-level detection surveys for bats. It needs to be learned whether bats roost in the area and whether bats forage on site.

Preconstruction surveys: Completion of reports of the methods and outcomes of preconstruction surveys for burrowing owls and nesting birds should be required. The reports should be made available to the public.

Construction Monitoring: If the project goes forward, two or more qualified biologists need to serve as construction monitors. Objective, enforceable criteria need to be specified for implementation of buffers around bird nests or dens of fossorial mammals. The events associated with construction monitoring, such as efforts to avoid impacts and findings of dead and injured wildlife, need to be summarized in a report that is subsequently made available to the public.

Habitat Loss: If the project goes forward, compensatory mitigation would be warranted for habitat loss. At least an equal area of land should be protected in perpetuity as close to the project site as possible, but a larger area is likely warranted to mitigate for the impacts to so many special-status species of wildlife as likely occur on the site. And additional compensatory mitigation should be linked to impacts identified in construction monitoring.

Road Mortality: Compensatory mitigation is needed for the increased wildlife mortality that would be caused by the project-generated road traffic in the region. I suggest that this mitigation can be directed toward funding research to identify fatality patterns and effective impact reduction measures such as reduced speed limits and wildlife under-crossings or overcrossings of particularly dangerous road segments. Compensatory mitigation can also be provided in the form of donations to wildlife rehabilitation facilities (see below).

Fund Wildlife Rehabilitation Facilities: Compensatory mitigation ought also to include funding contributions to wildlife rehabilitation facilities to cover the costs of injured animals that will be delivered to these facilities for care. Many animals would likely be injured by collisions with automobiles.

Thank you for your attention,

____
Shawn Smallwood, Ph.D.

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Curriculum Vitae

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Born May 3, 1963 in
Sacramento, California.
Married, father of two.

Ecologist

Expertise

- Finding solutions to controversial problems related to wildlife interactions with human industry, infrastructure, and activities;
- Wildlife monitoring and field study using GPS, thermal imaging, behavior surveys;
- Using systems analysis and experimental design principles to identify meaningful ecological patterns that inform management decisions.

Education

Ph.D. Ecology, University of California, Davis. September 1990.
M.S. Ecology, University of California, Davis. June 1987.
B.S. Anthropology, University of California, Davis. June 1985.
Corcoran High School, Corcoran, California. June 1981.

Experience

- 762 professional reports, including:
- 90 peer reviewed publications
- 24 in non-reviewed proceedings
- 646 reports, declarations, posters and book reviews
- 8 in mass media outlets
- 92 public presentations of research results

Editing for scientific journals: Guest Editor, *Wildlife Society Bulletin*, 2012-2013, of invited papers representing international views on the impacts of wind energy on wildlife and how to mitigate the impacts. Associate Editor, *Journal of Wildlife Management*, March 2004 to 30 June 2007. Editorial Board Member, *Environmental Management*, 10/1999 to 8/2004. Associate Editor, *Biological Conservation*, 9/1994 to 9/1995.

Member, Alameda County Scientific Review Committee (SRC), August 2006 to April 2011. The five-member committee investigated causes of bird and bat collisions in the Altamont Pass Wind Resource Area, and recommended mitigation and monitoring measures. The SRC reviewed the science underlying the Alameda County Avian Protection Program, and advised the County on how to reduce wildlife fatalities.

Consulting Ecologist, 2004-2007, California Energy Commission (CEC). Provided consulting services as needed to the CEC on renewable energy impacts, monitoring and research, and produced several reports. Also collaborated with Lawrence-Livermore National Lab on research to understand and reduce wind turbine impacts on wildlife.

Consulting Ecologist, 1999-2013, U.S. Navy. Performed endangered species surveys, hazardous waste site monitoring, and habitat restoration for the endangered San Joaquin kangaroo rat, California tiger salamander, California red-legged frog, California clapper rail, western burrowing owl, salt marsh harvest mouse, and other species at Naval Air Station Lemoore; Naval Weapons Station, Seal Beach, Detachment Concord; Naval Security Group Activity, Skaggs Island; National Radio Transmitter Facility, Dixon; and, Naval Outlying Landing Field Imperial Beach.

Part-time Lecturer, 1998-2005, California State University, Sacramento. Instructed Mammalogy, Behavioral Ecology, and Ornithology Lab, Contemporary Environmental Issues, Natural Resources Conservation.

Senior Ecologist, 1999-2005, BioResource Consultants. Designed and implemented research and monitoring studies related to avian fatalities at wind turbines, avian electrocutions on electric distribution poles across California, and avian fatalities at transmission lines.

Chairman, Conservation Affairs Committee, The Wildlife Society--Western Section, 1999-2001. Prepared position statements and led efforts directed toward conservation issues, including travel to Washington, D.C. to lobby Congress for more wildlife conservation funding.

Systems Ecologist, 1995-2000, Institute for Sustainable Development. Headed ISD's program on integrated resources management. Developed indicators of ecological integrity for large areas, using remotely sensed data, local community involvement and GIS.

Associate, 1997-1998, Department of Agronomy and Range Science, University of California, Davis. Worked with Shu Geng and Mingua Zhang on several studies related to wildlife interactions with agriculture and patterns of fertilizer and pesticide residues in groundwater across a large landscape.

Lead Scientist, 1996-1999, National Endangered Species Network. Informed academic scientists and environmental activists about emerging issues regarding the Endangered Species Act and other environmental laws. Testified at public hearings on endangered species issues.

Ecologist, 1997-1998, Western Foundation of Vertebrate Zoology. Conducted field research to determine the impact of past mercury mining on the status of California red-legged frogs in Santa Clara County, California.

Senior Systems Ecologist, 1994-1995, EIP Associates, Sacramento, California. Provided consulting services in environmental planning, and quantitative assessment of land units for their conservation and restoration opportunities basedon ecological resource requirements of 29 special-status species. Developed ecological indicators for prioritizing areas within Yolo County to receive mitigation funds for habitat easements and restoration.

Post-Graduate Researcher, 1990-1994, Department of Agronomy and Range Science, *U.C. Davis*. Under Dr. Shu Geng's mentorship, studied landscape and management effects on temporal and spatial patterns of abundance among pocket gophers and species of Falconiformes and Carnivora in the Sacramento Valley. Managed and analyzed a data base of energy use in California agriculture. Assisted with landscape (GIS) study of groundwater contamination across Tulare County, California.

Work experience in graduate school: Co-taught Conservation Biology with Dr. Christine Schonewald, 1991 & 1993, UC Davis Graduate Group in Ecology; Reader for Dr. Richard Coss's course on Psychobiology in 1990, UC Davis Department of Psychology; Research Assistant to Dr. Walter E. Howard, 1988-1990, UC Davis Department of Wildlife and Fisheries Biology, testing durable baits for pocket gopher management in forest clearcuts; Research Assistant to Dr. Terrell P. Salmon, 1987-1988, UC Wildlife Extension, Department of Wildlife and Fisheries Biology, developing empirical models of mammal and bird invasions in North America, and a rating system for priority research and control of exotic species based on economic, environmental and human health hazards in California. Student Assistant to Dr. E. Lee Fitzhugh, 1985-1987, UC Cooperative Extension, Department of Wildlife and Fisheries Biology, developing and implementing statewide mountain lion track count for long-term monitoring.

Fulbright Research Fellow, Indonesia, 1988. Tested use of new sampling methods for numerical monitoring of Sumatran tiger and six other species of endemic felids, and evaluated methods used by other researchers.

Projects

Repowering wind energy projects through careful siting of new wind turbines using map-based collision hazard models to minimize impacts to volant wildlife. Funded by wind companies (principally NextEra Renewable Energy, Inc.), California Energy Commission and East Bay Regional Park District, I have collaborated with a GIS analyst and managed a crew of five field biologists performing golden eagle behavior surveys and nocturnal surveys on bats and owls. The goal is to quantify flight patterns for development of predictive models to more carefully site new wind turbines in repowering projects. Focused behavior surveys began May 2012 and continue. Collision hazard models have been prepared for seven wind projects, three of which were built. Planning for additional repowering projects is underway.

Test avian safety of new mixer-ejector wind turbine (MEWT). Designed and implemented a before-after, control-impact experimental design to test the avian safety of a new, shrouded wind turbine developed by Ogin Inc. (formerly known as FloDesign Wind Turbine Corporation). Supported by a $718,000 grant from the California Energy Commission's Public Interest Energy Research program and a 20% match share contribution from Ogin, I managed a crew of seven field biologists who performed periodic fatality searches and behavior surveys, carcass detection trials, nocturnal behavior surveys using a thermal camera, and spatial analyses with the collaboration of a GIS analyst. Field work began 1 April 2012 and ended 30 March 2015 without Ogin installing its MEWTs, but we still achieved multiple important scientific advances.

Reduce avian mortality due to wind turbines at Altamont Pass. Studied wildlife impacts caused by 5,400 wind turbines at the world's most notorious wind resource area. Studied how impacts are perceived by monitoring and how they are affected by terrain, wind patterns, food resources, range management practices, wind turbine operations, seasonal patterns, population cycles, infrastructure management such as electric distribution, animal behavior and social interactions.

Reduce avian mortality on electric distribution poles. Directed research toward reducing bird electrocutions on electric distribution poles, 2000-2007. Oversaw 5 founds of fatality searches at 10,000 poles from Orange County to Glenn County, California, and produced two large reports.

Cook *et al*. v. Rockwell International *et al*., No. 90-K-181 (D. Colorado). Provided expert testimony on the role of burrowing animals in affecting the fate of buried and surface-deposited radioactive and hazardous chemical wastes at the Rocky Flats Plant, Colorado. Provided expert reports based on four site visits and an extensive document review of burrowing animals. Conducted transect surveys for evidence of burrowing animals and other wildlife on and around waste facilities. Discovered substantial intrusion of waste structures by burrowing animals. I testified in federal court in November 2005, and my clients were subsequently awarded a $553,000,000 judgment by a jury. After appeals the award was increased to two billion dollars.

Hanford Nuclear Reservation Litigation. Provided expert testimony on the role of burrowing animals in affecting the fate of buried radioactive wastes at the Hanford Nuclear Reservation, Washington. Provided three expert reports based on three site visits and extensive document review. Predicted and verified a certain population density of pocket gophers on buried waste structures, as well as incidence of radionuclide contamination in body tissue. Conducted transect surveys for evidence of burrowing animals and other wildlife on and around waste facilities. Discovered substantial intrusion of waste structures by burrowing animals.

Expert testimony and declarations on proposed residential and commercial developments, gas-fired power plants, wind, solar and geothermal projects, water transfers and water transfer delivery systems, endangered species recovery plans, Habitat Conservation Plans and Natural Communities Conservation Programs. Testified before multiple government agencies, Tribunals, Boards of Supervisors and City Councils, and participated with press conferences and depositions. Prepared expert witness reports and court declarations, which are summarized under Reports (below).

Protocol-level surveys for special-status species. Used California Department of Fish and Wildlife and US Fish and Wildlife Service protocols to search for California red-legged frog, California tiger salamander, arroyo southwestern toad, blunt-nosed leopard lizard, western pond turtle, giant kangaroo rat, San Joaquin kangaroo rat, San Joaquin kit fox, western burrowing owl, Swainson's hawk, Valley elderberry longhorn beetle and other special-status species.

Conservation of San Joaquin kangaroo rat. Performed research to identify factors responsible for the decline of this endangered species at Lemoore Naval Air Station, 2000-2013, and implemented habitat enhancements designed to reverse the trend and expand the population.

Impact of West Nile Virus on yellow-billed magpies. Funded by Sacramento-Yolo Mosquito and Vector Control District, 2005-2008, compared survey results pre- and post-West Nile Virus epidemic for multiple bird species in the Sacramento Valley, particularly on yellow-billed magpie and American crow due to susceptibility to WNV.

Workshops on HCPs. Assisted Dr. Michael Morrison with organizing and conducting a 2-day workshop on Habitat Conservation Plans, sponsored by Southern California Edison, and another 1-day workshop sponsored by PG&E. These Workshops were attended by academics, attorneys, and consultants with HCP experience. We guest-edited a Proceedings published in Environmental Management.

Mapping of biological resources along Highways 101, 46 and 41. Used GPS and GIS to delineate vegetation complexes and locations of special-status species along 26 miles of highway in San Luis Obispo County, 14 miles of highway and roadway in Monterey County, and in a large area north of Fresno, including within reclaimed gravel mining pits.

GPS mapping and monitoring at restoration sites and at Caltrans mitigation sites. Monitored the success of elderberry shrubs at one location, the success of willows at another location, and the response of wildlife to the succession of vegetation at both sites. Also used GPS to monitor the response of fossorial animals to yellow star-thistle eradication and natural grassland restoration efforts at Bear Valley in Colusa County and at the decommissioned Mather Air Force Base in Sacramento County.

Mercury effects on Red-legged Frog. Assisted Dr. Michael Morrison and US Fish and Wildlife Service in assessing the possible impacts of historical mercury mining on the federally listed California red-legged frog in Santa Clara County. Also measured habitat variables in streams.

Opposition to proposed No Surprises rule. Wrote a white paper and summary letter explaining scientific grounds for opposing the incidental take permit (ITP) rules providing ITP applicants and holders with general assurances they will be free of compliance with the Endangered Species Act once they adhere to the terms of a “properly functioning HCP.” Submitted 188 signatures of scientists and environmental professionals concerned about No Surprises rule US Fish and Wildlife Service, National Marine Fisheries Service, all US Senators.

Natomas Basin Habitat Conservation Plan alternative. Designed narrow channel marsh to increase the likelihood of survival and recovery in the wild of giant garter snake, Swainson’s hawk and Valley Elderberry Longhorn Beetle. The design included replication and interspersion of treatments for experimental testing of critical habitat elements. I provided a report to Northern Territories, Inc.

Assessments of agricultural production system and environmental technology transfer to China. Twice visited China and interviewed scientists, industrialists, agriculturalists, and the Directors of the Chinese Environmental Protection Agency and the Department of Agriculture to assess the need and possible pathways for environmental clean-up technologies and trade opportunities between the US and China.

Yolo County Habitat Conservation Plan. Conducted landscape ecology study of Yolo County to spatially prioritize allocation of mitigation efforts to improve ecosystem functionality within the County from the perspective of 29 special-status species of wildlife and plants. Used a hierarchically structured indicators approach to apply principles of landscape and ecosystem ecology, conservation biology, and local values in rating land units. Derived GIS maps to help guide the conservation area design, and then developed implementation strategies.

Mountain lion track count. Developed and conducted a carnivore monitoring program throughout California since 1985. Species counted include mountain lion, bobcat, black bear, coyote, red and gray fox, raccoon, striped skunk, badger, and black-tailed deer. Vegetation and land use are also monitored. Track survey transect was established on dusty, dirt roads within randomly selected quadrats.

Sumatran tiger and other felids. Upon award of Fulbright Research Fellowship, I designed and initiated track counts for seven species of wild cats in Sumatra, including Sumatran tiger, fishing cat, and golden cat. Spent four months on Sumatra and Java in 1988, and learned Bahasa Indonesia, the official Indonesian language.

Wildlife in agriculture. Beginning as post-graduate research, I studied pocket gophers and other wildlife in 40 alfalfa fields throughout the Sacramento Valley, and I surveyed for wildlife along a 200 mile road transect since 1989 with a hiatus of 1996-2004. The data are analyzed using GIS and methods from landscape ecology, and the results published and presented orally to farming groups in California and elsewhere. I also conducted the first study of wildlife in cover crops used on vineyards and orchards.

Agricultural energy use and Tulare County groundwater study. Developed and analyzed a data base of energy use in California agriculture, and collaborated on a landscape (GIS) study of groundwater contamination across Tulare County, California.

Pocket gopher damage in forest clear-cuts. Developed gopher sampling methods and tested various poison baits and baiting regimes in the largest-ever field study of pocket gopher management in forest plantations, involving 68 research plots in 55 clear-cuts among 6 National Forests in northern California.

Risk assessment of exotic species in North America. Developed empirical models of mammal and bird species invasions in North America, as well as a rating system for assigning priority research and control to exotic species in California, based on economic, environmental, and human health hazards.

Peer Reviewed Publications

Smallwood, K. S. 2022. Utility-scale solar impacts to volant wildlife. Journal of Wildlife Management: e22216. https://doi.org/10.1002/jwmg.22216

Smallwood, K. S., and N. L. Smallwood. 2021. Breeding Density and Collision Mortality of Loggerhead Shrike (*Lanius ludovicianus*) in the Altamont Pass Wind Resource Area. Diversity 13, 540. https://doi.org/10.3390/d13110540.

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