

**River Walk Specific Plan and Draft EIR - DEIR Comments -
Resident Letters received.**

	Name of Commentor	Date Submitted
1	Yvonne Brouard	3-Feb-24
2	Richard & Deborah Gunther	8-Feb-24
3	Mike and Roberta Mc Reynolds	8-Feb-24
4	Susan Jimenez	19-Feb-24
5	Libby Longstreth	21-Feb-24
6	Donald B. Mooney, Attorney for Central Valley Concerned Citizens	26-Feb-24
7	Votersforfarmland	28-Feb-24
8	Donald B. Mooney, Attorney for Central Valley Concerned Citizens	26-Feb-24
9	Votersforfarmland	28-Feb-24
10	Victoria R	29-Feb-24
11	Donald B. Mooney, Attorney for Central Valley Concerned Citizens	4-Mar-24
12	Richard and Christine Holmer	6-Mar-24
13	Colleen Preston	6-Mar-24
14	Soluri Meserve on behalf of Annabel Gammon and Allen Gammon	7-Mar-24
15	Joseph Adrian	11-Mar-24
16	Deborah Basey, M.S. Biological Conservation	14-Mar-24
17	Krystal Rodriguez	15-Mar-24
18	Marilyn McRitchie, Tom Hollander, Shaaron Hollander, John Degele	18-Mar-24
19	Jude Lamare, Friends of the Swainson's hawk	20-Mar-24
20	Donald B. Mooney, Attorney for Central Valley Concerned Citizens	20-Mar-24
21	Charles Carley (Laurie Carley), League of Woman Voters	21-Mar-24
22	Diana Hernandez	27-Mar-24
23	Leefong Mouavangsou	2-Apr-24
24	Kerry H Tsai	4-Apr-24
25	Bryan Paradee	6-Apr-24
26	Leefong Mouavangsou	8-Apr-24
27	Judith Lamare, Friends of the Swainson's Hawk	16-Apr-24
28	Christa Casci	22-Apr-24
29	Nana Redell	25-Apr-24
30	Jean Davis	25-Apr-24
31	Bob Leonard	30-Apr-24
32	Dianna Hernandez	30-Apr-24
33	Jean Davis	4-May-24
34	Donald B. Mooney, Attorney for Central Valley Concerned Citizens	4-May-24
35	Janet and Joe Neal	6-May-24
36	Robert Mallory	8-May-24
37	Milton Trieweiler, Yokuts Group of the Sierra Club	9-May-24
38	Karen and Kent Mitchell	13-May-24
39	Lori Wolf of wood Colony	13-May-24
40	John Herrick	13-May-24
41	Diana Hernandez-Adrian	13-May-24

42	Michael and Kyle Lingg	13-May-24
43	Martin Adrian	14-May-24
44	Richard and Christine Holmer	14-May-34
45	Karen Conrotto	14-May-24
46	Donald B. Mooney, Attorney for Central Valley Concerned Citizens	15-May-24
47	Betsy Walton	15-May-24
48	Susan Worden	15-May-24
49	James Inman	15-May-24
50	Ector Olivares, Catholic Charities	15-May-24
51	Susan Wedegaertner	16-May-24
52	Margaret L. W. Cousins	16-May-24
53	Robert DeMont - flood	16-May-24
54	Robert DeMont - farmland	16-May-24
55	Robert DeMont - climate	16-May-24
56	Robert DeMont - biology	16-May-24
57	Robert DeMont - traffic	16-May-24
58	Donald B. Mooney, Attorney for Central Valley Concerned Citizens	16-May-24
59	Vivian Lopez	16-May-24
60	Garry Pearson	16-May-24
61	Soluri Meserve on behalf of Annabel and Allen Gammon	16-May-24
62	John Herrick	16-May-24
63	Brian and Mary Lomax	16-May-24
64	Robert DeMont - groundwater	16-May-24
65	Kevin Wolf	16-May-24
66	Chad Wright	16-May-24
67	Jeani Ferrari, Farmland Working Group	16-May-24
68	Gary Pearson	16-May-24
69	Bernard Aggers	16-May-24
70	Jami Aggers - 134 bulleted comments	16-May-24
71	Jami Aggers - petition	16-May-24
72	Jami Aggers - MSR	16-May-24
73	Jami Aggers - Specific Plan	16-May-24
74	Jami Aggers - safe Passage	16-May-24
75	Jami Aggers - Wendt ranch Reclamation District	16-May-24
76	Jami Aggers - groundwater	16-May-24
77	Evelyn Halbert	16-May-24
78	Karen Conrotto	16-May-24

Miguel Galvez

From: Yvonne Brouard <yvonnebrouard@me.com>
Sent: Saturday, February 3, 2024 5:01 PM
To: River Walk
Subject: 1507 Patterson Road

2/3/2024

Hello,

We, Robert Altman, MD and Yvonne Brouard, MD are the owners and farmers of 1507 Patterson road, Modesto, 95357, which appears to be in an intended low density residential area of the riverwalk project area specific plan. We received a letter today about the riverwalk project and it is the first thing we have heard of this.

We need to know what the intent is of the city of Riverbank. Is eminent domain being planned to take over these areas? Or is development up to the property owners?
I would like to speak with someone about the plans.

Yvonne Brouard, MD
209-402-6643

Miguel Galvez

From: Deborah <gunther.deb@gmail.com>
Sent: Thursday, February 8, 2024 11:37 AM
To: River Walk
Subject: Riverwalk comments

Att: Miguel Galvez

A short, simple and clear comment re: the Riverwalk development. For all the reasons mentioned in the EIR we are NOT in favor of this massive development. Our prime concerns are the loss of valuable prime farmland and the huge impact Riverwalk will have on infrastructure, traffic, schools and city services. Build out should continue to reach completion within Riverbank's existing sphere of influence before going after more land and more development.

Richard & Deborah Gunther
Riverbank, CA

Sent from my iPad

FEB 08 2024

DEVELOPMENT SERVICES

February 5, 2024

ATTN: Miguel Galvez, Contract City Planner,

The River Walk Draft EIR was located after writing a letter to express concerns to the Mayor and City Council. The letter is included below; please read it. We are in complete agreement with the concerns regarding this project, which have been thoroughly listed on pages ES-2, ES-3, and ES-4. You don't need us to repeat what you already know and have studied; these concerns cannot be overlooked.

Thank you for hearing our voices,

Mike Mc Reynolds
Roberto Mc Reynolds

Dear Mayor O'Brien and City Council Members,

We are registered voters and signed the petition to get the River Walk development on the ballot for the residents of Riverbank to decide on the measure. We are strongly against using the land for more housing and any other development.

The Modesto Bee reported on Jan. 30, "Riverbank Mayor Richard O'Brien has said that he is against voter-imposed limits on land in general but would weigh River Walk carefully. 'We'll still work with the agricultural community,' he said in a phone interview Tuesday."

It is safe to assume that the majority of voters are against politician-imposed limits on our freedom to have a voice in a matter that affects not only our quality of life, but countless other consumers who can hope to benefit from the proper usage of prime agricultural land.

Does the will of a handful of a few politicians, who happen to briefly hold office, truly outweigh the many lives that must live with the consequences for generations to come?

This is a decision that cannot be reversed. Once you have paved over this precious land, the damage is done forever.

Thank you for your time,

To: City of Riverbank
Miguel Galvez, Contract City Planner
City of Riverbank
6707 3rd Street, Suite A
Riverbank, CA 95367

CITY OF RIVERBANK
FEB 26 2024
DEVELOPMENT SERVICES

Date: February 19, 2024

Reject the proposed Riverwalk Specific Plan (RWSP)!

Preserve the land in question as Prime Agricultural Land!

I urge the decision-makers to reject the proposed Riverwalk Specific Plan (RWSP) and the annexation of the land into the City of Riverbank. Further, I urge you to preserve the land as prime agricultural land, and if growth is needed/desired, to direct growth away from the RWSP area permanently.

What about our Prime Agricultural land, Zoning and Land Use Issues? The proposed RWSP development does not comply with existing zoning regulations or land use plans, leading to concerns about inappropriate land use and increased density. The RWSP EIR concludes that the *loss of agricultural land* that would result if this project moves forward is “significant and unavoidable.”

Please do not convert this *Prime Agricultural Land and Land of Statewide Importance (as classified by the State of California)* into a population-dense development of houses that will require commercial enterprises such as grocery stores, shopping, medical offices, care facilities, and other services that humans require.

What about environmental concerns? The RWSP project will have negative impacts on the local environment, such as habitat destruction, water pollution, and increased traffic, more drivers on the road, leading to air pollution. The RWSP will be growth-inducing which will only bring more development on prime agricultural land in the area. Page ES-44 of the EIR lists this impact as “less than significant” when, in fact, it should be classified as “potentially very significant” as it will entice growth from Escalon (San Joaquin County) to the North of the proposed RWSP project, and from either Riverbank or Modesto to the South (from Coffee Road heading West and between Patterson and Kiernan/Claribel Roads). *If this were to occur there would be virtually no remaining agricultural buffer in Riverbank.*

What about strain on existing infrastructure? The RWSP development will strain existing infrastructure such as roads, utilities, and services such as police, fire, EMS, medical/hospitals, and schools, leading to potential issues with capacity and maintenance.

What does the community say? Local Riverbank residents and neighbors adjacent to the proposed RWSP oppose the project due to concerns about changes to the character of the area, change in use of the land, increased traffic, loss of agricultural

1/2

land, and increased noise levels - an extreme change in the experience and quality of life of locals and visitors.

Who benefits? The RWSP project primarily benefits developers and/or outside investors without providing significant advantages to the local community.

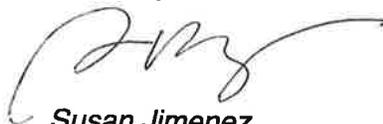
What about preserving history, cultural heritage, and the rural 'feel' to the area?

The RWSP project destroys the rural 'feel' to Riverbank, Escalon, this area of Stanislaus County, and will erode quality of life for those who live in the area. This beautiful, fertile agricultural land is an asset to the Riverbank Area, The Central Valley, and California, and it should be preserved as agricultural land for future generations because there is no greater value than to grow the food with which we feed ourselves. To convert this prime agricultural land to mixed use/mixed density housing will forever change the experience and quality of life of locals and visitors; it will encourage growth and expansion of services in between Riverbank and the RWSP. This represents a slippery slope of development and there will be no going back to the way it was.

Who am I? I grew up in Modesto. While I now live elsewhere, I have family in Riverbank and Modesto, and I visit the Riverbank area regularly. I know the area proposed for the RWSP very well. I have watched that area evolve for over 40 years - from a walnut orchard to row crops; always growing food. I appreciate the agricultural 'feel' to the area and knowing that food is grown there.

I urge decision-makers to choose "No Development" - thus, rejecting the Riverwalk Specific Plan (RWSP).

Sincerely,



Susan Jimenez
8754 Steelhead Ct
Reno, Nevada 89523

susan@maddawgfitness.com

CITY OF RIVERBANK

FEB 21 2024

DEVELOPMENT SERVICES

Libby Longstreth
2205 Christmas Tree Lane
Riverbank, CA

2/11/24
Riverbank, CA

Dear City of Riverbank

I am writing to voice my strong opposition to the proposed housing project in our community. The following points highlight my concerns:

Heavy housing density: 3300 units, predominantly medium to high density.

Need for two new wells and one-million-gallon water tanks, further depleting groundwater basins.

Excessive government subsidization of developer expenses.

Anticipated riparian habitat degradation due to sewer drains.

Loss of space, blocking wildlife corridors.

Inadequate flood control plans, neglecting climate change implications.

Lack of guarantee for Modesto Irrigation District's acceptance of excess water.

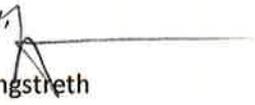
Solid waste disposal to local landfills, with insufficient data on capacity.

Withheld information regarding funding and stakeholder identification.

Potential loss of world-quality agricultural land.

I urge you to reconsider support for this project in light of these concerns. Thank you for your attention to this matter.

Sincerely,


Libby Longstreth

CITY OF RIVERBANK

FEB 21 2024

DEVELOPMENT SERVICES

Libby Longstreth
2205 Christmas Tree Lane
Riverbank, CA

2/11/24

Dear City of Riverbank

I wanted to talk about the housing project they're planning. Here are some things I'm worried about:

They want to build too many houses, 3300 in total! Most of them will be very close together, and that will make things too crowded. They need two new wells and big water tanks. This will use up a lot of our water, and it could be bad for everyone. I heard the government will pay too much money for it. We have to use our money carefully! The sewer drains they want to build will hurt the animals and plants near the river. Building the houses will block the animals' paths. What if it rains a lot? The plans don't seem to think about that very much. I don't want the river to get dirty because of extra water. Can the landfills take all the trash from the new houses? They're not telling us everything about the money and the people involved. We should know! I love our farming land. I don't want to lose it.

Thanks for listening. Please think about these things before making a decision.

Sincerely,


Libby Longstreth

FEB 21 2024

DEVELOPMENT SERVICES

Libby Longstreth
2205 Christmas Tree Lane
Riverbank, CA

2/11/24

Dear City of Riverbank

I wanted to talk about the new houses they want to build. Here's what's bothering me:

They want to build so many houses, 3300 in total!

They need two new wells and big water tanks. That's a lot of water!

I heard the government will pay a lot of money for it.

I'm worried about the animals and plants near the river if they build the sewer drains.

Building all those houses will block the animals' paths.

What if it rains a lot? Are they ready?

I don't want the river to get dirty because of extra water.

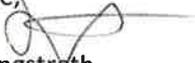
Can the landfills take all the trash from the new houses?

They're not telling us everything about the money and people involved.

I love our farming land. I don't want to lose it.

Thanks for listening. Let's think about it together.

Take care,


Libby Longstreth

CITY OF RIVERBANK

FEB 21 2024

DEVELOPMENT SERVICES

Libby Longstreth
2205 Christmas Tree Lane
Riverbank, CA

2/11/24
Riverbank, CA

Dear City of Riverbank

I wanted to share some concerns about the proposed housing project that's been circulating lately.

Here's what's been on my mind:

Heavy Housing Density: There's talk about building 3300 units, and most of them will be pretty close together. It makes me worry about how crowded things will get.

Water Depletion: They're planning to put in two new wells and some really big water tanks. I can't help but wonder if that's going to make our water situation even worse.

Excessive Government Subsidization: I've heard that the project will get a lot of money from the government. It makes me wonder if that money could be better spent somewhere else.

Riparian Habitat Degradation: The sewer drains they want to put in could harm the habitats near the river. It's scary to think about what will happen to the animals and plants there.

Loss of Wildlife Corridors: Building all those houses will block the paths animals use to move around. It could really mess up their homes.

Inadequate Flood Control Plans: With all the changes happening in the weather lately, it feels like we should be more prepared for floods. But the plans don't seem to talk much about that.

Uncertain Water Discharge: I'm not sure if the Modesto Irrigation District will agree to take all the extra water. If they don't, what happens to it?

Solid Waste Disposal Concerns: I've heard that the trash from the new houses will go to the local landfills. But I don't know if they're ready to handle all that extra stuff.

Transparency Issues: It feels like we don't know everything about where the money for the project is coming from or who's involved. Shouldn't we know that stuff?

Threat to Agricultural Land: The land they want to build on is really good for farming. If we lose it, where will our food come from?

I hope you'll think about these things before making any big decisions about the housing project. Thanks for listening.

Sincerely,


Libby Longstreth

CITY OF RIVERBANK

FEB 21 2024

DEVELOPMENT SERVICES

Libby Longstreth
2205 Christmas Tree Lane
Riverbank, CA

2/11/24
Riverbank, CA

Dear City of Riverbank

I am writing to express my concerns regarding the proposed housing project. My apprehensions revolve around the following areas:

Heavy Housing Density: The plan proposes 3300 units, primarily in medium to high density, raising concerns about overcrowding and resource strain.

Water Depletion: The project necessitates two new wells and one-million-gallon water tanks, potentially exacerbating groundwater depletion issues.

Excessive Government Subsidization: There are worries about the project relying heavily on government subsidies, which may lead to fiscal mismanagement.

Riparian Habitat Degradation: The installation of sewer drains under the river poses risks to riparian habitats and local wildlife.

Loss of Wildlife Corridors: The project may disrupt wildlife corridors, resulting in loss of habitat and hindering animal movement.

Inadequate Flood Control Plans: Flood control measures appear inadequate to address potential climate change impacts, leaving the community vulnerable.

Uncertain Water Discharge: Concerns arise over the Modesto Irrigation District's acceptance of excess water, potentially leading to river contamination.

Solid Waste Disposal Concerns: Disposal of solid waste to local landfills lacks clarity on their capacity to manage increased tonnage effectively.

Transparency Issues: There is a lack of transparency regarding funding sources and project participants, raising accountability concerns.

Threat to Agricultural Land: The project jeopardizes world-quality agricultural land, impacting food security and local economy.

I urge you to carefully consider these concerns before proceeding with the project. Thank you for your attention.

Sincerely,


Libby Longstreth

CITY OF RIVERBANK

FEB 21 2024

DEVELOPMENT SERVICES

Libby Longstreth
2205 Christmas Tree Lane
Riverbank, CA

2/11/24
Riverbank, CA

Dear City of Riverbank

As a concerned member of our community, I feel compelled to address the proposed housing project that looms on the horizon, casting a shadow of uncertainty over our collective future. Permit me to elucidate my reservations through a narrative lens, weaving together the multifaceted concerns that animate my advocacy against this endeavor.

Picture, if you will, a landscape teeming with vitality, where verdant meadows and babbling brooks intertwine with the rhythmic pulse of urban life. Now, envisage the encroachment of concrete monoliths, as 3300 housing units materialize, their imposing stature casting a pall over the once pristine expanse.

As the architectural behemoth takes shape, so too does the specter of environmental degradation. The need for two new wells and one-million-gallon water tanks emerges as a harbinger of ecological imbalance, threatening to deplete our groundwater basins and consigning precious aquifers to the annals of history.

Yet, the greatest tragedy lies not in the physical footprint of development, but in the erosion of democratic principles that undergird our society. The opaque veil shrouding the project's funding and stakeholder identities bespeaks a governance system in disarray, where transparency and accountability languish in the shadows of vested interests.

Moreover, the riparian habitats that cradle our ecosystem in tender embrace stand imperiled by the specter of sewer drains, weaving a subterranean labyrinth beneath the river's surface. This assault on biodiversity strikes at the very heart of our communal ethos, heralding a reckoning with the fragility of our natural heritage.

In the absence of robust flood control measures, the ravages of climate change loom large, casting a pall of uncertainty over our collective destiny. As rising tides encroach upon our doorstep, the inadequacy of our preparedness stands as a stark indictment of our hubris. In the crucible of civic engagement, we find the crucible of our shared humanity, where voices rise in unison to challenge the status quo and demand accountability. It is within this crucible that I humbly beseech your solidarity, as we stand on the precipice of history, poised to shape the contours of our shared future.

In closing, let us heed the clarion call of stewardship, as custodians of a legacy entrusted to us by generations past. Let us forge a path forward guided by the twin beacons of prudence and foresight, as we navigate the turbulent waters of progress with wisdom and humility.

Thank you for your unwavering commitment to the public good.

With warm regards,


Libby Longstreth

Libby Longstreth
2205 Christmas Tree Ln
Riverbank, CA

CITY OF RIVERBANK

FEB 21 2024

DEVELOPMENT SERVICES

CITY OF RIVERBANK

FEB 21 2024

DEVELOPMENT SERVICES

City of Riverbank
RE Riverwalk

I'm writing to talk about the housing project they're planning. Here's what I'm worried about:

- **Heavy Housing Density:** They want to build too many houses, 3300 in total! Most of them will be very close together, and that will result in crowding.
- **Water Depletion:** They say they need two new wells and big water tanks. This will use up a lot of our water, and it could be bad for everyone.
- **Government Subsidization:** I heard the government will pay too much money for it. We have to use our money carefully!
- **Habitat Damage:** The sewer drains they want to build will hurt the animals and plants near the river.
- **Loss of Space:** Building the houses will block the animals' paths and hurt their homes.
- **Flood Control:** What if it rains a lot? The plans don't seem to think about that very much.
- **Water Discharge:** The river will get dirty if they don't handle the extra water properly.
- **Waste Disposal:** The trash from the new houses will go to the landfills nearby.
- **Lack of Transparency:** They're not telling us everything about the money and the people involved. We should know!
- **Agricultural Land Loss:** We will lose our good farming land. That's important for food!
- **We are losing valuable flood plain.** This doesn't just protect us from flooding but also provides the open land necessary to collect rainfall and replenish the aquifer.

Thank you for listening. Please think about these things before making a decision.

Sincerely,

Libby Longstreth



CITY OF RIVERBANK

FEB 21 2024

DEVELOPMENT SERVICES

Libby Longstreth
2205 Christmas Tree Lane
Riverbank, CA
2/11/24
City of Riverbank
Riverbank, CA

Dear City of Riverbank

Allow me to express my profound concerns regarding the proposed housing project within our community. In evaluating the project's facets, it becomes evident that several critical issues necessitate deliberation and reconsideration:

Firstly, the projected heavy housing density, comprising 3300 units with a predominant emphasis on medium to high density, raises apprehensions about the sustainability of urban development initiatives and the potential strain on existing infrastructural frameworks.

Secondly, the proposed implementation of two new wells and one-million-gallon water tanks portends adverse consequences for groundwater basins, exacerbating already precarious water scarcity concerns and compromising the integrity of local aquifers.

Thirdly, the apparent overreliance on governmental subsidization to offset developer expenses calls into question the equitable allocation of public funds and the prudence of financial investments within the developmental sphere.

Moreover, the anticipated riparian habitat degradation, attributable to the installation of sewer drains beneath the river and surrounding habitats, poses an imminent threat to local biodiversity and ecological equilibrium.

Furthermore, the encroachment upon open space, compounded by the obstruction of crucial wildlife corridors, heralds the prospect of irreversible ecological damage with far-reaching ecological ramifications.

Additionally, the inadequacies inherent in flood control plans, bereft of considerations for the escalating impacts of climate change, underscore the imperative for adaptive and sustainable developmental strategies.

The absence of assurances regarding the Modesto Irrigation District's receptivity to excess water further compounds concerns, potentially culminating in the contamination of riverine ecosystems and the compromise of water quality standards.

The proposed solid waste disposal scheme, entailing transportation to local landfills, remains shrouded in opacity, lacking the requisite data to ascertain the capacity for accommodating escalated tonnage.

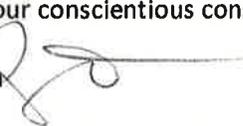
Furthermore, the withholding of critical information concerning funding sources and stakeholder involvement engenders a climate of distrust and obfuscates the principles of transparency and accountability integral to sound governance practices.

In summation, the projected loss of world-quality agricultural land represents a sobering indictment of prevailing developmental paradigms, underscoring the need for a concerted reevaluation of priorities and a steadfast commitment to sustainable urbanization strategies.

In light of these considerations, I implore your judicious reassessment of support for the aforementioned housing project, prioritizing the preservation of ecological integrity and the safeguarding of community interests.

Thank you for your conscientious consideration of these concerns.

Warm regards,
Libby Longstreth



FEB 21 2024

DEVELOPMENT SERVICES

Libby Longstreth
2205 Christmas Tree Lane
Riverbank, CA

2/11/24

City of Riverbank
Riverbank, CA

Dear City of Riverbank

I am writing to express my deep concerns regarding the proposed housing project within our community. Below are the key issues that trouble me:

- **Heavy Housing Density:** The project plans to accommodate 3300 units, with most falling within medium to high-density categories. Such density raises worries about overpopulation and strain on resources.
- **Water Depletion:** The need for two new wells and one-million-gallon water tanks is alarming. This will further deplete our groundwater basins, exacerbating existing water scarcity issues.
- **Excessive Government Subsidization:** There are concerns about the project being excessively subsidized by the government, potentially leading to misallocation of funds.
- **Riparian Habitat Degradation:** The installation of sewer drains under the river threatens riparian habitats and biodiversity.
- **Loss of Wildlife Corridors:** The project may block wildlife corridors, leading to loss of space and hindrance to animal movement.
- **Inadequate Flood Control Plans:** Flood control plans seem insufficient to address the potential impacts of climate change, putting the community at risk. Preventing refill of the aquifer is a serious risk.
- **Uncertain Water Discharge:** There is no guarantee that the Modesto Irrigation District will accept excess water, potentially leading to discharge of waste water into the river.
- **Solid Waste Disposal Concerns:** The plan to dispose solid waste in local landfills lacks clarity on their capacity to handle the extra tonnage.
- **Transparency Issues:** Information regarding funding and identification of project participants is not transparent, raising concerns about accountability.
- **Threat to Agricultural Land:** The project may lead to the loss of world-quality agricultural land, affecting food security and local economy.

I urge you to consider these concerns before proceeding with the project. Thank you for your attention to this matter.

Sincerely,


Libby Longstreth

FEB 21 2024

Libby Longstreth
2205 Christmas Tree Lane
Riverbank, CA

2/11/24
City of Riverbank

Dear City of Riverbank

I am writing to express my concerns about the proposed housing project. Here are the key points of contention:

Heavy Housing Density: The project plans to build 3300 units, mostly in medium to high density, which could strain community resources.

Water Depletion: The project requires two new wells and one-million-gallon water tanks, potentially depleting groundwater basins.

Excessive Government Subsidization: Concerns have been raised about the project's heavy reliance on government subsidies, which may lead to fiscal mismanagement.

Riparian Habitat Degradation: Installation of sewer drains under the river poses risks to riparian habitats and wildlife.

Loss of Wildlife Corridors: The project may block wildlife corridors, leading to loss of habitat and hindering animal movement.

Inadequate Flood Control Plans: Flood control measures do not seem adequate to address potential climate change impacts.

Uncertain Water Discharge: There is uncertainty about whether the Modesto Irrigation District will accept excess water, raising concerns about waste water discharge into the river.

Solid Waste Disposal Concerns:

Disposal of solid waste to local landfills lacks clarity on their capacity to handle increased tonnage.

Transparency Issues: Lack of transparency regarding funding sources and project participants is concerning.

Threat to Agricultural Land: The project threatens world-quality agricultural land, impacting food security and local economy.

I urge you to carefully consider these concerns before proceeding with the project. Thank you for your attention.

Sincerely,


Libby Longstreth

CITY OF RIVERBANK

FEB 21 2024

DEVELOPMENT SERVICES

Libby Longstreth
2205 Christmas Tree Lane
Riverbank, CA

2/11/24
Riverbank, CA

Dear City of Riverbank

I am writing to express my concerns about the proposed housing project. Below are the key issues:

Heavy Housing Density: 3300 units, mostly medium to high density.

Water Depletion: Two new wells and one-million-gallon water tanks may deplete groundwater basins.

Excessive Government Subsidization: Concerns about overreliance on government subsidies.

Riparian Habitat Degradation: Sewer drains under the river pose risks to habitats and wildlife.

Loss of Wildlife Corridors: Project may block wildlife corridors, hindering animal movement.

Inadequate Flood Control Plans: Flood control measures do not address potential climate change impacts.

Uncertain Water Discharge: Modesto Irrigation District's acceptance of excess water uncertain, raising discharge concerns.

Solid Waste Disposal Concerns: Disposal to local landfills lacks clarity on capacity.

Transparency Issues: Lack of transparency regarding funding and project participants.

Threat to Agricultural Land: Project threatens world-quality agricultural land.

I urge you to consider these concerns before proceeding. Thank you for your attention.

Sincerely,


Libby Longstreth

CITY OF RIVERBANK

FEB 21 2024

DEVELOPMENT SERVICES

Libby Longstreth
2205 Christmas Tree Lane
Riverbank, CA

2/15/2024

Dear City of Riverbank

I want to share my concerns about the housing project:

They want to build 3300 houses! That's a lot of houses.

They need two new wells and big water tanks. What about our water?

The government will pay too much money for it.

The sewer drains will hurt animals and plants near the river.

Building the houses will block the animals' paths.

What if it rains a lot? Are they ready?

The river will get dirty with the extra water.

Can the landfills take all the trash from the new houses?

They're not telling us everything about the money and people involved.

We will lose our good farming land.

Please think about these things. Thank you.

Sincerely,


Libby Longstreth

CITY OF RIVERBANK

FEB 21 2024

DEVELOPMENT SERVICES

Libby Longstreth
2205 Christmas Tree Lane
Riverbank, CA

2/11/24

Dear City of Riverbank

I wanted to remind you about the housing project. Here are some things I'm worried about:

They want to build 3300 houses. That's a lot!

They need two new wells and big water tanks. What about our water?

I heard the government will pay too much money for it.

I'm worried about the animals and plants near the river with the sewer drains.

Building the houses will block the animals' paths.

What if it rains a lot? Are they ready?

I don't want the river to get dirty because of extra water.

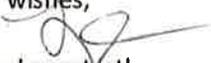
Can the landfills take all the trash from the new houses?

They're not telling us everything about the money and people involved.

I love our farming land. I don't want to lose it.

Thanks for listening. Let's make sure we think about everything.

Best wishes,


Libby Longstreth

FEB 21 2024

DEVELOPMENT SERVICES

Libby Longstreth
2205 Christmas Tree Lane
Riverbank, CA

2/11/24
Riverbank, CA

Dear City of Riverbank

I write to express my profound reservations regarding the proposed housing project within our community. The following points encapsulate the crux of my concerns:

Heavy Housing Density:

The project entails the construction of 3300 units, predominantly in medium to high density, raising apprehensions about urban congestion and infrastructure strain.

Water Depletion:

The projected requirement for two new wells and one-million-gallon water tanks poses a grave risk of exacerbating groundwater depletion and water scarcity issues.

Excessive Government Subsidization:

There are concerns regarding the disproportionate subsidization of developer expenses by governmental entities, potentially engendering fiscal imbalances and misallocation of public funds.

Riparian Habitat Degradation:

The installation of sewer drains beneath the river and riparian habitats poses a significant threat to local biodiversity and ecosystem integrity.

Loss of Space and Wildlife Corridors:

The project's encroachment upon open spaces and wildlife corridors portends adverse ecological ramifications, necessitating a robust environmental impact assessment.

Inadequate Flood Control Plans:

Flood control measures appear insufficient to address the exigencies of climate change, warranting comprehensive revisions to enhance environmental resilience.

Uncertainty Regarding Water Discharge:

The lack of assurances regarding the Modesto Irrigation District's acceptance of excess water heightens concerns about potential river contamination and compromised water quality.

Solid Waste Disposal Concerns:

There is a dearth of data regarding the capacity of local landfills to accommodate increased tonnage, underscoring the imperative for comprehensive waste management strategies.

Transparency Issues:

Withheld information pertaining to funding sources and stakeholder identification undermines public trust and accountability in the decision-making process.

Threat to Agricultural Land:

The projected loss of world-quality agricultural land poses a significant threat to regional food security and environmental sustainability.

In light of these considerations, I beseech your careful reconsideration of support for the proposed housing project, prioritizing the preservation of environmental integrity and community well-being.

Thank you for your attention to these critical matters.

Sincerely,


Libby Longstreth

FEB 21 2024

Libby Longstreth
2205 Christmas Tree Lane
Riverbank, CA

2/11/24
Riverbank, CA

Dear City of Riverbank

I write to express my vehement opposition to the proposed housing project slated for development within our community. My concerns, outlined below, reflect not only environmental apprehensions but also broader socio-economic implications:

The envisaged heavy housing density, comprising 3300 units primarily in medium to high density, threatens to overwhelm our infrastructure and compromise the quality of life for residents.

The projected need for two new wells and one-million-gallon water tanks raises alarms about the exacerbation of groundwater depletion, exacerbating existing water scarcity issues.

The apparent excessive subsidization of developer expenses by governmental bodies raises questions regarding fiscal responsibility and equitable resource allocation.

The anticipated riparian habitat degradation due to sewer drains traversing the river and surrounding habitats poses a significant threat to local biodiversity and ecosystem integrity.

The loss of open space, compounded by the blockage of vital wildlife corridors, portends adverse ecological consequences with long-term ramifications.

The inadequacy of flood control plans to address the evolving challenges posed by climate change underscores a systemic failure to prioritize environmental resilience.

The absence of guarantees regarding the Modesto Irrigation District's acceptance of excess water heightens concerns about potential river contamination and compromised water quality.

The proposed solid waste disposal strategy lacks transparency and oversight, with inadequate assurances regarding the capacity of local landfills to manage increased tonnage.

Withheld information pertaining to project funding and stakeholder involvement further undermines public trust and accountability in the decision-making process.

The projected encroachment upon world-class agricultural land threatens to jeopardize regional food security and disrupt vital agricultural ecosystems.

In conclusion, I implore your earnest consideration of these multifaceted concerns and urge a reevaluation of support for the aforementioned housing project.
Thank you for your attention to this matter.

Sincerely,


Libby Longstreth

LAW OFFICE OF DONALD B. MOONEY

417 Mace Blvd, Suite J-334

Davis, CA 95618

530-304-2424

dbmooney@dcn.org

February 26, 2024

VIA ELECTRONIC MAIL

riverwalk@riverbank.org

Miguel Galvez,
Contract City Planner
City of Riverbank
6617 3rd Street
Riverbank, CA 95367

Re: Riverbank Draft Environmental Impact Report for the River Walk Specific Plan

Dear Mr. Galvez,

On behalf of Central Valley Concerned Citizens I have two requests regarding our review of the Draft Environmental Impact Report for the River Walk Specific Plan.

1. Central Valley Concerned Citizens request that the City provide a 30-day extension for the submittal of public comments. The Draft EIR is quite voluminous at 794 pages and the Appendices is over 1700 pages. Additionally, the Draft EIR raises numerous issues that the community seeks to address. Also, it is our understanding that the City intends to have the Draft EIR translated into Spanish. With the document being translated into Spanish, there should also be an extension of the comment period to provide the opportunity for comments.

2. Central Valley Concerned Citizens also requests that the City provide a copy of the Confidential Cultural Resource Assessment that is identified as *Cultural Resource Assessment for the River Walk Project Area, City of Riverbank, California* (Peak & Associates, Inc., September 2021.) Given the confidential nature of the material, the Assessment should be sent directly to Dr. Sandra Gaskell, Archaeology Resource & Culture, CVCC's consultant in this matter. CVCC understands and appreciates the confidential nature of the material, however, the material is critical to CVCC's ability to provide comments on the Project's potentially significant impacts to cultural resources. CVCC requests that the material be provided directly to Dr. Gaskell as she is authorized by the Office of Historic Preservation's California Historical Resources Information System ("CHRIS") to review confidential information regarding cultural resources. In fact, Dr. Gaskell has been authorized under CHRIS for over 20 years to review this type of confidential information. Again, the Assessment should be sent directly to Dr. Gaskell at Archaeology Resource & Culture, 2601 Oakdale Road, H2 117, Modesto, CA. 95355. Or email: arcresours@gmail.com.

Mr. Miguel Galvez
February 26, 2024
Page 2

Please let me know at your earliest convenience if the City is agreeable to the above requests. In the meantime please do not hesitate to call or email me if you have any questions or would like to discuss this matter. I can be reached at 530-304-2424 or dbmooney@dcn.org

Sincerely,

A handwritten signature in blue ink that reads "Donald B. Mooney". The signature is fluid and cursive, with the first name "Donald" and last name "Mooney" clearly legible.

Donald B. Mooney
Attorney for Central Valley
Concerned Citizens

cc: Clients
Dr. Sandra Gaskell
Gaby Hernandez, City Clerk ghernandez@riverbank.org

Miguel Galvez

From: votersforfarmland <votersforfarmland@gmail.com>
Sent: Wednesday, February 28, 2024 9:33 AM
To: River Walk
Subject: response and opposition to the River Walk Project

Urban sprawl hurts us all. Particularly the type identified within the Draft EIR of the River Walk Project. Taxpayers/ratepayers/voters are all on the hook for the long term negative impacts of this proposal.

Identified as an area with superior soil qualities and water recharge capabilities per the Modesto Irrigation District/City of Modesto 2007

study: https://www.mid.org/water/gw/STRGBA_Recharge_TM_fnl%2004_23_07-Rev1.pdf there is no need to urbanize west of the City of Riverbank. Additionally, the application by the City to LAFCO in 2016 for Sphere of Influence and annexation expansion stated that the plan was more than adequate for 25 years.

Long term negative impacts borne by taxpayers/ratepayers/voters include costs of maintaining additional sewer/water/electrical infrastructure service and capacity buildup for excess demand over existing facilities. Significant costs are imposed by needed police and fire protection structures and labor costs for vast areas with little initial return. Long before buildout and occupancy of the sprawl area, the existing city budget is strained without offsetting income sources. Property taxes do not cover the cost of needed services for such a vast area. More housing without significant commercial sales taxes is a city budget breaker with profound negative impacts for the city to provide needed and existing citywide services. Nothing in this proposal identifies adequate revenue to cover its cost.

No to the River Walk Project!

LAW OFFICE OF DONALD B. MOONEY

417 Mace Blvd, Suite J-334

Davis, CA 95618

530-304-2424

dbmooney@dcn.org

February 26, 2024

VIA ELECTRONIC MAIL

riverwalk@riverbank.org

Miguel Galvez,
Contract City Planner
City of Riverbank
6617 3rd Street
Riverbank, CA 95367

Re: Riverbank Draft Environmental Impact Report for the River Walk Specific Plan

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Mr. Miguel Galvez
February 26, 2024
Page 2

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Sincerely,

A handwritten signature in blue ink that reads "Donald B. Mooney". The signature is fluid and cursive, with the first name "Donald" being the most prominent.

Donald B. Mooney
Attorney for Central Valley
Concerned Citizens

cc: Clients
Dr. Sandra Gaskell
Gaby Hernandez, City Clerk ghernandez@riverbank.org

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No to the River Walk Project!

Miguel Galvez

From: Victoria R <victoriareem@gmail.com>
Sent: Thursday, February 29, 2024 12:02 PM
To: River Walk
Subject: RWSP

Attn: Miguel Galvez, Contract City Planner

I am writing to you on behalf of many Riverbank residents to express strong opposition regarding the RWSP.

While we appreciate the consideration for more housing opportunities, it is widely noted that the infrastructure of Riverbank currently does not support the addition of such a project of this size, particularly in terms of our roadways and emergency access, including police and fire departments.

Additionally, it appears as though this development construction will take place over a few years. This prolonged noise will cause a major disturbance to the nearby residents, and is truly unacceptable for our rural community.

Next, as a healthcare professional, I can attest to the fact that every winter that I have lived in this region (including the years before covid), our hospitals have been at capacity and unable to admit/care for the number of patients coming in. By creating housing to accommodate thousands of new residents, I have serious concerns about how we will be able to care for the healthcare needs of so many more people. Additionally, wait times for specialist consultations currently can take several months, and the healthcare system in this region is truly stretched thin at times. Simply put, we do not have the healthcare resources at this time to support this.

Lastly, What will the impact be on our school districts? What research has been done to show that this added volume of students will be able to be accommodated, in a manner that will not be detrimental to the existing students?

At this time, the negatives that would come along with approval of this project will greatly outweigh the positives. Approval of this project would strongly violate the mission of the City Council.

Thank you,

Residents of Riverbank

LAW OFFICE OF DONALD B. MOONEY

417 Mace Blvd, Suite J-334

Davis, CA 95618

530-304-2424

dbmooney@dcn.org

March 4, 2024

VIA ELECTRONIC MAIL

riverwalk@riverbank.org

Miguel Galvez,
Contract City Planner
City of Riverbank
6617 3rd Street
Riverbank, CA 95367

**Re: Riverbank Draft Environmental Impact Report for the River
Walk Specific Plan**

Dear Mr. Galvez,

Thank you for your prompt response to my February 26th letter. As a followup, however, can you please provide Dr. Sandra Gaskell the following:

- 1) File No. 11579L 12-4-2020-- full attachments of archaeological data
- 2) File No. 112651L 12-18-2020--full attachments of archaeological data
- 3) Draft versions of the Peak and Associates' archaeological field survey record forms data not yet included in any record search -the recent 2019-2022 findings.

Also, can you please provide me an update on whether the City is agreeable to a 30-day extension for the submittal of public comments.

Sincerely,



Donald B. Mooney
Attorney for Central Valley
Concerned Citizens

cc: Clients
Dr. Sandra Gaskell

Miguel Galvez

From: City Clerk
Sent: Wednesday, March 6, 2024 8:54 AM
To: River Walk
Subject: FW: Agenda Item 11.2 - Presentation - Riverwalk Specific Plan and Draft Environmental Impact Report (EIR)

From: Christine Holmer <revchris23@gmail.com>
Sent: Tuesday, February 27, 2024 2:31 PM
To: City Clerk <CityClerk@riverbank.org>
Subject: Agenda Item 11.2 - Presentation - Riverwalk Specific Plan and Draft Environmental Impact Report (EIR)

We would like to express our concern that the Water Supply Analysis (WSA) in the Draft EIR is not complete if it has not taken into account the impact that drilling three new wells and installing a water tank to support the Riverwalk Development will have on the adjacent Park Heights Water District. The Park Heights Water District currently has two wells to service 97 homes. The viability of the Park Heights Water District wells could very well be compromised by the drilling of three additional wells to the west.

Additionally, we understand that the sewage will need to be pumped under the Stanislaus River and through four pump stations until it reaches the Riverbank Sewer Treatment Plant, which is 1.4 miles east of the final pump station. While the initial costs will be paid for by the developer, who will pay to maintain the pump stations and systems in the future? Will the proposed homes be in a community service district that will amass fees for that purpose?

We also object to further loss of agricultural/farm land surrounding the City of Riverbank for a development that will ultimately cost the city money for services, with little provision for revenues to offset such services.

Respectively,

Richard and Christine Holmer
2116 Park Ridge Dr.
Riverbank, CA 95367
rmholmer@gmail.com

Miguel Galvez

From: City Clerk
ent: Wednesday, March 6, 2024 8:55 AM
To: River Walk
Subject: FW: River Walk Tuesday Agenda please confirm receipt

From: Colleen Preston <colleenp652@gmail.com>
Sent: Monday, February 26, 2024 4:54 PM
To: City Clerk <CityClerk@riverbank.org>
Subject: Re: River Walk Tuesday Agenda please confirm receipt

Thanks Gabby, you were so helpful

On Mon, Feb 26, 2024 at 4:09 PM City Clerk <CityClerk@riverbank.org> wrote:

Good Afternoon Colleen,

I have received your comment on the River Walk Project. I will forward your comment to the appropriate contact. Should you wish to submit this yourself or for future comments regarding the River Walk EIR. Please send those to riverwalk@riverbank.org

Thank you,

Gabriela Hernandez | City Clerk

City of Riverbank

6707 Third Street

Riverbank, CA 95367

Office: 209-863-7198

Fax: 209-869-7100

Email: ghernandez@riverbank.org

cityclerk@riverbank.org



Monday-Thursday, 7:30AM-5:30PM

CLOSED ALL FRIDAYS.

From: Colleen Preston <colleenp652@gmail.com>
Sent: Sunday, February 25, 2024 3:27 PM
To: City Clerk <CityClerk@riverbank.org>
Subject: River Walk Tuesday Agenda please confirm receipt

Dear Riverbank Planning, City Council, Citizens,

This proposal of River Walk is very grandiose to say the least.

1. It will increase Riverbank's current housing by 30%, where is the need? That needs be determined, not only within Riverbank but also county-wide.
2. This River Walk plan is ignoring current urban boundaries and leapfrogging over current development and creating really a "new" community on "**prime farmland.**"
 - Stanislaus County in general has not preserved farmland when compared to other counties as mentioned below
 - San Joaquin County has preserved 3,100 acres
 - Merced County has preserved 10,000 acres
 - Yolo County has preserved 20,000 acres
 - **Stanislaus County has preserved only 300 acres**
 - **We all know that LAFCo's formation by the State is to protect and promote agriculture and steer development away from "prime farmland"**
3. River Walk is "prime farmland." River Walk also was determined by the Army Corp of Engineers to be within a Flood Plain. Army Corp of Engineers need to weigh in on this project.
4. What happens to Park Ridge and River Heights? This annexation plan creates an unincorporated island of this area. This needs to be addressed and determined.
5. Public Services: Riverbank already leans on the county and other cities for Schools, Fire, and Police. In a way Riverbank is currently a de-facto city in how it relies on surrounding areas for services. To increase your dwellings by 30% its time that you provide your own infrastructure.



Monday-Thursday, 7:30AM-5:30PM

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4. What happens to Park Ridge and River Heights? This annexation plan creates an unincorporated island of this area. This needs to be addressed and determined.
5. Public Services: Riverbank already leans on the county and other cities for Schools, Fire, and Police. In a way Riverbank is currently a de-facto city in how it relies on surrounding areas for services. To increase your dwellings by 30% its time that you provide your own infrastructure.

Miguel Galvez

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Thank you,

Gabriela Hernandez | City Clerk

City of Riverbank

6707 Third Street

Riverbank, CA 95367

Office: 209-863-7198

Fax: 209-869-7100

Email: ghernandez@riverbank.org

cityclerk@riverbank.org

This is really a short list of a really long list of concerns.

--
Colleen O'Brien Preston

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--
Colleen O'Brien Preston

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Miguel Galvez

From: Mae Ryan Empleo <Legal@semlawyers.com>
Sent: Thursday, March 7, 2024 5:25 PM
To: River Walk
Cc: Osha Meserve
Subject: River Walk Specific Plan and Draft Environmental Impact Report
Attachments: 24.03.07 Ltr Req Extend Cmnt Period.pdf

Dear Mr. Galvez:

Attached please find the request regarding the above-referenced matter, which is submitted on behalf of Riverbank residents Annabel Gammon and Dr. J. Allen Gammon. Should you have questions, please do not hesitate to contact our office. Thank you for your attention to this matter.

Sincerely,

Mae Ryan Empleo
Legal Assistant
Soluri Meserve, A Law Corporation
510 8th Street, Sacramento, CA 95814

☎ tel: 916.455.7300 ▪ 📠 fax: 916.244.7300 ▪ ✉ email: legal@semlawyers.com

This email and any attachments thereto may contain private, confidential, and privileged material for the sole use of the intended recipient.

Miguel Galvez

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Sincerely,

Mae Ryan Empleo
Legal Assistant
Soluri Meserve, A Law Corporation
510 8th Street, Sacramento, CA 95814

☎ tel: 916.455.7300 ▪ 📠 fax: 916.244.7300 ▪ ✉ email: legal@semlawyers.com

This email and any attachments thereto may contain private, confidential, and privileged material for the sole use of the intended recipient.



tel: 916.455.7300 • fax: 916.244.7300
510 8th Street • Sacramento, CA 95814

March 7, 2024

SENT VIA EMAIL
(riverwalk@riverbank.org)

Miguel Galvez, Contract City Planner
City of Riverbank
6707 3rd Street, Suite A
Riverbank, CA 95367

RE: River Walk Specific Plan and Draft Environmental Impact Report

Dear Mr. Galvez:

This request is submitted on behalf of Riverbank residents Annabel Gammon and Dr. J. Allen Gammon. The Gammons request that the City of Riverbank (“City”) provide a 30-day extension of time to provide public comments on the River Walk Specific Plan (“RWSP”) and Draft Environmental Impact Report (“Draft EIR”).

A 45-day public review period for the RWSP and Draft EIR began on January 31, 2024, and is currently scheduled to end on March 18, 2024. Given the voluminous length of the Draft EIR, which contains 794 pages, and the appendices is over 1,700 pages, as well as the technical materials relied upon, this creates unusual circumstances that require the public review period to be extended. (CEQA Guidelines, § 15105, subd. (a).) Additional time is necessary to meaningfully respond to the data and information contained in the Draft EIR and supporting technical materials.

Furthermore, my office provided comments on the notice of preparation on behalf of the Gammons¹ on July 6, 2021, but I did not receive any notice of availability of the RWSP and Draft EIR. This omission delayed my review of the Draft EIR. For these reasons, we request to extend the comment deadline to at least April 17, 2024. Thank you in advance for your consideration of this request.

Very truly yours,

SOLURI MESERVE
A Law Corporation

By: 
Osha R. Meserve

¹ The Draft EIR lists my firm, Soluri Meserve, as being the commentor on the NOP. My firm submitted comments on behalf of its clients, the Gammons, who should have been listed.

Miguel Galvez

From: Joey Adrian <joeyadrian1@gmail.com>
Sent: Monday, March 11, 2024 5:55 PM
To: River Walk
Subject: River Walk Comments
Attachments: River Walk Comments.pdf

Please review my attached comments on the River Walk Project.

Thank You for your time,
Joey Adrian

March 12, 2024

**City of Riverbank
Attention: Miguel Galvez, Contract City Planner
6617 Third Street
Riverbank CA 95367**

RE: River Walk Specific Plan/Draft Environmental Impact Report, Riverbank CA

I am commenting on the proposed River Walk Specific Plan and would like my comments to be public record and included in the Final Environmental Impact Report for this project which proposes thousands of new homes, businesses, parks and a trail around the project. It also includes a new 4 lane road that terminates onto McHenry Ave. as well as two or three new wells which rely only on groundwater to serve a 2-million gallon storage tank. This project is on river bottom that is in a flood zone and identified by the State Department of Conservation as "prime" farm ground. The need for this project has not been shown.

I live and farm directly across the river from this project. I can tell you with certainty that this new project will flood, exactly like my ranch has flooded several times in the past. Although our ranch has taken all of the preventable measures, it still floods and will continue to do so. The Modesto Bee issued a flood warning impacting three cities on the Stanislaus River in January of this year. How will this be mitigated?

Another major issue that is not being addressed is having river access points and what that will bring into this development and into the city of Riverbank. The river is not a safe place anymore. It has become a place where people know they can drink and do drugs with no law enforcement present. I have had prostitutes use the banks of the river for business and have had to ask many young adults as well as older adults to leave my home that were intoxicated. People come from the bay area to float the river and to party. Many of these people camp at the river making fires to keep warm. In 2015, there was a huge fire where this new community is proposed and last summer there was a large fire not very far from it.

JA

At my expense and to keep my family safe, I had to put up a fence approximately a mile long along the river to keep people out of my home and off of my property. During the summer, I have to inspect this fence weekly due to homeless people and river floaters cutting holes in it. They have no regard for keeping the natural environment preserved and no regard for private property. These people have even come up and got in my pool and yelled at my children in my yard. They have broken into my home and threatened me on my own property. With google maps, people can now find any access points to the river and have no problem trespassing. I have law enforcement on my property many weekends in the summer responding to 911 calls people make while they are intoxicated and fighting in the river and along the banks. I rarely see a family or a kayaker in the river anymore which I feel is due to safety concerns. How do you plan on keeping people in this new community safe and mitigate this issue?

As I stated, I am a farmer and I drive our almonds into Blue Diamond during the summer. Traffic is currently a major issue for me and I only have a window of a few hours where I can deliver these nuts without sitting in traffic for extended periods of time in a semi truck. Escalon has trains coming through all day which currently backs up traffic on McHenry Ave. in both directions. To avoid this, many cars travel down Santa Fe from Escalon into Riverbank and the traffic in this area stretches for miles at certain times of the day. How are you going to mitigate this as there are no other ways to travel these areas and get across the river?

As a farmer, the thought of paving over this "prime" farmland and taking it away from future generations creating so many negative impacts for our community so that Mr. Berryhill and his partner can make a fortune is beyond incomprehensible and completely irresponsible of the city of Riverbank.

Joseph Adrian
26554 E. River Rd.
Escalon, CA 95320



- Enclosures: 1. Modesto Bee Article regarding flood advisory 2024
2. Modesto Bee Article on Fire near Hogue Rd. 2015

JA



Advertisement



The Modesto

Rain prompts flood advisory close to Stanislaus River in three towns. What's the forecast?

John Holland

January 22, 2024 · 1 min read



Officials advised residents Monday of a chance for flooding along low-lying portions of the Stanislaus River.

The advisory was until noon for Riverbank, Oakdale and Knights Ferry. Most residents live well above the current level, but people should be cautious close to the water.

The Stanislaus rose because of rain Sunday and Monday. In Modesto, the storm caused flooding on Highway 99 at Tuolumne Boulevard.

"Persistent moderate to heavy rainfall may lead to localized urban flooding," said a Facebook post by the Stanislaus County Office of Emergency Services. "Drive with extra caution this morning and slow down if encountering wet roads!"

The Modesto Irrigation District recorded 1.38 inches of rain at its downtown offices Sunday and early Monday. It has had a total of 5.36 inches in the water year that began July 1. The average year brings 12.17 inches, mainly from November through March.

The National Weather Service forecast up to 0.35 inches of further rain in Modesto later Monday. Tuesday looks to be sunny, followed by more rain Wednesday. The forecast for the remainder of the week is for mostly sunny days.



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NEWS

Fire north of Modesto declared 100 percent contained

BY ERIN TRACY AND DEKE FARROW

ETRACY@MODBEE.COM

UPDATED JUNE 19, 2015 6:06 AM

Several structures were lost as a wind-fueled vegetation fire raged out of control north of Modesto. BY MCCLATCHY



Only have a minute? Listen instead

Powered by **Trinity Audio**

00:00

1.0x

03:55

Several structures were lost as a wind-fueled vegetation fire raged out of control north of Modesto on Thursday afternoon.

By nightfall, the fast-moving blaze that threatened homes along McHenry Avenue, Hogue Road and the Del Rio community was declared 100 percent contained. It had roared south from its start north of the Stanislaus River, charring 30 to 40 acres of vegetation, according to Jessica Smart, spokeswoman for the Modesto Fire Department.



Smart said firefighters would closely monitor the area with roving patrols throughout the evening and would start the complete overhaul in the morning.

Randall Bradley, chief of the Stanislaus Consolidated Fire Protection District, said at least three structures had been lost and 12 homes south of the Stanislaus River to Hogue Road had been evacuated.

One woman suffered minor burns and was taken by private car to a hospital. Two rafters on the Stanislaus River were lost amid the smoke but were later located west of the McHenry Bridge.

Believed to have suffered damage was the Lotus Garden, which has more than 80 varieties of lotus flowers, several water lilies and ponds.

The fire, which began at about 3 p.m., was believed to have started in an area south of Escalon near River Road and then jumped the river and headed toward north Modesto as late afternoon winds began to grow.

Tony Williams saw the early stages of the fire from his vantage point at Escalon Sportsman's Club, which is on River Road just west of McHenry Avenue.

He said he saw smoke coming up across the street west of the road and called 911.

Minutes later, he said, "This fire just blew out of proportion and the wind pushed it."

Christopher Hill lives on McHenry north of Hogue Road with his wife and three children – ages 8, 11 and 13. He was at work when he got word that his family had to be evacuated.

He attempted to drive home while his family was packing their belongings as ash began falling from the sky.

In 2008, he said, he lost his Salida home – and 85 percent of his belongings – to fire.

"We've already lived through a house fire," he said Thursday night. "What did I do, roll snake eyes to have to go through this again? It took everything I had to drive sane over here."

His family was with friends in Modesto. He said he received information that his home might have been saved.

"All we can do is hope and pray for the best," he said. "I don't do much praying, but in these cases, you don't want to have to start over again."

"It was scary," said Ken Miller, who grew up in Del Rio and now owns McHenry Golf Center a few miles south of fire.

As he was conducting a lesson, he watched as more than 30 fire trucks screamed heading in the direction of his old neighborhood. He later hopped in his car and got as far as Al's Furniture on McHenry near Ladd Road.

"Looking down the road it was the nastiest thing I had seen in my life," he said. "The road was so smoky. It was unbelievable."

One resident on Stewart Road, who gave only her first name, Gail, said she had been watching the news but was not too concerned.

But, she added, "I packed a little bag, but that's just me."

Bradley said evacuees numbered fewer than 100. He said about 100 firefighters were on the scene.

Although the fire was extinguished, power was reported out Thursday evening to about 20 homes north of Stewart and east of McHenry, which authorities said would be closed into the evening.

Air support was called in, and local fire authorities asked for strike teams from the California Department of Forestry and Fire Protection.

Agencies from around the region were called to assist; volunteer firefighters have been called to staff their stations in rural communities.

This story was originally published June 18, 2015, 3:39 PM.

RELATED STORIES FROM MODESTO BEE

LOCAL

Social Media: Fire burns out of control north of Modesto

JUNE 18, 2015 5:21 PM

LOCAL

Fire north of Modesto burns out of control

JUNE 18, 2015 5:03 PM

City Of Riverbank

ATT: Miguel Galvez, Contract City Planner

6617 Third Street

Riverbank, CA 95367

CITY OF RIVERBANK

MAR 14 2024

DEVELOPMENT SERVICES

Re: River Walk Specific Plan/Draft Environmental Impact Report, Riverbank, CA

Dear Mr. Galvez,

I would like to comment on the proposed River Walk Specific Plan project so that it becomes part of the public record and is included in the final Environmental Impact Report for the referenced project.

Quality of Life Riverbank keeps growing, but the streets do not, the traffic is horrible. Our daily commute to Modesto used to take 15 minutes, now it takes 30 minutes or more. The traffic backs up on Hiway 108 at the 1st Street light. To avoid the backups, drivers use our street, Riverside Drive, as a back route. Cars speed down our street, blowing through stop signs. This is very dangerous for children and pets. Another new subdivision will only add to the problem. Don't build anymore unless you do something about the traffic.

Riparian Habitat I am very concerned about building a subdivision on riparian habitat. My husband and I have spent several years studying riparian species. This will certainly cause problems for the wildlife that lives along the Stanislaus River. Western Gray fox, opossums, and other species will probably be killed by homeowners as pests. Don't build on riparian habitat. There is very little of it left in California.

Thank you,

Deborah Basey

Glenn Basey, M.S. Biological Conservation

3231 Riverside Drive

Riverbank, CA 95367

(909) 863-8416

03/15/2024

City of Riverbank
Attn: Miguel Galvez, Contract City Planner
6617 Third Street
Riverbank, CA 95367

RE: River Walk Specific Plan / Draft EIR Report for Riverbank CA

Dear Mr. Galvez:

I would like to comment on the proposed River Walk Specific Plan and Draft EIR and express my opposition for not only the project as a whole, but also would like to request that the City Council thoroughly invest time into studying this project before making any decision on its acceptance to move forward. I find there are several items of interest that the Council should be concerned about as currently this particular project is gerrymandering as it is not with the natural flow of growth for the city of Riverbank. Only a few individuals will benefit from this project in the future and none of them will remain in the area to feel the aftermath.

The City of Riverbank went to LAFCO in 2016 to update their Sphere of Influence showing a buildout projected at 0-20 years with approximately 1,783 SF which had remained to be developed. Currently as it stands, that particular SOI has yet to be completely built-out in 2024. It has been 8 years since the last SOI request and the population in the City of Riverbank has not grown at such a rapid pace that this development is currently required or needed. Population in the City of Riverbank in 2010 was 22,678 and by 2022 was 24,826. That is only 2,148 new residents in a matter of 12 years. That is the equivalent to one person moving into this community per year, yet there are several other areas of development that the city currently has available as infill projects if needed for the current amount of growth in the area.

I feel that the specific plan that is being brought forward for acceptance is a leapfrog development that is being advertised as a "55 and over" community but yet this particular location is not in close proximity to any services that a senior would need on an everyday basis. It can easily be assumed that a senior would refrain from locating to this area as there would be little to provide for their health and safety within a close proximity.

Another Item of concern is that the Specific plan states that there is "flexibility" provided to the city to make modifications to the densities in the development, should they be needed. My concern is that when the city finds that this is not a viable project as a 55 and over community, the EIR will then be rendered useless as it will not consider the correct measurements of mitigation for a sustainable "family" community. There will be several items of impact that the city will then need to address to accommodate. The city's General Plan does not mirror the zoning usages in the Specific Plan as well, which tells me that the city's original desire for this area was not for a large-scale 2000+ home community and had some expectation for a slower build out than what is currently being proposed.

It is my assumption that this particular developer chose to market this project as 55 and over as this would be the least mitigated approach and my hope is that the city sees through this and

understands that this is a developer's typical approach to obtaining approvals through the city with minimal mitigation required. Cities are then left to clean up the mess once the project has been approved. My hope is that the Council will do their research to note that there are several communities throughout San Joaquin County that were in entitlement phases recently that adjusted their plans as they understood that the desire for senior living is not in high demand. Some of these developments were in better locations closer to senior services but were not viable projects as age restricted communities.

Another issue that I see currently is that the City of Riverbank will be utilizing outside public services that do not directly affect Riverbank. This new development will affect the San Joaquin County Sheriff's Department and all other local Police Departments, yet it will not directly affect the City of Riverbank. The same can be said for the Fire Department as well as all of the surrounding Schools and Districts. How is it that a city can approve a project such as this but not have the services in place to support the homes and residents? This is doing a disservice to the current residents, future residents, and surrounding communities. There are SEVERAL different projects throughout the state of California that are built to this scale or larger that all include schools, parks, public service facilities, etc. within their 1000-acre footprints, yet the City of Riverbank will only depend on outside services for this particular project to be sustainable. This is wrong, as it puts pressure on everyone else but the city and lines the pockets of no one but the developer.

The current layout of the development fails to take many items into consideration. The current proposed circulation for the development is unpractical, especially if the development removes the age restriction being promoted. I understand that these items can be changed during planning phases but again these modifications will not be taken into account via the EIR and the mitigation requirements will not be adjusted to accommodate the changes.

Another alarming issue is that of flooding. Currently our state has seen record storms sweep through the area, where 200-year floods are now being recognized as closer to 70-year floods. If the City does the right thing to require the Developer to stabilize the levee issues next to the river, the city should also take into account the destruction that it will be pushed onto surrounding farmers and neighbors on the other side of the river. Both sides of the river will NOT be of the same structure which will lead to further flooding of the neighbors to the north of the community and will require neighbors adjacent to the community to have to invest hundreds of thousands of dollars to address the issues of integrity to their land based on the modifications of what is needed on the Riverbank side of the river to accommodate this community being so close.

It is very clear that the push for this particular project is being made by a "developer" who owns a very large portion of this particular development while having majority of the remaining development under option by others who would like to cash out on their land. The very unfortunate part to many situations such as this is that both the developer and individuals that sold are no longer affected by what is left behind, where the residents who are currently in opposition are those who have this project "shoved down their throats" for many years to come.

Keep in mind that the city will be left with what issues remain to be resolved based on an EIR that did not mitigate for the correct development if changed post EIR approval. No updated reports will be required to confirm mitigation necessities to an already approved project and the city will then

have to find the means to mitigate on a case-by-case basis which can have a very detrimental effect on a city financially.

I hope that the city does the right thing to pull the plug on this project and perhaps look at starting with a substantially smaller Sphere of Influence, if needed, until the city has a better handle of the affects that this project could have on surrounding areas and on the city financially.

Thank you,

Krystal Rodriguez

Krystal Rodriguez

RECEIVED

MAR 18 2024

BY: Chaudia

MARCH 16, 2024

TO WHOM IT MAY CONCERN,

WE ARE WRITING TO OPPOSE THE "RIVER WALK" DEVELOPMENT WEST OF RIVERBANK'S CITY LIMITS. OUR FIRST CONCERN IS THE PRIME FARMLAND THAT WOULD BE LOST TO DEVELOPMENT AND PRESENTLY MOST OF THAT AREA INCLUDES ACRES OF ALMOND TREES AND WALNUTS.

IN A TIME OF CLIMATE CHANGE WHEN ARABLE LAND IS DISAPPEARING DUE TO DROUGHT OR EROSION CAUSED BY FLOODING, PROTECTING STILL VIABLE AND PRIME FARMLAND SEEMS THE SENSIBLE THING TO DO.

THEREFORE THIS AREA CAN BETTER ABSORB FLOOD WATERS AND HELP REPLENISH UNDERGROUND AQUIFERS NEEDED FOR THE FUTURE.

THERE IS ALSO POTENTIAL CONGESTION ON MCHENRY, PATTERSON, OAKDALE AND COFFEE ROADS AND AN INCREASE IN TRAFFIC FLOWS WITH CLOSE TO 4,000 VEHICLES IMPACTING THOSE ROADS.

FINALLY, LIVING ON THE BORDER OF THE PROPOSED SUBDIVISION FOR OVER 35 YEARS, IT DEFINITELY WOULD IMPACT OUR LIVES BY THE CLOSE PROXIMITY OF NEW HOMES!

THEREFORE, WE, THE UNDERSIGNED, OPPOSE ADDING THE RIVER WALK DEVELOPMENT TO THE EXTENSION OF THE CURRENT WESTERN BOUNDARY OF RIVERBANK.

SINCERELY YOURS,

MARILYN R. MCRITCHIE Marilyn R. McRitchie (2001 RIVER HTS. DR.)

TOM HOLLANDER Tom Hollander (6737 WOODHAVEN PL.)

SHAARN HOLLANDER Shaarn Hollander (6737 WOODHAVEN PL.)

JOHN DEGELE John Degele (6713 WOODHAVEN PL.)

Miguel Galvez

From: Friends of the Swainson's Hawk <friendsoftheswainsonshawk@gmail.com>
Sent: Wednesday, March 20, 2024 11:15 AM
To: River Walk
Cc: Friends
Subject: Riverwalk Request for biological study

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Mr Galvez

I understand DEIR comment deadline on Riverwalk has been extended to May 6. We are reviewing this EIR for impacts on Swainson's Hawk. Please provide a copy of any biological studies as referenced in the EIR (second request). We are requesting the research documents that underlie the statements in the DEIR regarding nesting and foraging habitat impacts of the project. For example, on p. 3.4-45 the DEIR references nesting habitat and includes a reference to Figure 3.4-5. It also references 366 acres of foraging habitat to be removed on the 1500 acre site.

Please email this information.

Jude Lamare, Ph.D.

Begin forwarded message:

From: Friends of the Swainson's Hawk <friendsoftheswainsonshawk@gmail.com>
Subject: Request for extension of comment period
Date: March 18, 2024 at 12:20:38 PM PDT
To: "Donna M. Kenney" <dkenney@riverbank.org>
Cc: Friends <friendsoftheswainsonshawk@gmail.com>

Dear Ms Kenney

We are requesting an extension of the comment period of at least two weeks, and a copy of the biological studies conducted for the Riverwalk DEIR.

Typically any surveys referenced in the DEIR biological section are included in an appendix to the document. In this case, the Appendices do not include the Biological survey documents.

It is not possible to evaluate the biological resources impact analysis and mitigation measure without the biological study upon which they are based.

Please send the document via email and we will review and submit a late comment, but to be fair, the extension should be granted and notice sent that the biological appendix is available.

Thank you, Jude Lamare

Friends of the Swainson's Hawk
friendsoftheswainsonshawk@gmail.com
Judith Lamare
James Pachl
916 769 2857 c

Friends of the Swainson's Hawk
friendsoftheswainsonshawk@gmail.com
Judith Lamare
James Pachl
916 769 2857 c

LAW OFFICE OF DONALD B. MOONEY

417 Mace Blvd, Suite J-334

Davis, CA 95618

530-304-2424

dbmooney@dcn.org

March 20, 2024

VIA ELECTRONIC MAIL

riverwalk@riverbank.org

Miguel Galvez,
Contract City Planner
City of Riverbank
6617 3rd Street
Riverbank, CA 95367

**Re: Riverbank Draft Environmental Impact Report for the River
Walk Specific Plan**

Dear Mr. Galvez,

I have not received a response to my March 4, 2024 letter requesting that the following documents be provided to Dr. Sandra Gaskell:

- 1) File No. 11579L 12-4-2020-- full attachments of archaeological data
- 2) File No. 112651L 12-18-2020--full attachments of archaeological data
- 3) Draft versions of the Peak and Associates' archaeological field survey record forms data not yet included in any record search -the recent 2019-2022 findings.

Please provide the requested documents to Dr. Gaskell at your earliest convenience. If City does not intend to provide the documents, then please me the legal basis for the refusal.

Sincerely,



Donald B. Mooney
Attorney for Central Valley
Concerned Citizens

cc: Clients
Dr. Sandra Gaskell
Marisela Garcia, City Manager (mhgarcia@riverbank.org)

Miguel Galvez

From: Charles Carley <modestocarley@sbcglobal.net>
Sent: Thursday, March 21, 2024 1:35 PM
To: River Walk
Subject: EIR Comments-Riverwalk
Attachments: River Walk ltr head.docx

Please see attached comments. I know I'm late. I had a family emergency and got off track. I spoke at the Council meeting. I assume our comments and position are on file.

Laurie Carley, President-LWV Stanislaus County



LEAGUE OF WOMEN VOTERS[®]
OF STANISLAUS COUNTY

February 27, 2024
City of Riverbank
Mayor and City Council Members
6706 Third Street
Riverbank, CA 95367

The League of Women Voters of Stanislaus County has a history of study and advocacy regarding land use decisions, including comments on the 2006 Riverbank General Plan Update. We recognize that farmland is an irreplaceable resource and prime farmland, in particular, needs to be preserved and protected.

Riverbank's current Sphere of Influence contains land which can be developed for housing, avoiding unnecessary conversion of the prime farmland in the proposed River Walk Development area.

The League of Women Voters advocates for urban development that is contiguous with existing development. Contiguous development provides more economical provision of urban services allowing for adequate funding for infrastructure (water, sewer, parks, schools, transportation, etc.).

The League of Women Voters also supports water policies and practices that protect and ensure coordinated, sustainable use of ground water and surface water supplies for urban, agricultural and environment purposes. We are concerned that the urbanized land use proposed for River Walk will affect the ability of the land to serve the purpose of aquifer re-charge that can occur when the land is in agricultural use.

Respectfully,

Laurie Carley
President, League of Women Voters of Stanislaus County

Miguel Galvez

From: Diana Hernandez <djadrian1983@gmail.com>
Sent: Wednesday, March 27, 2024 2:59 PM
To: River Walk
Subject: Fwd: River Walk EIR

Hello, I called but Miguel was out sick and I was told to send an e-mail to the city planner which I did, but it has been over a week and I have had no response.

Thank you.

Diana Hernandez

----- Forwarded message -----

From: **Diana Hernandez** <djadrian1983@gmail.com>
Date: Tue, Mar 19, 2024 at 10:59 AM
Subject: River Walk EIR
To: <cityplanner@riverbank.org>

Hello,

I have been looking over the EIR and can't seem to find where the list of agencies that were notified about this project are. Is there any chance you know which page they might be on?

Thank you very much,

Diana Hernandez

Miguel Galvez

From: Leefong Mouavangsou <leefongmouavangsou@gmail.com>
Sent: Tuesday, April 2, 2024 10:43 PM
To: River Walk
Subject: Inquiry - Riverwalk Project

Good evening Miguel,

I just had a quick question regarding the Riverwalk Specific Plan Project that is being proposed. Is this plan being initiated by the City (with grant funded dollars to conduct a study on the potential project area), or is this plan being initiated by the Developer?

Any information you can provide would be greatly appreciated.

Thank you.

Best,

Leefong Mouavangsou

March 15, 2024

CITY OF RIVERBANK

City of Riverbank
Attn: Miguel Galvez, Contract City Planner
6617 Third Street
Riverbank CA 95367

APR 04 2024

DEVELOPMENT SERVICES

RE: River Walk Specific Plan/Draft Environmental Impact Report, Riverbank, CA

Dear Mr. Galvez:

I would like to comment on the proposed River Walk Specific Plan project so that it becomes part of the public record and is included in the Final Environmental Impact Report for the referenced project. This project proposes to construct thousands of new homes, businesses, and infrastructure including parks, a walking trail around the entire perimeter, a new 4-lane road that would terminate onto McHenry Avenue, and two or three new water wells which would rely solely on groundwater to serve a 2-million gallon storage tank; nearly all of which would occur on river bottom land that is identified by the State Department of Conservation as "prime."

The State defines "prime" as follows: "prime farmland has the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustainable high yields." Homes and businesses should be constructed on soils of lesser quality, not on prime farm land. In addition, the City of Riverbank has more than ample pre-approved, land area which is available to construct thousands of new homes based on the 1,500 acres which was added to its Sphere of Influence in 2016. The need for this project has not been adequately demonstrated and the far-ranging impacts of this development has not been adequately vetted.

Like others, I cannot help but feel that this project will adversely impact the quality of life for myself and other citizens in this area by creating more suburban sprawl and irrevocably destroying the residential agricultural way of life in the central valley.

Sincerely,



Kerry H. Tsai

Miguel Galvez

From: Bryan@pietransport.com
Sent: Saturday, April 6, 2024 9:21 AM
To: River Walk
Subject: property owner

I have a the property 1009 Paterson rd. 20 plus acre almond orchard, will I be affected by the river walk project? Thank you Bryan Paradee

Miguel Galvez

From: Leefong Mouavangsou <leefongmouavangsou@gmail.com>
Sent: Monday, April 8, 2024 11:39 AM
To: River Walk
Subject: Re: Inquiry - Riverwalk Project

Good morning Miguel,

I hope this email finds you well. I am following up on the email that I sent on 4/2/2024. Any information you can provide would be greatly appreciated.

Best,

Leefong Mouavangsou

On Tue, Apr 2, 2024 at 10:42 PM Leefong Mouavangsou <leefongmouavangsou@gmail.com> wrote:
Good evening Miguel,

I just had a quick question regarding the Riverwalk Specific Plan Project that is being proposed. Is this plan being initiated by the City (with grant funded dollars to conduct a study on the potential project area), or is this plan being initiated by the Developer?

Any information you can provide would be greatly appreciated.

Thank you.

Best,

Leefong Mouavangsou

Miguel Galvez

From: Friends of the Swainson's Hawk <friendsoftheswainsonshawk@gmail.com>
Sent: Tuesday, April 16, 2024 7:02 PM
To: River Walk
Cc: Friends; bees2@sbcglobal.net; youngbooks@sbcglobal.net; Jim.Vang@wildlife.ca.gov; julie.vance@wildlife.ca.gov; Sean Wirth; Jody Hallstrom
Subject: DEIR Comment from Friends of the Swainson's Hawk
Attachments: riverwalkdeircomment3.24.pdf; FINAL CDFWSwainsons Hawk Status Review 2016.pdf; Distribution, Abundance, and Habitat Associations of Nesting Swainson's Hawks in the Central San Joaquin Valley, California.pdf

Dear Ms Kenny

Please review, print, review and provide to others our comments on the Riverwalk Project.

Thank you,

Friends of the Swainson's Hawk
friendsoftheswainsonshawk@gmail.com
Judith Lamare
James Pachl
916 769 2857 c



www.swainsonshawk.org

April 16, 2024
Delivered via email

Send all notices & correspondence to:
Friends of the Swainson's Hawk
8867 Bluff Lane
Fair Oaks, CA 95628
916-769-2857

email: friendsoftheswainsonshawk@gmail.com

web: www.swainsonshawk.org

Diana Kenney, Manager
Miguel Galvez, Contract City Planner
City of Riverbank,
6707 3rd Street, Suite A,
Riverbank, CA 95367
riverwalk@riverbank.org

Dear Ms Kenney and Mr. Galvez:

Friends of the Swainson's Hawk is commenting on the draft Environmental Impact Report for Riverwalk, as provided in the Notice of Availability.

Friends of the Swainson's Hawk is an unincorporated citizens advocacy group committed to the preservation of the Swainson's Hawk, a threatened species protected under the California Endangered Species Act. We incorporate by reference the comments made on the NOP and DEIR by the California Department of Fish and Wildlife and other wildlife protection organizations.

Improper Lead Agency; Role of the EIR for Stanislaus LAFCo. On page 1.0-5, the preparers described the role of the EIR in Stanislaus LAFCo decision making as:

"Amendment of the Sphere of Influence of the City of Riverbank to cover the entire Project Area, Municipal Services Review Update/Amendment and Annexation of the Specific Plan area to the City of Riverbank".

We believe that LAFCo itself must be the lead agency for an environmental review of these LAFCo decisions. The project is described on p. 2.0-1 as 1,522 acres entirely within a proposed Sphere of Influence Expansion. The first and primary decision that must be made for this Specific Plan is the expansion of the Sphere of Influence, which is by statute a LAFCo decision. Moreover, the Specific Plan cannot be adopted by the City until the Municipal Services Review and Annexation are approved by LAFCo. These are the primary decisions.

It is inconsistent with CEQA for the City to be lead agency on the EIR and to treat the Stanislaus LAFCo as a responsible agency. In our experience, LAFCo must be the lead agency for an EIR on the decision to expand the Sphere of Influence and must certify the EIR as adequate for those decisions, decisions which only Stanislaus LAFCo can make. Please explain how LAFCo can legally proceed to consider these decisions without preparing environmental review as the lead agency and certifying the EIR.

Impacts to Swainson's Hawk and Mitigation

We have requested a copy of the biological survey and related documents to examine and comment on the biological survey referenced but not included in the DEIR. We have not received that information. The information provided in the DEIR is inadequate to assess the impacts on Swainson's Hawk nesting and foraging activity in and near the project area. Should this information become available prior to May 6 deadline for comment on the DEIR, please send it via email to friendsoftheswainsonshawk@gmail.com, and we will attempt a review. However, we believe we are entitled to 30 days review of the biological study documents.

The DEIR says that no nesting was found during field surveys, but fails to disclose what time of year the field surveys were conducted. Swainson's Hawk nesting occurs only between April and August, and surveys of potential nesting sites should meet the criteria of the Swainson's Hawk Technical Advisory Committee, as recommended by the California Department of Fish and Wildlife (discussed below and appended).

The assessment of impacts to Swainson's Hawk is woefully inadequate in that the EIR does not disclose the presence of documented Swainson's Hawk nesting activity within 1, 2 and 5 mile radii of the project area. This information is

available from the California Department of Fish and Wildlife and augmented from a valid survey as recommended in their NOP letter of July 6, 2021.

The DEIR should disclose the following:

1. How many acres of Swainson's Hawk foraging habitat will be removed by implementing the Riverwalk Specific Plan?
2. How many acres of Swainson's Hawk foraging habitat will be preserved?
3. How many Swainson's Hawk nests have been documented within foraging distance (ten miles) of this loss of foraging habitat?

California Department of Fish and Wildlife advised you in its July, 2021 NOP letter that the property is both foraging habitat and within .5 miles of known Swainson's Hawk nesting activity. It advised you to conduct research according to their approved protocol:

"To evaluate potential impacts, CDFW recommends that a qualified wildlife biologist conduct surveys for nesting SWHA following the survey methods developed by the Swainson's Hawk Technical Advisory Committee (SWHA TAC, 2000) prior to project implementation. The survey protocol includes early season surveys to assist the project proponent in implementing necessary avoidance and minimization measures, and in identifying active nest sites prior to initiating ground-disturbing activities. (p. 4)

Did your biological survey for Swainson's Hawks meet these criteria?

We are also concerned that the DEIR does not acknowledge and include other recommendations made by CDFW in their NOP letter, including commitment to apply for incidental take permit under Section 2081 of Fish and Wildlife Code, protection of nesting habitat, including replacement of nesting habitat loss, and burrowing owl protections. We urge you to include all of CDFW's recommendations in the DEIR to support your claim of no significant impact after mitigation.

Foraging Habitat Mitigation Measure Does Not Mitigate to Less than Significant. The California Department of Fish and Wildlife ("CDFW") performed a Status Review titled SWAINSON'S HAWK (*Buteo swainsoni*) IN CALIFORNIA (Reported to California Fish and Game Commission) 2016 FIVE-YEAR STATUS REPORT. A copy

of the report is attached to this letter. That Report states: "the Department recommends retaining the Threatened classification for this species based on the following:

- On-going cumulative loss of foraging habitats throughout California
 - Significantly reduced abundance throughout much of the breeding range compared to historic estimates
 - An overall reduction in the hawk's breeding range in California."
- (CDFW Status Report at p. 4.)

Critical to CDFW's review was the finding that "[t]he primary threat to the Swainson's Hawk population in California continues to be habitat loss, especially the loss of suitable foraging habitat, but also nesting habitat in some portions of the species' breeding range due to urban development and incompatible agriculture." (CDFW Status Report at p. 3.)

The report specifically notes that "[t]he lack of suitable nesting habitat throughout much of the San Joaquin Valley, due to conversion of riparian systems and woodland communities to agriculture, also limits the distribution and abundance of Swainson's Hawks (California Department of Fish and Game 1993)." (Ibid. at p. 4.)

We are concerned that mitigation measure 3.4-6 is deeply flawed. The mitigation measure uses agricultural land mitigation requirements for the project to also serve as Swainson's Hawk foraging habitat mitigation. Yet agricultural land conservation typically allows crop covers such as vineyards that are not suitable for foraging habitat.

Orchards and vineyards provide scarce forage for Swainson's Hawks and other raptors. As California Department of Fish and Wildlife said in its NOP comment letter to you:

"Vineyards, orchards, cotton fields, and other dense vegetation do not provide adequate foraging habitat." (p. 5).

There is abundant science to back this statement. (See for example, Estep and Dinsdale, **Distribution, Abundance, and Habitat Associations of Nesting Swainson's Hawks in the Central San Joaquin Valley, California**, pp 97-98, vineyards and orchards are "considered incompatible with Swainson's Hawk foraging.")

Stacking Swainson's Hawk foraging habitat mitigation on agricultural land mitigation does not mitigate to less than significant unless owner is willing to grant an easement that prohibits any future planting of orchards or vineyards on the property. Yet the mitigation measure does not include this easement condition. The mitigation measure will not mitigate to less than significant.

Mitigation Measure 3.4-6 allows mitigation land to be conserved anywhere in the breeding range of the Swainson's Hawk in California. The range is not defined. As the Estep and Dinsdale study confirms, conditions conducive to SWH breeding are not found everywhere within entire range of the Swainson's Hawk in California, but are defined by specific conditions. There are areas of no nesting, of low nesting density, and areas of high nesting density.

It is well documented by Estep and others that grassland habitats support much lower nesting density than agricultural habitats. (See for example p. 27, Jim Estep, "The Distribution, Abundance, and Habitat Associations of the Swainson's Hawk in South Sacramento County.")

The standard that CDFW uses is "like for like", that is, the project area nesting density and foraging value should be matched by the mitigation site. Site crop cover, proximity to known nesting sites, and density of nest sites within 5 miles equal to the mitigation site characteristics, and mitigation located within 10 miles of the project site, define "like for like." This is because reproductive success depends upon provisioning the nests, and the quality of forage and distance from nest are key factors in that success or failure. As Estep and Dinsdale showed, there is a "strong relationship between habitat availability and suitability in an agricultural landscape and the resulting distribution and abundance of Swainson's Hawks." (p. 104)

Swainson's Hawk conserved mitigation land preferably would be within 5-6 miles of the nesting sites in the project area in order to mitigate the project impacts on the local Swainson's Hawk population to less than significant.

Thank you for this opportunity to comment. We request that the DEIR be revised and recirculated to correct against the errors and deficiencies we've identified. Please notice us by email of any future public hearings on this project.



James P. Pachl



Judith L. Lamare

C: CDFW
Stanislaus Audubon Society, Sal Salerno, Jody Hallstrom
Sierra Club, Yokuts Group, Anita Young, Milt Treiweiler
Sierra Club, Mother Lode Chapter, Sean Wirth

Att:

SWAINSON'S HAWK (*Buteo swainsoni*) IN CALIFORNIA (Reported to
California Fish and Game Commission) 2016 FIVE-YEAR STATUS REPORT
Estep and Dinsdale, **Distribution, Abundance, and Habitat Associations of
Nesting Swainson's Hawks in the Central San Joaquin Valley, California, CVS
Bulletin, Fall, 2012, Vol. 15, Number 4.**

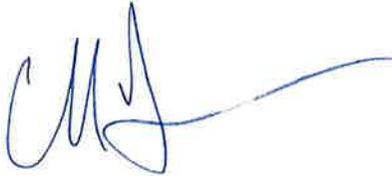
State of California
Department of Fish and Game

Memorandum

Date: April 11, 2016

To: Michael Yaun, Acting Executive Director
Fish and Game Commission

From: Charlton H. Bonham
Director



Subject: **Five Year Status Review for Swainson's Hawk (*Buteo swainsoni*)**

Attached is the Five Year Status Review for Swainson's Hawk (*Buteo swainsoni*). This Status Review updates descriptions, habitat requirements, threats, research needs, etc., for this species. The Status Review recommends retaining this species as Threatened.

The Swainson's hawk was listed as a threatened species by the California Fish and Game Commission in 1983, pursuant to the CESA (Title 14, California Code of Regulations, §670.5(b)(5)(A)). According to FGC Section 2077, the Department is required to reevaluate Threatened and Endangered species every 5 years by developing a Status Review. The last status review for the Swainson's Hawk was completed in 1993. This status review was prepared to satisfy several management and reporting objectives including Section 2077.

If you have any questions regarding this item, please contact Dr. Eric Loft, Chief, Wildlife Branch, at (916) 445-3555.

Attachment

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CALIFORNIA DEPARTMENT OF
FISH AND WILDLIFE
WILDLIFE AND FISHERIES DIVISION
NONGAME WILDLIFE PROGRAM
1812 Ninth Street
Sacramento, California 95814

Status Review:
SWAINSON'S HAWK (*Buteo swainsoni*)
IN CALIFORNIA

Reported to:

California Fish and Game Commission

2016

FIVE-YEAR STATUS REPORT



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I. COMMON NAME, SCIENTIFIC NAME AND CLASSIFICATION

Common Name: Swainson's Hawk

Scientific Name: *Buteo swainsoni*

Current Classification: State Threatened

II. RECOMMENDED ACTION

The California Department of Fish and Wildlife (Department) recommends that Swainson's Hawk retain threatened status under the California Endangered Species Act.

III. SUMMARY OF REASONS FOR RECOMMENDED ACTION

The Swainson's Hawk was listed as a threatened species by the California Fish and Game Commission in 1983, pursuant to the California Endangered Species Act (CESA; Title 14, California Code of Regulations, §670.5(b)(5)(A)). The last status review was completed in 1993 (California Department of Fish and Game 1993). Timely 5-year status reviews have not been possible due to budget, staff, and workload priorities.

The primary threat to the Swainson's Hawk population in California continues to be habitat loss, especially the loss of suitable foraging habitat, but also nesting habitat in some portions of the species' breeding range due to urban development and incompatible agriculture. This impact may have been the greatest factor in reducing Swainson's Hawk range and abundance in California over the last century (California Department of Fish and Game 1993, California Department of Conservation 2011).

Urban development continues to reduce Swainson's Hawk foraging habitat in the Central Valley, particularly in the southern Sacramento Valley (California Department of Conservation 2011). Swainson's Hawk densities are the greatest in this portion of their range, particularly in Sacramento, Yolo, and San Joaquin Counties (see Figure 2). While the Swainson's Hawk is a focus of planning efforts, current General Plans within Sacramento and San Joaquin counties contain goals of converting large areas of natural and agricultural lands that contain suitable Swainson's Hawk foraging habitat to urban features that do not provide foraging habitat (Sacramento County 2011, San Joaquin County 1992). San Joaquin County, however, does have in place an approved Habitat Conservation Plan under which Swainson's Hawk preservation is a major emphasis. In Yolo County, one of the densest areas of hawk territories in the State, current policies focus on preserving both agriculture and Swainson's Hawk foraging habitat. Current efforts under the developing Yolo County Natural Heritage Program (<http://www.yolohabitatconservancy.org/>) are aimed at maintaining this focus into the

future, thereby potentially lessening the long-term impacts to the species once the plan is approved and implemented.

Agricultural cropping patterns directly influence the distribution and abundance of the Swainson's Hawk in the Central Valley (Estep 1989). Swainson's Hawks can forage in natural grasslands, pasture, hay crops, and some irrigated crops but do not preferentially forage in other agricultural crops such as orchards and vineyards once these crops develop their typical canopy (Estep 2009, Swolgaard et al. 2008). This dependence on land use patterns poses a continuing vulnerability for a large percentage of the remaining population based on current trends toward cultivation of largely incompatible crop-types such as orchards and vineyards (California Department of Conservation Agricultural Land Mapping 2010). Compatible crop types do, however, provide a very important benefit to the species (Estep 2008). The lack of suitable nesting habitat throughout much of the San Joaquin Valley, due to conversion of riparian systems and woodland communities to agriculture, also limits the distribution and abundance of Swainson's Hawks (California Department of Fish and Game 1993). The loss of historic sage-steppe/grassland foraging habitat may also be a significant factor in a continuing decline of Swainson's Hawks in portions of the Great Basin and Mojave Desert regions of the state (California Department of Fish and Game 1993). Disturbances on the hawk's Mexican and South American wintering grounds, or during migration, may also contribute to population declines (Goldstein et al. 1996, Sarasola et al. 2005).

At this time, the Department recommends retaining the Threatened classification for this species based on the following:

- On-going cumulative loss of foraging habitats throughout California
- Significantly reduced abundance throughout much of the breeding range compared to historic estimates
- An overall reduction in the hawk's breeding range in California

IV. SPECIES DESCRIPTION AND BIOLOGY

The Swainson's Hawk is a medium-sized raptor with relatively long, pointed wings that curve up while in flight (California Department of Fish and Game 1993). There are three main plumage morphological types: light, rufous, and dark, with several intermediates (Woodbridge 1985). Light morph adults have dark heads, a light chin, and a dark breast band, set off distinctively from the lighter colored belly. In dark morph adults, however, the entire body of the bird may be a drake brown to sooty black. The cere (the fleshy region at the base of the upper bill) is bright yellow and set off distinctively from the dark head. The throat is white or partially white in dark morph adults and the wings are bicolored underneath, with the wing linings generally lighter than the dark, and with gray flight feathers. The light colored leading edge of the wing is a diagnostic feature. Juveniles have the same characteristic underwing markings; however there is more spotting and streaks on the breast and sides than adults (Bechard et al. 2010). Adults generally weigh from 550 to 1100 grams (19 to 39 oz); females, which range between 650 and 1100 grams (23 to 39 oz), are heavier than males, which range from 550 to 850

grams (19 to 30 oz) (Anderson pers. comm. 2012, Bradbury pers. comm. 2012, Estep pers. comm. 2012). Butte Valley hawks in northeastern California seem to be slightly larger than in other areas of the state, with females from 880 to 1300 grams, and males from 620 to 970 grams (Briggs pers. comm. 2012).

The Swainson's Hawk was historically a species adapted to open grasslands and prairies, but it has become increasingly dependent on agriculture as native plant communities have been converted to agricultural lands (California Department of Fish and Game 1993). This bird also forages in large numbers in managed wetlands during the dry summer months when the vegetation in these wetlands is being mowed or disced (Feliz pers. comm. 2012). The diet of the Central Valley population is varied. The California vole (*Microtus californicus*) is the staple of the diet; however, a variety of other small mammals, birds, and insects are also taken (Estep 1989).

The Swainson's Hawk breeds in the western United States, and Canada (California Department of Fish and Game 1993). Its winter range occurs in isolated areas of California, Mexico and Central America, through South America and as far south as Argentina (Bechard et al. 2010, Kochert et al. 2011). Generally the Swainson's Hawk is found in wintering areas from early November through mid-March (England et al. 1997, Kochert et al. 2011, Bradbury pers. comm. 2012). In 1997, six Swainson's Hawks from the Central Valley were fitted with satellite transmitters and tracked to determine routes of migration and the locations of wintering areas (Bechard et al. 2010). Central Valley birds were located wintering in a region north of Mexico City, Mexico, and near Bogota, Colombia (England et al. 1997), although a hawk from northeastern California was tracked to Argentina during the winter of 1996 (Feliz pers. comm. 2012). One unpublished telemetry study found that Central Valley hawks mostly winter in Central Mexico, but some also end up in central and northern South America (Anderson pers. comm. 2014). A current telemetry study on hawk in the Natomas area of California, has tracked several birds (N= 2 to 4) to Argentina, while the remaining birds went to northern South America, Central America, and Mexico (Anderson pers. comm. 2014). After their long migration north, Swainson's Hawks arrive at their breeding sites in the Central Valley between March and April (Bechard et al. 2010).

Swainson's Hawks are generally monogamous, with some undocumented cases of polyandry (Briggs pers. comm. 2012), and show a high degree of site fidelity by returning to the same territory year after year (England et al. 1997, Bechard et al. 2010). Breeding pairs begin to build nests soon after they arrive at their territory, and lay eggs between late-March to early-April (England et al. 1997, Bradbury pers. comm. 2012). Clutch size is between 1 and 4 eggs, but most often 2 or 3 eggs are laid (Bechard et al. 2010). The incubation period lasts 34-35 days (Bechard et al. 2010). The young typically fledge from the nest about 6 weeks after hatching, but may leave the nest as early as 5 weeks old and remain on nearby branches (Bradbury pers. comm. 2012). Craighead and Craighead (1956) reported fledging success of 0.6 young per pair. Studies conducted in the Sacramento Valley reported an average of 1.4 to 1.8 young per successful nest (Estep 2008). In the Butte Valley, Briggs (2007) found productivity to be at 2.01 fledged young per successful breeding attempt. Throughout California, most young have fledged by

mid- to late-August, at which point pre-migratory groups begin to form (Bechard et al. 2010). In the Central Valley most young fledge during the first part of July (Bradbury pers. comm. 2012). Migration back to the wintering grounds begins mid-August, and by October most hawks have left California (Kochert et al. 2011).

Several studies on breeding home range have been conducted on California's Swainson's Hawk population. In the Central Valley, home range size varies from 2760 to 4038 ha, with a relatively smaller home range size of 405 ha found in the Butte Valley (Table 1). Home range size is thought to be related to quality of, and distance to foraging habitat (Estep 1989, Babcock 1995, Bechard et al. 2010).

Home Range Size (ha)	Area	Reference
2760.4	Central Valley	Estep 1989
405	Butte Valley	Woodbridge 1991
4038.4	Central Valley	Babcock 1995
3265.4	Central Valley	Sernke 1999

Table 1. Home range for the Swainson's Hawk in California.

Swainson's Hawks in the Central Valley often nest at the periphery of riparian forests or in riparian corridors where they have greater access to foraging areas, but virtually any suitable tree may be used (Estep 1989, England et al. 1995, Bechard et al. 2010). Hawks will also use lone trees in agricultural fields or pastures, and roadside trees when they are adjacent to suitable foraging habitat (Estep 1989, Anderson et al. 2007). Estep (1989) found Valley oak (*Quercus lobata*), Fremont cottonwood (*Populus fremontii*), walnut (*Juglans sp.*), and willow (*Salix sp.*) are the most commonly used nest-tree species, with an average height ranging from 12.6 to 25 m (41.3 to 82.0 ft). Similarly, Anderson et al. (2007) found Valley oak, cottonwood, willow and *Eucalyptus* spp. were more frequently used, with an average height between 14.8 to 16.2 m (48.6 to 53.1 ft).

In the Great Basin, Swainson's Hawks occupy the juniper/sagebrush community typical of the area; however, much of the lowlands have been converted to agriculture (Bloom 1980, Woodbridge et al. 1995). Junipers (*Juniperus occidentalis*), with an average height of 4.6 m (15.0 ft), are most commonly used as nest trees in the Great Basin (California Department of Fish and Game 1993). The diet of the Great Basin population consists largely of montane meadow voles (*Microtus montanus*) and Belding's ground squirrels (*Spermophilus beldingi*) (California Department of Fish and Game 1993).

Other areas in California inhabited by small populations of Swainson's Hawk include the isolated desert areas in the Mojave National Preserve regions of the western Mojave Desert, the greater Antelope Valley near Lancaster, and in the Owen's Valley along the eastern edge of the Sierra Nevada (see Figure 2). Joshua tree (*Yucca brevifolia*), ornamental trees, and lone trees along roadsides or on private property are commonly used as nest trees in these regions (Bloom 1980).

V. HABITAT REQUIREMENTS

Large open areas of suitable foraging habitat with abundant and available prey base in association with suitable nesting habitat are basic requirements for the successful reproduction of Swainson's Hawk (Estep 1989). Historically, the natural foraging habitat of the Swainson's Hawk was primarily open stands of grass-dominated vegetation and relatively sparse shrublands (Bloom 1980, Bechard et al. 2010). However, much of the original foraging habitat in California has been converted to either urban landscapes or agricultural production. Consequently, the Swainson's Hawk has shifted its foraging strategy to rely more heavily on agricultural crops (Bloom 1980, Estep 2009).

Today, suitable foraging habitat includes a variety of agriculture crops, grassland, and pasture. In the Central Valley, Swainson's Hawks forage more often in mixed agricultural lands that support irrigated hay crops (e.g. alfalfa), as well as dryland pasture, grassy ruderal lots, and some irrigated crops, due to a higher accessibility and relative abundance of prey (Bloom 1980, Estep 1989, Babcock 1995, Smallwood 1995, Swolgaard et al. 2008, Anderson et al. 2011). Alfalfa fields are more routinely used by foraging Swainson's Hawks than any other crop type (Bloom 1980, Woodbridge 1985, Estep 1989, Babcock 1995, Sernka 1999, Swolgaard et al. 2008, Anderson et al. 2011). Anderson et al. (2011) reported that 63% of observed foraging occurred in alfalfa.

The ability of the hawk to use agricultural crops for foraging is dependent on a complex interaction of crop structure and the timing of agricultural practices (Bechard 1982, Schmutz 1987, Estep 1989, Woodbridge 1991, Smallwood 1995, Sernka 1999, Estep 2009). Prey species may be displaced during irrigation, burning, and harvesting activities, which often allows for ample foraging opportunities for Swainson's Hawks and other predators (Sernka 1999). The availability of prey is also largely dependent on the crop structure. Certain crops provide improved foraging opportunities for Swainson's Hawks due to high prey numbers, low vegetation structure, and favorable farming practices (e.g. mowing, irrigating; Estep 1989, Babcock 1995, Sernka 1999, Swolgaard et al. 2008, Estep 2008, Estep 2009). Some crops and managed wetlands are useful in foraging for a period after harvest, but may remain relatively unavailable in other periods of crop growth; likewise, other crops are available early in the season when a less dense vegetative structure and shorter height allows for access to prey (England pers. comm. 2012, Feliz pers. comm. 2012).

In a report to the Yolo Natural Heritage Program, Estep (2009) described the relative value (low to high) of vegetative structure and accessibility of different agricultural crop types in Yolo County to foraging Swainson's Hawk. Based on two main components, prey accessibility and prey availability, Estep (pers. comm. 2012) places high value on alfalfa, and on wheat, tomatoes, and beets during harvest; moderate value on irrigated and non-irrigated pasture, grasslands, and some other annually rotated crops; low value safflower, sunflower, corn and rice; and little to no value on orchards and vineyards. The variety of habitats used for foraging by this hawk suggests that maintenance of large heterogeneous areas of agricultural habitats and grasslands, which include a high

percentage of alfalfa, should be a priority for conservation of the species (Swolgaard et al. 2008, Estep 2009, Anderson et al. 2011).

Unsuitable or low value foraging habitat includes any habitat which does not support adequate prey abundance, as well as any habitat in which prey are inaccessible to foraging hawks due to vegetation characteristics (e.g. vineyards, mature orchards, cotton fields, dense or tall vegetation). For example, orchards and vineyards in general are not suitable foraging habitat for Swainson's Hawk due to the dense woody cover making prey unavailable (Estep 1989, Babcock 1995). In a study to ascertain the extent of vineyard use by Swainson's Hawk in the Central Valley, Swolgaard et al. (2008) observed relatively low foraging levels in vineyards and stated that "large contiguous areas of vineyards are likely unsuitable for foraging by Swainson's Hawk at a population level."

Suitable nesting habitat includes trees within mature riparian forest or corridors, lone oak trees and oak groves, and mature roadside trees. It is thought that trees on the periphery of riparian habitat are preferred by Swainson's Hawk (Estep 1989, England et al. 1995, Bechard et al. 2010). The majority of documented Swainson's Hawk nest trees in the Central Valley have been found in riparian systems in Sacramento, Sutter, Yolo, and San Joaquin counties, making this habitat type critically important (Schlorff and Bloom 1983). This is likely the case for nesting hawks in the San Joaquin Valley as well; however the hawks that regularly nest here have not been extensively studied. A portion of the Swainson's Hawk population also resides in the Great Basin of Northeastern California where hawks typically nest in juniper trees (Bloom 1980). Swainson's Hawks have been observed in several studies to select nest sites in greater densities when near large tracts of agricultural lands than when adjacent to non-agricultural lands (e.g. urban, annual grassland, or even vernal pool landscapes; Bloom 1980; Estep 1989; Babcock 1995; Smallwood 1995; Swolgaard et al. 2008). Data collected during Department Swainson's Hawk nest surveys in 2002 through 2009 indicated that nests were clumped at higher densities in mixed agricultural landscapes (Gifford et al. 2012). Nest sites are generally adjacent to, or within easy flying distance to suitable foraging habitat that provides available prey resources (England et al. 1995). The Swainson's Hawk is also known to nest within urban environments, such as Davis, Stockton and Sacramento, California; however, what is known about these nesting pairs is largely anecdotal as there have been no focused studies on these hawks.

Wintering habitat in California is less critical for Swainson's Hawk because only a small number of hawks have been documented to over winter in California (Herzog 1996; Anderson pers. comm. 2012; eBird 2012). In the Central Valley Delta region, overwintering hawks have been documented to roost in numbers of 10 to 30 individuals, mostly comprised of adults and some juveniles, in large cottonwoods or eucalyptus trees (Anderson pers. comm. 2012). During the day these hawks disperse on the nearby landscape to forage either individually or in groups with red-tailed hawks, Ferruginous hawks, rough-legged hawks, corvid species, and other raptors. It is unknown where these wintering birds originated (Anderson pers. comm. 2012).

During the breeding season and just prior to their annual fall migration period, Swainson's Hawk in California often congregate in groups from 5 up to 100+ individuals (Anderson pers. comm. 2012). Foraging often occurs during congregation, but communal roosting may also take place. Congregations during the breeding season happen nearer nesting sites and groups will sometimes form during any portion of the nesting cycle (nest building to fledgling care). Late summer-fall congregations may occur during delayed migration periods lasting up to three months starting in early August through late October. These congregation areas can occur anywhere there is food available, but are typically associated with alfalfa, other hay crops, and various row crops (excluding orchards and vineyards) that have been recently mowed, disced, harvested or irrigated (Anderson pers. comm. 2012). Support for practices that provide for these critical breeding and pre-migration congregation areas is an important conservation need.

VI. NATURE AND DEGREE OF THREAT

Foraging Habitat Conversion to Urban and Non-Suitable Habitat

Fragmentation of habitat has been observed to adversely affect long-term viability of animal populations, and can be defined as dissection of habitat into smaller portions that does not allow free movement of individuals (Fahrig 2003). Habitat fragmentation has two components, both of which contribute significantly to, and may even cause, extinctions for some species: (1) reduction in total habitat area, and (2) redistribution of the remaining area into disjunct fragments (Wilcove et al. 1986).

Significant loss of agricultural lands and foraging habitat has occurred in counties within the Sacramento and San Joaquin valleys due to urban development. According to the State of California's 2008-2010 California Farmland Conversion Report (California Department of Conservation 2014), Southern California and San Joaquin Valley counties were included in the "top ten list" of California counties with the most acres converted from farmland to urban land. Irrigated farmland was the source of 25 percent of all new urban land statewide, with another 30 percent of new urban land derived from dryland farming and grazing uses, and 45 percent from natural vegetation or vacant lands. Direct conversion of irrigated farmland to urban land was 25 percent of total new urban growth for both the Sacramento and San Joaquin valleys. Land idling was the most prevalent in the southern San Joaquin Valley and counties in the Sacramento-San Joaquin Delta. If current trends in habitat conversion of compatible agriculture to urban development continue, the Swainson's Hawk population will likely experience reduced foraging opportunities, which may result in a further reduction in the species' range, distribution, and abundance.

Native foraging habitat in the lowland areas of the Great Basin also has been converted to agricultural land (Bloom 1980). The smaller Great Basin Swainson's Hawk population, while not subject to the same urban development pressures as the Central Valley population, is becoming more dependent on the agricultural system of the region to provide suitable foraging habitat (California Department of Fish and Game 1993). As

agricultural conversion continues to replace native habitat, the suitability of crop-types could determine the level of Swainson's Hawk foraging use. Ultimately the distribution of crops dictates the distribution and abundance of Swainson's Hawks in the Great Basin as it does in the Central Valley (California Department of Fish and Game 1993).

There has been a steady decline in active Swainson's Hawk territories occupying rangeland habitat in the Great Basin region of the state. Overgrazing and fire suppression have caused an increase in juniper forest and sagebrush communities (Miller and Rose 1999, Miller et al. 2001). The Swainson's Hawk decline in this area may have been a result of the increase in juniper/sage habitat at the expense of sage-steppe/grassland communities. Replacement of sage-steppe/grassland with juniper/sage habitats results in a reduction of microtine rodents and ground squirrels, the principal prey of the Swainson's Hawk in the Great Basin (California Department of Fish and Game 1993). While Swainson's Hawks have steadily declined in rangeland habitats of the Great Basin, there has been an apparent increase in breeding pairs utilizing agricultural foraging habitats such as alfalfa fields, largely due to greater prey densities and availability of prey in these areas (California Department of Fish and Game 1993).

Habitat Conversion to Vineyards and Orchards

Vineyards and orchards are considered low value foraging habitat for Swainson's Hawk because of low prey density and vegetation structure which prevents hawks from stooping on prey (Estep 1989, Smallwood 1995). Statewide, wine grape acreage has approximately doubled since 1990 (California Department of Conservation Agricultural Land Mapping 2010). Conversion of undeveloped land to vineyards involves the clearing of native upland and riparian vegetation. This type of conversion has the potential to affect Swainson's Hawk breeding and foraging habitat.

The 2008-2010 California Farmland Conversion Report (California Department of Conservation 2014) states that while urbanization is a leading component of agricultural land conversion throughout the state, economic and resource availability factors (i.e. water) also lead to conversion to more intensive agricultural uses, including orchards and vineyards. Conversion from grasslands to orchards, mainly almonds, was the most widespread form of conversion in 2010, with the Sacramento Valley having more conversions to high density olive orchards. Again, if conversion of compatible foraging habitat to non-habit continues, the Swainson's Hawk population in California will likely be impacted.

Breeding Habitat Conversion

Swainson's Hawks are not exclusively or predominately associated with nests in riparian areas, although a significant portion of the known nesting population in the Sacramento and San Joaquin Valleys occur in riparian areas (Bloom 1980, Estep 1989). Loss of suitable breeding habitat through conversion of riparian and woodland habitat to agriculture and unsuitable urban environments is a concern for breeding Swainson's Hawks across California, particularly in the San Joaquin Valley where suitable nest trees

are in lower abundance. Loss of lone trees along roadsides to road maintenance and construction may also impact breeding Swainson's Hawks as many of these trees are in proximity to suitable foraging habitat and are often used by Swainson's Hawks.

Implementation of levee vegetation removal policies could result in significant impacts to Central Valley Swainson's Hawk populations as a large portion of suitable nesting habitat may be removed. In April 2010, the Department's Director and the Department of Water Resources wrote a letter to the U.S. Army Corps of Engineers (Corps; DWR and CDFW 2010) expressing concern over the Corps' issuance and use of a new levee vegetation removal policy (USACE ETL 1110-2-571), and stating that "the proposed vegetation policy will likely have devastating environmental impacts, as the remnants of the once vast riparian forests and adjacent riverine ecosystems of the Central Valley are now concentrated on the banks and levees of its flood channels".

Climate Change

Climate change adds unpredictability to the existing suitable breeding and foraging habitats and could cause additional stress on Swainson's Hawk populations. These impacts, both to suitable habitats and to populations, can be generally anticipated based on current climate research. However, the level of these impacts is impossible to predict with accuracy or precision. Most climate projection studies agree that California will retain its typical Mediterranean climate (i.e. cool, wet winters and hot, dry summers), yet the degree of wetness/dryness will likely be amplified and vary by location across California (Pierce et al. 2011, Cayan et al. 2012,). Impacts may include increased winter runoff and flooding (with possible impacts to riparian nesting habitat) and sea level rise (with possible inundation of low-lying nesting or foraging habitat), more frequent extreme temperature events, and less snowpack (Pierce et al. 2011, Cayan et al. 2012).

Limited water availability in the summertime may significantly reduce the supply of water and therefore reduce prevalence of alfalfa and other high-quality foraging habitat. In addition, drought conditions associated with long-term changes in precipitation may negatively impact prey abundance (CDFW 2016), and consequently impact breeding success and survival of Swainson's Hawks.

The 2006 Executive Order S-06-06 calls for the increased production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources, largely comprised of corn. The market price for energy crops could result in farmers shifting to those crops that do not provide high value habitat to the Swainson's Hawk. For example, one study looking at agriculture impacts of climate change in Yolo County predicts that crops with high water utilization, such as alfalfa, are likely to become more scarce on the landscape in the future if water availability declines, and crops with a higher cash value per unit of water, such as vegetables, fruits and nuts will become more common (Jackson et al. 2009). Other potential indirect impacts may come from practices aimed at mitigating climate change. The future agricultural landscape could change from the existing mosaic of crops to grasses that can be used for carbon sequestration. Changing crop types to those less frequently irrigated and harvested, or those that would store

carbon for a longer time period could still provide habitat, but research is needed to understand the potential scale of the changes and how that could affect the range and reproductive success of the Swainson's Hawk (Bradbury 2009).

Renewable Energy Facilities

Wind energy project areas contribute to direct mortality of Swainson's Hawk through turbine strikes, particularly where wind resource areas overlap with hawk foraging areas. Swainson's Hawk mortality from wind turbines has been documented by Kingsley and Whittam (2001). The Solano County Wind Resource Area, which overlaps with the range of Central Valley Swainson's Hawks, has one of the highest raptor abundances of California's wind resource areas and initial studies show substantial numbers of bird and bat mortalities related to wind development. Birds most susceptible to this source of mortality are those that fly at or below the maximum blade height of wind turbines, particularly while hunting (Orloff and Flannery 1992), as is the case with Swainson's Hawks.

Disease

There have been some documented cases of Swainson's Hawk having experienced West Nile Virus (WNV) mortality. One Swainson's Hawk has been reported to test positive for WNV in California (reported in South Lake Tahoe area, but thought to have been brought from Mono County; Center for Disease Control and Prevention database), and another was confirmed positive by the Department's Wildlife Investigation Laboratory in 2015 from Contra Costa County (Rogers pers. comm. 2015). Eleven Swainson's Hawks were found dead with WNV infection in the USA from 1999 to 2004 (Nemeth et al. 2006). However, the extent of vulnerability WNV presents to the Swainson's Hawk is unknown at this time. Increased levels of WNV in California populations could exacerbate the effects of other threats on this species.

Contaminants

Insecticides are responsible for high mortality rates in hawks that migrate to Argentina. Prior to northerly migration, when flocks feed on insects in nearby harvested agriculture fields, several large-scale mortality events of Swainson's Hawks (>1000's found dead) were reported in Argentina due to applications of organophosphate and carbamate insecticides in agricultural fields (Goldstein et al. 1996). However, many of the birds that breed in California winter in Mexico, where the timing of pesticide applications poses less of a threat. Therefore, the importance of this factor for California's breeding hawks is unclear.

Application of anticoagulant rodenticide (AR) is a known threat to raptors due to ingestion of poisoned prey. Numerous field monitoring studies on raptor species indicate lethal and sublethal impacts of AR exposure (Stone et al. 2003, Murray 2011, Thomas et al. 2011, Christensen et al. 2012). Pesticide use throughout the Swainson's Hawk's range, specifically targeting ground squirrels, may also impact Swainson's Hawks and cause

secondary poisoning. In 2015, the Department's Wildlife Investigation Laboratory confirmed two AR exposures for Swainson's Hawks, both from Contra Costa County, with the cause of death in one due to AR toxicosis (Rogers pers. comm. 2015). Although the evidence indicates raptors are negatively affected by pesticide use, further research is needed to determine what extent Swainson's Hawks also incur these same impacts.

Other Direct Mortality Agents

Swainson's Hawk mortality is reported occasionally in California. Direct mortality of birds can be due to several actions as also described elsewhere in this document, including trimming of nest trees (typically due to construction or utility maintenance activities), shooting, vehicle collisions, electrocution, or pesticides. Biologists have only occasionally found shot or electrocuted Swainson's Hawks.

Stochastic Events

A mass mortality event of wintering Swainson's Hawk was observed in Argentina during November of 2003 when 113 Swainson's Hawks were found dead as a result of a single hailstorm (Sarasola et al. 2005). In addition, 14 hawks with severe injuries were recovered alive, but only 10 of these survived. Another 45 dead birds of 11 species were collected in the area. Interviews with local landowners conducted in other areas of these wintering grounds provided further evidence of past hailstorm-related mortality involving the hawk, suggesting that such events commonly occur in the Argentine Pampas. This potential cause of mass mortality of Swainson's Hawk wintering in agricultural areas of Argentina may be significant when added to the increased mortality associated with poisoning events during the last decade. Even though California's Central Valley Swainson's Hawk population is known to largely over-winter in Mexico, the Central Valley population may experience similar events.

VII. HISTORICAL AND CURRENT DISTRIBUTION

Historical Distribution (pre-1980)

Information gathered through an extensive search of the literature and museum records allowed Bloom (1980) to estimate the historic range of the Swainson's Hawk in California (Figure 1). From this analysis, Swainson's Hawks were found throughout the state except in the Sierra Nevada, North Coast Ranges and Klamath Mountains (Bloom 1980). Historically, the species was found in large, open grassland valleys with scattered trees or groups of trees. Swainson's Hawks also established breeding territories in foothill and canyon habitat. The valleys and deserts of southern California and the coastal valleys from the Santa Rosa Valley south to the Mexican border supported significant populations of Swainson's Hawks.

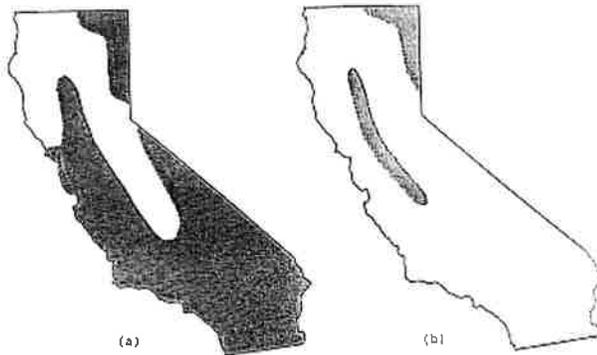


Figure 1. This figure was taken from Bloom 1980 and shows the historic (a) and current (b) range of Swainson's Hawk in California, as understood at that time.

In 1979, Bloom surveyed much of the state to determine the current distribution of Swainson's Hawks (Bloom 1980). In his report he depicted eight major geographic regions in California where Swainson's Hawk were found. The greatest number of nesting Swainson's Hawks were located in the Central Valley and also in the Great Basin of northeastern California from Butte Valley east to Nevada, south-central Modoc County and eastern Lassen County (Bloom 1980). In addition, Swainson's Hawks were also located in the Shasta and Owens valleys, and the Mojave Desert (Bloom 1980). Bloom's description of Swainson's Hawk distribution remains consistent with current knowledge and more recent data do not contradict Bloom's estimate of distribution as explained below.

Current Distribution (post-1980)

In 1988, the Department surveyed the entire Central Valley, coastal valleys, and parts of Southern California, and was provided with information from cooperators in the Great Basin region of the state. In addition, information on Swainson's Hawk activity was gathered by the Department from 1979 to 1993 throughout the state (California Department of Fish and Game 1993). These data revealed no change in the distribution of the Swainson's Hawk in California since Bloom's 1980 report (California Department of Fish and Game 1993).

In 2005 and 2006 another statewide survey of Swainson's Hawk breeding pairs was conducted using a stratified random sample design (Anderson et al. in prep). The results of these survey findings roughly duplicate Bloom's (1980) earlier findings, with the majority of Swainson's Hawk records located in the Central Valley, and with the next large population center in the Great Basin. However, this survey was only focused within the current known distribution and did not cover areas of the state where Swainson's Hawk had historically nested and the species was presumed extirpated (Anderson et al. in prep). For example, additional areas not included in the 2005 and 2006 survey include some areas in Sonoma and Napa counties. Recently, 3 to 4 Swainson's Hawk nests have

been detected in upland habitat at the north end of San Francisco baylands near Highway 37 (Fish pers. comm. 2012). These nests have been monitored as part of the Golden Gate Raptor Observatory's Bay Area Raptor Nesting Survey over the last few years.

The Department's California Natural Diversity Database (CNDDDB) records contain 2,394 Swainson's Hawk occurrence records, ranging from 1894 to present (California Natural Diversity Database; December 1, 2015). Eighty-five percent (2029/2394) of the CNDDDB records occur within the Central Valley, and 59% (1407/2394) occur within Sacramento, Yolo, Solano, and San Joaquin counties. CNDDDB records largely corroborate Bloom (1980) and Anderson et al. (in prep) results in that the majority of the records occur within the Central Valley (Figure 2). A majority of records (n=2140) are from 1990 on. Of equal importance, in areas of the state where Bloom reported that the Swainson's Hawk had been extirpated, CNDDDB similarly contained no Swainson's Hawk records. There are no CNDDDB records in the Sierra Nevada, North Coast Ranges, and Klamath Mountains, and with the exception of a handful of new records in Napa County, Sonoma County, and two records in San Luis Obispo County. CNDDDB provides no indication that the species has reoccupied historical range in coastal valleys from Santa Rosa south.

eBird (<http://ebird.org>) is a citizen science database that houses bird observation data. To supplement CNDDDB data, we extracted likely breeding records (e.g. observations with noted breeding activity, nest location, eggs or young) for Swainson's Hawks in California from 1995 during the breeding season (April through August). We found 716 breeding records in eBird, some of which may duplicate CNDDDB occurrences (see Figure 2). Some caution should be used when interpreting eBird data for breeding activity. eBird is an observational database not meant to track breeding status of any one species, and designation of breeding status from extracted data in this case was largely gleaned from the notes a submitter entered. Therefore, some breeding observations may have been missed, while others misclassified. Although the incoming data to eBird receives some level of scrutiny via automated filters and volunteer reviewers, there is still some margin of error. Alternately, incoming records for CNDDDB receive a much higher level of verification before it is added and viewable.

The data for Swainson's Hawk recorded in the CNDDDB and eBird is not collected in a systematic fashion and for this reason its use as the principle measure for describing the species' distribution and range is open to criticism. Nevertheless, the accumulation of over 2,300 Swainson's Hawk observational records in CNDDDB and over 700 in eBird can be used, in conjunction with other records, to form a better understanding of the species' current distribution and range.

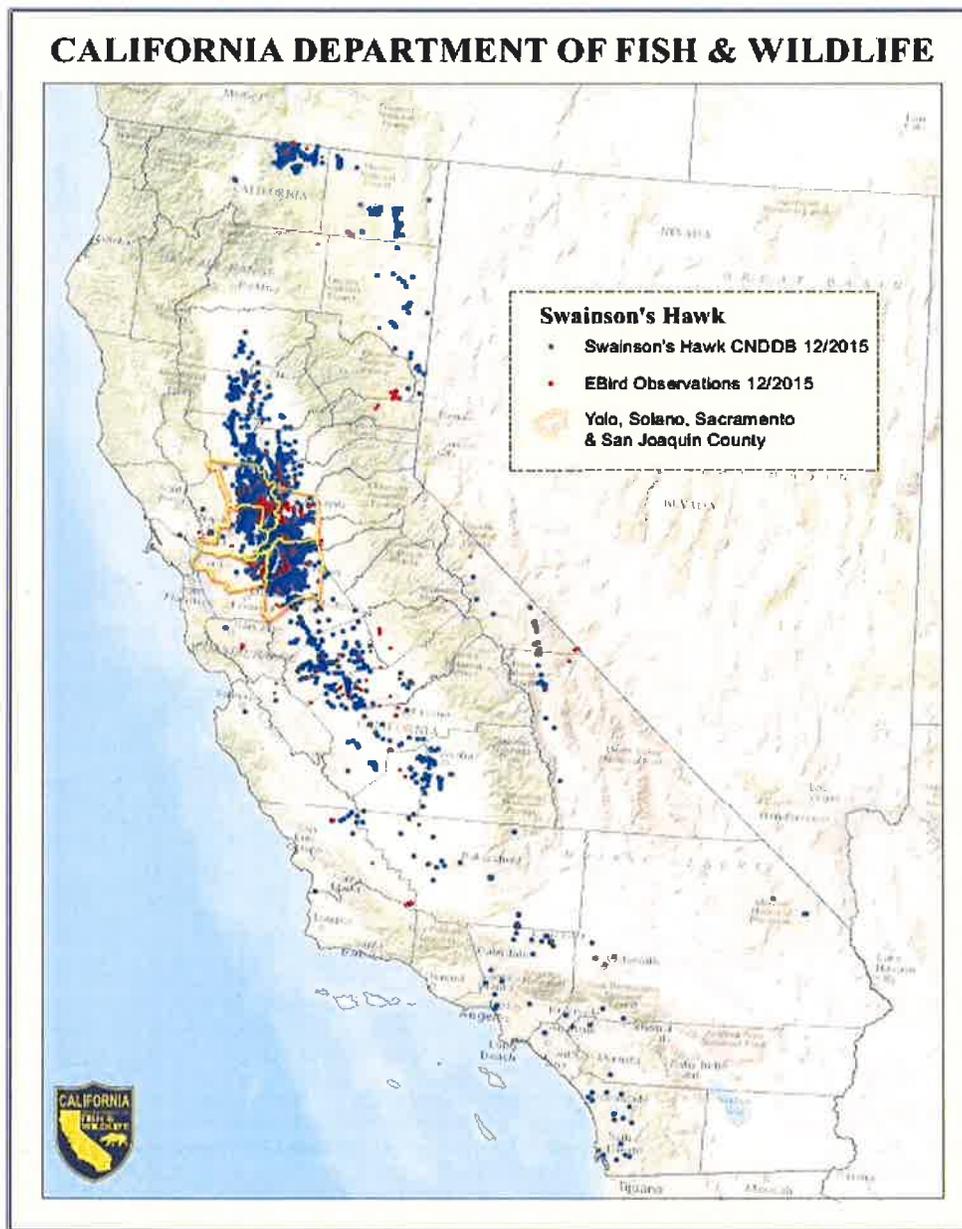


Figure 2. CNDDDB and eBird data for Swainson's Hawk in California (extracted from CNDDDB 12/1/2015 and eBird in 12/15/2016). The majority of the Central Valley's Swainson's Hawk population lies within an area that includes Sacramento, Yolo, Solano, and San Joaquin counties.

As previously mentioned, Bloom (1980), Gifford et al. (2012), Anderson et.al. (in prep.), CNDDDB occurrence records, and eBird breeding records all indicate that the majority of Swainson's Hawk nests are located in the Central Valley and that the nesting density in the Central Valley is unevenly distributed. Approximately 70 to 80% of the Central Valley population is located in the southern Sacramento-northern San Joaquin Valley, a

region composed of four counties: Yolo, Solano, Sacramento, and San Joaquin (Bloom 1980, Anderson et.al. in prep., Gifford et al. 2012). These four counties are located in the Central Valley, where suitable irrigated farmland is the primary land-use (Estep 1989). Numbers of breeding pairs decreased both to the north and south of this four county region, and no significant foothill breeding populations have been documented. Another important Swainson's Hawk population center is in the Great Basin.

The distribution of the Swainson's Hawk has changed little since Bloom (1980) originally described the species distribution. With few exceptions, areas within the historical range, particularly along the Central Coast and southern regions, have not been reoccupied, and the Central Valley and Great Basin continue to provide the species its core habitat in California. However, the Antelope Valley is considered reoccupied by some, probably as a result of irrigated agriculture, as well as some inner coastal valleys, portions of the Sierra foothills, and some portions of the San Joaquin Valley (Estep pers. comm. 2012).

VIII. HISTORICAL AND CURRENT ABUNDANCE

Historical Abundance

Historically, the Swainson's Hawk was considered one of California's most common nesting buteos (Sharp 1902), but the population declined dramatically around 1900, concurrent with a contraction of the species' range, particularly along the central and southern coastal areas of California. Bloom (1980) estimated as many as 17,136 pairs of Swainson's Hawks historically nested in California (includes data from 1880-1969). This estimated 90% decline in the population and the loss of a significant portion of its range prompted the hawk's listing by the State of California as a Threatened species in 1983 by the California Fish and Game Commission pursuant to CESA. (See Cal. Code Regs., tit. 14, §670.5(b)(5)(A).

Current Abundance

In a 1979 survey, Bloom (1980) estimated that there were only 375 (± 50) breeding pairs of Swainson's Hawks remaining in California. Since this estimate was made and the hawk was listed in 1983, interest in the Swainson's Hawk has grown considerably. Thus there has been an increased survey effort throughout the state. This increase in data collection efforts may be one reason we see higher breeding densities reported from certain areas within the state. A 1988 estimate of the Central Valley population was obtained using nest density information contained in the study by Estep (1989), where an area estimate of the habitat was multiplied by a breeding density of 0.16 pairs/sq km (0.42/sq mi) (the lowest breeding density of Estep's four study areas in the Central Valley, totaling an area of 374.4 sq km). The results indicated an estimate of 430 pairs in the Central Valley. This estimate was further subdivided into three main regions of the Central Valley: 80 pairs were estimated south of and including the Merced River, 35 pairs north of Sutter Buttes in Sutter County, and 315 pairs between these areas. Using

survey data and population estimates derived by biologists working in the Great Basin region, the population for that area was estimated to be 110 pairs (Estep 1989). In addition, five pairs were estimated for the Owens Valley area, and five for the Mojave Desert area (Estep 1989). The species was assumed to be extirpated from Southern California and coastal valleys. The individual estimates were combined to form a total statewide estimate of 550 breeding pairs in 1988 (Estep 1989). Neither Bloom 1980 nor Estep 1989 methods to estimate the population of hawks was sufficient to provide a statistically rigorous estimate.

More recently, Anderson et al. (in prep) completed a survey of the statewide breeding Swainson's Hawk population in 2005 and of the Central Valley breeding population 2006, and estimated the number of breeding pairs statewide at 1,893 (95% CI, 1462-2325) in 2005 and an estimated the number of breeding pairs in the Central Valley at 2,251 (95% CI, 1811-2690) in 2006. Another recent survey of nesting Swainson's Hawk was conducted in a portion of the Central Valley (Butte to San Joaquin counties) during the period 2002 to 2009 (Gifford et al. 2012). The latter survey yielded yearly estimates for numbers of breeding pairs of Swainson's Hawks in the Central Valley north of the Stanislaus River and south of Red Bluff: in 2002 the estimate was 593 (388-798) breeding pairs; in 2003 the estimate was 1,008 (720-1,296) breeding pairs; and in 2009 the estimate was 941 (692-1,190) breeding pairs (Gifford et al. 2012). Both Anderson et al. (in prep) and Gifford et al. (2012) methods employed to estimate the population of hawks were sufficient to provide a statistically rigorous population estimate, and are designed to be repeatable in order to accurately detect changes in the breeding population of Swainson's Hawks within each of their study areas.

Compared to historical distribution and abundance, current surveys have indicated a smaller population occupying a restricted range that includes the core habitat areas of the Central Valley and Great Basin. Surveys subsequent to Bloom's 1979 inventory (Bloom 1980) have resulted in higher population estimates within these core areas, but it is unknown if this was due to an increase in survey effort or an actual increase in the population. Recent surveys employing repeatable survey designs hold promise for future comparative analysis.

IX. POPULATION TREND

Raptors may experience year-to-year changes or fluctuations in their population numbers due to a variety of factors including changes in prey abundance, habitat, and weather. In order to detect long-term changes over time (i.e. trends) in California's Swainson's Hawk population, it is necessary to collect data over a sufficient number of years to span any short-term population fluctuations or cycles (Hatfield et al. 1996; Newton 1998; Lewis and Gould 2000).

Historical statewide population estimates were based on a limited number of annual surveys and were not designed to be repeated (Bloom 1980, Estep 1989). Anderson et al. (in prep.) used repeatable survey efforts statewide with a repeatable survey design over

two years to estimate the number of nesting hawks. Gifford's et al. (2012) also used repeatable survey efforts and covers a seven year interval; however, the study area is limited to the northern portion of the Central Valley and again, and the time period is insufficient to span population fluctuations or cycles (Hatfield et al. 1996; Newton 1998; Lewis and Gould 2000). Due to differences between the two studies in survey design, duration and scope, neither of these surveys can currently be used to accurately estimate a statewide trend for Swainson's Hawk.

The Breeding Bird Survey (BBS) is a dataset that spans a sufficient length of time to be useful in detecting trends in the Swainson's Hawk populations. The BBS is a long-term, large scale avian monitoring program initiated in 1966 (1968 in California) to track the status and trend of North American bird populations. Each year during the height of the avian breeding season, participants skilled in avian identification collect bird population data along randomly selected roadside survey routes. The raw data for survey routes in California are accessible on the BBS website, <http://www.pwrc.usgs.gov/BBS/>. In addition to collecting and storing raw data the website also provides tools for trend analysis.

The BBS data has been used in over 450 publications and is often the only long-term data set available for avian trend analysis. However, use of BBS data is controversial because of a number of possible sources of error. These include missing data, observer bias, alternating observers, biases due to road-only surveys, and BBS's index method for population abundance (rather than a true estimate of the population). The BBS data on Swainson's Hawk for California are marked as "data with an important deficiency" (USGS 2012). Data may be so marked because:

1. The regional abundance is less than 0.1 birds/route (very low abundance),
2. The sample is based on less than 5 routes for the long-term (very small samples), or
3. The results are so imprecise that a 5% per year would not be detected over the long-term.

Cautious of the potential for errors in interpretation, the BBS appears to be useful for analyzing population trends for Swainson's Hawk populations in California. More than 30 routes monitored over the last 40 years have recorded the occurrence of Swainson's Hawk (Sauer et al. 2011; USGS 2012). The roadside surveys are conducted in peak breeding season while Swainson's Hawk are active, visible and easily identified as they rear young. Therefore, the data collected by BBS presents a potentially valuable resource for trend analyses.

The trend analysis presented in Figure 3 for Swainson's Hawk populations is taken from the BBS website and is based on the current BBS hierarchical model for population change (Sauer and Link 2011, Sauer et al 2011). The analysis tools used were from the Species Group Summaries Results where the species group is Neotropical Migrant, the Period is 1968-2009, and the Region is California. This tool gives a Swainson's Hawk trend index of 3.6 at ($P < 0.05$, $N = 38$), which translates into an increasing trend of 3.6%

per year. The index value is a measure of percent change per year, and in this case is listed as "significant." The P value is the likelihood that the result is attributable to chance alone, and in this case the P value is significant. Figure 3 suggests that a low initial value for Swainson's Hawk detected followed by a slow rate of increase thru the 1990s, followed by a faster rate of increase in 2000's.

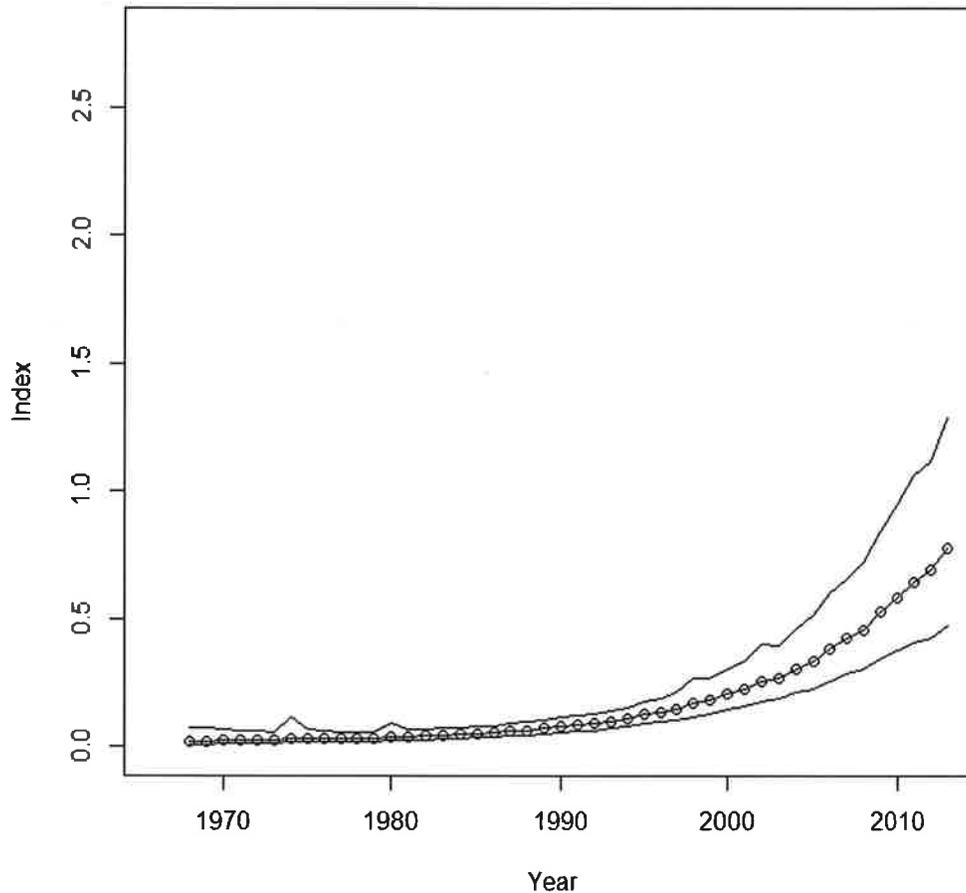


Figure 3. Breeding Bird Survey trend (with 95% confidence intervals shown) for the Swainson's Hawk from 38 survey routes in California from 1966 to 2013. The x axis is year and the y axis is the relative abundance estimates for all years, estimated as yearly predicted abundances from the hierarchical model analysis (see Sauer and Link 2011).

As mentioned earlier there are only three statewide estimates for breeding pairs of Swainson's Hawk ranging from 1980 to 2007 (Bloom 1980; Estep 1989; Anderson et al. in prep). The 1979 and 1988 surveys yielded comparable population estimates: 375 (± 50) and 550 breeding pairs respectively (Bloom 1980; Estep 1989). The 1988 survey effort was designed to be repeatable and consisted of several years of surveys. The 2005 statewide survey yielded a higher population estimate (1,893 pairs; Anderson et al. in prep.). This more recent effort was a stratified random sample that involved numerous

biologists throughout the state; a level of effort substantially greater than previous efforts which undoubtedly influenced its greater population estimate.

Based on the results of the three statewide surveys occurring in California, it is possible to conclude that the population is increasing over time. However, this perception is tempered by the differences in effort, design, technique and time frame of data collection of the three studies. The latest population estimate (Anderson et al. in prep) is still below the historical population estimate, and there is little evidence to indicate that this hawk has reoccupied much of its former range in the central and south coast valley and Southern California. Although the three statewide estimates are not sufficient to form a trend line, cautious speculation that the Swainson's Hawk population has experienced a modest increase within the Central Valley may be warranted .

X. EXISTING MANAGEMENT EFFORTS

Regulations, Protections, and Conservation

California Endangered Species Act (CESA; Fish and G. Code, § 2050 et seq.). The Swainson's Hawk was listed as a threatened species in 1983 by the California Fish and Game Commission pursuant to CESA, (Cal. Code Regs., tit. 14, § 670.5(b)(5)(A).)

Under CESA it is unlawful to take (Fish & G. Code, §86) a species listed as "threatened" or "endangered" (or a candidate) by the State of California unless 1) the take is incidental to an otherwise lawful activity, 2) the impacts of the lawful take are fully minimized and mitigated, 3) the take is consistent with Fish and Game Code sections 2112 and 2114, and 4) adequate funding to implement the permitted take's mitigation and monitoring measures is ensured.

Section 2053 of the Fish and Game Code states, in part, "it is the policy of the state that state agencies should not approve projects as proposed which would jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available consistent with conserving the species and or its habitat which would prevent jeopardy." Section 2054 states "The Legislature further finds and declares that, in the event specific economic, social, and or other conditions make infeasible such alternatives, individual projects may be approved if appropriate mitigation and enhancement measures are provided."

Loss or alteration of foraging habitat or nest site disturbance which results in: (1) nest abandonment; (2) loss of young; (3) reduced health and vigor of eggs and/or nestlings (resulting in reduced survival rates), may ultimately result in the take of nestling or fledgling Swainson's Hawks incidental to otherwise lawful activities. The taking of Swainson's Hawks in this manner can be a violation of CESA. This interpretation of take has been judicially affirmed by the 1992 landmark appellate

court decision, *Department of Fish and Game v. Anderson-Cottonwood Irrigation District* (8 Cal.App. 4th, 1568), which emphasized that the intent and purpose of CESA applies to all activities that take or kill endangered or threatened species, even when the taking is incidental to otherwise legal activities.

California Environmental Quality Act (CEQA, Pub. Resources Code, § 21000 et seq.). CEQA requires adoption of mandatory findings of significance if a project's impacts to threatened or endangered species are likely to occur (§21001 (c), §21083, Guidelines §15380, §15064, and §15065). Impacts must be avoided or mitigated to less than significant levels unless the CEQA Lead Agency makes and supports findings of Overriding Consideration. Mitigation for impacts to Swainson's Hawk foraging habitat varies among CEQA lead agencies, but essentially does not occur at a rate greater than 1:1 habitat lost to habitat protected.

Fish and Game Code §§ 3503, 3503.5, and 3800. These Fish and Game Code sections prohibit the take, possession, or destruction of birds, their nests or eggs.

Migratory Bird Treaty Act (MBTA). Swainson's Hawks are protected under the federal MBTA of 1918 (16 U.S.C. 703 711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in §50 of the Code of Federal Regulations (C.F.R.) Part 10, including feathers or other parts, nests, eggs or products, except as allowed by implementing regulations (50 C.F.R. 21).

Conservation Plans

Regional conservation planning efforts take a comprehensive approach to ecosystem conservation while allowing land use authorities the ability to manage anticipated growth and development. A few regional conservation plans currently being administered are designed to provide conservation of nesting and foraging Swainson's Hawk habitat within the bird's nesting range, including: the San Joaquin County Multi-species Habitat Conservation and Open Space Plan, the Natomas Basin Habitat Conservation Plan, the Metro Air Park Habitat Conservation Plan, and the East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan. Each of these plans has a unique strategy for providing conservation value for the Swainson's Hawk; however none of these provide habitat at a rate greater than 1:1 habitat lost to habitat protected. In addition to the plans described above, there are several jurisdictions with conservation plans in the development stage which aim to provide good conservation value to the Swainson's Hawk, including: Butte County, Yolo County, Solano County, Sacramento County, Yuba and Sutter Counties, and Placer County.

XI. DATA GAPS

The Swainson's Hawk has been listed under the California Endangered Species Act since 1983, and yet there is still much to learn about the species. Several surveys have been conducted throughout the state, but the purposes and methodologies have been independent for each. Some long-term studies have been or are being conducted in Yolo

County and Butte Valley; however, these studies provide information at a regional scale rather than statewide (Estep pers. comm. 2012).

A long-term repeatable statewide breeding/nest survey, possibly using a stratified random sampling survey design, is needed to assess the population's trend, distribution and range, temporal variation, and abundance. Surveys outside of the known range should be included to determine if range expansions are occurring and at what level.

Additional research is needed to inform managers who are responsible for conserving the species. Research topics of need include: assessing survival, recruitment levels, breeding success, characteristics of migration, disease and parasites, and contaminant studies, specifically how contaminants may affect egg shells.

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Distribution, Abundance, and Habitat Associations of Nesting Swainson's Hawks in the Central San Joaquin Valley, California

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ABSTRACT

We conducted a census of nesting Swainson's Hawks (*Buteo swainsoni*) across a large section of Fresno and Kings counties in 2011. Surveys determined the distribution and abundance of Swainson's Hawk and other stick nest-building raptors, documented nesting and foraging habitats, and determined reproductive rates. We documented 90 occupied Swainson's Hawk nesting territories within the approximately 1 million-acre study area. Of the 80 territories where nesting outcomes were determined, 52 pairs (65%) nested successfully, 22 (28%) nested but failed to successfully nest, and 6 (8%) occupied nesting territories but did not nest. Nesting raptors, including Swainson's Hawks, were unevenly distributed within the survey area, with the highest nesting densities along the Kings River-Fresno Slough corridor and within and near the Mendota Wildlife Area. Availability of suitable trees for nesting appeared to be the primary factor determining distribution. The greatest proportion of nesting Swainson's Hawks (40%) nested in riparian woodland habitat, with the remaining 60% divided among seven other nesting habitat types. Eucalyptus was the most commonly used nest tree (34%) followed by cottonwood (28%) and willow (28%). Reproductive rate (0.91 fledged young per occupied nest) was consistent with other Central Valley locales for the 2011 breeding season.

INTRODUCTION AND STUDY AREA

The breeding range of the Swainson's Hawk extends throughout most of the Central Valley from near Red Bluff in the north to Bakersfield in the south, and from the Coast Range foothills in the west to the Sierra Nevada foothills in the east. Most large, regional survey efforts over the past 30 years since the 1983 state listing of this species as Threatened have occurred north of Stanislaus County in the Sacramento Valley and northern San Joaquin Valley regions of the Central Valley where the species is relatively abundant. Most of

this work has been conducted as basic research on the distribution, abundance, and life history of the Swainson's Hawk or to support large regional conservation planning (Estep 1989, 2007, 2008, Babcock 1995, ICF International 2012, 2013). Although localized surveys have been conducted in the southern and central San Joaquin Valley, no regional census-level surveys have been conducted recently. As a result, information is lacking on the distribution and abundance of the Swainson's Hawk throughout much of the San Joaquin Valley.

In the San Joaquin Valley, most surveys have been conducted on state and federal wildlife refuges and in response to proposed development, infrastructure, and energy projects. Additional incidental data have been reported over the years, some of which have been submitted to the California Department of Fish and Wildlife's (CDFW) Natural Diversity Data Base (CNDDDB). In 2005 and 2006, CDFW funded a statewide survey of the species that included several randomly selected 1-square mile survey blocks in the San Joaquin Valley (Anderson et al. 2007). Although this effort was useful in estimating the regional and statewide populations, it was less useful in describing the distribution and abundance of the species across the regional landscape and the habitat conditions in areas where the species occurs.

In 2011, we surveyed a large portion of Fresno and Kings counties. These surveys were conducted in response to eight proposed photovoltaic solar generation facilities and the need to assess the effects of these projects on the distribution and abundance of the Swainson's Hawk. Reliable and current information on hawk nesting in the area was lacking. Therefore, we established a study area by encompassing 10-mile radius areas extending from the edges of each of the proposed solar project sites. The individual survey areas overlapped to varying degrees creating a single contiguous survey area (Figure 1).

Because the project sites are irregularly shaped, the study area boundaries were expanded outward until a circular-shaped area was achieved. As a result, the total irregularly-shaped study area encompassed 416,739 ha (1,029,785 acres or 1,609 sq. mi) extending from approximately Kettleman City on the south to Mendota on the north, and from Coalinga on the west to Hanford on the east.

The study area is primarily an agricultural landscape; however, several small and medium-sized urban areas are present including the towns of San Joaquin, Tranquility, Huron, and Stratford, and the small cities of Lemoore and Coalinga. Lemoore Naval Air Station is also within the study area, much of which is also actively farmed. The CDFW's Mendota Wildlife Area also is within the study area just south of Mendota, most of which is maintained as managed seasonal wetland. In addition to portions of the Mendota Wildlife Area, the most prominent natural feature in the study area is the Kings River-

Fresno Slough corridor, in the central-east portion of the study area. Fresno Slough extends from the northernmost portion of the study area, through the Mendota Wildlife Area and along with the James Bypass (a water conveyance canal paralleling the Fresno Slough) continues southeast until it connects with the Kings River. The Kings River continues southward until it terminates at the Tulare Lakebed south of Stratford (Figure 1).

We conducted surveys for nesting Swainson's Hawks to determine distribution and abundance relative to the location of the eight proposed photovoltaic solar facilities and to assess the effects of the facilities on the local and regional Swainson's Hawk population. The survey, however, also provides a broader landscape perspective on the distribution and abundance of this species in the central San Joaquin Valley.

METHODS

Distribution and Abundance

Our primary objective was to record all active Swainson's Hawk nests within the study area and document nesting and foraging habitat associations. While the survey focused primarily on nesting Swainson's Hawks, our secondary objective was to collect similar data on several other species that may compete for nesting or foraging habitat and that may influence the distribution and abundance of Swainson's Hawks, including the Red-tailed Hawk (*Buteo jamaicensis*), Red-shouldered Hawk (*Buteo lineatus*), White-tailed Kite (*Elanus leucurus*), and Great-horned Owl (*Bubo virginianus*). We determined how these species were distributed within the study area and described the habitat conditions that influence distribution and abundance.

The survey was designed as a complete census. We surveyed all potential nesting areas equally according to the protocol described below regardless of past survey effort or existing information on Swainson's Hawk nesting locations.

Surveys were conducted in two phases, once during the incubation/early nestling phase from 12-29 April, and again during late nestling/early fledging phase from 6 June to 1 July. Conducting early and later surveys ensures that all active nesting territories are documented and that failed nests and nests abandoned later in the breeding season are not missed as they may be if only a single survey were conducted. It also provides an opportunity to resurvey all areas in the event that any active sites were missed during the first survey, and allows for documentation of reproductive outcome.

Surveys were conducted by systematically driving all available roads within the study area. Where roads were not available to drive or where there were no roads to access potential nest trees, the survey was conducted on foot unless access to private property was not granted. In general, access in the study area was very good; we were provided with access to state lands

and to all levees maintained by the Kings River Conservation District. Access onto private farmlands was also regularly granted or provided through numerous public roadways. Therefore, overall access and survey coverage throughout the study area was excellent.

Using binoculars and spotting scopes, we checked all suitable nesting habitats for the presence of active nests and adult Swainson's Hawks and to note nesting activity and behavior (e.g., nest construction, courtship flights, and defensive behavior). We searched all trees for active nests. We recorded nest site and habitat data on a standardized field form. Activity was noted and mapped on field maps; locations of active nests were documented on 7.5 minute USGS quadrangle maps, and a hand-held GPS unit was used to record latitude-longitude coordinates of each nest. We took photographs of each active nest site and surrounding land use.

We conducted follow-up surveys as needed until all potential habitats were inspected. As necessary, each active nest was revisited to determine activity and reproductive status and to record the number of fledged young: the metric used to report reproductive performance. Many nesting territories were visited multiple times to collect the necessary data. Activity data were recorded based on the following standard definitions (Postupalsky 1983):

- *Occupied Nesting Territory*: a nesting area in which a pair of raptors showed activity indicating territory establishment. Territories were considered occupied when the following activities and behaviors were observed: regular presence and activity of adults, courtship displays, circling low above the nest tree or nesting stand, defensive behavior, prey exchanges and prey delivery to the nest. The nesting territory location was plotted based on the location of the nest, or if the nest was not located, based on the primary area of observed activity within potential nesting habitat.
- *Active Nest*: An occupied nesting territory at which egg laying was confirmed through direct observation of incubating adults.
- *Occupied Inactive Nesting Territory*: an occupied nesting territory in which multiple observations confirmed that adults did not lay eggs.
- *Occupied Nesting Territory with Unconfirmed Nesting Status*: an occupied nesting territory for which reproductive outcome was not confirmed. This category includes occupied nesting territories where access was inadequate to determine nesting activity (in some cases the actual nest was not observed) or where repeat visits were inconclusive in determining if the nest was active.
- *Successful Nest*: an active nest that fledged at least one young.
- *Unsuccessful Nesting Attempt*: an occupied territory in which the pair did not lay eggs, or an active nest that failed to produce fledged young.

We measured productivity of the populations as the average number of fledged young produced per occupied nesting territory with confirmed nesting status (active nests plus occupied nesting territories that did not nest). Brood size was measured as the average number of fledged young produced per successful nest.

Each active nest was characterized with regard to nesting habitat type, tree species, condition, and location within the nesting habitat. A chi-square (χ^2) analysis was conducted to statistically compare the similarity of use of nest tree species among species with significance levels set at $\alpha \leq 0.05$.

Distribution of Nesting and Foraging Habitats

We mapped and characterized land uses and habitat types in the field throughout the study area on 7.5 minute USGS quadrangle base maps. Fifty quad maps were used during the study. We documented the current 2011 land use in the field according to the land cover type categories listed below. Field boundaries were recorded, confirmed, or adjusted as needed on the USGS base maps.

We assessed raptor foraging habitat associations based on broad agricultural land use categories rather than the specific crop type. The crop pattern mosaic is diverse in the study area and subject to change annually and seasonally through typical crop rotation practices. Therefore, with the exception of perennial and long-term crop types (e.g., vineyards, orchards, pasturelands), and semi-perennial types (e.g., alfalfa hay), specific crop types were grouped into the following broad categories that represent long-term land use patterns in the study area.

- Rotated cropland (annually cultivated and rotated crops, including fields that were idle at the time of the survey)
- Alfalfa and other hay crops
- Irrigated pastureland
- Orchards and vineyards
- Managed wetland
- Natural land (includes all uncultivated grassland and scrub natural communities)
- Developed land (excluding rural residential less than one acre, which were subsumed into the land use category within which they occurred).

These types are described in more detail, along with use by Swainson's Hawks and other raptors, in ***Results and Discussion***.

Nesting habitats were limited to those woody land cover types that could be reasonably mapped and quantified including riparian, tree rows, and tree groves. However, several other nesting habitat types, such as isolated trees and small groups or rows of trees too small to effectively map, were recognized (see ***Results and Discussion***) and their use was reported.

Following the initial field mapping of habitat/land use categories, the data were then re-mapped using aerial photos to confirm field boundaries. These maps were then converted to graphic maps using Adobe Illustrator. Habitat/land use cover type acreages were calculated from the graphic maps using a plug-in filter from Telegraphics Inc. Although this process provided a reasonably accurate mapping representation, and particularly for calculating the relative abundance of the mapped types across the landscape, it did not exclude roads and other edge features. As a result, the acreage totals reported may exceed the actual acreage for most types. These inclusions, however, were considered to have a negligible effect on meeting the study purposes of characterizing raptor responses at a broader landscape scale. Using the mapped and quantified habitat/land use information, we then characterized and described the distribution and abundance of nesting Swainson's Hawks in the study area with regard to these broad habitat associations.

RESULTS AND DISCUSSION

Distribution and Abundance

We documented a total of 90 occupied Swainson's Hawk nesting territories during the survey effort (Figure 1). Table 1 summarizes nesting activity and reproductive results for Swainson's Hawk and other raptors.

The density of Swainson's Hawk nesting territories within the study area was 0.16 per km² (0.06 per mi²). This nesting density is very low compared with the Sacramento Valley breeding population (i.e., Yolo and Sacramento counties), but similar to nesting densities reported elsewhere in the breeding range (Table 2).

The nesting distribution was uneven across the study area, with most Swainson's Hawk nesting territories (68%) concentrated in the vicinity of the DFW Mendota Wildlife Area and along and east of Fresno Slough and the Kings River (Figure 1). Fourteen of the 90 nest sites (16%) were on or immediately adjacent to the Mendota Wildlife Area, where riparian woodland, tree groves, tree rows, and many isolated trees provide abundant suitable nesting habitat. Twenty-four nest territories were along Fresno Slough or the Kings River where suitable riparian nesting habitat is also abundant. An additional 23 territories were east of the Fresno Slough/Kings River corridor where nesting habitat is abundant and crop patterns are highly suitable for Swainson's Hawk foraging.

The remaining 29 territories were scattered throughout the western portion of the study area, where available nesting habitat is scarce and is limited primarily to trees around farm houses, tree rows, isolated trees, and small patches of riparian woodland.

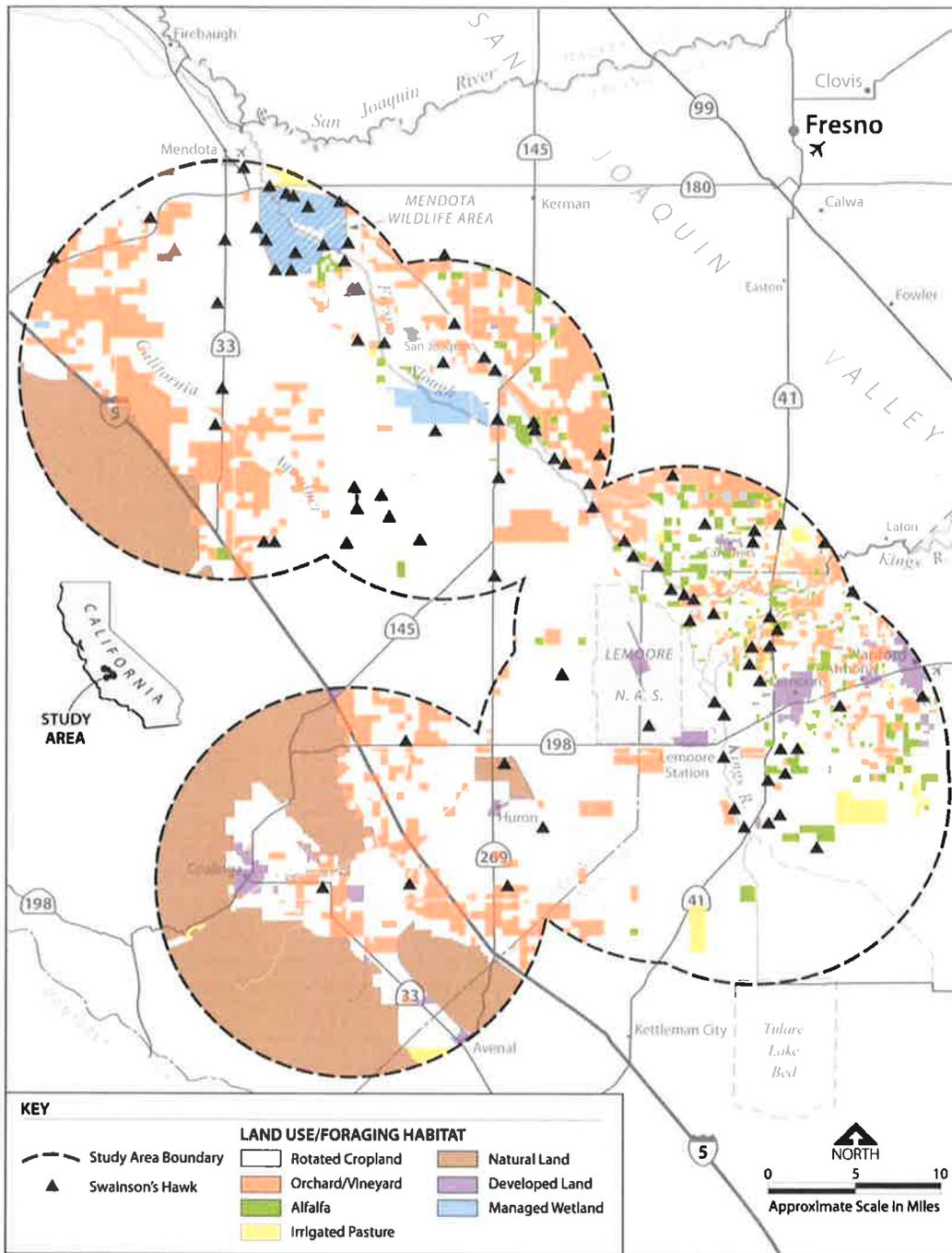


Figure 1. Distribution of nesting Swainson's Hawks and land use/foraging habitat with the Central San Joaquin Valley study area. 2011.

Table 1. Nesting success and reproduction of Swainson Hawks and other nesting raptors in Fresno and Kings counties, San Joaquin Valley, California.

A. Nesting Success										
	Swainson's Hawk		Red-tailed Hawk		Red-shouldered hawk		Great-horned owl			
	# Territories	%	# Territories	%	# Territories	%	# Territories	%	# Territories	%
Successful	52	58	80	83	2	67	23	92		
Unsuccessful	22	24	5	5	0	0	0	0		
Not nesting	6	7	0	0	0	0	0	0		
Unconfirmed	10	11	12	12	1	33	2	8		
Total	90	100	97	100	3	100	25	100		
B. Reproduction										
	Swainson's Hawk	Red-tailed Hawk	Red-shouldered hawk	Great-horned owl						
Young fledged	73	129	3	48						
Fledglings/ occupied nest	0.91	1.52	1.5	2.10						
Fledglings/ successful nest	1.40	1.61	1.5	2.10						

We documented a similar distribution and abundance for Red-tailed Hawk (Table 1, Figure 2). The 97 active Red-tailed Hawk nesting territories represent a survey area-wide nest density of 0.17 territories per km² (0.07 nests per mi²), also quite low relative to the Sacramento Valley (Estep 2007, 2008). Nest distribution for Red-tailed Hawks followed the same general pattern as for Swainson's Hawks, with most nest territories occurring along and east of the Fresno Slough/Kings River corridor.

Results for Red-shouldered Hawk and Great-horned Owl were similar to other species (Table 1, Figure 2). However, we found only three Red-shouldered Hawk nests during the survey, indicating a very low nest density compared with the Sacramento Valley. While all three were found along or east of the Fresno Slough/Kings River corridor, additional nesting pairs were expected given the extent of available nesting habitat in that area. We also documented a total of 25 Great-horned Owl nests, which probably under-represents the breeding population of this species since the surveys were conducted too late in the season to ensure detection of all Great-horned Owl nests. Nonetheless, the distribution of the Great-horned Owl follows that of the other species (Figure 2). Notable also was the lack of any confirmed White-tailed Kite territories. While this species also occurs in low densities in the Sacramento Valley, particularly compared with Swainson's Hawk and Red-tailed Hawk (Estep 2007, 2008), we were surprised that none were detected even though a substantial amount of apparently-suitable nesting and foraging habitat occurred in the eastern portion of the study area.

Table 2. Swainson's Hawk nest density in the study area compared with other geographic areas.

Location	Nesting Territories per km ² (/mi ²)	Source
Yolo Co., CA	0.98 (0.38)	Estep 2008
Sacramento Co., CA	0.96 (0.37)	Estep 2007
Butte Valley, Siskiyou Co., CA	0.37 (0.14)	Woodbridge et al. 1995
Alberta, Canada	0.23 (0.09)	Schmutz 1987
New Mexico	0.17 (0.07)	Bednarz et al. 1990
Fresno and Kings county, CA	0.16 (0.06)	This study

Activity and Reproduction

Most of the Swainson's Hawk pairs in the study area were confirmed to have attempted nesting (82%). The proportion of active nests that failed to produce young (24%), however, was high compared with other years of record in other areas, but consistent with those of other Central Valley locales during the 2011 breeding season (ICF International 2012). The proportion of pairs that did not attempt to nest (6.7%) was lower than other areas in 2011 and other recent survey efforts, whereas the proportion of occupied nesting territories with unconfirmed nesting status (11%) was similar or lower than in other areas (Estep 2007, 2008, ICF International 2012).

Red-tailed Hawks, possibly due to a more diverse diet, were more successful than Swainson's Hawks, with 88% of pairs confirmed nesting and only 5% confirmed to have failed. Such success is typical of Red-tailed Hawk reproductive performance in other areas. While no failed Great-horned Owl nests were confirmed, the high proportion (92%) of active and successful nests does not include nests that may have failed prior to the first survey and so the calculated success may be inflated (Table 1).

We recorded 73 fledged Swainson's Hawk young, equating to averages of 0.91 young per occupied nest (the total of active nests and non-nesting active territories) and 1.40 young per successful nest (Table 1). While the number of young per successful nest is generally consistent with other past and ongoing studies of Swainson's Hawk in the Central Valley (Estep 2007, 2008, unpub. data; ICF International 2012), the number of young per occupied nests is lower than typically reported due to the high number of nest failures in 2011. Both indicators are also lower than for most populations outside of the Central Valley (Briggs 2007, Alsup 2012).

One possible explanation for lower reproduction in Fresno and Kings counties and the rest of the Central Valley is the dynamic nature of valley agricultural systems. While the diverse matrix of cover types and the planting and harvesting regimes can produce periodic high prey abundance, the growth and harvesting of crops also can create an inconsistent forage base, forcing birds to hunt further from the nest during some portions of the breeding season and possibly contributing to lower reproductive success per nesting pair (England et al. 1995).

Reproductive performance for the other three species (Table 1) was more robust and typical of most years elsewhere for these species (Stout et al. 2006, Estep 2007, 2008).

Habitat Associations

The distribution and abundances of land cover types across the entire 1,029,785-acre study area are shown in Figure 1 and Table 3. Descriptions of each type that are considered foraging and nesting habitats follow.

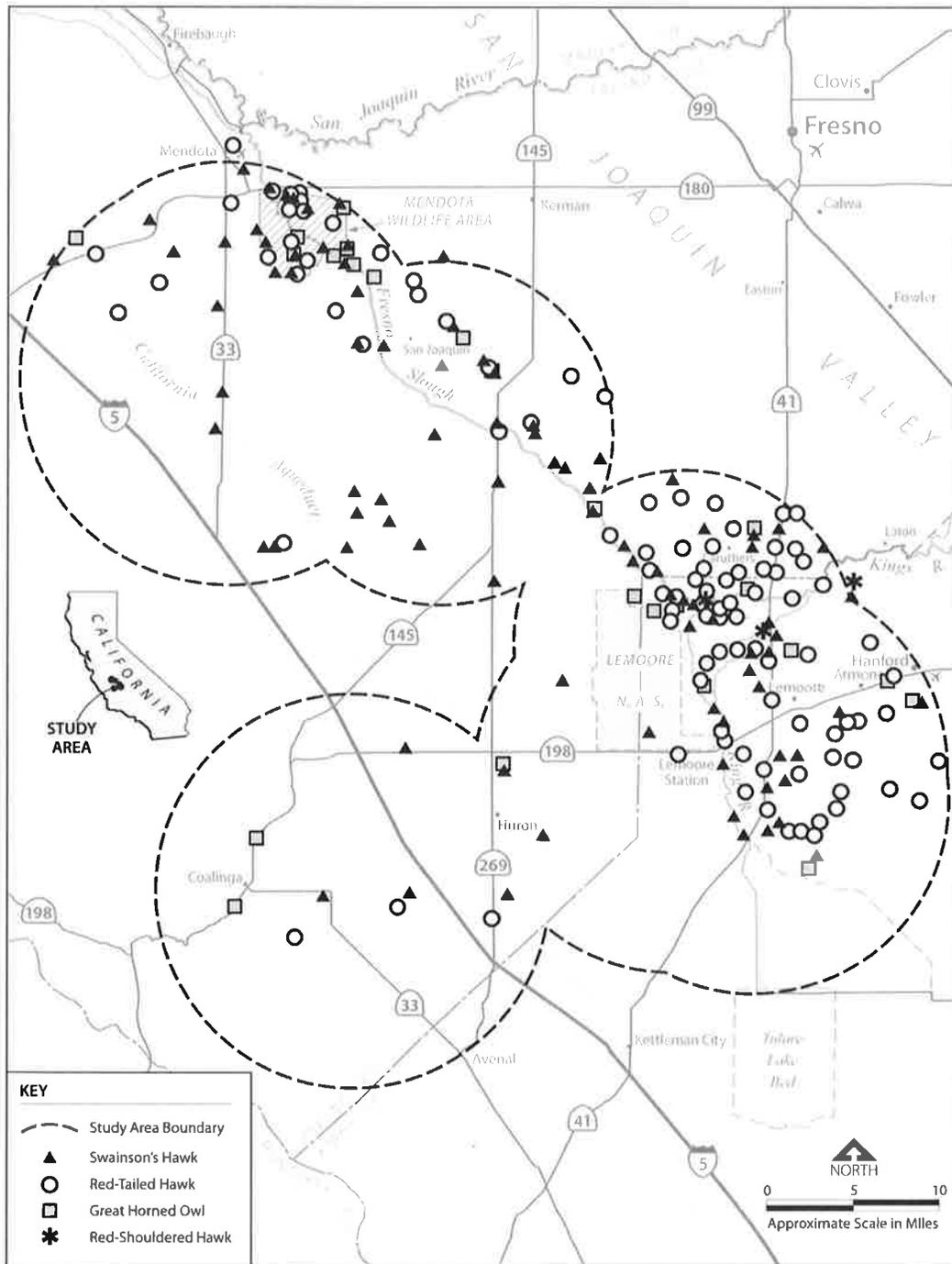


Figure 2 Distribution of Swainson's Hawks in relation to other nesting raptors within the Central San Joaquin Valley study area, 2011.

Foraging Habitat. Within a diverse agricultural landscape, as occurs through most of the Central Valley, raptor foraging habitat tends to be spatially dynamic throughout the breeding season. Where irrigated hay, row, and grain crops dominate, hawk use of cultivated lands is primarily affected by vegetation structure (i.e., height and density; Bechard 1982, Swolgaard et al. 2008, Estep 2009), which changes seasonally and annually based on planting, growth, and harvesting regimes of the many crops grown. Therefore, the agricultural crop matrix present in any given year influences Swainson's Hawk foraging use and behavior. A similar relationship likely exists for other raptor species, but the relationship appears to be much more pronounced in Swainson's Hawk, which relies primarily on cultivated lands.

Within the study area, land uses considered suitable for Swainson's Hawk foraging, including rotated croplands, alfalfa and other hay fields, irrigated pastures, and natural lands, occupy 332,547 ha (821,742 ac) or 80% of the study area. The term 'suitable', however, is not synonymous with 'available'. Within the broad agricultural matrix, most suitable crop types are available to foraging Swainson's Hawks only during a portion of the season due to seasonal changes in vegetation structure, which influences the accessibility of prey to foraging hawks (Estep 2009). The following sections describe the land use/cover type categories in the study area that are considered suitable Swainson's Hawk foraging habitat and generally describe their seasonal availability.

Rotated Cropland. This type includes crops that are annually or seasonally cultivated and rotated. This is the dominant cover type in the study area comprising 62% of the land area (Table 3, Figure 1). Most of this type included cotton, tomatoes, wheat, and corn. It has likely declined in overall acreage due to recent and ongoing conversion of rotated cropland to orchards. While individual crop types within this category were not mapped or evaluated, cotton, tomato, wheat, and corn comprised approximately 75% and 55% of the total irrigated cropland area in Kings and Fresno counties, respectively (Kings County 2012, Fresno County 2012). A typical crop rotation includes cotton, wheat, and tomatoes. With milk products as important commodities in Kings and Fresno counties, dairies support the cultivation of a variety of silage and hay crops including corn, wheat, sorghum, and triticale (Kings County 2012). Alfalfa is also an important part of this rotation, but as noted below alfalfa hay remains in fields for several consecutive seasons, and thus is not included in this category.

Rotated crops generally have seasonal or fluctuating foraging habitat value depending on the planting, growth, and harvesting regime and resulting vegetation structure (Estep 2009). For example, tomatoes are planted in the spring and vegetation height and density increases throughout the breeding season. Rodent populations increase during this period, but prey accessibility (and thus hawk foraging use) decreases as vegetation height and density

increases (Bechard 1982, Estep 1989, 2009). When tomatoes are harvested in August, prey accessibility increases when rodent populations are at their highest; therefore, the value and foraging use of tomato fields reaches its peak then.

Each crop type within the rotated category undergoes a similar temporal change in value and use; however, the timing is different for each. Some crops, including cotton and corn have limited value because their vegetation structure precludes foraging early in the breeding season, prey populations are generally low, and harvesting often occurs after Swainson's Hawks have begun fall migration.

In general, however, rotated croplands as a whole are considered to have at least moderate foraging value due to the matrix of different crop types across the agricultural landscape, the seasonal value of certain types such as tomatoes and wheat, and the seasonal or annual rotation practices.

Table 3. Land area and relative abundance of mapped land use types.

Land Use Type	Hectares (Acres)	Percent of Total
Rotated Cropland	256,456 (633,716)	62
Orchard/Vineyard	67,603 (167,050)	16
	63,141 (156,025)	15
Alfalfa Hay	10,059 (24,857)	2.4
Managed Wetland	7,816 (19,313)	1.9
Developed Land	6,093 (15,056)	1.5
Irrigated Pasture	2,891 (7,144)	0.7
Riparian	1,870 (4,620)	0.4
Tree Grove	413 (1,021)	0.1
Tree Row	398 (983)	0.1
Total	416,739 (1,029,785)	100

Alfalfa. Alfalfa is an ungrazed irrigated hay crop used for livestock feed. The nutritional benefits alfalfa provides to livestock, including high protein content, also benefits the abundant rodent and insect prey populations found in alfalfa fields (Putnam et al. 2001, Ball 2005). Alfalfa typically remains uncultivated for 3 to 5 years, and occasionally longer, without being rotated to other crops. Alfalfa is considered the cover type with the highest foraging value to Swainson's Hawks due to its relatively low vegetation structure, lack of seasonal cultivation, and the practice of regular mowing and flood-irrigating during the breeding season, which exposes and concentrates prey

(Estep 1989, 2009, Swolgaard et al. 2008, Anderson et al. in preparation). Following its multi-year growth, alfalfa is often converted back to rotated cropland. Alfalfa is interspersed throughout the agricultural matrix. It constitutes approximately 2.4% of the total land area (Table 3, Figure 1) with the largest proportion occurring east of the Fresno Slough/Kings River corridor.

Irrigated Pasture. Irrigated pastures grow irrigated grasses or forbs grazed by livestock or periodically cut for hay. These include large pasturelands such as those south of the city of Lemoore and east of the Kings River, smaller pastures associated with dairy operations scattered throughout the study area, and small pastures associated with farm residences. Depending on rodent availability and grazing intensity, irrigated pastures can provide moderate to high value foraging habitat for Swainson's Hawk and other raptors because they usually maintain low vegetation cover and are available for foraging throughout the breeding season. Approximately 0.7% of the study area consists of this cover type (Table 3, Figure 1) with the largest proportion east of the Fresno Slough/Kings River corridor.

Natural Land. Natural land consists of uncultivated areas that have retained some natural topography, vegetation characteristics, or other values. These lands are rare on the valley floor and are usually associated with remnant patches of native salt scrub community, other uncultivated grazing land, or river bottom along the edges of the Kings River. Most natural land consists mainly of annual grassland in the western portion of the study area in the eastern foothills of the Coast Ranges. Natural lands constitute 15% of the study area (Table 3, Figure 1). Although annual grasslands provide suitable foraging habitat that is available throughout the season, Swainson's Hawks are generally associated with flat landscapes, so foraging use of the more topographically diverse foothill areas in the western portion of the study area is expected to be substantially less than in the cultivated habitats on the valley floor.

Managed Wetland. In the Central Valley, most managed wetlands are agricultural fields or former agricultural fields periodically flooded to provide wintering waterfowl habitat. During summer, these areas are typically dry and provide upland habitat for foraging raptors and other wildlife. Managed wetlands constitute 2% of the study area (Table 3, Figure 1), most of which is associated with the Mendota Wildlife Area and a waterfowl management area near the town of Helm.

The following cover types in the study area provide limited to no suitable foraging habitat for Swainson's Hawks.

Vineyards and Orchards. These perennial crops develop a vegetative overstory that usually precludes access by foraging Swainson's Hawks and most other raptors. Although Swolgaard et al. (2008) found some limited use

of vineyard habitats, both types are generally considered incompatible with Swainson's Hawk foraging. These types occur throughout the study area, with the largest proportions east of the Fresno Slough/Kings River corridor and in the western portion of the study area, particularly immediately east of Interstate 5 (Figure 1). The type constitutes 16% of the total study area and is the second most abundant land cover type in the study area (Table 3).

Developed Lands. Developed lands include urban, industrial, and rural residential areas greater than 1 acre. These types generally consist of high density developed areas that lack natural or cultivated landscapes and provide no foraging habitat value. Rural residential is lower density urbanization that fragments natural or cultivated landscapes. Most developed lands are found east of the Fresno Slough/Kings River corridor, including the cities of Lemoore, Hanford, and San Joaquin. Other smaller developed areas are scattered throughout the study area and include small towns such as Huron, and large farming or packing facilities. Both high density urban areas and lower density rural residential or commercial areas, constituting 1.5% of the total study area (Table 3, Figure 1), are considered unsuitable habitat areas.

Of the seven defined foraging cover types, two (Vineyards/Orchards and Developed Lands) represent distinct land uses or cover types that provide limited to no suitable Swainson's Hawk foraging habitat. These types comprise 18% of the study area (Table 3). The remaining 82% of the study area is considered suitable Swainson's Hawk foraging habitat, but with variable value.

Nesting Habitat. We found Swainson's Hawk nests in eight of the nesting habitat types (Table 4). Red-tailed Hawks used these and also utility poles and electrical transmission towers. Not surprisingly, due to its relative abundance, riparian was the most commonly used nesting habitat for all species combined. Swainson's Hawk and Red-tailed Hawk nesting habitat use was similarly diverse. Each type is described below.

Riparian. Riparian is streamside vegetation that generally supports an overstory of Fremont cottonwood (*Populus fremontii*), willow (*Salix* spp.), and valley oak (*Quercus lobata*) trees, which are commonly used for nesting by Swainson's Hawks and other raptors. Eucalyptus (*Eucalyptus* spp.), salt cedar (*Tamarix* spp.), and other non-native trees also occur within riparian zones. Thirty-six of the 90 occupied Swainson's Hawk territories (40%) were associated with riparian habitat (Table 4). The Kings River (North Fork, South Fork, and Clarks Fork) supports a relatively continuous corridor of mature riparian forest, and Fresno Slough, which supports intermittent, patchy willow-cottonwood riparian woodland. Other riparian vegetation is associated with small sloughs, creeks, or other channels.

Table 4. Nesting habitat types of four raptor species in Fresno & Kings county.

Nesting Habitat	Swainson's Hawk		Red-tailed Hawk		Red-shouldered hawk		Great-horned Owl	
	Occupied territories	% of Total						
Riparian	36	40	28	29	2	67	13	52
Rural Residential	17	19	31	32	0	0	3	12
Isolated Tree	13	14	12	12	0	0	5	20
Tree Row	10	11	5	5	0	0	0	0
Grove	5	6	12	12	0	0	2	8
Isolated Roadside Tree	5	6	2	2	0	0	1	4
Roadside Tree Row	2	2	2	2	1	33	1	4
Farmyard	2	2	2	2	0	0	0	0
Utility Pole/Tower	0	0	3	3	0	0	0	0
Total	90	100	97	100	3	100	25	100

Rural Residential. Rural residential includes trees planted for windbreak cover, shade, or ornamentals around rural farmsteads. These trees are of a variety of species, but are predominantly eucalyptus. Nesting Swainson's Hawks can be quite tolerant of human activities and often use trees associated with rural farm residences or farmyards (Estep 2007, 2008). Seventeen of the 90 occupied Swainson's Hawk territories (19%) were associated with rural residential areas, with all nests in eucalyptus trees (Table 4).

Isolated Tree. Isolated trees are single trees (and occasionally two or three trees) that are not associated with roadsides, residences, or other features. Many are large, mature valley oak trees within agricultural fields that are remnants of pre-agricultural oak woodlands or trees that have grown along field edges. Thirteen Swainson's Hawk nest territories (14%) were associated with isolated trees (Table 4).

Tree Row. Tree row consists of planted rows of trees not associated with roadsides. These often occur along field borders or rural driveways and were usually planted as windbreaks. Most tree rows consist of eucalyptus trees. Ten occupied Swainson's Hawk territories (11%) were associated with this habitat type (Table 4).

Grove. Groves were defined as at least six trees in a planted or remnant native stand. While there are several small valley oak and cottonwood groves in the northern and central portions of the study area east of the Fresno Slough/Kings River corridor, most groves are planted eucalyptus or other non-native tree species. Eucalyptus groves are common in the study area, planted as windbreaks or as sound and visual barriers. Five (6%) occupied Swainson's Hawk territories were associated with this habitat (Table 4).

Isolated Roadside Tree. Isolated roadside trees were distinguished from other isolated trees because they generally receive a substantially greater amount of noise and other human disturbances. This type includes any naturally occurring or planted native or nonnative tree. Isolated roadside trees include eucalyptus, willow, cottonwood, and valley oak trees. Five occupied Swainson's Hawk territories (6%) were in isolated roadside trees (Table 4).

Roadside Tree Row. Roadside tree rows are planted rows of trees along roadsides, which were planted as visual barriers or windbreaks. Most of these rows are eucalyptus trees. They are distinguished from isolated roadside trees because they provide additional cover, perching and roosting opportunities, and nest security from vehicle traffic. Two Swainson's Hawk nests (2%) were associated with roadside tree rows (Table 4).

Farmyard Tree. Farmyards are sites along the edges of agricultural fields that are used for equipment staging for planting and harvesting operations or storage of farm equipment. They are usually less than 1 acre in size and often

Table 5. Nest tree species used by four raptor species in Fresno and Kings counties.

Tree Species/ Other substrate	Swainson's Hawk		Red-tailed Hawk		Red-shouldered Hawk		Great-horned Owl	
	No. Nest Sites	% of Total	No. Nest Sites	% of Total	No. Nest Sites	% of Total	No. Nest Sites	% of Total
Eucalyptus	28	34	47	48	1	33	7	28
Cottonwood	23	28	24	25	1	33	8	32
Willow	23	28	7	7	0	0	7	28
Valley Oak	7	8	11	11	1	33	1	4
Pine sp.	2	2	3	3	0	0	0	0
Locust	0	0	2	2	0	0	0	0
Sycamore	0	0	0	0	0	0	1	4
Beefwood	0	0	0	0	0	0	1	4
Utility Pole	0	0	2	2	0	0	0	0
Transmission Tower	0	0	1	1	0	0	0	0
Total	83	100	97	100	3	100	25	100

have trees within or around their perimeter, which provide nesting opportunities for Swainson's Hawks, particularly where nesting habitat is otherwise limited. Two Swainson's Hawk nest territories (2%) were associated with farmyards (Table 4).

Nesting Swainson's Hawks and other raptors used a variety of tree species (Table 5). Swainson's Hawks nested in five different tree species. Eucalyptus was the predominant nest tree species used by both Swainson's Hawk and Red-tailed Hawk. Both species also used cottonwood, willow, and valley oak, and to a lesser extent ornamental pine. Eucalyptus nest trees were mainly within tree rows, roadside tree rows, or rural residences. Cottonwood and willow trees were the most commonly used trees in riparian areas. Valley oak nest trees were mostly isolated trees in fields or along field edges. While there were similarities in relative use among most tree species, the difference in use of willow resulted in an overall pattern of use that differed significantly between Swainson's Hawks and Red-tailed Hawks ($\chi^2_{1,d.f.} = 3.84$ $P < 0.025$). Red-tailed Hawks typically construct larger more robust nests than Swainson's Hawks and willow trees often are not capable of supporting their nests.

Relationship between Hawk Distribution and Habitat Associations

Swainson's Hawks forage widely over agricultural landscapes, and foraging has been documented to regularly occur greater than 10 miles from nest sites (Estep 1989, Babcock 1995). Foraging ranges, however, are highly elastic and change seasonally as fields are prepared, planted, mature, and are harvested. These changes thereby result in seasonal changes in prey populations and in vegetation structure and density that influences prey abundance and accessibility (Bechard 1982, Estep 2009). Swainson's Hawks have proven to be very adaptable to this dynamic foraging landscape and have learned to opportunistically exploit suitable foraging conditions as they become available over the season. Using the information on general crop patterns throughout the study area and data on Swainson's Hawk foraging use patterns in the Central Valley (Estep 1989, Babcock 1995, Anderson et al. in preparation), it is possible to qualitatively describe the likely use of the study area by the 90 nesting pairs that reside within it.

The distribution of nesting Swainson's Hawks and other raptors in the study area suggests differences between habitat conditions east of the Fresno Slough/Kings River corridor, where nesting density is most concentrated, and the larger western portion of the study area where nesting territories are sparsely distributed across a broad agricultural landscape. Figure 1 illustrates the distribution of Swainson's Hawk nesting territories relative to the distribution of land use/cover types in the study area. The figure suggests a relationship between the distribution of hawks and land cover based on two primary factors: the distribution of nesting habitat and the distribution of high value foraging habitat.

Because of the greater extent of alfalfa and other higher value crop types east of the Kings River; it is reasonable to assume that most foraging activity also occurs east of the Kings River. However, Swainson's Hawks readily travel significant distances from their nest sites to forage when opportunities occur. For example, high quality foraging conditions occur during wheat harvest (June), and tomato harvest (August), when these crop types are used extensively by foraging Swainson's Hawks. Because these crop types are among the most common in the study area and throughout Kings and Fresno counties, the area west of the Kings River likely also receives a substantial amount of foraging activity.

As previously noted, there are very few nesting opportunities west of the Fresno Slough/Kings River corridor. This area supports an abundance of moderate value foraging habitat, but the paucity of trees restricts nesting opportunities to relatively few locations. East of the Fresno Slough/Kings River corridor, nesting habitat is relatively abundant and includes nearly continuous riparian woodland along the three forks of the Kings River, sparse and intermittent riparian along Fresno Slough, and remnant valley oak trees, eucalyptus tree rows, groves, and isolated trees between Stratford and Riverdale. Few suitable nest trees exist south of Stratford toward the Tulare Lakebed, and no nesting territories occur in this area. Relatively few nest trees and Swainson's Hawk nesting territories occur west of the Fresno Slough/Kings River corridor, including the area south of State Route 198 west to Interstate 5, west of the Lemoore Naval Air Station and, with the exception of the Mendota Wildlife Area, west of Fresno Slough to Interstate 5 in the northern portion of the study area (Figure 1). West of Interstate 5, the landscape changes to include rolling grassland hills, where suitable nest trees are also largely absent, and thus support few Swainson's Hawk nesting territories. Only two nesting territories were documented west of Interstate 5, one near the western edge of the valley floor and one further west in Pleasant Valley near Coalinga.

Interestingly, in the open agricultural landscape between Interstate 5 and the Fresno Slough/Kings River corridor, Swainson's Hawks occupied much of the available nesting habitat. A large proportion of the isolated trees, eucalyptus tree rows, and small riparian corridors, such as Cantua Creek, supported nesting Swainson's Hawks. This pattern suggests that the agricultural landscape in this area, while only moderately suitable compared with the eastern portion of the study area, could support additional Swainson's Hawk nesting pairs and that the lack of nesting habitat may be the primary factor limiting population size in that area.

While nesting habitat distribution is likely the key factor affecting the distribution of nesting Swainson's Hawks, the more diverse agricultural landscape and the presence of higher value foraging habitat types (e.g., alfalfa and irrigated pasture) east of the Kings River also influences the distribution

and abundance of nesting Swainson's Hawks and other raptors. Virtually all of the dairies, and the associated alfalfa hay fields and irrigated pastureland occur east of the Kings River. The combination of abundant nesting habitat and a more diverse agricultural pattern with higher value crop types supports a greater abundance of nesting Swainson's Hawks in this area and illustrates the strong relationship between habitat availability and suitability in an agricultural landscape and the resulting distribution and abundance of Swainson's Hawk.

ACKNOWLEDGEMENTS

We thank Recurrent Energy, in particular Aimee Epstein, Seth Israel, and Elizabeth Brady, for initiating and supporting this project; the Kings River Conservation District for access along the Kings River and tributaries; the staff at CDFW's Mendota Wildlife Area for access to refuge lands; and to the many farmers who permitted access onto their lands. We also thank Mary Estep for preparing the graphics and Dan Airola for his thorough review and insightful comments.

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APRIL 22, 2024

City of Riverbank

ATTN: Miguel Galvez, Contract City Planner
6617 Third Street
Riverbank CA 95367

RE: River Walk Specific Plan/Draft EIR Report, Riverbank, CA

Dear Mr. Galvez,

I am commenting of the proposed River Walk Specific Plan project and want my comments included in the Final EIR report for this project.

I moved to Oakdale, CA from Nevada to get away from the urban sprawl happening there as so many large companies are moving to Nevada with a large majority coming from California. This project is exactly what I moved away from and it will create a disaster for future generations to deal with. This project has too many red flags and by curiously digging into how this project got this far, it is obvious even to an outsider that the conflict of interest regarding Mayor O'Brien and Mr. Berryhill is questionable and needs to be looked into. River Walk would be the single largest development project in Stanislaus County in over 20 years and the residents of Riverbank will be the ones footing the bill for infrastructure improvements. This project also violates the terms by which LAFCO approved Riverbank's annexation in 2016 where Riverbank stated a commitment to not developing properties to its west and designated the land as agricultural buffer.

I drive into Modesto regularly and the traffic now is unbelievable for several hours a day on McHenry Ave. where the proposed project is and on Santa Fe and Patterson roads. The homeless camps and trash on the sides of the river banks coming into Riverbank from Oakdale is alarming and would only get worse with this new project and river access. The issues of needing water and sewer and digging up the beautiful river to place pipes under it is shocking and have not been properly addressed in the EIR.

The biggest concern seems to be that the proponents of this new development are destroying prime agriculture ground only to build it in a known flood zone that actually floods, has previously flooded and will continue to flood. Flood insurance is not cheap and will make this community cost prohibitive for anyone looking for affordable housing. Has anyone even bothered to see how expensive flood insurance is since the major insurance companies will no longer issue flood insurance in California?

Being one of the few people to move to California in the last 3 years, I can tell you that if this project goes in, I will be moving out of this area along with many people that I have spoken with. This project is like fitting a square piece in a round hole. It does not work and trying to force it with so many negative impacts to this community is a very sad thing to witness and speaks volumes about the people behind it.

Christa Casci

Christa Casci
Oakdale, CA

April 21, 2024
City of Riverbank
Att: Miguel Galvez, Contract City Planner
6617 Third Street
Riverbank, CA 95367

CITY OF RIVERBANK

RE; RIVER Walk Specific Plan/Draft Environmental Impact
Report, Riverbank, CA

APR 25 2024

DEVELOPMENT SERVICES

Dear Mr. Galvez:

I moved to my home in November of 1975 so I have been a resident of this area for quite a number of years.

I would like to comment on the proposed River Walk and the housing project that would accompany it. The housing plan proposes to construct thousands of structures, which include homes, duplexes, maybe a retirement home, businesses, parks, a stage/performing area and perhaps more.. Water wells would need to be dug which would impact existing homes as well as existing agriculture. Aside from the traffic this would impose on our already busy Patterson Road and McHenry Ave the project is slated to be built on prime agriculture land certainly not suited for a neighborhood.

California has a housing shortage which I acknowledge, but what is needed are entry level homes and this project does not give our community this feature.

I am hopeful that our board in Riverbank along with our mayor will see the wisdom and vote no on the River Walk. Perhaps some non prime farmland would be a better site to construct these homes.



Nana Redell
nane7012@gmail.com
2094023549

Miguel Galvez

From: Jean Davis <jdavis2246@att.net>
Sent: Thursday, April 25, 2024 9:56 PM
To: River Walk
Subject: Comment on River Walk proposal

I am against this project. Is there a guarantee it will always be a 55 and older community?
Sent from my iPhone

Miguel Galvez

From: Bob Leonard <bobleonard61@me.com>
Sent: Tuesday, April 30, 2024 7:09 AM
To: River Walk
Subject: Against Riverwalk

Morning,

I am adamantly against the Riverwalk project. Riverbank slow your expansion roll. Stay small and quaint. No to the Riverwalk project!

Bob Leonard
Sent from my iPhone

Miguel Galvez

From: Diana Hernandez <djadrian1983@gmail.com>
Sent: Tuesday, April 30, 2024 12:24 PM
To: River Walk
Subject: Re: River Walk EIR

Hi Mr. Galvez,

Thank you very much for your reply. I was especially interested in knowing if the Army Corp of Engineers were notified as they usually have a very large say in what may take place in and around the river. From what I can see, it appears that they were not notified.

Thank you,

Diana Hernandez

On Thu, Apr 25, 2024 at 9:52 AM River Walk <riverwalk@riverbank.org> wrote:

Hi Diana,

Sorry for the delay in response. I wanted to wait until I can relay comments that have come in from reviewing agencies.

The Draft EIR was distributed to the agencies that received the Notice of Preparation, see attached documents. In addition, the Draft EIR was published with the Governor's Office of Planning and Research (OPR) and the State Clearing House (SCH), which publishes the environmental document for State Agencies to review and respond. See both the Notice of Preparation (NOP) and the draft Environmental Impact Report (EIR) - SCH No. 2021060098 at <https://ceqanet.opr.ca.gov/2021060098> and <https://ceqanet.opr.ca.gov/2021060098/2>

State Agencies that received notice of the Draft EIR through OPR/SCH include:

California Air Resources Board (ARB), California Department of Conservation (DOC), California Department of Fish and Wildlife, Central Region 4 (CDFW), California Department of Fish and Wildlife, North Central Region 2 (CDFW), California Department of Forestry and Fire Protection (CAL FIRE), California Department of Housing and Community Development (HCD), California Department of Parks and Recreation, California Department of Transportation, District 10 (DOT), California Department of Water Resources (DWR), California Governor's Office of Emergency Services (OES), California Highway Patrol (CHP), California Native American Heritage Commission (NAHC), California Natural Resources Agency, California State Lands Commission (SLC), Delta Protection Commission, Delta Stewardship

Council, Department of Toxic Substances Control, Office of Historic Preservation, State Water Resources Control Board, Division of Water Quality, State Water Resources Control Board, Division of Water Rights, State Water Resources Control Board, Division of Drinking Water, District 10, California Regional Water Quality Control Board, Central Valley Sacramento Region 5 (RWQCB), Central Valley Flood Protection Board

Comment responses received thus far from State Agencies are from:

Central Valley Flood Protection Board; <https://ceqanet.opr.ca.gov/2021060098/2/Attachment/R2zuM6>

State Water Resources Control Board: <https://ceqanet.opr.ca.gov/2021060098/2/Attachment/LfdUKj>

Central Valley Regional Water Quality Control Board:
<https://ceqanet.opr.ca.gov/2021060098/2/Attachment/cU4X9v>

Comments letters from state and local agencies as well as from residents can be submitted by May 16, 2024.

The City's environmental consultant for the project will review and respond to all comments received and will publish a Response to Comments that makes part of the Final EIR document. Any revisions to the EIR and the proposed River Walk Specific Plan will be memorialized in an Errata to the Riverwalk EIR. A final list of environmental impacts, Mitigation Measures and Findings will be presented to both the Planning Commission and City Council at separately advertised public hearings for their consideration.

Respectfully,

Miguel Galvez,

Contract City Planner

City of Riverbank Development Services

6707 Third Street

Riverbank, CA 95367

(209) 863-7124 Office

(209) 869-7126 Fax

cityplanner@riverbank.org

City Hall Office Hours:

Monday – Thursday: 7:30 a.m. – 5:30 p.m.

Closed on Fridays

From: Diana Hernandez <djadrian1983@gmail.com>

Sent: Wednesday, March 27, 2024 2:59 PM

To: River Walk <riverwalk@riverbank.org>

Subject: Fwd: River Walk EIR

Hello, I called but Miguel was out sick and I was told to send an e-mail to the city planner which I did, but it has been over a week and I have had no response.

Thank you.

Diana Hernandez

----- Forwarded message -----

From: Diana Hernandez <djadrian1983@gmail.com>

Date: Tue, Mar 19, 2024 at 10:59 AM

Subject: River Walk EIR

To: <cityplanner@riverbank.org>

Hello,

I have been looking over the EIR and can't seem to find where the list of agencies that were notified about this project are. Is there any chance you know which page they might be on?

Thank you very much,

Diana Hernandez

Miguel Galvez

From: Jean Davis <jdavis2246@att.net>
Sent: Saturday, May 4, 2024 11:59 AM
To: River Walk
Subject: Re: Comment on River Walk proposal

Sent from my iPhone

> On Apr 25, 2024, at 9:56 PM, Jean Davis <jdavis2246@att.net> wrote:
> I am against this project. Is there a guarantee it will always be a 55 and older community?
> Sent from my iPhone

Miguel Galvez

From: Don Mooney <dbmooneylaw@gmail.com>
Sent: Saturday, May 4, 2024 9:52 PM
To: River Walk
Cc: Marisela Garcia; smcmurtry@denovoplanning.com; Janet Smallen; John Anderson
Subject: Re: River Walk Project
Attachments: Site 1.pdf; Site 2.pdf; Site 4.pdf; Site 3.pdf

Mr. Galvez,

This is a start. The record searches for the project included all of the archaeological and historic reports and survey record forms listed on both record searches. The City has only provided us t the cover letters for the other two record searches. According to the cover letters, these are the surveys and reports that were given to the CRM firm before they performed the four survey forms that were sent to us today.

These are also required:

Record Search 11265L dated 12-18-2019
3 resources in the project P-50-001750, 2002, 2321
5 resources w/in 1/8th mi. radius P-50-001751, 1959, 2320, 2322, 2323
5 reports in project area SJ-00826,1952, 7964, 8138,8892
7 reports w/in 1/8 mi. radius SJ-00369, 921, 6625, 2594, 7341, 8284, 8542

Record Search 11579L dated 12-4-2020
resources informal within project area SJ-01751
1 resource w/in 1/8 mi. radius P-39-000564
7 resources SJ-00369, 826, 921, 1751, 4644, 5575, 6734
No reports w/in 1/8 mi. radius

Please provide a prompt response. Thank you.

Don Mooney
Law Office of Donald B. Mooney
417 Mace Blvd, Suite J-334
Davis, CA 95618
530-758-2377
530-304-2424 (cell)
dbmooneylaw@gmail.com

On Apr 30, 2024, at 5:35 PM, River Walk <riverwalk@riverbank.org> wrote:

Mr. Mooney,

Please see attached.

The four sites found on the River Walk project have been recorded at the Information Center with the below numbers. Please confirm if this addresses your request.

ML-20-01 P-50-002362
ML-20-02 P-50-002365
ML-20-03 P-50-002363
ML-20-04 P-50-002364

Sincerely,

Miguel Galvez,

Contract City Planner
City of Riverbank Development Services
6707 Third Street
Riverbank, CA 95367

(209) 863-7124 Office
(209) 869-7126 Fax
cityplanner@riverbank.org

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Closed on Fridays

From: Don Mooney <dbmooneylaw@gmail.com>
Sent: Wednesday, March 20, 2024 12:22 PM
To: River Walk <riverwalk@riverbank.org>
Cc: Marisela Garcia <mhgarcia@riverbank.org>
Subject: River Walk Project

Mr. Galvez,

Please see attached letter.

Don Mooney
Law Office of Donald B. Mooney
417 Mace Blvd, Suite J-334
Davis, CA 95618
530-758-2377
530-304-2424 (cell)
dbmooneylaw@gmail.com

Miguel Galvez

From: Janet Neal <j2neal70@sbcglobal.net>
Sent: Monday, May 6, 2024 10:19 PM
To: River Walk
Subject: Fw: Comments on Riverwalk Plan & Draft EIR - wrong address earlier

sorry, I made a typo in sending the email this afternoon. Janet Neal

----- Forwarded Message -----

From: Janet Neal <j2neal70@sbcglobal.net>
To: riverwalk@riverwalk.org <riverwalk@riverwalk.org>
Sent: Monday, May 6, 2024, 4:46:53 PM PDT
Subject: Comments on Riverwalk Plan & Draft EIR

Miguel Galvez::

As property owners of parcel APN 074-003-012 next to the proposed development, we have concerns about the project.

Development should be limited to land outside the 100 and 200 year flood plains, and perhaps even the 500 year flood plain since the Riverwalk project area is located within the dam failure inundation area for New Melones Lake. (Draft EIR 3.9) It seems unwise to plan a housing project in such a location.

Would homeowners located there be able to get home owners insurance? What will be the cost to taxpayers to maintain levees adequate for development? What will be the cost to taxpayers if the levees fail?

The development will have a major impact on traffic on McHenry Avenue and on Patterson Road. What is the cost to taxpayers for road improvements? How many more accidents will result from the increased congestion? What is the estimated increase in noise level?

The best use of the low lying areas would be as a preserve. Perhaps one of the non profit land trust organizations would be interested in purchasing the land.

Sincerely,

Janet & Joe Neal
9308 Woodward Lake Drive
Oakdale, CA 95361

CITY OF RIVERBANK
MAY 08 2024
DEVELOPMENT SERVICES

4/29/24

City of Riverbank
Attn: Miguel Galvez, Contract City Planner
6617 Third Street
Riverbank CA 95367

RE: River Walk Specific Plan/Draft Environmental Impact Report, Riverbank, CA

Dear Mr. Galvez:

I would like to comment on the proposed River Walk Specific Plan project so that it becomes part of the public record and is included in the Final Environmental Impact Report for the referenced project. This project proposes to construct thousands of new homes, businesses, and infrastructure including parks, a walking trail around the entire perimeter, a new 4-lane road that would terminate onto McHenry Avenue, and two or three new water wells which would rely solely on groundwater to serve a 2-million gallon storage tank; nearly all of which would occur on river bottom land that is identified by the State Department of Conservation as "prime."

The State defines "prime" as follows: "prime farmland has the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustainable high yields." Homes and businesses should be constructed on soils of lesser quality, not on prime farm land. In addition, the City of Riverbank has more than ample pre-approved, land area which is available to construct thousands of new homes based on the 1,500 acres which was added to its Sphere of Influence in 2016. The need for this project has not been demonstrated.

Prime Ag Land & the State Dept. of Conservation's Farmland Mapping & Monitoring Program (FMMP): The State's mapping program maps all ag parcels of 10 acres or more into categories. The Project Area primarily consists of the top 2 categories: Prime and Lands of Statewide Importance and the project concludes that the loss of this ag land would be "Significant and Unavoidable." The proposed mitigation measure for this is to buy land somewhere, but not necessarily in Stanislaus County. How does this help maintain Stanislaus County and the Central Valley's ag heritage?

My other concerns:

-The Stanislaus River flooded in 1997 including this specific area. You could see the orchards flooded from the Mchenry bridge.

= What about other emergency access points? Will one be required in the River Heights/Park Ridge area? There is no discussion in the DEIR about emergency access at all. Recall that we had a serious fire approx. 7 years ago that started along the River and went under the McHenry bridge and through the (now) cherry orchard area down into the walnut orchard. If an emergency evacuation is needed, how will you evacuate the people out of only 2 main entrances/exits? Fighting that fire was nearly a disaster in itself because 3 different fire agencies were arguing about who's jurisdiction it was!

= Prime Ag Land & the State Dept. of Conservation's Farmland Mapping & Monitoring Program (FMMP): The State's mapping program maps all ag parcels of 10 acres or more into categories. The Project Area primarily consists of the top 2 categories: Prime and Lands of Statewide Importance and the project concludes that the loss of this ag land would be "Significant and Unavoidable." The proposed mitigation measure for this is to pay \$ to buy land somewhere, but not necessarily in Stanislaus County. How does this help maintain Stanislaus County and the Central Valley's ag heritage?

- Finally please really think this project through. I believe it is not feasible in this area and will create a serious impact on the environment, community and our quality of life in the Riverbank area.

Robert Mallory
2204 Christmas Tree Lane
Riverbank, CA 95367

Yokuts Group of the Sierra Club
Milton Trieweiler
Yokuts Group of the Sierra Club Conservation and Sustainability Chair
P. O. Box 2020
Turlock, CA 95381-2020
Phone 209-535-1274

CITY OF RIVERBANK

MAY 09 2024

DEVELOPMENT SERVICES

May 9, 2024

Miguel Galvez
Contract City Planner
City of Riverbank 6707 3rd Street, Suite A
Riverbank, CA 95367

RE: Comments on the River Walk Draft EIR
SCH: 202160098
Chapter 3.2 Agricultural Resources

Dear Mr. Galvez:

The Yokuts Group of the Sierra appreciates the opportunity to have reviewed the Draft Environmental Impact Report for the River Walk Proposed Project Chapter 3.2 Agricultural Resources:

Comments on the River Walk Draft EIR Chapter 3.2

CHAPTER 3.2.1, PAGE 3.2-4 "Existing Site Conditions" states there is a cherry orchards and Fallow Land in the western/central portion of the Project Area. This is incorrect in that this entire area is farmed seasonally in watermelons, pumpkins and other crops on an annual basis, this land is not fallow.

CHAPTER 3.2.1, PAGE 3.2-6 "Important Farmland Designations" Table 3.2-5; Important Farmlands, and the section; Prime Farmland; top of page 3.2-7; The majority of the land in the Project area, approximately 919.32 acres, is designated Prime Farmland, as shown on Figure 3.2-1. This includes approximately 661.33 acres within the Specific Plan Area, and approximately 257.99 acres outside the Specific Plan Area, but within the Project Area.

This is incorrect; the majority of the Prime Farmland in the Project area is approximately 1,069 acres. Figure 3.2-1 designates the solar farm as Urban and Build-Up Land, when in fact it is Prime Farmland. This approximately 150 acres of Prime Farmland is leased by SunPower Corp to generate solar power for Modesto Irrigation District until 2036. When the lease expires for the solar farm, this Prime Farmland will be available for farming again.

Figure 2.0-6 shows that the entire land area within the Specific Plan Area, and outside and the Specific Plan Area is Assessed for Agriculture Land use, except for Morris Nursey and the Gun Club land area. The Solar farm is designated as Assessed for Agriculture Land use.

CHAPTER 3.2.1, PAGE 3.2-11 " Williamson Act Contracts", This Demonstrates that people who wish to preserve Prime Farmland for agricultural use have no property rights and can have their farmland taken from them. This is inconstant with the needs and requirements of us Humans, who must have food to live. Even with Climate Change this River Walk land area will be able to grow agriculture crops for food because of the Irrigation Water from Modesto Irrigation District.

CHAPTER 3.2.2, PAGE 3.2-15 "California Government Code Section 560643"

Prime agricultural land means an area of land, whether a single parcel or contiguous parcels that have not been developed for a use other than an agricultural use and that meets any of the following qualifications:

Land that qualifies, if irrigated, for rating as class 1 or class II in the USDA Natural Resources Conservation Service land use capability classification, whether or not land is actually irrigated, provided that irrigation is feasible.

The Stanislaus County Zoning Ordinance currently designates the majority of the Project Area for General Agriculture 40 Acre (A-2-40) uses, and a limited portion as General Agriculture 10 Acre (A-2-10). The County Zoning Code contains the following standards to guide development for these Designations: **General Agriculture 40 and 10 Acre (A-2)** The A-2 zone supports and enhances agriculture as the predominant land use in the unincorporated areas of the County.

This California Government Code Section 560643 proves that this farmland within the Specific Plan area and outside the Specific Plan area is Prime Farmland for agricultural food production. Modesto Irrigation District provides water for the entire Project Area so this land area can provide food production for hundreds of years.

CHAPTER 3.2.2, PAGE 3.2-15 "City of Riverbank Sustainable Agricultural Strategy"

In 2016 the City of Riverbank adopted a Sustainable Agricultural Strategy. The purpose of the Sustainable Agricultural Strategy is to meet the stated goals of Stanislaus Local Agency Formation Commission's (LAFCo's) Agriculture Preservation Policy.

Properties granted discretionary approval of residential development entitlements that are located on lands designated as Prime Farmland, shall be conditioned to cause the permanent preservation of similar quality farmland at a 1:1 ratio of the gross amount of farmland converted to the amount of farmland preserved.

Land set aside for permanent preservation shall: (1) be equal or better soil quality, have a dependable and sustainably supply of irrigation water, and be located within Stanislaus County; and (2) not be previously encumbered by a conservation easement of any nature.

It is not possible to mitigate the loss of this Prime Farmland because there is no other farmland in Stanislaus County that is equal or better than this Farmland. This farmland within the Specific Plan area and outside the Specific Plan area is Prime Farmland plus 148 acres of Riparian Habitat. The majority of the land in the Specific Plan area is Flood Plain. See Figure 3.9-2, FEMA Flood Zone Designations. This map does not indicate where the 200-year Flood Zone is located. It is very likely that this Flood Plain Map is incomplete and is no longer valid because of Climate Change. The 200 hundred year Flood Zone is very likely to be the 100 hundred year Flood Zone today, and how much river flow can be expected in future flood events with Atmospheric River Rain events must be factored in. There is no other Stanislaus County land that can mitigate the loss of this Flood Plain. This Flood plain would be necessary to prevent flooding down river and upriver in an Atmospheric River Rain event.

CHAPTER 3.2.3, PAGE 3.2-18 "Impacts and Mitigation Measures" Impact 3.2-1 The proposed Specific Plan will result in the conversion of Farmlands, as shown on maps (With Errors: See previous comments in CHAPTER 3.2.1, PAGE 3.2-6 "Important Farmland Designations") prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural uses. **(Significant and Voids Proposed Specific Plan)**

Development of the proposed Project would result in the permanent conversion of approximately 1069 acres of Prime Farmland to nonagricultural use. The loss of approximately 1069 acres of Prime Farmland would have a significant environmental impact on Stanislaus County.

Mitigation Measure, Impact 3.2-1, PAGE 3.2-18 While the Proposed implementation of these mitigation measures WOULD NOT assist in offsetting some impacts from farmland conversion because there is no Farmland in Stanislaus County that is equal or better than this Farmland in the Proposed Specific Plan area and in the area outside the Specific Plan area. It is absolutely impossible to mitigate the loose of this Prime Farmland other than by "Not Allowing this Project".

Mitigation of Prime Farmland in Stanislaus County is a complete Scam. After many Years the total acreage of farmland mitigated by the Central Valley Farmland Trust in Stanislaus County is a very small 306.94 acres. The Stanislaus County Scam of building housing developments on the best Prime Farmland in the Nation and world for Bay Area people is ludicrous. No one is going to rewrite the laws of physics and reality. As humans we must have food to eat, by destroying the best farmland in the world we will be making our children and our descendants suffer needlessly.

There is an abundance of poor soils in Central California to build houses on for those that work in the Bay Area. There are the Altamont Pass land areas, North and South of Highway 580 and there are many acres of poor soils to the East of Fairfield CA and the adjoining area. In Stanislaus County we have poor soils to build houses on West of Interstate 5 and Northwest of Patterson.

In Stanislaus County there is no way that anyone can mitigate the loss of this Prime Farmland in the land area within the Specific Plan Area, and outside and the Specific Plan Area. Recently, one Court of Appeal has questioned the effectiveness of conservation easements as mitigation for the loss of agricultural land, In King & Gardner Farms, LLC v. County of Kern (2020) 45 Cal.App.5th 814, 872-875 (King), the court held that substantial evidence did not support the conclusion in an EIR that the use of conservation easements would mitigate the loss of agricultural land to less than a significant level.

In Stanislaus County farmland mitigation is a Scam and hoax. After twenty years the total acreage of farmland mitigated by the Central Valley Farmland Trust in Stanislaus County is a very small 306.94 acres. It is totally false to say this prime farmland could ever be migrated in Stanislaus County. Farmland mitigation in Stanislaus County has not happened and will not happen, it is simply a Scam and hoax designed to fool the people of Stanislaus County into thinking housing developments are not affecting the food supply for our Country.

CHAPTER 3.2.3, PAGE 3.2-24 "Impact 3.2-3: The proposed Project has the potential to result in conflicts with adjacent agricultural lands or indirectly cause conversion of agricultural lands.

This project definitely has the potential to indirectly cause the conversion of agricultural lands into developments. Housing developments are like a cancer that keeps spreading from one land area to the next until all the prime farmland is gone. It would likely make it possible to spread to the South of the Project Area and spread to the North across the Stanislaus River into San Joaquin County. The solution is to stop building on all Prime Farmland and only build housing developments on the poor soils like to the East of Riverbank in our County.

Sincerely,



MILTON TRIEWEILER,

YOKUTS GROUP OF THE SIERRA CLUB

CONSERVATION AND SUSTAINABILITY CHAIR

MAY 13 2024

DEVELOPMENT SERVICES

Response to the Draft EIR of the River Walk Development Project

submitted by: Karen Mitchell, karenmitchell@gmail.com
2130 Cedarwood Dr., Riverbank, CA. 95367

Kent Mitchell, kmitch9348@sbcglobal.net
2130 Cedarwood Dr., Riverbank, CA. 95367

This response will cover three areas of concern: environmental-biological, social-community and infrastructure.

Environmental and Biological Concerns re. the Project

The River Walk Development Project proposes building on land that has not one, but four important features that strongly argue for its preservation. First the land has been designated as “flood plain,” second it sits atop an aquifer and is a water recharge area, third it has been rated as prime farmland, and fourth it contains riparian habitat and is bordered by the Stanislaus River.

Flood Plain: (*EIR: 3.9, 3.9-38, Hydrology and Water Quality*)

The Draft EIR represents an ignoring and avoiding of the current nomenclature re. flood risk. The designations 1/100 yr. flood area, 1/200yr, etc. were created in 1968 before we knew about climate change. On the U.S. Geological Survey website (waterwatch.USGS.gov), it states that because this terminology can confuse and mislead those unfamiliar with flood science, the U.S. Geological Survey, along with other agencies, is encouraging the use of the Annual Exceedence Probability (AEP) terminology.

The site further describes what degree of risk is being described. This is a direct quote:

The 1% AEP flood (1/100 yr storm) has a 1% chance of occurring in any given year; however during the span of a 30 year mortgage, a home in the 1% AEP floodplain has a 26% percent chance of being flooded at least one during those 30 years.

Between 500-600 acres in the proposed River Walk development site lie in the .5% or 1% AEP zone.

There is also no mention in the Draft EIR about what climate scientists are saying about climate change. There is a general agreement that while annual rainfalls in any one area remain unpredictable, higher, more intense precipitation events will very probably occur everywhere. This is because a warmer atmosphere can hold more water. As our atmosphere continues to warm, the precipitation events will increase in intensity and this of course means a greater likelihood of more frequent and intense flooding. The Modesto Irrigation District has been tracking daily rainfall since 1887. On their website they list ten of the highest single day rain amounts. Among the top six are three that occurred in the last 10 years. (See attachment).

More intense precipitation will very likely damage earthen levees, which is the kind that will remain with the River Walk build-out. These kind of levees, though protective to a certain degree, are subject to erosion. The predicted increase in the intensity of precipitation events will necessitate frequent repair of the earthen levee, or in a worse case but possible scenario, a disastrous collapse of the levee. (An article about the effects of climate change on earthen levees is attached.)

Another area of concern is the upriver dams. In January of this year, people living in several "low-lying" areas along the Stanislaus River were warned of potential flooding. In June of 2023, *The New York Times Magazine* featured a report on the condition of California's dams and their preparedness for extreme weather events. It began with going into some detail about the failure near the spillway of Oroville Dam, 60 miles north of Sacramento, on February 7, 2017 which created a complicated emergency situation. This led to a mandatory evacuation of well over a 100,000 people on February 12th. The article quoted Daniel Swain, a climate scientist at the University of California Los Angeles. He said: "We still haven't severely tested California's primary flood-control structures." Regarding the Oroville Dam, he added, "*If we had an even marginally*

bigger event on the weather from that year it would have been significantly worse."

In this same article, Dale Cox, a former project manager at the United States Geological Survey, said that California's dams are unprepared for extreme weather because state water authorities have a false sense of how bad flooding can get. He said that a lot of engineering decisions have come from recorded peaks in the past, but those are underestimates: "Already, we are seeing several 100 year floods every 10 years."

Lastly, there are some concerns about the New Melones Dam upstream on the Stanislaus River. New Melones is classified as a "High Hazard Potential Classification." This latter classification refers to the determination that if the New Melones dam failed or was wrongly operated, it would probably cause the loss of human life.

(EIR: 3.9-36-37)

There are several drainage basins with pumping stations planned for the River Walk project to mitigate flood damage. The Public Works Dept. for the city of Riverbank will be maintaining these. Does this mean that the city/citizens of Riverbank will be responsible not only for the maintenance/repair of the basins but for the maintenance and repair of the pumping stations as well? What are the estimated costs? Who will pay them? Lastly, there does not appear to be a mandated time frame to empty the water storage basins by. It is likely this cannot be mandated because no one knows how much water they will need to retain going forward or if a particular pumping station may fail under the conditions of intense flooding. Standing water is both a health and safety hazard.

Many of the homeowners in the planned new development may find it very difficult or even impossible to purchase flood insurance as the risk-adverse insurance agency takes climate change more into account in their policy making decisions.

The River Walk development project is one that will introduce an unacceptable level of unnecessary risk to human lives and property.

(see attachment titled: *Climate Change Is Increasing the Risk of a California Megaflood*)

Water ReCharge Area (EIR 3.9 Hydrology and Water Quality/ 3.6-7 Subsidence):

Climate scientists say that they cannot make any long-term predictions regarding the annual rainfall amount in any particular region. More intense precipitation events, which they do foresee, does not mean more overall rain. Droughts will still occur and can intensify. The aquifer and important water recharge area within the boundaries of the proposed River Walk development are extremely important future water resources for our area. Once an aquifer nears depletion and the land sinks it doesn't re-inflate. A water storage area is lost.

Groundwater levels have fallen significantly around the country in the past four decades according to data gathered and analyzed from tens of thousands of wells in a New York Times investigation in 2023. The article which came out on Sunday March 3, 2024 reports that there is now a push towards stricter groundwater regulations and that, "some of the worst effects of aquifer depletion in the United States are in California. In some part of the state, including the Central Valley, so much groundwater has been extracted that the ground has sunk 20 feet or more." More State control of aquifer extraction began about ten years ago and will become more intense going forward.

Agriculture often depends on water pumped from aquifers. Planting crops and trees in the Valley that require a lot of water (such as cotton and almonds), and over-drawing water from the aquifer has caused subsidence and the collapse of aquifers. However, the current thinking sees how farmland can also be used to replenish aquifers if crops/trees are planted that require less water. This is especially true if agricultural land lies dormant/fallow in the winter allowing for the recharging of the aquifer. This latter use of agriculture land describes most of the area of the proposed project. It is an aquifer recharge area. It is both a prime agricultural land and a water recharge area. As such, it is an invaluable resource going forward, a protection against future droughts. How will the future citizens

and inhabitants of Riverbank remember us if we do not now protect this important resource?

Prime Farmland As An Invaluable Resource (EIR 3.2 Agricultural Resources)

The land proposed for build-out has productive soils of the highest or very high quality. Mitigating its loss (guaranteeing the conserving-protecting of other farmland) will be difficult because mitigation means the conservation of soils of equal or better quality. Mitigation itself, is coming under more scrutiny and criticism both in terms of its real protective value and lack of transparency.

There are no certain predictions for how, where, and when climate change and a warming atmosphere will affect any particular area or region, and what its effect on farming will be. However, the *UC Merced* website reported that 2020-2022 was the driest period on historical record for California. In 2022, 752,000 acres were left uncultivated due to drought. That number is almost 10% of the state's agricultural land.

The loss of California's agricultural land has been compared to a melting glacier with a loss of an average 50,000 acres every year. The farmland proposed to be largely paved over by the River Walk Project is less likely to be severely affected by drought periods as in other areas, given its proximity to several sources of water. Its high quality soil and this access to water warrant efforts to protect it in a warming and unpredictable climate.

From a website called *Western Plant Health*: "A top priority for meeting California's climate change goals should be the preservation and conservation of our farmlands which play a major role in carbon capture from the atmosphere."

Conservation of the Stanislaus River and Its Riparian Habitat (EIR 3.4 Biological Resources)

The Stanislaus River and its riparian habitat are invaluable not just as a material and psychological resource for us humans, but also as a special place that nourishes and sustains and is composed of many forms of life. In Stanislaus County, there is a fairly consistent pattern of building too close to the Stanislaus River, or too close to the river's bluffs. The effects of erosion over time and the real space needed for a healthy riparian habitat have not been adequately factored in other development projects in Riverbank and in Stanislaus County. I see the River Walk Project falling into the same pattern. Given the predictions of more intense precipitation events going forward, erosion will probably happen at a quicker rate and riparian habitat will disappear more rapidly than in the past.

There is also concern about laying pipes underneath the Stanislaus River and alongside it. There are ways such as the trenchless, micro-tunnelling method that are said to be less environmentally disruptive, but even if this would be the method used, this does not completely allay concern about the environmental impacts.

Social-Community Concerns

The River Walk development project is described as being an interconnected community. However, that interconnection does not exist with regard to connecting with the larger community of the city of Riverbank. The children who live there will not be attending Riverbank schools, and the planned parks do not appear to be really accessible to the public. There does not seem to be any planned, accessible public parking for the parks including the River Walk trail.

Though there is no mention of the River Walk Project including a gated portion, there is no clear statement that none of this project will be gated with the build-out or in the future. Recent research has been showing the negative effects of gated communities.

Gated communities come with social risks. A national government website: NIH// National Library of Medicine: National Center for Biotechnology Information has a very nuanced, research-based article titled ***Members Only: Gated Communities and Residential Segregation in the Metropolitan United States***. The article concludes by saying this:

Establishing a strong line of urban research about the process of gating should become a priority, given the links between gating and segregation and the proliferation of GC's (gated communities) in the United States. As a new powerful form of urban inequality and privatization of space, gating has the potential to reconfigure the social and spacial organization of cities for centuries to come.

An omission regarding this issue — the possibility of portions of the development being gated — will be wrongful and unfair to the city of Riverbank.

Another social-community concern is the effect of having a disproportionate number of seniors added to Riverbank's population. Only 11.5% of the housing will not have an age (Senior) restriction. The 2,151 age restricted homes, with 1.8 residents will house 3,871 seniors. Riverbank's current population is about 24,500. This is very likely to skew voting patterns and is likely to place a greater demand on both medical and emergency services in the area than a more proportionate population would.

Another huge concern is how little this project does to create true affordable housing for the citizens of Riverbank.

Traffic Concerns

*(Traffic Operational Analysis For RiverWalk Specific Plan EIR/
Introduction to Appendix)*

The first traffic study offered in the Project proposal was absolutely bare bones (the number of vehicles per day on the roads near the proposed project) There was nothing about how many vehicles are on those roads at peak times, nor was there a predicted estimate of vehicle numbers for when River Walk is fully built out. The more recent addition to the traffic segment is more thorough. There are projected numbers for when the build-out is complete, but I did not see how those new numbers were arrived at. Also, in trying to estimate future vehicle numbers,

commonsense dictates that rather giving a single number of estimated vehicles that an estimated range be given.

It was predicted that Coffee Road between Claribel and Claratina would operate at a LOS "F" (very unacceptable level) without expanding from its current two-lane condition to four lanes. However, even if this expansion occurred in a timely manner— without a light where Coffee meets Patterson Rd.— there would be no way for traffic to continue safely through Coffee Rd. and into the new development project. However, a traffic light where Coffee Rd. and Patterson Rd. intersect would likely create horrible back-ups due to the fact it is less than .5 miles away from another major intersection: the Patterson Rd./McHenry/Ladd intersection. This intersection has two lights in close proximity to each other: one for McHenry Rd. southbound and another light for traffic headed northbound on McHenry Rd. and westbound to Ladd Rd.

Also the fact that there are only two exits unto major arterial streets from such a large proposed development project is very problematic, both in terms of traffic flow and safety.

The large number of proposed homes in the River Walk Development Project are in excess of what the one arterial road with only two exits can handle even with the expanding of McHenry Ave. and Coffee Rd. south of Patterson Rd. to four lanes.

Also, there are no time frames stated for when the various road expansions to accommodate this large development would occur. Without a time frame, there is less of a sense of real commitment on the part of Riverbank and Modesto to do the necessary road expansions and improvement.

Other Infra-Structure Concerns

The River-Walk project will strain the area's medical and emergency services given that it will be disproportionately populated by seniors.

Also, in case of a flood (it will be built on flood-plain) or fire where there is a need for quick evacuation, there does not seem enough outlet roads.

There are likely to be more school-age children than predicted given that many grandparents are raising their grandchildren. Will Modesto schools be able to accommodate them? Has Modesto Schools been contacted regarding the project plan?



Levee Fragility Behavior under Projected Future Flooding in a Warming Climate

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Abstract: Adaptation to climate change requires careful evaluation of infrastructure performance under future climatic extremes. This study demonstrates how a multidisciplinary approach integrating geotechnical engineering, hydrology, and climate science can be employed to quantify site-specific impacts of climate change on geotechnical infrastructure. Specifically, this paper quantifies the effects of changes in future streamflow on the performance of an earthen levee in Sacramento, California, considering multiple modes of failure. The streamflows for historical (1950–2000) and projected (2049–2099) scenarios with different recurrence intervals were derived from routed hydrological simulations driven by bias-corrected global climate models. The historical and future flood levels were then applied in a set of transient coupled finite-element seepage and limit equilibrium slope stability analyses to simulate the levee subjected to extreme streamflow. Variability in hydraulic and mechanical properties of soils was addressed using a Monte Carlo sampling method to evaluate and compare the probability of failure of the levee under different historical and future climate scenarios. Three individual modes (underseepage, uplift, and slope stability) along with lower and upper bounds for the combined mode of failure were examined. The results showed that incorporating future floods into levee failure analysis led to considerable reductions in the mean factor of safety and increases in the levee's probability of failure, suggesting that risk assessment based on historical records can significantly underestimate the levee's failure probability in a warming climate. Despite inherent uncertainties in future projections and substantial variability across climate models, evaluating infrastructure against projected extremes offers insights into their likely performance for the future. DOI: 10.1061/(ASCE)GT.1943-5606.0002399. © 2020 American Society of Civil Engineers.

Author keywords: Climate change; Adaptation; Levees; Probability of failure; Streamflow; Numerical modeling; Process-informed nonstationary extreme value analysis (ProNEVA).

Introduction

Historical observations show considerable changes in type, severity, frequency, and duration of extreme precipitation and flood events across the world (Groisman et al. 2004; USGCRP 2009; IPCC 2013). For instance, ground-based observations show a 9% increase in heavy precipitations from 1958 to 2012 (USGCRP 2009). Additionally, partly attributed to anthropogenic activities,

climate models project increases in the intensity and frequency of future extreme precipitation and flooding (e.g., Florsheim and Mount 2003; Ragno et al. 2019). In the United States, the impact of the annual flood-related damage to infrastructure has increased significantly since 1934 (Pielke et al. 2002), attributed to both increased exposure and changes in the frequency and severity of extremes. A warming climate is expected to increase the water-holding capacity of the atmosphere, which can intensify precipitation extremes and flood risk (Trenberth 2001; Papalexou and Montanari 2019; Chen and Hossain 2019).

Adaptation to climate change requires evaluations of infrastructure performance for extreme events such as flooding for different emission scenarios (e.g., Vardon 2015; CACC 2018; Forzieri et al. 2018; Hagenlocher et al. 2018; Reidmiller et al. 2017; Vahedifard et al. 2018; Fletcher et al. 2019). Changes in statistics of extreme precipitation and floods in a changing climate can significantly affect the stability of natural and man-made earthen structures, including levees (e.g., Robinson and Vahedifard 2016; Jasim et al. 2017; Robinson et al. 2017; Vahedifard et al. 2017; CACC 2018; FEMA 2018). The severity of damage to levees depends on the structural integrity of the levee as well as the intensity, duration, and frequency characteristics of extreme climatic events such as rainfalls, floods, and even droughts (e.g., Vahedifard et al. 2016). The structural integrity of levees subjected to extreme events and loading conditions can be threatened by one or more modes of failure, such as slope stability, underseepage, uplift, through seepage, and overtopping.

Over the past few decades, several methods have been employed for risk and reliability analyses of levees under various loading conditions (e.g., Wood 1977; Wolff 2008; Wu et al. 2011; Ludy and Kondolf 2012; Jongejan and Calle 2013; Zhang et al. 2013;

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Hui et al. 2016; Roe et al. 2016; Bessette et al. 2017; Jasim et al. 2017; Schultz et al. 2018; Lanzafame and Sitar 2019; Rahimi et al. 2019; USBR 2019; Zimmaro et al. 2019). These methods include expert judgment, empirical, analytical, and hybrid methods, depending upon the source of knowledge used to assess the probability of failure, or the probability of unsatisfactory performance, versus the range of levee loads (e.g., Schultz et al. 2010). The probability of failure-load relationship is commonly referred to as a fragility curve (or system response curve), a useful tool for levee risk analysis (e.g., Schultz et al. 2010; USBR 2019). Among others, the analytical method, which is based on quantitative models of load and resistance, is shown to be best suited for robust risk analysis (e.g., Schultz et al. 2018; Lanzafame and Sitar 2019; USBR 2019; Zimmaro et al. 2019). In this approach, the levee's probability of failure is estimated by considering the uncertainty in one or more variables (e.g., soil types, soil properties, levee geometry and dimensions, and water level) that affect load or resistance.

This study demonstrates how hydrology and climate science findings can be employed to quantify site-specific impacts of climate change on earthen levees. We quantified the effects of extreme streamflow in a changing climate on the performance of an earthen levee considering multiple failure modes. Historical (1950–2000) and future (2049–2099) streamflow simulations were derived from bias-corrected global climate models and routed hydrologic simulations, developed for the 4th California Climate Change Assessment (Pierce et al. 2015, 2018). Floods with different climatic extreme recurrence intervals were then employed as hydraulic loads into a set of transient coupled finite-element seepage and limit equilibrium slope stability analyses to simulate the levee subjected to extreme streamflow. Considering the variability in the hydraulic and mechanical properties of soils, the numerical modeling framework was used along with the Monte Carlo method to evaluate the probability of failure of the levee against individual and combined modes of failure, including underseepage, uplift, and slope stability.

Study Area

Over 21,000 km of levees protect land and infrastructure from floods in California (CDWR 2011). However, most of these levees work under relatively marginal conditions (CDWR 2011), which is comparable to the overall grade of the nation's levee systems (ASCE 2017). According to a 155-year observational data record from a California river system, structural failures have occurred in more than 25% of the earthen levees during the last century (Florsheim and Dettlinger 2007). Rapidly growing urbanization, socioeconomic importance of the region, marginal conditions, and continuous exposure to a variety of natural hazards and climate extremes (e.g., earthquakes, land subsidence, droughts, floods, and wildfires) have stimulated several studies over the past few decades to assess the vulnerability and risk associated with California's levee systems (e.g., Deverel and Leighton 2010; Brooks et al. 2012; LAO 2015; Vahedifard et al. 2015, 2016; Hui et al. 2016; Roe et al. 2016; Deverel et al. 2016; Robinson and Vahedifard 2016; Jasim et al. 2017; Hui et al. 2018; Lanzafame and Sitar 2019; Zimmaro et al. 2019).

For modeling, we studied the Elkhorn Levee, an earthen levee in a high-risk flooding zone (Reclamation District No. 1000) in Sacramento, California (Fig. 1). Levee systems throughout the Northern California Central Valley are often urban and protect densely populated areas from flooding (CDWR 2011). Many of these levees are loaded only during flooding or high water. In contrast, the levees throughout most of the Delta downstream of

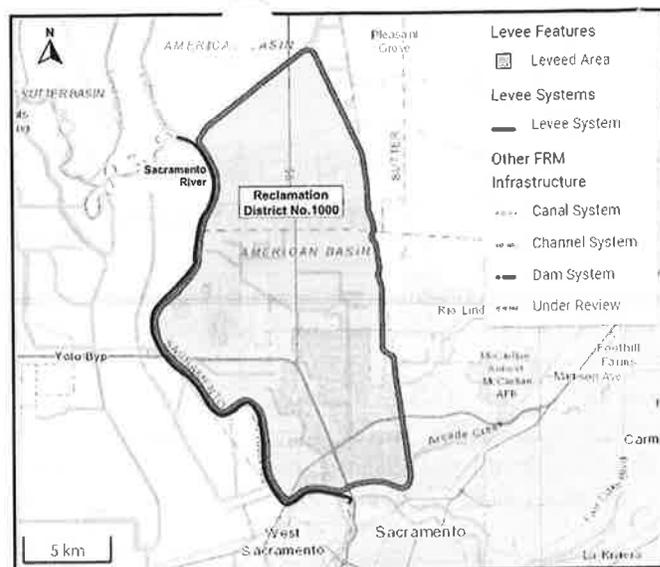


Fig. 1. Leveed area in Reclamation District No. 1000, Sacramento, California. (Reprinted from NLD 2020.)

Sacramento are mainly nonurban, protecting land that is at or below sea level, and continuously hold back water.

Streamflow Loading in a Changing Climate

Current practices for design and risk assessments of infrastructure systems commonly rely on observed historical extremes, such as rainfall and flood records, assuming the statistics of extremes do not change significantly over time (Cheng et al. 2014; Salas and Obeysekera 2014). Here, we incorporated future flood projections into the risk analysis of the Elkhorn Levee. Unlike common statistical proxies to estimate future river discharge (e.g., Kundzewicz et al. 2014; Wobus et al. 2014; Hui et al. 2018), we employed projected future streamflow derived from global climate models and hydrologic simulations. The Elkhorn Levee is adjacent to Camp Far West, one of the 59 locations across Northern California where daily streamflow projections (1950–2099) were developed, bias corrected, and routed as part of the California Fourth Climate Change Assessment project (Pierce et al. 2014, 2015, 2018). The variable infiltration capacity (VIC) hydrological model (Lohmann et al. 1996, 1998), which simulates surface and subsurface processes, was forced with downscaled global climate model (GCM) simulations to route daily streamflow. The bias-corrected inputs to the hydrologic model (VIC) were based on ten GCMs from the Fifth Coupled Model Intercomparison Project (CMIP5) and two representative concentration pathways (RCPs): RCP4.5 and RCP8.5.

For flood risk assessment in the Elkhorn Levee, we employed RCP8.5 data and the most extreme projected streamflow scenario from the CanESM2 model, one of four representative climate models for California. Pierce et al. (2018) and Thome et al. (2018) provided more information on representative models for the state of California. We ran flood frequency analysis using process-informed nonstationary extreme value analysis (ProNEVA, Ragno et al. 2019; Cheng et al. 2014) to identify flood magnitudes for different recurrence intervals (White 1976; Groves et al. 2006). We used daily annual flow maxima for flood frequency analysis, as it is a key design variable and the most commonly used variable for flood risk assessment when instantaneous observations are unavailable (e.g., England et al. 2019). The streamflow design load was represented by the

Table 1. Streamflow and corresponding flood level for different recurrence intervals using historical and projected future data

Recurrence interval (years)	Levee loading	Historical (1950–2000)	Future (2049–2099)
10	Streamflow (m ³ /s)	613.86	1,073.07
	Flood level (m)	18.33	20.46
25	Streamflow (m ³ /s)	858.83	1,308.43
	Flood level (m)	19.54	21.38
50	Streamflow (m ³ /s)	1,095.59	1,478.50
	Flood level (m)	20.56	21.90

flood water level behind the levee. Applying the rating curve concept (i.e., river stage and discharge relationship at the gauging station), we estimated the flood water level corresponding to the design streamflow for different recurrence intervals (e.g., 25- and 50-year flood events).

Table 1 shows the streamflow and flood level for different recurrence intervals using the historical (1950–2000) and projected future (2049–2099, RCP 8.5) simulations. The future flood levels from the CanESM2 model, for all recurrence intervals, show higher peak water levels compared to baseline (1950–2000) flood levels simulations, implying higher flood risk in the future, consistent with the findings of Mallakpour et al. (2018). The future flood simulations had a 1.34-m higher flood level than the baseline period for the 50-year event, a 6.5% increase.

Probability of Failure Considering Different Modes of Failure

In this study, the probability of unsatisfactory performance, hereafter referred to as the probability of failure, was calculated by treating the soils' hydromechanical properties as random variables. The performance function, $G(X)$, can be defined as

$$G(X) = G(R, S) = \frac{G_R(X)}{G_S(X)} \quad (1)$$

where X = vector of random variables; $S = G_S(X)$ is the load imposed on the levee; and $R = G_R(X)$ is the capacity of levee to resist the load. In this equation, $G(R, S)$ represents the factor of safety, which is the ratio of the capacity to resist a demand (i.e., load) placed on the levee. When $G(X)$ is less than the predefined performance criteria [$G_{\text{design}}(X)$], the performance of the levee is considered unsatisfactory. The probability of failure for the i th mode of failure ($P_{f,i}$) is determined by integrating the multivariate density function, $f_X(X)$, for the n -dimensional vector of random variables over the unsatisfactory performance domain (e.g., Schultz et al. 2018)

$$P_{f,i} = P[G(X) < 1] = \int \dots \int_{G(X) < G_{\text{design}}(X)} f_X(X) dX \quad (2)$$

The historical and future flood levels were applied in a set of coupled transient finite-element seepage and limit equilibrium slope stability analyses to simulate the levee subjected to extreme streamflow. The Monte Carlo method with 6,000 realizations of soil properties (treated as random variables) was used to estimate the probability of failure for each mode at each water level. The input data sets needed for the Monte Carlo simulation were from sampling the probability distributions of uncertain mechanical and hydraulic properties of each soil type [based on its unified soil classification system (USCS) classification] in the levee embankment

and foundation. A total of 11 random variables (including sampled and derived variables) for each soil type were considered, covering mechanical and hydraulic properties of the soil layers in saturated and unsaturated conditions (see the section "Soil Properties and Random Variables" for more details). Each realization was examined to see if the levee met the performance criteria defined for underseepage, uplift, and slope stability. The probability of failure at selected times during the simulation was calculated as the fraction of 6,000 realizations that failed to satisfy the performance criteria for that failure mode. The following performance functions were used for different modes of failure:

$$G(R, S)_{un} < \frac{0.33i_{cv}}{i_v} \quad (3)$$

$$G(R, S)_{up} < \frac{0.667u_t}{u_u} \quad (4)$$

$$G(R, S)_{st} < 0.909 \left(\frac{\tau}{\tau_f} \right)_{\min} \quad (5)$$

where $G(R, S)_{un}$, $G(R, S)_{up}$, and $G(R, S)_{st}$ = performance functions for underseepage, uplift, and slope stability modes of failure, respectively; i_{cv} = critical vertical exit gradient at the landside toe of the levee; i_v = vertical exit gradient at the landside toe of the levee; u_t = pressure applied by the weight of the saturated soil at the toe beneath the confining layer of the levee; u_u = uplift pressure at the same location; τ = shear stress; and τ_f = shear strength of the soil along the most critical failure surface sought in the limit equilibrium slope stability analysis of the landside levee slope. The aforementioned performance functions embody the following factors of safety: 3 for underseepage, 1.5 for uplift, and 1.1 for slope stability. These values were selected within the range of recommended values by guidelines for design and risk analysis of earthen levees (e.g., USACE 2000; USBR 2019).

After estimating the probability of failure for each mode, the combined probability of failure can be calculated. As discussed by Lendering et al. (2018), the upper and lower bounds of the combined probability of failure can be determined by assuming mutual exclusivity (upper bound) or complete dependence (lower bound) between n modes of failure as follows:

$$\max(P_{f,i}) \leq P_{f,t} \leq \sum_{i=1}^n P_{f,i} = 1 - \prod_{i=1}^n (1 - P_{f,i}) \quad (6)$$

where $P_{f,t}$ = combined (aggregate) probability of failure. Most previous studies (e.g., Wolff 2008; Rice and Polanco 2012; Jongejan et al. 2013; Bogárdi and Balogh 2014; Schultz et al. 2018; Lendering et al. 2018) determine the combined probability of failure of earthen levees by assuming independence among failure modes. However, different failure modes can be somewhat dependent, because they share common triggering and resisting factors. To properly represent the range of possible $P_{f,t}$ values, we considered and presented both lower and upper bounds in this study. Other possible uncertainties not considered in this study include uncertainties in the response threshold, model error, and flood scenarios. The latter itself includes uncertainties from intermodel variability when multiple models are used, and uncertainties from future RCPs.

Numerical Modeling

Probabilistic numerical simulations were performed using two codes, SEEP2D-COUPLED-HPC and SLOPE2D-HPC (Tracy et al. 2020).

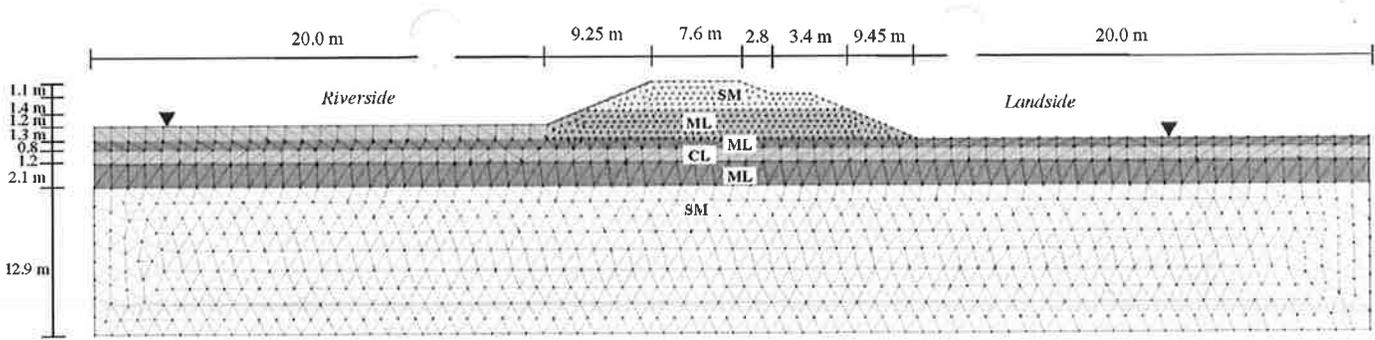


Fig. 2. Geometry of Elkhorn Levee used in numerical modeling.

The former is a two-dimensional coupled transient finite-element seepage/structural plane strain program designed to run on the US Army Engineer Research and Development Center (ERDC)'s high-performance computing facility, whereas the latter is a limit equilibrium slope stability code that uses the simplified Bishop method. The pore water pressures obtained from the coupled finite-element seepage are incorporated into the limit equilibrium slope stability analysis. Geometry and soil types were assumed to be known. Parameters describing the hydraulic and mechanical properties of soils were treated as uncertain variables, while the geometry of the two-dimensional levee section was held constant. It is noted that a similar probabilistic modeling framework is currently being used by the USACE (Schultz et al. 2018; Tracy et al. 2020) to examine the fragility behavior of an extensive array of USACE portfolio of levees throughout the nation. Employing this method allows performing site-specific probabilistic analysis for levees with limited in situ data (such as geometry and soil type) while accounting for the uncertainty of soil parameters. This feature makes the method broadly applicable to the nation's portfolio of levees. Further, the probabilistic method is objective, rigorous, and quantitative (Schultz et al. 2018; Tracy et al. 2020).

Theory of Coupled Seepage Analysis in Variably Saturated Soils

Transient flow under an elevating water level can be described using Laplace's equation as follows:

$$\frac{\partial}{\partial x} \left(k_x \frac{\partial \theta}{\partial x} \right) + \frac{\partial}{\partial y} \left(k_y \frac{\partial \theta}{\partial y} \right) = m_v \frac{\partial \theta}{\partial t} \quad (7)$$

where x = horizontal direction; y = vertical direction; k_x and k_y = hydraulic conductivities in the x - and y -directions; θ = total head; m_v = coefficient of soil volume compressibility; and t = time. The coupled governing equation for conservation of flow can be written as (Tracy et al. 2020)

$$\frac{\partial}{\partial x} \left(k_x \frac{\partial \theta}{\partial x} \right) + \frac{\partial}{\partial y} \left(k_y \frac{\partial \theta}{\partial y} \right) = \frac{\partial}{\partial t} \left(\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} \right) \quad (8)$$

where u and v = displacements in the x - and y -directions, respectively. The derivation of displacement with respect to the horizontal and vertical directions can be determined using the conservation of forces inside a finite element:

$$\begin{Bmatrix} \sigma_{xx} \\ \sigma_{yy} \\ \tau_{xy} \end{Bmatrix} + \gamma_w(\theta - y) \begin{Bmatrix} 1 \\ 1 \\ 0 \end{Bmatrix} = [C] \begin{Bmatrix} \frac{\partial u}{\partial x} \\ \frac{\partial v}{\partial y} \\ \frac{\partial v}{\partial x} + \frac{\partial u}{\partial y} \end{Bmatrix} \quad (9)$$

$$[C] = \frac{E}{(1 + \theta)(1 - 2\theta)} \begin{pmatrix} 1 - \mu & \mu & 0 \\ \mu & 1 - \mu & 0 \\ 0 & 0 & \frac{1 - 2\mu}{2} \end{pmatrix} \quad (10)$$

where σ_{xx} = normal stress in the x -direction; σ_{yy} = normal stress in the y -direction; τ_{xy} = shearing stress; E = Young's modulus; and μ = Poisson's ratio.

For unsaturated soils, the model proposed by Fredlund and Xing (1994) was used to represent the soil-water retention curve (SWRC) as follows:

$$\theta(\psi) = C(\psi) \frac{\theta_s}{[\ln(e + (\frac{\psi}{a})^b)]^c} \quad (11)$$

where $\theta(\psi)$ = volumetric water content at matric suction (ψ); θ_s = saturated volumetric water content; ψ = matric suction; a , b , and c = fitting parameters; and $C(\psi)$ is defined as

$$C(\psi) = 1 - \frac{\ln(1 + \frac{\psi}{C_r})}{\ln(1 + \frac{10^6}{C_r})} \quad (12)$$

where C_r = constant related to matric suction at the residual water content. For the hydraulic conductivity function (HCF), the Fredlund et al. (1994) model was used as

$$k(\psi) = \frac{\int_{\ln \psi}^{10^6} \frac{\theta(\varepsilon^z) - \theta(\psi)}{\varepsilon^z} \theta'(\varepsilon^z) d\psi}{\int_{\ln \psi}^{10^6} \frac{\theta(\varepsilon^z) - \theta_0}{\varepsilon^z} \theta'(\varepsilon^z) d\psi} k_s \quad (13)$$

where z = dummy variable of integration representing $\ln \psi$; ε_n = small positive number; θ' = derivative of Eq. (11) with respect to ψ ; and k_s = saturated hydraulic conductivity.

Model Geometry

Fig. 2 shows the cross section of the Elkhorn Levee numerically modeled to evaluate and compare the impacts of historical and projected future floods. The model consisted of a five-layer soil system. The levee's body is 3.7 m of silty sand (SM) over a deep foundation, consisting of a thin layer of sandy clay (CL) with low hydraulic

conductivity. Under the CL layer is a 2.1-m-thick layer of ML, and below that the soil is mostly silty sand (SM). The geometry was adopted and modified from that reported in Brizendine (1997) and Khalilzad et al. (2014).

Soil Properties and Random Variables

Three soil types (SM, ML, and CL) were used in the model, and for each soil type, a total of 11 random variables (including three sampled and eight derived random variables) and two deterministic properties were considered as input covering both the mechanical and hydraulic properties of soil layers under saturated and unsaturated conditions. Sampling from the probability distributions representing the uncertain mechanical and hydraulic properties of each soil type was performed to obtain data sets for the Monte Carlo simulation. Probability distributions were defined for (1) vertical saturated hydraulic conductivity, (2) anisotropy ratio with respect to hydraulic conductivity, (3) liquid limit, (4) plasticity index, (5) effective friction angle of coarse-grained soils, (6) porosity, and (7) percent fines. Three sampled variables out of the aforementioned seven variables were used directly as random variables into the seepage and slope stability analyses: vertical saturated hydraulic conductivity, effective friction angle of coarse-grained soils, and porosity. The sampled variables were assumed to be uncorrelated. Input values for the additional eight soil properties required to perform the seepage and slope stability simulations were derived from the aforementioned seven sampled random variables. Derived random variables include (1) horizontal saturated hydraulic conductivity, (2) saturated unit weight, (3) partially saturated unit weight, (4) undrained shear strength for foundation fine-grained soils, (5) SWRC parameter a , (6) SWRC parameter b , (7) SWRC parameter c , and (8) SWRC parameter C_r . Further details about these soil properties are provided in the following. It is noted that the soil properties and random variables are mostly adopted from Schultz et al. (2018) and Tracy et al. (2020).

Sampled Variables

- Vertical saturated hydraulic conductivity (k_v): The uncertainty in hydraulic conductivities is commonly shown using lognormal probability distribution (Baecher and Christian 2003). The parameters of a lognormal distribution of k_v for each soil class in the levee or foundation are reported in Table 2. The mean of the distribution was obtained by taking the midpoint between the log-transformed minimum and maximum. The standard deviation was obtained by assuming a coefficient of variation equal to 0.9, which produced extreme values that approximate these minimums and maximums.
- Anisotropy ratio (r): The anisotropy ratio, r , is the ratio of the vertical to the horizontal hydraulic conductivity ($r = k_v/k_h$). The variable is distributed lognormally. A mean of one was used for the sandy soils (SM), a mean of 0.5 was used for silty soils (ML), and a mean of 0.25 was used for clayey soils (CL). A coefficient of variation equal to 0.4 is reported for clay soils in USACE (1999). Silt and sand show less variability in r than clay soils. Thus, variation coefficients of 0.2 and 0.075 were

considered for silt and sand, respectively. In this study, the same values of the anisotropy ratio were used for foundation and embankment soils of the same USCS class.

- Liquid limit (LL) and plasticity index (PI): Correlated values of LL and PI were obtained by sampling each from uniform random fields with upper and lower bounds as indicated in the plasticity chart (Fig. 3). Combinations of values between the U-line and the A-line were then randomly selected. The correlated random samples of LL and PI are shown in Fig. 3.
- Effective friction angle for coarse-grained soils (ϕ'): The effective friction angle was used to calculate the long-term strength of soil. For the SM layer in the foundation, values of ϕ' were sampled from symmetrical triangular distributions with minimum and maximum values reported by Holtz et al. (2011). For silty sand, SM: min = 29°, max = 37°.
- Porosity (n): Ranges of porosity were obtained from Holtz et al. (2011) and are as follows for different soil types: SM: min = 0.36, max = 0.45; ML: min = 0.40, max = 0.50; CL: min = 0.40, max = 0.52. A symmetric triangular distribution was assumed for porosity.
- Percent fines (w): Percent fines is the fraction of material by weight that is less than 0.075 mm in diameter. For the soil layer classified as SM, a uniform distribution with a lower bound of 0.12 and an upper bound of 0.4999 was used. For the soil layers classified as ML and CL, a uniform distribution with a lower bound of 0.5 and an upper bound of 0.65 was used.

Derived Variables

- Horizontal saturated hydraulic conductivity (k_H): Values of K_H were derived by multiplying the vertical saturated hydraulic conductivity (K_V) by the anisotropy ratio (r). Deriving K_H from K_V ensured that the two values were correlated. Soils with higher values of K_H also tend to have higher values of K_V .
- Saturated and partially saturated unit weight (γ_{sat}, γ_p): The saturated unit weight, γ_{sat} , was calculated from void ratio $\gamma_{sat} = (G + S_r \cdot e) \cdot \gamma_w \cdot (1 + e)^{-1}$, where G is the specific gravity of soil, $G = 2.68$; γ_w is the unit weight of water, $\gamma_w = 9.81 \text{ kN/m}^3$; e is the void ratio where $e = n/(1 - n)$; and S_r is the degree of saturation. For saturated soils below the phreatic surface, $S_r = 1$. For partially saturated soils above the phreatic

Table 2. Minimum and maximum values for k_v (m/s)

USCS	Horizontal hydraulic conductivity, k_v (m/s)			
	Minimum	Maximum	Mean	Standard deviation
SM	5.00×10^{-8}	5.00×10^{-6}	6.37×10^{-7}	6.05×10^{-7}
ML	5.00×10^{-9}	5.00×10^{-7}	6.37×10^{-8}	6.05×10^{-8}
CL	5.00×10^{-10}	5.00×10^{-8}	6.37×10^{-9}	6.05×10^{-9}

Source: Data from Holtz et al. (2011).

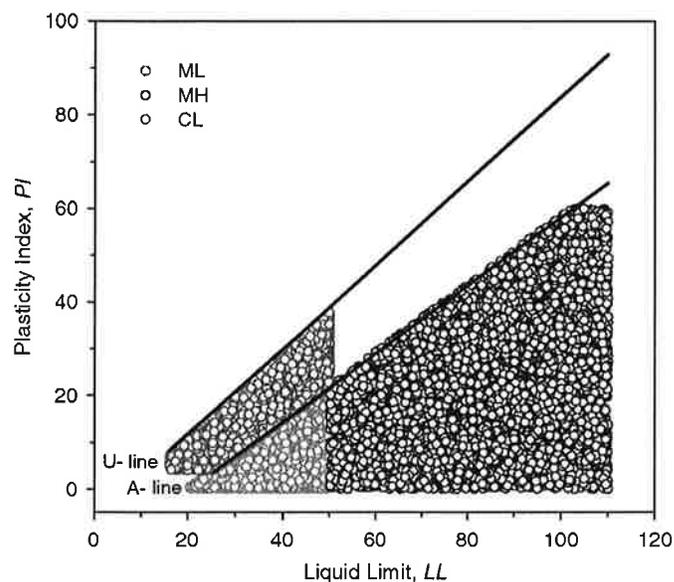


Fig. 3. Correlated random samples of LL and PI used in simulation. (Data from Schultz et al. 2018.)

surface, S_r was defined as a uniform random variable between 0.5 and 0.95.

- Undrained shear strength (S_u): For silts and clays in foundations, undrained shear strength S_u was defined as a function of the strength ratio (SR). SR is the ratio of the shear strength to the effective overburden pressure (σ'_v). Values of SR were obtained by sampling from asymmetrical triangular distributions in which its three parameters were calculated from PI using the correlations developed by Mayne (2012):

$$S_u = SR \cdot \sigma'_v \quad (14)$$

$$SR_{\min} = 0.05 + 0.0019PI \quad (15)$$

$$SR_{\max} = 0.35 + 0.0002PI \quad (16)$$

$$SR_{\text{mod}} = 0.198 + 0.001PI \quad (17)$$

where SR_{\min} , SR_{\max} , and SR_{mod} = minimum, maximum, and mode of the distribution.

- SWRC and HCF parameters (a , b , c , and C_r): The SWRC and HCF parameters were sampled from symmetrical triangular distributions. The parameters of the SWRC and HCF models were correlated with the wPI parameter as follows (Witczak et al. 2000):

$$a = 0.00364(wPI)^{3.35} + 4(wPI) + 11 \quad (18)$$

$$\frac{b}{c} = -2.313(wPI)^{0.14} + 5 \quad (19)$$

$$c = 0.0514(wPI)^{0.465} + 0.5 \quad (20)$$

$$\frac{C_r}{a} = 32.44e^{0.0186(wPI)} \quad (21)$$

$$wPI = \text{percent fines} \times PI \quad (22)$$

Deterministic Soil Properties

- Modulus of elasticity (E): The modulus of elasticity, E , was used as a constant value of 1.47×10^4 , 3.48×10^3 , and 8.62×10^2 kPa for SM, ML, and CL soils, respectively.
- Undrained shear strength (S_u) for ML in embankment: A constant value of 38.3 kPa (800 psf) was assigned to model the undrained strength of the ML layer under flood loading.

Boundary Conditions

The bottom boundary was constrained in both the vertical and horizontal directions. For the flow boundary conditions, the bottom boundary was set as impermeable. The total head was applied to the left boundary according to the specified elevation of the water as a function of time on the levee (hydrograph), no flow was applied to the right boundary of the embankment, and the total head equal to the ground elevation was applied on the landside or right boundary of the foundation.

Modeling Stages

The simulation for the historical and the projected flood levels consisted of two stages. It is noted that the landside and riverside ground elevations were different (as shown in Fig. 2). The first stage involved generation of a steady-state seepage flow throughout the levee domain as the initial hydraulic condition. In this stage, the simulation was started with an initial condition of total head

defined at the elevation of the landside ground surface throughout the levee. Total hydraulic heads of 18.3 and 17.0 m were then assigned to the riverside and landside, which represent the ground surface elevation at the riverside and landside, respectively. Seepage analysis was performed to achieve a steady state condition under the assigned boundary conditions. In the second stage (transient stage), the water level behind the levee was raised at a constant rate of 6 cm/hour until reaching the peak flood level for each scenario (shown in Table 1). Then, the flood peak was maintained for several days until a steady-state condition was reached. The flood modeling stage is consistent with the approach commonly used by operational agencies (e.g., USACE 2000) and other similar studies. For example, Khalilzad et al. (2014) employed the same approach for modeling the Elkhorn Levee.

Results and Discussion

This section presents and discusses results of the probabilistic seepage-slope stability modeling for the three failure modes examined (underseepage at toe, uplift at toe, and slope stability for the landside slope) using historical and future flood scenarios. For each mode, the probability of failure at each time was determined as the fraction of 6,000 Monte Carlo realizations that failed to satisfy the performance criteria for that mode of failure. Further, for each mode and at each specified time, factors of safety corresponding to 6,000 realizations were averaged to estimate the mean factor of safety. Lower and upper bounds for the probability of failure considering combined mode of failure were also calculated and presented. The primary emphasis was on the comparison between the results of the historical floods versus those from future floods. The probabilities of failure that are presented are probabilities of failure for particular scenarios. The presented results represent changes in conditional probabilities of failure (i.e., conditioned on the given scenarios). These are different than the probability of failure at different return periods. For instance, the probabilities of failure shown in the following sections for a recurrence interval of 50 years are not the probabilities of failure over a 50-year period. The latter would have to account for the frequency at which these scenarios occur.

Underseepage

Fig. 4 shows the mean factor of safety against underseepage at toe versus time using the historical and future flood scenarios for three

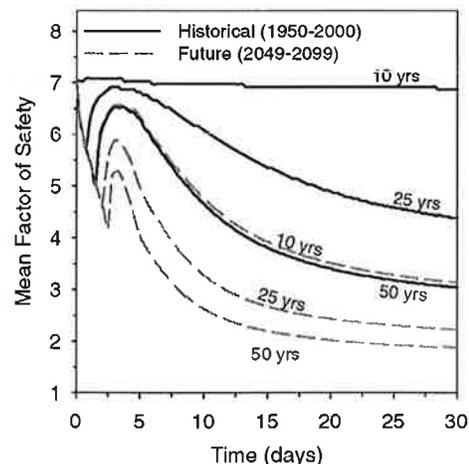


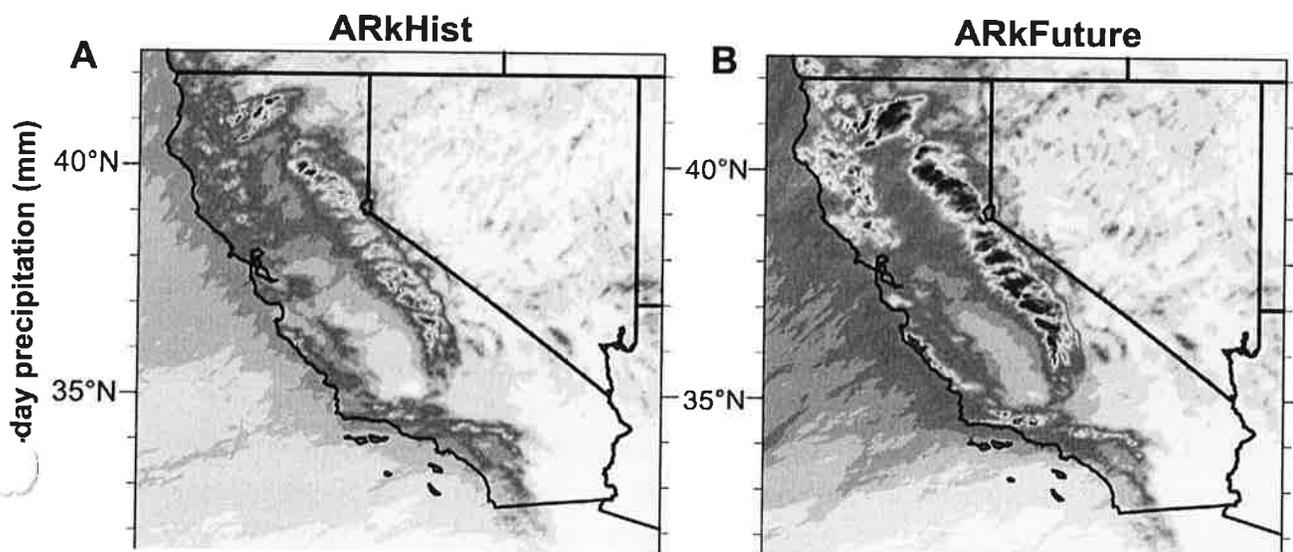
Fig. 4. Mean factor of safety for underseepage at the toe versus time using the historical and future 10-, 25-, and 50-year flood simulations.

ic) in ARkFuture relative to ARkHist. Visual inspection of movies S1 and S2 further confirm that both 30-day scenario storm sequences are characterized by the occurrence of multiple deep extratropical cyclones just west of or over California, which is consistent with recent results in (35), which found that AR-associated precipitation in the San Francisco Bay Area increased more for ARs directly associated with extratropical cyclones than those without.

We also find that composite atmospheric instability is relatively high during both ARkStorm scenarios. A 30-day composite convective available potential energy (CAPE) exhibits a broad region of >300 J/kg west of the northern California coast during ARkHist, with an even wider region of CAPE (>300 J/kg) (and locally >400 J/kg) in ARkFuture (fig. S5). The values might be unremarkable in a different geographic context, but in coastal California, ARs are typically associated with primarily stratiform or dynamically forced precipitation, and California ARs tend to be characterized by moist-neutral (versus conditional unstable) vertical profiles (36). Modest increases in atmospheric instability have been associated with outsized impacts during certain historical California storm events, increasing the risk of flash flooding/debris flows (37) and severe wind gusts (38) (fig. S6).

Cumulative and extreme precipitation

In both ARkHist and ARkFuture, 30-day cumulative precipitation is extremely high. In ARkHist, we find broad regions exceeding 500 mm of cumulative precipitation, with widespread areas exceeding 1000 mm in the Sierra Nevada (SN) and more isolated pockets exceeding 1000 mm in the Coast Ranges, Transverse Ranges, and far southern end of the Cascade Range (domain maximum of ~ 2150 mm; Fig. 2A). In ARkFuture, spatial patterns of event total precipitation are similar but are uniformly characterized by heavier accumulations, with broad areas in both northern and southern California exceeding 700 mm and widespread areas in the abovementioned mountain areas above 1400 mm (domain maximum of ~ 3200 mm; Fig. 2B). We note that these values are comparable to maximum precipitation informally reported during the GF1862, which exceeded 2500 mm in at least two locations on the SN western slope over a slightly longer (~ 40 -day) period (6). In general, cumulative precipitation in ARkFuture is between 35 and 60% higher than in ARkHist for northern and central California (although locally $>80\%$ higher), with lesser increases in far southern California (fig. S7, A and B). On a statewide average basis, 30-day precipitation is $\sim 45\%$ higher in ARkFuture.



As with Nino 3.4 SST anomalies, all eight such events are again associated with anomalously warm conditions in the tropical Pacific Ocean, but ELI values more clearly illustrate a wider range of ENSO spatial variability and dynamical intensity (ELI = 169.9°E, 171.6°E, 185.1°E, and 181.5°E for the top 4 historical events and ELI = 174.2°E, 181.0°E, 176.8°E, and 179.1°E for future events, respectively, using detrended SST).

Using the ELI categorizations defined in (29), this suggests that two of four events each in the historical and future simulations occur under “strong El Niño” conditions ($\text{ELI} \geq 179^\circ\text{E}$), and one of four historical and two of four future events occur under “moderate El Niño” conditions ($170^\circ\text{E} \leq \text{ELI} < 179^\circ\text{E}$), with the final historical event falling nominally under the “moderate” threshold. Collectively, seven of eight historical and future potential California megastorm events occur under moderate or strong El Niño conditions as defined by the ELI (eight of eight, if rounding to the nearest degree of longitude). These findings strongly suggest that there is a substantially elevated likelihood of month-long storm sequences capable of producing very large precipitation accumulations during moderate to strong El Niño conditions and that the conspicuous anomalous deepening of the Gulf of Alaska low present in most of these eight events (fig. S3) is plausibly linked to El Niño teleconnections [which would be consistent with (28)].

Much previous work has focused on the critical role AR storms (“ARs”) play in California hydroclimate—both as beneficial bolsterers of water supply and as the cause of hazardous floods (30–32). Composite analysis of 30-day averaged vertically integrated water vapor transport (IVT) and animations of IVT over the 30-day scenarios (movies S1 and S2) confirm that ARs are the primary storm mode during both ARkHist and ARkFuture (Fig. 1, C and D) scenarios, with a well-defined moisture transport axis extending northeastward from just north of the Hawaiian Islands to central California. This alignment is suggestive of 30-day mean storm trajectories capable of entraining large quantities of subtropical moisture (i.e., a “Pineapple Express”-type pattern), although with considerable upstream longitudinal extension of the IVT corridor westward of Hawaii (particularly in the future scenario; Fig. 1, C and D). This overall zonal pattern (but with localized meridional flow near California) is consistent with that recently associated with “AR families” occurring during El Niño conditions (33), which tend to be characterized by a strengthened subtropical Pacific jet stream and a persistently anomalous Gulf of Alaska cyclone that together favor long-duration periods of successive AR activity across California. While the general spatial structure of IVT is similar for both scenarios, ARkFuture exhibits mean 30-day composite IVT values that are ~25% higher than ARkHist.

Both severe storm sequences are associated with strong westerly (zonal) winds throughout nearly the entire atmospheric column (fig. S4), with a pronounced vertical maximum of ~60 m/s located around jet stream level (200 to 250 hPa) between 30°N and 35°N. Zonal winds are stronger in ARkFuture, especially in the upper troposphere (by >10 m/s above ~400 hPa). Analysis of 500-hPa geopotential height fields (Fig. 1, E and F) indicates that both events are associated with a broad region of negative mid-tropospheric height anomalies over the North Pacific to the west of California, although the negative height anomaly is more localized to the northeastern Pacific in ARkFuture. This suggests that both ARkStorm scenarios are associated with a robust Pacific jet, which is dynamically consistent with the eastward extension of the wintertime Pacific jet associated with both El Niño (Fig. 1, A and B) [e.g., (28)] and climate change [e.g., (34)], although the 30-day mean low-level (850-hPa) flow pattern exhibits a slightly more zonal pattern (with less of a meridional component over the northeastern Pacific).

vances in atmospheric modeling by coupling a high-resolution weather model to a climate model large ensemble, we assess the meteorological characteristics of extreme storm sequences (henceforth referred to as “megastorm” events) as well as the subsequent extreme runoff and adverse hydrologic outcomes such as meteorological conditions (henceforth, “megaflood” events) would produce under both present-day and warmer future climate regimes. This work builds upon previous research by explicitly considering long-duration (30-day) storm sequences (rather than single-storm events) most relevant to flood hazard management and disaster preparedness, characterizing large-scale ocean and atmosphere conditions associated with such severe storm sequences, and assessing the likelihood of these events over a wide range of potential levels of global warming. We find that climate change has already increased the risk of a GF1862-like megaflood scenario in California, but that future climate warming will likely bring about even sharper risk increases.

RESULTS

Large-scale and regional climate conditions associated with megaflood scenarios

We design two separate megastorm scenarios capable of causing a megaflood in California—one drawn from the recent historical climate (circa 1996–2005; henceforth “ARkHist”) and another from a hypothetical warmer future climate (2071–2080 in the “high warming” RCP8.5 emissions scenario; henceforth “ARkFuture”). Each scenario comprises a multiweek sequence of consecutive severe winter storm events similar to what is reported to have occurred during the peak of the GF1862 event. Specific events are selected by ranking the 30-day cumulative precipitation on a California statewide basis simulated by the 40-member Community Earth System Model Large Ensemble (CESM1-LENS) and subsequently choosing from among the top 3 ranked events in each climate era to dynamically downscale using a high-resolution weather model [the Weather Research and Forecasting (WRF) model v4.3]. Further details can be found in Materials and Methods.

We find that both ARkHist and ARkFuture events occur during simulated warm-phase ENSO (El Niño) years, although the El Niño event that co-occurs with ARkFuture is much stronger [Niño 3.4 sea surface temperature (SST) anomaly = +1.48 K] than that with ARkHist (+0.56 K). Both events have maximum SST anomalies located in the tropical central Pacific ([Fig. 1, A and B](#)), which would be consistent with so-called “central Pacific” or “Modoki” El Niño ([27](#)). Warm (positive) SST anomalies are also present in the western Bering Sea and Sea of Okhotsk, as well as along the immediate California coast, in both cases. In addition, a broad region of negative sea level pressure (SLP) anomalies is centered over the Gulf of Alaska and adjacent portions of western North America—consistent with traditional El Niño teleconnections—although the zone of negative SLP anomalies extends farther westward across the North Pacific in ARkHist.

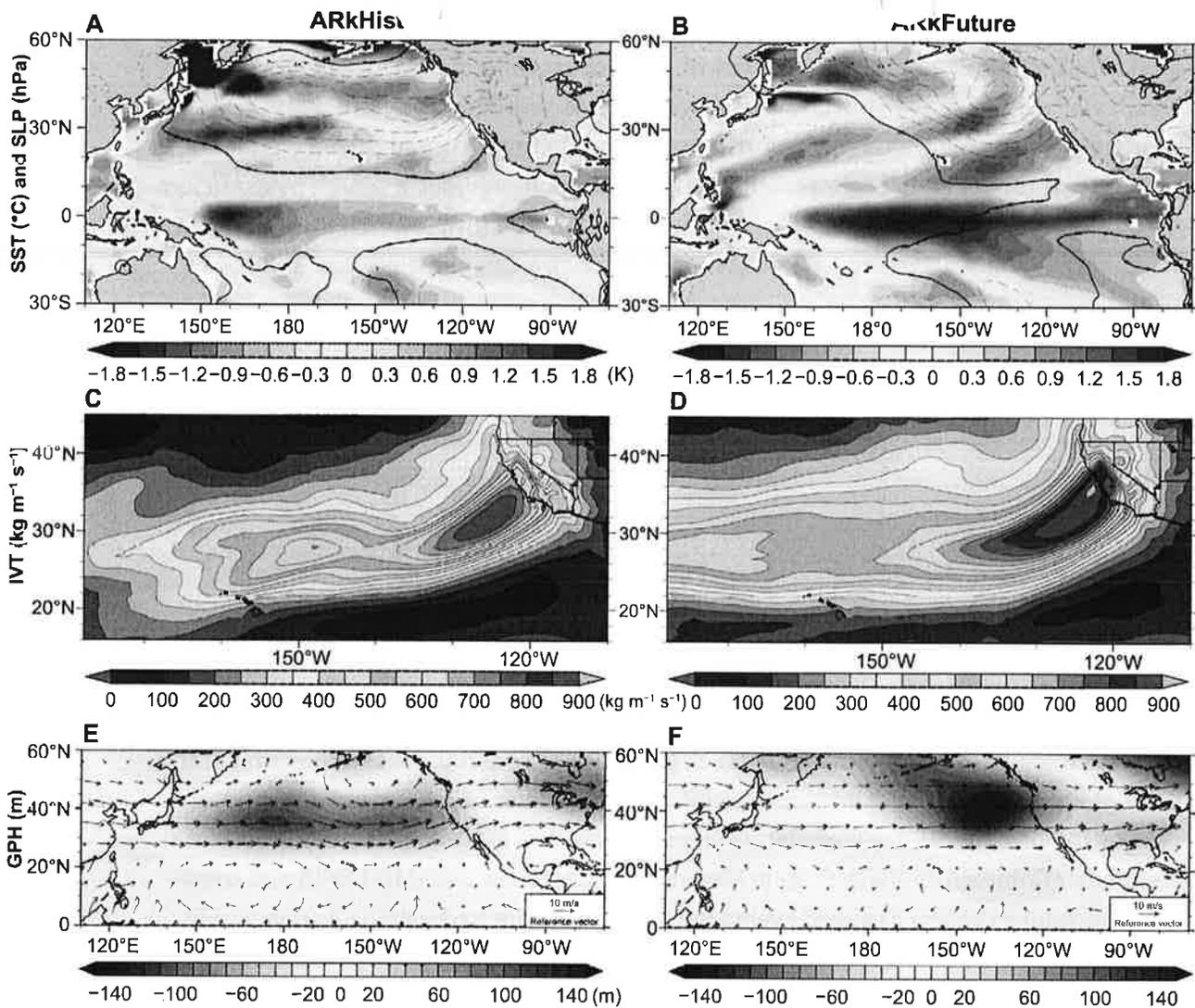


Fig. 1. Large-scale conditions during California megastorm scenarios.

(A and B) Mean SST anomalies (color contours, K) and mean SLP (hPa) anomalies (dashed/solid contours) during ARkHist (A) and ARkFuture (B). SST and SLP are detrended before anomaly calculation using monthly data from each corresponding CES-M1-LENS member (baseline period 1980 to 2005 for ARkHist; 2060–2090 for ARkFuture); solid (dashed) SLP contours denote positive (negative) anomalies in increments of 2 hPa. (C and D) Composite instantaneous vertically IVT ($\text{kg m}^{-1} \text{s}^{-1}$) for all hours in which California mean precipitation exceeds 1.5 mm ARkHist (C) and ARkFuture (D) using WRF 81-km simulations. Mean 30-day 500-hPa geopotential height (GPH, detrended) anomalies (color contours, m) and mean absolute 850-hPa wind vectors (m/s) (black arrows) during ARkHist (E) and ARkFuture (F).

We acknowledge, however, that these large-scale patterns and associations with ENSO are drawn from only two individual scenario instances, and we cannot determine from this analysis alone whether these relationships are robust across a wider range of potential megastorm events. To offer a more systematic assessment, we consider the top 4 ranked 30-day California precipitation events in the CES-M1-LENS historical and warmer future snapshot periods (fig. S1). We find that all eight such events are associated with anomalously warm conditions in the tropical Pacific Ocean, and Niño 3.4 SST anomalies are uniformly positive (+0.33, +0.56, +2.28, and +1.56 K for the top 4 historical events and +1.17, +1.95, +1.48, and +1.39 K for future events, respectively, using detrended SST). However, it has recently been demonstrated that dynamic ENSO indices can better capture the spatial diversity of ENSO events and their subsequent western U.S. hydroclimate teleconnections (28). We thus calculate the ENSO Longitude Index (ELI)—an ENSO metric that tracks the average longitudinal position of ENSO-associated deep convection and accounts for the nonlinear response of convective activity to SST (29).

was likely the most intense in the (1) millennium (1, 2)—resulting in widespread agricultural, ecological, and wildfire-related impacts (3, 4) and ongoing drought-focused public policy conversations. Yet, historical and paleoclimate evidence shows that California is also a region subject to episodic pluvials that substantially exceed any in the meteorological instrumental era (5)—potentially leading to underestimation of the risks associated with extreme (but infrequent) floods. Observed extreme precipitation and severe subregional flood events during the 20th century—including those in 1969, 1986, and 1997—hint at this latent potential, but despite their substantial societal impacts, none have rivaled (from a geophysical perspective) the benchmark “Great Flood of 1861–1862” (henceforth, GF1862). This event, which was characterized by weeks-long sequences of winter storms, produced widespread catastrophic flooding across virtually all of California’s lowlands—transforming the interior Sacramento and San Joaquin valleys into a temporary but vast inland sea nearly 300 miles in length (6) and inundating much of the now densely populated coastal plain in present-day Los Angeles and Orange counties (7). Recent estimates suggest that floods equal to or greater in magnitude to those in 1862 occur five to seven times per millennium [i.e., a 1.0 to 0.5% annual likelihood or 100- to 200-year recurrence interval (RI)] (5, 8).

The extraordinary impacts resulting from GF1862 provided motivation for a 2010 California statewide disaster scenario—known as “ARkStorm” (ARkStorm 1.0)—led by the U.S. Geological Survey in conjunction with a large, interdisciplinary team (9). The meteorological scenario underpinning the ARkStorm 1.0 exercise involved the synthetic concatenation of two nonconsecutive extreme storm events from the 20th century (10). Subsequent analysis suggested that such an event would likely produce widespread, catastrophic flooding and subsequently lead to the displacement of millions of people, the long-term closure of critical transportation corridors (9), and ultimately to nearly \$1 trillion in overall economic losses (2022 dollars) (11).

Meanwhile, a growing body of research suggests that climate change is likely increasing the risk of extreme precipitation events along the Pacific coast of North America (12, 13), including California (14–16), and of subsequent severe flood events (17, 18). The primary physical mechanism responsible for this projected regional intensification of extreme precipitation is an increase in the strength of cool-season atmospheric river (AR) events (19–21). Previous analyses have suggested that the thermodynamically driven increase in atmospheric water vapor with warming is directly responsible for most of this projected AR intensification [e.g., (16)], with the remainder contributed by shifts in regional atmospheric circulation. There is also evidence that increased radiative forcing may result in an eastward shifted expression of atmospheric circulation anomalies associated with both the Madden-Julian Oscillation (22) and the El Niño–Southern Oscillation (ENSO)–forced component of the Pacific North American pattern (23)—both of which would increase the subseasonal variability of cool season precipitation over and near California. Compounding the increase in extreme precipitation associated with AR events are warming temperatures themselves (24)—which raise the mean elevation of snow accumulation in mountainous areas (25), increase instantaneous runoff rates as rain falls at the expense of snow (18), and raise the risk of “rain on snow” events (26). Collectively, these previous research findings motivate the question of whether climate change may substantially affect the odds of “low probability but high consequence” flood events.

Here, we describe the overall design and implementation of, as well as results from, “ARkStorm 2.0”—a new severe storm and flood scenario reimagined for the climate change era. Leveraging recent ad-

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Climate change is increasing the risk of a California megaflood

XINGYING HUANG AND DANIEL L. SWAIN [Authors Info & Affiliations](#)

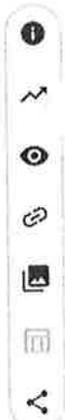
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Abstract

Despite the recent prevalence of severe drought, California faces a broadly underappreciated risk of severe floods. Here, we investigate the physical characteristics of “plausible worst case scenario” extreme storm sequences capable of giving rise to “megaflood” conditions using a combination of climate model data and high-resolution weather modeling. Using the data from the Community Earth System Model Large Ensemble, we find that climate change has already doubled the likelihood of an event capable of producing catastrophic flooding, but larger future increases are likely due to continued warming. We further find that runoff in the future extreme storm scenario is 200 to 400% greater than historical values in the Sierra Nevada because of increased precipitation rates and decreased snow fraction. These findings have direct implications for flood and emergency management, as well as broader implications for hazard mitigation and climate adaptation activities.



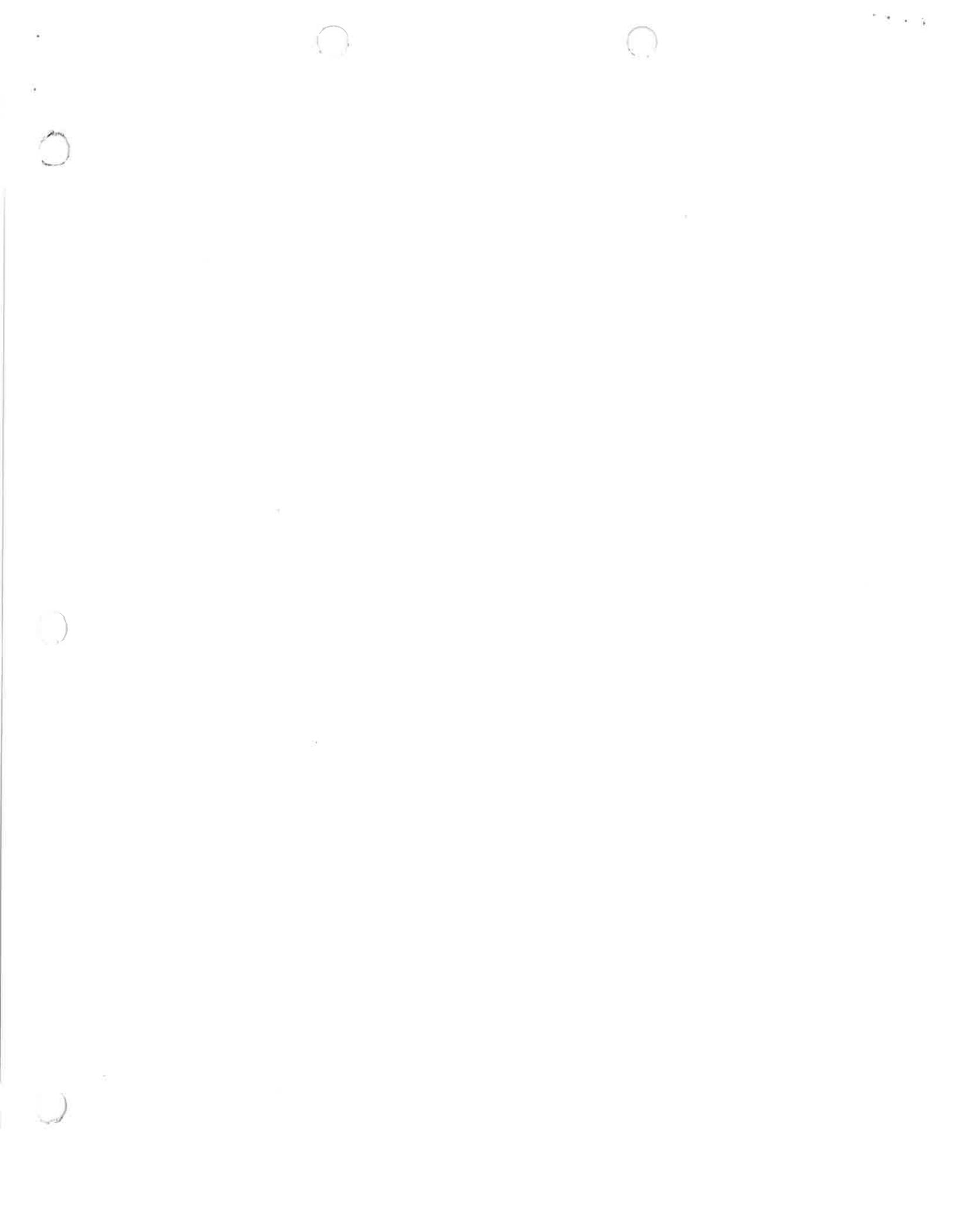
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INTRODUCTION

California is a region more accustomed to water scarcity than overabundance in the modern era. Between 2012 and 2021, California experienced two historically severe droughts—at least one of which



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limited in situ data (such as geometry and soil type) and can be broadly applicable to the nation's portfolio of levees while accounting for the uncertainty of soil parameters.

The focus in this paper was presenting a methodological framework to integrate climate model simulations for analyzing the integrity of infrastructure systems. For site-specific engineering applications, depending on the location and driving forces, different types of inputs and design variables may be required. Further, to account for intermodel variability and uncertainty in model simulations and future scenarios, we recommend using multiple climate model simulations and representative concentration pathways. The approach would be very similar to this study but would involve running more simulations using different climate models and/or future scenarios. Given that our goal here was to introduce a methodological framework, we did not use a wide range of scenarios, so we cannot claim that this is a comprehensive local-scale future flood risk analysis.

Data Availability Statement

Some or all data, models, or code generated or used during the study are available from the corresponding author by request. These data and models include the model for finite-element simulations and the code used for ProNEVA.

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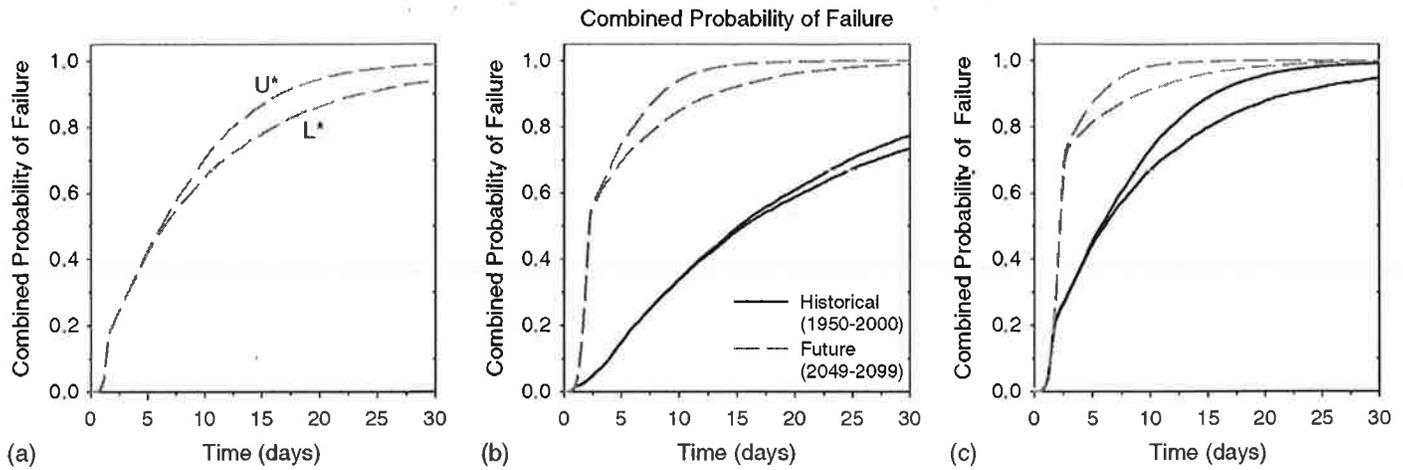


Fig. 10. Upper and lower bounds for combined probability of failure versus time using the historical and future flood scenarios for different recurrence intervals: (a) 10 years; (b) 25 years; and (c) 50 years.

Table 3. Relative decrease in mean factor of safety and relative increase in probability of failure for different modes of failure and recurrence intervals using future compared to historical flood data

Performance metric	Recurrence interval (years)	Relative change in results using future versus past floods				
		Underseepage	Uplift	Slope stability	Combined—lower bound	Combined—upper bound
Decrease in mean factor of safety (%)	10	54.2	16.9	17.3	—	—
	25	49.3	17.0	18.2	—	—
	50	38.1	13.3	14.8	—	—
Increase in probability of failure (%)	10	≥100	≥100	≥100	≥100	≥100
	25	100	34.6	≥100	34.6	29.2
	50	100	5.2	27.1	5.2	0.8

largest change for the future flood scenarios. Further, the impact of using future flooding is more pronounced for shorter recurrence intervals (e.g., 10-year). This can be from the significant increase in projected future flood levels for 10-year events (shown in Table 1). For the 10-year events, because the historical probabilities of failure were very low, the dominator in the relative difference was very small, exaggerating relative differences. For these cases, a relative difference of $\gg 100\%$ was reported in Table 3. For the 25- and 50-year events, the probability of failure increased as much as 100% for the cases examined.

This study presented a systematic framework for translating large-scale climate information down to local-scale engineering applications, an aspect that has been indemnified as a critical gap in the state of the art and practice by the Fourth National Climate Assessment model (Reidmiller et al. 2017). This framework allows engineers and other stakeholders to perform levee risk analysis while accounting for possible effects of climate change. While the impact can be significant in one region/levee system, it might be insignificant in another area/levee system. The approach introduced in this study can be applied to a wide array of levee systems to quantify the impact of climate change on the integrity and reliability of levees.

Conclusions

The warming climate and its consequences cause changes in severity, frequency, and duration of extreme precipitation and flooding, which can significantly affect the integrity and performance of levees. This study incorporated a set of historical and projected

flood levels into a fully coupled finite-element seepage–limit equilibrium slope stability model to numerically evaluate the fragility of the Elkhorn Levee in Sacramento, California, against multiple modes of failures including slope stability, underseepage, and uplift. The projected design floods were obtained using a nonstationary framework and climate model simulations. The results obtained from historical (baseline) and future flood simulations are evaluated against each other to quantify climate change impact on the levee integrity.

The results showed that future flood events could significantly increase the levee's probability of failure against individual and combined modes of underseepage, uplift and slope stability. For all cases, an increase in the flood level of all recurrence intervals significantly impacts the overall stability in the future relative to the past. For the cases examined, the results showed up to 54% reduction in safety factor and over 100% increase in the probability of failure when considering the future versus historical flood scenarios. Any changes in the statistics of extreme events due to climate change will directly impact the overall stability of levees. The proposed framework in this study can be adopted as a basis for performing risk analysis of geotechnical structures under changes in climatic extreme events. Integrating concepts from geotechnical engineering, hydrology, and climate science, this study demonstrated how a multidisciplinary approach can be employed to quantify site-specific impacts of climate change on earthen infrastructure [i.e., translating large-scale climate information down to local-scale applications—this is identified as one of the current gaps in the Fourth National Climate Assessment model (USGCRP 2018)]. The probabilistic methodology presented in this study requires very

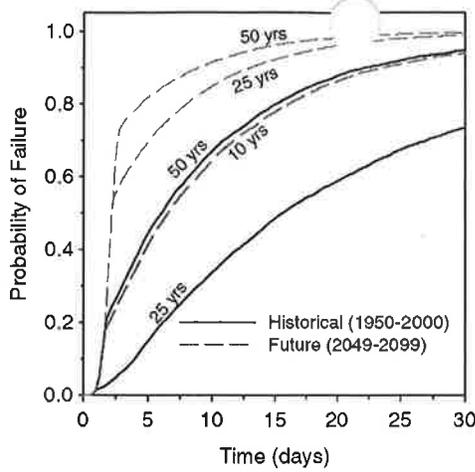


Fig. 7. Probability of failure for uplift at the toe versus time using the historical and future 10-, 25-, and 50-year flood simulations.

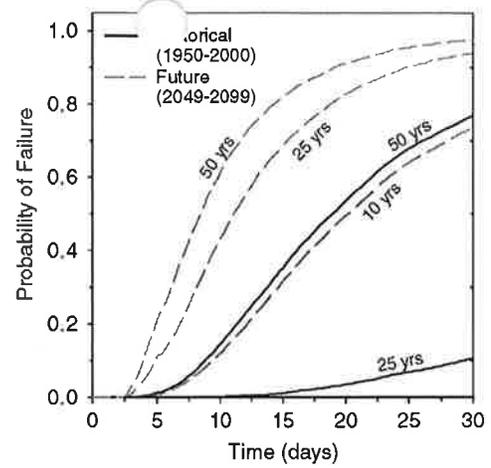


Fig. 9. Probability of failure for slope stability versus time using the historical and future 10-, 25-, and 50-year flood simulations.

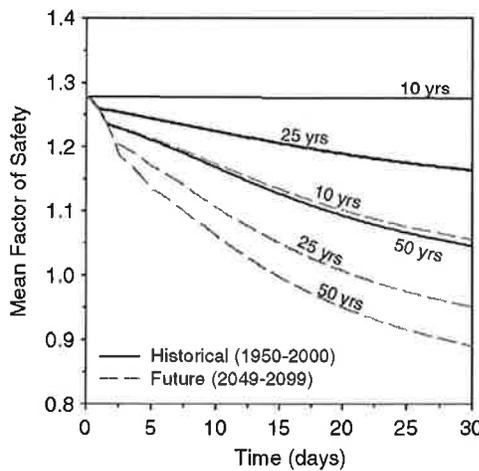


Fig. 8. Mean factor of safety for slope stability versus time using the historical and future 10-, 25-, and 50-year flood simulations.

floods, respectively, for the future flooding scenario. Overall, the levee showed very high probabilities of failure against uplift for almost all cases, except the 10-year historical flood. For the 10-year flooding, using the future data led to a drastic increase in the probability of failure (from zero to 0.94), which is due to the significant increase (2.13 m) in the flood level obtained for these two cases (Table 1).

Slope Stability

Fig. 8 provides a comparison between the mean factors of safety for slope stability of the landside slope versus time for different recurrence intervals using historical versus future floods. The mean factor of safety was 1.28 initially, and then decreased with time. Under the historical flooding scenario, it reached to 1.28, 1.16, and 1.05 after 30 days for 10-, 25-, and 50-year floods. For the same cases but using the future flood data, the mean factor of safety dropped to 1.06, 0.95, and 0.89 for 10-, 25-, and 50-year floods, respectively. The landside slope initially exhibited a marginal stability, which was further degraded by the introduction of the flood, bringing the mean factor of safety even below the limit state. Longer duration and higher flood levels increased the pore-water pressure within

the level embankment, which led to a reduction in the soil's shear strength, degrading the stability of the levee. Incorporating the future climate (i.e., higher flood stage) rather than relying on the historical dataset resulted in a further decrease in the factor of safety against slope stability.

Fig. 9 shows the probability of failure for slope stability. Consistent with the tendencies discussed for Fig. 8, the probability of failure increased with time and reached very high values in most cases (e.g., 0.94 and 0.98 for the 25- and 50-year future floods). The probability of failure for the 10-year historical flood exhibited an almost constant value over time, because the water level did not increase considerably with time for this case. When the projected future flood was applied, the probability of failure was significantly higher compared to those attained using the historical floods.

Combined Mode of Failure

Fig. 10 shows the probability of failure in combined failure modes for various flood water levels using historical and future flood events considering different recurrence intervals. The upper and lower bounds for the combined probability of failure were determined by employing the individual probabilities of failure along with Eq. (6). The combined probability of failure provides an effective measure to properly assess overall levee performance. For all cases, the results from the lower and upper bounds were close, leading to a narrow band. Considering the combined mode of failure, the probability of failure quickly approached to one for 25- and 50-year future floods. Also, the probability of failure significantly increased toward higher recurrence intervals with high water level.

Relative Changes in Results for Past versus Future Flood Scenarios

Table 3 summarizes the relative decreases in the mean factor of safety and the relative increases in the probability of failure for different modes of failure and recurrence intervals using the future compared to the historical flood data. In each case, the relative change percentage was calculated as (future-historical)/historical. The future floods significantly decrease the mean factor of safety and increase the probability of failure for all modes and recurrence intervals. The highest relative reduction in the mean factor of safety was found to be 54.2% for underseepage for the 10-year flood scenario. Among different modes of failure, underseepage had the

recurrence intervals of 10, 25, and 50 years. For all recurrence intervals and climate scenarios, the mean factor of safety decreased as the water level approached the flood peak and continued to further decrease even after the water level was maintained at the peak flood, reaching an almost plateau toward the end of simulations.

These curves in Fig. 4 illustrate the buildup of excess pore water pressure and release in soils with relatively low hydraulic conductivity. Higher water levels increase total head due to the higher hydraulic boundary conditions. In the coupled analysis, the forces were also considered from the increase of water load on the embankment. Because the soil particles and water were considered incompressible, this extra load was first seen by "excess" pore-water pressure (those that were above what would be realized by hydraulic boundary conditions only in an uncoupled computation). So, in the 50-year future curve, a strong decrease in the mean factor of safety was seen until around 2.5 days. Beyond this point, the mean factor of safety reached a plateau. When given a chance, the built-up excess pore-water pressure was dissipated, and that is what is shown in the results by the mean factor of safety going up as the total head went down during this process. However, because the water on the levee stayed constant at its highest level, the mean factor of safety started falling again and eventually reached a steady-state value.

The 50-year current hydrograph reached its maximum height at around 1.6 days, so the downturn in mean factor of safety for underseepage occurred at that time but did not get nearly as low as with the larger 50-year future simulated event. Therefore, we see that the stronger the rise of the water level for a given event, the more profound the coupled effect is. All results showed this dip and rebound, but this behavior was more pronounced in underseepage results than uplift or slope stability results. This is because the exit gradient represents a type of derivative ($\Delta\phi/\Delta y$) at the toe, whereas uplift and slope stability just involve parameter values. Derivatives can magnify changes. Finally, in an uncoupled analysis, parameter values do not experience this dip and rebound effect but simply increase monotonically, and with enough time will achieve steady state.

This explains why the mean factor of safety against underseepage for the future flood was much less than those for the historical flood in all recurrence intervals. In all cases, the mean factor of safety against underseepage was 7.03 in the beginning (initial steady-state condition). For the 50-year flood, the mean factor of safety decreased to 3.04 and 1.88 after 30 days by applying the historical and future floods, respectively. For the 10-year flood, applying the historical flood data led to a mean factor of safety of 6.87 against underseepage

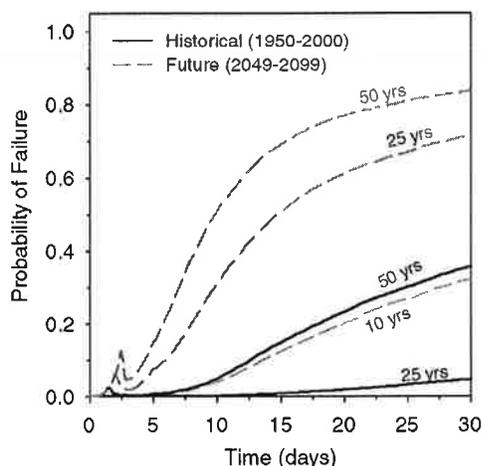


Fig. 5. Probability of failure for underseepage at the toe versus time using the historical and future 10-, 25-, and 50-year flood simulations.

after 30 days, whereas a mean factor of safety of 3.15 was attained for the same case by imposing the future flood data.

A similar behavior was seen when studying this mode of failure (Fig. 5). The probability of failure against underseepage was almost zero in the initial steady-state condition. When using the historical flood simulations, the probability of failure due to underseepage was zero, 0.05, and 0.36 at the end of modeling for 10-, 25-, and 50-year floods, respectively. Employing the future floods significantly increased the probability of failure due to underseepage, resulting in 0.32, 0.71, and 0.84 probability of failure against underseepage for 10-, 25-, and 50-year floods, respectively. This observation signifies the importance of considering the climate change for levee risk analysis under flooding. It is also important to note the dip and rebound that occurred in these results, with the 50-year future being the most dramatic and occurring again at 2.5 days (when the hydrograph stopped increasing and the excess pore-water pressure began to dissipate).

Uplift

Fig. 6 depicts the mean factor of safety against uplift at the toe versus time for historical and future flood scenarios at different recurrence intervals. The factor of safety against uplift was 1.61 in the beginning and continuously decreased for all cases until reaching an almost steady state toward the end of simulations. Like the underseepage results, employing the future floods led to significantly lower factors of safety against uplift compared to the historical flood scenario. The mean factor of safety against uplift was 1.60, 1.46, and 1.32 after 30 days by applying 10-, 25-, and 50-year historical flood data, respectively. It is noted that the mean factor of safety for 10-year historical flood data remained almost unchanged, which is due to the fact that the flood level for this scenario (Table 1) raised only few centimeters above the riverside ground surface (Fig. 2). For the same cases but using the future floods, the mean factor of safety against uplift was found to be 1.33, 1.21, and 1.15 after 30 days for 10-, 25-, and 50-year flood data.

Fig. 7 illustrates the probability of failure against uplift for different historical and projected flooding. The trends are consistent with those in Fig. 6. The probability of failure against uplift was zero in the initial condition. With the historical flood data, the probability of failure due to uplift was zero, 0.73, and 0.95 at the end of simulations for 10-, 25-, and 50-year floods, respectively. These values increased to 0.94, 0.99, and 1.00 for 10-, 25-, and 50-year

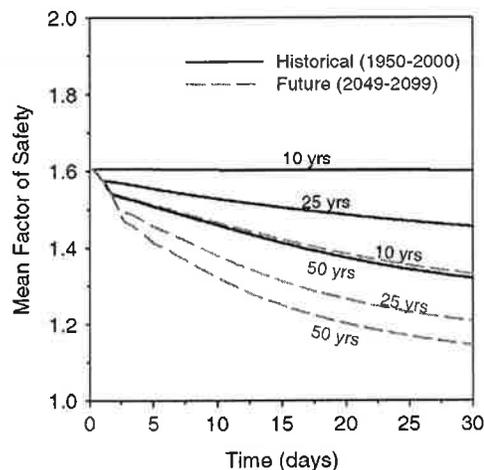
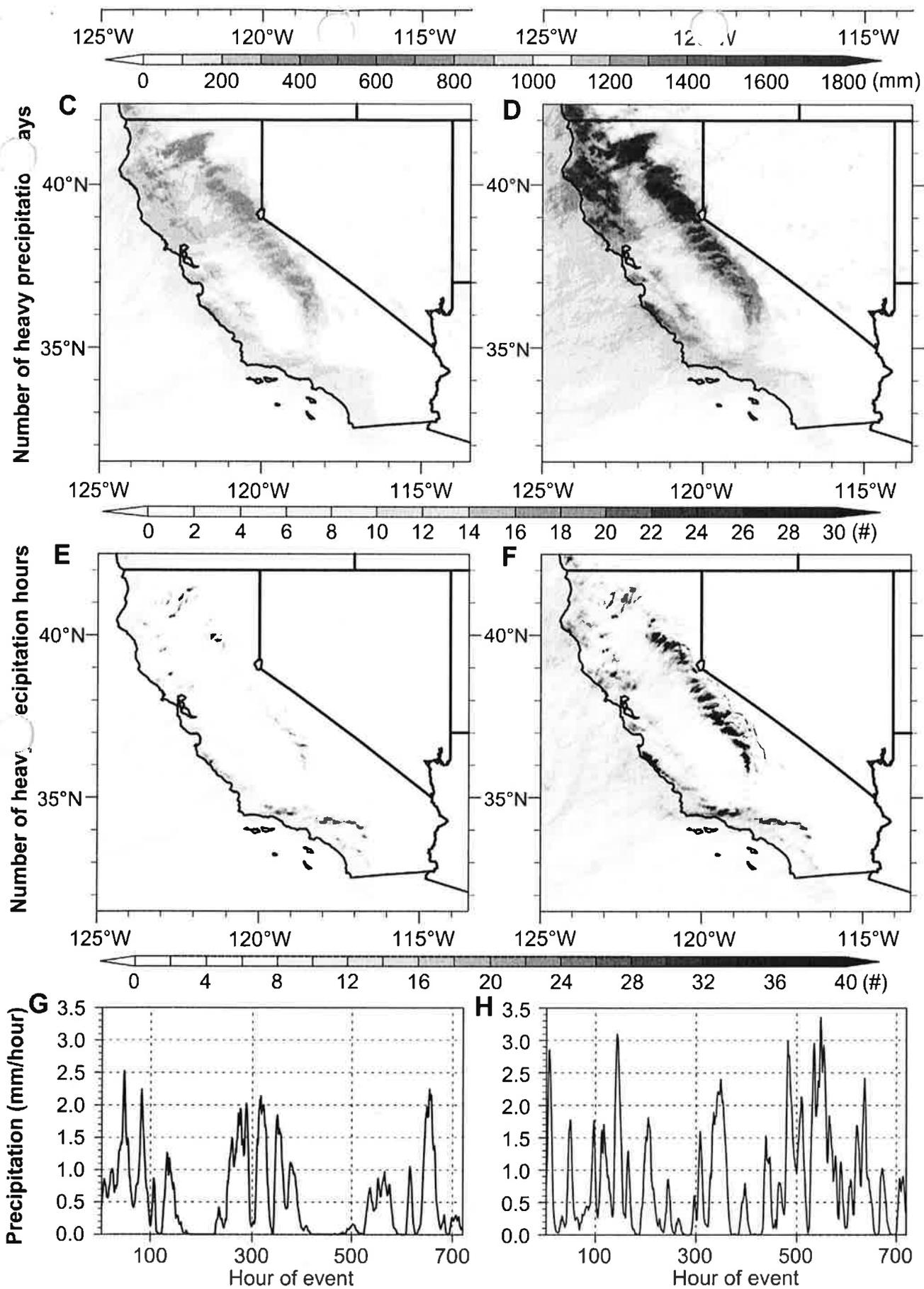


Fig. 6. Mean factor of safety for uplift at the toe versus time using the historical and future 10-, 25-, and 50-year flood simulations.



2. Precipitation associated with California megastorm scenarios.

(A and B) Cumulative 30-day precipitation (mm) during ARKHist (A) and ARKFutur (B). (C and D) Cumulative number of heavy precipitation days (days with precipitation > 20 mm/day) during ARKHist (C) and ARKFutur (D). (E and F) Cumulative number of heavy precipitation hours (hours with precipitation > 10 mm/hour) during ARKHist (E) and ARKFutur (F). (G and H) Time series depicting hourly precipitation (mm/hour) on a cumulative California statewide basis during ARKHist (G) and ARKFutur (H).

Although absolute increases in cumulative precipitation are highest in mountainous areas (fig. S7A), relative increases in event total precipitation are greatest in areas that are not prone to orographic enhancement of precipitation during prevailing southwesterly winds (fig. S7B). Thus, some of the largest relative increases in precipitation (locally >80%) instead occur in regions that are less historically accustomed to receiving extreme precipitation during these events, such as inland valleys and otherwise wind-shadowed areas, which is consistent with earlier work (16).

Both ARkStorm scenarios are also notable for their very high precipitation intensities. We quantify this on several time scales, focusing on the frequency (over the 30-day scenario periods) with which precipitation intensity exceeds fixed daily and hourly thresholds [the number of days with precipitation > 20 mm/day and the number of hours with precipitation > 10 mm/hour, henceforth “heavy precipitation days” (HPDs) and “heavy precipitation hours” (HPHs)]. In ARkHist, we find that nearly all coastal areas experience at least 8 (of 30) days with precipitation exceeding 20 mm, and most mountain areas exceed 14 such days (except the Transverse Ranges in southern California, Fig. 2C). In ARkFuture, we find a sharp increase in the number of HPDs, especially in northern and central California, where most coastal areas exceed 16 (of 30) HPDs and most mountain areas exceed 20 such days (Fig. 2D and fig. S7, C and D). In some small pockets in the northern SN and far southern Cascades, all 30 days of the ARkFuture scenario are HPDs. HPD increases are substantially smaller in magnitude across southern California (mostly on the order of one to five additional days) but still nearly ubiquitous (fig. S7C).

Because of their particular relevance in the context of flash flood and debris flow risk (39), we specifically consider the occurrence of short-duration precipitation extremes in both ARkStorm scenarios. We find that the highest number of such hours occur in orographically favored areas, with the highest frequency of occurrence in the southern California Transverse Ranges and the Feather River watershed in the northern SN during ARkHist (Fig. 2, E and F). In ARkFuture, we report large and widespread increase in the occurrence of HPHs across essentially the entire domain. The largest increases [+25 to 40 cumulative hours (fig. S7, E and F)] occur broadly across the SN and (locally) in Santa Lucia Mountains—shifting the domain-wide maximum in HPH from southern to northern California. We find large relative increases (~200 to 300%) in the frequency of HPH and a large increase in the spatial extent of affected regions in ARkFuture. On a statewide average basis, we find that the frequency of HPH is ~220% higher in ARkFuture versus ARkHist (Fig. 2, G and H). Oakley *et al.* (40) conducted a literature review on published hourly rainfall rates in California and/or similar Mediterranean climate regions thought to be sufficient to trigger shallow landslides and debris flows in susceptible terrain, noting a range (5 to 20 mm/hour) that encompasses our HPH threshold (10 mm/hour) in the present study. These findings, therefore, likely have large implications from a flash flood and debris flow risk perspective.

California-wide average cumulative precipitation during the 30-day periods encompassing both extreme storm sequence scenarios represents a considerable fraction of the total annual [October–September water year (WY)] precipitation occurring during both ARkHist (~447 mm or 46% of the WY total) and ARkFuture (~586 mm, of 40% of the WY total). Compared to the climatological mean WY precipitation across all 40 ensemble members during the baseline periods (1996–2005 and 2071–2080, respectively); however, these events represent an even larger fraction of average annual precipitation—60% of WY precipitation in ARkHist and 71% of WY precipitation in ARkFuture. This also means that

both the ARkHist and ARkFuture occur during anomalously wet WYs overall (70% and 77% wetter than the contemporaneous averages in ARkHist and ARkFuture, respectively). This would be dynamically consistent, from an ENSO teleconnection perspective, with the strong relationship between moderate to strong El Niño events (as characterized by the ELI) and anomalously wet cool-season conditions in California (29). It also has significant implications from a potential flood hazard perspective, as soil conditions are likely to be more saturated than average during anomalously wet WYs, likely amplifying runoff and further elevating the risk of flooding.

To systematically contextualize the precipitation-related results arising from these two specific down-scaled extreme storm scenarios drawn from CESM1-LENS relative to all top-ranked 30-day precipitation events in multiple large ensembles—including the CanESM2, GFDL-CM3, and CSIRO-Mk3.6 ensembles [as described in (41)]. We conducted an intercomparison of these events during the historical and future study periods. We found that of the top 4 ranked megastorm events (as quantified by California-wide cumulative 30-day precipitation), all 16 events across the four single-model large ensembles have larger cumulative precipitation in the warmer future scenario versus their counterparts drawn from cooler historical climate snapshot period (fig. S1). We further show that hourly precipitation maxima are also higher in future versus historical megastorm events in all four large ensembles (fig. S2).

We also note that there are substantial differences across the large ensembles regarding the absolute magnitude of the 30-day precipitation associated with the top four ranked storm sequences, with CESM1-LENS exhibiting the largest precipitation accumulations (fig. S1). However, a direct comparison between these absolute precipitation values is not possible in this context because of the widely differing number of ensemble members and potential and biases in the representation of extreme precipitation in specific models. Nevertheless, we emphasize that the overall consistency of the response of both 30-day cumulative and hourly precipitation in the warmer future versus cooler historical megastorms, in relative terms within each respective large ensemble, suggests that many of the key conclusions drawn from the two synthetic case studies drawn from CESM1-LENS and emphasized in this analysis are likely to be generalizable.

Precipitation phase, freezing level height, and snow water equivalent

The heaviest precipitation during both ARkStorm scenarios occurs over mountainous terrain—particularly in the SN—and a substantial fraction of that high elevation accumulation falls in the form of snow. In ARkHist, a substantial fraction of the higher elevation portions of the SN receives more than 1000 mm (Fig. 3A) of snow water equivalent (SWE) over the 30-day event (yielding a domain maximum of 7.7 m of accumulated snowfall). Estimates of peak on-the-ground SWE range from around ~300 mm in the southern Sierra to 470 mm in the central Sierra (fig. S8), with even higher maxima over localized mountain peaks (Fig. 3). This extremely heavy snowfall would likely be highly disruptive to infrastructure and emergency response activities.

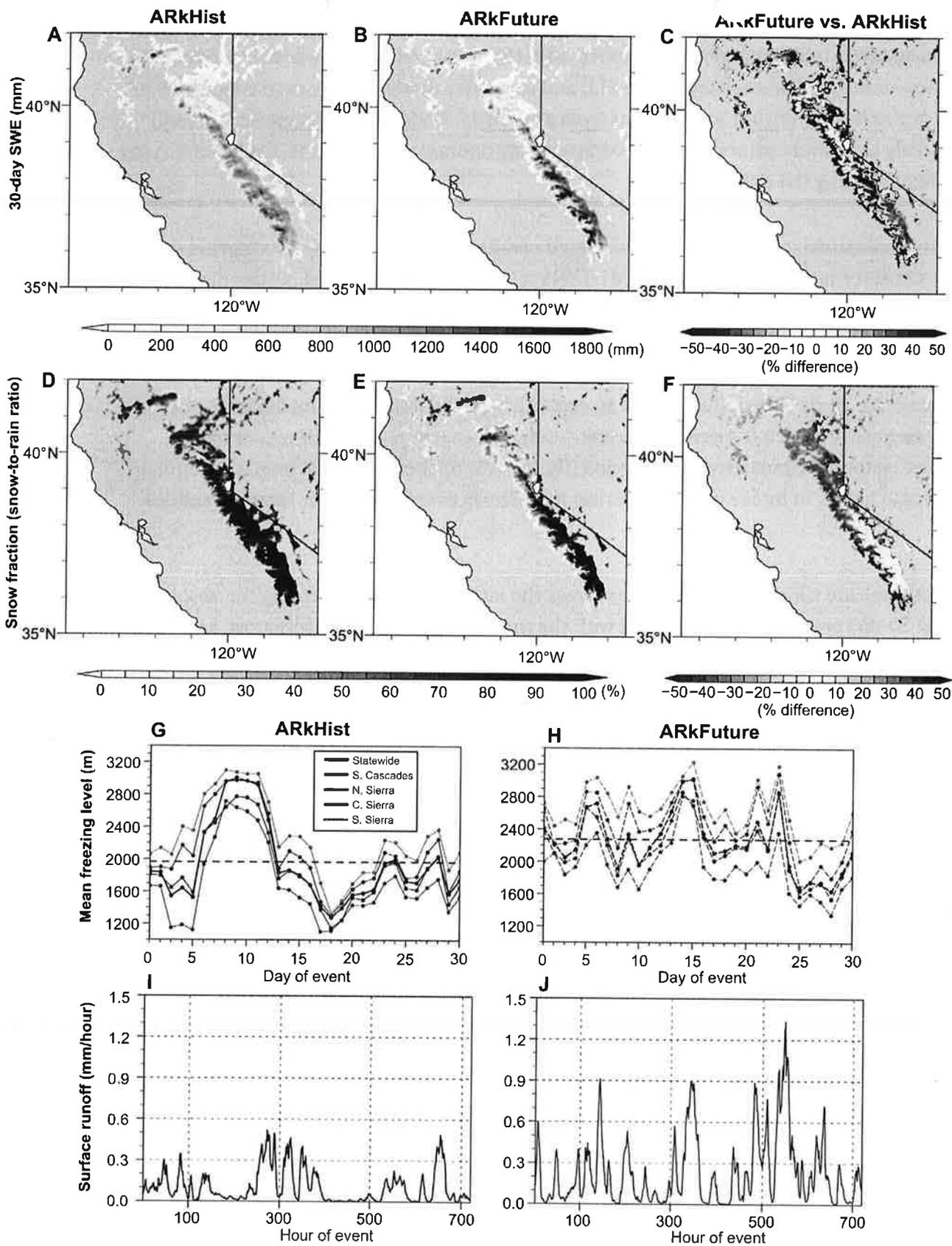


Fig. 3. Snowfall and surface runoff associated with California megastorm scenarios.

(A and B) Cumulative 30-day gross SWE (mm) during ARkHist (A) and ARkFuture (B). (C) Difference in cumulative SWE (mm) between ARkFuture and ARkHist. (D and E) Mean snow fraction (snow-to-rain ratio, in percent) during ARkHist (D) and ARkFuture (E). (F) Difference (%) in mean snow fraction between ARkFuture and ARkHist. (G and H) Mean freezing level (m) during ARkHist (G) and ARkFuture (H). (I and J) Time series depicting hourly surface runoff (mm/hour) on a cumulative California statewide basis during ARkHist (I) and ARkFuture (J). Data depicted in all panels are from the innermost 3-km WRF domain.

In ARkFuture, we find that the event-averaged precipitation phase changes from primarily snow to primarily rain at low to mid-elevations (~1200 to 2000 m) but remains primarily snow at very high elevations (≥ 2500 m) in the SN (Fig. 3, D and E). This results in a spatial dipole pattern of SWE changes, with large (>50%) SWE decreases at lower elevations but large SWE increases at the highest elevations (>3000 m) of the SN and southern Cascades (locally >50%, yielding cumulative total SWE as high as 1800 mm and a domain maximum of 10.4 m of accumulated snowfall) (Fig. 3, B and C). Further, there is a stark contrast between the large SWE and snow-to-rain ratio decrease in the northern SN versus a substantial SWE increase and lesser snow-to-rain ratio decrease in the southern SN (Fig. 3E) (likely because of lower elevations in the northern Sierra). We report widespread increases in the mean atmospheric freezing level height during ARkFuture (statewide freezing level of ~2230 m for the 30-day window) versus ARkHist (freezing level of ~1940 m; Fig. 3, G and H)—supporting prior studies finding that warmer temperatures during future extreme storm events will fundamentally alter mountain hydrology and subsequent watershed response [e.g., (18) and (25)].

Very large increase in cumulative and peak runoff during ARkFuture

We find that both ARkStorm scenarios are likely to generate very high runoff across a wide range of watersheds and topographies. Projected increases in ARkFuture runoff, however, are widespread and extremely high in magnitude. On a statewide basis, peak runoff during ARkFuture is more than double that during ARkHist (Fig. 3, I and J). In certain key watersheds, however, the relative differences are even larger: In all three SN subregions, the peak runoff is 200 to 400% higher in ARkFuture (fig. S9). A ~100% increase in peak runoff is also observed in the South Coast and Cascade subregions, with a 60% increase along the North Coast.

Event total cumulative runoff increases are similarly large, with increases of 100% or more across most of the SN western slope, the southern Cascades, the Santa Lucias, and also in several major urban areas with a high impervious surface fraction (including the Los Angeles, Sacramento, and San Jose metropolitan areas; fig. S9B). Even greater fractional increases are found for extreme runoff periods (defined as hours with surface runoff of >10 mm/hour; fig. S9, C and D), which increase from being almost negligible in ARkHist (generally three or fewer total hours, except in the Los Angeles Basin) to being widespread across nearly all of California's major urban areas and mountain ranges (with many locations experiencing >10 such extreme runoff hours). In addition, we find that runoff efficiency during ARkFuture relative to ARkHist (measured as the ratio of total 30-day runoff to 30-day precipitation) increases by ~50% (from ~0.19 to ~0.29)—suggesting that a considerably higher fraction of precipitation is likely to immediately contribute to potential food risk in the warmer future scenario.

Given the geographic concentration of numerous critical pieces of water and flood management infrastructure on the western slopes of the SN Mountains and in California's Central Valley, we conduct additional analysis focused on the Sacramento and San Joaquin River watersheds that encompass these regions [as defined by their respective U.S. Geological Survey (USGS) Hydrologic Unit Code (HUC) footprints; fig. S10]. We find large and ubiquitous increases in the upper tail of the empirical distribution of both precipitation and surface runoff at both hourly and 24-hour temporal aggregations in ARkFuture relative to ARkHist, although the relative increases are larger for the San Joaquin basin than the Sacramento Basin (Fig. 4). Here, again, we find that the relative increases in the uppermost tail of the surface runoff distributions are much larger than that of the precipitation distribu-

tions. At the 24-hour aggregation level, the upper tail of the surface runoff distributions is largely nonoverlapping in both basins (Fig. 3 G and H)—with virtually no overlap at or above the San Joaquin basin during ARkFuture relative to ARkHist. This points to the potential for historically unprecedented surface runoff regimes during future extreme storms in a strong warming scenario—especially in the watersheds draining the western slopes of the central and southern SN, with major implications for operation of critical water infrastructure in these regions.

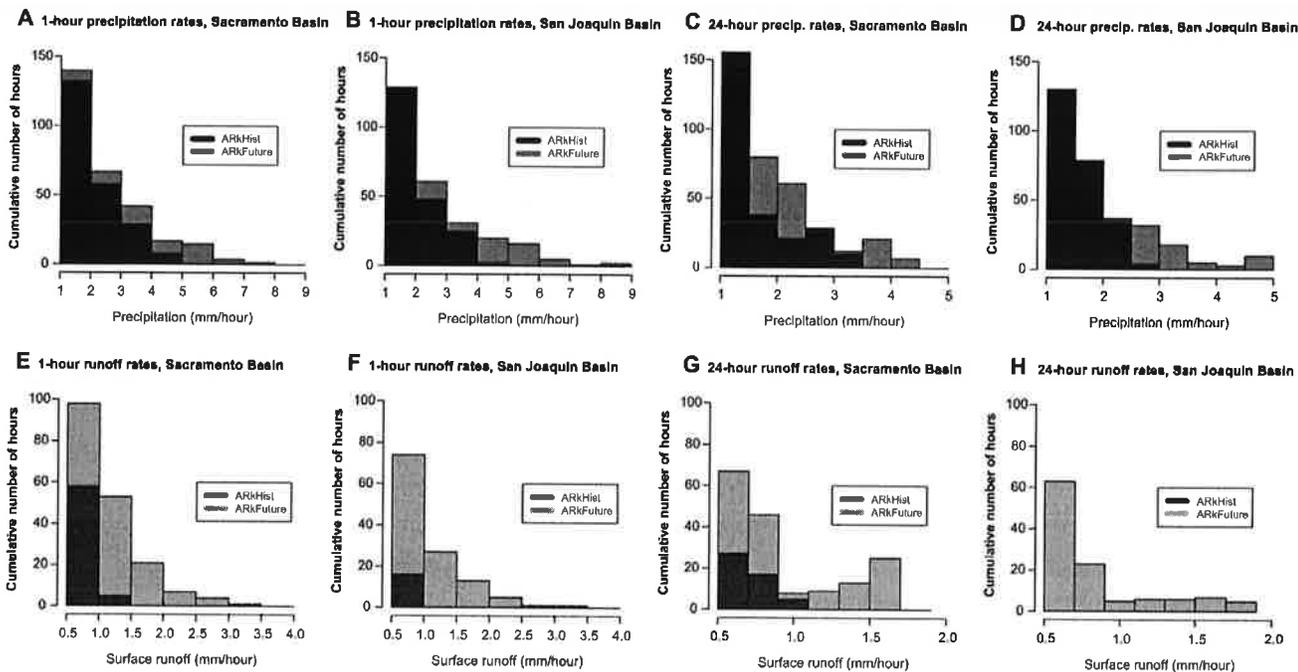


Fig. 4. Upper tail of precipitation and surface runoff distribution for Sacramento and San Joaquin River watersheds.

Empirical histograms depicting the cumulative number of hours (over the 30-day scenarios) at or above specific precipitation [purple bars (A to D)] and surface runoff [blue bars (E to H)] thresholds (in units of mm/hour) at two levels of temporal aggregation (1 hour and 24 hours) for two key California watersheds as outlined by HUC Subregion 1802 (the Sacramento River watershed) and HUC subregion 1804 (the San Joaquin River watershed). Data are drawn from the WRF 3-km domain for ARkHist (darker bars) and ARkFuture (lighter bars) and are calculated as average values for each entire watershed. Values less than 1 mm/hour for precipitation and 0.5 mm/hour for surface runoff are excluded from this upper tail analysis.

We attribute these notably high increases in runoff, which greatly exceed fractional increases in precipitation, to the nonlinear hydrologic effects of increasing both total precipitation (via increased AR intensity) and decreasing the snow-to-rain fraction (due to AR warming and the solid-to-liquid phase change of precipitation). This so-called “double whammy effect,” whereby both the volume of precipitation falling on watersheds and the fraction of that precipitation that immediately becomes runoff at higher elevations increases substantially, can be responsible for unexpectedly large increases in runoff volume (18). We also suggest that there is arguably a “triple whammy” effect at play in the case of ARkFuture: In addition to the previous two factors, there is evidence for multiple intense “rain on snow” events (26) in both scenarios (Fig. 3 G and H) that correspond temporally with event-maximum runoff peaks (Fig. 3 I and J). However, we acknowledge that antecedent hydrologic conditions—particularly soil moisture and the extent/moisture content of snowpack leading up to the event—could potentially have large influences on simulated runoff and ultimately on potential flood risks. In this analysis, we only consider the specific antecedent conditions that were actually present in the respective large ensemble members leading up to the simulated events. Although a comprehensive assessment of the various antecedent hydrological contributors to surface runoff is beyond the scope of the present manuscript, more systematic assessments will be conducted in later stages of the ARkStorm

2.0 project.

Mega-flood risk increases robustly as function of climate warming

We assess the cumulative and annual likelihood of a 30-day megastorm sequence capable of causing a California mega-flood and find that both increase strongly as a function of climate warming. On a high warming emissions trajectory (RCP8.5), we find that the cumulative likelihood of an ARkHist level event begins to accelerate after the year ~2020 period, with corresponding accelerations becoming apparent earlier (~2000) for lesser (50-year RI) and later (~2030) for higher magnitude (200-year RI) events (Fig. 5A).

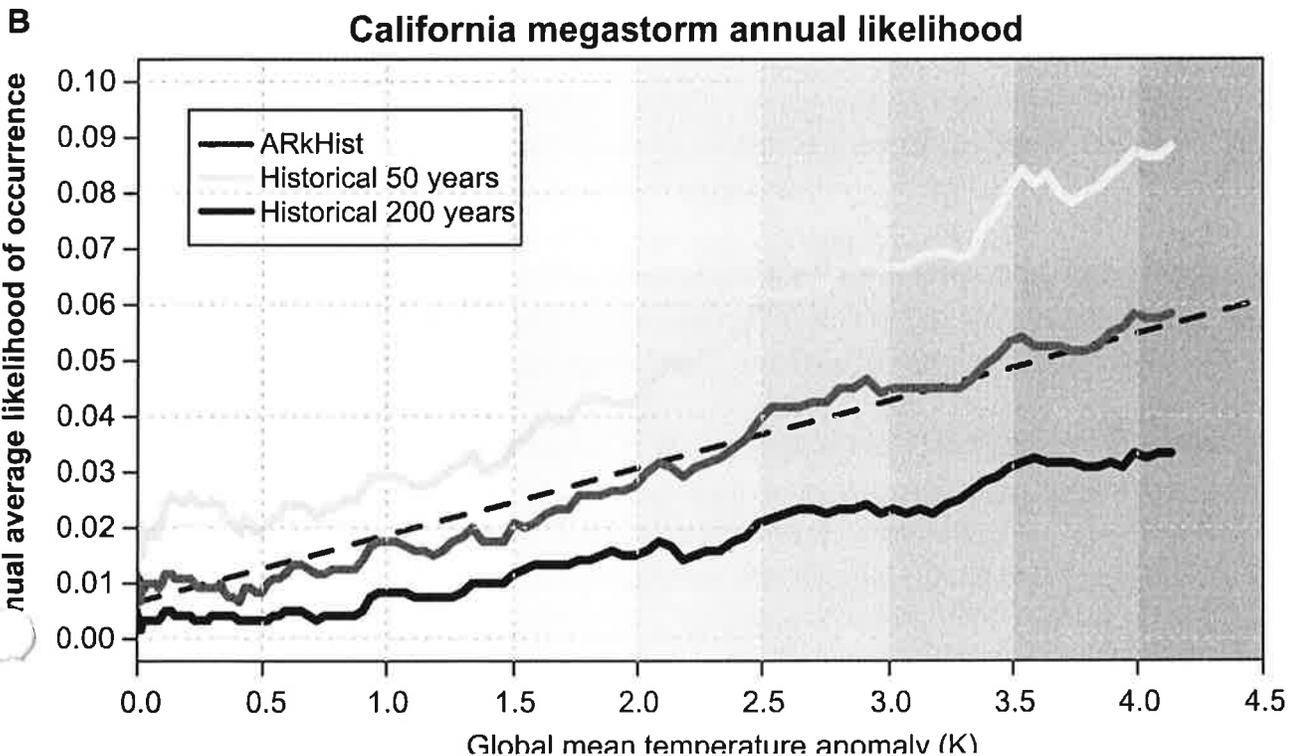
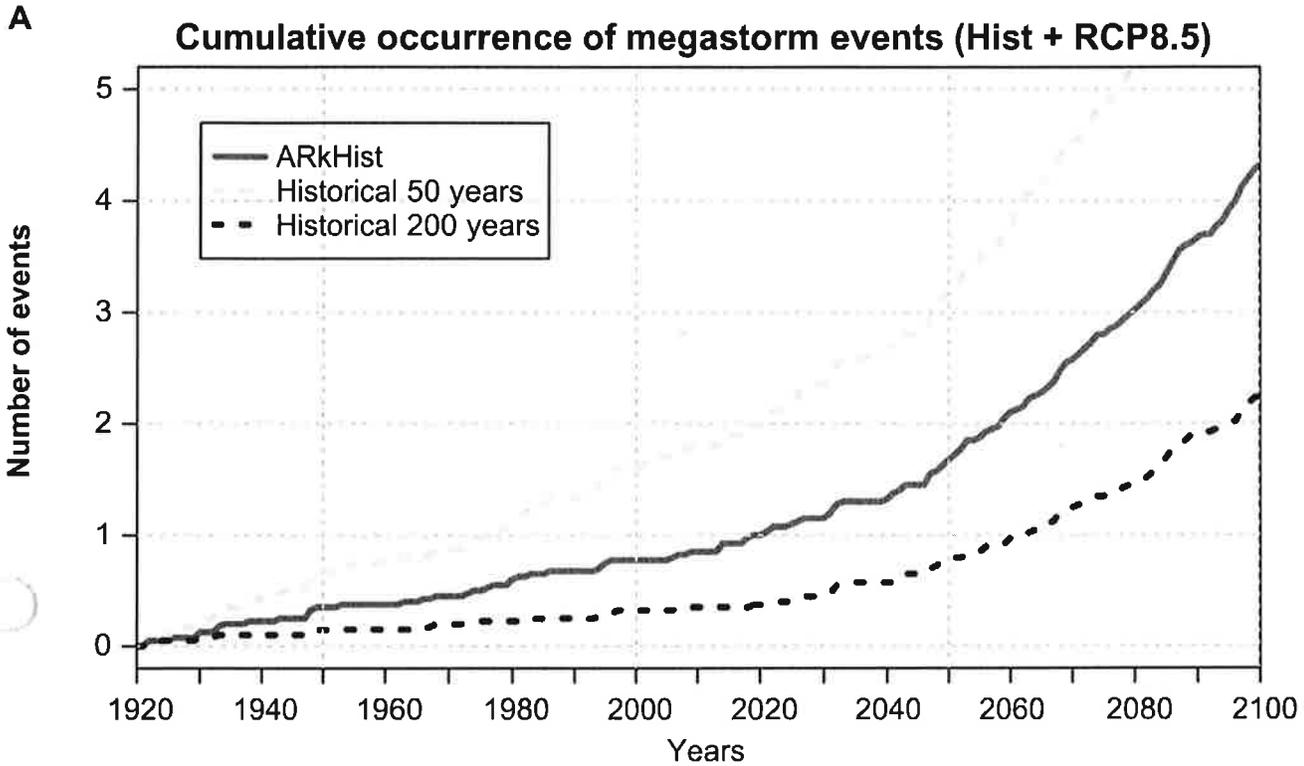


Fig. 5. Climate change and California megastorm risk.

(A) Cumulative occurrence of extreme 30-day precipitation accumulations on a California statewide basis as simulated by the CESM1-LENS ensemble. The three blue-green curves denote cumulative occurrence of events equal or greater in magnitude to the ARkHist scenario, as well as for events with approximate RIs of 50 and 200 years. Data are drawn from the historical CESM1-LENS simulations for 1920–2005 and from the RCP8.5 scenario for 2006–2100. (B) Annual likelihood of extreme 30-day cumulative precipitation events as a function of projected global mean surface temperature (GMST; K) anomaly across the 40-member ensemble. Blue-green curves correspond to definitions in (A). GMST anomaly is defined relative to a baseline calculated from the CESM1-LENS preindustrial control run, and both annual likelihood and GMST are smoothed on a 30-year running mean basis.

To accommodate the various Earth system and sociopolitical uncertainties that complicate future predictions of possible greenhouse gas emission trajectories and to facilitate direct comparison with various proposed targets linked to specific planetary warming levels, we conduct further analysis to estimate changes in megastorm risk as a function of the warming itself. We find that the annual likelihood of an ARkHist level event increases rapidly for each 1°C of global warming [by ~0.012/year per degree C from a baseline of ~0.01/year]; [Fig. 5B](#)) and that this approximately linear relationship ($P < 0.001$) appears to hold even at very high levels of warming (~+4°C). We find that climate change to date (as of 2022) has already increased the annual likelihood of an ARkHist event by ~105% relative to 1920 in the CESM1-LENS ensemble and of an even higher magnitude (200-year RI) event by ~234%. This finding is consistent with prior work reporting progressively larger increases in projected extreme precipitation events for increasing event magnitudes [e.g., [\(42\)](#)]. We further find that by ~2060, on a high emissions trajectory, the annual likelihood of an ARkHist level event increases by ~374% and by ~683% for a formerly 200-year RI event. These statistics represent notably large increases in risk of California megastorm events due to climate change, as they transform an event that previously would have occurred once every two centuries into one that may occur approximately three times per century.

DISCUSSION

Our analyses suggest that the fundamental characteristics of the plausible worst-case California megafloods of the future will be familiar: Similar to their contemporary and historical counterparts, they will be characterized by a week-long sequences of recurrent, strong to extreme ARs during the cool season and coinciding with a persistently strong Pacific jet stream. Yet, we also find evidence of some critical differences: Future extreme storm sequences will bring more intense moisture transport and more overall precipitation, along with higher freezing levels and decreased snow-to-rain ratios that together yield runoff that is much higher than that during historical events. In addition, we find even larger increases in hourly rainfall rates during individual storm events, which have high potential to increase the severity of geophysical hazards such as flash flooding and debris flows. This is especially true in the vicinity of large or high-intensity wildfire burn areas, which are themselves increasing due to climate change [\(39\)](#) and yielding large increases in associated compound hazards [\(43\)](#).

An extensive body of existing research has linked climate change to increasingly extreme precipitation events [e.g., [\(44–47\)](#)], even in locations where changes in mean precipitation are nonrobust [\(48, 49\)](#). There is further evidence that climate warming increases the intensity of ARs in many regions [\(20\)](#), including California [\(16, 19\)](#). The strongest ARs are expected to strengthen considerably at the expense of the weakest—shifting the balance from “primarily beneficial” AR events to “primarily hazardous” ones [\(21\)](#)—an intensification brought about primarily via the direct thermodynamic effect of warming [\(16\)](#).

Our analysis goes beyond these prior works to demonstrate that climate change is robustly increasing both the frequency and magnitude of extremely severe storm sequences capable of causing megaflood events in California. Our analysis suggests that the present-day (circa 2022) likelihood of historically rare to unprecedented 30-day precipitation accumulations has already increased substantially and that even modest additional increments of global warming will bring about even larger increases in likelihood. Critically, this finding means that existing international emissions policies, which are estimated to yield cumulative warming of well over 2°C (50), will entail large further increases in the likelihood of a California megaflood event. We further find that all of the most intense 30-day megastorm events in the CESM1-LENS ensemble occur during moderate to strong ENSO warm phase (El Niño) conditions—both in the historical and warmer future scenarios—suggesting that these events may potentially exhibit some degree of predictability at seasonal scale. For these reasons, we emphasize that recognizing and mitigating the societal risks associated with this subtly but substantially escalating natural hazard is a critically important consideration from a climate adaptation perspective.

Recent evidence suggests that increases in western United States flood risk caused by anthropogenic warming may have been counteracted in recent decades by natural variability, but that further warming and shifts in natural variability will eventually “unmask” this accumulated increase in regional flood risk (51). Additional work suggests that the response of flood risk to climate change is likely to exhibit threshold behavior, at least in certain climatological and hydrological regimes (52), with a precipitation extremeness threshold dictating whether flood risk decreases (for smaller events, due to the antecedent soil aridification effect of warming temperatures) or increases (for the largest events, due to the overwhelming effect of large increases in precipitation intensity). Both of these considerations are especially germane to California—a region where most contemporary public policy and climate adaptation efforts emphasize drought and wildfire risk due to lack of recent experience with widespread severe floods. Collectively, the findings from previous work and this study illustrate the growing urgency of planning for and mitigating the hazards from potentially catastrophic floods in California in a warming climate.

The extreme storm scenario development and subsequent analyses described here represent the first phase of the broader ARkStorm 2.0 exercise, which is eventually expected to encompass a full suite of follow-on hydrologic and inundation modeling, hazard assessments, and tabletop disaster response exercises. We plan to work with local, regional, and federal stakeholders to integrate quantification of physical hazards resulting from an “ARkStorm”-level event in California within disaster resilience and climate adaptation frameworks. Our initial atmospheric modeling results presented here demonstrate that extremely severe winter storm sequences once thought to be exceptionally rare events are likely to become much more common under essentially all plausible future climate trajectories—suggesting that 20th century hazard mapping, emergency response plans, and even physical infrastructure design standards may already be out of date in a warmer 21st century climate. Still, region-wide and high-resolution runoff inundation modeling capable of accounting for the effects of various active and passive flood management infrastructure will be required to fully quantify the extent of flood-related hazards and associated societal impacts resulting from these two ARkStorm 2.0 scenarios, and these simulations are actively being planned for the project’s future phases.

Yet, potential solutions to increasing flood risk do exist. Examples of climate-aware strategies that have the potential to mitigate harm during a 21st century California megaflood include floodplain

restoration and levee setbacks, which would lessen flood risk in urban areas by offering environmental cobenefits (53); forecast-informed reservoir operations, which would afford reservoir operators greater flexibility in the face of uncertainty (54); and revised emergency evacuation and contingency plans that accommodate the possibility of inundation and transportation disruption extending far beyond that which has occurred in the past century. Some of these interventions—such as flood-managed aquifer recharge—even have the potential to reduce flood damages while simultaneously improving resilience to future regional droughts (55). Ultimately, our hope is that the analysis described here can serve as a geographically portable framework for scenario-based emergency response and regional adaptation endeavors in the climate change era, both within and beyond California.

MATERIALS AND METHODS

Overall ARkStorm 2.0 scenario design

ARkStorm 2.0 is a wide-reaching extreme storm and flood scenario for California that seeks to build upon previous disaster contingency and emergency response planning efforts. This endeavor is intended to build upon previous efforts in the original ARkStorm exercise (ARkStorm 1.0), which was completed in 2010 (9) and involved a broad consortium of local, state, and federal agencies. It was found that the hypothetical storm scenario used in ARkStorm 1.0 would have produced widespread, deep inundation of a large fraction of the Sacramento and San Joaquin valley floors, as well as widespread, life-threatening flooding in other highly populated parts of California. Total economic losses (the sum of direct damages and indirect losses due to business and economic disruption) were projected to exceed \$750 billion [2010 dollars (11)]. This would be equivalent to approximately \$1 trillion in 2022 dollars, making it the most expensive geophysical disaster in global history to date. Partly for this reason, this hypothetical event was informally dubbed California's "other Big One:" Such a flood event in modern California would likely exceed the damages from a large magnitude earthquake by a considerable margin.

In ARkStorm 1.0, the scenario design involved the artificial concatenation of two of the most intense individual storm sequences in the observed 20th century climate [from January 1969 to February 1986; (9)], with additional manual adjustments to the persistence of individual ARs to amplify cumulative precipitation totals. Historical atmospheric reanalysis data were used to obtain boundary conditions for simulating these concatenated events using the Weather Research and Forecasting Model (v3.0.1) at spatial resolution ranging from 2 to 6 km across California. Precipitation and other variables from this single simulation were then used to estimate flood and other related impacts.

In ARkStorm 2.0, we update and upgrade the methods used in ARkStorm 1.0 in several fundamental ways. First, we use a hypothetical extreme event selection method that is both systematic and internally consistent from an atmospheric dynamical perspective: Rather than artificially concatenating multiple historical events, we leverage the large sample size afforded by large ensemble climate model simulations to draw upon a much wider range of physically plausible event sequences that are available by considering the roughly century-long observational record alone (and we make no manual adjustments to storm sequencing). Second, we use a newer and more sophisticated weather model (WRF V4.3) with generally higher spatial resolution (3 km across all of California and adjacent regions). Last and most critically, we design and implement two separate scenarios—ARkHist and ARkFuture—with

the combined aim of comparing a “worse” present era severe storm sequence with a much more intense but physically plausible future sequence amplified by climate change. The overall approach of embedding a high-resolution weather model within existing climate model large ensemble simulations is similar to that described in (16) and has the dual advantage of not only expanding the statistical sample size of physically plausible but observationally rare or unprecedented precipitation events (in CESM1-LENS) but also attaining the high degree of physical realism afforded by simulating extreme ARs in a high-resolution setting (38).

Selection of specific extreme storm sequences

Both ARkHist and ARkFuture are intended to capture multiweek sequences of discrete severe storm events that produce extremely high cumulative precipitation over a 30-day period. The use of a 30-day accumulation period is motivated by the desire to conduct a realistic emergency management contingency exercise as part of ARkStorm 2.0 and the prior knowledge that multiple successive storm events often challenge infrastructure and response systems to a greater degree than shorter-duration events. We first calculate the cumulative 30-day precipitation for the state of California from all 40 ensemble members from the CESM1-LENS (56) from two decade long “snapshot” intervals during which high-frequency (6 hourly) data are available for dynamical downscaling: 1996–2005 (using the historical scenario, which aims to replicate real-world aerosol and greenhouse gas climate forcings) and 2071–2080 (using the RCP8.5 scenario, which assumes continued rapid growth of greenhouse gas emissions over the 21st century).

Among the available global climate model large ensemble datasets, CESM1-LENS stands out with its comprehensive suite of three-dimensional, high-frequency (6 hourly) atmospheric variables, which provide the forcing conditions required for dynamical downscaling simulations. We note that, while it might otherwise be desirable to sample from a wider time period than the two specific decades included in these snapshots, these are the only two such intervals for which a comprehensive suite of three-dimensional, high-temporal frequency (6 hourly) atmospheric conditions were retained in the original CESM1-LENS experiment, and so, it is not possible to conduct high-resolution WRF simulations during other intervals because of the unavailability of needed initial and boundary conditions. However, as the snapshot periods include data from 40 independent ensemble members initialized decades before the assessment period—each with their own sequences of internal variability—these snapshot periods nonetheless include a wide range of potentially relevant internal ocean-atmospheric oscillations.

We also note that although real-world greenhouse gas forcings are likely to be lower than assumed in the RCP8.5 scenario (57), this is the only scenario for which high-frequency data are available as part of the CESM1-LENS dataset (56). We further emphasize that although RCP8.5 is considered to be a high warming scenario, we explicitly intend to design a plausible “worst case scenario” storm and flood sequence in this analysis, and therefore, the use of a high-end emissions trajectory is appropriate.

We then rank all such 30-day cumulative precipitation events from each CESM1-LENS snapshot period, drawing from an effective sample size of 400-model years in each instance (10 years × 40 ensemble members). To ensure statistical independence of the dataset and that long-lasting events are not double counted, we require at least a 30-day separation between storm sequences. From among the top 3 ranked events in each period, we manually select a single 30-day storm sequence that exhibits large

precipitation intensity peaks in both northern and southern California, as well as a pattern of 30-day cumulative precipitation that is spatially well distributed throughout both northern and southern portions of the state. This subjective aspect of the extreme event scenario selection process is critically important from the broader perspective of ARkStorm 2.0, which is designed to be a statewide exercise in which flood and emergency management capacity is severely tested. Therefore, we manually selected the respective ARkHist and ARkFuture events from among the top three ranked events such that each would bring a high level of impacts to the entire state rather than just a portion of the region. In so doing, we ultimately select the second ranked event for ARkHist (calendar date range: 9 February 2002 to 12 March 2002 in ensemble member #20) and the third ranked event for ARkFuture (calendar date range: 11 January 2072 to 11 February 2072 in ensemble member #2). Further analysis suggests that the selected ARkHist event has an approximate RI of ~85 years in the 1971–2020 era climate, and the ARkFuture event has an approximate RI of ~333 years in a 2051–2100 era high warming climate and is empirically unprecedented (i.e., a >400-year RI) in the 1971–2020 era climate (fig. S11).

LENS-WRF event-targeted downscaling approach

For each selected 30-day storm sequence, we use a high-resolution (3 km), nonhydrostatic regional weather model (WRF V4.3) embedded within initial and boundary conditions from CESM1 large ensemble (a framework known as “LENS-WRF”) to perform dynamical downscaling as originally developed by (16). We use a full suite of three-dimensional atmospheric initial and boundary conditions from the high-frequency (6 hourly) temporal data available from the CESM1-LENS output files and conduct ~50-day long WRF simulations for each 30-day scenario event (allowing for ~1 week of model spin-up and ~1 week of event follow-up). Land surface initial and boundary conditions (including three-dimensional soil temperature, soil moisture, and snow depth) are drawn from the corresponding model member at monthly frequency (as this is the highest temporal resolution retained for three-dimensional land surface conditions in CESM1-LENS) such that they are spatiotemporally congruent with the atmospheric conditions.

In this analysis, we use a nonhydrostatic configuration of WRF-ARW (V4.3) including four nested domains with progressively finer spatial resolutions of 81, 27, 9, and 3 km (see fig. S12 for the detailed domain configuration). The outer three domains cover a large portion of the northeastern Pacific Ocean and the innermost 3-km domain also covers a broad oceanic region—as well as all of California and Nevada—to better represent near-coastal processes and sea-air interactions. WRF is configured using 44 vertical levels (with model top pressure at 50 hPa and vertical velocity damping turned on) and forced with time-varying SST (from CESM1-LENS). A higher density of vertical levels is prescribed near the surface to improve the representation of lower-level processes.

WRF physics parameterizations applied in these simulations include the Thompson graupel scheme (58), the Kain-Fritsch (new Eta) cumulus scheme (59) (for 81-, 27-, and 9-km domains only; cumulus parameterizations are turned off for the innermost 3-km domain), the Dudhia shortwave radiation scheme (60); the “rrtm” longwave radiation scheme (61), the Yonsei University (YSU) boundary layer scheme (62), the revised MM5 Monin-Obukhov surface layer scheme (63), and the Noah-multiple parameterization (MP) land surface model (64). The Noah-MP model includes a multilayer snowpack capable of liquid water storage and melt/refreeze cycles, direct representation of heat exchange due to phase changes, and a snow interception component allowing for canopy interception (64).

Model validation and fitness for purpose

The overall performance of both CESM (as implemented in CESM1-LENS) and WRF have been previously assessed and validated in the context of both mean and extreme cool season precipitation in California. Swain *et al.* (14) found that the simulated distribution of CESM1-LENS cool-season precipitation was statistically indistinguishable from observations during the recent historical period in both northern and southern California. In addition, Huang *et al.* (38) found that high-resolution (3 km), nonhydrostatic WRF simulations nested within boundary and initial conditions from atmospheric reanalysis (i.e., pseudo-observations) were capable of simulating real-world extreme AR events (including extreme IVT) and associated extreme precipitation—including spatial patterns of orographic enhancement. However, we acknowledge that this validation does not obviate the potential for parametric and/or structural uncertainties that could lead to model biases that are difficult to quantify (as it is not possible to directly validate large ensemble climate model representation of specific extreme events). Nonetheless, the LENS-WRF configuration used in the present analysis is capable of generating physically realistic extreme storm events and is an appropriate tool for use in the context of “plausible worst case” scenario development.

Contextualization of CESM1-LENS relative to other large ensembles

We conduct additional analysis using daily precipitation data from several other large single-model ensembles [the 50-member CanESM2 (Canadian Earth System Model, Second Generation) at $\sim 2.8^\circ \times 2.8^\circ$ horizontal resolution, 20-member GFDL-CM3 (Geophysical Fluid Dynamics Laboratory Coupled Model, Version 3) at $2.0^\circ \times 2.5^\circ$ horizontal resolution, and 30-member CSIRO-Mk3.6 (Commonwealth Scientific and Industrial Research Organisation Model, Version 3) at $\sim 1.875^\circ \times 1.875^\circ$ horizontal resolution] to aid in contextualization of the study’s primary focus on results driven by CESM1-LENS (40 members at $1^\circ \times 1^\circ$ horizontal resolution). We note that CESM1-LENS has the highest horizontal resolution, by a wide margin, as well as the second largest number of ensemble members of these four large ensembles. To conduct as systematic an intercomparison as possible, we extract precipitation data for each of the top 4 ranked events in each ensemble and during each ARkHist and ARkFuture snapshot period. The results of this analysis are discussed in Results and can be visualized in figs. S1 and S2.

HUC region precipitation and runoff analysis

We select two “four-digit/subregional” HUC regions, as defined by the USGS, for more detailed analysis of regional precipitation and surface runoff during ARkHist and ARkFuture scenarios: HUC 1802 (Sacramento subregion, which includes the Sacramento River basin and Goose Lake watershed) and HUC 1804 (San Joaquin subregion, which includes the San Joaquin River basin; see fig. S10 for geographic outlines). We select these HUC regions, particularly, because they encompass most or all of the major SN western slope water storage and flood control reservoirs, as well as broad swaths of land in California’s Central Valley that are highly susceptible to large-scale flooding and are home to numerous flood control structures. We extract precipitation and runoff data from the WRF 3-km domain at 1 hour frequencies from geographic regions delineated by the respective HUC subregion shapefiles made available via the USGS (at <https://apps.nationalmap.gov/downloader>). We then plot empirical histograms of the upper tail of the precipitation (all values above 1 mm/hour) and runoff (all values above 3 mm/hour) distributions for each selected HUC region temporally aggregated at two different durations (1 and 24 hours) in both historical and future scenarios (Fig. 4).

Public availability of ARKStorm 2.0 atmospheric simulation data

Boundary and initial condition input files (derived from CESM1-LENS) and output files from the WRF simulations are archived on the DesignSafe web platform (65) via DOI: [10.17603/ds2-mzgn-cy51](https://doi.org/10.17603/ds2-mzgn-cy51) (66).

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Competing interests: The authors declare that they have no competing interests.

Data and materials availability: All data needed to evaluate the conclusions in the paper are present in the paper and/or the Supplementary Materials. Data from the parent CESM1-LENS simulations are publicly available via <https://cesm.ucar.edu/projects/community-projects/LENS/data-sets.html>. Data from the CSIRO, GFDL, and CanESM2 large ensembles are publicly available at the Multi-Model Large Ensemble Archive via <https://cesm.ucar.edu/projects/community-projects/MMLEA>. Source code for WRF 4.3 may be found at <https://github.com/wrf-model/WRF>. Specific forcing files from CESM1-LENS used in the WRF simulations, as well as WRF output and configuration files for the simulations described here and code used in the underlying analysis, are archived on the NSF DesignSafe platform at <https://doi.org/10.17603/ds2-mzgn-cy51>.

Supplementary Materials

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Historical Season Rainfall

Years 1888 to 2024

* Rain Season runs July 1 - June 30 annually.

Season Rain Total	
Season	Rain Total
2023 - 2024	15.33"
2022 - 2023	18.94"
2021 - 2022	9.96"
2020 - 2021	9.40"
2019 - 2020	6.54"
2018 - 2019	12.50"
2017 - 2018	7.87"
2016 - 2017	17.93"
2015 - 2016	17.41"
2014 - 2015	12.10"
2013 - 2014	7.19"
2012 - 2013	9.97"
2011 - 2012	9.54"
2010 - 2011	15.99"
2009 - 2010	16.76"
2008 - 2009	8.78"
2007 - 2008	11.80"
2006 - 2007	8.36"
2005 - 2006	13.28"
2004 - 2005	16.34"
2003 - 2004	8.56"
2002 - 2003	9.40"
2001 - 2002	10.53"
2000 - 2001	12.99"

Season Rain Records

Driest Rainfall Season:	1913 (4.30")
Wettest Rainfall Season:	1983 (26.01")
Season Rainfall Average:	12.17"

Highest Single Day Rain Amounts

12/11/1906	3.41"
01/27/2021	3.15"
03/04/1978	2.72"
11/30/1892	2.37"
01/28/2021	2.29"
12/11/2014	2.29"
11/28/1970	2.25"
03/10/1995	2.19"
05/15/2000	2.06"
04/02/1958	2.01"

Average Rain Total by Month

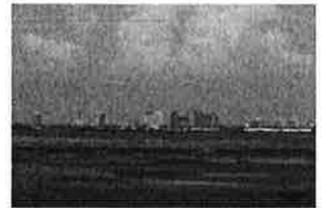
January	2.41"
February	2.03"
March	1.90"
April	0.95"
May	0.48"
June	0.09"
July	0.02"
August	0.03"
September	0.19"



Aquapedia background

FLOODPLAINS IN CALIFORNIA

With the dual threats of obsolete [levees](#) and anticipated rising sea levels, [floodplains](#)—low areas adjacent to waterways that flood during wet years—are increasingly at the forefront of many public policy and water issues in California.



Adding to the challenges, many floodplains have been heavily developed and are home to major cities such as Sacramento. Large parts of California's valleys are historic floodplains as well.

Despite levees and upstream [dams](#), floods in these areas have caused billions of dollars in damage.

From an ecosystem perspective, it is important to recognize that development for farming, urban construction and flood control has removed virtually all of the historic riparian and floodplain habitat in the Central Valley and Sacramento-San Joaquin Delta. Stakeholders are pursuing innovative solutions to restore floodplain habitat on the landscape in a manner that benefits people and the environment.

On the [Yolo Bypass](#), just northwest of Sacramento, for example, work to adjust or move levees is now underway and, when completed, will allow more water to flood the area more frequently. This will create important habitat for small fish – notably Chinook salmon smolts – while reducing the threat of damaging floods in communities downstream. Similar landscape modifications are underway or have been completed throughout the Central Valley.

Responding to Floodplain Challenges

Congress established the National Flood Insurance Program with passage of the National Flood Insurance Act of 1968. Regular homeowner insurance typically does not cover flooding, and this measure allows property owners to buy insurance as protection against flood losses. However, insurance providers do not always offer flood protection to property owners in at-risk communities.

Additionally, the Department of Homeland Security's Federal Emergency Management Agency (FEMA) is required by statute to identify and map the nation's flood-prone areas and establish flood-risk zones. But decisions to allow development in floodplains are made by local governments. FEMA's maps are considered an important, if problematic, tool for flood hazard mitigation.

In California, for instance, questions arose about the adequacy of a FEMA 100-year flood designation—the 1 percent chance a flood will occur annually, or 1 in 100 chance of yearly flood—in the Central Valley after floods in 1997. Critics said the maps did not adequately depict areas reasonably likely to flood and do not incorporate the effects of upstream development, which rapidly pushes runoff to downstream areas.

The state Legislative Analyst's Office (LAO) also noted in 2005 that FEMA's mapping activities had not kept pace with changing conditions in California. The LAO noted _____ while the Department of Water Resources estimates that at least 50,000 of the state's 200,000 miles of streams will likely see development during the next 20 years, FEMA has mapped only 15,000 miles the past 30 years. The state has attempted to fill the gap through its own mapping program, which, while not as detailed as FEMA's, does include analysis of areas outside of FEMA's designation of areas prone to a 100-year flood that may be at risk.

In addition to FEMA's flood mapping efforts, Congress in 1992 created "AR Zones," flood management restoration areas based on 100-year floodplains where levee restoration is underway. The designation can affect flood insurance rates and the design of new structures, but may not preclude new development. Eligibility for the AR zone is determined by the flood protection system being deemed restorable by a federal agency.

Floodplains in Sacramento

Flood mapping has particularly been the target of discussion in flood-prone Sacramento. The California capital is also considered one of the most at-risk cities for a major flood in the United States.

Following severe floods in the Sacramento-area in 1986, the U.S. Army Corps of Engineers reassessed the adequacy of the local levee system and estimated that a 100-year flood along the American River floodplain could cause up to \$15 billion in damages and cost as many as 100 lives.

FEMA then mapped most of Sacramento into the 100-year floodplain in 1989. Much of the now heavily developed Natomas area, consisting of 86 square miles of land near the Sacramento International Airport, was also included in the revised FEMA floodplain.

Other projects to address levee under seepage (where water accumulates underneath the barriers) and erosion concerns allowed the Corps to certify most of the remainder of Sacramento's levees for 100-year protection. Areas still within the 100-year floodplain include the South Sacramento, Mayhew and Pocket areas, and areas affected by local streams and storm drainage issues.

After Natomas was declared to be high risk in 2006, a levee protection program was launched. The Natomas Levee Improvement Program aims to provide at least 100-year flood protection and lay the groundwork for 200-year flood protection. Such efforts would significantly reduce the risk of an uncontrolled flood, one with estimated costs of \$7 billion. Such flooding could also disrupt operation of the Sacramento International Airport and close Interstate 5 and State Route 99.

Meanwhile, Sacramento Area Flood Control Agency and the Corps have worked with the state to restore 100-year flood protection for most of the Sacramento urban area. More than \$460 million has been spent on levee improvements.

And in 2012, West Sacramento, addressing an ongoing problem with under seepage, completed a \$27 million project to reconstruct more than 8,000 feet of levees.

Floodplains and the Central Valley

California's Department of Water Resources has a Central Valley Flood Protection Plan in place, which is considered a crucial first step in re-assessing how floods are channeled through the Sacramento-San Joaquin river systems. The Flood Plan is a 25-year, \$17 billion blueprint that includes the acquisition of as much as 40,000 acres of land to accommodate flood waters as they drain from the Sacramento and San Joaquin river watersheds.

Sacramento, one of the cities most at risk of catastrophic flooding, benefits from the Yolo Bypass west of the city, where flood waters from the Sacramento River are funneled. About 100 miles upstream from the city on the Sacramento River, the Hamilton City Flood Damage Reduction and Ecosystem Restoration Project features seven miles of setback levee to improve flood protection for Hamilton City and restoration of about 1,500 acres to native habitat.

Miguel Galvez

From: Lori Wolf <lori_wolf52@yahoo.com>
ent: Monday, May 13, 2024 6:45 AM
ro: River Walk
Subject: River Walk

By now you have heard every comment in the world regarding the arguments both for and against the Riverwalk project.

Perhaps the Planning Department and City Council feel they have to keep pushing this through to save face with the developers. Perhaps when this project was proposed they had no idea how much push back there would be.

The same thing happened to the City of Modesto in regards to the inclusion of Wood Colony in their quest to produce a General Plan update. There was so much push back from the citizens of Modesto and Stanislaus County the city had to revert to 1995 documents and now have had to start over.

The negative impacts of the Riverwalk project far outweigh the positives. Make a definitive list and you can see that for yourselves. I personally do not support this project.

Lori Wolf of Wood Colony

209-578-0898 home

209-479-8030 cell

"Buy land, they're not making it anymore." - Mark Twain

Miguel Galvez

From: John Herrick <joherri@yahoo.com>
Sent: Monday, May 13, 2024 1:25 PM
To: River Walk
Subject: Two River Walk-related questions: Public Participation in Specific Plan prep and 5-year Land Use Element Update

Dear Mr Galvez/Miguel-

I have two questions as a result of reviewing the River Walk Specific Plan and the dEIR that I hope you can answer-

1) River Walk Specific Plan public participation-

Was there a public participation component to the drafting of the River Walk Specific Plan, such as a public visioning session, that were considered in the *drafting* of the River Walk Specific Plan?

I'm aware of the July 13 2021 Zoom meeting that followed the June 4 2021 NOP, but I'm looking for earlier opportunities for the public to contribute suggestions that would be considered in the drafting of the River Walk Specific Plan.

I did not find a reference to public participation in the Specific Plan, a "Public Participation Plan " in the 2025 Riverbank General Plan or on the Riverbank website

2) Land Use Element Update (Policy Land-6.1)

What is the most recent Land Use Element Update?

The City will review the Land Use Element at least every five years to ensure that it remains responsive to the community's vision with respect to changing conditions

My interest is the Buffer/Greenway/Open Space designation-

I believe standards and boundaries for B/G/OS should be incorporated into the River Walk Specific Plan and available for public review as part of the dEIR review process. The scope and nature of the River Walk project warrant more specific definition(s) than the B/G/OS in the 2025 General Plan and the River Walk Specific Plan.

dEIR-level review, rather than defining and designating B/G/OS as part of the development agreement negotiation gives the public a better opportunity to evaluate impacts and to offer recommendations.

Thanks for your help

John Herrick
209 527 2591 (landline)

5/13/2024

City of Riverbank
Attn: Miguel Galvez, Contract City Planner
6617 Third St.
Riverbank, CA 95367

RE: River Walk Specific Plan/Draft EIR Report for Riverbank, CA

Dear Mr. Galvez:

I would like to comment on the proposed River Walk Specific Plan project and have my comments and observations become part of the public record and to be included in the final EIR report for this project.

It is of utmost importance to know the background of how this project came to fruition. This project was not something that the city of Riverbank sought out or has a need for. It was brought to Riverbank by Bill Berryhill who purchased this land a few years ago with the intent to develop it. The question becomes why would a career politician who has stated himself that he has, "A lifetime commitment to agriculture" and a "friend to farmers" willingly and purposely want to destroy "prime" farmland that also happens to be in a major flood zone? The answer is money. Mr. Berryhill stands to make a fortune on this project and he has the political connections to make it happen.

The public also needs to know how absolutely shocking it is that Mr. Berryhill sits on the LAFCO committee where he was "chosen to represent the public" and this exact committee will be voting on whether or not this project will get the green light. Interesting enough, is that Richard O'Brien who is the mayor of Riverbank and has favored the project thus far, is also on this committee. It appears that there is a conflict of interest with members on this committee. The annexation of 1,000 acres of prime farmland is also a clear violation of Riverbank's expansion plan from 2016. In fact, Riverbank's Sphere of Influence was increased by 1,500 acres in 2016. These increases are intended to cover a minimum of a 20-year planning horizon which would be through the year 2036 at a minimum. Trying to increase Riverbank's sphere of influence again with this annexation (coupled with absolutely no shown need for it) and all of the negative impacts it will force on Riverbank, Modesto and Escalon is reckless and clearly being driven by the huge financial gain this project will bring for the developers of this project.

There are so many issues with this project. Traffic is a huge concern for not only Riverbank but also for Modesto and for the city of Escalon. On any given day, the traffic coming into Riverbank from Escalon on Santa Fe Ave. is severely backed up at commute times. From 4:00 p.m. to 6:00 p.m., the cars are piled up for over a mile and the wait time to get over the bridge is at least 15 minutes. In the summer, when Jacob

Myers Park is full, we have waited over 40 minutes in a hot car waiting to get into Riverbank. The traffic on McHenry Ave. at that time as well as the morning commute time is equally as bad.

There are only 2 ways to get over the river and into Riverbank. Adding 2,700 or more homes, businesses, parks, along with a large number of people trying to access the new paths to the river will create a traffic nightmare. How will this be mitigated? *Page 2.0-11 says, "The Specific Plan includes a 'flexible design' provision to enable each of the 18 villages a variety of housing "products" varying in lot and sizes and page 4.0-22 states at maximum density there could be up to 5,607 units doubling the project size. How can one actually know what the impact of this project could be without more details? I would like to know why this wasn't made clear or addressed in the DEIR?

Project impact 3.10-3 states the project's potential to induce substantial population growth is "less than significant" yet it shows commercial use on both sides of Coffee Rd. at McHenry and Patterson on figure 1.0-8. This is significant for not only Riverbank but for Escalon and Modesto as well. Riverbank's 2014 General Plan states that specific plans like River Walk shall be generally "200 acres" in size yet this development is more than 5 times greater and would increase the size of Riverbank by 1/3. This is unacceptable.

Since the year 2000, inbound migration to California has been steadily declining. Since the pandemic, there has been a noticeable decline in the number of inbound moving and an increase in outbound moving leading to the first population declines for California for over a century.¹ With 22% of all retirees moving out of CA, along with the hundreds of thousands moving out of California each year, there is no shown need for this project. According to US NEWS and WORLD REPORT, the exodus from California has been substantial enough for us to lose a Congressional Seat following the 2020 census and is dropping its delegation from 53 to 52 members. Most retirees want a peaceful and very quiet and very safe community to live out their golden years. They do not want to take walks with motorized bicycles, golf carts, horses and children in electric vehicles all while being on the lookout for homeless camps knowing they have questionable and very limited police and fire protection. Oddly enough, the project states it would also have horse trails, but did not address where all of the horse trailers and trucks will be parking and who will be cleaning up after the horses?

Homelessness is a major issue especially around the river and one that will be introduced into this community with new access points to the river and a way for anyone out of the community to access them. Living on the Stanislaus River, we see the homeless on almost a daily basis. We have been threatened with guns and knives on our own property and we are the ones left to deal with all of the

¹ SOURCE: California department of Finance Population Estimates 2000 to 2020 (E-6), census Bureau 2021-2022

garbage that they leave behind (including human waste), the drug needles we have to pick up and dispose of, putting out the fires that they start, watching their animals fight with our own pets and watch as they use the river as their bathroom, YET we have been told by several law enforcement agencies that we as homeowners cannot do anything about them being on our property. How are you going to deal with this?

An article in the Modesto Bee picked up by CBS News on January 25, 2024 told of the homeless communities that have been setting up in Riverbank along the Stanislaus River with elaborate shanties and caves being dug in the banks complete with generators, power and water pumps. Neighbors stated that although they have been taken down several times, they reappear the next day. In this same article, Mayor O' Brien is quoted as saying, "It's a very high priority." In addition he stated, "It's a danger to themselves or others if that river happens to rise rapidly" and that he is well aware of the situation, but the homeless "have the right to live on public property". How is this new community going to deal with the homeless and their rights while protecting the property owners living here?

There is no planned school for this active community of "55 and over" yet 348 homes at this time are not designated for this older age group and could easily see hundreds of school aged children, yet this plan says on page 2.0-30 of the DEIR "that these homes will generate few, if any, school aged children" and no school districts have been notified of this project. This is an outrage and how is this going to be mitigated?

There is also no fire station or planned fire station for this huge project. While page 2.0-29 says the fire district has an "interest" in a site off property, Riverbank's general plan calls for stations located to ensure adequate response time and an ISO rating of Class 2 or better is needed. The city's most current rating was lower than this at a Class 3. How will this project provide for the required adequate response time?

Police services are also a huge issue as the General Plan for Riverbank requires 1.25 sworn officers per 1,000 residents, yet they have never met that standard. Why is that and how will this going to be mitigated?

In the *Transportation Impact Analysis for Riverwalk Specific Plan EIR* that was dated April 11, 2023 but only recently published on the Riverwalk Website, it clearly shows how this project will negatively impact traffic creating a dangerous and unacceptable gridlock in many areas not only for Riverbank but for Modesto and Escalon as well. A huge concern for those trying to get into Escalon or reach Highway 120 is that this report clearly states, "In San Joaquin County, McHenry Avenue north of River Road would need to be a 4-lane facility" and that "No plans exist for widening that road".

After speaking with the city of Escalon staff on May 8, 2024, they clearly stated that they have no plans to widen this area and that this is something that they will not do. They also stated that they were not notified of this project, but many concerned citizens had brought it to their attention.

In closing, it is obvious that this project is being pushed on Riverbank, Escalon and Modesto to benefit the developers and NOT the city of Riverbank. There is a **major conflict of interest** with officials and a complete and total disregard of rules and expectations set forth by our county.

Diana Hernandez-Adrian

Diana Hernandez-Adrian
4606 River Rd.
Oakdale, CA 95361

Enclosure: CBS News/Modest Bee Article on Riverbank Caves 1-25-2024

Shanty town, built-in homeless caves persist along Stanislaus River following Modesto discovery

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RIVERBANK — Homeless communities have been setting up camps along the Stanislaus River. Another setup in the community of Riverbank follows a similar story we covered in nearby Modesto this week.

Elaborate shanties have been taken down and built right back up many times over the last few years along the Stanislaus River in the Riverbank area. Caves are being dug into the banks below Highways 108 and 120.

"I'm sure everyone who drives down Highway 120 there should be worried about it," says nearby resident Eddie Eagleton.

"As soon as they get kicked out, the night after they get kicked out, they just start digging," Eagleton added. "Doesn't seem like anyone can slow them down or stop them."

Eagleton regularly fishes down the Stanislaus River and has been encountering these people for years. He said he often sees people digging into the river's bank to build caves and even wooden shacks.

"It's pretty amazing what 15-20 people can do in a night or two," Eagleton said. "They got generators down there. They got power, water pumps."

The area was cleaned up last fall, but people remain along the river.

"It's a very high priority. First off, it's pollution. It's a danger to themselves or others if that river happens to rise rapidly," Riverbank Mayor Richard O'Brien said.

The mayor said the city is well aware of the situation. They want to find a solution that doesn't infringe on anyone's rights but that also considers the environmental and public health concerns of the community.

"They have the right to live on public property, according to the courts. The Supreme Court is going to take that, so we'll see there," Mayor O'Brien said.

The mayor added that erosion concerns will be addressed with Caltrans.

Residents and business owners we spoke with are most concerned with the environmental impact that building unregulated shacks could have on the river and surrounding areas.

"The reality is you need an actual solution," said Chris Howe, a business owner in the area.

Over in Modesto along the Tuolumne River, eight different hidden homeless caves were cleared out over the weekend. Temporary barricades have since been put up to keep people out.

More from CBS News

Miguel Galvez

From: mlingg <mlingg@charter.net>
ent: Monday, May 13, 2024 8:00 PM
fo: River Walk
Subject: Riverwalk

May 13, 2024

Re: Riverwalk Specific Plan (-SCH #2021060098)

We are writing to express our strong opposition to the proposed Riverwalk development. Many others have already expressed many valid reasons why Riverwalk is not in the best interests of the city of Riverbank or its residents. Rather than rehash those reasons here, we believe the overall issue simply revolves around quality of life and how Riverwalk would change that quality of life in a variety of negative ways. We do not mean to resist change for its own sake. But change on this extreme and irreversible level should be measured very carefully.

Many of us moved to Riverbank to get away from areas with unbearable traffic, rampant crime and deteriorating services. We love living here. The Riverwalk as proposed looks attractive on the surface, but we expect and count on city leaders and other decision makers who are more informed than we are to be responsible and look very carefully at the impact of this project.

Invaluable and irreplaceable farmland, traffic issues, sewer systems, water supply, police services, fire services, another school? Any one of these issues could be the tipping point. The issue of increased traffic alone should raise alarms beyond the developers' assurances of, "Don't worry, it'll be fine". We urge you to not make irreversible decisions that we will all regret for many years to come.

Respectfully,

Michael and Kyle Lingg

4151 Stride Way, Riverbank, 95367

mlingg@charter.net

209-484-0183

04/19/2024

City Of Riverbank
Attn: Miguel Galvez, Contract City Planner
6617 Third Street
Riverbank, CA 95367

RE: Riverwalk Specific Plan/Draft environmental Impact Report, Riverbank CA

Mr. Galvez,

I would like to comment on the proposed Riverwalk Specific Plan project so that it becomes part of the public record and so that it is included in the Final Environmental Impact Report for the referenced project. This project and DEIR have many flaws of which I would like to comment on a few of the most obvious. To me the biggest flaw, and most glaring is that the project is located in a FLOOD PLAIN, no one questions this fact, the only question is, is it in the 50, 100 or 200 year flood plain? It's in a flood plain and will flood at some point in the future.

I have lived and farmed directly across the river to the north for the last 56 years. Before New Melones Dam was constructed the area would flood regularly, since New Melones Dam has been filled it has still occasionally flooded. In fact, the DEIR states that the homeowners will probably want to purchase flood insurance! It's not a question if it will flood, but, when will it flood. I'm sure the developers are counting on it not flooding until after they have taken their profits and left the area. This is why insurers are leaving our state, developments have been located where they are at risk. The very reason the farmland at the development site is so fertile is that it floods and deposits silt and nutrients on the soil. Only a few years ago the Oroville dam spillway almost failed, putting thousands of homes and the residents who live there at risk...our flood control structures are not infallible. See the attached parcel quest Dam Inundation report. As I am writing this letter the Panguitch Dam in Utah has developed a crack and is in danger of failing. Why would someone want to put a development in an area that could flood? The answer has to be profits for the developer.

The DEIR also states that some of the existing levees may need to be strengthened or raised. It's common knowledge that if you raise a levee, it forces the water into a narrow stream instead of letting it expand out over a flood plain, causing the water to "back up" raising the water level upstream. Are you going to flood the River Cove development so as to not flood the River Walk development? River Cove already has water issues. The upstream water issues have not been addressed. In high water times, these flood plain areas become ponds even before the water goes over the levee top. The soils are very sandy and the water subs up to the level of water on the river side of the levee. A prime example of this is the pond just to the west as you cross the McHenry Bridge. I have seen them pump the water out of the pond only to have it refill within a few days as it equalizes to the water level in the river.

This brings up another flaw in the DEIR. It is proposed to build retention ponds for rainwater runoff but if you dig down to build a stormwater retention/infiltration pond it will fill with water before it even rains. See the attached photo of the existing pond I am referencing.

It is proposed to tunnel the sewer under the river to the existing Riverbank sewage treatment plant. The treatment plant does not currently have capacity to serve 3,000 more homes and businesses and it will

have to be expanded. The expansion of the sewer treatment plant will require more fertile river bottom farmland be converted to sewer processing.

Traffic into Riverbank via Santa Fe, McHenry and Patterson roads is already a nightmare at commute hours. All this project proposed to do is dump 3,000 homes worth of traffic onto McHenry and Patterson Avenues. I believe the residents of Riverbank, Escalon and Modesto are against dumping more traffic into this already congested area with virtually no mitigation efforts addressed.

Police, Fire and Schools were not even addressed, except to dump these issues onto Riverbank and let the city deal with the issues after the developers have taken their money and moved on.

I attended the February 27th 2024 meeting of Riverbank City Council for the presentation of the Draft Environmental Impact Report for the River Walk Development and felt like it was more of a sales presentation than an impartial presentation of a DEIR. The presenters of the DEIR/Sales Presentation were given as much time as they wanted and spoke for approximately 45 minutes, but anyone speaking against the project had a timer on them, and all of sudden Mayor O'Brien said, "last comment" and no one else was allowed to speak against the project. There is also a significant conflict of interest with this whole project as both Mayor O'Brien and Bill Berryhill are on the LAFCO committee. This should disqualify this project from the start. This project goes directly against LAFCO's stated goals and objectives. One has to wonder why someone who is on the LAFCO committee would bring up a proposal that contradicts LAFCO's stated goals unless they have already been assured of enough votes to approve it? (see enclosed Modesto Bee article)

As a third-generation farmer, I want my comments to go down in the permanent record in case the Riverbank City Council makes the wrong decision to approve this project. I want my decedents to know I fought for their way of life. We value farming, hard work and some of the best soil in our country.



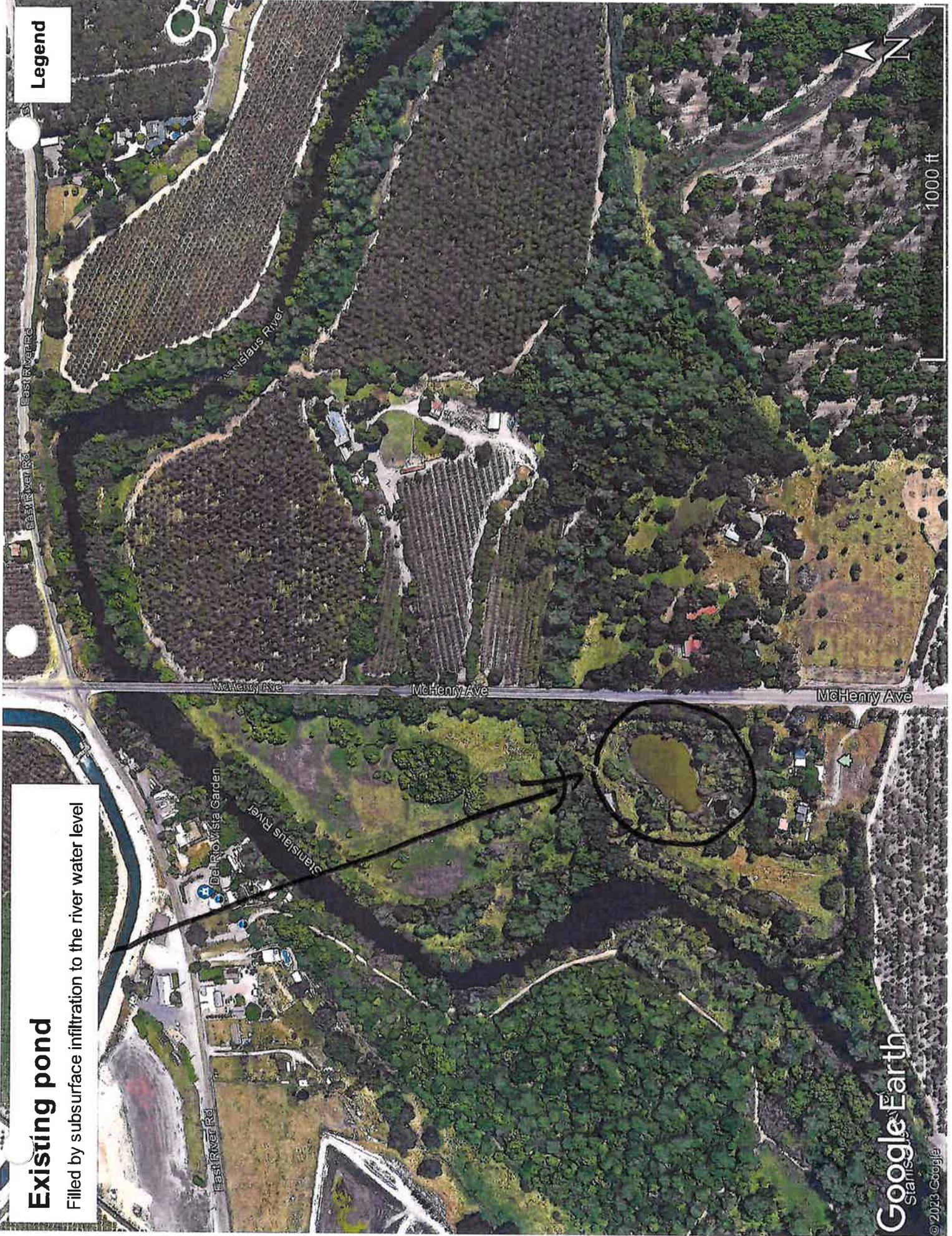
Martin Adrian
4606 River Rd
Oakdale, CA 95361

Enclosures:

- 1- Google Map of subsurface filled pond
- 2- Modesto Bee on RiverWalk/LAFCO
- 3- Parcel quest Dam Inundation Report

Existing pond

Filled by subsurface infiltration to the river water level



Legend



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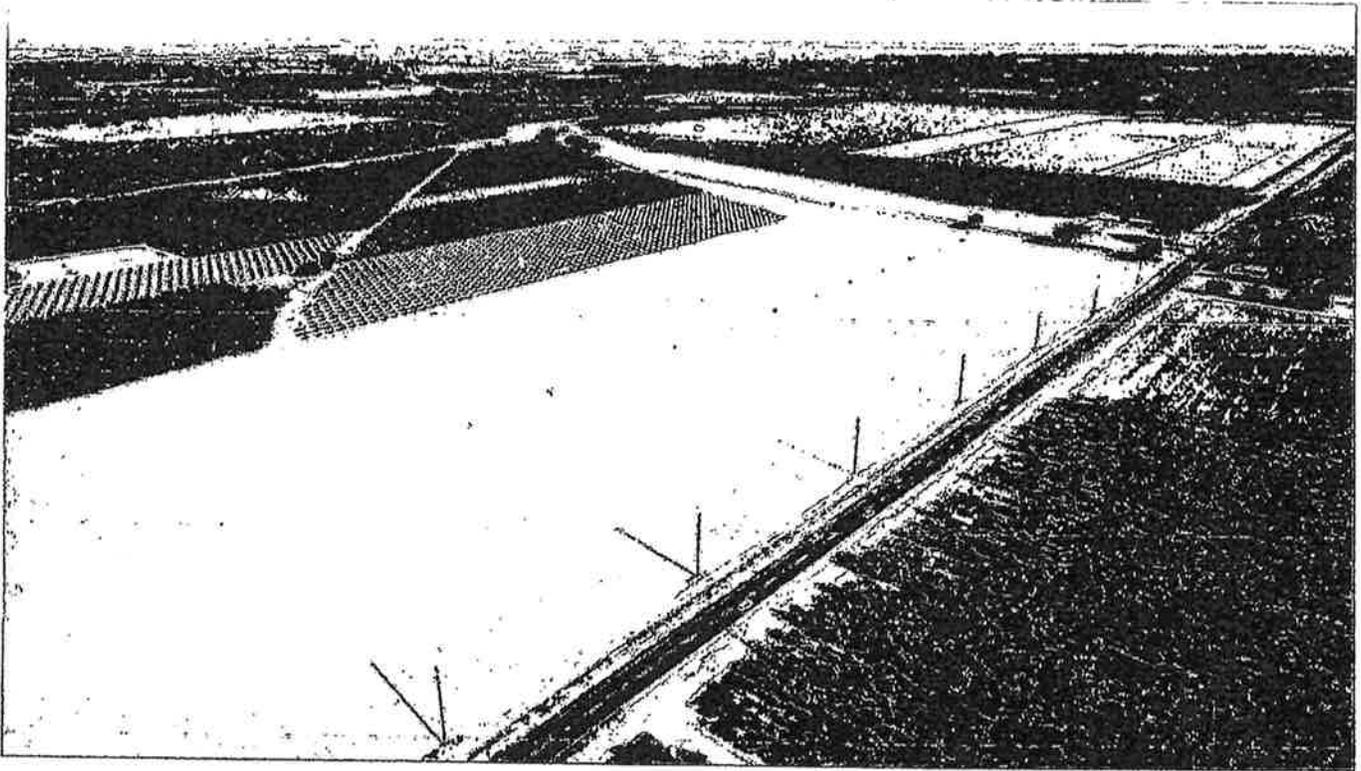
OPINION COLUMNS & BLOGS

Problems with River Walk, largest Stanislaus proposal in two decades / Opinion

BY MATT BEEKMAN, JEANI FERRARI AND LORI WOLF *SPECIAL TO THE MODESTO BEE*

MAY 07, 2023 7:00 AM





The River Walk proposal would add 2,400 homes near Patterson Road and McHenry Avenue, west of Riverbank. ANDY ALFARO aalfaro@modbee.com



Only have a minute? Listen instead

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The city of Riverbank is still early in a process that will be highly consequential for how, where and at what pace cities pursue residential development in Stanislaus County.

A Notice of Preparation for the Environmental Impact Report of the River Walk Specific Plan was completed approximately two years ago. The full Environmental Impact Report (EIR) for River Walk is expected to be completed this spring.

River Walk would expand Riverbank's Sphere of Influence by 1,535 acres and annex nearly 1,000 acres, making it the single largest development project in Stanislaus County in over 20 years. The scale of the project alone should be a cause for concern considering the conversion of some of the best farmland in the world, as well as potential impacts to infrastructure and city finances.

OPINION

Riverbank residents should understand that they will be responsible for footing part of the bill for infrastructure improvements to accommodate this project and have already started paying for it in their recent sewer rate increase.

One must question the wisdom of building a large-scale residential development in a flood plain. River Walk's location is prone to floods and has flooded three times in the last 75 years. The Farmland Working Group hopes that this legitimate concern is adequately addressed in the upcoming EIR. It is worth mentioning that over 15 years ago, parcels in the annexation area were deemed ineligible for a conservation easement by the Army Corps of Engineers due to concerns regarding potential for flooding.

Stanislaus County Local Agency Formation Commission has raised concerns about the pace at which Riverbank is filing for annexations. LAFCO approved a 1,479-acre annexation for Riverbank in 2016. The intention articulated by the city was to have the annexation accommodate growth for the next 20 years.

Just three years later, Riverbank obtained another 400-acre annexation referred to as Crossroads West. Approving a third annexation that violates Riverbank's own articulated rates of growth in previous annexation requests creates a dangerous precedent, allowing annexations to be based on false premises. This lack of factual basis would erode transparency or accountability at LAFCO.

LAFCOs are an important check to ensure development will not have long-term negative consequences. A key part of this check is a document referred to as a Municipal Service Review. An MSR is "a comprehensive study to determine the adequacy of governmental services being provided by the local agencies under LAFCO jurisdiction." Riverbank's current MSR has not been updated to account for another expansion to the scale of River Walk.

The River Walk project would create a county island by surrounding the unincorporated Park Ridge and River Heights neighborhoods. Such county islands become problematic in providing services to, and are to be avoided.

The River Walk project would directly violate the terms by which LAFCO approved Riverbank's annexation in 2016. In that annexation request, Riverbank explicitly stated a commitment to not developing properties to its west, and designated the land as agricultural buffer. These buffers are spelled out as a plan for "agricultural preservation," which is also referenced in Riverbank's General Plan that prioritized infill development.

There need to be consequences for such potential bait-and-switch tactics. If cities can defy long-established codified LAFCO policies without consequence, all residents in Stanislaus County, urban and rural, will lose an important check against unbridled growth that can have long-term consequences for our agricultural economy that injects billions of dollars into our county annually, providing the ability to fund first responders and to maintain adequate infrastructure.

Fortunately, it is early in the process for the River Walk project. Changes can be made. Farmland Working Group hopes the city of Riverbank reconsiders the River Walk project and keeps its commitments, as articulated in its annexation request in 2016, to prioritize infill development and agricultural buffers to its west. This would be for the direct benefit of Riverbank and county residents while ensuring the maintenance of Stanislaus LAFCO's critical role.

Matt Beekman, Jeani Ferrari and Lori Wolf are members of Turlock-based Farmland Working Group's advocacy committee.

RELATED STORIES FROM MODESTO BEE

LOCAL

Riverbank would grow to McHenry under plan for 2,400 homes. Not so fast, critics say

JUNE 20, 2021 6:00 AM

GARTH STAPLEY

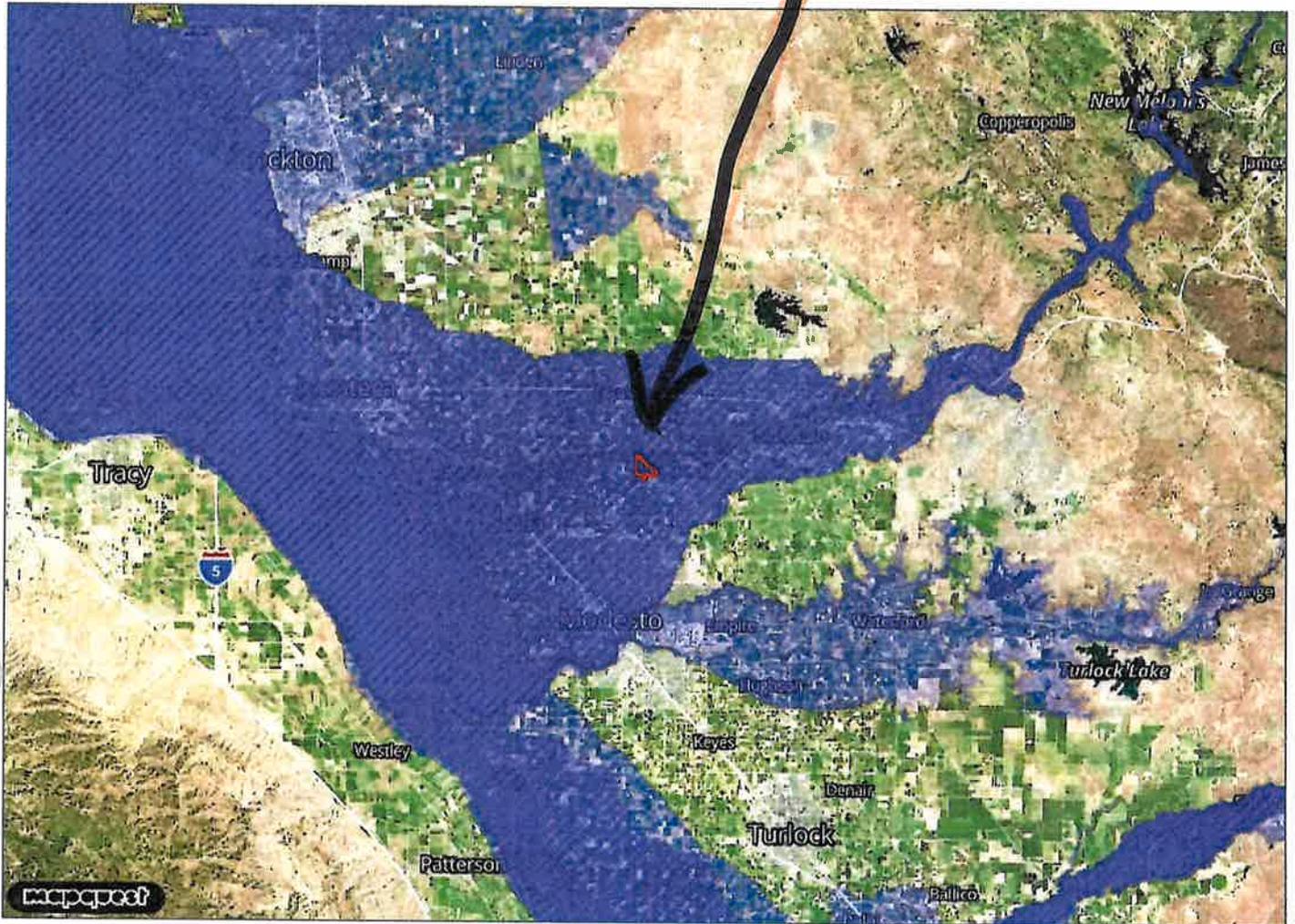
Against the odds, rape penalty bill moves forward | Opinion

APRIL 23, 2023 6:00 AM

Dam Inundation Report

Property Address:
PATTERSON RD OAKDALE CA 95361

Parcel # (APN):
074-003-022-000



CEMA Dam Inundation Legend

-  CEMA Dam Inundation Zone(s)

Special Flood Hazard Report

The Federal Emergency Management Agency (FEMA) has prepared Flood Insurance Rate Maps, which delineate flood zones based on estimated flood risk. The zones pertinent to this report are Zone A and V (Special Flood Hazard Areas). Zone V is for coastal areas and Zone A is for inland areas. These zones are located within a 100-year flood plain. A 100-year flood has a one-percent chance of occurrence in any given year. Flood insurance is required by federally regulated lending institutions for the properties located within Zones A or V. Local flood control projects to mitigate flood hazard potential can change the flood risk of a specific area or property. The flood risk of a specific area or property may be updated through a Letter of Map Change filed with FEMA. Specific updated flood risk information, not included on the Flood Insurance Rate Maps, is not provided in this report. If a property is located within a Special Flood Hazard Area, ParcelQuest recommends contacting FEMA for the updated risk assessment of the property and the current flood insurance requirements. It should be noted that properties within a Special Flood Hazard Zone may never experience flooding, and conversely, properties not located within a Special Flood Hazard Zone may experience flooding. This report is not meant to predict flooding, but rather to identify properties for which flood insurance may be required by federally regulated lending institutions.

Dam Inundation Report

The California Office of Emergency Services (CA OES), also known as the California Emergency Management Agency (CEMA), has provided Inundation Maps, which delineate areas subject to flooding from a sudden, catastrophic failure of a dam with a full reservoir. Maps are not available for all dams in the state. Additional maps may become available subsequent to approval by the OES. Inundation from reservoir, dam, or dike failure can pose serious risks to large segments of the population. Cities and counties within the mapped areas are required to adopt emergency procedures for the evacuation of populated areas.

Fire Hazard Severity Report

The California Department of Forestry and Fire Protection (CDF), also known as Cal Fire, under the Bates Bill (AB 337) established Very High Fire Hazard Severity Zones (VHFHSZ) in the Local Responsibility Areas (LRA) of California. The maps prepared by Cal Fire show zones based on State criteria. Local agencies, by law, are allowed to make changes to the zones. Fire defense improvements are mandated for properties located within the zones under section 51178 and 51179 of the Government Code. Mandated improvements include a Class A roof for new development or replacement of an existing roof and brush clearing within 30 feet of a structure. For a complete listing of the mandated fire defense improvements and local zone changes, contact the local fire department. The Very High Fire Hazard Severity Zone Maps were prepared at a scale that does not always allow a conclusive determination to be made at zone boundaries. In these cases, the local fire department should be contacted to determine if the property is located within the zone.

Wildland Fire Hazard Report

The California Department of Forestry and Fire Protection (CDF), also known as Cal Fire, has established State Responsibility Areas (SRAs) for which the primary financial responsibility for prevention and suppression of fires is that of the State. However, the State is not responsible for protecting structures within these areas. The property owner is subject to certain maintenance requirements and may be responsible for fire protection of structures under Section 4291 of the Public Resources Code. If the property is located within a State Responsibility Area, ParcelQuest recommends contacting the county fire department to obtain a full listing of property owner maintenance and fire protection requirements. Public Resources Code Section 4326 reads, "A seller of real property which is located within a state responsibility area determined by the board, pursuant to Section 4125, shall disclose to any prospective purchase the fact that the property is located within a wild land area which may contain substantial forest fire risks and hazards and is subject to the requirements of Section 4291." The State Responsibility Area Maps were prepared as a scale that does not always allow a conclusive determination to be made at zone boundaries. In these cases, the county fire department should be contacted to determine if the property is located within the zone.

Miguel Galvez

From: Miguel Galvez
Sent: Tuesday, May 14, 2024 1:02 PM
To: Christine Holmer
Cc: River Walk
Subject: RE: River Walk Protest Letter
Attachments: May 15 Letter to Riverbank Contract City Planner.docx; SWG_Safe Passages_2014.pdf

Richard and Christine Holmer,

Your comments on the River Walk Specific Plan and Draft EIR have been received by the City of Riverbank.

Thank you,

Miguel Galvez,
Contract City Planner
City of Riverbank
(209) 863-7124
cityplanner@riverbank.org

From: Christine Holmer <revchris23@gmail.com>
Sent: Tuesday, May 14, 2024 11:20 AM
To: Miguel Galvez <cityplanner@riverbank.org>
Subject: River Walk Protest Letter

Dear Mr. Galvez,

Attached please find a letter from us concerning the proposed River Walk Project as well as the Safe Passages Study we feel should be considered regarding this proposed project.

We are requesting notification that you received this email and the contents within.

Thank you very much,

Richard and Christine Holmer

May 15, 2024

City of Riverbank
Attn: Miquel Galvez, Contract City Planner
6617 Santa Fe Street
Riverbank, CA 95367

RE: River Walk Specific Plan/Draft Environmental Impact Report, Riverbank, CA

Dear Mr. Galvez:

We are writing to list our concerns regarding the proposed Riverwalk Development. First, it is our understanding that a similar project was denied in approximately 2007 due to: 1. The opposition to a gated community, 2. Conflicting school district boundaries, and 3. Environmental concerns addressed in a UC Davis Study that was subsequently submitted and accepted by the State Department of Fish and Wildlife in 2014. This study is attached for your review as it appears you are unaware of the issues and impacts addressed in this report. There is nothing in the Specific Plan nor the Environmental Impact Report that speaks to how the City would mitigate and address the vast number of issues listed in the Study. Furthermore, we would like to know if the State Department of Fish and Game, as well as the Army Corp of Engineers, have been notified of this potential development and its many impacts.

Second, we were informed that the City was mandated by the County to build approximately 3600 new homes to ease the housing shortage in the State/County. Upon further research, we learned that the Stanislaus Council of Governments (StanCog) made the recommendation to each City in the County of the number of houses they should build. The Cities are under no obligation to build this number of homes and must only refrain from placing artificial barriers to their construction. The State of California Finance Department's 2060 population projections for Riverbank actually shows that Riverbank need to build 20 dwellings per year, well below the figure that the State Housing and Community Development Department rammed through StanCOG. The State Finance Department has Stanislaus County's entire 40 year population delta equaling 55,909. This number divided by 40 equals 1,398 new residents per year. With a house size of 3.21, this equates to 435 dwelling units per year. This equates to 3,483 total units in Stanislaus County over an eight (8) year Housing Element Cycle. Riverbank consists of 4.5% of the Stanislaus County Population meaning that 158 units should be built during these eight years, equaling 20 dwellings per year. This is a far lower number than the initially proposed 3,200 residential units.

Third, we are concerned that the Water Supply Analysis (WSA) is not complete if it has not taken into account the impact that drilling three new deep wells and installing a water tank to support the River Walk Development will have on the adjacent Park Heights Water District. We understand that Stanislaus County recently lost a lawsuit because they allowed deep well drilling for farmers in Knights Ferry that negatively affected the well levels of surrounding homes without first completing an Environmental Impact Report. The Park Heights Water

District has two wells to service 97 homes. The production of these wells will be compromised by the drilling of three additional wells to the west, thus this must be addressed in the Environmental Impact Report.

Fourth, we understand that the sewage generated by the development will need to be pumped under the Stanislaus River and through four pump stations until it reaches the Riverbank Sewer Treatment Plant. While the initial costs will be paid for by the developer, the long-term maintenance will be placed on current and future residents. Will the proposed homes in this plan be placed in a community service district that will amass fees for that purpose?

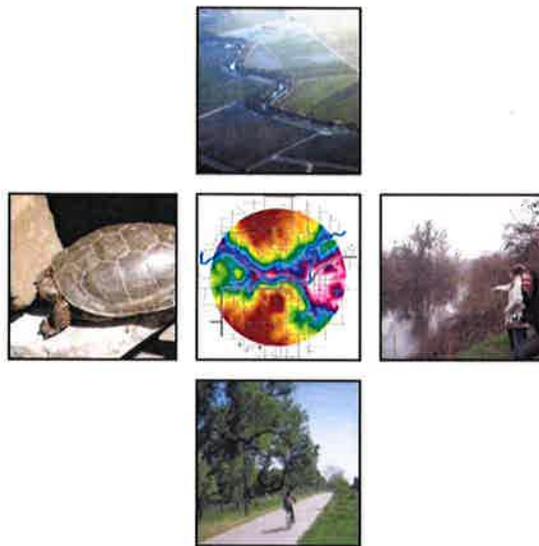
Finally, it is our understanding that both Mayor Richard O'Brien and Bill Berryhill, who is a land owner that is a part of this proposed development, serve on LAFCO, an agency that will be required to vote to approve this project. We expect that both Mayor O'Brien and Mr. Berryhill will recuse themselves from all voting that pertains to this project as this can be construed as a direct conflict of interest.

The loss of prime farm and agricultural land is not warranted for a non-existent housing need at the expense of irreparable damage to the Stanislaus River Wildlife Corridor as well as endangering the water supply of an existing adjacent neighborhood and placing undue stress on Riverbank's wastewater treatment plant, not to mention traffic concerns, pollution and other negative impacts. We strongly urge the Mayor and the City Council to vote not to proceed with this project and to further work with State of California and Stanislaus County to protect the Local and Regional Wildlife Habitat as well as our irreplaceable farmland.

Sincerely,

Richard and Christine Holmer
2116 Park Ridge Dr.
Riverbank, CA 95367
rmholmer@gmail.com
(209) 648-3496

SAFE PASSAGES: Local and Regional Wildlife Habitat Connectivity Planning



Prepared by

**Patrick R. Huber
Ryan C. Hill
and
Steven E. Greco**

June 2014

**Safe Passages:
Local and Regional Wildlife Habitat Connectivity Planning**

Prepared by:

**Patrick R. Huber
Ryan C. Hill
and
Steven E. Greco**

**Landscape Analysis and Systems Research Laboratory
Department of Human Ecology
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Prepared for:

**California Department of Fish and Wildlife
Habitat Conservation Planning Branch
1416 9th St., 12th Floor
Sacramento, CA 95814**

June 2014

EXECUTIVE SUMMARY

The ability of wildlife to move through a landscape in order to acquire or complement necessary resources for feeding, cover, and reproduction has been recognized as critical for the survival of animal populations. The Safe Passages project was initiated in 2008 to provide guidance to management agencies on how to incorporate this ecological process into land use planning. This report details a portion of the overall Safe Passages project, a linkage design for a local municipality that collaborated with researchers in order to better understand the ecological needs of their local region and to incorporate them into their local land use planning process.

The city of Riverbank is located adjacent to the Stanislaus River in Stanislaus County in the San Joaquin Valley. Using data derived in earlier portions of the Safe Passages project as well as land cover and species data specific to this analysis, the research team conducted a systematic conservation planning assessment for the area surrounding Riverbank. Marxan optimization software was used to perform conservation priority analyses of land parcels using a number of land cover and species specific data sources as input. These included connectivity assessments for four focal species at several spatial scales, habitat models for 22 sensitive species and ecosystem types, as well as mapped extents of five major land cover types.

Land ownership parcels receiving a high irreplaceability score at any of the scales of analysis in Marxan were identified as part of the linkage. Further, parcels that were not selected by Marxan but nonetheless had high connectivity scores for any of the focal species at any of the scales were included in the final linkage design.

The final linkage design includes: (1) parcels along the Stanislaus River that can either facilitate wildlife movement along the riparian corridor or provide habitat for resident species; (2) extensive, relatively intact grasslands and vernal pool complexes in the eastern portion of the study area; and (3) agricultural lands that can support both food production and ecological needs for native species.

The authors intend for the approach taken in this linkage design to be transferable, especially to other areas in the Central Valley or any regions that include extensive areas of working landscapes. The novel use of connectivity modeling in the Safe Passages project has the potential to provide important benefits to systematic conservation planning in this and other regions of California and beyond.

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INTRODUCTION

The Safe Passages project, launched in 2008, is a collaborative effort to advance the concepts, planning, and implementation of local and regional wildlife habitat connectivity within the state of California. The original team included both university research groups and conservation NGOs working closely with state agencies. Funding for the Safe Passages project has been provided by the Wildlife Conservation Society and the California Department of Fish and Wildlife (CDFW) to support the implementation of the State Wildlife Action Plan (SWAP) as well as Caltrans' compliance with requirements of federal transportation legislation. Included among the SWAP recommendations and priorities was the need for wildlife connectivity to be incorporated into state-wide, regional, and local planning processes (Bunn et al. 2007).

One of the major actions associated with the Safe Passages project is the design of a model linkage to serve as a prototype for future community planning efforts. The objective of this portion of the project was to design an implementable wildlife linkage in a location highly impacted by human activity and subject to many constraints imposed by the physical and regulatory setting. We selected as our study area a small incorporated city in the San Joaquin Valley (SJV), an agricultural region in California that is currently undergoing rapid urbanization. We made the decision to select the model linkage location from a group of willing local government entities. This interaction with local governments was deemed important to ultimately achieve the incorporation of connectivity planning results into city and county general plans, the primary policy vehicles guiding land use changes.

Study Area

The study area is located in the southern portion of California's Great Central Valley, in the San Joaquin Valley. The San Joaquin Valley (SJV) includes eight counties and measures approximately 7 million hectares (70,000 km²) in extent, spanning 450 km from north to south, and 150 km from east to west. The human population of this geographically and biologically diverse region is growing faster than Mexico's (CIA 2002) and has a poverty rate higher than that of the Appalachia region of the United States (Rural Migration News 2006). Prior to European settlement, the wildlife habitats of the valley floor were well connected to the foothills and Sierra Nevada mountains through natural community linkages, comprising a healthy, functioning ecosystem. During the late nineteenth and early twentieth centuries, however, the SJV became one of the most productive agricultural centers in the USA. Today, agriculture remains the predominant land use in the SJV, but burgeoning populations and the need for housing and supportive commercial and industrial development have intensified pressures on the regions natural resources. In the next 35–40 years, the population in the valley is projected to more than double, increasing from 3.3 million today to more than 7 million by 2040 (PPIC 2006). By 2050 there will be close to 8 million SJV residents.

The city of Riverbank is an incorporated municipality with a population of approximately 20,000 residents. It is located in northern Stanislaus County, adjacent to the south bank of the Stanislaus River (Figure 1). The river forms the border between Stanislaus and San Joaquin counties. The city lies on a high bluff (tens of meters in height) overlooking the river. It is primarily an agricultural center, founded as a railroad stop from which to ship locally produced crops. The natural vegetation in the area surrounding the city has been highly fragmented, the result of land conversions accompanying the intensification of post-Gold Rush agricultural production. Currently, about 4% of the area within a 10 km radius of the city can be considered natural vegetation (primarily riparian vegetation and annual grassland), with roughly 70% of the area used

for agriculture and 25% converted to urban uses (Huber et al. 2010b). The Stanislaus River is a major ecological feature of the area, and one of the major components of the city of Riverbank's open space and recreational system is Jacob Myers Park, located within the riparian zone. The Stanislaus River's headwaters begin in the Sierra Nevada mountains (east of the San Joaquin Valley), and the river flows roughly east to west for approximately 154 km before its confluence with the San Joaquin River approximately 25 km west of the city.

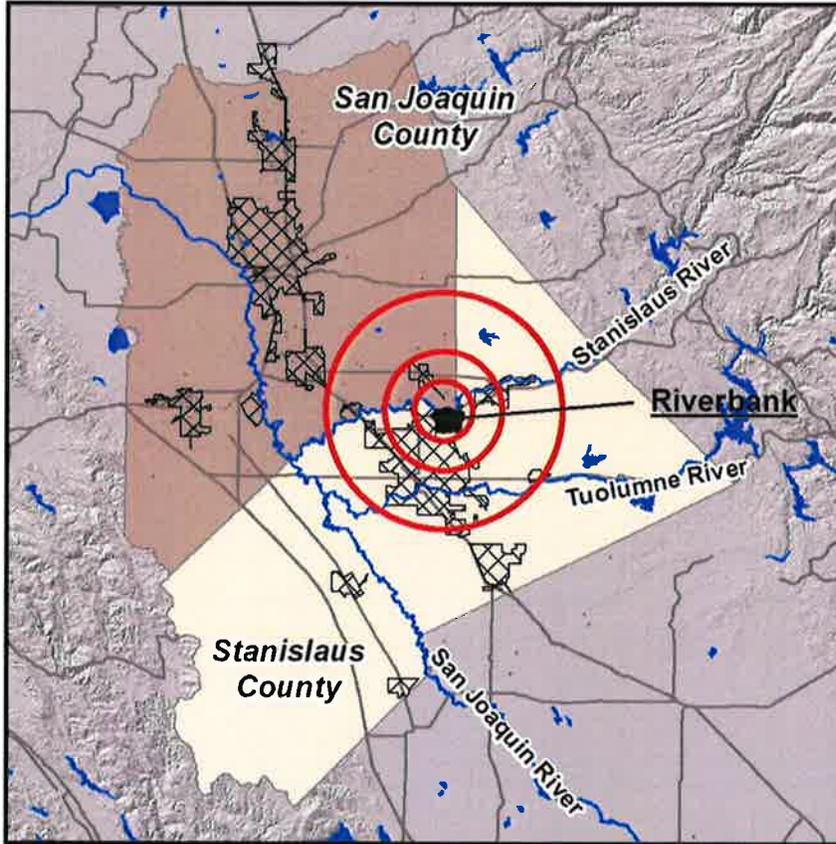


Figure 1. Study area. Red circles depict the three spatial scales assessed in this project: 5, 10, and 20 km radii from a point on the north edge of the city of Riverbank, Stanislaus County, California. Hatched areas are urban centers, except the city of Riverbank which is depicted as solid black fill.

Wildlife Habitat Connectivity

The ability of wildlife to move through a landscape in order to acquire or complement necessary resources for feeding, cover, and reproduction has been recognized as critical for the survival of animal populations (Taylor et al. 1993). One definition of habitat “connectivity” is the ability of an individual or population to move between habitat patches that provide these resources (Hilty et al. 2006). Habitat patches and landscape connectivity are species-specific concepts that are determined by an animal's perception, vagility, and life history requirements, operating within a spatially explicit context of

topography, land cover (e.g. vegetation), hydrology, disturbance regimes, and other elements which determine the composition, configuration, and structure of the animal's environment. Connectivity can also be seen as the opportunistic movement of wildlife in response to environmental cues over various time frames. A species can undertake several types of movement events, which generally take place at different spatial and temporal scales at various life history stages. Daily movement can occur in the procurement of food and water, shelter, or other resource requirements. Seasonal movement, or "migration," might generally occur at a much larger spatial scale. Long distance juvenile dispersal or other colonization events might take place once in an individual's life or even less frequently, occurring only after a lapse of several generations. These various types of movement, coupled with inter-specific biological differences, lead to numerous ways in which to measure a landscape's connectivity in terms of habitat needs.

Management for landscape connectivity often focuses on planning and implementation of wildlife "corridors" (Dobson et al. 1999, Bennett 2003). Designed to facilitate animal (and plant propagule) movement between larger "core" habitats, these connective landscape configurations are often linear in form. While these ecological network components often fulfill important conservation management roles, they do not encompass the entirety of animal movement across a landscape. While a designated corridor might promote animal movement within its borders, between discrete termini, important ecological opportunities within the surrounding landscape, or "matrix", may be lost.

A fuller, 360° landscape view of connectivity rather than a constrained corridor-focused approach might be more effective and especially applicable in regions where there are few large core habitat areas (ecological nodes), as is the case in the San Joaquin Valley and the Riverbank study area. Such an approach would seek to "soften" some portion of the agricultural landscape matrix to make wildlife passage through a larger proportion of the landscape possible rather than relying entirely on a designated corridor. When any given landscape is dominated by human land uses, "softening the matrix" signifies an attempt to identify and ameliorate human generated barriers and impediments to ecological processes, thereby encouraging and potentially re-enabling certain ecological functions such as wildlife species movement to occur within those areas characterized by human land uses (e.g., farmland or cities) (Green et al. 2005; Noss and Daly 2006; Wiens 2006; Fischer et al. 2008). Examples of softening the agricultural landscape matrix include augmenting farm edges with hedgerows, constructing tail water ponds in low elevation areas, and vegetating canal edges (Robins et al. 2001; Long and Anderson 2010; Burchett and Burchett 2011). Urban areas and urban edges can also be softened to facilitate animal movement and other ecological functions (Soule 1991; Marzluff and Ewing 2001; Gehrt and Chelsvig 2003; Lundholm and Richardson 2010). Some examples in the city of Riverbank would be creation of multifunctional storm water detention basins that also provide habitat resources near the Stanislaus River and adding tertiary water treatment wetlands adjacent to the existing sewage treatment plant near the river. City parks can also contribute to softening the urban edge and, to some degree, provide wildlife connectivity resources.

This approach to planning for wildlife connectivity views the landscape holistically and strives to create an "ecological network" (Jongman and Pungetti 2004) consisting of traditional natural reserve cores and corridors along with cultural landscape features that function to contribute to animal habitat and movement. Ecological networks can integrate open space, urban areas, agricultural areas, and natural reserves into a single coherent system.

Previous Work

Previous work that the team conducted for this project (“Phase 1”) focused on developing new modeling techniques to assess connectivity. These techniques were designed to more fully integrate high circuitry, multi-directional connectivity rather than focusing on movement between a priori endpoints, or termini (Huber et al. 2012). These “least cost surfaces” were developed for four focal species: mule deer (*Odocoileus hemionus*), bobcat (*Lynx rufus*), San Joaquin pocket mouse (*Perognathus inornatus*), and western pond turtle (*Actinemys marmorata*). These species were selected to represent many of the major ecological needs of the region’s native species.

Further, it is known that the choice of spatial scale in analyses can affect the outcome of conservation planning efforts (Huber et al. 2010a). To address some of these concerns, connectivity was assessed at multiple spatial scales for each of the focal species, resulting in 12 distinct least cost surfaces (Huber et al. 2012).

Finally, an additional goal of the selection of the study site was to evaluate the future potential for re-establishing landscape connectivity between the relatively intact wildlands of the Sierra Nevada and ecologically important San Joaquin River and its associated riparian ecosystems. A traditional least cost corridor analysis was conducted between Stanislaus National Forest (east) and San Joaquin National Wildlife Refuge (west), based on mule deer habitat and movement patterns.

Linkage Design

While the previous analyses provide potentially useful management information as independent datasets, they were intended as inputs to a larger linkage design. The concept of a linkage design is the creation of a conservation plan that incorporates the important ecological features of the planning area with a particular focus on landscape connectivity for multiple species. The linkage design found in this report includes representative examples of major land cover types in addition to potential habitat for sensitive native plant and animal species. The land cover types included in the analysis were annual grassland (AGS), freshwater emergent wetland (FEW), valley foothill riparian forest (VRI), and wet meadow (WET). There were 22 sensitive species and habitat types also considered here, as well as vernal pool complexes (VP). This analysis also incorporated areas of high potential connectivity for the four focal species that are meant to serve as proxies for a wide array of the region’s native species.

Ecological patterns and processes occur at various spatial scales (Turner et al. 1989). The linkage was designed to address multiple scales in order to capture as many of the region’s ecological patterns and processes as possible. Land parcels representing land title ownership were chosen as the unit of analysis (as opposed to a normalized unit of land such as a square or hexagonal grid) because they are the most expedient unit for acquiring land or implementing usage regulations for incorporation into a linkage design. Selected parcels include connectivity needs assessed at four spatial scales in order to provide movement potential: (1) in the immediate vicinity of Riverbank; (2) at a larger local scale across the San Joaquin Valley floor; (3) at a larger regional scale that includes the lower end of the Sierra Nevada foothills; and (4) at the largest scale – linking the Sierra Nevada to the San Joaquin River.

The linkage design is meant to serve as a guide for local jurisdictions in making land management decisions. Different portions of the linkage will be included in the design for various ecological reasons and therefore will be associated with management suggestions appropriate for specific parcels. The

hypothesis of the linkage design is that if implemented it will provide the basis for sustainable management of existing and potential future ecological resources in the vicinity of Riverbank.

METHODS

Four categories of input data were used for the linkage design:

1. Conservation feature / land cover associations
2. Potential habitat for sensitive species
3. Land cover
4. Connectivity analyses for four focal species

Conservation Feature / Land Cover Associations

Objective: To compile a comprehensive list of land cover types which provide high quality habitat for the feeding, cover, or reproductive needs of the 22 sensitive species considered in the linkage design, or which provide the structural and ecological context for the sensitive habitat types considered. For instance, vernal pools, a sensitive habitat type considered in the linkage design, may be found in areas with land cover types of annual grassland (AGS), perennial grassland (PGS), or pasture (PAS).

Process

1. The California Department of Fish and Wildlife (CDFW) developed and maintains a database/client application called California Wildlife Habitat Relationships (CWHR). This wildlife and habitat information system contains life history, geographic range, habitat relationships, and management information on 694 species of amphibians, reptiles, birds, and mammals known to occur in California (CDFW 2014).
2. For each of the 22 species of special concern and five ecological community types (i.e., conservation targets) considered in the linkage design (Table 1), the ecological literature and CWHR were used to determine the land cover types considered to be of high value for the feeding, cover, reproduction, or ecological context of the conservation target. CWHR uses a scale of 'low,' 'medium,' and 'high' to rate the suitability of land cover types for a species according to its life history requirements (i.e., ecological needs). Any land cover type which ranked 'high' in CWHR for any one of the species' basic needs was considered in our analysis as a 'high' value land cover for that species.

Output

The output of the above process is a text file (hereafter referred to as the 'conservation target/habitat association file.') in which each conservation target is associated with a list of high quality habitat types according to the CWHR classification schema.

Potential Habitat Analysis

Objective: To estimate the total area (in acres) of potential habitat for 22 sensitive native species within each parcel in the scope of analysis (Table 1).

Key Inputs

1. **California Natural Diversity Database (CNDDDB) layer:** Point shapefile (CNDDDB May 2011) of centroids taken from CNDDDB polygons representing species observations.
2. **Land cover layer:** Central Valley land cover shapefile, derived from the National Land Cover Database (2006; Fry et al. 2011) and Fire and Resource Assessment Program (FRAP 2006), then crosswalked to California Wildlife Habitat Relationship (CWHR) classifications.
3. **Vernal pool layer:** US Fish and Wildlife Service (USFWS) Vernal Pool shapefile (USFWS 2005).
4. **Parcel layer (Figure 2):** Riverbank analysis area subdivided by ownership parcel. A 20 km radius was used to circumscribe the scope of analysis around the town of Riverbank. All parcels entirely within or intersected by the demarcation line were included within the scope of analysis. Analysis scopes employing 10 and 5 km radii were also used.

Process

1. For each conservation target, the following process was applied iteratively in ArcGIS 10.0.
 - A. CNDDDB observation centroids of the conservation target were buffered with a one mile radius to create circular polygons. This radius was selected in order to capture likely usable habitat within a close vicinity of the approximate occurrence points. Usable habitat could potentially be found beyond this distance, but a conservative extent was used to identify only the most likely habitat. The radius distance was also selected to help address the spatial uncertainty of CNDDDB data.
 - B. The circular polygons of the conservation target were used as a clip shape for the land cover layer.
 - C. The resultant clipped land cover was further refined by selecting only high value CWHR habitat types for that conservation target.
 - D. These high value land cover polygons for the conservation target were then overlaid with the parcel layer, and their areas summed by each parcel. In this way, land cover was employed as the conservation currency rather than species occurrence counts, making the accuracy of the point locations less critical. For instance, whether a conservation target point was located on one side of a parcel border or the other, a substantial portion of both parcels are likely to have their land cover evaluated for high quality habitat within the buffered polygon area.

Output

The output from the above process is a shapefile of all parcels within the scope of analysis. Each parcel constitutes a single polygon and record in the shapefile attribute table. For each conservation target within the scope of analysis, a field is named and written to the attribute table. The sum of aggregate high value habitat area for each conservation target is then calculated according to each parcel, and recorded in the designated field. For example, if a parcel contained high value habitat for five of the 22 conservation targets, then the parcel

record would have the five corresponding conservation target fields written with the summed habitat area for each of those conservation targets, while the fields for other conservation targets not found in that parcel would record zeros.

Notes

1. For conservation targets which are obligate vernal pool species, a USFWS vernal pool shapefile was clipped to the bounds of the CNDDDB species shapefile (see 2B above). This vernal pool area was summed and recorded for each parcel record in the field for the conservation target species.
2. For conservation targets which are facultative vernal pool species, both the USFWS vernal pool layer and CWHR cross-walked land cover layer were clipped to the area of the CNDDDB species shapefile. A union was performed between the two layers in order to aggregate high value habitat areas of all types pertinent to the species.

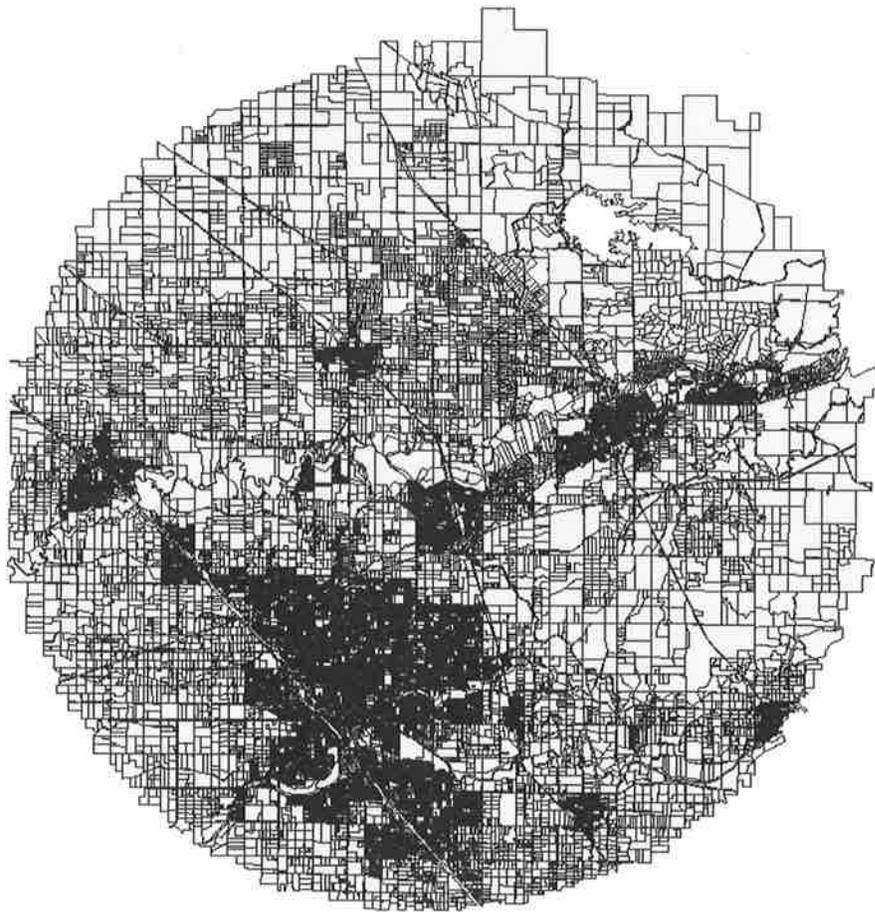


Figure 2. Parcel layer showing land ownership parcels within the largest (20 km) scope of analysis. A 20 km radius was used to circumscribe the perimeter of the largest study area. All parcels intersected by the demarcation line were included in the scope of analysis. Analysis scopes of 10 and 5 km were also used.

Table 1. Major land cover types and sensitive species. These 27 types were conservation targets in the Marxan analyses. The total area of each in the study region, the overall conservation goal for each (as a percentage of their total area), and the data source for each are included.

Conservation Target	Total (ac)	Target (%)	Source
Annual Grassland	40,365.6	50	CWHR
Freshwater Emergent Wetland	3,151.7	100	CWHR
Valley Foothill Riparian Forest	1,269.8	100	CWHR
Wet Meadow	0.8	100	CWHR
Tricolored Blackbird	3,698.7	75	CNDDDB
California Tiger Salamander	2,718.1	75	CNDDDB
Burrowing Owl	2,903.2	75	CNDDDB
Aleutian Canada Goose	13.6	75	CNDDDB
Swainson's Hawk	3,425.7	75	CNDDDB
Valley Elderberry Longhorn Beetle	118.0	75	CNDDDB
Elderberry Savanna	13.5	75	CNDDDB
Western Pond Turtle	183.4	75	CNDDDB
Delta Button-Celery	6.8	75	CNDDDB
Hoary Bat	120.1	75	CNDDDB
Vernal Pool Tadpole Shrimp	11,299.1	75	CNDDDB
California Linderiella	6,678.6	75	CNDDDB
Hardhead	293.3	75	CNDDDB
Yuma Myotis	119.3	75	CNDDDB
Colusa Grass	365.8	75	CNDDDB
Riparian Woodrat	0.8	75	CNDDDB
Nothern Hardpan Vernal Pool	4,741.3	75	CNDDDB
San Joaquin Valley Orcutt Grass	322.0	75	CNDDDB
Hartweg's Golden Sunburst	390.2	75	CNDDDB
Riparian Brush Rabbit	0.8	75	CNDDDB
Greene's Tuctoria	322.0	75	CNDDDB
Great Valley Mixed Riparian Forest	40.5	75	CNDDDB
Vernal Pools	21,526.1	50	USFWS

Land Cover Analysis

Objective: To calculate the total coverage (in acres) of various CWHR land cover types within the parcels in the scope of analysis. The assessed land cover types were annual grassland (AGS), freshwater emergent wetland (FEW), valley foothill riparian forest (VRI), wet meadow (WTM), and vernal pools (VP) (Table 1).

Key Inputs

1. **Land cover layer:** Central Valley land cover shapefile crosswalked to California Wildlife Habitat Relationship (CWHR) classifications.
2. **Vernal pool layer:** USFWS vernal pool shapefile.
3. **Parcel layer:** Riverbank analysis area subdivided by ownership parcel. Parcel data were acquired from each county's Assessor's office: Stanislaus County in 2009, San Joaquin County in 2010. Parcels within or intersected by circles of 20 km , 10 km, and 5 km radii comprised the analysis areas.

Process

1. A clean parcel layer (extraneous attribute fields removed) was created in order to store the summed values of each CWHR land cover type within each parcel (summary parcel layer).
2. A master land cover list was generated of all land cover types which offered high value habitats, by iterating through the conservation target/habitat association text file and extracting one of each high quality land cover type occurrence. Though agricultural crops often constitute high value species habitat, they were not considered to be relevant conservation targets for this analysis. The final master land cover list was comprised of the following land cover types: annual grassland (AGS), freshwater emergent wetland (FEW), valley foothill riparian forest (VRI), wet meadow (WTM), and vernal pools (VP).
3. In the attribute table of the summary parcel layer, a field was created and named for each land cover type in the master land cover list. Each of these fields holds the acreage sum of its respective land cover types for each parcel record in the table.
4. The USFWS VP layer was dissolved into a multi-part polygon and then clipped down to the largest scope of analysis using a dissolved parcel layer as clip shape (a dissolve of the layer in Figure 2, above). The VP polygon was further refined to only those areas which the land cover layer classified as annual grassland (AGS), perennial grassland (PGS), or pasture (PAS). This was achieved by making a selection on the land cover layer for all polygons classified as either AGS, PGS, or PAS, then clipping this target selection with the vernal pool polygon clip shape.
5. The parcel layer was intersected with the land cover layer, hereafter referred to as 'parcel/land cover intersection layer'.
6. For each land cover type in the master land cover list, the following operation was applied iteratively in ArcGIS 10.0.
 - A. Each CWHR land cover type was selected from the parcel/land cover intersection layer.
 - B. A summary analysis operation was performed on the land cover type selection, which calculated the total acreage of all polygons of the land cover type, for each parcel. The resultant acreage sum of the land cover type for each parcel record was written to the attribute table of the summary parcel layer, in the field named for that land cover type.

7. The parcel layer was then intersected with the refined VP layer. The area of all VP intersect polygons was then totaled by parcel in a summary analysis operation. The resultant acreage sum for VP land cover for each parcel record was written to the attribute table of the summary parcel layer, in the field named for VP.

Output

The output from the above workflow is a summary parcel shapefile in which a field is created for each land cover type in the attribute table. Each parcel within the scope of analysis constitutes a single record in the parcel summary shapefile, in which the total acreage of each land cover type is recorded in the corresponding field.

Notes

1. Total acreage of Vernal Pool habitat for each parcel record was computed from the refined USFWS vernal pool layer, narrowed to those areas which overlapped with a CWHR land cover polygon of type AGS, PGS, or PAS.

Connectivity Analysis

Objective: To calculate a total connectivity value for each parcel for four focal species at three spatial scales and one focal species at a fourth.

Key Inputs

1. **Focal species connectivity rasters:** A set of 10 m connectivity rasters were generated for four focal species: bobcat, pocket mouse, mule deer, and western pond turtle during Phase 1 of this project. The four species were chosen to represent the differential movement and dispersal modes of a range of species through the landscape. For the purposes of this portion of the study, "connectivity" is defined as the ability of a focal species to move through a raster cell. The connectivity rasters for each focal species were generated using a least cost approach, which considered potential animal movement in any direction across the field of analysis, rather than between pre-determined terminal points (with the exception of the Stanislaus – San Joaquin mule deer corridor raster). The final product of a least cost approach is the assignment of a numeric value to each raster cell mapped onto the landscape (see Huber et al. 2010b or Huber et al. 2012 for a description of how connectivity values were calculated for each raster cell). A high cell value indicates high connectivity, while a low value indicates low connectivity. A high connectivity value indicates: (1) ease of movement for the focal species across that cell, which may be a result of favorable vegetation structure or lack of barriers; or (2) presence of vital resources which act as species attractors. Such attractors may be food, water, cover, or special habitat elements such as snags in the case of woodpeckers, or rodent burrows in the case of salamanders or snakes which advantageously make use of them. Low connectivity values within a raster cell indicate greater difficulty for a focal species' movements, due to inhospitable

terrain, unsuitable habitat for movement, or other barriers. Low connectivity values may also imply a paucity of food or other vital resources.

In summary, a high connectivity value for a raster cell mapped to the landscape may be equated with a high suitability rating for that species. The landscape is amenable to the species' needs, and is proximal to other landscape cells which are similarly inviting. In contrast, a low connectivity value for a cell connotes that the landscape is 'hostile' to the species or surrounded by landscape of low suitability for that particular species. Low connectivity values imply that an organism will likely choose an alternate path comprised of higher value cells if presented the choice.

2. **Stanislaus – San Joaquin mule deer corridor raster:** A connectivity raster was generated for a mule deer corridor between the Stanislaus National Forest and San Joaquin National Wildlife Refuge. A high cell value indicates high connectivity, a low value, low connectivity.
3. **Parcel layer:** The Riverbank analysis area was subdivided by ownership parcels, in which each parcel constitutes a record in the attribute table. A field for each of the four focal species at each scope of analysis and the mule deer corridor was created in the attribute table, in order to hold a final 'connectivity score' for each parcel according to each raster.

Process

1. For each of the four focal species connectivity rasters and the Stanislaus – San Joaquin mule deer corridor raster, a Zonal Statistics operation was performed to determine the mean connectivity value of each parcel. This is the sum of all connectivity values from each 10 m cell within a parcel, divided by the number of cells in the parcel.
2. The mean connectivity value was multiplied by the area of the parcel (in acres) in order to determine a total 'connectivity score' for the parcel, i.e., the overall attractiveness to species movement and exploration contributed by each parcel.
3. The mean connectivity score for each parcel was written to a field created in the summary parcel layer and named for the focal species and scope of connectivity analysis. This was repeated for each of the four focal species at each of the three scopes of analysis, for a total of 12 connectivity fields written to the summary parcel layer. Each parcel, i.e., each record in the attribute table, received a total 'connectivity score' for each of these 12 fields.
4. To better understand how connectivity scores are analyzed, a brief hypothetical example may help to illustrate:

Consider three parcels: #1, #2, and #3, where each successive parcel is twice the size of that preceding it. If we consider parcel #1 to have an areal unit of 1, then parcel #2 has an area of 2, and parcel #3 has an area of 4. After finding the average connectivity value for each parcel, the results are as follows:

Parcel #1. Average connectivity value = 5

Parcel #2. Average connectivity value = 2

Parcel #3. Average connectivity value = 3

The formula for total parcel connectivity is the average parcel connectivity value * parcel area, so results for this example are:

Parcel #1: average value 5 * 1 areal unit = connectivity score of 5
Parcel #2: average value 2 * 2 areal units = connectivity score of 4
Parcel #3: average value 3 * 4 areal units = connectivity score of 12

This example demonstrates the key point that total connectivity contributed by a parcel is a function of both the quality of connectivity and the quantity. Parcel #3 has a mid-range average connectivity score of 3 across all of its cells. However, because parcel #3 is twice the size of parcel #2 and four times the size of parcel #1, its total “connectivity contribution” to a connectivity model is the greatest of the three parcels.

Output

The output from the connectivity assessment operation is a summary parcel layer with a field for each of the 12 connectivity rasters written to the attribute table. To each field is recorded a final connectivity value for each parcel record in the table. The above described zonal statistics operations and total connectivity scores were determined for each parcel for each of the four focal species, at 20 km, 10 km, and 5 km scopes of analysis.

Marxan Analysis: Conservation Feature Summary Table

Marxan input file (puvspr.dat)

The default file name for the conservation feature summary table, one of three principal Marxan input files, is 'puvspr.dat'. 'Puvspr' is an acronym derived from **planning unit vs species**, while '.dat' is a file type suffix indicating a 'data' file which in this case is expected by Marxan software to be text.

Objective: Consolidate and reformat GIS analyses of conservation feature quantities within each parcel for input to Marxan software.

Results from CNDDDB, land cover, and connectivity analyses have been stored in separate parcel summary layers. The purpose of the conservation feature summary table is to compile the results from these separate analyses, and translate them into the input form required by Marxan optimization software. This puvspr.dat input file consists of a single table with three fields:

1. **'species'**: A field which holds an arbitrary but unique identification number for each conservation feature. The terms 'species' is a logical choice to describe conservation features, as it is typically a suite of true biological species which are the objects of most Marxan based conservation analyses, and 'species' is the naming convention expected by Marxan software to identify conservation features. In our case, however, we have extended our suite of conservation features to include several sensitive habitat types, and in this context we will retain the word 'species' in quotes to designate that it is a table field name which signifies an expanded domain of conservation features.
2. **'pu'**: (**planning unit**): The unique identification number for a particular parcel.

3. **'amount'**: The amount (in acres) of a conservation feature ('species') which occurs in a specific parcel, or planning unit ('pu').

Key inputs

1. Summary parcel layers.
 - A. **CNDDDB results layer**: A parcel layer with CNDDDB results fields.
 - B. **Land cover results layer**: A parcel layer with land cover results fields.
 - C. **Connectivity results layer**: A parcel layer with connectivity results fields.

Process

1. **Write Conservation Feature Summary Table** (puvspr.dat file). Each summary parcel layer is iterated across each field of the attribute table, holding results from the previous CNDDDB, land cover, and connectivity analyses. The first field encountered is assigned an arbitrary 'species' number (beginning with 1). A new record is created in the conservation feature summary table for each parcel which contains 'species 1', and the amount (acreage) of coverage for that 'species.' Each subsequent field is assigned the next 'species' number in sequence and a new record is created for each parcel, or planning unit ('pu') containing the 'species', and the acreage of 'species' representation is recorded in the 'amount' field.

Output

1. The output from the above operation is a table with three fields: 'species', 'pu', and 'amount'. The table is written with a new record for each conservation feature ('species') occurring in each parcel, along with the acreage sum in which the conservation feature is represented. This table, with a simple name change, becomes the puvspr.dat Marxan input file.

Marxan Analysis: Planning Unit Summary Table

Marxan input file (pu.dat)

The default file name for the planning unit summary table, one of three principal Marxan input files, is 'pu.dat'. 'Pu' is an acronym derived from **planning unit**, while '.dat' is a file type suffix indicating a 'data' file which in this case is expected by Marxan software to be text.

Objective: Consolidate and reformat GIS analyses of planning units (parcels) for input to Marxan.

Each planning unit (parcel) possesses a unique identification number. Each planning unit is also assigned a 'cost' for inclusion into a conservation network, as well as a 'status' indicating whether the parcel is already conserved (locked into a reserve design), is to be excluded from analysis (e.g. is primarily urban), or is 'in play' for potential inclusion in a conservation network design.

Key Inputs

1. **Parcel layer**: The Riverbank analysis area subdivided by ownership parcel. A 20 km radius was used to circumscribe the scope of analysis around the city of Riverbank. All parcels entirely

within or intersected by the demarcation line were included within the scope of analysis. Scopes of 10 and 5 km were also used.

2. **Land cover layer:** This is the Central Valley land cover shapefile cross-walked to CWHR vegetation classifications.
3. **CPAD layer:** The California Protected Areas Database (2011b) shapefile.
4. **NCED layer:** The National Conservation Easement Database (2011) shapefile.

Process

1. **Urban land cover extraction:** Land cover polygons designated as 'urban' were selected from the land cover layer and written to an **urban layer**.
2. **Exclude urban parcels from analysis:** A summary analysis operation was performed on the intersected regions of the urban layer and parcel layer, to produce the sum of urban area per parcel. Parcels > 50% urban were excluded from analysis.
3. **Lock-in conserved areas:** The CPAD and NCED polygons were aggregated into a **protected areas layer**. A summary analysis operation was performed on the intersected regions of this protected areas layer and the parcel layer, to produce the sum of current protected areas per parcel. Parcels > 50% protected were locked into inclusion in our conservation network models.
4. **Create Planning Unit Summary Table (pu):** The planning unit table is written with three fields: 'id' (unique parcel identification number), 'cost', and 'status'.
 - A. **Cost:** Cost is defined here as monetary cost per acre. Cost per acre for each parcel was calculated according to the equation:

$$\ln(\text{cost/acre}) = 12.55017 - 0.79771(\ln(\text{acres}))$$

This function was developed for the Elkhorn Slough watershed on California's Central Coast (Thorne et al. 2009). While the actual per acre parcel cost is likely different than in the watershed in which it was assessed, we assume that the general relationship holds: larger parcels have a lower cost per unit area than small parcels, and more recent parcel transactions are more representative than older ones. Unfortunately, specific data for the SJV study area have not been developed to date and is beyond the scope of this study. We use these calculated land parcel values to indicate relativistic costs, not actual costs.

- B. **Status:** There are three potential states for each planning unit (parcel): (1) locked in (> 50% conserved), (2) locked out (> 50% urban), or (3) 'in play,' which describes all parcels not locked-in or out.

Output

The output from the above process is a planning unit summary table (pu) with three fields: 'id', 'cost', and 'status'. Each planning unit (parcel) receives a single record in the table, and is assigned the appropriate cost and status according to the logic described above.

Marxan Analysis: Species Summary Table

Marxan input file (spec.dat)

The default file name for the species summary table, one of three principal Marxan input files, is 'spec.dat'.

Objective: Consolidate and reformat GIS analyses of conservation features ('species') for input to Marxan.

The species summary table (spec.dat file) must have nine fields expected by the Marxan software. Several of these fields may be assigned values of zero and then do not play a role in the Marxan computations. The four pertinent spec.dat fields utilized in this analysis are as follows:

- A. **'ID'**: An arbitrary numeric identification code which is assigned to each conservation feature or 'species.'
- B. **'Name'**: This field serves to hold the name of the 'species' and associate it with its assigned ID code.
- C. **'Target'**: The target field defines the acreage goals for each conservation feature which Marxan is attempting to achieve with each of its model runs. These goals are user defined. Total available acreages for each land cover type have been determined in the analyses above, and the user must now select a proportion of what is available to conserve.
- D. **'Spf'**: This field name is an acronym for 'species penalty factor.' Varying degrees of penalty factor may be assigned if Marxan fails to meet the user defined goals ('targets') for each conservation feature ('species'). This penalty factor serves to prioritize the magnitude of importance which the user has placed on achieving the goals for each 'species'. Spf was set to 1 for each conservation feature.

The conservation goals that were input into Marxan are as follows:

- Sensitive species habitat: 75% of total extent of each habitat
- Connectivity: 50% of total least cost surface values for each focal species at each spatial scale
- Annual grassland: 50% of total extent of the land cover type
- Vernal pool complexes: 50% of total extent of the land cover type
- Freshwater wetlands, riparian forest, wet meadow: 100% of total extent of each land cover type

Scopes of Analyses

The various GIS-based analyses and consolidation of information for Marxan input files described above were applied at three scopes of analysis around the city of Riverbank. In addition to the 20 km radius which circumscribed the largest scope of analysis, radii of 10 and 5 km were also used to define analysis zones around Riverbank. Any parcels which fell within, or were intersected by the demarcation line, were included in the particular scope of analysis.

Marxan Analysis

Marxan analyses were conducted at the three spatial scales described. Runs totaled 100 for each analysis, and a boundary modifier of 1,500 was used for all analyses at the three scopes. Boundary modifiers are used in Marxan to control the “clumping” of planning units selected during an analysis. We used several test runs to determine a modifier that encouraged some clumping while not forcing a solution that included numerous parcels selected merely for their adjacency to existing conservation areas or parcels selected for their ecological attributes.

Linkage Identification

Parcels were selected in several ways to be included in the final linkage design. First, any parcel that was selected more than 75% of the time in a Marxan analysis at any scale was included. These parcels represent the set of parcels that best met the full suite of ecological goals that were input into Marxan. To ensure that adequate landscape connectivity was represented, parcels were also selected that did not meet the Marxan threshold but did possess high connectivity scores for at least one focal species at one spatial scale. Finally, parcels were selected that did not meet the Marxan threshold but had high values in the analysis conducted for mule deer connectivity between Stanislaus National Forest and San Joaquin National Wildlife Refuge. Together, these three elements constitute the final linkage design.

RESULTS

The Marxan analyses resulted in three sets of output files, one for each scale of analysis. Those used in the linkage design were the “summed solution” files, indicating the number of times out of 100 runs that a particular parcel was selected as part of a low cost set of planning units.

The analysis at the 5 km radius resulted in many of the parcels immediately surrounding Riverbank to be selected at least once by Marxan (Figure 2). Parcels selected all or most of the time were concentrated along the Stanislaus River, the southwestern edge of Riverbank, and several kilometers east of Riverbank.

The 10 km analysis yielded many fewer parcels that had intermediate scores (Figure 3). In fact, almost every parcel was either selected every time or never. Most of the selected parcels were either along the Stanislaus River or scattered to the east of Riverbank.

Results from the analysis at 20 km were similar to those at 10 km; there were very few parcels with intermediate scores (Figure 4). In addition to the patterns found at 10 km, many large parcels at least 15 km east and northeast of Riverbank were selected. These parcels represent the location where farming gives way to ranching, resulting in the presence of relatively intact grassland areas.

To identify the parcels comprising a linkage design, we selected those that were found in more than 75% of the Marxan solutions in at least one of the scales of analysis (Figures 5 and 6). While not implying that those not meeting this threshold are not important to conservation in this region, those that exceed the threshold were found to most likely contribute important features to a regional ecological network. This subset of parcels totaled 853, comprising 69,179 acres of land.

Annual grassland (AGS) had by far the greatest extent of land cover types found in the selected parcels: 26,040 acres (Table 2; Figure 7). Much less freshwater emergent wetland (FEW) was included (1,581 acres), followed by valley foothill riparian (VRI) forest (685 acres) and wet meadow (WTM) (0.9 acres). However, because of the distributed nature of wetlands in the study area, more parcels were needed to meet these totals (296 vs. 275). The combined area of the parcels selected for these land cover types is similar as well: 53,536 acres contained the total AGS compared with 44,624 acres for FEW. The total VRI was also found scattered across many parcels (146, for a total of 23,258 acres). WTM was only found on one parcel.

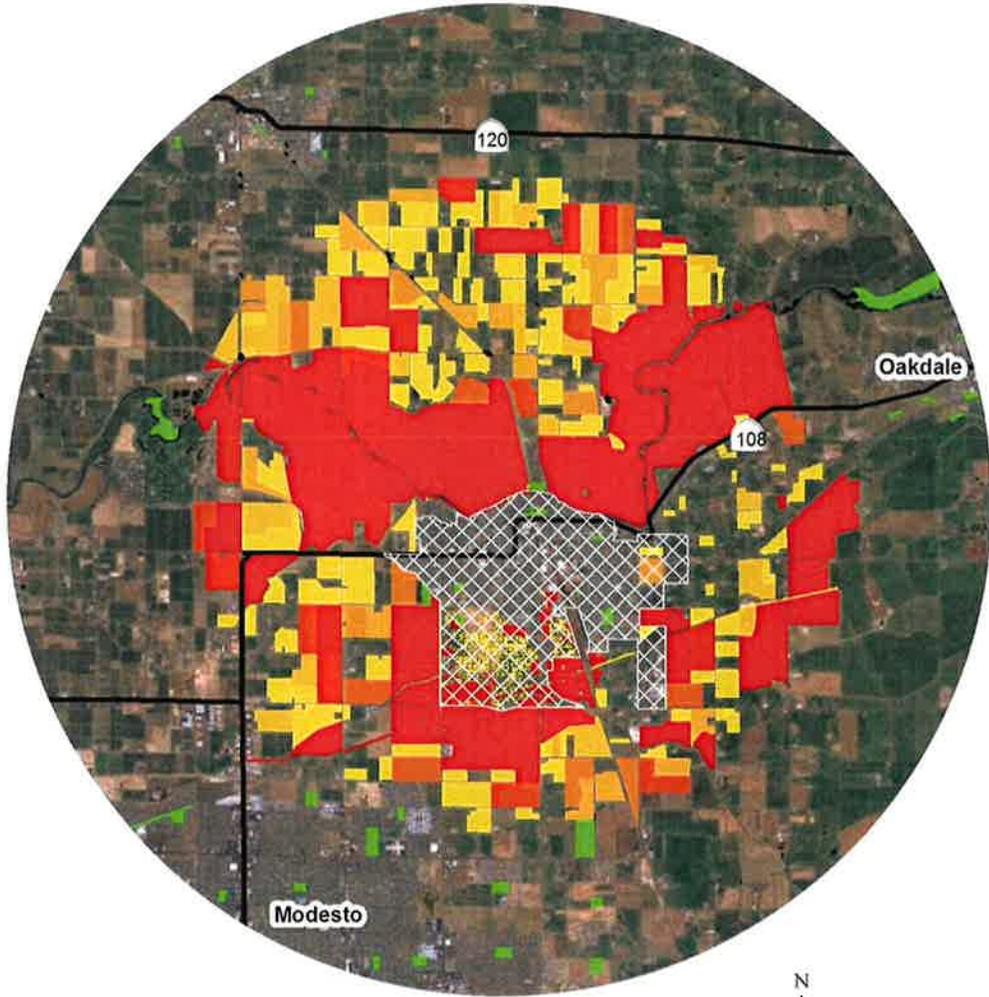
The greatest extent of habitat within the selected parcels (Table 2) was 8,472 acres (vernal pool tadpole shrimp). Other extents greater than 1,000 acres include: California Linderiella (5,061 acres), northern hardpan vernal pool (3,532 acres), tricolored blackbird (2,778 acres), California tiger salamander (2,003 acres), burrowing owl (1,919 acres), and Swainson's hawk (1,702 acres). The smallest habitat extents were riparian woodrat and riparian brush rabbit (both 0.8 acres). The greatest number of parcels included was for burrowing owl (141 parcels). Other habitats found on numerous parcels were Swainson's hawk (59 parcels) and vernal pool tadpole shrimp (43 parcels).

Parcels will generally be included in the linkage through fee title or easement purchase of the full property rather than portions that may contribute the most towards conservation goals. Therefore, the total area of parcels that would be required to protect the habitat extents (above) were calculated. The total area of parcels in the linkage that included any habitat (Table 2) was greatest for vernal pool tadpole shrimp (16,376 acres). Other large total parcel areas include Swainson's hawk (10,099 acres), northern hardpan vernal pool (9,546 acres), California tiger salamander (8,932 acres), and California Linderiella (8,274 acres).

The focal species-based connectivity accounted for by the Marxan-selected parcels follows the patterns found in previous analyses (Huber et al. 2010b, Huber et al. 2012). Parcels along the Stanislaus River and comprising the pasture lands just east of Riverbank were selected by Marxan for meeting the 5 and 10 km radius connectivity needs, while those in the more intact grasslands in the eastern portion of the study area were selected to meet the goals for connectivity at the 20 km extent (Figure 8). Parcels meeting the conservation goals for the regional mule deer corridor were concentrated along the Stanislaus River (Figure 9).

Parcels with high levels of modeled connectivity but not selected by Marxan were found for all four focal species at all three scales with the exception of western pond turtle at the 5 km scale (Figure 10). Some important connectivity areas for bobcat and mule deer were found: (1) on the northeast edge of Riverbank linking the Stanislaus River with pasture lands east of the city (5 km); (2) crossing CA Highway 120 just north of Oakdale (10 km); and (3) linking large grassland blocks across CA Highway 120/108 east of Oakdale (20 km). Some important connectivity areas for San Joaquin pocket mouse were found: (1) east of Riverbank linking the Stanislaus River with pasture lands east of the city (5 km); (2) linking pasture lands south of Oakdale (10km); and (3) linking large grassland blocks north of Woodward Reservoir (20 km). Some important connectivity areas for western pond turtle were found: (1) filling gaps along the Stanislaus River west of Riverbank (10 km); and (2) linking large grassland blocks across CA Highway 120/108 east of Oakdale (20 km).

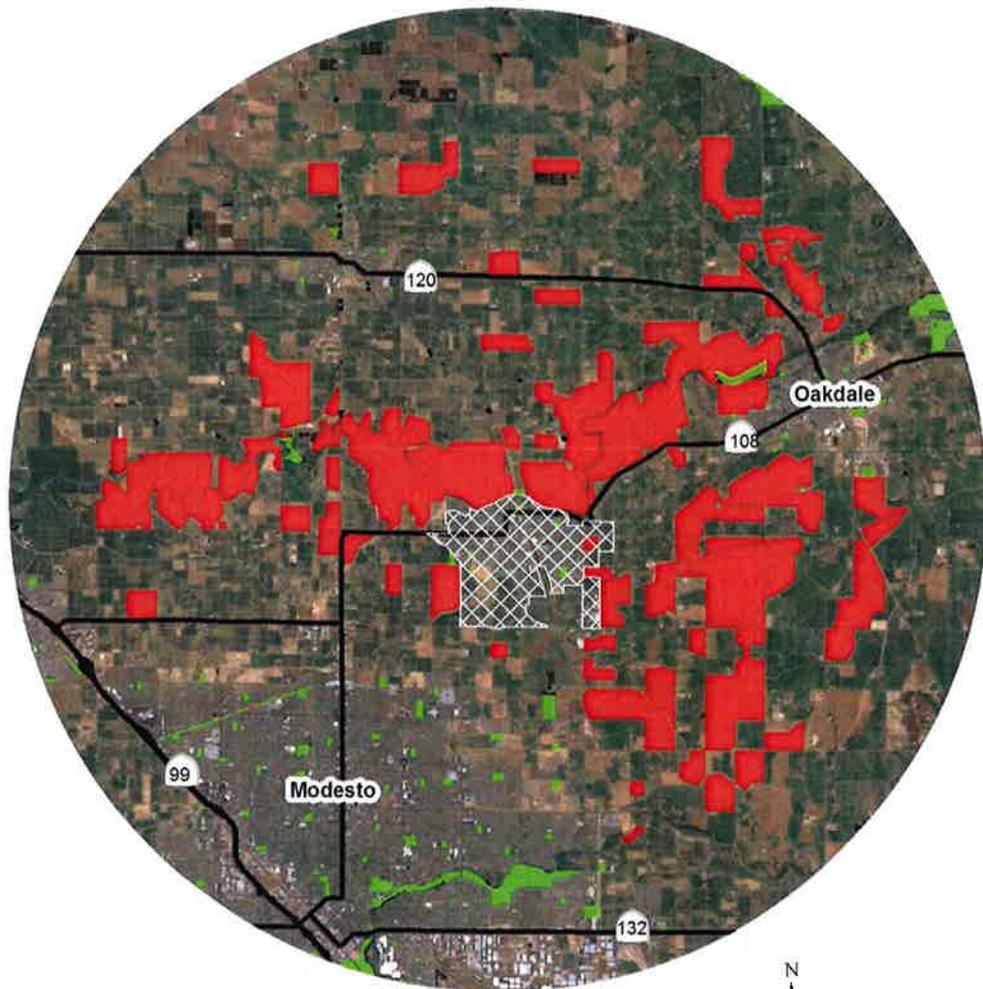
Parcels that provide regional mule deer connectivity but fall outside the Marxan solution (Figure 11) fall into three categories: (1) linking large blocks of eastern grasslands with the Stanislaus River riparian corridor generally north of Oakdale; (2) filling gaps in the Stanislaus River riparian corridor between Oakdale and Ripon; and (3) linking the Marxan-identified parcels along the Stanislaus River with currently protected areas (e.g. Caswell Memorial State Park) along the river in the western portion of the study area.



Marxa 5km Summed Solution



Figure 3. Marxa results at the 5 km scale. Values indicate the number of times (out of 100 runs) that a parcel was selected by Marxa as part of a “low cost” reserve network.



Marxa 10km Summed Solution

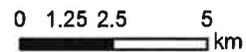
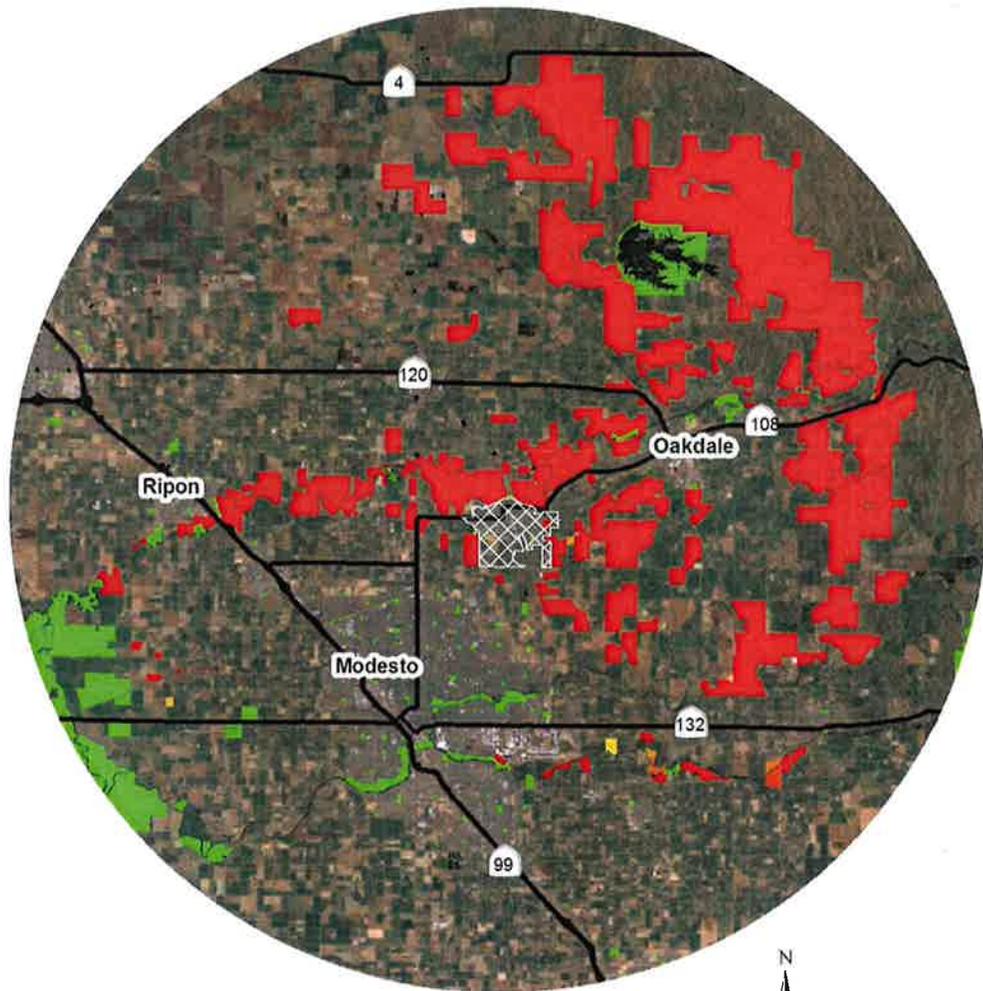


Figure 4. Marxa results at the 10 km scale. Values indicate the number of times (out of 100 runs) that a parcel was selected by Marxa as part of a “low cost” reserve network.



Marxa 20km Summed Solution

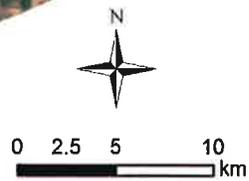


Figure 5. Marxa results at the 20 km scale. Values indicate the number of times (out of 100 runs) that a parcel was selected by Marxa as part of a “low cost” reserve network.

Table 2. Total amount of each conservation target found within the parcels selected by Marxan. “Parcels” refers to the number of parcels on which these conservation targets were located. “Area” is the total area of the parcels (which will usually be larger than the “Total” because there are often multiple land cover types within any given parcel).

Conservation Target	Total (ac)	Parcels	Area (ac)
Annual Grassland	26,039.9	275	53,536.3
Freshwater Emergent Wetland	1,581.1	296	44,624.2
Valley Foothill Riparian Forest	684.6	146	23,257.7
Wet Meadow	0.9	1	28.5
Tricolored Blackbird	2,777.6	20	7,873.0
California Tiger Salamander	2,003.4	24	8,932.0
Burrowing Owl	1,919.1	141	2,915.0
Aleutian Canada Goose	10.8	4	147.8
Swainson's Hawk	1,702.0	59	10,099.0
Valley Elderberry Longhorn Beetle	88.2	23	1,910.7
Elderberry Savanna	13.5	1	179.2
Western Pond Turtle	75.2	12	992.0
Delta Button-Celery	6.8	2	312.7
Hoary Bat	85.1	24	992.7
Vernal Pool Tadpole Shrimp	8,472.1	43	16,375.9
California Linderiella	5,060.9	24	8,273.9
Hardhead	215.5	17	1,549.3
Yuma Myotis	85.1	24	992.7
Colusa Grass	285.9	3	2,390.4
Riparian Woodrat	0.8	1	179.2
Nothern Hardpan Vernal Pool	3,532.1	20	9,546.1
San Joaquin Valley Orcutt Grass	242.1	2	946.4
Hartweg's Golden Sunburst	362.4	6	2,410.0
Riparian Brush Rabbit	0.8	1	179.2
Greene's Tuctoria	242.1	2	946.4
Great Valley Mixed Riparian Forest	40.5	2	312.7
Vernal Pools	15,520.4	77	31,074.2
Total		853	69,179.3

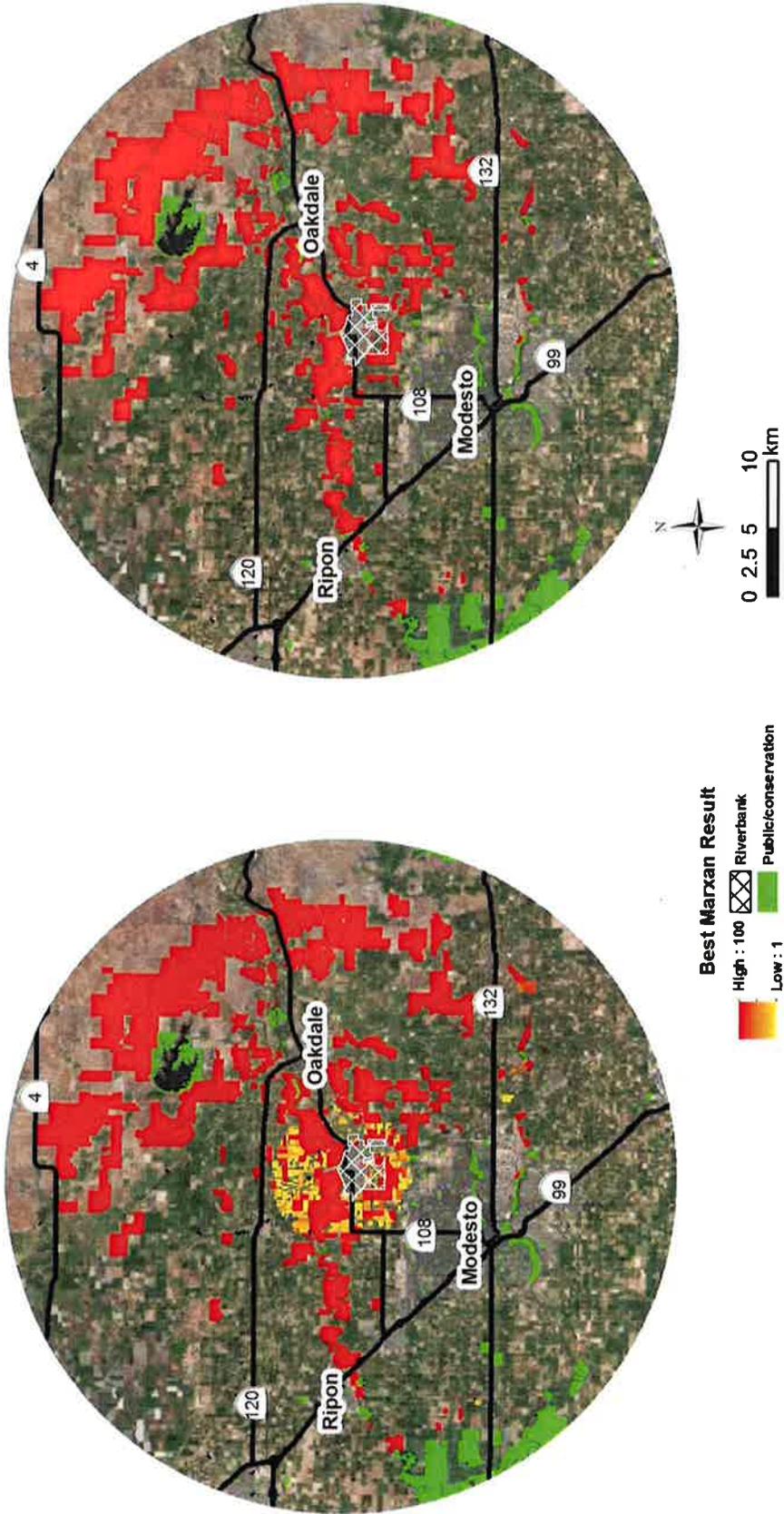


Figure 6. The largest “summed solution” score across the three scales of analysis for each parcel (left) and parcels that had a “summed solution” score of more than 75 in any of the scales of analysis (right). The map on the right represents the final linkage area.

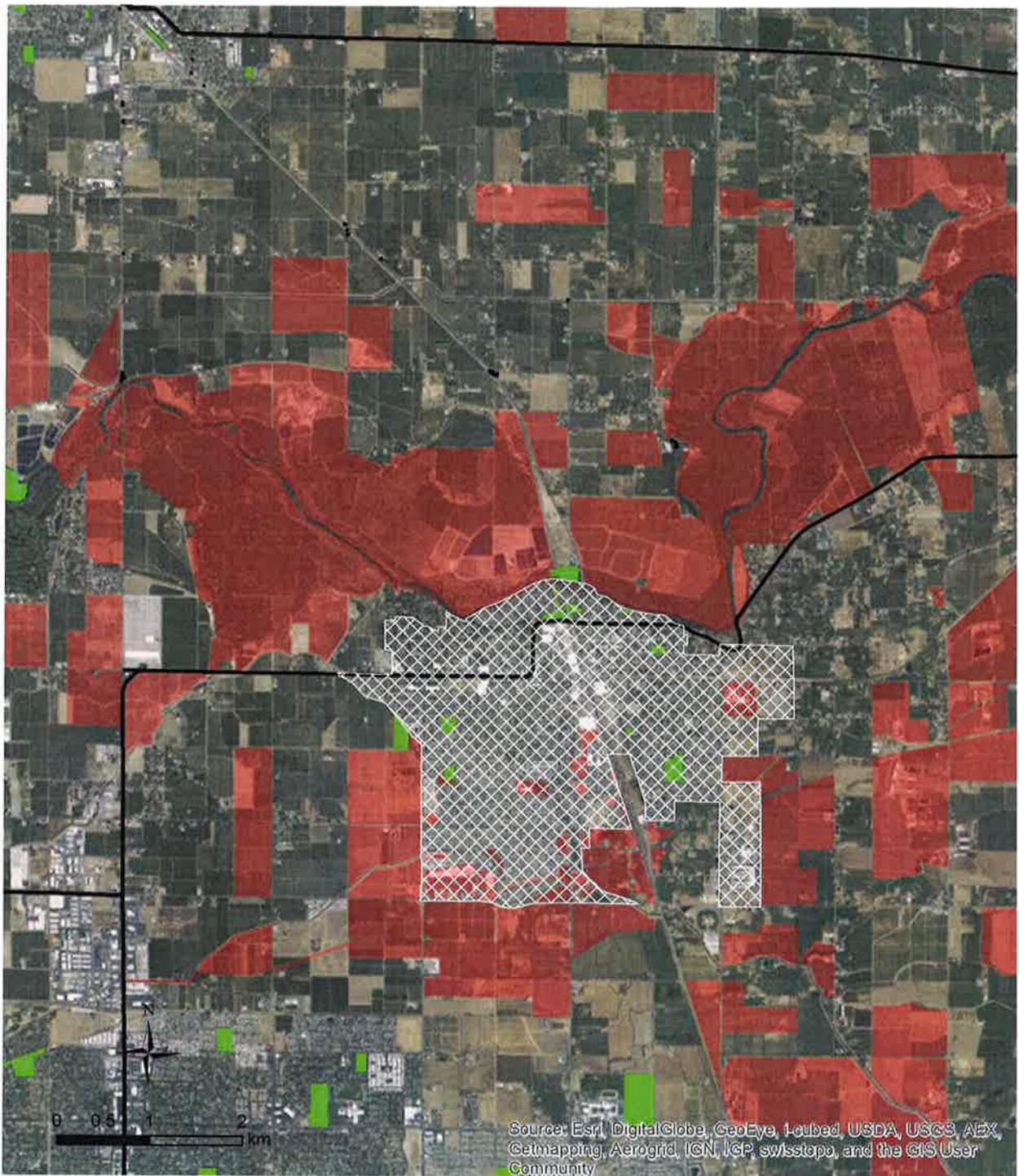


Figure 7. The previous map of selected parcels zoomed to the vicinity of Riverbank.

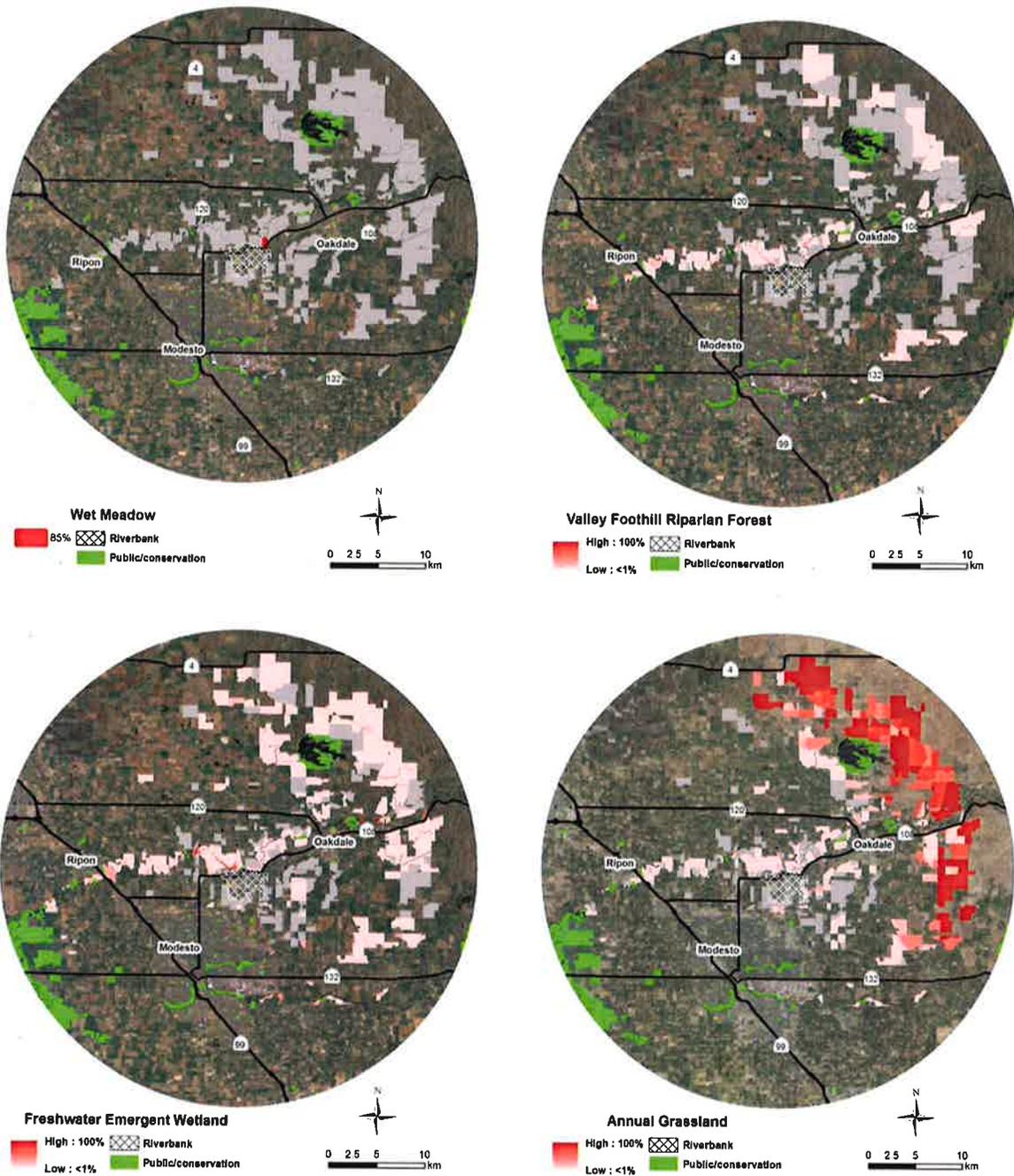
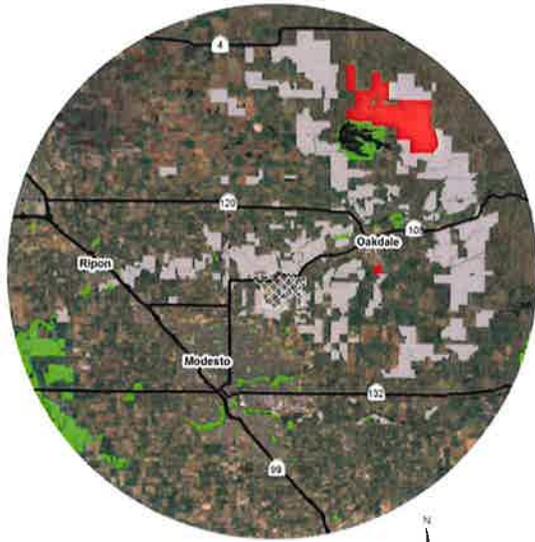
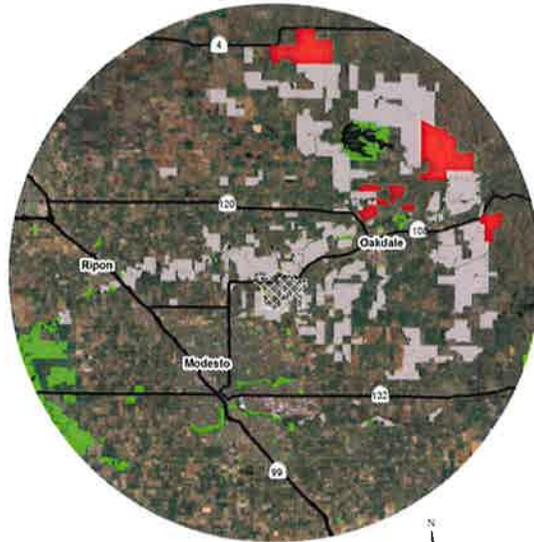


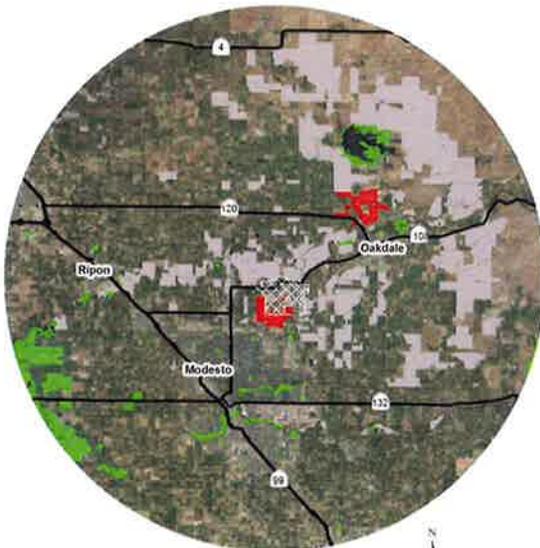
Figure 8. Conservation features in Marxan-selected parcels. The red color ramp indicates either the relative amount of that feature within a parcel (land cover) or the presence of that feature in a parcel (species-specific models). Gray polygons indicate parcels within the network identified by Marxan but lacking the specific conservation feature.



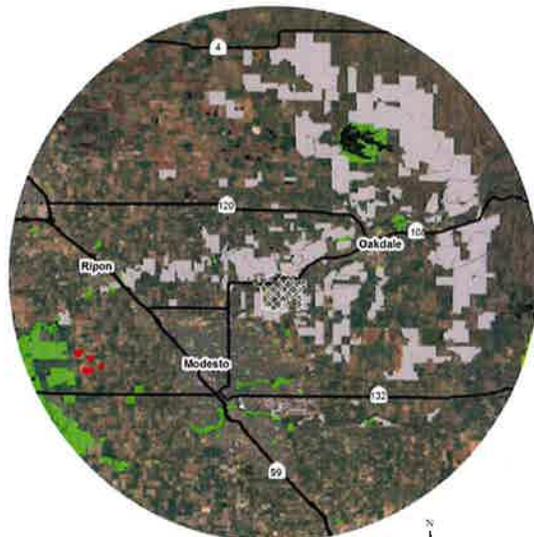
Tricolored Blackbird
 Potential habitat Riverbank
 Public/conservation



California Tiger Salamander
 Potential habitat Riverbank
 Public/conservation

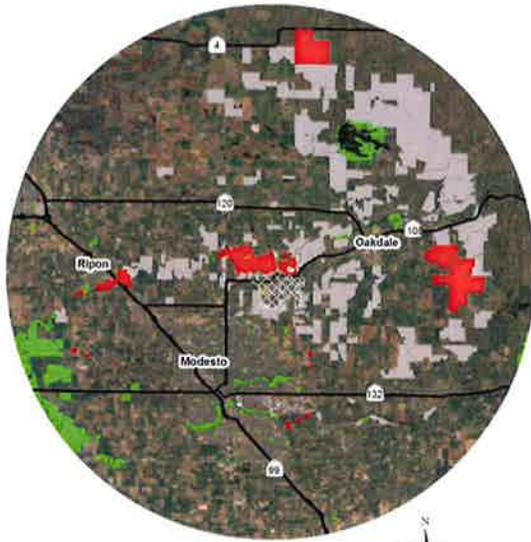


Burrowing Owl
 Potential habitat Riverbank
 Public/conservation

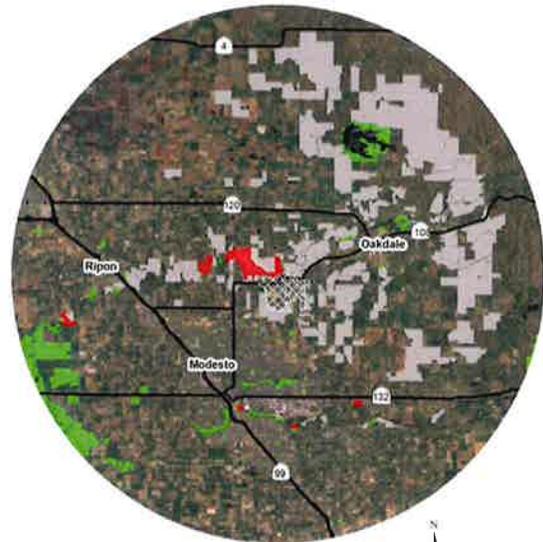


Aleutian Canada Goose
 Potential habitat Riverbank
 Public/conservation

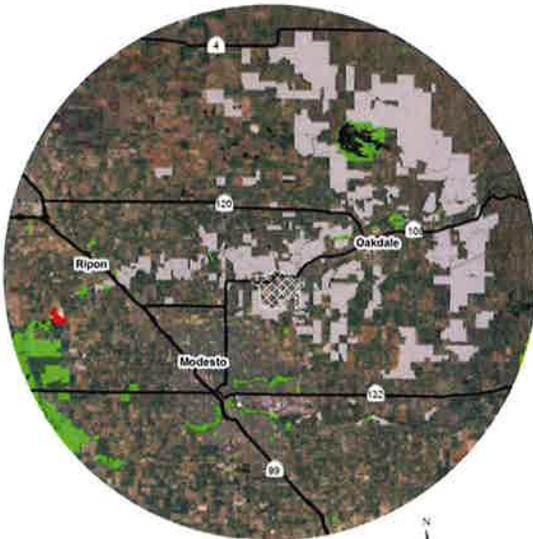
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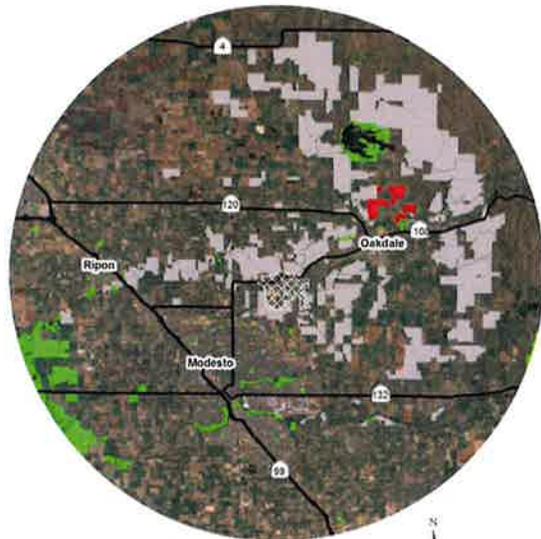
Swainson's Hawk
 Potential habitat Riverbank Public/conservation
 0 2.5 5 10 km



Valley Elderberry Longhorn Beetle
 Potential habitat Riverbank Public/conservation
 0 2.5 5 10 km

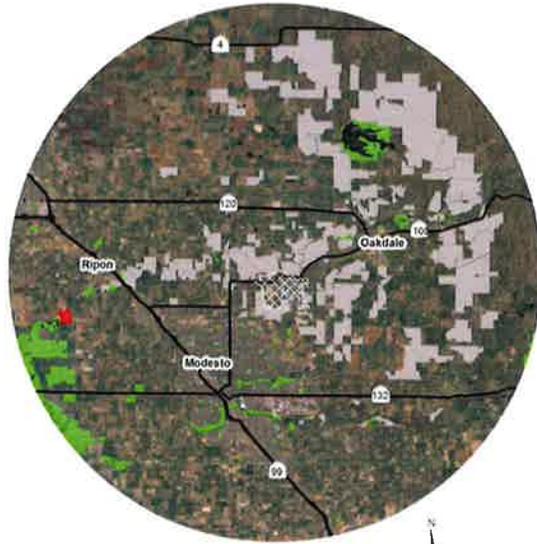


Elderberry Savanna
 Potential habitat Riverbank Public/conservation
 0 2.5 5 10 km

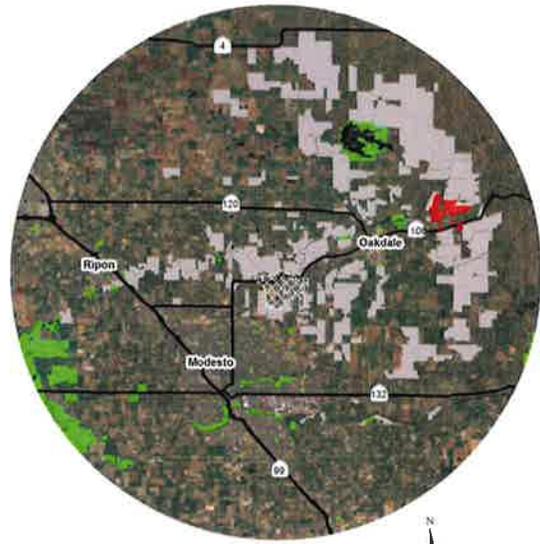


Western Pond Turtle
 Potential habitat Riverbank Public/conservation
 0 2.5 5 10 km

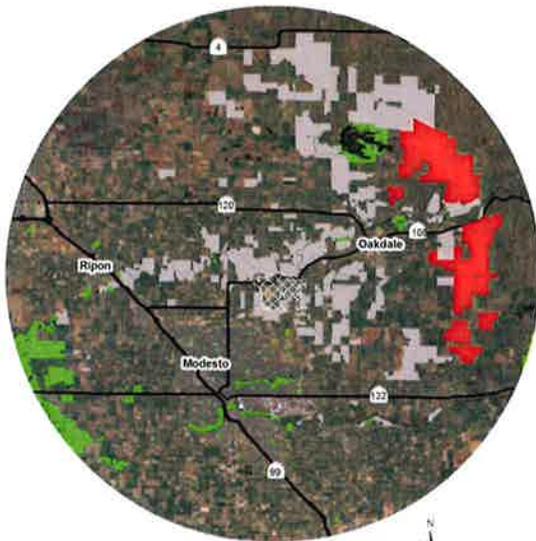
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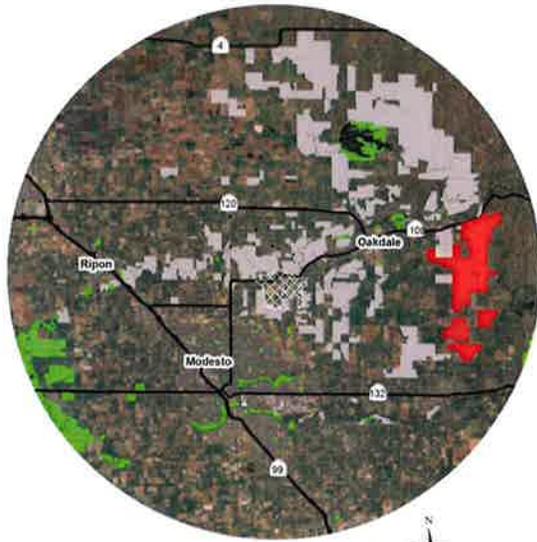
Delta Button-Celery
 Potential habitat Riverbank
 Public/conservation



Hoary Bat
 Potential habitat Riverbank
 Public/conservation

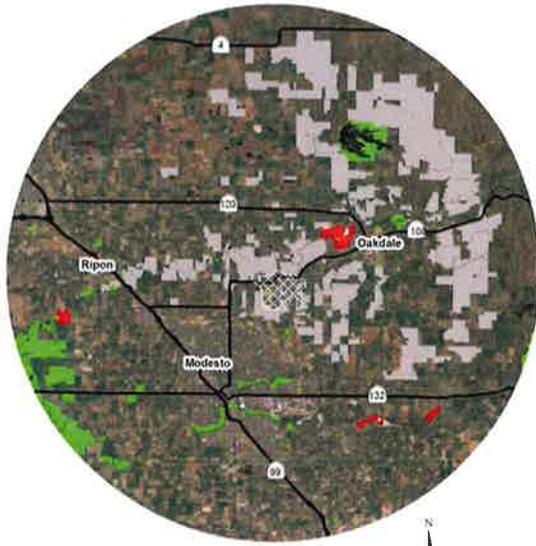


Vernal Pool Tadpole Shrimp
 Potential habitat Riverbank
 Public/conservation



California Linderella
 Potential habitat Riverbank
 Public/conservation

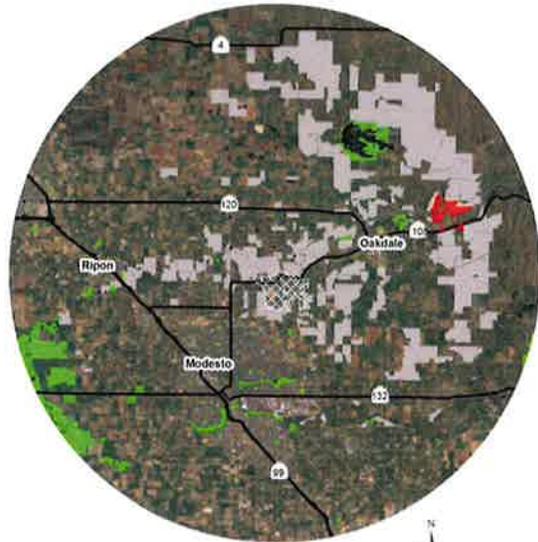
Figure 8. Continued.



Hardhead

Potential habitat Riverbank
Public/conservation

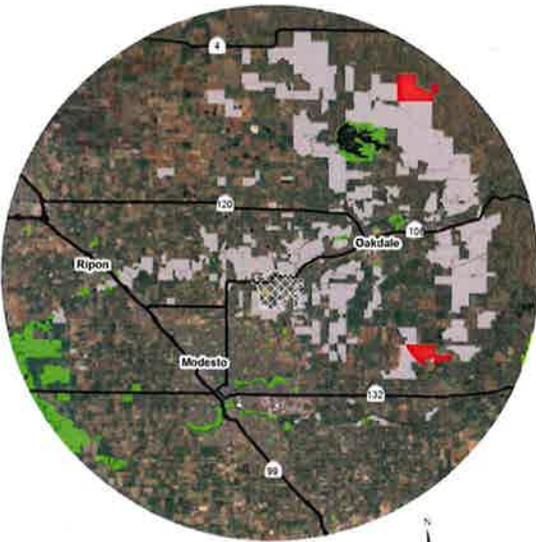
0 2.5 5 10 km



Yuma Myotis

Potential habitat Riverbank
Public/conservation

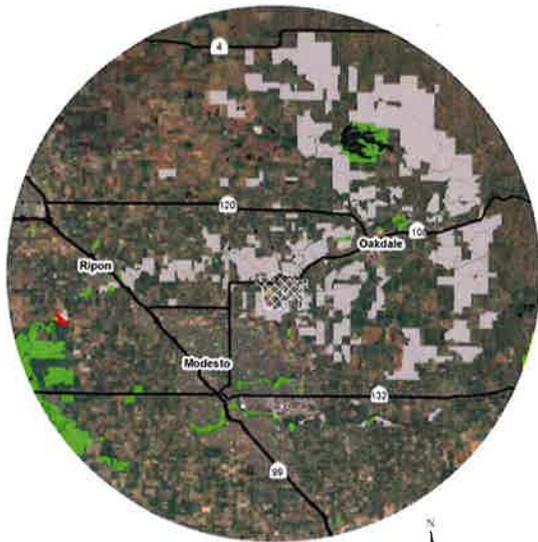
0 2.5 5 10 km



Colusa Grass

Potential habitat Riverbank
Public/conservation

0 2.5 5 10 km

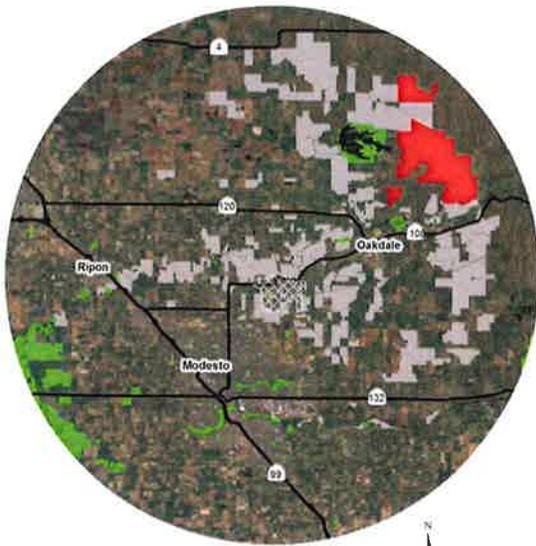


Riparian Woodrat

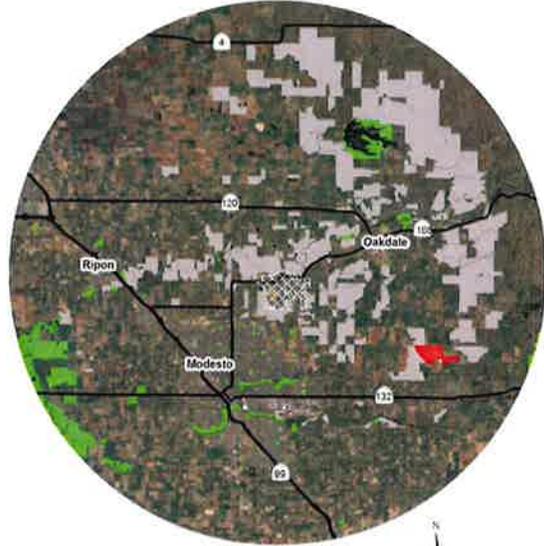
Potential habitat Riverbank
Public/conservation

0 2.5 5 10 km

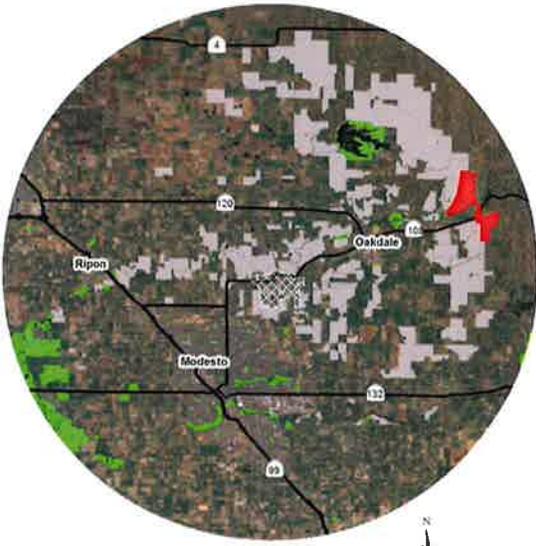
Figure 8. Continued.



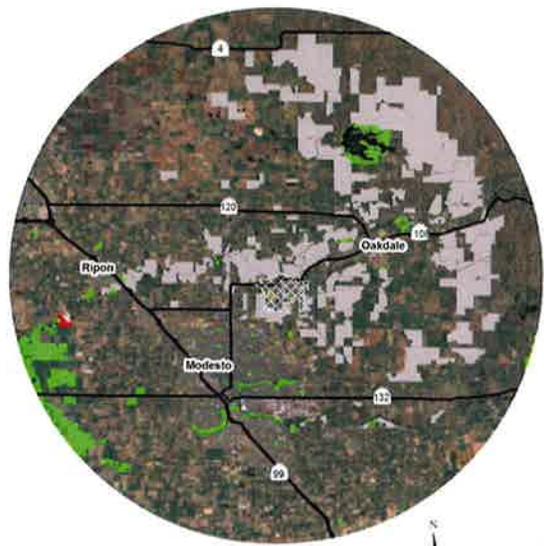
Northern Hardpan Vernal Pool
 Potential habitat Riverbank Public/conservation
 0 2.5 5 10 km



San Joaquin Valley Orcutt Grass
 Potential habitat Riverbank Public/conservation
 0 2.5 5 10 km

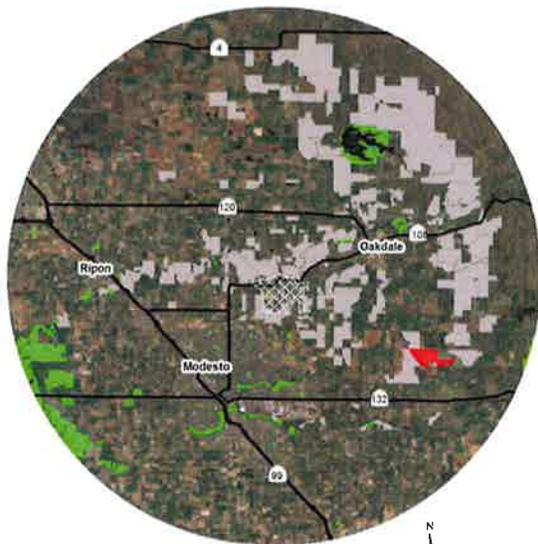


Hartweg's Golden Sunburst
 Potential habitat Riverbank Public/conservation
 0 2.5 5 10 km

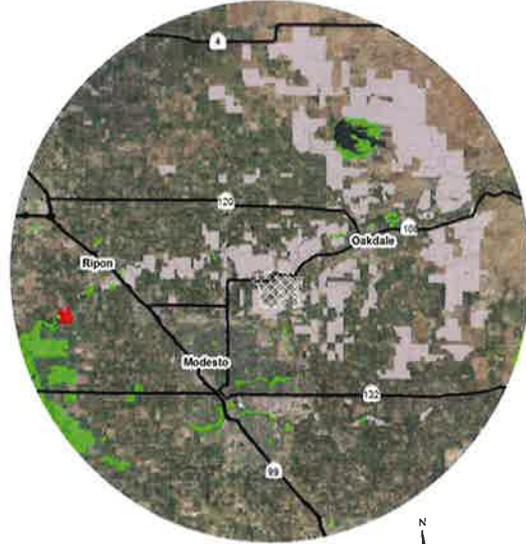


Riparian Brush Rabbit
 Potential habitat Riverbank Public/conservation
 0 2.5 5 10 km

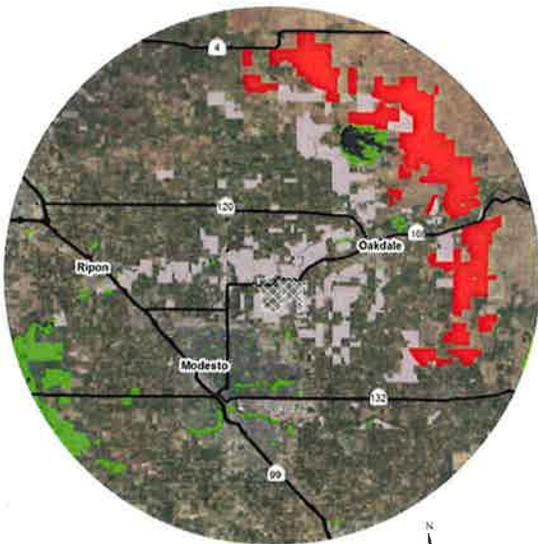
Figure 8. Continued.



Greene's Tuctoria
 Potential habitat Riverbank
 Public/conservation



Great Valley Mixed Riparian Forest
 Potential habitat Riverbank
 Public/conservation



Vernal Pools
 Potential habitat Riverbank
 Public/conservation



Figure 8. Continued.

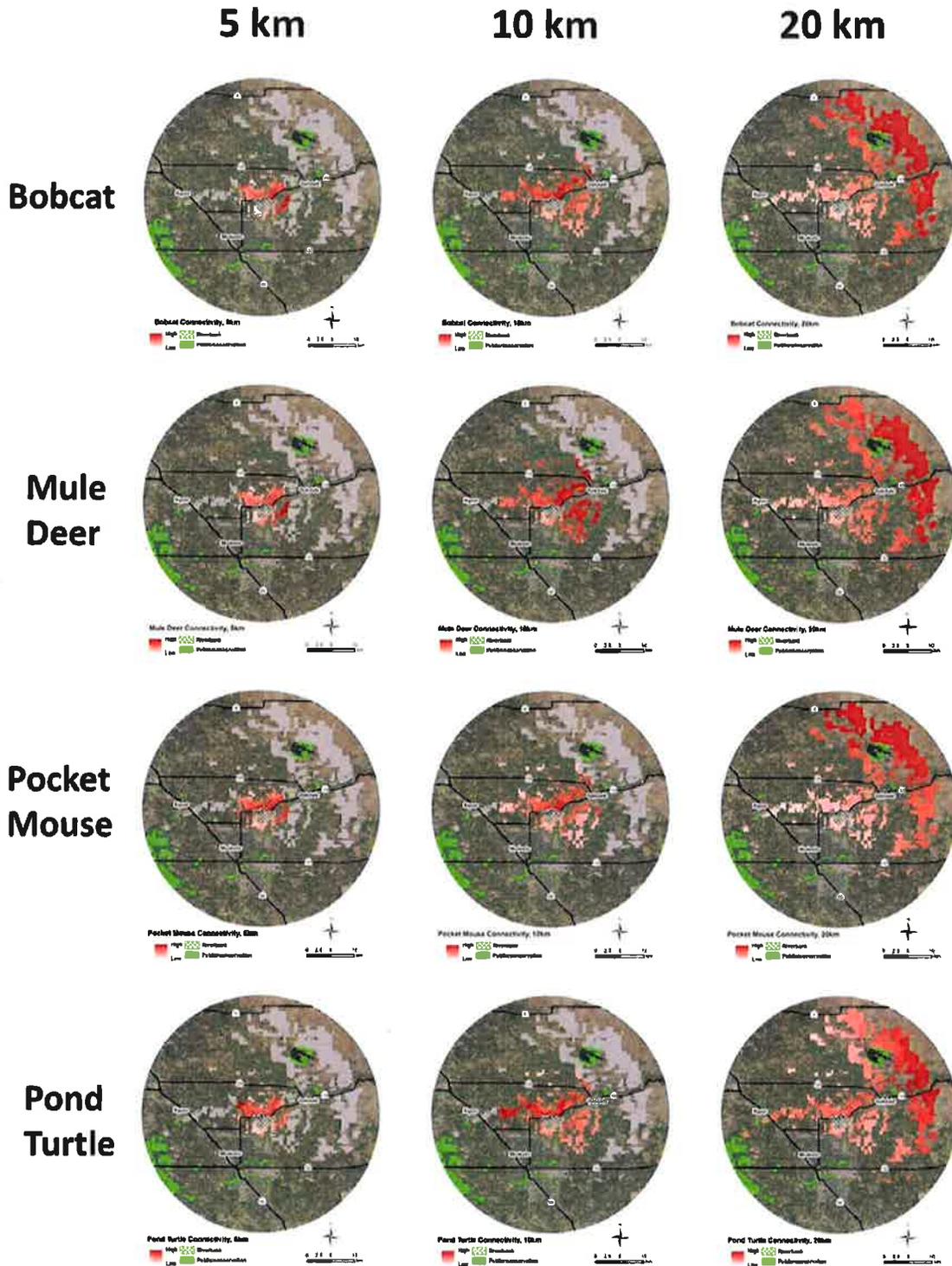


Figure 9. Modeled connectivity for four focal species at multiple spatial scales in Marxan-selected parcels. The red color ramp indicates the relative strength of the modeled connectivity in the parcels. Gray polygons indicate parcels within the network identified by Marxan but lacking the specific conservation feature.

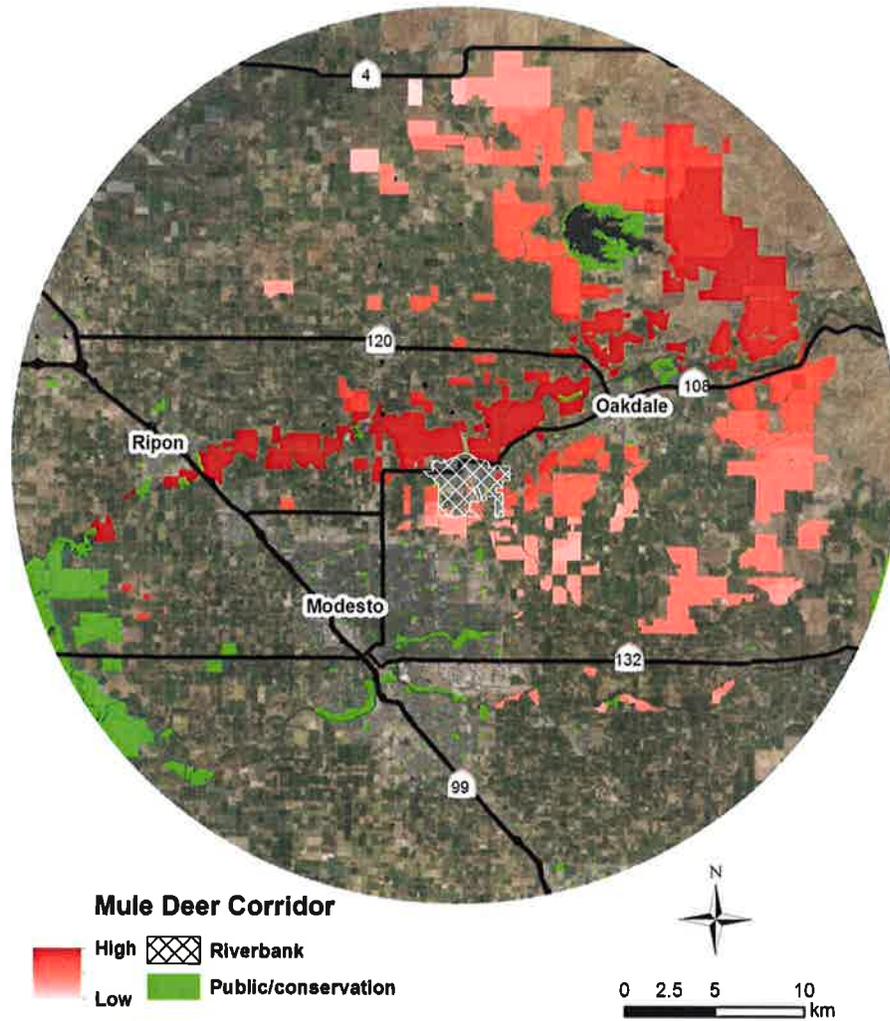


Figure 10. Modeled mule deer corridor results for Marxan-selected parcels. Darker red hues indicate areas of higher landscape connectivity between Stanislaus National Forest (east) and San Joaquin National Wildlife Refuge (west) (note: both of these protected areas are beyond the extent of this map and not depicted).

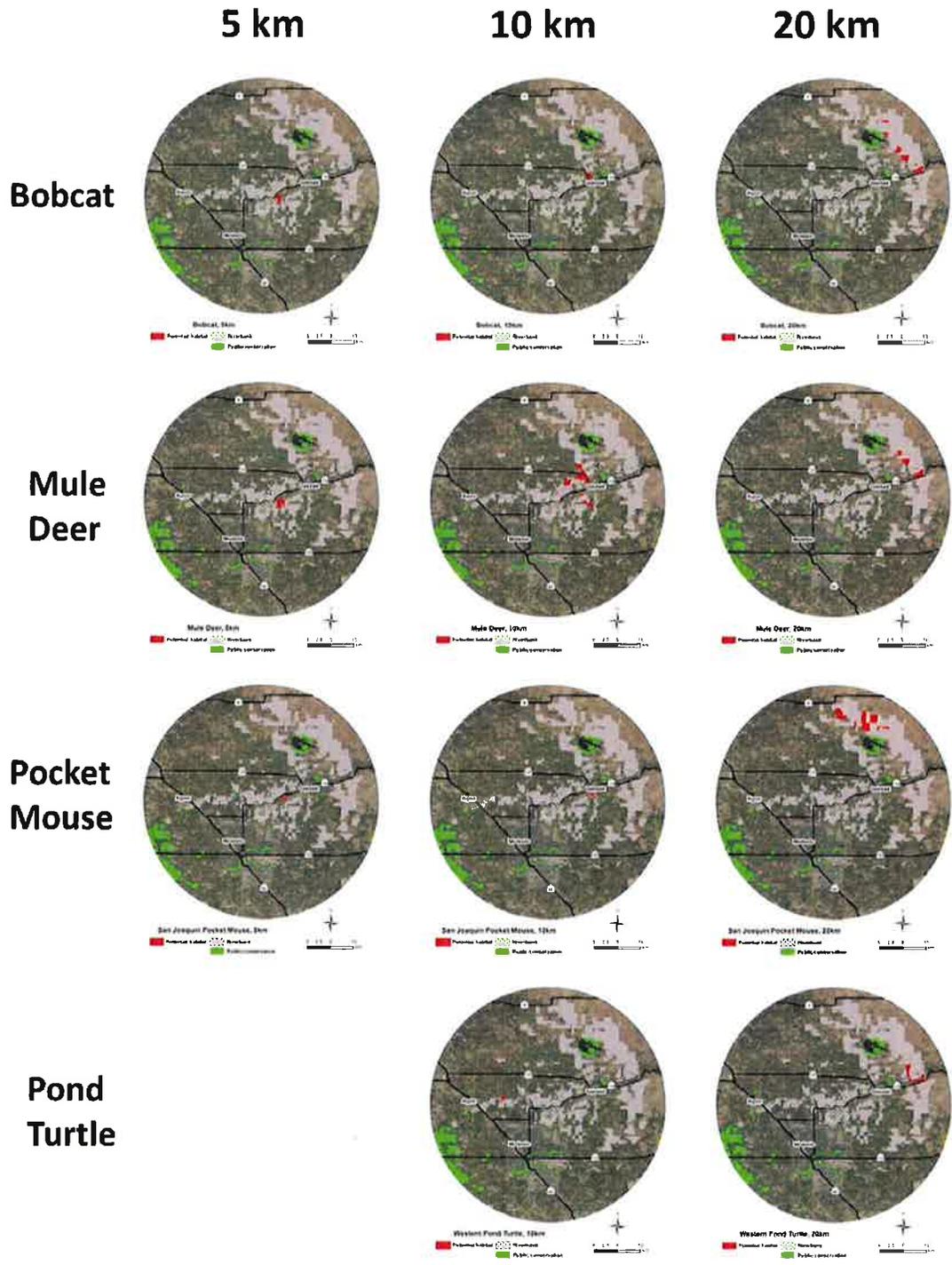
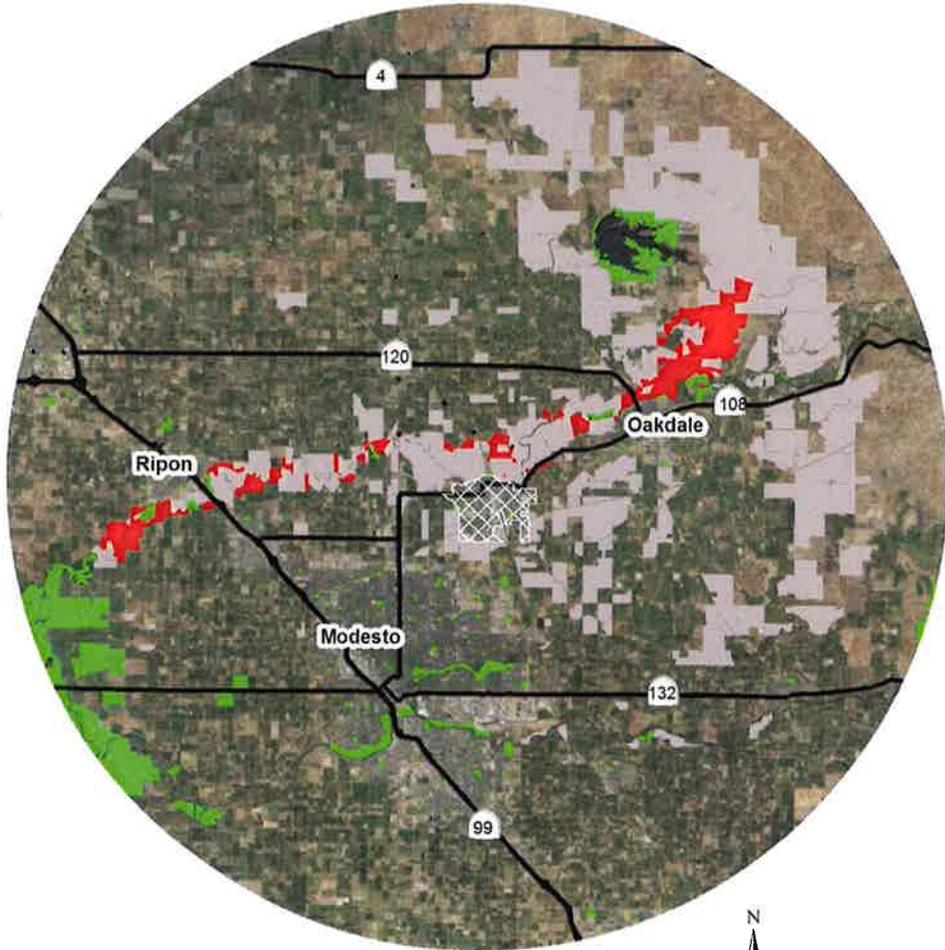


Figure 11. Connectivity areas. Parcels in red were not selected by Marxan to meet regional ecological goals. However, they have high modeled connectivity for the focal species at the indicated spatial scale. They should be considered for management of animal movement across the study region.



Mule Deer Corridor



Figure 12. Mule deer corridor areas. Parcels in red were not selected by Marxan to meet regional ecological goals. However, they have high modeled connectivity for regional mule deer movement between the Sierra Nevada and San Joaquin River. They should be considered for management of animal movement across the study region.

LINKAGE DESIGN

The results of the Marxan and other analyses were compiled into a final linkage design (Figure 12). Three kinds of parcels are included: (1) Marxan-identified parcels that should be managed for preservation or restoration of one or more of the conservation targets used in the analysis; (2) those parcels that should be managed for the movement of one or more of the focal species; and (3) those to be managed for long-range movement patterns in order to provide regional connectivity. These are not intended as mutually exclusive management regimes, but rather as high priority considerations within a multi-pronged management strategies.

Some general descriptions of the first type of parcel follow:

Annual Grassland (AGS)

- Total: 26,040 ac
- Parcels: 275
- Total parcel area: 53,537 ac

AGS is the assessed land cover type with the greatest extent in the identified linkage. It is primarily found in the northeastern portion of the study area where the heavily agricultural San Joaquin Valley grades into rangeland at the lower edge of the Sierra Nevada foothills. The large grassland parcels should be considered for easement or fee title purchase to protect these relatively intact working landscapes from future conversion to land uses not compatible with the needs of native species. In addition to the large parcels here, smaller patches of AGS are found scattered across other portions of the linkage. These parcels should be considered for targeted grassland restoration projects in the future.

Freshwater Emergent Wetland (FEW)

- Total: 1,581 ac
- Parcels: 296
- Total parcel area: 44,624 ac

Parcels containing FEW are scattered throughout the linkage, with several near the Stanislaus River with higher densities. The wetlands in the linkage are generally small, comprising about 1/30th the area of the parcels in which they are embedded. Little of the study area was historically comprised of extensive wetlands (GIC 2003), so large-scale restoration is likely not a suitable strategy in the linkage. However, the existing small wetlands should be protected, new wetlands could be constructed (for example, tail water ponds in agricultural fields), and some restoration in the Stanislaus River floodplain should be undertaken to increase the habitat and ecosystem services that wetlands generally provide.

Valley Foothill Riparian (VRI)

- Total: 685 ac
- Parcels: 146
- Total parcel area: 23,258 ac

The riparian areas in the linkage are concentrated along the major rivers in the study area, especially the Stanislaus River. Several parcels along the Tuolumne River and several other smaller waterways in the study area were also identified and selected. The remnant patches comprising the small total riparian land cover should be preserved to maintain ecological health. There are also many restoration opportunities in the much greater area of the parcels which contain the fragmented riparian forest. The primary focus of these efforts should be in the floodplain of the Stanislaus River, where opportunities

are greatest for successful remediation and regaining ecosystem processes such as animal movement east/west through the study area.

Wet Meadow (WTM)

- Total: 0.9 ac
- Parcels: 1
- Total parcel area: 28.5 ac

There is one parcel in the linkage that contains this land cover type. It is located just east of Riverbank on the south bank of the Stanislaus River. This parcel should be conserved as part of the river's floodplain ecosystem. Like FEW, there was likely little extensive WTM in this area historically, so restoration/creation of this habitat type should only be a priority in rare cases.

Tricolored Blackbird

- Total: 2,778 ac
- Parcels: 20
- Total parcel area: 7,873 ac

The tricolored blackbird is a sensitive species in California with recent studies showing a rapidly diminishing population (Ortiz 2014). Habitat for the species within the linkage is found primarily in the grasslands on larger parcels northeast of Woodward Reservoir. Smaller parcels are also found just south of Oakdale. This species can be compatible with agricultural operations if the timing of the operations takes into consideration the natural history of the blackbird. Agricultural easements could be pursued for these parcels as well as restoration projects designed to increase the numbers of insects serving as a food source for the birds.

California Tiger Salamander

- Total: 2,003 ac
- Parcels: 24
- Total parcel area: 8,932 ac

Potential salamander habitat is found on several large grassland parcels in the eastern portion of the study area as well as a number of smaller agricultural parcels in the vicinity of Oakdale. Easements or fee title should be acquired on the larger parcels, while grazing could still occur there. Protection and enhancement of salamander habitat on the smaller parcels will be more problematic. The greatest potential for salamander habitat on these parcels probably would occur if they are purchased and restored to a more natural habitat, such as grassland with embedded seasonal wetlands.

Burrowing Owl

- Total: 1,919 ac
- Parcels: 141
- Total parcel area: 2,915 ac

There are two clusters of potential burrowing owl habitat in the linkage: adjacent to Riverbank on the southwest, and just north of Oakdale. The pastureland near Riverbank represents suitable owl habitat most likely to come under threat by near future development, as it lies in the buffer area between Riverbank and Modesto. Easements (or fee title purchases) to secure this area as part of a linkage could also serve as an open space buffer between the two cities, sometimes referred to as "community separators" in planning literature. Many of the parcels containing owl habitat north of Oakdale are also potential California tiger salamander habitat. Grassland restoration projects on these parcels could serve to improve habitat for both species.

Aleutian Canada Goose

- Total: 11 ac
- Parcels: 4
- Total parcel area: 148 ac

This species was delisted in 2001 when its recovery was deemed sufficient, and so it is not a species of great concern in this region. Four agricultural parcels west of Modesto and south of Ripon contain a moderate amount of potential habitat for this species. Easements could be secured here to ensure future agricultural operations benefitting the goose and other species.

Swainson's Hawk

- Total: 1,702 ac
- Parcels: 59
- Total parcel area: 10,099 ac

There are four main clusters of parcels containing potential Swainson's hawk habitat in the linkage: (1) in the northern section adjacent to CA Highway 4; (2) southeast of Oakdale, along the Stanislaus River where it crosses CA Highway 99 near Ripon; (3) along the Stanislaus River immediately adjacent to Riverbank's northern border; and (4) several scattered parcels near the eastern edge of Modesto. Several strategies could be combined to preserve and/or enhance hawk habitat. These include securing easements to keep the identified parcels in agriculture production, specifically row and field crops and alfalfa. Additionally, valley oaks should be planted in these locations to provide future nesting sites in close proximity to the feeding habitat.

Valley Elderberry Longhorn Beetle

- Total: 88 ac
- Parcels: 23
- Total parcel area: 1,911 ac

The major concentration of parcels identified as possessing valley elderberry longhorn beetle (VELB) habitat lies along the Stanislaus River, immediately downstream from Riverbank. While only 88 acres of potential existing habitat were identified, the parcels containing the habitat total almost 2,000 acres. Therefore there may be favorable opportunities for riparian restoration on these sites in order to benefit VELB and other native riparian species. Other locations in the linkage with modeled VELB habitat include a smaller area along the Stanislaus River in the vicinity of Caswell Memorial State Park as well as a few sites along the Tuolumne River.

Elderberry Savanna

- Total: 14 ac
- Parcels: 1
- Total parcel area: 179 ac

There is only one parcel in the linkage identified as elderberry savanna, which is located adjacent to Caswell Memorial State Park. Elderberry savanna is especially critical for VELB, so preservation of this parcel (coupled with restoration activities on the majority of parcel that is in agricultural production) could provide a very beneficial extension to the riparian area currently protected at the state park. Other sites along the Stanislaus River could serve as restoration areas as well.

Western Pond Turtle

- Total: 75 ac
- Parcels: 12
- Total parcel area: 992 ac

While the linkage accounts for longer distance movement events by this species across the study region, known occurrences are limited to an area adjacent to the Stanislaus River just upstream of Oakdale. The parcels identified for the linkage include both riparian and upland areas that could potentially be used by the turtle. The turtle can potentially use water bodies that also serve agricultural purposes (such as tail water ponds); however agricultural activities in the uplands or in riparian areas could negatively affect the species. Therefore, these parcels should be considered for restoration activities.

Delta Button-Celery

- Total: 7 ac
- Parcels: 2
- Total parcel area: 313 ac

Delta button-celery requires wetland habitat associated with riparian systems. Modeled habitat for the species in the study region is only found on two parcels, adjacent to Caswell Memorial State Park. Habitat for the species should be preserved and enhanced through wetland restoration activities. These parcels also include VELB habitat, so restoration should be designed to include a mosaic of multiple kinds of riparian and wetland habitat.

Hoary Bat

- Total: 85 ac
- Parcels: 24
- Total parcel area: 993 ac

Parcels with modeled hoary bat habitat total almost 1,000 acres along the Stanislaus River, just east of Oakdale. Steps that could be taken to preserve this species in the linkage include the creation of patches of large trees, such as riparian forest or valley oak woodland. The bats require larger trees for cover and reproduction. The creation of a patchy or open structure would allow for both cover and foraging opportunities on these parcels. Trees will take a number of years to mature; therefore artificial bat houses could be installed in this area until such time as the trees are usable by the bats.

Vernal Pool Tadpole Shrimp

- Total: 8,472 ac
- Parcels: 43
- Total parcel area: 16,376 ac

Vernal pool tadpole shrimp are found on large parcels in the grasslands on the eastern edge of the study region. Much of this area could be managed for grazing that takes into consideration the needs of this and other vernal pool species (Marty 2005). If there are locations with exceptional quality or density of vernal pools containing tadpole shrimp, they could be purchased to ensure focused management on ecosystem health. Otherwise easements could serve to ensure that vernal pool habitat would not be lost to future development.

California Linderiella

- Total: 5,061 ac
- Parcels: 24
- Total parcel area: 8,274 ac

Parcels selected for potential California Linderiella (or California fairy shrimp) habitat overlaps the southern portion of the vernal pool tadpole shrimp parcels. These are found in the eastern portion of the study region, south of the Stanislaus River. Management suggestions are the same as for vernal pool tadpole shrimp (above).

Hardhead

- Total: 216 ac
- Parcels: 17
- Total parcel area: 1,549 ac

Parcels containing potential hardhead habitat were identified along both the Stanislaus and Tuolumne rivers. For most effective conservation, these parcels should be purchased to allow for restoration or habitat enhancement activities at these sites. Such activities could include riparian vegetation enhancement or augmentation of substrate used by the fish as spawning habitat.

Yuma Myotis

- Total: 85 ac
- Parcels: 24
- Total parcel area: 993 ac

Parcels with modeled Yuma myotis habitat total almost 1,000 acres along the Stanislaus River, just east of Oakdale. Steps that could be taken to preserve this species in the linkage include the creation of patches of large trees, such as riparian forest or valley oak woodland. The bats require larger trees for cover and reproduction. The creation of a patchy or open structure would allow for both cover and foraging opportunities on these parcels. Trees will take a number of years to mature; therefore artificial bat houses could be installed in this area until such time as the trees are usable by the bats.

Colusa Grass

- Total: 286 ac
- Parcels: 3
- Total parcel area: 2,390 ac

Colusa grass is potentially found on three parcels in two locations in the linkage. One is a single parcel northeast of Woodward Reservoir in the eastern grasslands. To ensure preservation of the site, purchase of the parcel is likely the preferred strategy. The other location is just north of the town of Waterford. Only portions of the two parcels remain in a natural condition, so purchase combined with habitat restoration or creation should be considered.

Riparian Woodrat

- Total: 0.8 ac
- Parcels: 1
- Total parcel area: 179 ac

Modeled habitat for the riparian woodrat is found on a single parcel in the linkage. This parcel is adjacent to Caswell Memorial State Park and is also the site of potential habitat for several other target species (such as riparian brush rabbit and VELB). This parcel should be purchased in order to protect and expand the riparian forest serving as habitat for multiple sensitive species.

Northern Hardpan Vernal Pool

- Total: 3,532 ac
- Parcels: 20

- Total parcel area: 9,546 ac

Several thousand acres of northern hardpan vernal pool complex is found in the northeastern grasslands, approximately between Woodward Reservoir and CA Highway 120. Conservation easements can be used to protect these areas from future development while still allowing grazing to occur that can benefit these ecosystems.

San Joaquin Valley Orcutt Grass

- Total: 242 ac
- Parcels: 2
- Total parcel area: 946 ac

San Joaquin Valley orcutt grass is potentially found on two parcels near the town of Waterford. Colusa grass and Greene's tuctoria are also potentially found here. The very limited nature of the habitat for this species in this region suggests purchase of the parcels in question in order to conduct restoration activities and better ensure management practices to protect and enhance the species.

Hartweg's Golden Sunburst

- Total: 362 ac
- Parcels: 6
- Total parcel area: 2,410 ac

Potential habitat for this species is limited to several hundred acres in the eastern grasslands, straddling CA Highway 120. Both the location (adjacent to the highway) and the limited area of the species in the region suggest purchase of the properties as a preferred conservation strategy. Natural habitat could be protected and agricultural land restored to grassland and possibly valley oak woodland.

Riparian Brush Rabbit

- Total: 0.8 ac
- Parcels: 1
- Total parcel area: 179 ac

Modeled habitat for the riparian woodrat is found on a single parcel in the linkage. This parcel is adjacent to Caswell Memorial State Park and is also the site of potential habitat for several other target species (such as riparian woodrat and VELB). This parcel should be purchased in order to protect and expand the riparian forest serving as habitat for multiple sensitive species.

Greene's Tuctoria

- Total: 242 ac
- Parcels: 2
- Total parcel area: 946 ac

Greene's tuctoria is potentially found on two parcels near the town of Waterford. Colusa grass and San Joaquin Valley orcutt grass are also potentially found here. The very limited nature of the habitat for this species in this region suggests purchase of the parcels in question in order to conduct restoration activities and better ensure management practices to protect and enhance the species.

Great Valley Mixed Riparian Forest

- Total: 40.5 ac
- Parcels: 2
- Total parcel area: 312.7 ac

While riparian forest fragments exist in various locations throughout the study area, this particular community is found only in two parcels, adjacent to Caswell Memorial State Park. See the description above for Valley Foothill Riparian for more details on suggested management options.

Vernal Pools

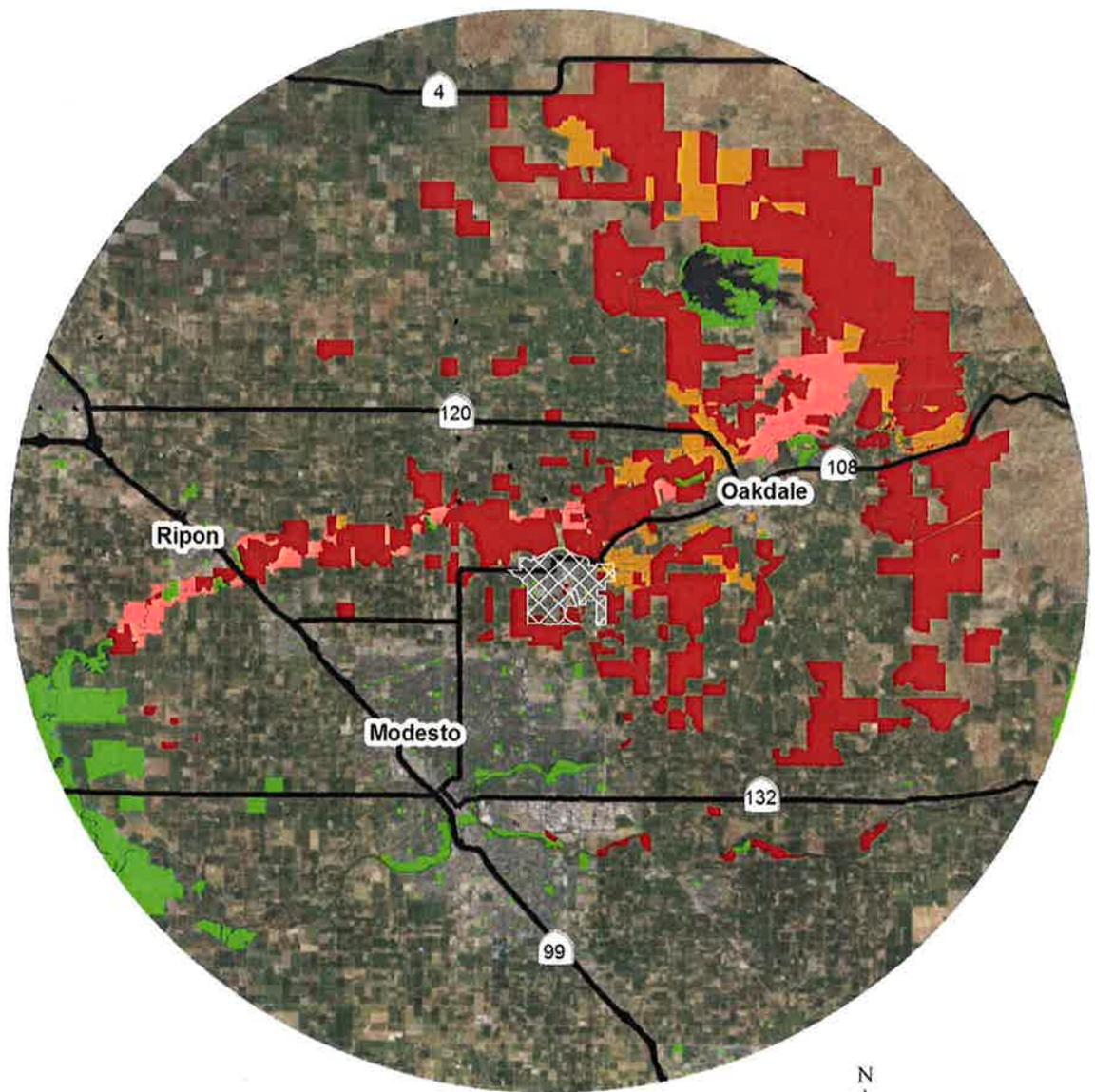
- Total: 15,520.4 ac
- Parcels: 77
- Total parcel area: 31,074.2 ac

This land cover type refers to extensive vernal pool complexes rather than just vernal pools themselves. These are found across the eastern portion of the study area. Conservation easements can be used to protect these areas from future development while still allowing grazing to occur that can benefit these ecosystems.

Connectivity

Linkage parcels not specifically selected for the above ecological features were identified in order to be managed for landscape connectivity within the study area. There are numerous management actions that could support this strategy. Parcels could be purchased and restored to a more natural condition in order to encourage movement between suitable habitats. Alternatively, easements could be obtained and parcels could be managed to reduce wildlife conflicts and/or strategic implementation of small-scale restoration activities could be planned that, while not returning the parcel to a fully natural condition could provide an increased selection of ecological resources. A potential example is the installation of small ponds or other water features to facilitate the movement of western pond turtles. Alternatively, small pockets of valley oak or other native tree species could be planted to provide temporary cover for mule deer or bobcat moving across a parcel.

One crucial need in managing for connectivity lies in designing road crossings that are suited to the particular species in the region. There are several critical locations where crossings should be carefully planned and constructed in order for the linkage to function as successfully as possible. CA Highway 120 just north of Oakdale will need a crossing structure for east-west connectivity through the study area to be maximized. This same highway will need a crossing structure east of Oakdale as well if the two major grassland patches are to be fully connected. CA Highway 108 just east of Riverbank also presents a barrier to movement between the Stanislaus River and the pasture lands east of the city.



Final Linkage Design

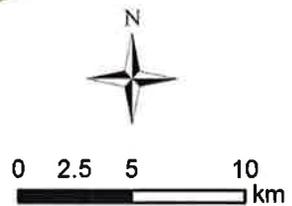
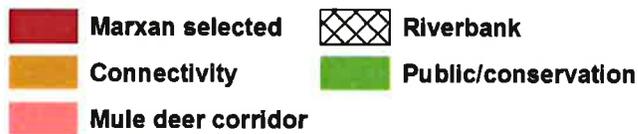


Figure 13. Final linkage design. The four components are: (1) existing public/conservation land; (2) parcels selected by the Marxan analysis; (3) parcels with high connectivity scores not selected by Marxan; and (4) parcels with a high score for the regional mule deer corridor but not selected by Marxan.

CONCLUSIONS AND NEXT STEPS

The linkage design identified in this study is unique in that landscape connectivity was incorporated in all stages of the ecological assessment process, not in the latter stages as is typically the case. Most designs such as this identify ecological core areas, and then evaluate connectivity between them. However, in working landscapes such as this, there may not be large, relatively intact core areas. Efforts to assess patterns of landscape connectivity may need to occur early in the process in order to identify management strategies that may be most effective in protecting and restoring ecosystem patterns and processes in a region. The linkage design presented in this study represents a hypothesis concerning the most effective strategies for this kind of landscape, which will become increasingly more common as global human resource demands increase over the coming decades.

Another important feature of this design is the effort made to incorporate multiple spatial scales in the plan. Ecosystem patterns and processes occur at many spatial scales and important features may be overlooked and potentially lost if these multiple scales are not taken into consideration. These scales are focused around Riverbank, with the northern edge of the city lying at the center of the 5, 10, and 20 km radii circular zones used in the analysis. If this same kind of analysis were undertaken for the cities of Oakdale or Modesto, we would expect there to be some incongruence in the resulting linkage design due to a change of focus from the vicinity of Riverbank to that of another location. The effects of scale and location should be taken into consideration if similar planning efforts are undertaken in overlapping but non-identical areas.

The regional nature of the linkage design will probably require a coalition of local governments, state and federal agencies, and private non-governmental organizations to move implementation forward. As there were a variety of ecological features considered during planning of the linkage model, so too will there need to be a variety of complementary management strategies. If such a coalition could be formed leading to the implementation of a linkage such as that detailed here, the ecological condition of the region should be preserved and enhanced in the coming decades. One possibility is integrating this information into a regional habitat conservation plan (HCP; under the federal ESA) and Natural Community Conservation (NCCP) planning process. The northern portion of the study area, north of the Stanislaus River, is largely covered by an HCP in San Joaquin County; however, currently there is no HCP or NCCP in Stanislaus County. Recently, a new program has been established to use the state cap-and-trade program's revenue to fund 'community separator' greenbelts for preservation of farmland between cities to limit urban sprawl and encourage compact urban growth and in-fill development (White 2014). The research presented in this study shows that existing agricultural land between the cities of Riverbank and Modesto, and Riverbank and Oakdale, meet these criteria and could contribute to agricultural land preservation and ecological connectivity functions. When these funds become available the CDFW could assist and encourage local municipalities (cities and counties) to utilize these funds for both agricultural and ecological functions.

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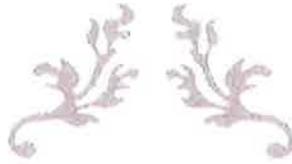
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Karen Conrotto



**River Lowlands Farms Historic District
Traditional Cultural Place Rural Landscape Report
The Kroeber (1959) Lakisumne Name for the settlement is "Hise-ti"
Historic Burwood / Monroeville and Burneyville from 1852**

PARCELS AND LINEAR FEATURES LOCATED IN THE STANISLAUS
RIVER LOWLANDS CULTURAL RESOURCES
of the HISTORIC FARMLANDS TRADITIONAL CULTURAL
PROPERTY STANISLAUS & SAN JOAQUIN COUNTIES, CALIFORNIA FOR
THE CENTRAL VALLEY CONCERNED CITIZENS (CVCC) BULLETIN 30,
BULLETIN 38, & SECTION 106 EVALUATION ABRIEVIATED DRAFT
Prepared for the Central Valley Concerned Citizens (CVCC)



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**FOR THE CENTRAL VALLEY CONCERNED CITIZENS (CVCC)
BULLETIN 30, BULLETIN 38, & SECTION 106 EVALUATION**

ABRIEVIATED

DRAFT

Prepared for the Central Valley Concerned Citizens (CVCC)

Memorandum

RE: Notice of Proposed Plan for Initial Study for Section 106 Historic Properties Survey Inventory Report for Developing the Traditional Cultural Property Historic Farmlands of the Burwood-Burneyville Family Farms

The following cultural resources report provides detailed findings and explanations for this decision proposed by the qualified archaeological representative holding the qualifications that meet the Secretary of the Interiors Standards for archaeology. Private confidential consultation interviews are the basis for this preliminary draft. Qualifications of the individuals performing the original studies provided by the Central Valley Concerned Citizens (CVCC) are included in the records themselves, and the qualifications of the persons performing and receiving the record searches can be found in the documentation of the California Historic Resource Information System (CHRIS) located in Sacramento, California. Properties previously determined eligible or ineligible for the National Register of Historic Places have been included in the Record Searches #11265L, #11579L, draft surveys [ML-20-01, ML-20-02 Criterion D, ML-20-03 Criterion D, ML-20-04 Criterion B, ML-20-05] with additional private property resource contributions by the Farmers and Landowners of the Burwood-Burneyville Historic Farmlands. Identification of any previously recorded historic properties following the requirements set forth in established codes [36 CFR Part 800.4(a)(2)] will indicate whether SHPO concurred on previous eligibility determinations. These findings should be reviewed by the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) for recommendations as to the quality of preservation of the cultural heritage presented here. Since this is the introduction to an Initial Study and the required Record Search for developing a preservation plan, coordination between agencies represented across this broad range of the Riverbank and Escalon riparian Stanislaus River geographic quadrangles requires further preservation efforts be continued with this initial draft report as the basis for field research.

It is the opinion of the principal investigator and the CVCC, and not to be regarded as legal advice, that the preliminary historic property survey was performed using the best practices of the archaeological profession as stated in the ethical guidelines of the Register of Professional Archaeologists. Farm historians have been self-reporting confidential privileged family genealogical contributors to the documents. Since changes over time may occur under concurrent investigations and given the elements of nature, changes in the approach or attributes of a particular site may vary. Therefore, the investigator and associates shall be held harmless from any liability, financial or otherwise resulting from the activities of others regarding undertakings at these locations. There is no other warranty implied by the acceptance of the report presented as it is the responsibility of the lead agency or project proponent to apply the recommendations and ensure that the field operations conform to the mitigation measures.

Central Valley Concerned Citizens

Abstract

The River Lowlands Farming Historic District Traditional Cultural Place is the rural historic landscape along the north and south banks of the Stanislaus River between the communities of Riverbank and Escalon, Stanislaus and San Joaquin Counties, California. Upon review of the three sources of historic resources, the River Lowlands Farming Historic District Traditional Cultural Place has determined that a large body of evidence has been left unreported by these documents. This summary and analysis of the results of the archival research that informed the areas of potential effects (APE) of previous proposed project regions revealed any recorded historic properties [36 CFR Part 800.4(a)(2)] and indicated any State Historic Property Office (SHPO) eligibility determinations. The boundaries of the River Lowlands Farming Historic District Traditional Cultural Place include the western border of McHenry Avenue, the northern boundary of River Road, the eastern boundary of the Santa Fe Avenue over the Stanislaus River, and the southern boundary being the City of Riverbank and Highway 108 Patterson Road to where it intersects with McHenry Avenue. Physical evidence of the historic values inherent within this landscape are tangible elements of the environment signifying the beliefs, attitudes, traditions, and values of these people numbering approximately 27 parcels on the northern bank of the Stanislaus River and numbering approximately 61 parcels on the southern bank of the Stanislaus River. Although there is a recent proposal for annexation into the Riverbank Sphere Of Influence (SOI) to include a buffer of one-half mile radius from a perimeter of a proposed 1522 acreage out of a partial section of the total Assessor's Parcel Numbers of approximately 88 parcels, the River Lowlands Farming Historic District Traditional Cultural Place is the overarching theme of rural historic farmland separated by the Army Corp of Engineers governance over the riparian zone along the Stanislaus River lying between the parcels.

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River Lowlands Farms Historic District Traditional Cultural Place
Rural Landscape Report

The River Lowlands Farming Historic District Traditional Cultural Place is the rural historic landscape along the north and south banks of the Stanislaus River between the communities of Riverbank and Escalon, Stanislaus and San Joaquin Counties, California. Historic pioneer families' remembrances and identification of ancient trails, historic roads, farming practices, riverboats and ferries, buildings, structures, objects, and sites in this landscape have identified places with significance to their pioneer family homesteads. Evaluations during previous Phases I and II Section 106 Identification of Historic Properties conducted report the results of these elements within the record searches obtained from the Central California Information Center. In 2019, 2021, and 2022 there were combined efforts to review and make additional submissions of historic records which were accessed through record search 1) file no. 11579L 12-4-2020; 2) file no. 112651L 12-18-2020, and 3) draft versions of the Peak and Associates (2021) archaeological field survey record forms data not yet included in any record search -the recent 2019-2022 findings. These record search perimeters consisted of only 1/16th of a mile radius along the boundary edge of the one parcel of 1522 acres having limited results. Upon review of the three sources of historic resources, the River Lowlands Farming Historic District Traditional Cultural Place has reviewed and determined that *a large body of evidence has been left unreported by these documents*. The Scope of Work (SOW) performed here provides a description of the archival research and oral history interviews conducted in order to identify elements of the environment to be preserved within the rural historic landscape and provides evidence of properties.

This summary and analysis of the results of the archival research that informed the areas of potential effects (APE) of previous proposed project regions revealed any recorded historic properties [36 CFR Part 800.4(a)(2)] and indicated any State Historic Property Office (SHPO) eligibility determinations. The boundaries of the River Lowlands Farming Historic District Traditional Cultural Place include the western border of McHenry Avenue, the northern boundary of River Road, the eastern boundary of the Santa Fe Avenue over the Stanislaus River, and the southern boundary being the City of Riverbank and

Highway 108 Patterson Road to where it intersects with McHenry Avenue. The name given to Riverbank habitation areas is "Hise-ti" described by a Yokut informant according to the interviews with Louis in 1923 by Gifford and Kroeber (Hall, 1978) and Joe Guzman by C. H. Merriam in 1934. Physical evidence of the historic values inherent within this landscape are tangible elements of the environment signifying the beliefs, attitudes, traditions, and values of these people numbering more than 27 parcels on the northern bank of the Stanislaus River and numbering more than 61 parcels on the southern bank of the Stanislaus River. The river lowlands do extend further upstream and downstream with evidence from oral interviews reported of the old golf course and of the old residence of Chester Smith, a historic musician. Each traditional landscape elevation is characterized by a viewshed unique to each elevation and viewpoint. Fields, pastures, open plains and traces of the wagon ruts and farm roads on the lowlands are tangible contours covered by layers of alluvium silt deposited over centuries of flood waters leaving high points where ancient settlement and trails were traversed by the Spanish and Gold Rush colonization of the pioneers that settled here. Although there is a recent proposal for annexation into the Riverbank Sphere Of Influence (SOI) to include a buffer of one-sixteenth mile radius from a perimeter of a proposed 1522 acreage out of a partial section of the total Assessors Parcel Numbers of approximately 88 parcels, the River Lowlands Farming Historic District Traditional Cultural Place is the overarching theme of rural historic farmland separated by the Army Corp of Engineers governance over the riparian zone along the Stanislaus River lying between the parcels.

Purpose of This Study

An analysis conducted by the project proponent team members of the CVCC during the preparation of the application to the lead agency addresses the most recent oral interviews, historic features of the private property farming communities and previous historic resources reviewed within this area of potential effects between Burwood and Burneyville along the Stanislaus River, California to formulate a historic resource overview. Before pre-field activities commenced, full archaeological and architectural surveys were requested by the CVCC archaeological consultant, which at this time have not been received. Three resource surveys were obtained from the City of Riverbank of the most recent

investigations of the work along the central natural ditch system on the south side of the Stanislaus River were received, but the 2019-2021 field work which consisted of the full record searches were not received.

Review of the established previously recorded historic properties following the requirements set forth in established codes [36 CFR Part 800.4(a)(2)] were only able to be reviewed through the bibliography of the record searches which were not given to the CVCC. These titles in the bibliography indicated whether SHPO concurred on previous eligibility determinations. The record search would have allowed the determination of whether past projects were in the coverage area when provided with the project name, and the agency who initially evaluated the resource. All survey, evaluation, and assessment must be conducted by or under the direct supervision of a qualified professional in the appropriate field meeting the Secretary of the Interiors Professional Qualification Standards (36 CFR 61) in accordance with the Secretary of the Interior's Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48 FR 44716-42). Providing a broad narrative historical overview of the overarching forces surrounding the project environmental, geographical, social, cultural, political, governmental, and technological elements which have shaped land use patterns of the Stanislaus River corridor from lowlands to foothills and mountains can provide a backdrop for understanding any significance according to the requirements of context. The historic eras in California Indigenous, Spanish Mission, Mexican, Gold Rush colonization, and American civil and foreign war inductions inform the more recent history of the population and development of the built environment of the area under consideration.

Heritage Values

The historical patterns present within the archival reports about the areas of potential effects on the two 7.5 quadrangle maps of Escalon and Riverbank follow specific themes. The environmental and cultural influences of the human influence in prehistoric California and the built environment hold varying levels of significance. Significant individuals and groups relevant to the context theme of this broad area may relate to prehistoric habitation patterns, phases of colonization history, and current events

surrounding geography and agriculture. An overview of this broad area falls within specific types of interpretation depending upon the intent or scope of work for each region and reasoning for the impact upon the land. In order to construct the consistent theme related to the construction of the entire agricultural lowlands, the significance of the architectural elements, the physical plant, the underlying geological constituents, and periods in history where all locations under review reveal concurrent themes connecting them even though the area is so broad.

Historic Context Themes and Periods of Significance

For the purpose of the evaluation of the properties listed within the record search outline letters obtained from the Central California Information Center of 2019, 2021, and 2022 and additional submissions of historic records which were accessed through record search 1) file no. 11579L 12-4-2020; 2) file no. 112651L 12-18-2020, and 3) draft versions of the Peak and Associates (2021) archaeological field survey record forms data which have not yet been received, additional research was conducted by the CVCC. The historic eras have been considered following these year descriptions: Prehistoric; Pre-colonial (1500-1769); Spanish Mexican (1769-1848); Early American (1848-1880); Turn of the Century (1880-1914); Early Twentieth Century (1914-1945); Post World War II (1945-). Since the records contain the temporal definitions based upon resource type and age, the Historic Periods previously mentioned hold particular characteristics in order to identify the timeframe. These classifications are listed in these records as Prehistoric, Protohistoric, and Historic. For these definitions the source is the California Office of Historic Preservation (1995) publications.

Prehistoric sites minimally consist of a single feature, or at least three associated artifacts (if less than three items then the item is listed as an isolate), and it must be at least older than 45 years. A prehistoric location can also be defined because of oral history, recorded history of an event or significant person occurring before the recent dominant culture. Within the California floodplains the physiological conditions that altered the landscape require a particular concern where these alterations require a depth of understanding of what occurred on the land during the above-named year descriptions of eras. Since

any of these types of resources required human intervention to alter the natural form on the landscape, then evidence of human activity more than 45 years old was examined.

Archaeological resources can also include architectural construct within the definition of a site. These are considered to be built environment features within the survey records obtained and include fragments and full concrete canals older than 45, ditches or agricultural features including levees, dams, weirs, flumes, railroad grades or roadbeds, retaining walls or rock walls, fences, ranch related items such as fencing, corals, and poles or posts. Historic period buildings are identified within these records, with some having applications for historic significance.

Boundary Description and Chronology of Occupants

Reviewing the evidence for creating the boundaries of the River Lowlands Farming Historic District Traditional Cultural Place, oral history, physical evidence, and archival compilation from local museums and farming group chapters contributed to the basis for these boundary demarcations. The boundary and historical knowledge can range beyond these markers, but most of the concerns for the natural habitat, early farming practices, and flood plain occur within the western border of McHenry Avenue, the northern boundary of River Road, the eastern boundary of the Santa Fe Avenue over the Stanislaus River, and the southern boundary being the City of Riverbank and Highway 108 Patterson Road to where it intersects with McHenry Avenue. Family contributions for the archival collection of physical and literary objects and stories attributed to these 88 assessors parcel number plots of acreage have been compiled here to demonstrate the rich cultural values inherent to the rural historic farmland of the River Lowlands Farming Historic District Traditional Cultural Place.

Original Government Land Office maps, early topographic maps, and aerial photography accessed through the partnership with the McHenry Museum from a time before the New Melones Dam was constructed, show a biodiverse landscape tended by the farming families. The footprint of the River Lowlands Farming Historic District Traditional Cultural Place boundary began in the contact period before the Spanish Land Grants were established. Evidence of the ancient trail system ran along both sides of the river both on the upper cliffs and along the riparian zones. Evidence of these trails have been

found in the oral history of the Elders interviewed for the ethnographic studies of the New Melones Dam prehistory work, along with oral history from Elders of the upstream Native American Indian groups (Suchuchumu and Chakachina), and from handwritten ethnographic field notes from the post-contact period describing these trails systems (Hall, 1978, Dyer, 1972).

Lakisumnes River, Rio Laquisimnes 1829

Combining the ethnographic record with the cultural history over time of the Central Valley region has been given eras of classification based upon the findings of earlier archaeological evaluations for the Windmill Culture, the Cosumnes Culture, and Hotchkiss Culture these sequences are established in the California archaeological community. Ethnographic definitions of time in the local Yokut and Miwuk interpretation of history follows a combination of mythology and legend to define this same history from their perspective. The history of the trail system network interpreted by the Elder's stories explain the use of an ancient trail system far beyond the boundary of California where trade goods were brought here from adjoining civilizations from the Midwest and the coast. Archaeological history is variable (Bennyhoff, 1977; Moratto, 1984; Alexander Taylor-Smith, 1860) interpreted through geological features. The Elder record of habitation extends well into the past and is held within the oral history of the local contributors. Archaeology is a relatively young science and primarily discounts the indigenous intellectual knowledge from generations of inhabitants.

The knowledge of an historic structure of the boundary of the early inhabitants family groups who remained on the farms and ranches when these places were converted by the fur traders, the Spanish, then the Gold Rush invasion. Evidence from oral history from the Yokut and Miwuk who melded into the farming and ranching communities in Montpelier, Cooperstown, Paulsell, Farmington, Oakdale, Green Springs and others have passed the history of the conversion of the region into the new era in ethnographic interviews and through confidential transmission through genealogical relations. When the ethnographic record was investigated for the New Melones Dam, the generation of Miwuk and Yokut were identified and interviewed (Van Beuren, 1983; Hall, 1978; Moratto, 1984). There were also Elders who would not speak to the investigators, and these oral histories remain confidential within the local

tribal communities. To this day many of the descendants of the local people hold this information close and do not share it with the Native American Heritage Commission (NAHC) because they believe in nondisclosure of sacred sites. Efforts for consultation and stakeholder information during the scoping of major projects often times remain secret until an archaeologist uncovers physical evidence of their existence.

In order to give a description of the region of the River Lowlands Farming Historic District Traditional Cultural Place boundary, the linear feature of the ancient trail system through the riparian area has to be explained in the terms of the trade route defined by the Elders of the area between the Tuolumne River, the Stanislaus River, the San Joaquin River, and the Calaveras River. The footrail from the San Joaquin river led up the Stanislaus River through the three settlements to the large settlement with three sections at Knights Ferry. Before 1840, the central hub where three-to-four lineages came together was just above Riverbank and Oakdale at the three settlements at Knights Ferry there was a ten-mile stretch of land between the Stanislaus and Tuolumne River at the Rushing Mountain Big Hill at 1525 feet elevation level (Light, 2004). The place centered along this route standing today under the fire lookout tower was the meeting grounds for trading and later used as a Pow-wow grounds (Fahey, 1962). Based upon the oral history and physical evidence of the Knights Ferry ethnographic historic area, the family use routes along the circuit between Webbers Point and Jamestown, included the Siakumna, the Lakisumne, and the Tulanachi. The three main habitation areas along the ancient trails of Knights Ferry were the north side of the river named "Cha-pa-ir-sy/Chapaerse", on the south side of the river Lakiu/Lukusu and Tuyiwünu, and west down river lowlands named "Takin/Tam-kan." These three places were associated with different lineages and routes entering and leaving the Stanislaus River lowlands.

According to Kroeber (1959, p. 19) there was a settlement below Oakdale along the Stanislaus River named "Hise-ti" which was a part of the water moiety and may have been the settlements below the Oakdale settlement of "Wallakumne." Wallakumne was a large Siyante (Cucunuchi) Yokut village reported to Samuel Barrett by Frank Hooky Wilson (Barrett, 1906). The Si-yante (plains Yokut) encompassed the Co-co-noon who were a smaller group out of the A-pang-as-ne. According to Wilson (a

captain of the Southern Sierra Miwuk Nation 1820-1906) the Cucunuchi-Cocoonoon had settlements from Mariposa to Oakdale on the Stanislaus. The larger group of Apangasne occupied from the Merced River to near Sonora and was a larger group of which the Cucunuchi were a part. The Siyante inhabited the lower elevation foothills with intermarriage of the contact era showing family use tracts from the Stanislaus River at Oakdale (Wallakumne), Waterford (Tagualames), Snelling (Ya'ppa northside and Potoi'-un-te on southside), and Merced Falls (Olwi'-ak of Oopla), Merced (Ke'trache -ket-watche), and Chowchilla.

According to Bancroft (1886) the river at the time of Vallejo was called Rio Laquisimes, and according to Gilbert (1879) the Si-yak-um-nes (the tribe where Jose Jesus was the captain) controlled the north side of the Stanislaus (Lakisumnes) River. A more recent record by Sol Elias (1924) repeated the descriptions of the fortifications at the confluence of the San Joaquin River and further upstream (pp. 166-168). Oral history from members of the Chicken Ranch Rancheria, the Tuolumne Rancheria, and unenrolled indigenous members of the Yokut-Miwuk community, define their territory beginning at Weber's Point in Stockton and extending up through Lathrop and to above Jamestown. One past chairman of Chicken Ranch Rancheria described how he would travel with his grandfather to the Weber's Point area. Other members of his family owned homes in the late 1800s in Columbia, in Montpelier, in La Grange, and in Oakdale. This tribal member mapped out the locations of the homes of the approximately 20 people of this lineage on a map showing where they lived and who they worked for in the early 1900s which corroborated the oral interviews gathered during the New Melones Dam interviews. Gray (1993) describes some of the families by name both Yokut and Miwuk substantiating their family routes and areas of habitation.

The Lakisumne settlements along the Stanislaus (Lakisumnes) River at particular locations (not yet recorded) are on private property along the length of the river from Knights Ferry down past Salida and the confluence with the San Joaquin River. Evidence in the Riverwalk DEIR public record show archaeological locations where even after many years of flood waters surface surveys showed that there are features of a settlement (ML-20-01; ML-20-02; ML-20-03) (Peak & Associates, 2021). Items found

over the years on the 88 parcels of the River Lowlands Farming Historic District Traditional Cultural Place locate other possible resource areas lying under layers of silt from the flood years. One Miwok-Yokut great-grandmother reported to her lineage how she was born at Green Springs and would accompany her family to Stockton through the Spanish land grant "through the lower foothills to the tributaries of the Calaveras River and then down to Stockton" (Gaskell, 2005, p. 19). In this same interview the route taken along Little John Creek was substantiated from Gray (1993) spoken by Indian Gomez and reflected in the population data of the Kelsey Report of 1904-06(1971). These ancient trail systems were shared routes.

Evidence in the oral history from the Cucunuchi (Cocoonoon) Yokut descendants describe that the captains of the village at Oakdale (upstream from Riverbank settlement) were the same captains of the settlement at the old Big Bear Park in Waterford (Tagualames) and likely of Hise-ti at Riverbank. These Yokut people on the plains shared the ancient trail system with the foothill people when during the early conflicts and Spanish incursions, had moved into the higher settlements on shared fluid boundaries with Miwuk. The significance of the lineages of the Cucunuchi (Cocoonoon) as named in the Moraga testimonies, earlier generations included Estanislao born a Cucunuchi, and his successor Jose Jesus (Casoos) who was a Cucunuchi- Lakissamni (in Spanish called Laquisimes).

The ancient trail system along the Stanislaus River became part of the Spanish rancho in 1846 where eight leagues along the Stanislaus River was granted as the Thompson Rancho. Thompson came to California in 1834 and married the daughter of the Governor of Alta California with land later patented to Thompson in 1851. So in 1846 the ancient trail system still intact was used by the incursion forces, the early Spanish ranchers, and then the Gold Rush colonizers. Oral history of local indigenous reported being employed at the rancho as vaqueros and as laborers at the winery of the rancho (Gaskell, 2005). The Cucunuchi of the 1829 Spanish incursions were the ancestors of the indigenous of the places at Knights Ferry where the ancient settlements continued to exist but were moved further uphill during Knights Ferry colonization. The three settlements of Knights Ferry prehistory became combined on the upper southern cliffs near where the maintenance yard of the Corp of Engineers has fenced off the tiny remnants of a

cemetery. The relatives alive today have made a private map of where the actual cemetery lies and it is in an unprotected area.

Jose Jesus (Casoos) a Cucunuchi Laksiumne inhabited the area called Lakiu (later called Buena Vista) in the early to mid-1800s pictured in a photograph of the entry way of the ceremonial roundhouse by the Corp of Engineers photographic history (Houseworth, 1866). The cemetery for these relatives lies to the west in the meadow of the area photographed as seen in Oakdale Leader photographs of old wooden grave markers (Kriswell, 1973). Jose Jesus was recorded in Catholic records as Chaipaiseme and Cotuplanimne which was described as a region going down the Stanislaus River, to the French Camp Creek between the Calaveras River and the Stanislaus River (Ryer, 1852). In 1906, Barrett was checking the boundaries of the different languages and dialects, and found that according to Charley Dorsey, his parents came from Lathrop. He defined the range of his family which was very close to the explanation given by the old chairman from the Chicken Ranch Rancheria. This range was given as a series of locations along the route beginning at Lathrop, Tracey, Oakdale, Montpelier, Crowslanding-Modesto, Stockton, Milton, Lockford, Copperopolis, Knights Ferry, Cooperstown, Paulsell, Merced Falls, and Merced. This interview took place in Knights Ferry in 1906 when the population was more condensed into this area. The location of the River Lowlands Farming Historic District Traditional Cultural Place being below Oakdale (Wallakumne) on the Stanislaus River is along this route, confirming another oral history of other members of this transient population in Riverbank.

Cultures of that time period were transient between the settlements at elevations and seasons along the Stanislaus River. Each settlement along the River system was occupied by the extended family preserving their family use route just as the ethnographers had described. Archaeological findings found in the local archives, museums, and oral history of locations surrounding the river and City of Riverbank show that there was human occupation above the river bottom along River Road and south within the city itself on the upper benches of the riparian zone. Recent news articles showed that the cliffs and caves were able to be occupied by the homeless in 2023-24. These common knowledge artifacts and locations are separate from the non-disclosed record search resources which have not been shared.

In summary of the river of Lakisumnes, the Rio Laquisimnes of 1829 and the inhabitants of the area settlements in the years before 1840, the river lowlands were permanent settlements on the bottoms during low river levels, and on the cliffs during flood times. Native people with pre-contact permanent residences located at the confluence of the San Joaquin River and the Stanislaus River, along the shores at Ripon and Salida, at "Hise-ti" or Riverbank, near the old Keeler Ferry, near Orangeblossom bridge, and further up river surrounding the rancho and Knight's Ferry continue to yield physical evidence and oral history of their existence. Movement around a family use route was common with ceremonial structures at these convergence locations. The settlements existed along the waterways at certain points where the lineages owned crossings or fishing spots, and where soil surveys in recent history locate evidence of "kitchen middens" or soils impacted by human use patterns with a more oily consistency. These types of soils indicate the possible presence of hearths, fire pits, milling sites, lithic scatter and groups of human remains buried following the customs of the time (Arkley, 1959). The ancient trail system described in this section relates the isolates found at this location as part of a larger cultural system of commerce including traditional cultural uses predating the River Lowlands Farming Historic District Traditional Cultural Place. To follow are some of the prehistoric artifacts and features which have historically been discovered and described by the historic farmers of these bottom lands as they tilled the early 1850s farms.

Yachicumnes/ Yatch-a-chum'-ne Northern, Lakisumnes Central

Northern Valley Yokut (Yachicumnes/ Yatch-a-chum'-ne) relationships to the Stanislaus River were not recorded by the ethnographers either early or during the ethnographic interviews for this region (Taylor-Smith, 1860; Guzman, 1934; Gilbert, 1879). Plains Yokut of the Stanislaus River were Lakisumnes. When reviewing the list of the California Native American Tribes listed by the NAHC for consultation, there were entities not contacted. The tribes were also not contacted until two years after the ground disturbance occurred, and not by the consulting archaeologist but by the City of Riverbank officials after being reprimanded by the NAHC. The Native American California Indian tribes which should be contacted for consultation for the Riverbank (Hise-ti) settlement prehistoric or historic information would be entities from the Calaveras River, the Stanislaus River, and the Tuolumne River. Typical communication between tribal entities exists where once a tribe is contacted, they will refer the consultation duty to the lineages and people more responsible for consulting on that particular location. Entities which would have been the appropriate Most Likely Descendants to consult would be to add the

Chicken Ranch Rancheria of Miwuk Indians to the consultation requirements. Yachicumnes/ Yatch-a-chum'-ne lineages begin at the Calaveras River and north and consult as Northern Valley Yokut north of Stockton with Calaveras River as the southern extremity.

In the records of Frank Latta (1977) there is confirmation of the names of the locations of the Yache people confirming the interviews with Joe Guzman by Kroeber and Gifford. In Pinart (1910) Alexander Taylor Smith recorded that his head village was a mound in Stockton that in 1852 was a remnant of his tribe. It was on a levee in front of Weber's residence. Also he reported that in records from 1813 the Yachicumnes were in French Camp up the Calaveras River. The earliest contact by Jedediah Smith calling the area as Appelaminy is the same as the information that the Apelumne in Latta (p. 97) were from Stockton, Sand Plains, Escalon, Manteca, Lathrop. This is also reported by Santos (2002, p. 1).

Significant People in History of Hise-ti

Developing a boundary of the ancient settlement of Hise-ti has been based upon the oral histories gathered during the New Melones Dam project, the literature available, and the archaeological discoveries of local residents and of the recent archaeological projects for various development environmental studies. Because many of the farm relatives of Burwood and Burneyville continue to own the artifacts found from their farming practices along with the recorded resources, the lowlands and the bluffs are included within the boundaries of Hise-ti. Information regarding the Cucunutci / Cucunuchi found in the Spanish documentation, the writing of Charles Weber, and the research of Gray (1993), Hall (1978) and some interpretation by Brotherton (1976) regarding the early significant names of the population of Hise-ti included the physical properties along the Stanislaus River from the San Joaquin River up to the region now known as Sonora. The record of the conflicts between the military and the local indigenous gave names of the most important individuals of this area.

The two individuals that gave the route of the family use area were Louie of Knights Ferry and by Joe Guzman of Lathrop. When Charles Weber sent the Siyakumna Indians on the route from Stockton to Knights Ferry up to the foot hills to train Jose Jesus (Casoos) how to gold mine along Woods Creek. Gilbert (1879) stated that that Jose Jesus was the captain of the Si-yak-umna of 1845. Again in 1846 Jose

Jesus took 30 indigenous from Sutter's Fort to fight in the San Joaquin during the Flores Insurrection. Settlements along the Stanislaus River beginning at the confluence with the San Joaquin River were somewhere at Mapes Ranch, then the next settlement was about Ripon possibly the location of Jedediah Smith's encampment he called the river Appelaminy which was called a camp of Lacquisamnes. The next settlement would have been Hise-ti (Burneyville / Riverbank) and then up river about Oakdale a settlement was named by Frank Wilson in 1906 as Wallakumne, and between there and Knights Ferry was a settlement about Keeler's Ferry which today is a walnut orchard. The configuration of Knights Ferry was divided into three named segments because of the three family use areas of the Lakisumne-Lukusu, the Siakumne- Cha-pa-er-sy, Chapairsy, and the Takin', Tam-kan with three separate ceremonial structures.

Research by Gray (1993), Brotherton (1976) , and Gilbert (1879) discuss the negotiations between the head captain of the Siakumne of the Stanislaus and Sutter where there was an alliance between the indigenous families of Stockton and Charles Weber. Indigenous family names from these families were preceding the indigenous of today since later in history due to the influx of miners they congregated about Knights Ferry. Although there were indigenous people in the settlement on the hill at Knights Ferry into the 1960s, the people also lived on ranches, dairies, and in towns having employment locally. Some of these names appear in Cooperstown, Montpelier, and other towns. Homes up by the school house in Knights Ferry were owned by local indigenous into the 1980s. The route between the San Joaquin River and Burneyville was part of this route and there was a seasonal routine of following the resources needed even after the region was civilized.

Names of Significant People on the Route of Appelimany-Hise-ti-Wallakumne

Considering the names listed in the documentation of Gray and others, the vague nature of the records from that era leaves only a few original people using the Stanislaus River route. Estanislao of the Lakisumni tribe of the Cooconoon/Cucunuchi as was confirmed by Frank Wilson in 1906, the Cucunuchi were dominant along the river. Names of people in his era and previous were Huhuyut or Cipriano, Younate the wife of Estanislao, Pitzenete the mother of Estanislao, Lanucuye the daughter of

Estanislao, and Jose Jesus of a younger generation than Estanislao who took over as the captain of the Siyak-umna (about 1845) (Gilbert, 1879). Estanislao had a brother named Saulon according to the research of Gray (1993, p. 123). Memories of the Indians at Knights Ferry in Prowse (1976) quoted Marjorie Wilms and there is a list of the Indian names from between 1920-1940 where they list 20 names. These 20 names have moved forward in history and continue the tradition of the tribal affiliations with local people. From these 20 names there have been many descendants. The last names of these Indian families seem closer to English names than the indigenous heritage of the 1860s. Descendants are spread across the territory now, some at the three reservations, and others in important positions of government and public domain business ownership. Prior to the 1820s the transient nature of resource use placed them along the route from Stockton to Sonora.

Significant People in History of Hise-ti Now Burneyville

Once the trail to the gold fields became important and the river crossings became valuable for trade and supply routes for miners and military, settlement changed from indigenous resource use to a more colonized existence. Once the Mariposa Indian War had completed, the Sheriff Burney of Mariposa County decided to move to develop a ferry boat location further down stream from the Islip Ferry. The two towns came into existence of Burwood and Burneyville. James Burney ran the ferry business from 1853-1867, when Thomas and Henry Ross took it over from 1867-1870. Henry Ross became the postmaster in 1901 at Burneyville, and at Burwood in 1864 by President Abraham Lincoln, Ismael Monroe had the post office in his farm house. Evidence of the Burney home where the ferry office was located can be seen in photographs. Evidence of the Monroe house can be seen on Burwood Road where the home is the residence of descendants.

Many names from history continue on in the Burneyville and Burwood heritage. These are some of the names of the ancestors where farms were operated: Monroe, Sneidegar, Elison, Cahill, Thomas and Henry Ross, Fred Myers, Jacob Myers, Leighton, Drake, Wheeler, Hogue, AJ Patterson, Barton, Christianson, Hall, Roberson, Crow, Frederick, Dickey, Semone, Walton, Amerine, Wells, Gerber, Huntley, Chester Smith, Adrian, Beard, McKinsey, Bedell, Bevaro, and others.

Early Evidence of the Spanish Mexican Wars

Studies about the development of the trails and reports of the ancient pathways as discussed by Bolton (1922) talk about how Pedro Fages entered the southern San Joaquin Valley in 1772 to chase deserters from the missions. The deserters were returning to their origins in settlements along the edges of the wetlands. On October 2, 1806, Moraga arrived at the Stanislaus River, On October 9, 1806, his group was at the Bear Creek near Merced. These were the earliest accounts of the Stanislaus River. Speculations about the location of the battle twenty-years later in 1829 between Estanislao and Vallejo and Sanchez have been attributed to the cliffs of Riverbank. Troop movements leading up to the battle began at the confluence of the San Joaquin and Stanislaus Rivers downstream from Salida.

In May of 1829, the reports continued about the large village at the confluence of the Stanislaus and San Joaquin River where a five-day standoff led to a request for Vallejo to join. On May 9th, according to calculations by Cook (1960), the Spanish soldiers were speculated in the vicinity a distance above Oakdale (Wallakumne) (Coats & Gaskell, 2023, p. 174, 206) (a large Siyante village reported to Samuel Barrett by Hooky Wilson). But by May 29th, the village of the Sanchez expedition battle was vacated, leaving only charred bones of dead soldiers (p.177). The pursuit continued up the Stanislaus, then crossing between the Stanislaus (Rio Pescaderos) to the Tuolumne Rivers. This battle took place in the area between the two large band settlements a distance of a ten-mile land mass between the Stanislaus and Tuolumne River between Wu-ye and Chapair-se Siakumna (between Turlock Lake and Knights Ferry). The Spanish infantry and Indian auxiliaries from the mission came to just below Wu-ye at Tagualames (Waterford a settlement of Frank Hooky Wilson Siyante Band) (p. 178; p. 206).

Later on May 29th, Vallejo and Sanchez resumed the hunt for the fugitives where on May 30th they were in position at the Rio Laquisimnes. The cannon, a three-pounder according to Bancroft (1886) was stationed on the opposite side of the river from the warriors of Estanislao. A nine pound cannon ball identified as a Spanish round was discovered in the roots of an almond tree in the front yard of a home on Topeka Street. When looking into the type of cannon and the trajectory of the historic Spanish-Mexican cannon, the logistics correlate to the span of a shot being consistent with a location on the other side of

the river. The approximate location of the cannon ball discovered at a depth of about five feet deep was in the yard of 2455 Topeka Street, Riverbank, California. Other artifacts from this same location are obsidian spear heads, arrow heads and portable mortars used for milling acorn. According to Branch (2010) the location is consistent with the battle recorded in the Brotherton (2008) accounts of the history of Stanislaus County and in Bancroft's history (1886). The upper levels of the bench along the river at the Topeka Street site was part of the settlement in the 1800s settlement below Oakdale along the Stanislaus River named "Hise-ti" (Kroeber, 1959) which would have stretched along both sides of the river.

Cannon Ball of Preston Tucker

The accounts of the battle of the cliffs recorded by the Spanish and Mexican soldiers described a similar location that would have been more like the earliest topographic maps before the New Melones Dam was installed. According to Branch (2010) the trajectory of the solid iron nine-pound cannon ball would have been shot from a swivel gun which could be transported with horse and wagon. The mortars shot from the swivel gun could reach targets beyond obstructions by using a high angle of firing aim which could have easily reach from the river bottom to the top of the cliff opposite where the settlement was located. The description of the underbrush in the description of the battle would have been consistent with the natural setting of the bottom land. Proprietors of the Riverbank Museum reported a specialist came to the archives to inspect and research the cannon ball and confirmed the quality of the piece and the metal material and weight of the ball for the type of cannon the specialist determined had been carried there by the Spanish military (Riverbank Museum, 2023).

The story of Estanislao as reported by Sol Elias (1924) recounted the time spent in the mission, and the time he conscripted other neophytes to leave the mission, and after the battle was won against the general, the Indians from neighboring rancherias joined Estanislao (pp. 166-167). Elias reports the names of the ranches where the farmers plowed the remains of Indians and their artifacts which are the evidence like were plowed and saved on the River Lowlands Farming Historic District Traditional Cultural Place (p. 169). The artifacts found over the years by farmers and residents of Riverbank, Burneyville, Burwood, Escalon and the surrounding area have compiled the evidence for the settlement named "Hise-ti" which

existed surrounding Burneyville, and the area covered by the lowlands which was the settlement between the settlements of Oakdale to the east and the settlement at Salida and Ripon to the west.

Original Name of the Lakisumne's Settlement

During an interview with an indigenous survivor located in Lathrop, Gifford and Kroeber (1959) wrote notes in the field journal about the name of the settlement on the Stanislaus River before ascending up slope to the Knight's Ferry or Jamestown area. Based upon the locations within that interview before and after the geographic reference, the place named would be approximately at the river crossing along the Lakisumne trail on the Stanislaus where the name of "Hise-ti" was stated. The river velocity during the dry drought summer season between the 1940s to 1970s allowed for the creation of a ford crossing of the Stanislaus River by farmers working the fields on both sides of the river with their tractors. This allowed others to take advantage of the ford for crossing between farms owned on both sides of the river. One landowner used the ford and along the ground disturbance picked up some shell beads similar to dentalium fragments, and stone projectile points. One other location yielded obsidian projectile points and fragments held by the farmers. This resident mapped out the ford on a map showing its location. Other artifacts have been found and housed in the Riverbank Museum with the provenience named showing a southern occupation boundary of Hise-ti. Evidence from the formal archaeological surveys from the titles of the record searches provided enough information to show that objects and remains were located within the boundaries of Hise-ti. In recent news reports, the caves along the cliffs under Riverbank approximately behind the Setliff's property, showed the locations of the cave dwellings being used by the homeless of today.

Delineating the Settlement of "Hise-ti"

Previous investigations of the occupation sites along the river systems of California show similar structures for settlements along the rivers entering the San Joaquin river from its tributaries. Evidence compiled from the documentation of the archaeological surveys from the record searches performed for the Stanislaus River may extrapolate the location of the settlement of Hise-ti. The archaeological record composed of information from the historic evidence of the Spanish cannon ball and cultural items from

various areas around the lowlands can contribute data. Prehistoric Archaeological site attribute definitions where evidence can be seen for these sorts of human occupation are: AP2-lithic scatter consisting of chipped or flaked stone resulting from human manipulation like obsidian flakes, chipped stone or other artifacts; AP4- milling feature or bedrock mortar, some portable mortars are in the collections of the farmers consistent with material processing; AP7- the site contains any evidence of human construction activity (post holes, house pit depressions, fish traps, hunting blinds; AP8-structural changes of geologic materials out of place for a suspected purpose such as rock alignments, cairns, rock rings of unknown function; AP9- site contains human bone which may have been indicated in past record search findings. Many of these types of resources have been reported by the farmers unrelated to any archaeological excavations. Recent oral interviews have located the resources and given provenience to the items.

Farming practices in the mid-to-late 1800s found in oral history told of farmers plowing the fields and removing items of human use such as arrowhead points, large stones like hand stones used for processing, portable mortars, and when removing trees with deep roots bringing up shells and beads and spear head tips in pieces showing a manufactured tool of obsidian. The working group has compiled a list of the provenience of items found by the early generations which have been archived with different families, and different members of the families original to the 1860 influx of settlers who were the first to farm. Later in the 1960s the farm hands were plowing pastures to change them to row crops and they found arrowheads as a regular occurrence. Tractor operators were allowed to discard or take the objects that they found during plowing the fields. Historic farm equipment has been included into a registry by the farming families following the oral histories. Some of the historic families are the inventors of specific industrial innovations having their beginnings in Burwood and Burneyville. These have been inventoried and listed by numbers on the table of resource attribute codes.

NAHC Stakeholders and Record Search Deficiencies

After searching through the many paged document for the letters to tribes, there were no sample correspondence with the NAHC or the tribes listed in the document for consultation. Constructing a

timeline of the contact regarding communication with the Most Likely Descendants revealed a delay in contact, and a contact list that did not include many of the stakeholders. The formal Confidential Appendix C did not contain the information regarding any notification to any tribal entities. No copy of the letter they sent to NAHC nor any letter from NAHC, nor letters to tribes with no copies of the responses.

The cultural resource management agency failed to follow protocol for Executive Order 13175 Consultation and Coordination, 2014 CEQA Assembly Bill 52, and the only communication from the NAHC was in the form of a reprimand letter with instructions for remedying the failure. The NAHC agency does not mention the contacts or the NAHC list of Most Likely Descendants only the letter to the City telling how to consult. The reprimand from NAHC was only after they received the Notice Of Preparation (NOP) as this was the first that the NAHC heard of the project and notified the City of Riverbank that they were out of compliance. A reconstruction of the timeline has been charted keeping in mind the requirements: CEQA Timeline: California State Regulation Section 21080.3.1= 14 days to notify of a project approval / 30 days for receipt of formal notification / IF THE RIGHT TRIBES ARE NOTIFIED and a requirement that the list of the NAHC has the correct tribes listed for consultation.

Requests were made by the CVCC for the Confidential Appendix C and the Record Searches. Typically the initial record search contains the required records for an entire project, but in this case, two searches were performed a year apart. The only materials received by the CVCC archaeologist of record were the cover letters for the record searches without any of the attached reports or archaeological site surveys. Consideration of the contact information regarding the timing of the NAHC contacts, and the items received were previous cover sheets for the past two record searches.

All attachments from these three separate actions required had not been received. Letters of clarification for delivery of the documents were sent twice to the City of Riverbank:

- 1) Record Search 11265L dated 12-18-2019
- 2) Record Search 11579L dated 12-4-2020

- 3) Recorded draft site surveys ML-20-01, ML-20-02 Criterion D, ML-20-03 Criterion D, ML-20-04 Criterion B, ML-20-05

TABLE OF THE PROJECT TIMELINE

Date	Timeline Item
2019	The job was contracted for cultural resources review
12-18-2019	Neuenschwander ordered the first record search
2020	"All work was completed during the due diligence phase in 2020"
February and March 2020	field work with no consultation attempted
12-4-2020	Gerry- A second record search was ordered for the San Joaquin County side of the river (sewer plant archaeology)
Before June 9, 2021	Notice of Preparation was received by the NAHC and other agencies
June 9, 2021 Received by the City of Riverbank on June 15, 2021	NAHC out of compliance - City of Riverbank receives the Reprimand from the NAHC
September 2021	Date on the Appendix C Confidential Report
January 12, 2022	Tribal consultation by City of Riverbank not the CRM Peak 1-12-2022
(3.5-11-12) 1-12-2022 January 2024 Report release There is a three year lapse of consultation with tribes. No effort to identify Tribal Cultural Resources	DEIR Consultation summary (3.5-11-12) 1-12-2022 List of tribes: California Valley Miwok Tribe, Northern Valley Yokut Tribe, Southern Sierra Miwuk Nation, Tule River Indian Tribe, Tuolumne Band of Me-wuk Indians
2-10-2022	NAHC letter dated showing Negative results on the sacred lands search
2-11-2022	Tuolumne Response Andrea Reich provided a letter which does not show up in Appendix C
1-31-2024	Release of the DEIR document and the beginning of a timeline to respond

Not included in the record searches provided for the current 2020 archaeological data are the present archaeological records for the items: ML-20-01, ML-20-02 Criterion D, ML-20-03 Criterion D, ML-20-04 Criterion B, ML-20-05. SHPO Criterion A-D were not exhaustive in nature with no adequate representation of appropriate interviews or historical documentation to negate any of the necessary background investigation. The two previous years of research by the landowner group has compiled detailed information regarding the locations Criterion documentation to challenge the lack of finding of significance, pending an appeal to SHPO for an audience. Records in oral history and personal maps indicate that other ditch irrigation systems existed, and evidence of these functional attributes can still be identified. The historic levee development for both elevations of the river holds significant information

relating to the historic locations and river channel history. The key reason for the request for these confidential materials is to 1) prove that throughout the ground disturbance they never contacted the correct tribal entities, 2) prove that they did not do any oral interviews, research in external sources (local museums), or 3) make any other contacts throughout the previous archaeological survey work with the stakeholders of the correct Tribes.

Notes on historic interviews with local residents and farmers are absent from the reporting in the cultural resources report. Timelines for proper consultation were not followed, and stakeholders for the region of the project were excluded from consultation. Typically the correspondence between the tribes is included in the reports for showing due diligence. Confidential Appendix C is almost identical to the 3.5.11 section in the DEIR. The only pages left out of the public record were the historical proofs for the tribal identities beginning with the 1820s fur traders, the history of the Spanish and Mexican incursions, and the background for the indigenous nomenclature in Yokut and Miwok language for territorial labeling. The purpose of this document has been to answer the lack of clarity from the Confidential Appendix C provided to the CVCC qualified individual and describe the relationship between the stages of history on these parcels. The two pages of information left out of the public record were the brief outline of historic resources surveys which were not reviewed in depth by the contractor.

Description for the Assessor Parcel Number Attributes

Physical evidence of the historic values inherent within this landscape are tangible elements of the environment signifying the beliefs, attitudes, traditions, and values of these people numbering families from the 27 parcels on the northern bank of the Stanislaus River and numbering more than 61 parcels on the southern bank of the Stanislaus River. Each traditional landscape elevation is characterized by a viewshed unique to each elevation and viewpoint. Fields, pastures, open plains and traces of the wagon ruts and farm roads on the lowlands are tangible contours covered by layers of alluvium silt from centuries of flood waters leaving high points where ancient settlement and trails were traversed by the Spanish and Gold Rush colonization of the pioneers that settled here. Current farm family residents have provided historic interviews, maps, descriptions of objects, descriptions of the agricultural products and

processes, photographs of farm equipment, accounts of resource related locations, with all of this information listed in a confidential bibliography of the family members that contributed to the effort.

Heritage Values Inherent on the River Lowlands

The term 'heritage values' refers to the meanings and values that individuals or groups of people bestow on heritage (including collections, buildings, archaeological sites, landscapes and intangible expressions of culture, such as traditions). Heritage values are dependent upon the evidence brought forward by the individuals that hold the place or item in high esteem (Parker & King, 1998). These values have been a key factor in the legitimation of heritage protection and management, although the understanding of what they are has varied over time and there are nuances between one country and another. There are many classifications of values, including historical, aesthetic, economic, social, scientific and otherwise according to Azzopardi et al. (2022).

Architectural Investigations

The built environment holds many variables when looking at preservation values. The structure itself is subject to the era or period of design elements, but also the significance of the persons that built it and lived in the place according to a chronology of local history. The vernacular based upon architectural historic guidelines are important as well as the period of time and the events of that period. Whenever possible according to Sprinkle (2014), it is important to preserve the record of the community's cultural heritage "reflecting the values, beliefs, and traditions of past generations" whenever these structures maintain the cultural fabric to future generations.

Historic attribute code (HP20) is used for the various categories of architectural features were reported for both sides of the Stanislaus River and they were: HP2-Single Family Property; HP4-Ancillary buildings like barns, outhouses, detached garages, carriage houses, sheds, and others; HP33-a farm or ranch; HP11-an engineering structure or feature not covered in any other category like a dock, runway, water tower, ferry piling or footing, and other categories; HP15 – educational building any building used for educational purposes; HP17 Railroad related features; and HP19-Bridges or any overpass for automobiles, trains, pedestrians. Historic architectural structures were reported in the Cal

Trans study for the bridge at the McHenry Avenue crossing of the Stanislaus River. Archaeological site attribute definitions where building structures may be involved are AH2-foundations; AH4-privy, trash pits, scatters or dumps, or other accumulation of debris related to the location of a structure; AH11- walls or fences including postholes, posts or supports placed at intervals, post-cairns, fences, jetties, and breakwaters; AH12-grave or cemetery or any single or multiple burial location; and AH13- wharf or piling or remains of a built structure at the shore of a river for docking boats.

Finally Prehistoric Archaeological site attribute definitions where evidence can be seen for these sorts of human occupation: AP7- the site contains any evidence of human construction activity (post holes, house pit depressions, fish traps, hunting blinds. AP8-structural changes of geologic materials out of place for a suspected purpose such as rock alignments, cairns, rock rings of unknown function; AP9- site contains human bone; AP10- a cache used to store tools or food of natural or constructed local elements; and AP14- rock shelter or caves- a concavity within a rock surface evidencing human use. There were also architectural studies during the San Joaquin County Sewer expansion projects. Interview and oral history for this current study show that there were features reported for the Burwood APN Resources North of the Stanislaus and Hogue Road APN Resources South of the Stanislaus have been entered into the totals of resources signifying their existence as part of a farmland traditional cultural property. Locations of the original post office, the home of the postmaster, the original school, the home of school teacher, the farming ancillary buildings, the crops farmed, the marketing of different crops and the families who own and farm the lands.

Flumes, Ditches, Canals, Water conveyance and Wells

Historic irrigation ditches and canals may be simply water conveyance systems or can be part of flood control. These elements are part of the designed landscape where human interference in natural processes are performed for specific reasons. In historic preservation they are considered linear features and begin at one point and end at another point. On the benches of the lowlands, there were uses as flood control, water conveyance, and for uses by neighbors as a means of controlling the boundaries of their irrigated lands. One such use was a ditch that began somewhere near Jacobs Meyers Park on the south

side of the river and continued in a line over to a place near McHenry Avenue where it ran under the road toward what is now the old lily pad lake and flowing through a historic walnut orchard which has been removed. Residents remember the large carp which were fished from this waterway ditch. Other ditches and canals were earthen structures designed to retain the water flow onto the landowners property from the river in contrast to the ditches of the other landowners. These built environmental modifications would be recorded following the historic resources attribute codes.

Historic attribute code (HP20) is used for the various water conveyance systems include earthen construction of an artificial waterway that can include pipes, conduits and bridge-like structures above ground for carrying water which can be identified as flumes. Prehistoric Archaeological site attribute definitions where evidence can be seen AH6- a water conveyance system or any device constructed to transport water over a distance. Burwood APN Resources North of the Stanislaus and Hogue Road APN Resources South of the Stanislaus such as historic 1910 brick structures, dairy drainage and water holding tanks, the Hogue Spillway used by the Modesto Irrigation District before the canal system, irrigation both flood and sprinkler, the ditches, the boils located at the low points when flood waters rose, and other water related fixtures. When comparing the area on the 1953 Escalon topographic map in Sections 21 and 16, this shows the river benches and elevations before the 1955 flood. The 1953 ditches are very clear showing the areas where the informants used to fish not in the river, but in the ditches.

During oral interviews with farmers from both sides of the river, in three instances the farmers had confidence in the New Melones dam but also mentioned the failure of the Oroville Dam a few years back. They agreed that flood control is not infallible and shared concerns for their orchards and fields. Different farmers talked about the levees before the dam was built and the efforts of them all in keeping the levees built up and viable during the storms. Flood irrigation during the 1960s was most common with them all, and some used well water for irrigation. Storm water retention ponds were more dominant on the south side of the river in conversations, and they described the water as sandy. The sand was a concern with the pumps and the filters. The ponds could be dug as deep as river level before the water appeared in the bottom of the hole. There was consensus regarding the pump at the end of the ditch at the

end where the lotus ponds used to be. There was discussion about the annual water still within the Hogue Spillway which was the source of the water which ended up at the pump near McHenry by the lotus pond. The old swimming hole was not far from the old McHenry Bridge where there were deeper swimming ponds in the river. When the storm water retention ponds were deep, they were also used and explored for swimming.

Heritage crops or orchards have been reported on some of the farms. There are persimmon trees over 100 years of age. There are grape vines purported to be from Spanish mission origin at a location. There was a report of some 150 year old olive trees left from an orchard. The seed saving and records of heritage crops was something that was a concern of some of the families.

Wagon Roads and Ancient Trails

Recorded history began in the field reports of the fur traders and of the Spanish mission Priests of the early 1800s for this region. Oral history from the oldest residents of the settlements of the Stanislaus River interviewed by ethnographers described the trail systems. The Spanish records of the incursion to the table mountain reported the massacre at the rock corral circle just below the table mountain. Ancient trails doubled as animal trails that followed up and down both sides of the Stanislaus River. Trails recorded by Sample (1950) and Davis (1974) revealed routes aligning with the river courses. The earliest fur trade records of Jedediah Smith show interactions with Northern Miwuk in the 1820s, and of conflict between the Spanish Priests and the fur traders for the conscription of the Indigenous labor force. The ancient trails became Spanish military routes, then the Spanish land grants of Thompson and then the Rancheria Del Rio Estanislao increasing the use of the trail system to expand to wagon roads.

Historic attribute code (HP37 or AH7) is used for any roadway from a built freeway down to the level of a footpath labeled Highway or Trail in the historic period. These are a road, trail or railroad bed having linear construction, either depressed or elevated, or at ground level designed to facilitate the transportation of people or vehicles including a bridge, railroad grade, trail, wagon road, or other types. Prehistoric Archaeological site attribute definitions where evidence can be seen can be mapped (AP13) as linear features where intermittent evidence may be used where there are only traces of the feature. These

features would be seen as natural or constructed elements indicating human use such as earthworks, windrows, or stone trail steps. Burwood APN Resources North of the Stanislaus and Hogue Road APN Resources South of the Stanislaus consisted of the trails used previous to colonization in the Spanish wars with the indigenous, the wagon trails leading to the prominent crossings, and the later developed trails leading to the ferries and finally the railroad crossings. The river crossings would have changed over the centuries since the meander of the river changes each year even after the New Melones Dam.

Historic Golf Club Features

Based upon the evidence found in the document written by Ristau (2007) after the railroad reached Modesto in 1870, it took until before or early 1920 when George Nelson acquired a parcel of land east of McHenry Avenue and built a three-hole course which was expanded to nine holes. This parcel was located on what is today APN 074-001-001 owned by Huddelson Company. At the time it was a nine hole course with cottonwood trees and natural oak trees on the last three holes. The club was incorporated in 1920 with 300 members. There was a large home on the property which served as the clubhouse. In 1942 the Army Corp of Engineers trimmed and denuded the underbrush, dredged up fill to form a massive levee, which when spring floods collapsed the levee spreading a thick layer of mud over the green course. Based upon the soil survey by Arkley (1959) the soil types were listed as along the river on the lower bench 29-Grangeville very fine sandy loam, then up one bench to 28- Grangeville fine sandy loam, and on the same level 95-riverwash, and toward the last bench 67- Tujunga loamy sand with a 3-to-8% slope uphill. When comparing the area on the 1953 Escalon topographic map in Sections 21 and 16, this shows the river benches and elevations before the 1955 flood. Before the 1942 levee building and dredging an early caddy was Don Monaco of Modesto who reported to the author of the memoires of the old Del Rio golf course. Economics and the war effort caused the failure of the location on this parcel of land.

Also located on this parcel was a local garbage dump where illegal dumping occurred for a period of years (Hopper, A., 2023 and Hopper, B., 2024). When family would visit the area under the bridge along the river in the late 1970s and early 1980s there was a landing and location where they would fish. At this spot they would dig in the soil and find that there was an approximately 1860s dump where they

unearthed old bottles and items such as cast iron toys and other garbage items. At this location and further west along the river bank, the evidence of the ditch where the farmers (Escalon Museum, 2023) reported the location of the carp fishing spot in the 1950s. During the McHenry Avenue bridge expansion project, previous archaeological surveys took place referenced in the record search of 2020 and 2021.

Another reference from some farmers explained the location of other family dump sites and places where strangers would use the opportunity to dump foreign materials. One dump site can still be seen in the heavy rains because the sand washes away and the historic bottles show up in the soil where they were dumped years ago. The old bottles were from the 1920s and 1930s where people went to the bluff and threw the trash over. Another dump area was removed and cleaned up when some others were using the family land to build houses.

Railroad and River Ferry Crossing History

Since Riverbank was originally begun as a ferry crossing both at Islip's Ferry and Burney Ferry, it became a town along the wagon road from San Francisco to Yosemite trail where one route went east to Knights Ferry, and another went in the direction of Modesto. The railroad crossing at the site of the Burney Ferry made river crossings obsolete. Early on the mail stop was at Burwood on the north side of the river. Riverbank would have to receive the mail and deliveries in Burwood. The early ferry crossing town was called Burneyville in about 1850 (Santos, 2002). Stanislaus River Bridge was originally built in 1905, named the Atchison, Topeka & Santa Fe Railway at Stanislaus River, was determined eligible for inclusion in the National Register of Historic Places in 1994, and represents a rare extant truss bridge in California's San Joaquin Valley.

Historic attribute code (HP19) is used for a built bridge or overpass used for automobiles, trains, pedestrians; AH7- linear construction of a railroad bed- bridge or railroad bed elevated or depressed; there are no train stations or buildings along the stretch of railroad at this location. There were archaeological studies performed in the bibliography of the record searches which were not made available to the CVCC.

Historic attribute code HP19 can also be used for detailing the structures and ships and docking and pully systems. Evidence of the moorings, pilons, pully systems or any structural element on the

ground can be placed in the category of bridge. The ferry itself would be placed into the category for reporting as HP23- a ship or any vessel able to navigate inland or ocean waters. There are various photographs of the Burney Ferry and the town of Burneyville. There is also northern shore information for the trail or wagon road from the ferry structure to the town of Burwood. The earliest fords may have been built up through elevating the rock bed of the stream when the indigenous controlled the waterway. The farmers constructed the sand bridge to get from one crop section to another field on the other side of the river without having to go to the roads and use the bridge over McHenry avenue as was described in interviews.

Historic Farmland Heritage Family names

The farms and ranches (HP33) of the River Lowlands of Burwood and Burneyville which were partly recorded during the McHenry Avenue bridge replacement and the sewer facility resources surveys show some of the culturally affiliated properties of original families descended from the founders. The town of Burwood began as Monroeville in 1859 when Ishmael Monroe was farming the area. He received a commission from Abraham Lincoln to be the postmaster of the location. Monroe's ranch was the location of the post office and mail was received two-to-three times a week (Hillman & Covello, 1985, pp. 198-199). The homes of the Monroe brothers still stand today, and they were active in the community from 1862 through 1885. By 1866 there was a brick school house erected for the Burwood town. When the school had discontinued use, the land was returned to the Monroe Family. In the early 1880s there were other businesses in Burwood a general merchandise store, the Cahill Hotel, two blacksmiths, two merchants, a butcher shop, a shoemaker, a clergyman who was a farmer there, and two music teachers listed in the county directory. One ranch farmstead was located south of River Road and north of the river and was a historic home which became famous as Chester Smith's home (Escalon Museum, 2023).

Three of the farming families had evidence of historic farm equipment still existing, and some old equipment still in working condition. Orchard farmers of walnut had hullers and were offering photographs of the older equipment. Five farm family names still hold the historic large equipment. Some of the equipment is out of site and was made available to the CVCC team to photograph. Before George Reed began the gravel pit, this farmland was used for dry farming beans and other crops.

Burneyville on the south side of the Stanislaus River consisted at first of a home for James Burney's family and the ferry docks and pulleys and the ferry boat business (Branch, 1996). Burwood or Monroeville began when Ishmael Monroe purchased the land and began farming which caused other farms to begin and a small town developed which gained a post office. When Riverbank was beginning to

be built, the upper benches of the river were beginning to be converted from farmland to home and business property. The farmland of Sneidegar and Leighton were some of the farmers that changed their land to building sites from growing crops.

Viewshed Quality of Life

Planning terminology for the visual field of a culturally sensitive place, where an unobstructed view is important to the meaning of the unspoken story of a sacred place. Viewsheds contain elements having special meaning to the culture in question which are deemed worthy of preservation. The visuospatial vantage point of the river lowlands from the surrounding farms and ranches consists of the river flow, the density of the natural plants, and the clear view of the elements of the natural environment. Visibility analysis is an essential evaluation for environmental health and predicts impacts on human perspective over time when the viewshed is impacted. Landmarks and open space affect the human perspective in various ways. The view from the cliffs along the Stanislaus River has not changed for a thousand years. The meander of the central current of the river has changed the oxbows and curves of the channel, but the lowlands from Burwood and from Hogue Road has remained unchanged except for the crop cover. Visual significance of a perceived terrain is influential to the human perception of the environment is affected by the slope, aspect, distance, and elevation to arrive at a specific viewscape. These factors affect human well-being and behaviors when the focus of attention has shifted through a change in the natural environment which cannot be mitigated.

Historic Farmland Heritage Family Names Numbered Resources

The historic families descended from the original farmers and ranchers of the river lowlands of Burneyville, Burwood, Monroeville, and the transitional town names for the place at the crossing of the Stanislaus River have compiled a listing of 154 resources identified through a cursory few oral histories and interviews.

RESOURCE ATTRIBUTE CODE CHART & QUANTITIES OF SITES

Resource Attribute	Code	Item (totals from confidential interviews from March-May 2024)	APN #
Architectural-Historic			
7	HP2	Single family property	
8	HP23	Vessel able to navigate inland waters	
9	HP4	Ancillary Building-barns, outhouse, sheds	
28	HP33	Farm/Ranch- any place where crops or animals are raised	
2	HP11	Engineering structure-docks, water towers	
1	HP15	Educational Building- school, library, museum	
5	HP14	Government Building- post office, city hall, court	
3	HP17	Railroad related	
2	HP19	Bridge for pedestrian, train, auto, overpass	
2	HP34	Military property- owned by US armed services	
1	HP45	Unreinforced masonry building	
2	HP5	Hotel/Motel	
3	HP42	Sports areas- (rodeo, go carts, golf course etc)	
1	HP44	Adobe structure	
6	HP21	Dam any barrier constructed to hold back water AH8-Dam	
2	HP32	Rural open space any area that has little to no development in a city limit	
2	HP30	Riparian areas with Old Growth Oak Trees	
3	HP40	Cemetery and private family burials	
Architectural-Prehistoric			
1	AP7	Architectural feature any feature indicating human presence	
1	AP8	Stone features arrangement of rocks	
3	AP9	Burial contains human bone	
1	AP10	Cache feature for storing goods (cave)	
1	AP14	Rock shelter	
Various locations	AP2	Lithic Scatter	
Flumes, Ditches, Canals,		Water conveyance and Wells-Historic	
9	HP20	Canal aqueduct ditch – waterway, irrigation, drainages, bridge like structure for water	
Wagon Roads and Ancient Trails: Historic			
10	HP37	Trail highway any roadway footpath to highway/ AH7-Roads, trails, railroad grades	
3	AH2	Foundations structures pads	
12	AH10	Machinery-mechanical device- farm equipment mills windmills	
7	AH5	Wells cisterns receptacle designed to hold water	
Various in use	AH6	Water conveyance system any device to transport water over a distance	
Various in use	AH3	Landscaping evidence of plantings hedgerows, orchards, terraces, ponds	
3	AH4	Privies, Dumps, Trash scatter	
Prehistoric			
2	AP13	Trail linear earthworks	
8	AP2	Lithic scatter	
6	AP15	Habitation debris	
Railroad and River Ferry Crossing-History-Historic			
3	HP19	Bridge trestle	
Total 154		RESOURCES	

These interviews are from regions of the Hise-ti / Burneyville / Burwood Stanislaus River farming area not including the record search findings which have yet to be delivered to the cultural resource's representative of the CVCC. These physical and aesthetic cultural resources can be categorized

according to the Resource Attribute Codes of the Guidelines for Recording Historical Resources by the Office of Historic Preservation of the State of California. The number and configuration of the findings from the interviews with the historic families is listed in a separate document and correlated to a topographic geographic location map. The resources cited do not include the resources reported in any of the previous archaeological survey results. Interviews took place at the Riverbank Museum, the Escalon Museum, via telephonic communication with families and neighbors and are confidential communications. Some families were for the development but wanted to preserve the history of the place before it was destroyed, but others were anti-development and wanted to see farmlands preserved. The interviews were performed by the local residents themselves, and compiled and scored as to the contents of archaeological evidence by the secretary of the interior professional to determine whether the resources would be eligible for listing if they were ever surveyed.

Resources Reported by Descendants of Historic Families

Historic Family Names (including the descendant name not necessarily in order of the 1850 original names): Hogue, Wigley, Monroe, Huntley, Roberson, Bodell, Kimberling, Abersenti, Bellino, Johnsons, McManis Winery, Crow Brothers, William Crow (Lou, Susan, Charlie), Frederick, Dickey, Hogue and other names as are listed by the interviewer. The list of residents and farmers is not exhaustive, and interviews were made confidential with no one family being named as informants for any region in order to conceal the locations of the resources.

Deficiencies in the Cultural Resources Assessment 2021

While comparing the proposed cultural resources confidential appendix to the Draft Environmental Impact Report CRM section, the identical information appeared in the public version and the confidential draft except for two pages where there is a historical review of the Indian naming of the people from the first contacts and Indian wars. These two pages are a prehistory and historic description of the Central Valley of California from an overview of the time period from 1769 and the missions to the Gold Rush period land use. The Confidential Appendix C is almost verbatim with only one section

removed in the public version. The following are some of the regulatory statements that are to be followed when working on a historic resources survey.

National Historic Preservation Act of 1966, as amended (NHPA)

Section 106 of the NHPA (54 USC § 306108) requires Federal agencies to take into account the effects of their undertakings on historic properties, through a process described at 36 CFR Part 800. Historic properties are cultural resources that are included in, or eligible for inclusion in, the National Register of Historic Places (NRHP).

State of California Environmental Quality Act

The California Environmental Quality Act (CEQA) of 1970 (PRC 21000) offers directives regarding impacts on historical resources and unique archaeological resources. The State CEQA Guidelines (California Code of Regulations [CCR] 15000) defines a “historical resource” to include more than one category of resources. The first category is “resource(s) listed or eligible for listing on the California Register of Historical Resources (CRHR).” (CCR Section 15064.5[a][1]; see also California PRC Sections 5024.1 and 21084.1.) A historical resource may be eligible for inclusion in the CRHR, as determined by the State Historical Resources Commission or the lead agency if it meets significance criteria. The alternatives under consideration would result in a significant impact related to cultural or tribal cultural resources if they would do any of the following:

- a. Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5 of the CEQA Guidelines;
- b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5 of the CEQA Guidelines;
- c. Disturb any human remains, including those interred outside of dedicated cemeteries;
- d. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is: i) Listed or eligible for listing in the California Register of

Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native American Tribe.

Significance Criteria

Parts of the criteria listed in CEQA are the thresholds of significance of impacts on a natural or cultural resource. The following criteria are applicable in the evaluation of impact thresholds on proposed projects: cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines §15064.5; cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines §15064.5; directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; disturb any human remains, including those interred outside of formal cemeteries. Historical resources are presumed significant if they are listed on the California Register of Historic Resources (CRHR) or has been determined to be eligible for listing by the State Historic Resources Commission. Significance is determined when substantial evidence is considered as such by a lead agency. Once a resource is considered significant, there are standards for determining what a substantial adverse change is defined as being.

A mitigated negative declaration is called for if there is a potential effect, and they can be mitigated to a "level of significance." In some instances when the significant effects cannot be avoided, the mitigation involves native plants, cultural properties, or some kind of negotiated trade-off of resources (Grissom, 1994). California agencies that would be involved in consultation regarding archaeological and biological inventory are the Department of Transportation, Energy Commission, Environmental Protection Agency, Water Resources Control Board, Department of Conservation, Department of Fish and Game, Department of Food and Agriculture, Department of Forestry and Fire Protection, Department of Parks and Recreation, Department of Water Resources, Resources Agency, State Lands Commission, and the University of California, Division of Agriculture and Natural Resources.

Public Resources Code 5024 and 5024.5

The California State legislature enacted PRC § 5024 and 5024.5 as part of an effort to establish a state program to preserve historical resources. These sections of the code require state agencies to take a number of actions to ensure the preservation of state-owned historical resources under their jurisdictions. California Register of Historic Resources. The CRHR was designed by the State Historical Resources Commission for use by state and local agencies, private groups, and citizens to identify, evaluate, register, and protect California's historical resources. The CRHR program encourages public recognition of architectural, historical, archaeological, and cultural significance, identifies historical resources for state and local planning purposes, determines eligibility for state historic preservation grant funding, and gives certain protections under CEQA.

Discovery of Human Remains-Public Resources Code 5097.9 and California Health and Safety Code 7050.5

PRC 5097.9 provides protection from interference with Native American religion or damage to cemeteries or places of worship. It also established the Native American Heritage Commission. California Health and Safety Code 7050.5 provides protection to Native American burials, remains, and associated grave artifacts in the event they are discovered in any location other than a designated cemetery. It also provides procedures if a County Coroner should determine that identified human remains are Native American in origin or may be Native American in origin.

California Natural Resources Agency Tribal Coordination Policy

The California Natural Resources Agency adopted the California Natural Resource Agency Final Tribal Coordination Policy on November 20, 2012, which was developed in response to Governor Brown's September 19, 2011, Executive Order B-10-11. CVFPB has adopted this Policy. As such, Native American consultation will be conducted in accordance with the Policy adopted by CVFPB. The purpose of the Policy is to ensure effective, meaningful, and mutually beneficial government-to-government consultation, communication, and coordination between CVFPB and tribal entities relative to activities under CVFPB's jurisdiction that may affect tribal communities.

Analysis of the Record Searches Performed from 2019-2022

Historic resource reviews consist of using materials already produced about a physical location including previous record searches, historical records, and oral histories from the residents among other things. The Riverwalk project planning required a cultural resources investigation and report before the planning department could approve the locations of structures and earthwork. Requests were made by the general counsel of the CVCC for access to these records by the qualified individual member of the farming community membership. These requests began with the preliminary review on February 28, 2023 and were as follows:

1. Communication between the qualified individual and the CVCC members after a review of the planning documents. Research began in February 2023 in preparation for the release of the DEIR which did not happen until January 2024.
2. Formal request for the required list of documents was sent and received by the City of Riverbank Planning department on February 19, 2024.
3. The copy of the Confidential Appendix C was received without the supporting record search attachments on February 26, 2024. There was an email correspondence between the CVCC attorney and the planner asking for the rest of the document.
4. On May 1, 2024 the planner forwarded the open confidential archaeological surveys numbers [ML-20-01, ML-20-02 Criterion D, ML-20-03 Criterion D, ML-20-04 Criterion B, ML-20-05] via email. But there were no attachments for the cover letter Record Searches #11265L and #11579L.
5. AS of May 12, 2024 the CVC confidential Secretary of Interior qualified individual continues to wait for the attachments for the cover letter Record Searches #11265L and #11579L.

In order for a comprehensive comparison between the oral histories and collections of the residents and the official record to be performed, the complete set of attachments which were used to formulate the research plan for the archaeological excavations needs to occur. The legal representation for the CVCC has sent the requests and has yet to receive a response for the balance of the freedom of information act

documentation. The CVCC has done due diligence in acquiring the Secretary of Interior Qualified individual who is a member of the CVCC to receive and review any and all confidential materials in order to make the necessary comparisons.

This report is the preliminary organizational record in preparation for the complete Historic Resources Survey for the petition to the State Historic Office of Preservation recording the values and attributes of the farmers and landowners of the Hise-ti-Burwood-Burneyville historic farmlands requesting a review by the State of California to establish a preservation area based upon the standards of a Traditional Cultural Property rulings found in similar properties. This TCP contains resources and proofs over the eras presented in this report which continues to develop by the members of the CVCC.

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APPENDIX

C

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2

Miguel Galvez

From: Don Mooney <dbmooneylaw@gmail.com>
Sent: Wednesday, May 15, 2024 1:32 PM
To: River Walk
Cc: Marisela Garcia; Janet Smallen; Joshua Mann
Subject: Re: River Walk Project

Mr. Galvez,

The person with access would be Dr Sandra Gaskell RPA
Her CHRIS Access and Use Agreement is No 378.
She has been #378 since 2004
There shouldnt be a need for a new Use Agreement

As such the doucments should be sent directly to her.

Don Mooney
Law Office of Donald B. Mooney
417 Mace Blvd, Suite J-334
Davis, CA 95618
530-758-2377
530-304-2424 (cell)
dbmooneylaw@gmail.com

On May 13, 2024, at 2:40 PM, River Walk <riverwalk@riverbank.org> wrote:

Hello Mr. Mooney,

The City will require a "Use Agreement" to be signed by the party receiving the information.

The subject information is considered confidential, and both the Information Center and the Cultural Consultant felt a sense of responsibility that the information does not end up in the public domain. The Use Agreement will need to be sent to the party receiving the information, and the information will be sent directly to that individual/party. Please let me know the contact information of the party that will be requesting and reviewing this information so that I may send the Use Agreement directly.

Respectfully,

Miguel Galvez,
Contract City Planner
City of Riverbank

(209) 863-7124

cityplanner@riverbank.org

From: Don Mooney <dbmooneylaw@gmail.com>

Sent: Saturday, May 4, 2024 9:52 PM

To: River Walk <riverwalk@riverbank.org>

Cc: Marisela Garcia <mhgarcia@riverbank.org>; smcmurtry@denovoplanning.com; Janet Smallen <jsmallen@riverbank.org>; John Anderson <john@jbandersonplanning.com>

Subject: Re: River Walk Project

Mr. Galvez,

This is a start. The record searches for the project included all of the archaeological and historic reports and survey record forms listed on both record searches. The City has only provided us the cover letters for the other two record searches. According to the cover letters, these are the surveys and reports that were given to the CRM firm before they performed the four survey forms that were sent to us today.

These are also required:

Record Search 11265L dated 12-18-2019

3 resources in the project P-50-001750, 2002, 2321

5 resources w/in 1/8th mi. radius P-50-001751, 1959, 2320, 2322, 2323

5 reports in project area SJ-00826, 1952, 7964, 8138, 8892

7 reports w/in 1/8 mi. radius SJ-00369, 921, 6625, 2594, 7341, 8284, 8542

Record Search 11579L dated 12-4-2020

resources informal within project area SJ-01751

1 resource w/in 1/8 mi. radius P-39-000564

7 resources SJ-00369, 826, 921, 1751, 4644, 5575, 6734

No reports w/in 1/8 mi. radius

Please provide a prompt response. Thank you.

Don Mooney

Law Office of Donald B. Mooney

417 Mace Blvd, Suite J-334

Davis, CA 95618

530-758-2377

530-304-2424 (cell)

dbmooneylaw@gmail.com

On Apr 30, 2024, at 5:35 PM, River Walk <riverwalk@riverbank.org> wrote:

Mr. Mooney,

Please see attached.

The four sites found on the River Walk project have been recorded at the Information Center with the below numbers. Please confirm if this addresses your request.

ML-20-01 P-50-002362
ML-20-02 P-50-002365
ML-20-03 P-50-002363
ML-20-04 P-50-002364

Sincerely,

Miguel Galvez,
Contract City Planner
City of Riverbank Development Services
6707 Third Street
Riverbank, CA 95367

(209) 863-7124 Office
(209) 869-7126 Fax
cityplanner@riverbank.org

City Hall Office Hours:
Monday – Thursday: 7:30 a.m. – 5:30 p.m.
Closed on Fridays

From: Don Mooney <dbmooneylaw@gmail.com>
Sent: Wednesday, March 20, 2024 12:22 PM
To: River Walk <riverwalk@riverbank.org>
Cc: Marisela Garcia <mhgarcia@riverbank.org>
Subject: River Walk Project

Mr. Galvez,

Please see attached letter.

Don Mooney
Law Office of Donald B. Mooney
417 Mace Blvd, Suite J-334
Davis, CA 95618
530-758-2377

530-304-2424 (cell)
dbmooneylaw@gmail.com

Miguel Galvez

From: Betsy Walton <Betsy@betsywaltonestates.com>
Sent: Wednesday, May 15, 2024 5:36 PM
To: River Walk
Subject: River Walk Specific Plan And Draft Environmental Impact Report - Comments
Attachments: National Register #06001133_ Robert and Mary Walton House in Modesto, California.pdf

May 14, 2024
City of Riverbank
Attn: Miguel Galvez, Contract City Planner
6703 3rd Street, Suite A
Riverbank CA 95367

RE: River Walk Specific Plan/Draft Environmental Impact Report, Riverbank, CA

Dear Mr. Galvez:

I would like to comment on the proposed River Walk Specific Plan project so that it becomes part of the public record and is included in the Final Environmental Impact Report for the referenced project. This project proposes to construct thousands of new homes, businesses, and infrastructure including parks, a walking trail around the entire perimeter, a new 4-lane road that would terminate onto McHenry Avenue, and two or three new water wells which would rely solely on groundwater to serve a 2-million gallon storage tank; nearly all of which would occur on river bottom land that is identified by the State Department of Conservation as “prime.”

The State defines “prime” as follows: “prime farmland has the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustainable high yields.” Homes and businesses should be constructed on soils of lesser quality, not on prime farm land. In addition, the City of Riverbank has more than ample pre-approved, land area which is available to construct thousands of new homes based on the 1,500 acres which was added to its Sphere of Influence in 2016. The need for this project has not been demonstrated.

Please include the attachment with my comments, titled: National Register #06001133 – Robert and Mary Walton House in Modesto, California.

Draft EIR Comments:

1. There will only be 2 primary entrances in & out of River Walk; one exiting on Patterson Road (the Coffee Rd extension) and one on McHenry (also the Coffee Rd extension which is currently a 5-acre cherry orchard). The DEIR says that there’s an additional “existing” road east of the MID canal that fronts on Patterson Road, but it’s unclear which existing “road” this is (at best it’s currently an unimproved road). With up to 2,700* new homes, businesses and multiple parks this will have an enormous impact on traffic. How will this be mitigated? Another traffic light on McHenry at the southern end of the bridge where Coffee Rd will exit? Another traffic light on

Patterson Road at Coffee? The document talks about road widening on Patterson but doesn't address signalization.

2. *Page 2.0-11 says, "The Specific Plan includes a 'flexible design' provision to enable each residential village (there are 18 of them) to be designed with a variety of housing 'products' varying in lot and product sizes. Under this flexible design, the final design of villages may include up to 25% of the lots designed at a density consistent with greater density 'products' as long as the average density does not exceed the density allowed for that land use." More detail/analysis of this should have been included in the DEIR because there's no clarification of what this 'flexible design' could look like. **NOTE:** Page 4.0-22 says, "Under the proposed land use changes, the Specific Plan Area would allow for 5,607 residential units at maximum density. This includes: 160 higher density units (already mentioned in the Plan) with an additional 450 higher density units in Mixed Use areas, plus 1,259 medium density units, plus 3,737 low density units." No where else in the DEIR, however, is this "maximum density" discussed or analyzed so how can we know what the impacts of this would be? 5,600 homes is more than DOUBLE the proposed 2,700....
3. Project Impact 3.10-3 on Page 3.10-33 concludes that the Project's potential to induce substantial population growth is less than significant, yet the Project proposes commercial designations on both sides of the extended Coffee Road at McHenry and on Patterson (shown on Figure 2.0-8). In addition, developing this area could impact Escalon and Modesto so the conclusion of inducing substantial population growth should be significant and unavoidable.
4. The Circulation Element, Page 2.0-15 says, The Project "will link the Plan Area to other nearby developments." What developments? The Project is two miles NW of Riverbank!
5. Page 2.0-7 states that the main purpose of the project is three-fold: 1) Expansion of the (Riverbank's) Sphere of Influence (the area they can expand into); 2) Approval of the Specific Plan; and for the DEIR (because this final one was NOT listed in the NOP); 3) To increase the housing supply to address California's "affordability crisis." How will this project significantly address the State's "affordability crisis" when the project may only include 180 high density units out of 2,700? Even this amount of proposed high density housing is questionable given that the DEIR says the planned multi-family unit, which is the second floor of a 2-story building, will either be "multi-family, commercial space, or a combination of the two." Conclusion: no guarantee there will be multi-family housing.
6. Hogue Road, an unimproved 2 lane road now within the proposed sphere of influence, houses generations of residents who have called this road home for over 80 years. Many families, including their children and grandchildren, have remained in the same homes over the decades. This road holds significant importance in our community, serving as a cherished space where children play, equestrians ride, and animals roam freely. It's also home to five architecturally significant residences, including notable works by Frank Lloyd Wright and Mario Corbett, both renowned and published architects of historical significance. As well as a 100 plus year-old farmhouse, an original carriage house and a midcentury modern. The Frank Lloyd Wright Home, nestled at 417 Hogue Rd, Modesto, was meticulously positioned on the property's bluff to embrace panoramic views of the surrounding farmland and the river below. This property is even listed in the National Register, a testament to its architectural and historical value. Similarly, Mario Corbett's design for the Gerbers' home remains a cherished space for multiple generations of the family. The proposed development threatens to disrupt the tranquility, charm and quality of life for this community, endangering not only its architectural heritage but also the cherished way of life enjoyed by its residents. The developers provided assurances that Hogue Road would

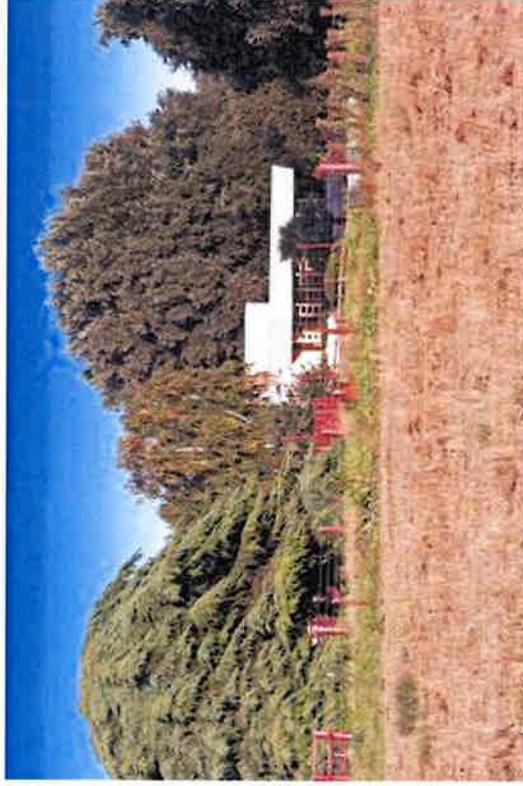
- remain untouched, with no proposed entrance or exit at its end, and no plans to widen it into an emergency access route. Any deviation from this commitment would be a genuine tragedy.
7. There is no planned school and they have tried to avoid this issue by calling the majority of the project an “active adult” (55+) community. Somewhat conflicting statements are made in the DEIR as follows: Page 2.0-30: The Plan “will generate few, if any, school aged children or young adults,” and Page 3.12-24 says the Plan “is not anticipated to generate ‘many’ school aged children.” These statements are made even though 348 of the homes are not proposed to be age restricted. Note: the project proponents did NOT notify the school districts of this project. Shouldn’t the schools decide whether this project impacts them and not the project proponent?
 8. How will the age restriction be implemented and enforced? Example: I’m Grandma Jane Doe and I buy an age-restricted home. I’m 55+ so I qualify, but after I move in my grandchild gets sideways with his/her parents and wants to move in with me. Do I have to move out of my age-restricted house and buy a non-age restricted one? And who will police this?
 9. Fire station? There is no new planned fire station for this project. Page 2.0-29 says, “The Fire District has ‘an interest in’ a site on Morrill Road approx. a ½ mile south of the Plan Area.” How does having “an interest in” a site provide adequate fire service? In addition, Riverbank’s General Plan includes the following City Policy: “Public 7.3. Stations located to ensure adequate response time” and one of the criteria for achieving this is maintaining an ISO rating of Class 2 or better. The City’s most recent (2016) rating was lower than this, or Class 3. How will the Project “ensure adequate response time?”
 10. Police services: Riverbank’s General Plan also establishes standard for police services. Specifically, Page 3.12-1, says: Public 8.2 “requires the City to provide 1.25 sworn officers per 1,000 residents... The calculated current ratio is 0.72.” They excuse this, however, by saying “Riverbank has historically operated well below 1.25” and, in fact, Riverbank is currently contracted with the Stanislaus County Sheriff’s Office to provide only 0.85 but they are not meeting that. So, because we’ve never met the standard, that somehow makes it okay? Additionally with the already substandard police services there is a real threat of homelessness, drugs and crime which will filter into the existing neighborhoods as well.
 11. McHenry Avenue is still only 2 lanes between Patterson/Ladd and Kiernan. More traffic on McHenry will only worsen this congestion. How will this be mitigated?
 12. When there is a traffic problem on Hwy 99, Ladd Road/McHenry/Patterson Road all back up because there are only so many ways to cross the Stanislaus River. This is a serious problem at times which will only worsen with more traffic on these roads as the result of this Plan. How will this be mitigated?
 13. Traffic already backs up at McHenry/River Road/Patterson & Ladd at commute times. With somewhere between 2,500 and 5,600 new homes and businesses, how will this be mitigated? If more traffic signals are required on McHenry Avenue and Patterson Road, congestion will be significantly worsened by River Walk. How will this be mitigated?
 14. The DEIR proposes to install 2 new groundwater wells and a 2M gallon storage tank. The Specific Plan document, in addition to the Power Point presentation made by the consultant (DeNovo) at the City Council meeting on 2/27/24, however, says that 3 new wells are required. Is it 2 new wells or 3? In addition, why are any new wells necessary when Riverbank’s 2016 Municipal Services Review which was presented to LAFCO, and the Water Supply Assessment Report prepared by West/Yost Engineering and referenced in the DEIR, both concluded that Riverbank

has more than sufficient water supply with its existing wells to meet projected growth and have capacity remaining even in drought years? Another question is: Riverbank's existing water storage capacity is 2M gallons. Why would River Walk need to double this amount of storage capacity with another 2M gallon tank? This would place additional demand upon the aquifer and put the existing, surrounding home/land owners who also rely on groundwater at risk.

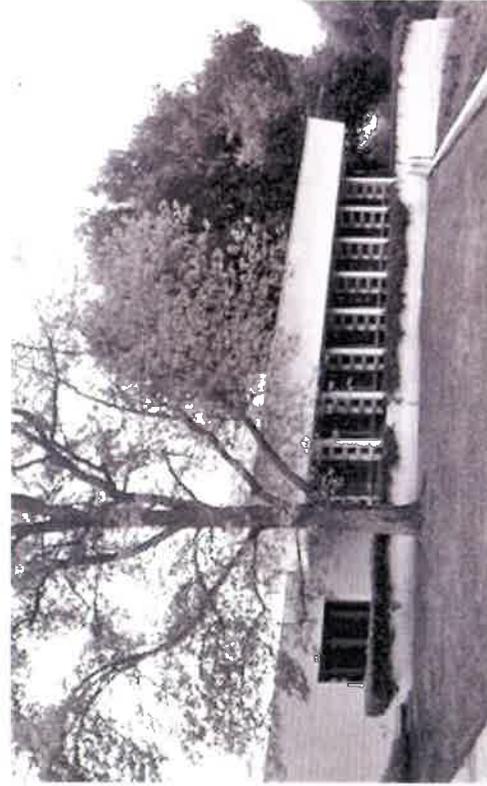
15. Wastewater: In order to get the wastewater from the project to Riverbank's treatment plant, which is across the River in SJ County, the Project proposes not 1, but 2 new sewer mains that would be tunneled UNDER the Stanislaus River, a distance of 1.4 miles. The significant, 5-year sewer rate increase that was approved by the Riverbank City Council in Dec. 2022 was many times referred to publicly as necessary "for current AND future growth." If River Walk is not approved, will the City be refunding money to Riverbank residents and businesses?
16. Prime Ag Land & the State Dept. of Conservation's Farmland Mapping & Monitoring Program (FMMP): The State's mapping program maps all ag parcels of 10 acres or more into categories. The Project Area primarily consists of the top 2 categories: Prime and Lands of Statewide Importance and the project concludes that the loss of this ag land would be "Significant and Unavoidable." The proposed mitigation measure for this is to pay \$ to buy land somewhere, but not necessarily in Stanislaus County. How does this help maintain Stanislaus County and the Central Valley's ag heritage?
17. The DEIR incorrectly refers to the Plan Area in many places as "fallow" land, including on Page 3.2-4 and 5.0-6 where it says, "...and fallow land in the west/central portion of the Project Area." We all know the land isn't fallow and they contradict themselves by saying this on Page 3.4-2: "The surveys spanned multiple growing seasons, so condition of the fields ranged from recently tilled agricultural fields, to early growth of crop." And on Page 4.0-33 it says: "The proposed project would convert 'actively cultivated ag land' to urban use." Correct! Not fallow!
18. The 2008 FEMA Flood Maps designate Special Flood Hazard Areas (SFHAs), and Senate Bill 5 restricts building in the 100-year flood plain. FEMA's Flood Insurance Rate Maps, or "FIRM," identify the 100-year flood plan areas as the places where they propose the various parks and the "River Walk Trail" which surrounds the Project. Most of the rest of the Project Area is designated "Zone X." Zone X is the 200-year flood plain, which is NOT included in SFHA but only because it's protected by a levee from the 100-year (1% chance) of flood. One point: no where in the document do they discuss how well, if at all, the levee has been maintained. In addition: Zone X has the following warning on the FIRM maps: "**WARNING: This area is shown as being protected from the 1% (100-year) annual flood chance hazard by a levee. Overtopping or failure is possible, which could result in destructive flood elevations and high velocity flood waters. There is a chance that large floods will occur that are greater than the level of protection provided by the levee. Communities should issue evacuation plans and encourage property owners behind these structures to purchase flood insurance even if the structure is currently shown as providing protection for the 1% chance.**" We all know what happened in the Flood of 1997 in Stanislaus County and homes in Riverbank's River Cove area flooded. How will home buyers be warned of this potential and will they be required to purchase and maintain flood insurance?
19. The Central Valley in California has one of the highest flood risks in the United States. The Central Valley Flood Protection Plan (CVFPP) 2022 Update predicts that peak flood flows by 2072 could increase up to five times compared to past recorded events, threatening millions of people and billions of dollars of infrastructure, commerce, agriculture, and the environment. The 2022 CVFPP Update focuses on three key themes: climate resilience, performance tracking, and alignment with other state efforts.

20. Parks: there is no discussion in the DEIR about who will pay for, build and maintain the parks and the Club House/pool/tennis courts/etc., etc. It says that the City would maintain the water and sewer system, but there is little if any discussion about the parks and other amenities. Regarding the River Walk Trail only (that goes around the entire project), it says this on Page 2.0-31: it “will be public owned and maintained through a Community Facilities District or similar funding mechanism.” Would that be a tax assessment for the Trail? More discussion is needed about this, including how the parks and other amenities will be funded, built and maintained.
21. Swainson’s Hawk, Page 3.4-45 and Figure 3.4-5 identify the following: a) 305 acres of foraging habitat would be impacted; and b) 83.37 acres of potential nesting habitat could be impacted, HOWEVER, 3.31 acres would be PERMANENTLY LOST because of where Coffee Rd would intersect McHenry. How do you mitigate that???
22. Riverbank’s 2014 General Plan Amendment states that Specific Plans (like River Walk) shall generally be “approx. 200 acres.” River Walk is 5 TIMES greater than this. Riverbank is currently 3,000 acres so annexing 1,000 for River Walk would increase Riverbank’s size by 1/3. It’s too big!
23. Riverbank’s Sphere of Influence (SOI) was increased by 1,500 acres in 2016. SOI increases are intended to cover at least a 20-year planning horizon, or through the year 2036 at a minimum. Increasing Riverbank’s SOI again now is premature and the need has not been demonstrated.

National Register of Historic Places in Stanislaus County



The Walton House Stands Away From the Road Hidden in a Grove of Large Trees
28 October 2012



One of the Photographs Submitted with the NRHP Nomination

National Register #06001133

Robert and Mary Walton House

417 Hogue Drive

Modesto

Built 1959-1961

The Walton House, which is one of a number of Usonian style residences designed between 1936 and 1959 by Frank Lloyd Wright, exemplifies all the major characteristics that define the Usonian style. It is a modest house with strongly horizontal lines that is integrated closely with its environment and which is organized to facilitate an informal, family oriented life-style.

The Walton House is also an example of Wright's particular expression of the Modernist movement, a movement that gained wide acceptance in the 1940s and 1950s. The Walton House exemplifies the innovations in construction and technology that Wright sought to introduce into home design with the object of significantly reducing costs for the average buyer. Among those found in the Walton House are the use of concrete flooring which extends beyond the envelope of the house onto the exterior terraces, concrete block construction, use of steel structural materials, and the organization of the building on a geometric grid system.

(Click Photos to Zoom)

The Usonian house has been widely recognized as one of Wright's most important design innovations and one of the major achievements of his long career. Each Usonian house was an individual expression of an architectural philosophy regarding how the American family should live and be housed. The Walton House aptly illustrates Wright's conviction that small, economical houses could be realized through the use of beautiful natural materials, careful spatial organization, and simplicity of design.

Excerpted from the NRHP nomination dated 14 December 2006.

[Prev](#)

[Stanislaus County: List | Map](#)

[California: List | Map](#)

Miguel Galvez

From: Susan Worden <cocoa.charlot@gmail.com>
Sent: Wednesday, May 15, 2024 11:01 PM
To: River Walk
Subject: Comment on draft EIR for Riverwalk

Dear Mr. Galves,

I am alarmed that the EIR is not taking into serious consideration that the proposed housing will likely be inundated with flood waters at some point.

The proposed plans cannot be dependent on a flood plain not running amuck. The plans cannot be based on any other model except climate from 2010 forward. Thirty-year or 100-year running average models are no longer valid. Homes should not and must not be built in flood plains.

You do not want to be liable for the loss of property and lives and the extreme hardships families will endure living in the proposed housing location.

Do the right thing. Do not place lives in harms way.

Susan Worden

Miguel Galvez

From: James Inman <jim.inman@me.com>
Sent: Wednesday, May 15, 2024 8:00 PM
To: River Walk
Subject: RWSP and Draft EIR Comments

Attention Miguel Galvez:

I'm writing to express my concern for the River Walk Specific Plan and draft EIR. I'm a wildlife biologist and resident of Riverbank. I have been working in my profession as a private consultant in the Central Valley for 25 years and have been working along the Stanislaus River for 20 years. The existing riparian habitat adjacent to the River Walk Project is largely inaccessible to the public. The only way for the public to access that reach of the Stanislaus River is by watercraft and they tend to continue down river without stopping. Because this stretch of river is inaccessible to the public, the riparian habitat is in pretty good condition with mature trees and dense understory. I have personally observed abundant wildlife utilizing this stretch of the river. Wildlife such as mule deer, coyote, grey fox, striped skunk, racoon, river otter, nesting red-tailed hawks and other nesting birds. The riparian area adjacent to the Stanislaus serves as the only natural habitat for many species in the area and serves as a wildlife corridor for movement between patches of remaining habitat.

The major concern I have for this project moving forward is potential harm to the existing riparian corridor. The EIR states that the project will have Less than significant impact (Impact 3.4-7) "The potential to result in adverse effects on riparian habitat or other sensitive natural community." I disagree with this conclusion for what should be obvious reasons. If the land use along the south bank of the Stanislaus River is converted from agriculture to residential, there is great potential for detrimental harm to the existing riparian habitat. The proposed development attempts to create a conservation buffer along the levee but in fact the current land use serves as a buffer to human impacts to the riparian and riverine corridor. I also disagree with the assumption that the project will have less than significant impact on "established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites" (Impact 3.4-8). There are many birds species that are protected by the Migratory Bird Treaty Act (MBTA) that nest in the area that will be pushed out of the habitat simply by the presence of human activities. I know you will conduct nesting bird survey before construction work but that doesn't account for the future loss of available nesting habitat due to the increased human presence.

By constructing houses up to the levee and opening public access where there currently is none, there will be significant impacts to the riparian habitat. Even if you only make the top of the levee public space, that will not keep people out of the riparian zone. With public access comes bank destabilization, disturbed soils, compacted soils, erosion, sediment deposition,

loss of native vegetation, introduction of non-native vegetation, litter, illegal dumping, animal and human waste, and water quality impacts. I challenge the City to look at the current condition of habitat along River Cove Drive, because that is what you will get if the River Walk rezoning and development prevails.

By making this section of the Stanislaus River accessible to the public you are essentially inviting homeless or "un-housed" individuals to establish camps in the area as they have done extensively upstream of the Santa Fe Bridge. Poaching ESA protected species will also become an issue. I have observed and reported to the CDFW Warden of illegal fishing out of season upstream near Jacob Myers Park and expect River Walk will also be susceptible to poaching. What impacts will there be to the existing fish counting weir installed annually adjacent to the River Walk Project, in operation for the past 20 years, for enumeration and research of ESA protected Fall-run Chinook salmon and Steelhead trout. Have you assessed the potential impacts to that important project? Will the Stanislaus River Weir be forced to relocate?

This project will limit potential for future restoration actions. Many public agencies throughout the state are realizing the importance of floodplains for flood protection and native fish species. If this project goes through you will eliminate the potential of future floodplain restoration at this site. A simple levee breach or levee setback would open up additional floodplain and potentially salmonid rearing habitat. Keep housing developments up on the bluff and leave the lowlands to natural habitat. Leave this important habitat zoned for agriculture.

Jim Inman
Wildlife Biologist
Riverbank, CA



DIRECTORS May 15, 2024

Myron J. Cotta
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City Council,
Riverbank, CA

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Debra Peranza
Community Volunteer

Joan Hart
Community Volunteer
CSSG Liaison

Martha Arevalos
Executive Director

RE: Comment letter to DEIR, River Walk Specific Plan (SCH: 2021060098)

Dear Mayor and City Councilmembers,

The Environmental Justice Program of Catholic Charities of Stockton (CCEJ) is asking the City of Riverbank to address the issues that we have identified through the Draft Environmental Impact Report for the proposed River Walk Specific plan.

The DEIR states that there will be a “Less Than Significant” impact on the riparian habitat on that borders the project area. CCEJ believes that this statement does not properly explain the potential impact that the project will have on the riparian areas. CCEJ believes that will be a more significant impact on this zone than is identified in the DEIR. In **Impact 3.4-7: The potential to result in adverse effects on riparian habitat or other sensitive natural community. (Less than Significant)** it states:

There are a few existing areas in the riparian area that are currently used for river access (fishing, swimming, and boat launch). These areas show existing disturbance in the forms of rip-rap, roads/trails, and trash/debris, and are best characterized as barren. It is anticipated that these areas will be cleaned up as part of the proposed project, but will be maintained for river access connecting any walking areas along the levee to the river front.

The existing language of “It is anticipated” should be modified to be more definitive. As the current language states, the project developers can use these current locations to allow more formal access point to the rivers water. However, the language will allow the developer to chose to pick other points along the riparian border the build access points. If this is the case, there will be nothing to stop residents from continuing to use the current access point to reach the water, In effect, the project has no way to limit or even encourage residents to use only the designated access points if the points are built in locations other then the identified ones that are currently there.

Overall, the DEIR fails to take in account the effects of a large established human population that will border the riparian zone. Through the review of the DEIR, several species of wildlife have been identified and the overall finding is that the project will have a “Less than Significant” impact on the wildlife species. CCEJ believes that this analysis is faulty. The DEIR fails to address the impact of hundreds of residents will have on the riparian zone and the wildlife that occupy it. Currently, there are no plans to limit people from traveling through the riparian zone and the negative. It is undoubtable that there will be a substantial impact on the wildlife in this zone. The DEIR also fails to address the impact of resident pets will have on the riparian zone. In a 2022 volume of *Biological Conservation* the study titled, “Prey selection and predation behavior of free-roaming domestic cats (*Felis catus*) in an urban ecosystem: Implications for



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urban cat management”¹, reviews the impacts that the common household domestic cat can have on wildlife. Domestic cats still maintain a high predation drive that does not change not matter how well fed or care for they are. According to this study:

While cats may be known for their predation of non-native rats, most studies conclude that such predation is relatively rare and is unlikely to suppress rat populations (Glass et al., 2009; Parsons et al., 2018). Instead, cats prefer smaller (<250 g) prey items such as non-native house mice (*Mus musculus*) and other small-bodied species like native rodents, songbirds, butterflies, and reptiles (Fleming et al., 2020; Parsons et al., 2018; Loss et al., 2013; Loyd et al., 2013; Childs, 1986)

It is recommended that the project area implement the complete banning of outdoor cats or fines for unrestrained cats. This policy will greatly reduce the harm to native wildlife in the riparian zone.

In section 3.13 **Transportation and Circulation** in the Pedestrian Facilities, it has been reported that there can develop a dangerous pedestrian crossing that the DEIR has no ability to properly mitigate.

PEDESTRIAN FACILITIES

The Specific Plan includes sidewalks on proposed streets, and a comprehensive on-site trail system to be provided. Proposed improvements to SR 108 (Patterson Road) will include sidewalks. The Specific Plan does not physically disrupt an existing pedestrian facility. It is very likely that some residents will travel on foot to reach destinations that are relatively close to their residences, such as commercial areas, parks, clubhouse, and trails. The extent to which safety issues could occur on these pedestrian facilities has been considered.

With implementation of planned improvements on SR 108 (Patterson Road), a 400-foot gap will remain between the Specific Plan’s sidewalk on Patterson Road and the existing sidewalk that ends west of Oakdale Road. Increased pedestrian volume in this area represents a potential safety concern. This is a **potentially significant** impact.

As the previously-approved Crossroads West Specific Plan proceeds, the MID Main Canal trail will become a likely pedestrian route between the Specific Plan Area, the Riverbank Sports Complex and Crossroads Shopping Center. Increased pedestrian activity across SR 108 is a safety issue due to the speed of vehicles in this area. This is a **potentially significant** impact.

It is recommended that the DEIR review this potential hazard and develop potential mitigation methods and how each method can work to avoid vehicle-on-pedestrian

¹ D.J. Herrera ^a, M.V. Cove ^c, W.J. McShea ^d, D.T. Flockhart ^e, S. Decker ^a, S.M. Moore ^a, T. Gallo, (2022), Prey selection and predation behavior of free-roaming domestic cats (*Felis catus*) in an urban ecosystem: Implications for urban cat management, *Biological Conservation*, Volume 268, 2022, 109503, ISSN 0006-3207



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collisions. The DEIR has proposed two methods that will depend on CalTrans approval but the DEIR does not properly publish how the mitigations efforts will reduce these collisions. Prior to the start of construction, the developer **must** receive an approval from CalTrans on which method the developer perceives to be the most effective. The Developers will also work with CalTrans to review the proposal and accept any technical assistance from that agency.

The Environmental Justice Program of Catholic Charities of Stockton requests that the concerns that we have raised are addressed and properly mitigated before this project is approved.

Sincerely,

Ector Olivares, Program Manager
Environmental Justice Program
eolivares@ccstockton.org

Susan Wedegaertner
1348 Kiernan Avenue
Modesto, CA 95356

May 15, 2024

To whom it may concern:

Here are my comments to the impact of the Riverwalk project and the environmental impact it has in this area.

You probably have received several reports that the impact to the environment in this area is low. Have you wonder how the people making these reports get their information? I do not know either but I would guess they probably have not been to the land to see the property in question.

So, I will tell you that the environment impact is **HUGE** for this area. Building the number of the houses they want in this area not only increases the air pollution (more cars coming and going in this area) but also increases noise pollution and traffic. How can it not increase?

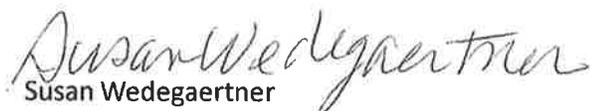
What about the animals that call this area home? They may not be on the endangered list but they count. It seems that reports about creatures in the building area get overlooked if they are not on the endangered list. That is very sad. Every creature deserves a place to call home even the ones I do not like – snakes and gophers!

Then we come to the biggest impact of them all is the land. If houses are built on this land, we lose valuable prime agricultural land. This is some of the best ag land in the state and people “that is ok we have more land and we need houses”. Just in my area our valuable ag land is disappearing for another church, Hindu Temple, a 300,000 square foot warehouse and more housing. No, we are losing valuable ag land every day so we need to protect our agricultural land!

And the final huge impact is the farmer who is farming land near this proposed housing community. During harvest farming is almost 24/7 for months. The noise and dust from machinery the farmers need to harvest their crops increases. The people who buy a home in this proposed community really do not understand farming and will complain that it is too dusty and noisy. Well, guess what you moved out the country and country living during certain times of the year is not quiet! It is like people who purchase a home near an airport and then have the nerve to complain about airplanes taking off and landing! Why does the farmer always come out on the short end?

So, I will end my impact document now by saying I am a farmer’s daughter and have seen our precious ag land disappear. It needs to stop and save the farmer and his valuable land.

Sincerely,


Susan Wedegaertner

Miguel Galvez

From: mattole2@aol.com
Sent: Thursday, May 16, 2024 12:10 PM
To: River Walk
Subject: River Walk
Attachments: Riverwalk Project letter #1.pages

Attached please find my letter regarding the River Walk project.

Margaret L. W. Cousins

Could
not
download
letter

Miguel Galvez

From: Robert DeMont <robert.demont@rhodeshof.com>
Sent: Thursday, May 16, 2024 1:52 PM
To: River Walk; Miguel Galvez
Subject: Riverwalk Draft EIR Comment-Flood Plain

Nearly the entire project area is within a flood plain as indicated on the EPA's own maps and website.

All over America it is a high priority to stop senseless rebuilding in areas prone to natural disasters. In many areas governments are taking tax dollars to buy people out of their properties so that they won't rebuild in hazardous areas. Here we're proposing to put significant communities in a flood plain behind what is admitted to be an unmaintained levy.

The community tragedy and environmental disaster that will be an inevitable outcome has not been addressed (and is completely avoidable). Further, insurance is getting increasingly difficult to obtain in CA. It will likely be impossible for future residents of the proposed development to get adequate flood insurance. In the event of a disaster, there are only two evacuation routes which as noted in the Traffic component will deliver poor LOS.

The possible costs to the community and the environment in the event of an inevitable flooding of the project area has not been adequately addressed.

Bob DeMont
Robert.demont@rhodeshof.com
209-604-6237

Miguel Galvez

From: Robert DeMont <robert.demont@rhodeshof.com>
Sent: Thursday, May 16, 2024 1:52 PM
To: River Walk; Miguel Galvez
Subject: Riverwalk Draft EIR Comment-Farmland Mitigation

The idea of farmland mitigation sounds nice. Here we're proposing to remove nearly 1500 acres of prime farmland and near prime farmland from production in perpetuity. I understand that to mitigate, it is politically acceptable to place conservation easements on comparable land within the county. How this is acceptable is surprising.

As an example, Initially we have 3000 acres of prime and near prime land available and somehow its acceptable to promise not to develop 1500 acres in order to take 1500 permanently out of production. The net is that you still end up with 1500 fewer acres of productive land. You've just "promised" not to develop the other. If this were to be extended logically, half of all farmland in CA, some of the richest farmland in the world, could be taken permanently out of production with the promise to not develop the rest. True mitigation would involve turning non-producing land into prime farmland so that there was still 3000 producing acres.

Furthermore, this land should clearly be identified and actioned as a prerequisite to any action on this issue. Otherwise general plans will be updated, land will be annexed, costs will be incurred and inertia will carry on ignoring mitigation promises. Specific, feasible, targeted lands need to be identified as part of legitimate mitigation.

Bob DeMont
Robert.demont@rhodeshof.com
209-604-6237

Miguel Galvez

From: Robert DeMont <robert.demont@rhodeshof.com>
Sent: Thursday, May 16, 2024 1:52 PM
To: River Walk; Miguel Galvez
Subject: Riverwalk Draft EIR Comment-Climate Contribution

Every news outlet today has a daily mention of climate change. The Climate change component of 3.7 only takes into account additional gasses generated by the project. The impact of eliminating the carbon dioxide devouring plants, trees and crops of the proposed project area and replacing them with carbon dioxide (and carbon monoxide) producing communities has not been fully quantified- we've only addressed half the equation, generation; not the other side which is the mitigation by the current status as farmland.. Almost nothing could be as important for an environmental impact report than the impact on the climate and the environment.

Bob DeMont
Robert.demont@rhodeshof.com
209-604-6237

Miguel Galvez

From: Robert DeMont <robert.demont@rhodeshof.com>
Sent: Thursday, May 16, 2024 1:52 PM
To: River Walk; Miguel Galvez
Subject: Riverwalk Draft EIR Comment- Biology Component

The biology component, was a once over lightly of the proposed area. The habitat of the Swainsons Hawk is represented as ending at the cliff to the south of the Berghill area. In reality, the Swainsons hawk habitat extends well south of that all the way to Patterson Road. They not only nest in the large oaks along the cliff but mate in the tall pines of 1731 Patterson. Regrettably at least 1 hawk every other year is hit by a car on Patterson Road proving their range. These are noted as not observed, however they are continuously observed by residents. Other omissions:

- There is at least one mating pair of red foxes that roams over the entire area in question.
- At least one pack of coyotes is resident along the river and roams to Patterson Road.
- Snowy Egrets were noted as not observed, however, they are observed by residents every year along the MID drainage canal.
- Great Blue Herons were noted as not observed, however, they are observed by residents every year along the MID drainage canal.
- Various bats are noted as potentially present, but some of those species are definitely present and regularly observed by residents.
- Giant gartersnakes have indeed been observed in the MID canal area by residents.
- Gopher snakes are also continuously present in the pastures and orchards of the project areas.
- Great horned owls are constant residents in the area and can be both seen and heard in the evenings.
- Deer prints are found throughout the floodplain area as well as the area to the south between the cliff and Patterson Road.
- Wild Turkeys are a regular in the area and roam from the river to Patterson Road.
- Wild Peacocks are a regular in the area and roam from the river to Patterson Road.
- Quail and Doves maintain habitat throughout the proposed project area.
- A large cat (not of the house cat variety) has left visible tracks on the lower portion of the proposed project area.
- A mating pair of white shouldered kites have been seen intermittently nesting near 1731 Patterson.

Realization of the proposed project will severely restrict habitat for all of the above effectively eliminating them from the area.

Bob DeMont

Robert.demont@rhodeshof.com

209-604-6237

Miguel Galvez

From: Robert DeMont <robert.demont@rhodeshof.com>
Sent: Thursday, May 16, 2024 1:53 PM
To: River Walk; Miguel Galvez
Subject: Riverwalk Draft EIR Comment-Traffic

The analysis of the impact of traffic is grossly inadequate. Data from 2021 is severely outdated and inaccurate. By March 2021 many were still working remotely and not commuting. . Most restrictions weren't lifted until June of 2021. Mask mandates in CA existed until February 2022. The Governor didn't end his state of emergency until Feb 2023. Residents can attest that traffic has increased since that time especially during morning and evening commute. Furthermore, the analysis has made no mention of the enormous impact on traffic that Crossroads West and the Costco center will have on the local network. These will bring enormous amounts of traffic to the area that have not been addressed. The proposed project cannot be analyzed in isolation against current patterns.

In order to determine the impact on traffic of the proposed development and any possible mitigation, a thorough quantitative analysis of traffic is necessary, and the people of Riverbank deserve to see the impact on their daily lives. The newly released traffic analysis certainly meets the criteria for analysis for CEQA. However, it fails to describe to resident of Riverbank and the surrounding area the community impact.

It is entirely possible that the proposed design is sufficient for local movement within the proposed area; 100 foot streets with bike paths and pedestrian lanes likely allow pleasant internal circulation. However, entrances and egress have been technically but not practically analyzed. The traffic forecasts show over 37,000 net new trips. These are funneled through 2 intersections to be traffic-lighted. The movement will be largely bimodal, in the morning and evening since Riverbank is a commuter community. The delays into Riverbank should be demonstrated publicly.

Merely planning two lanes in each direction on Patterson road is hand-waiving without visible analysis. Currently we have E and F level service in the area and we're contemplating adding 37,000 additional vehicle trips daily not including the load from the Costco center? It bears repeating for residents what D,E and F levels of service at Traffic lights are:

D: Significant congestions of critical approaches but intersection functional. Cars required to **wait through more than one cycle** during short peaks. No long queues formed. Delay > 35.0 sec and < 55.0 sec

E: Severe congestion with some long standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. **Traffic queue may block nearby intersection(s) upstream of critical approach(es)**. Delay > 55.0 sec and < 80.0 sec

F: Total breakdown, stop-and-go operation. Delay > 80.0 sec

Already, I have waited 10 minutes and counted well over 100 cars to turn RIGHT onto Patterson in the morning. I can only begin to imagine the backup between Coffee and Oakdale with a light at Coffee.

The Riverbank public deserves to see actual impact of the proposed development via simulation. Various public domain and paid analysis tools such as SUMO and SMARTS are available to produce a visual

presentation of traffic throughout the day including rush hour. As an Operations Research professional with a MS from Stanford, the traffic impact on Riverbank as presented gets a failing grade in describing the community impact. The people of Riverbank and the impacted area need to see a thorough analysis with best and worst case scenarios with clearly articulated assumptions and results including average wait times at each of the current and proposed intersections including interactions with pedestrians and bikes which drastically increase auto wait times at lights. Bike and pedestrian traffic are noted in alternative transportation nodes but not modelled in wait times.

The associated additional land procurements/ imminent domain declarations should also be included visually(esp the areas along Coffee and Patterson) along with associated costs. I acknowledge the traffic study enumerates needs but doesn't demonstrate for those affected what it means. A lot of other farm land outside the project area will be seized to accommodate the traffic component.

Before the city proceeds on any adoption, they should have in hand firm, funded agreement from other traffic agencies to the changes necessary. Otherwise we risk procuring property that can't be used, blight (people stop investing in and maintaining property when they know its soon to be developed) uprooting lives and disrupting homes and businesses only to find that key linchpins cannot be secured (eg improvements along CALTRANS areas of responsibility)

Finally, more commitment than Mitigation Fees Transportation Improvements need to shown. Firm plans and secure funding need to be shown and commitments not to develop until infrastructure is in place. Otherwise the community will be incremented into a traffic nightmare where the development will be done and the traffic plan less than completely finished.

Bob DeMont

Robert.demont@rhodeshof.com

209-604-6237

LAW OFFICE OF DONALD B. MOONEY

417 Mace Blvd, Suite J-334

Davis, CA 95618

530-304-2424

dbmooney@dcn.org

May 16, 2024

Via Electronic Mail

riverwalk@riverbank.org.

Miguel Galvez
Contract City Planner
City of Riverbank
6617 3rd Street
Riverbank, CA 95367

Re: *Comments on Draft Environmental Impact Report for the River Walk Specific Plan (SCH Number 2021060098)*

Dear Mr. Galvez:

This office represents Central Valley Concerned Citizens regarding the proposed the Proposed River Walk Specific Plan and the Environmental Impact Report for the River Walk Specific Plan . Central Valley Concerned Citizens object to the Project on the grounds that the Draft Environmental Impact Report (“DEIR”) for the Project fails to comply with the requirements of the California Environmental Quality Act (“CEQA”), Public Resources Code section 21000 *et seq.* and the CEQA Guidelines, section 15000 *et seq.*

A. THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

“CEQA is a comprehensive scheme designed to provide long-term protection to the environment. [Pub. Resources Code, §21001.] In enacting CEQA, the Legislature declared its intention that all public agencies responsible for regulating activities affecting the environment give prime consideration to preventing environmental damage when carrying out their duties. [Pub. Resources Code, § 21000(g).] CEQA is to be interpreted 'to afford the fullest possible protection to the environment within the reasonable scope of the statutory language.' [*Friends of Mammoth v. Board of Supervisors* (1972) 8 Cal.3d 247, 259]”. (*Mountain Lion Foundation v. Fish & Game Commission* (1997) 16 Cal.4th 105, 112; see also *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 511.) The EIR, “with all its specificity and complexity, is the mechanism prescribed by CEQA to force informed decision making and to expose the decision-making process to public scrutiny. (*Planning and Conservation League v. Department of Water Resources* (2000) 83 Cal.App.4th 892, 910; citing *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 86.) This interpretation remains the benchmark for judicial interpretation of CEQA. (*Laurel Heights Improvement Association v. Regents of the University of California* (“*Laurel Heights I*”) (1988) 47 Cal.3d 376, 390, quoting *Bozung v. Local Agency Formation Commission* (1975) 13 Cal.3d 263, 274.) As the *Laurel Heights I* court noted, “[i]t is, of course, too late to argue for a grudging, miserly reading of CEQA.” (*Laurel Heights I, supra*, 47 Cal.3d at 390.) The “foremost principle under CEQA is that the Legislature intended the act ‘to be interpreted in

such manner as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language.” (*Sierra Club, supra*, 6 Cal.5th at p. 511, quoting *Friends of Mammoth, supra*, 8 Cal.3d at 259.)

The EIR is “the heart of CEQA” and “an environmental alarm bell whose purpose is to alert the public and its responsible officials to environmental changes before they have reached the ecological point of no return.” (*Id.* at 392.) The EIR is the “primary means” of ensuring that public agencies “take all action necessary to protect, rehabilitate, and enhance the environmental quality of the state.” (*Id.*, quoting Pub. Resources Code, § 21001(a).) The EIR is also a “document of accountability,” intended “to demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its actions.” (*Laurel Heights I, supra*, 47 Cal.3d at 392 (quoting *No Oil, Inc., supra*, 13 Cal.3d at 86.)) Thus, “[t]he EIR process protects not only the environment but also informed self-government.” (*Ibid.*)

The central purpose of an EIR is to identify the significant environmental effects of the proposed project, and to identify ways of avoiding or minimizing those effects through the imposition of feasible mitigation measures or the selection of feasible alternatives. (Pub. Resources Code, §§ 21002, 21002.1(a), 21061.) “The basic purpose of an EIR is to provide public agencies and the public in general with detailed information about the effect [that] a proposed project is likely to have on the environment; to list ways in which the significant effects of such a project might be minimized; and to indicate alternatives to such a project.” (Pub. Resources Code, § 21061; see Title 14 Cal. Code Regulations (“CEQA Guidelines”) § 15003(b)-(e); *Sierra Club v. County of Fresno, supra*, 6 Cal.5th at 511; *Mountain Lion Foundation v. Fish & Game Commission, supra*, 16 Cal.4th at 113.) Thus, an EIR must provide information to government decision-makers and the public about the potential significant environmental effects of proposed projects (CEQA Guidelines, § 15002(a)(1);) and disclose to the public the reasons for approval of a project that may have significant environmental effects. (*Id.*, § 15002(a)(4).) This informed decision making and public participation constitutes the fundamental cornerstones of the CEQA process. (See *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564; *Laurel Heights I, supra*, 47 Cal.3d 376.)

A legally adequate EIR must “facilitat[e] ‘informed decision making and informed public participation.’” (*Sierra Club, supra*, 6 Cal.5th at p. 513, quoting *California Native Plant Society v. City of Santa Cruz* (2009) 177 Cal.App.4th 957, 988.) “To facilitate CEQA’s informational role, the EIR must contain facts and analysis, not just the agency’s bare conclusions or opinions.” (*Laurel Heights, supra*, 47 Cal.3d at pp. 404-405, quotation omitted.) “And . . . a sufficient discussion of significant impacts requires not merely a determination of whether an impact is significant, but some effort to explain the nature and magnitude of the impact.” (*Sierra Club, supra*, 6 Cal.5th at p. 519, citing *Cleveland Nat’l Forest Found. v. San Diego Assn. of Govts.* (2017) 3 Cal.5th 497, 514-515.) An EIR lacking such information does not “includ[e] enough detail ‘to enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed project.’” (*Sierra Club, supra*, 6 Cal.5th at 516, quoting *Laurel Heights, supra*, 47 Cal.3d at 405.)

An EIR also “must” include “a disclosure of the ‘analytic route the agency traveled from evidence to action.’” (*Laurel Heights, supra*, 47 Cal.3d at p. 404, quoting *Topanga Assn. for a Scenic Community v. County of Los Angeles* (1974) 11 Cal.3d 506, 515.) If this “analytic route” has not been revealed, it is impossible for “others, be they courts or constituents, [to] intelligently analyze the logic of the [agency’s] decision.” (*Citizens for Quality Growth v. City of Mt. Shasta* (1988) 198 Cal.App.3d 433, 441.) “The data in an EIR must not only be sufficient in quantity, it must be presented in a manner calculated to adequately inform the public and decision makers, who may not be previously familiar with the details of the project. ‘Information “scattered here and there in EIR appendices” or a report “buried in an appendix,” is not a substitute for ‘a good faith reasoned analysis.’” (*Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 442 (“*Vineyard*”), quoting *California Oak Foundation v. City of Santa Clarita* (2005) 133 Cal.App.4th 1219, 1239.) Finally, the “audience to whom an EIR must communicate is not the reviewing court but the public and the government officials deciding on the project. That a party’s briefs to the court may explain or supplement matters that are obscure or incomplete in the EIR, for example, is irrelevant, because the public and decision makers did not have the briefs available at the time the project was reviewed and approved. The question is therefore not whether the project’s significant environmental effects can be clearly explained, but whether they were.” (*Vineyard, supra*, 40 Cal.4th at p. 443.) “Whatever is required to be considered in an EIR must be in that formal report; what any official might have known from other writings or oral presentations cannot supply what is lacking in that report.” (*Laurel Heights, supra*, 47 Cal.3d at 405.) Thus, the “preparation and circulation of an EIR is more than a set of technical hurdles for agencies and developers to overcome. The EIR’s function is to ensure that government officials who decide to build or approve a project do so with a full understanding of the environmental consequences and, equally important, that the public is assured those consequences have been taken into account. [Citation.] For the EIR to serve these goals it must present information in such a manner that the foreseeable impacts of pursuing the project can actually be understood and weighed, and the public must be given an adequate opportunity to comment on that presentation before the decision to go forward is made.” (*Vineyard, supra*, 40 Cal.4th at pp. 449-450, citing *Laurel Heights, supra*, 47 Cal.3d at 391-392.)

Compliance with the procedural requirements of CEQA sets the stage for development of mitigation measures and alternatives. Without a proper procedural foundation, a local agency cannot comply with CEQA’s mandate that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects. (Pub. Resources Code § 21002.)

As discussed below, the DEIR fails to meet CEQA procedural requirements, fails as an informational document, and the DEIR’s conclusions are not supported by substantial evidence.

B. THE EIR CONTAINS AN INADEQUATE PROJECT DESCRIPTION

“An accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient EIR.” (*County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185,

193.) CEQA requires a complete project description to ensure that all of the project's environmental impacts are considered. (*City of Santee v. County of San Diego* (1989) 214 Cal.App.3d 1450, 1454; see *Communities for a Better Environment v. City of Richmond* (2010) 184 Cal.App.4th 70, 82.) A curtailed, enigmatic or unstable project description draws a red herring across the path of public input." (*San Joaquin Raptor Rescue Center v. County of Merced* (2007) 149 Cal.App.4th 645, 656; quoting *County of Inyo, supra*, 71 Cal.App.3d at 197-198.) The adequacy of a project description is closely linked to the adequacy of the impact analyses. If the description is inadequate because it fails to discuss an aspect of the project, the environmental analysis will probably reflect the same mistake. (See *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.3d 713, 722-723.) "An accurate project description is necessary for an intelligent evaluation of the potential environmental effects of a proposed activity. (*McQueen v. Board of Directors* (1998) 202 Cal.App.3d 1136, 1143.) A narrow view of a project could result in the fallacy of division, that is, overlooking its cumulative impact by separately focusing on isolated parts of the whole. (*Id.* at 1144.)" (*Burbank-Glendale-Pasadena Airport Authority v. Hensler, supra*, 233 Cal.App.3d at 592.)

The DEIR's Project description fails to disclose that development of the Project will require either updates to the City's current wastewater treatment facility or the construction of a new wastewater treatment facility. The Project description discloses that the project will require the construction of new sewer lines to the wastewater facility, but fails to disclose and discuss that the current facility does not have adequate capacity to receive and treat wastewater from the development. The reviewer only learns of this defect regarding the wastewater treatment facility's lack of capacity in the DEIR's Utility section. (See DEIR at 3.14-3 to 3.14-9.) The DEIR, however, does not link the necessary upgrades and/or new facility to the proposed Project, even though such upgrades and/or new facility will be required as a result of the proposed Project.

C. THE EIR CONTAINS IMPERMISSIBLE NARROW PROJECT OBJECTIVES

The EIR defines the project objectives in an impermissible narrow fashion which only impacts the range of alternatives analysis as well as the preferred alternative. (See *We Advocate Through Environmental Review v. County of Siskiyou ("WATER")* (2022) 78 Cal.App.5th 683, 691.). "The process of selecting the alternatives to be included in the EIR begins with the establishment of project objectives by the lead agency. 'A clearly written statement of objectives will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings....' [Citation.]" (*In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings* (2008) 43 Cal.4th 1143, 1163; see also CEQA Guidelines, § 15126.6 ["An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives."].) (*WATER, supra*, 78 Cal.App.5th at 691.)

In taking this artificially narrow approach for describing the project objectives, the City ensures that the results of its alternatives analysis is a foregone conclusion. (*Id.*) It transforms the EIR's alternatives section, which serves as the "core of the EIR" into an empty formality. (*Id.*, see also *In re Bay-Delta*, *supra*, 43 Cal.4th at 1162.) The EIR's "Overall Project Objectives" state the purpose of the proposed Project is the expansion of the Specific Plan as a means of increasing the housing supply in Stanislaus County. (DEIR at 2.0-7.) The EIR then lists Specific Plan Objectives including quantifiable objectives for the Specific Plan. Those quantifiable objectives lists specific amount of dwelling units. (DEIR at 2.0-8.)

Despite this effort to "limit" quantifiable objectives to the Specific Plan, the Project description provides for the development 2,432 dwelling units with the same breakdown between Low Density Residential (1,550), Medium Density Residential (702) and High Density Residential (180). (See DEIR at 2.0-8 & 2.0-11.) A review of the Alternatives, however, indicates that they all provide for a range of dwelling units from 2,432 to 2,682. (DEIR 5.0-7.) Thus, despite what DEIR states about the "quantifiable objectives" being limited to the Specific Plan, they are being used to identify the alternatives and appear to be project objectives for the CEQA analysis. Also, each alternative provides a Mixed Use area estimated from 375,000 to 875,000 square feet of commercial/retail uses, identical to the proposed Project. Thus, the DEIR's narrow project objectives renders the DEIR legally inadequate. (*WATER*, *supra*, 78 Cal.App.5th at 691.)

D. THE EIR'S CONTAINS AN INADEQUATE ALTERNATIVE ANALYSIS.

CEQA requires that an EIR consider a reasonable range of alternatives. (Pub. Resources Code §§ 21002, 21061, 21100; CEQA Guidelines § 15126.6; see, e.g., *Citizens of Goleta Valley v. Board of Supervisors*, *supra*, 52 Cal.3d at 566 (EIR must consider a reasonable range of alternatives that offer substantial environmental benefits and may feasibly be accomplished.) "CEQA and the Guidelines are replete with references to the need to discuss project alternatives." (*Laurel Heights I*, *supra*, 47 Cal.3d at 400, *citing* Pub. Resources Code, §§ 21001(g); 21002.1(a); 21061; 21100(c), (d); CEQA Guidelines § 15126(d), (d)(3).) These statutory and regulatory provisions clearly indicate that one of "an EIR's major functions is to ensure that all reasonable alternatives to proposed projects are thoroughly assessed by the responsible official." (*Laurel Heights I*, *supra*, 47 Cal.3d at 400, *quoting* *Wildlife Alive v. Chickering* (1976) 18 Cal.3d 190, 197.) Agencies must prevent "significant, avoidable damage to the environment" by adopting feasible alternatives, and cannot approve a Project if such alternatives exist. (CEQA Guidelines §§ 15002(a)(3); 15021(a)(2); see also Pub. Resources Code, §§ 21002, 21002.1, 21081.)

An EIR must "consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation," as determined by "the rule of reason." (Guidelines § 15126.6(a).) Agencies must consider alternatives that "would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project," "even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly." (*Id.*, § 15126(a), (b) [emphasis added].) Not only must an EIR include a reasonable range of alternatives, its discussion of those alternatives

must be reasonably specific. “The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project.” (*Id.*, § 15126.6(d).) Under CEQA, the “key issue is whether the selection and discussion of alternatives fosters informed decision making and informed public participation.” (*Laurel Heights, supra*, 47 Cal.3d at 404 .) “It is the project proponent’s responsibility to provide an adequate discussion of alternatives. (Guidelines, § 15126(d).) That responsibility is not dependent in the first instance on a showing by the public that there are feasible alternatives. If the agency concludes there are no feasible alternatives, it must explain in meaningful detail in the EIR the basis for that conclusion.” (*Laurel Heights, supra*, 47 Cal.3d at 404-405.) Such an explanation is necessary for an EIR “to enable meaningful participation by the public.” (*Id.* at 405.)

The determination of whether an alternative is feasible is made in two stages. (*See Mira Mar Mobile Community v. City of Oceanside* (2004) 119 Cal.App.4th 477- 489-490 *California Native Plant Society v. City of Santa Cruz* (2009) 177 Cal.App.4th 957, 981; CEQA Guidelines, § 15126.6(c).) The first stage involves identifying a range of alternatives that will satisfy basic project objectives while reducing significant impacts. (*Ibid.*) Alternatives that are not “potentially feasible” are excluded at this stage as there is no point in studying alternatives that cannot be implemented. (*Ibid.*) In the second stage, the final decision on the project, the agency evaluates whether the alternatives are actually feasible. (*California Native Plant Society, supra*, 177 Cal.App.4th at 981; *see* CEQA Guidelines, § 15091(a)(3).) At this point, the agency may reject as infeasible alternatives that were identified in the EIR as potentially feasible. (*California Native Plant Society, supra*, 177 Cal.App.4th at 981.)

As discussed above, a project proponent cannot artificially confine the range of available alternatives by relying upon an overly narrow statement of project objectives. (*North Coast Rivers Alliance v. Kawamura (“NCRA”)* (2016) 243 Cal.App.4th 647, 668, *quoting In re Bay-Delta Programmatic EIR* (2008) 43 Cal.4th 1143, 1165; *see also WATER, supra*, 78 Cal.App.5th at 692; *Kings County Farm Bureau v. City of Hanford, supra*, 221 Cal.App.3d at 736; *see also City of Carmel-By-the-Sea v. U.S. Department of Transportation* (1997) 123 F.3d 1142, 1155 (the project objective “necessarily dictates the range of ‘reasonable’ alternatives and an agency cannot define its objectives in unreasonably narrow terms.”).) Doing so enables the lead agency to skew the alternatives analysis process by improperly “dismiss[ing] out of hand” all alternatives except the preferred one. (*NCRA, supra*, 243, Cal.App.4th at 668.) To allow the project’s objectives to be unreasonably narrowed renders CEQA’s mandate to consider a reasonable range of potentially feasible alternatives meaningless. (*Kings County, supra*, 221 Cal.App.3d at 737.) CEQA requires that agencies to consider alternatives that “*would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project,*” “even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.” (*Id.*, § 15126(a), (b).)

The “Comparison of Alternative Project Impacts to the Proposed Project” (Table 5.0-4; DEIR 5.0-47 to 5.0-49) is misleading. The Comparison does not list a distinction between “Less” and “Less-than-Significant.” As a result it misleads the public as thinking that the

alternatives comply with the requirements of CEQA Guidelines section 15126(a) when in fact they do not substantially lessen any of the significant effects of the project.

A review of the Increased Density Alternative indicates that it does not avoid or substantially lessen any of the significant effect of the project. (See DEIR 5.0-17 to 5.0-27.) Aesthetics and Visual Resources will have similar impacts; agricultural resources impacts will be equal; air quality impacts reduced and/or equal (not substantially lessened); biological resources will be reduced (not substantially lessened); cultural and tribal resources will have equal impacts; geology and soils would have equal impacts; greenhouse gas, climate and energy would have decreased impacts for the project and equal impacts for construction; hazards and hazardous wastes would have equal impacts; hydrology and water quality would have reduced impacts (not substantially lessened); land use, population and housing impacts would be equal; noise impacts would be equal; public services and recreation impacts would be equal; transportation and circulation would be reduced but still significant; utilities solid waste would have equal impacts. Thus, this alternative does not avoid or substantially lessen any of the Project's significant impacts.

A review of the Lower Density Alternative also indicates that it does not avoid or substantially lessen any of the Project's significant effects of the Project. (See DEIR 5.0-27 to 5.0-35.) Agricultural resources impacts will be similar; air quality impacts reduced (not substantially lessened); biological resources impacts will be similar; cultural and tribal resources impacts will be similar; geology and soils would result in reduced potential for impacts; greenhouse gas, climate and energy would have reduced impacts for the project and equal impacts for construction; hazards and hazardous wastes would have reduced members; hydrology and water quality would have reduced impacts (not substantially lessened); land use, population and housing impacts would be reduced (not substantially lessened); noise impacts would be reduced (not substantially lessened); public services and recreation impacts would be reduced (not substantially lessened); transportation and circulation would be reduced but does not state substantially lessened; utilities solid waste would have similar impacts. Thus, like the Increased Density Alternative this alternative does not avoid or substantially lessen any of the Project's significant impacts.

Only the No Reserve alternative would substantially lessen some of the Project's impacts. (See AR DEIR 5.0-35 to 5.0-46.) Impacts to air quality, greenhouse gases; noise; public service and recreation, and utilities would be substantially lessened. Thus, only the No Reserve alternative arguably qualifies as part of the reasonable range of alternatives as defined by CEQA Guidelines 15126.6.

As discussed above, while the alternatives discussion identifies some impacts as less, only the discussion of the No Reserve Alternative identifies impacts as being substantially lessened. Thus, two of the alternatives do not meet the requirements of section 15125(a) that provide for a reasonable range of alternatives that avoid or substantially a project's significant impacts. As a result, the DEIR contains only a single alternative to the proposed Project. Given the size and scope of the proposed Project this does not constitute a reasonable range of alternatives as required by CEQA.

E. AGRICULTURAL RESOURCES

Mitigation Measure 3.2-2 provides for the preparation of a “Plan for Agricultural Preservation”, which shall include information such as the Project’s direct and indirect impacts to agricultural resources, the availability of other lands in the City of Riverbank’s existing boundaries, and relevant General Plan Policies. The Plan shall also specify the method or strategy proposed to minimize the loss of agricultural lands.” (DEIR 3-2.20.) Even though the DEIR finds that that impacts to agricultural resources to be significant and unavoidable, the agency is still required to provide feasible mitigation measures that serve to reduce the proposed Project’s impacts to agricultural resources. Mitigation Measure 3.2-2, however, constitutes an impermissible deferral of development of mitigation measures, as it fails to provide specific performance criteria to ensure that the measures, as implemented, will be effective. (*See, e.g.,* CEQA Guidelines § 15126.4(a)(1)(b); *Communities for a Better Environment, supra*, 184 Cal.App.4th at 92; *San Joaquin Raptor Rescue Center, supra*, 149 Cal.App.4th at 670.)

F. AESTHETIC AND VISUAL RESOURCES

General Plan “Policy CONS-7.6 requires lighting to be designed to avoid glare, prevent light spillage on adjacent properties, and avoid light pollution that would contribute light to the nighttime sky.” (DEIR 3.1-10.) The DEIR states “Lighting and Glare impacts may also be present from building materials used throughout the Project area. The Specific Plan Design Guidelines establishes a mix of residential building materials and discourages the use of materials that may create glare beyond the project area. Specifically, building materials that could create glare conditions beyond the project site are strongly discouraged.” (DEIR at 3.1-10.) The DEIR goes on to conclude that the potential impacts for light and glare are less than significant. (*Id.*) The Specific Plan Design Guidelines, however, only discourages the use of materials. If the materials, however, are used, then the DEIR does not address whether the glare impacts would be significant. As the use of the materials is not prohibited, the DEIR cannot determine that the impacts would be less than significant.

The DEIR states that the lighting plan would be designed to minimize light spillage onto adjacent properties to the greatest extent possible. (DEIR at 3.1-10.) Reliance on “to the greatest extent possible” does not quantify the potential impact from the lighting. The DEIR lacks performance criteria to ensure that the impact is less than significant.

G. BIOLOGICAL RESOURCES

Central Valley Concerned Citizens joins and incorporates the comments on Biological Resources in the comment letter by Soluri Meserve submitted on behalf of Annabel Gammon and Dr. J. Allen Gammon. Additionally Central Valley Concerned Citizens joins in the comment letter by Dr. Shawn Smallwood regarding the DEIR’s failure to adequately discuss, disclose and analyze the proposed Project’s impacts to biological resources.

In addition to the comments submitted by Soluri Meserve and Dr. Smallwood, Central Valley Concerned Citizens provide the following comments regarding biological resources.

The California Department of Fish and Wildlife (“CDFW”) has established Botanic Survey and Reporting Standards (CDFW Protocols).¹ DeNovo claims that they followed these standards. (DEIR at 3.4-1.) DeNovo's discussion of the surveys begins with Impact 3.4-5. (DEIR at 3.4-53.) A review of that discussion along with a review of the CDFW Protocols demonstrates that DeNovo did not follow CDFW Protocols.

Special Status Plants: DeNovo considered only California Rare Plant Rank (CRPR) 1 and 2 plants. The Protocols also mention CRPR 3 and 4 plants and the bullet-point that follows regarding locally rare plants. (See CDFW Protocols at Section 1, p. 3.)

Sensitive Natural Communities: CDFW Protocols recommend the surveyor consult the Classification and Mapping Program (VegCAMP) website. DeNovo, however, relied on the California Natural Diversity Database (CNDDB) and CalFire's FRAP data. DeNovo's rare plant communities search returns no communities relevant to Berghill parcels- Veg CAMP returns Valley Oak alliance, a California recognized rare alliance. (See CDFW Protocols at Section 2, p. 5.)

Survey Extent- CDFW Protocols state that botanical field surveys should be comprehensive over the entire project area, including areas that will be directly or indirectly impacted by the project. DeNovo, however, only surveyed the River Walk Specific Plan parcels owned by Berghill, and failed to conduct comprehensive surveys over the entire project area.. (*Id.*)

Negative Surveys: Special Status Plant and Sensitive Natural Community Observations. (*Id.* section 3 at pp. 7- 8.) DeNovo provided little of the information described in the CDFW Protocols.

Botanical Survey Reports: De Novo provides little to none of the information outlined in the CDFW Protocols. (See *Id.* at pp. 9-10.)

DeNovo's failure to follow the Protocols is important because it affects the impact assessment prepared for the DEIR. In the case of the Valley Oak alliance, DeNovo ignores the impacts entry roads construction will have on this sensitive alliance- the roads will break up the alliance, perhaps to the extent that the alliance loses ecological function.

In the case of other plant-related impacts, DeNovo's non-protocol surveys do not support the impact assessment. DeNovo uses the Bluff and Riparian area set-asides in defense of their

¹ CDFW's protocols are located at <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=18959&inline>

limited-coverage surveys. This argument is not valid. DeNovo failed to consider the operational impact of the project on the set-asides. 2000 dwelling units and a commercial area will introduce many stressors that did not exist with the farming operation.

Letter of Map Revision (LOMR) with the Federal Emergency Management Agency (“FEMA”). The LOMR is mentioned as a mechanism to allow floodplain occupancy. DeNovo, however, fails to describe the LOMR process² Guidance for Flood Risk Analysis and Mapping: MT-2 Requests at pp. 27-29 [process levee-protected areas is discussed.]

H. GREENHOUSE GASES, CLIMATE CHANGE AND ENERGY

After analyzing the various plans, policies for the purpose of reducing the emissions of greenhouse gases, the DEIR finds that the Project implementation could conflict with the State’s long-term climate goals of reducing Vehicle Miles Travelled (“VMT”). (DEIR 3.7-31 to 3.3-39.) To this end, the DEIR finds that the impact related to the consistency with the Scoping Plan is significant and unavoidable. (DEIR 3.7-39.) The DEIR, however, provides no discussion as to whether there are feasible mitigation measures to lessen the environmental impacts of increased VMT. Furthermore, the DEIR makes no determination that there are no feasible mitigation measures that would avoid or lessen the impact. (CEQA Guidelines, § 15091(f).)

The DEIR fails to comply with the requirements of CEQA Guidelines, § 15126.4(c) which provides:

Mitigation Measures Related to Greenhouse Gas Emissions. Consistent with section 15126.4(a), lead agencies shall consider feasible means, supported by substantial evidence and subject to monitoring or reporting, of mitigating the significant effects of greenhouse gas emissions. Measures to mitigate the significant effects of greenhouse gas emissions may include, among others:

- (1) Measures in an existing plan or mitigation program for the reduction of emissions that are required as part of the lead agency’s decision;
- (2) Reductions in emissions resulting from a project through implementation of project features, project design, or other measures, such as those described in Appendix F;
- (3) Off-site measures, including offsets that are not otherwise required, to mitigate a project’s emissions;
- (4) Measures that sequester greenhouse gases;
- (5) In the case of the adoption of a plan, such as a general plan, long range development plan, or plans for the reduction of greenhouse gas emissions, mitigation may include the identification of specific measures that may be implemented on a project-by-project basis. Mitigation may also include the

² See <https://www.fema.gov/flood-maps/change-your-flood-zone/lomr-clomr>

incorporation of specific measures or policies found in an adopted ordinance or regulation that reduces the cumulative effect of emissions.

Mitigation Measure 3.7-2 fails to meet the requirements of section 15126.4(c). MM 3.7-2 provides no operational or performance criteria to determine if the targets in the plans are being achieved. “Generally, courts uphold mitigation measures against attacks based on their alleged inadequacy where substantial evidence supports the approving agency’s conclusion that the measure will be effective. (*Sacramento Old City Assn. v. City Council* (1991) 229 Cal.App.3d 1011, 1027.) However, [a court] will not defer to the agency’s determination where the measure’s efficacy is not apparent and there is no evidence in the record showing it will be effective in remedying the identified environmental impact. (See *Sierra Club v. County of San Diego* (2014) 231 Cal.App.4th 1152, 1167-1170 [county violated CEQA by adopting a climate action plan that did not ensure greenhouse gas emission requirements would be met as mitigation measure required it to do].) (*League To Save Lake Tahoe v. County of Placer* 2022) 75 Cal.App.5th 63, 120-21.)

Nothing in MM 3.7-2 for construction emissions or operational emissions provides for reporting and monitoring of GHG emissions. Nor does the mitigation measure identify the targets that are to be met by the mitigation measures. As a result, the mitigation measure defers determining the significance of the impact and establishing appropriate mitigation to an undisclosed time in the future. (See, e.g., CEQA Guidelines § 15126.4(a)(1)(b); *Communities for a Better Environment, supra*, 184 Cal.App.4th at 92; *San Joaquin Raptor Rescue Center, supra*, 149 Cal.App.4th at 670.)

I. Hydrology and Water Quality

Central Valley Concerned Citizens incorporates the comments on Water Quality impacts submitted by Soluri Meserve. In addition to those comments Central Valley Concerned Citizens add the following comments.

As the project will be converting agricultural land into streets and parking lots, the DEIR fails to adequately address the run-off from these hard surfaces. Recent studies have linked stormwater runoff from these surfaces as being toxic to fish. “Vehicle tires contain the chemical known as 6PPD to prevent tires from breaking down due to reactions with ozone and other reactive oxygen species in the air. When 6PPD reacts with ozone in the air, it forms 6PPD-quinone. Tires wear down through contact with roads, releasing particles into the environment. When it rains, stormwater from hard surfaces like parking lots and streets washes these particles into streams and other water bodies. As a result, 6PPD-quinone may be present and aquatic organisms can be exposed to it.” (United States Environmental Protection Agency, *6PPD-quinone; What is 6PPD-quinone?*, [https://www.epa.gov/chemical-research/6ppd-quinone.](https://www.epa.gov/chemical-research/6ppd-quinone))

“Available information on 6PPD-quinone indicates that it is toxic enough to quickly kill some fish. A 2021 publication in the journal *Science* linked coho salmon death to 6PPD-quinone in stormwater. Concentrations in stormwater were found to be lethal for coho salmon following exposures lasting only a few hours. Subsequent work identified some other fish species as

vulnerable to 6PPD-quinone.” (*Id.*) A report from the California Department of Toxic Substances states “6PPD is toxic to many aquatic organisms throughout the food chain and can impair wildlife survival. 6PPD-quinone, a reaction product of 6PPD, is acutely toxic to coho salmon and kills fish within a few hours after exposure. While little is known about the effect of 6PPD-quinone on other organisms, 6PPD-quinone is also acutely lethal to other, related fish species found in California, including brook trout, steelhead/rainbow trout, and, to a much lesser degree, Chinook salmon.” (*Adopted Priority Product: Motor Vehicle Tires Containing 6PPD*, https://dtsc.ca.gov/scp/motor_vehicle_tires_containing_6ppd/.)

Given that the proposed Project is located adjacent to the Stanislaus River and it will be discharging stormwater into the river. The DEIR, however, makes no reference to the impact of 6PPD on aquatic species.

J. LAND USE: THE DEIR FAILS TO ADEQUATELY ANALYZE AND DISCLOSE LAND USE IMPACTS.

The DEIR failed to disclose and evaluate the full range of land use impacts that will result from the Project. The Project is inconsistent with the City General Plan, and the proposed Project annexation is also fatally at odds with the requirements of the Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000 (“CKH”) and the policies of the Stanislaus Local Agency Formation Commission (“LAFCo”).

A lead agency under CEQA must consider whether the project would “conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over a project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.” (CEQA Guidelines, Appendix G.)

In this case, the DEIR fails to adequately disclose and analyze the conflict between the Project and the City of Riverbank 2009 General Plan Update, as amended (“GPU”), particularly the direct conflict with the GPU Sustainable Agricultural Strategy. The Project is also directly at odds with the policies and regulations of the LAFCo, which is a responsible agency that will be the final decisionmaker with respect to the proposed SOI expansion and annexation.

Chapter 3.10 includes a discussion of “Impact 3.10-2: The proposed project would not conflict with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project adopted to avoid or mitigate an environmental effect,” concluding that the impact is “less than significant.” (DEIR, p. 3.10-17.) In considering this impact, the DEIR references general discussion in the GPU, but *no specific policies*. The DEIR also asserts that the City has considerable latitude in finding a project to be consistent with the GPU. The discussion provides more detail with respect to the applicable LAFCo policies, and then, also without any discussion of the factual basis for its conclusion, the DEIR states that the Project is consistent with the LAFCo requirements because impacts to agriculture will be mitigated “to the extent feasible.”

The City may not gloss over the direct conflicts with the City's GPU, Sustainable Agricultural Strategy, and the requirements of CKH and LAFCo policy by pointing to mitigation measures for impacts to agriculture. The City must disclose and analyze the conflicts with the GPU (Gov. Code § 65454, no specific plan may be adopted or amended unless it is consistent with the general plan), and the requirements and policies of CKH and the LAFCo are not designed simply to require mitigation for impacts to agriculture, they are designed to direct development away from prime agricultural lands and encourage development of existing vacant or nonprime agricultural lands for urban uses within the existing jurisdiction of a local agency or within the SOI of a local agency. (Govt. Code § 56377.)

The DEIR includes a lengthy chapter regarding land use impacts, but it consists of a recitation of unspecified "key land use issues and development concepts" of the GPU and the applicable LAFCo policies, followed by a vague conclusion bereft of any facts that the Project is "consistent" with all of these things. This falls far short of what is required by CEQA.

1. INCONSISTENCY WITH GENERAL PLAN.

Without discussing a single policy from the GPU that relates to protecting prime agricultural land from conversion to urban uses, the DEIR states that "City staff has concluded that the Project is consistent with the key land use issues and development concepts of the General Plan," referring to a vague list of aspirational ideas about "growth". (DEIR, p. 3.10-19.) Despite this glowing conclusion short on facts, the Project is inconsistent with clear, mandatory policies of the GPU.

The City asserts in the DEIR that its determination that the Project is consistent with the GPU "carries a strong presumption of regulatory," but this claim is not compelling in the face of a Specific Plan proposal that would strip 520 acres of the protective Agricultural Conservation Area designation that was at the heart of the GPU goals and policies and the City's Sustainable Agricultural Strategy. The GPU EIR discussed the primacy of the goals and policies designed to protect and promote agriculture. In response to LAFCo comments on the NOP for the GPU, the City stated as follows:

The City, as established in the draft General Plan, shares this goal of protecting and promoting agriculture, both the land resources on which agriculture is based, as well as promoting agriculture as a fundamental economic practice in the San Joaquin Valley. (GPU EIR, p. 2-2.)

In 2016 the City prepared and adopted its Sustainable Agricultural Strategy ("SAS"), required by LAFCo as part of its application for in expansion of the City's SOI. "The Plan identified many of the City's current General Plan policies, *including Agricultural Resource Conservation Areas covering 1,300 acres west of the City*, use of agricultural buffers, and overall policies related to infill development prior to consideration of additional annexation areas." (Stanislaus LAFCO NOP comments, p. 3, emphasis added.) The current proposal, LAFCO pointed out, "would remove the Agricultural Resource Conservation designation in the project area and represents a significant shift in General Plan policies, the impacts of which will

need to be fully discussed and considered.” (*Ibid.*) The DEIR fails to address the impacts of abandoning significant elements of the City’s SAS to allow for a Project that is in direct conflict with the stated purpose of protecting prime agricultural lands, particularly west of the City. (Sustainable Agricultural Strategy, pp. 4-5.)³

The SAS described the effects of the 2016 SOI expansion, noting that the expansion increased the City’s SOI Primary Area by 758 acres, and within the expansion area, build-out would accommodate an increased population of 8,476 persons. (SAS, p. 12.) In 2019, the City annexed 400 acres for a specific plan known as Crossroads West. The Crossroads West project included the proposed development of over 2,000 residential units. Some development has occurred in the Crossroads West annexation area, but there is no indication in the DEIR that the project is anywhere near “50% built” as required by the 2014 amendment to the City General Plan. (Resolution No. 2014-011, General Plan Amendment, Exhibit A, p. 2, item 11.) The 2014 amendment to the GPU includes a *mandatory* policy that the City “shall consider the progress made for previous annexations/plan areas when considering and allowing for new annexation/plan areas.” The DEIR does not include any discussion of the progress of previous annexation area development, including for Crossroads West. In fact, the DEIR also fails to include Crossroads West in the cumulative impacts analysis.

The GPU states that the City will promote infill development and a compact urban form. (*Id.*) The Project does exactly the opposite of protecting farmland and promoting infill development and a compact urban form. The Project does all the following, in conflict with the GPU:

- Directs development to the prime agricultural area that the GPU stated would be protected from urban encroachment. (Policy CONS-3.2.)
- Strips away protective land use designations from 650 acres of prime agricultural land and open space. (Policy CONS-3.2 and SAS.)
- Proposes annexation to “accommodate” 2,432 residential dwelling units despite the fact that land uses designated in the existing General Plan would accommodate 4,702 dwelling units, and if the existing SOI was developed, it would add 2,176 units (DEIR, p. 3.10-19, and SAS, p. 12), in direct violation of the GPU policy stating that the City will develop underutilized land within the City before entertaining any annexation. (Policy LAND-1.2.)
- Proposes annexation where there has been no showing that the previously annexed area is at 50% buildout as required by the 2014 amendment to the GPU. (Resolution No. 2014-011, General Plan Amendment, Exhibit A, p. 2, item 11.)

³ We request that the CEQA review documentation for the 2016 SOI expansion be included in the administrative record of proceedings for the Project.

The Project is inconsistent with the GPU and with the GPU EIR that was relied upon by the City to approve the GPU.⁴

2. THE PROJECT IS INCONSISTENT WITH CKH AND LAFCO POLICIES.

The California State Legislature has tasked LAFCo's with guiding development in each county by regulating the boundary changes of cities and districts and "discouraging urban sprawl, preserving open-space and prime agricultural lands, encouraging the efficient provision of government services, and encouraging the orderly formation and development of local agencies." (Gov. Code § 56301.)

Of considerable concern to the LAFCo, the Project would result in the permanent conversion of approximately 660 acres of Prime Farmland, plus an additional 165.80 acres of land designated as Farmland of Statewide Importance by the state. (DEIR, p. 3.10-29.) The Project will strip protection from all the land in the SOI expansion area currently designated as Agricultural Resource Conservation Area. (DEIR, Table 3.10-5, p. 3.10-20.) The expansion area also includes nine parcels under Williamson Act contracts. (DEIR, p. 3.10-29.)

Stanislaus LAFCO specifically requested the City include in the DEIR a discussion of the following:

- Amendment proposals involving Sphere expansion which contain prime agricultural land will not be approved by LAFCO if there is sufficient alternative land available for annexation within the existing Sphere of Influence. The City's analysis should identify undeveloped areas already within the City limits and Sphere of Influence that could be developed with similar uses.
- Territory not in need of urban services, including open space, agriculture, non-protested, or protested and not upheld Williamson Act contracted lands, shall not be assigned to an agency's sphere of influence, unless the area's exclusion would impede the planned orderly and efficient development of this area.
- Sphere of influence boundaries shall, to the extent possible, maintain a separation between existing communities to protect open space and agricultural lands and the identity of an individual community. (Stanislaus LAFCO NOP comments, p. 2.)
- existing communities to protect open space and agricultural lands and the identity of an individual community.

The DEIR failed to include adequate discussion of the topics requested by LAFCo. Despite the statement from LAFCo that SOI expansion into prime agricultural lands "will not"

⁴ We request that the GPU EIR, the GPU, the 2014 GPU amendment, and all relevant staff reports be included in the administrative record of proceedings for the Project.

be approved if there is sufficient land available within the existing SOI, the DEIR makes only the following statement:

The Riverbank Housing Element identifies development potential within the city limit (1,870 units) and 4,842 units within the SOI. These units may include developable areas on prime farmlands, but exclude lands with Williamson act contracts. However, it should be noted that development opportunities throughout the city limits and SOI do not provide for contiguous parcels that provide opportunities for large areas of master planned development similar to that proposed by the Specific Plan.(DEIR, p. 3.10-30.)

The City may not ignore the LAFCo policy that SOI expansions into prime agricultural lands will not be approved where sufficient undeveloped land within the existing City boundary and SOI could be developed with *similar* uses simply because the City enjoys the idea of “large areas of master planned development.” There is no exception in the law for such a preference.

With respect to the prohibition against assigning area under Williamson Act contracts to an SOI expansion unless it would impede orderly development, the City simply misunderstands the policy. Rather than explaining why the agricultural lands protected by Williamson Act contracts must be included in the SOI expansion despite important LAFCo policies, the City provides an explanation of how the farmland protection can easily be stripped from the parcels for ease of development. The DEIR states that the landowners under Williamson Act contracts may: “[1] file a notice of nonrenewal and wait nine years for the contract to expire, [2] cancel with the payment of fees equal to 12.5% of the property value, or [3] complete an agricultural easement exchange.” (DEIR, p. 3.10-29.) To complete the showing that the City misapprehends the purpose of LAFCo’s and the point of the policy, the DEIR concludes, “[a] proper cancellation and/or agricultural easement exchange would ensure that there is no conflict with a Williamson Act contract.” (DEIR, p. 3.10-30.) The Project is, in fact, in direct conflict with policies requiring that SOI boundaries should not be extended to include Williamson Act protected lands unless it is absolutely required for orderly development.

The last area of discussion requested by LAFCo involved the LAFCo policy to retain separation between communities. The concern raised by LAFCo is that, “[i]f both the City and County’s plans were developed to their extents, no separation of communities or agricultural land would remain ... in this area of Stanislaus County.” (Stanislaus LAFCo NOP comments, p. 2.) The DEIR does not include discussion as requested by the LAFCo. There is discussion in the DEIR attempting to downplay the fact that the proposed SOI expansion would create an unacceptable “island” under Government Code section 56744 and Stanislaus LAFCo General Powers and Policy Guidelines, Policy 20, but there is no discussion of the improper lack of separation between communities. The Project is inconsistent with LAFCo policies because it will result in a lack of separation between communities.

The DEIR describes the LAFCo process and omits critical aspects of the SOI expansion and annexation application requirements. (DEIR, p. 3.10-24.) The City’s description of events simply states that environmental review will be completed and the LAFCo Executive Officer (“EO”) will draft findings and present to the LAFCo for approval. (*Id.*) The City ignores the

LAFCo requirement that the Municipal Services Review (“MSR”) must be updated prior to application for annexation (Govt. Code §§ 56425 and 56430), and omits any mention of the specific requests from the EO for updates to the water and sewer master plans. (Stanislaus LAFCo NOP comments, p. 3.)

The Project is inconsistent with nearly every applicable LAFCo policy regarding agricultural lands, and the DEIR failed to address these conflicts. The overarching policy that will be applied by the LAFCo at the time it considers the SOI expansion and annexation is that “boundary changes for urban development should only be proposed, evaluated, and approved in a manner which, to the fullest extent feasible, is consistent with the continuing growth and vitality of agriculture within the County.” (Stanislaus LAFCo General Powers and Policy Guidelines, Policy 22.) The DEIR does not analyze or discuss the critical issues that will be needed to support any LAFCo findings regarding the Project’s consistency with LAFCo policy and/or CKH.

K. TRANSPORTATION AND CIRCULATION

The DEIR states that because there are no reliable forecasts for the City of Riverbank or Stanislaus County available, it is not possible to determine whether the Specific Plan’s residences will generate VMT per capita rate that is 15 percent below the current area average, as required under the OPR recommendation. (DEIR at 3.13-22.) The DEIR then states that since there are no forecasts it must be presumed that the VMT impact of the proposed residences is potentially significant. (DEIR at 3.13-22.) The DEIR, however, makes no effort provide the scope of the impact. The City, however, failed to conduct any studies or investigation to forecast residential development to determine how much more VMT the project will generate above the VMT per capita rate. (DEIR at 3.13-22.) As the reliable forecasts are not available the City should have done the studies/investigation necessary to determine the forecasts. (*See Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 311; *Save the Agoura Cornell v. City of Agoura Hills* (2020) 46 Cal.App.5th 665, 674.) The lack of study fails to inform the public and decisionmakers the percentage below the per capita rate.

The DEIR also states that not all individual VMT reduction measures may be applicable, but fails to provide any discussion on which ones may not be applicable. Whether a VMT reduction measure is applicable is a determination that must be made in the EIR process. Not left for some future determination. If the mitigation measures are applicable then the DEIR should so state. If they are not applicable or feasible, then the DEIR should so state. Otherwise the DEIR is just a list of mitigation measures that may or not be implemented. CEQA requires that the mitigation measures be enforceable. (CEQA Guidelines, § 15126.4(a)(2).) If the DEIR states that the mitigation measure, or a component of a mitigation measure may not be applicable, then how can it be enforced through permit conditions, agreements or other legally binding instruments? (*Id.*)

The DEIR's discussion of Mitigation Measure 3.13-2 states "though not all individual VMT reduction measures may be applicable, Mitigation Measure 3.13-2 is considered generally feasible" but fails to state what VMT reductions may not be applicable.

Mitigation Measure 3.13-3 states that the Project applicant shall contribute its pro-rata fair share to the cost of improvement to McHenry Avenue/Load Road/Patterson Road intersection. The DEIR, however, fails to provide an estimate of what constitutes a pro-rata fair share and how that is determined.

L. CUMULATIVE IMPACTS

CEQA requires that an EIR discuss a cumulative impact if the project's incremental effect combined with the effects of other projects is "cumulatively considerable." (CEQA Guidelines, § 15130(a).) The cumulative impact analysis is based upon an assessment of the project's incremental effects "viewed in connection with the effects of past projects, the effect of other current projects, and the effects of probable future projects." (CEQA Guidelines, § 15065(a)(3); *Banning Ranch Conservancy v. City of Newport* (2012) 211 Cal.App.4th 1209, 1228, CEQA Guidelines, § 15355(b).) Without the cumulative analysis, piecemeal approval of several projects with impacts could lead to severe environmental harm. (*Golden Door Properties, LLC. v. San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 720.)

The DEIR relies upon the list-of-project methods for the cumulative impact analysis. (DEIR at 4.0-2 to 4.0-3.) The DEIR, however, relies upon a narrow list of projects that are limited to projects within the City of Riverbank. (DEIR at 4.0-2.) It should be noted that the proposed Project is not currently within the City of Riverbank and if and when it is annexed it will be adjacent land within the County's jurisdiction. When an EIR relies upon the list method, CEQA Guidelines section 15130(b) does not limit the list to project's within the control of the agency. Section 15130(b)(1)(A) requires a list of past, present, and probable future projects producing related or cumulative impacts, *including, if necessary, those projects outside the control of the agency. . . .* (Emphasis added.)

The DEIR's cumulative analysis fails to address a project within the City – the Crossroads West Project. Crossroads West is a 1,500 acre project and began issuing building permits in 2002. The DEIR's cumulative impact analysis also fails to address nearby project's outside the City. Those projects include the Kaiser Hospital on Dale Road and Kiernan Avenue; Gregory High School on Dale Road and Pirrone Road; Holy Catholic Church on Tully Avenue and Bangs Avenue; the Hindu Church on Tully Road and Kiernan Avenue; Costco Warehouse on Kiernan Avenue and Oakdale Road. Given the DEIR failure to include these Projects the DEIR fails to meet CEQA's requirement to consider the Project's cumulative impacts.

M. CONCLUSION

The above comments, as well as the comments submitted by Soluri Meserve, Dr. Smallwood and others, demonstrate the DEIR's significant legal inadequacies. As such, the City

Mr. Miguel Galvez
May 16, 2024
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must make the necessary corrections and recirculate the DEIR in order to bring the document into compliance with CEQA's requirements. Failure to do so would constitute a prejudicial abuse of discretion and be contrary to law.

Sincerely,

A handwritten signature in blue ink, appearing to read "Donald B. Mooney". The signature is fluid and cursive, with a large loop at the end.

Donald B. Mooney
Attorney for Central Valley
Concerned Citizens

cc: Client

Miguel Galvez

From: vivian-lopez@sbcglobal.net
Sent: Thursday, May 16, 2024 3:19 PM
To: River Walk
Subject: River Walk Public Comments

5-16-2024

City of Riverbank
Attn: Miguel Galvez, Contract City Planner
6617 Third Street
Riverbank, CA 95367

Re: River Walk Specific Plan/Draft Environmental Impact Report

Dear Mr. Galvez

I am writing to comment on the proposed River Walk Plan Project.

I attended the City Council meeting on 2-27-2024 at the Community Center. I appreciate the City moving the meeting to the larger space. And recording the Power point presentation.

I'm concerned with many different aspects of the project;

Entering & exiting the housing/community buildings

Extreme massive amount of houses and units

Homes/units not being affordable

Cost for Fire, Police, water supply and wastewater treatment plant

Loss of Prime Ag land

Homes being in a flood zone area

The City of Riverbank has more than ample pre-approved, land area which is available to construct thousands of new homes based on acres added to its Sphere of Influence in 2016. This project is not needed.

Sincerely,

Vivian Lopez

6024 Roselle Ave

Riverbank, CA

Vivian-lopez@sbcglobal.net

Miguel Galvez

From: Garry Pearson <garrypearson@sbcglobal.net>
Sent: Thursday, May 16, 2024 4:00 PM
To: River Walk
Subject: Contact details for Garry Pearson

Miguel,
Good afternoon, great to chat with you this morning!

I left off my home address details for the dEIR for the Riverwalk project at 10:30 am this morning

contact details

Garry Pearson
2209 Cedarwood Circle
Riverbank, Ca 95367

I live in District 3 in the City of Riverbank
Phone number is 530-681-6577

best regards

Garry