Appendix F. Native American Correspondence

F1. Native American Correspondence (U.S. Army Corps of Engineers)

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

Environmental Resources Branch

SEP 0 2 2016

Ms. Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95896

Dear Ms. Polanco:

The U.S. Army Corps of Engineers, Sacramento District (Corps) is writing you to relay the project description and initiate consultation on the Area of Potential Effects (APE) for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California (Project). The local proponent, the California Department of Water Resources (DWR), has requested permission from the Corps under Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 408) and Section 404 of the Clean Water Act of 1977 (33 U.S.C. § 1344). Both of these permissions are Federal undertakings which require compliance with Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108). The APEs for both permit actions are the same, so the Corps compliance process will deal with both permit actions simultaneously; any reference to the Project APE should be interpreted as including both elements.

DWR proposes to improve flood management facilities in the Lower Elkhorn Basin and Sacramento Bypass areas of the flood system in Yolo County, just north of the existing Sacramento Bypass and Weir. The Project consists primarily of partial or complete removal of an "L"-shaped section of the existing Lower Elkhorn Basin East Levee from Interstate 5 to the Sacramento Bypass and the Sacramento Bypass North Levee from the Weir to its intersection with the Lower Elkhorn Basin East Levee; and construction of a new "L"-shaped setback levee northeast of the existing levee segments mentioned above. In sum, Project components include the following:

- Existing levee removal; to entail levee breaching, degrading, complete removal, and/ or partial removal
- Setback levee construction; to entail site grading, installation of cut-off walls up to 85 feet deep, and/or construction of seepage berms laterally along the landside (east side) of setback levee up to 300 feet in width
- Utility removal and/or relocation
- Vegetation removal and clearing
- Grading existing roads and hauling the debris off-site for disposal
- Grading and use of staging areas (locations to be determined)
- Acquisition of fill material for levee construction
- Grading and use of borrow sites
- Installation of relief wells and associated conduit connections
- Intermittent inundation during Project operation of the area between the existing levees and new setback levees

Widening of the Sacramento Bypass is also a recommended feature of the American River Common Features General Reevaluation Report (GRR), for which a general reevaluation was completed in 2016, although it is not yet congressionally authorized. The proposed Project is not intended to duplicate this recommended feature, rather it offers our partner, DWR, an alternative means to construct this key feature should the American River Common Features GRR not be authorized prior to possible permission under Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 408).

All construction activities described above will take place within the proposed APE (Enclosure), although the exact levee alignments and other locations of project activities have not been determined within that space. The APE encompasses approximately 2,003 acres (Grays Bend, CA USGS 7.5" Topographic Quadrangle, Unsectioned lands in T 9 N, R 3 E and T 10 N, R 3 E; Taylor Monument, CA USGS 7.5" Topographic Quadrangle, Unsectioned lands in T 9 N, R 3 E; Sacramento West, CA USGS 7.5" Topographic Quadrangle, Unsectioned lands in T 9 N, R 3 E and T 9 N, R 4 E). Should the location of any Project activities change to include areas outside this initial delineation of the APE, the Corps will notify all parties and continue consultation accordingly.

Inventory efforts are expected to include consultation with interested tribes, pedestrian surface survey, subsurface investigations through trenching or other means due to the potential for buried sites within the alluvial sediments of the Sacramento River floodplain. The results of the inventory efforts will be presented in a forthcoming technical report.

At this time, we are seeking your comments on the Project APE designation. Comments and questions may be sent to Attn: Ms. Geneva Kraus, U.S. Army Corps of Engineers, CESPK-PD-RC, 1325 J Street, Sacramento, CA 95814. Ms. Kraus can also be reached at (916) 557-7447 or by email at Geneva.Kraus@usace.army.mil.

Sincerely,

Mark T. Ziminske
Chief, Environmental Resources Branch

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

Environmental Resources Branch

SEP 0 2 2016

Charlie Wright
Chairperson
Cortina Band of Indians
P.O. Box 1630
Williams, CA 95987

Dear Mr. Wright:

The U.S. Army Corps of Engineers, Sacramento District (Corps) is writing you to relay the project description and initiate consultation on the Area of Potential Effects (APE) for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California (Project). The local proponent, the California Department of Water Resources (DWR), has requested permission from the Corps under Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 408) and Section 404 of the Clean Water Act of 1977 (33 U.S.C. § 1344). Both of these permissions are Federal undertakings which require compliance with Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108). The APEs for both permit actions are the same, so the Corps compliance process will deal with both permit actions simultaneously; any reference to the Project APE should be interpreted as including both elements. Additional state requirements, such as those under the California Environmental Quality Act and Assembly Bill 52, are the responsibility of DWR, from whom you will receive further documentation.

DWR proposes to improve flood management facilities in the Lower Elkhorn Basin and Sacramento Bypass areas of the flood system in Yolo County, just north of the existing Sacramento Bypass and Weir. The Project consists primarily of partial or complete removal of an "L"-shaped section of the existing Lower Elkhorn Basin East Levee from Interstate 5 to the Sacramento Bypass and the Sacramento Bypass North Levee from the Weir to its intersection with the Lower Elkhorn Basin East Levee; and construction of a new "L"-shaped setback levee northeast of the existing levees mentioned above. In sum, Project components include the following:

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All construction activities described above will take place within the proposed APE (Enclosure), although the exact levee alignments and other locations of project activities have not been cemented. The APE encompasses approximately 2,003 acres (Grays Bend, CA USGS 7.5" Series Topographic Quadrangle, Unsectioned lands in T 9 N, R 3 E and T 10 N, R 3 E; Taylor Monument, CA USGS 7.5" Series Topographic Quadrangle, Unsectioned lands in T 9 N, R 3 E; Sacramento West, CA USGS 7.5" Series Topographic Quadrangle, Unsectioned lands in T 9 N, R 3 E and T 9 N, R 4 E). Should the location of any Project activities change to include areas outside this initial delineation of the APE, the Corps will notify all parties and continue consultation accordingly.

Inventory efforts are expected to include pedestrian surface survey as well as subsurface investigations through trenching due to the potential for buried sites within the alluvial sediments of the Sacramento River floodplain. Proposed trenches will be located throughout the APE to best identify the presence or absence of subsurface archaeological deposits. A plan for carrying out this geoarchaeological work will be forthcoming and transmitted to you for review and comment.

At this time, we request that you please notify us if you are aware of any cultural resources or properties in the area that we should take into consideration during this permit action. We would like to work with you to identify any concerns you have about the project. If you know the locations of archaeological sites or traditional cultural properties in or near the APE, we request that you share that information with us within 30 days. In addition, we are seeking your comments on the Project APE designation. Comments and questions may be sent to Attn: Ms. Geneva Kraus, U.S. Army Corps of Engineers, CESPK-PD-RC, 1325 J Street, Sacramento, CA 95814. Ms. Kraus can also be reached at (916) 557-7447 or by email at Geneva.Kraus@usace.army.mil.

Sincerely,

Mark T. Ziminske
Chief, Environmental Resources Branch

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

Environmental Resources Branch

SEP 0 2 2016

Gene Whitehouse
Chairperson
United Auburn Indian Community of the Auburn Rancheria
10720 Indian Hill Road
Auburn, CA 95603

Dear Mr. Whitehouse:

The U.S. Army Corps of Engineers, Sacramento District (Corps) is writing you to relay the project description and initiate consultation on the Area of Potential Effects (APE) for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California (Project). The local proponent, the California Department of Water Resources (DWR), has requested permission from the Corps under Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 408) and Section 404 of the Clean Water Act of 1977 (33 U.S.C. § 1344). Both of these permissions are Federal undertakings which require compliance with Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108). The APEs for both permit actions are the same, so the Corps compliance process will deal with both permit actions simultaneously; any reference to the Project APE should be interpreted as including both elements. Additional state requirements, such as those under the California Environmental Quality Act and Assembly Bill 52, are the responsibility of DWR, from whom you will receive further documentation.

DWR proposes to improve flood management facilities in the Lower Elkhorn Basin and Sacramento Bypass areas of the flood system in Yolo County, just north of the existing Sacramento Bypass and Weir. The Project consists primarily of partial or complete removal of an "L"-shaped section of the existing Lower Elkhorn Basin East Levee from Interstate 5 to the Sacramento Bypass and the Sacramento Bypass North Levee from the Weir to its intersection with the Lower Elkhorn Basin East Levee; and construction of a new "L"-shaped setback levee northeast of the existing levees mentioned above. In sum, Project components include the following:

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Inventory efforts are expected to include pedestrian surface survey as well as subsurface investigations through trenching due to the potential for buried sites within the alluvial sediments of the Sacramento River floodplain. Proposed trenches will be located throughout the APE to best identify the presence or absence of subsurface archaeological deposits. A plan for carrying out this geoarchaeological work will be forthcoming and transmitted to you for review and comment.

A copy of this letter furnished with enclosures will be sent to Mr. Marcos Guerrero, Tribal Preservation Committee, and Mr. Matthew Moore, Tribal Historic Preservation Officer, both of United Auburn Indian Community of the Auburn Rancheria, 10720 Indian Hill Road, Auburn, CA 95603.

At this time, we request that you please notify us if you are aware of any cultural resources or properties in the area that we should take into consideration during this permit action. We would like to work with you to identify any concerns you have about the project. If you know the locations of archaeological sites or traditional cultural properties in or near the APE, we request that you share that information with us within 30 days. In addition, we are seeking your comments on the Project APE designation. Comments and questions may be sent to Attn: Ms. Geneva Kraus, U.S. Army Corps of Engineers, CESPK-PD-RC, 1325 J Street, Sacramento, CA 95814. Ms. Kraus can also be reached at (916) 557-7447 or by email at Geneva.Kraus@usace.army.mil.

Sincerely,

Mark T. Ziminske
Chief, Environmental Resources Branch

Enclosure

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

Environmental Resources Branch

SEP 0 2 2016

Leland Kinter
Chairperson
Yocha Dehe Wintun Nation
P.O. Box 18
Brooks, CA 95606

Dear Mr. Kinter:

The U.S. Army Corps of Engineers, Sacramento District (Corps) is writing you to relay the project description and initiate consultation on the Area of Potential Effects (APE) for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California (Project). The local proponent, the California Department of Water Resources (DWR), has requested permission from the Corps under Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 408) and Section 404 of the Clean Water Act of 1977 (33 U.S.C. § 1344). Both of these permissions are Federal undertakings which require compliance with Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108). The APEs for both permit actions are the same, so the Corps compliance process will deal with both permit actions simultaneously; any reference to the Project APE should be interpreted as including both elements. Additional state requirements, such as those under the California Environmental Quality Act and Assembly Bill 52, are the responsibility of DWR, from whom you will receive further documentation.

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Inventory efforts are expected to include pedestrian surface survey as well as subsurface investigations through trenching due to the potential for buried sites within the alluvial sediments of the Sacramento River floodplain. Proposed trenches will be located throughout the APE to best identify the presence or absence of subsurface archaeological deposits. A plan for carrying out this geoarchaeological work will be forthcoming and transmitted to you for review and comment.

A copy of this letter furnished with enclosures will be sent to Mr. James Sarmento, Tribal Historic Preservation Officer, Yocha Dehe Wintun Nation, P.O. Box 18, Brooks, CA 95606.

At this time, we request that you please notify us if you are aware of any cultural resources or properties in the area that we should take into consideration during this permit action. We would like to work with you to identify any concerns you have about the project. If you know the locations of archaeological sites or traditional cultural properties in or near the APE, we request that you share that information with us within 30 days. In addition, we are seeking your comments on the Project APE designation. Comments and questions may be sent to Attn: Ms. Geneva Kraus, U.S. Army Corps of Engineers, CESPK-PD-RC, 1325 J Street, Sacramento, CA 95814. Ms. Kraus can also be reached at (916) 557-7447 or by email at Geneva.Kraus@usace.army.mil.

Sincerely,

Mark T. Ziminske
Chief, Environmental Resources Branch

Enclosure

Dunn, Hannah

From: Scott, Barry
Sent: Tuesday, January 17, 2017 11:10 AM
To: Dunn, Hannah
Subject: FW: USACE Lower Elkhorn Public Scoping Meeting Invite

-----Original Message-----
From: Amrhein, Rochelle@DWR [mailto:Rochelle.Amrhein@water.ca.gov]
Sent: Wednesday, September 14, 2016 9:16 AM
To: Brock, Lori@DWR <Lori.Brock@water.ca.gov>; Agustinez, Anecita S.@DWR <Anecita.Agustinez@water.ca.gov>; Scott, Barry <bscott@geiconsultants.com>
Cc: Nelson, Tim@DWR <Tim.Nelson@water.ca.gov>; Briggs, Kelly@DWR <Kelly.Briggs@water.ca.gov>
Subject: FW: USACE Lower Elkhorn Public Scoping Meeting Invite

UAIC is interested in meeting with us and with the Corps. They have proposed meeting on September 27, 29, or 30th.

Marcos sent the request to Monica Nolte; so, I will follow up with her (and Jackie).

Shelly

-----Original Message-----
From: Simmons, Zachary M SPK [mailto:Zachary.M.Simmons@usace.army.mil]
Sent: Wednesday, September 14, 2016 7:58 AM
To: Kraus, Geneva SPK
Cc: Griffin, S. Joe SPK; Bowers, Lee Ann SPK; Nolte, Monica L.@DWR; Amrhein, Rochelle@DWR
Subject: FW: USACE Lower Elkhorn Public Scoping Meeting Invite

Hi Geneva,

I just received this response from Marcos Guerrero at UAIC. I am available the 27th and 29th. Would you like to coordinate a meeting or should I do it?

I don't know if Monica is the correct cultural resources contact at DWR for the Lower Elkhorn project.

Zach

-----Original Message-----
From: Marcos Guerrero [mailto:mguerrero@auburnrancheria.com]
Sent: Wednesday, September 14, 2016 7:45 AM
To: Simmons, Zachary M SPK <Zachary.M.Simmons@usace.army.mil>
Cc: Nolte, Monica L.@DWR (Monica.Nolte@water.ca.gov) <Monica.Nolte@water.ca.gov>; Melodi McAdams <mmcadams@auburnrancheria.com>; Matthew Moore <mmoore@auburnrancheria.com>
Subject: [EXTERNAL] FW: USACE Lower Elkhorn Public Scoping Meeting Invite

Hello Mr. Simmons/Ms. Nolte,
Thank you for your invitation to the public meeting. The UAIC is interested in meeting with USACE and DWR regarding this project.

If any cultural resources records searches or studies have been completed to date can you please send those over.

We are available September 27, 29 and 30th. Please suggest a time, if either of you are available.
Thanks,
mg

-----Original Message-----
From: Kraus, Geneva SPK [mailto:Geneva.Kraus@usace.army.mil]
Sent: Monday, September 12, 2016 12:26 PM
To: Marcos Guerrero
Cc: Griffin, S. Joe SPK; Matthew Moore; Lee, Kevin C SPK
Subject: USACE Lower Elkhorn Public Scoping Meeting Invite

Good Afternoon Mr. Guerrero,

I would like to invite you, and any other interested members of United Auburn Indian Community, to attend the upcoming public scoping meeting for the Lower Elkhorn 408 project. The details below are taken directly from the public notice.

"The U.S. Army Corps of Engineers Sacramento District has posted Public Notice SPK-2016-00457 to Blockedwww.spk.usace.army.mil/Media/RegulatoryPublicNotices.aspx

A public scoping meeting will be held for the proposed Lower Elkhorn Basin Levee Setback Project, Yolo County, California. The purpose of the meeting is to present information to the public and to receive comments from the public on the project and the scope of the environmental analysis.

West Sacramento - Thursday, September 15, 2016, 4:00 to 7:00 p.m., West Sacramento Civic Center, 1110 West Capitol Avenue, West Sacramento, CA 95691

Written comments and suggestions concerning the scope and content of the environmental information must be submitted by October 7, 2016, to Mr. Tyler Stalker, email at spk-pao@usace.army.mil; or surface mail at U.S. Army Corps of Engineers, Sacramento District, Attn: Public Affairs Office (CESPK-PAO), 1325 J Street, Sacramento, CA 95814-2922. Requests to be placed on the electronic or surface mail notification lists should also be sent to this address.

For additional information you may contact Mr. Zachary Simmons at our California South Regulatory Branch, 1325 J Street, Room 1350, Sacramento, California 95814-2922, email Zachary.M.Simmons@usace.army.mil, or telephone 916-557-6746."

If you have any questions about the meeting later this week please feel free to contact me. Additionally, if there are sensitive tribal concerns you prefer to voice in a more private setting, I would like extend to you the option to have a tribal scoping meeting as a follow-on to the public meeting. If this is something you would like to pursue please let me know as soon as possible. I have also attached for your reference the Notice of Intent for the project published recently in the Federal Register.

Thank you,
Geneva Kraus
Archaeologist (Student Trainee)
U.S. Army Corps of Engineers, Sacramento District
1325 J Street
Sacramento, CA 95814
(916) 557-7447

MIWOK MAIDU United Auburn Indian Community of the Auburn Rancheria

Gene Whitehouse, Chairman | John L. Williams, Vice Chairman | Danny Rey, Secretary | Jason Camp, Treasurer | Calvin Moman, Council Member

September 14, 2016

Geneva Kraus
United States Army Corps of Engineers
1325 J Street
Sacramento, CA 95814-2922

Subject: Environmental Resources Branch Lower Elkhorn Basin Levee Setback Projet, Yolo County, California

Dear Geneva Kraus,

Thank you for requesting information regarding the above referenced project. The United Auburn Indian Community (UAIC) of the Auburn Rancheria is comprised of Miwok and Southern Maidu (Nisenan) people whose tribal lands are within Placer County and whose service area includes El Dorado, Nevada, Placer, Sacramento, Sutter, and Yuba counties. The UAIC is concerned about development within its aboriginal territory that has potential to impact the lifeways, cultural sites, and landscapes that may be of sacred or ceremonial significance. We appreciate the opportunity to comment on this and other projects in your jurisdiction. The UAIC would like to consult on this project.

In order to ascertain whether the project could affect cultural resources that may be of importance to the UAIC, we would like to receive copies of any archaeological reports that are completed for the project. We also request copies of future environmental documents for the proposed project so that we have the opportunity to comment on potential impacts and proposed mitigation measures related to cultural resources. The UAIC would also like the opportunity to have our tribal monitors accompany you during the field survey. The information gathered will provide us with a better understanding of the project and cultural resources on site and is invaluable for consultation purposes.

The UAIC's preservation committee has identified cultural resources in and around your project area, and would like to recommend that a tribal monitor be present during any ground disturbing activities. Thank you again for taking these matters into consideration, and for involving the UAIC early in the planning process. We look forward to reviewing the documents requested above and consulting on your project. Please contact Marcos Guerrero, Cultural Resources Manager, at (530) 883-2364 or by email at mguerrero@auburnrancheria.com if you have any questions.

Sincerely,

Gene Whitehouse,
Chairman

CC: Marcos Guerrero, CRM

Tribal Office 10720 Indian Hill Road Auburn, CA 95603 (530) 883-2390 FAX (530) 883-2380

MIWOK
MAIDU

United Auburn Indian Community
of the Auburn Rancheria

Tribal Office
10720 Indian Hill Road
Auburn, CA 95603

Geneva Kraus,
United States Army Corps of Engineers
1325 J Street
Sacramento, CA 95814-2922

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Dunn, Hannah

From: Kraus, Geneva SPK <Geneva.Kraus@usace.army.mil>
Sent: Wednesday, October 12, 2016 3:05 PM
To: Marcos Guerrero; Matthew Moore
Cc: Amrhein, Rochelle@DWR; Griffin, S. Joe SPK; Rinck, Jane L SPK; Lee, Kevin C SPK; Scott, Barry
Subject: USACE - Tribal Consultation for the Lower Elkhorn Basin Levee Setback Project 408 permit
Attachments: APE_Location_Map.pdf; APE_map_aerial.pdf

Good Afternoon Mr. Guerrero,

I received your letter yesterday regarding the Lower Elkhorn Basin Levee Setback Project. I look forward to working with United Auburn throughout the tribal consultation process for the project on the Corps side. You outlined several requests in your letter, to which I hope I can provide some answers and suggestions below.

You have requested archaeological and environmental reports in your letter. Both DWR and the Corps will be generating cultural resources documents throughout the project and contacting you separately, although the documents pertain to the same project; DWR will be sending documents related to state requirements, while the Corps will be covering the federal Section 106 compliance process. I believe you will have already received the plan for the proposed geoarchaeological investigations from DWR by this time. Additional reports will be made available to you as cultural resources work continues. As far as future environmental documents, I will provide the Corps' lead on the NEPA side of the project with your contact information so that UAIC will receive NEPA notifications and/or documents as they are made available for public review.

DWR will be the lead on coordinating cultural resources fieldwork, so further questions about engaging tribal monitors would be best be addressed by their personnel. Given that we have a meeting with Corps, DWR, and UAIC personnel planned for next week, this would be an ideal agenda item for you to bring to the table.

Finally, you mention in your letter that UAIC's preservation committee has identified cultural resources in and around the project area. The meeting next week would be an excellent venue in which to begin to address your concerns about cultural resources relative to the locations of proposed project activities. I have attached maps of the Area of Potential Affects (APE) for your reference. We would appreciate it if you could share with the project team the location and nature of the cultural resources you refer to in your letter. The earlier we are aware of UAIC's concerns the better we can work together to resolve them.

Please feel free to call or email if you have any questions or concerns that you would like to address prior to the meeting next week.

Thank you,
Geneva Kraus
Archaeologist (Student Trainee)
U.S. Army Corps of Engineers, Sacramento District
1325 J Street
Sacramento, CA 95814
(916) 557-7447
Geneva.Kraus@usace.army.mil

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F2. Native American Correspondence (California Department of Water Resources)

STATE OF CALIFORNIA — Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710
Fax (916) 373-5471

May 20, 2016

Monica Notte
Department of Water Resources

Sent by Email: Monica.Notte@water.ca.gov
Number of Pages: 2

RE: Elk Slough to Sacramento Bypass Widening Feasibility Study, Yolo County

Dear Ms. Notte:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results. However, the APE is located within an area of high sensitivity therefor I recommend completing an additional record search through the California Historical Resources Information System (CHRIS). Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.

I suggest you contact all of those listed on the attached Native American Contact List, if they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. By contacting all those on the list, your organization will be better able to respond to claims of failure to consult. If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information please contact via email: sharaya.souza@nahc.ca.gov.

Sincerely,

Sharaya Souza
Staff Services Analyst

Native American Contacts
Yolo County
May 19, 2016

Cortina Band of Indians
Charlie Wright, Chairperson
P.O. Box 1630 Wintun / Patwin
Williams , CA 95987
(530) 473-3274 Office
(530) 473-3301 Fax

United Auburn Indian Community of the Auburn Rancheria
Gene Whitehouse, Chairperson
10720 Indian Hill Road Maidu
Auburn , CA 95603 Miwok
(530) 883-2390 Office

(530) 883-2380 Fax

Yocha Dehe Wintun Nation
Leland Kinter, Chairperson
P.O. Box 18 Wintun (Patwin)
Brooks , CA 95606
lkinter@yochadehe-nsn.gov
(530) 796-3400
(530) 796-2143 Fax

This list is current only as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Elk Slough to Sacramento Bypass Widening Feasibility Study, Yolo County.

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., *Governor*

DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT
P.O. BOX 219000
SACRAMENTO, CA 95821-9000

September 23, 2016

Honorable Gene Whitehouse, Chairman
United Auburn Indian Community of the Auburn Rancheria
10720 Indian Hill Road
Auburn, CA 95603

Subject: Division of Flood Management – Lower Elkhorn Basin Levee Setback: Geoarchaeology Investigation Plan

Dear Honorable Gene Whitehouse,

The California Department of Water Resources (DWR) is planning to improve flood facilities in the Lower Elkhorn Basin and Sacramento Bypass areas of the flood system. DWR proposes to construct a levee setback as part of this improvement effort as well as remove all or portions of the existing Yolo Bypass East Levee south of Interstate 5 and the Sacramento Bypass North Levee. Portions of the local reclamation district cross levees, which bisect the basin, would also be removed. DWR is proposing to use borrow for the planned setback levee from segments of the existing levee that would be removed, and from the agricultural lands between the existing levees and proposed future levee. The project area is within Yolo County and is shown on Attachment 1.

DWR first notified you of this project by letter dated May 20, 2016, and provided your tribe with the opportunity to provide information. On August 31, 2016, DWR sent you a second letter describing cultural resources investigations (records search and surveys to support geotechnical investigations) that had been conducted up to that date. The letter also indicated that a geoarchaeology sensitivity assessment and proposed work plan was being prepared. The purpose of this letter is to provide you with the *Georachaeology Sensitivity Assessment and Work Plan for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California* prepared by GEI Consultants.

The purpose of the sensitivity assessment is to determine the likelihood of the presence of buried archaeological resources in the various parts of the project area using existing information. This assessment is a "desktop" analysis of known soil types and ages, depositional context, and known archaeological site locations and was used to formulate the proposed geoarchaeological work plan. The work plan consists of a proposed geoarchaeological testing program and identifies proposed methods and locations for testing. The proposed geoarchaeological testing includes excavation of 34 – 42 trenches in an effort to locate buried archaeological sites and buried soils that may be sensitive for the presence of archaeological sites. This testing is part of the resource identification process, and will not include data recovery or mitigation.

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DWR is sending this letter to solicit your comments, questions or interest in the proposed geoarchaeological trenching at the project site. We respectfully request that you provide your comments, questions or other interest in the proposed investigation within 14 days of the date of this letter. Correspondence may be sent to Shelly Amrhein at Rochelle.Amrhein@water.ca.gov or you may call Ms. Amrhein directly at 916-574-1415. Please also feel free to contact Anecita Agustinez at 916-653-8726 or by email at Anecita.Agustinez@water.ca.gov. DWR is committed to working together with your tribe consistent with its Tribal Engagement Policy, the California Natural Resources Agency's Tribal Engagement Policy, Governor Brown's Executive Order B-10-11 and California Environmental Quality Act requirements.

Sincerely,

Eric Koch
Acting Chief
Division of Flood Management

cc: Shelly Amrhein, DWR
Anecita Agustinez, DWR
Geneva Kraus, U.S. Army Corps of Engineers
Tribal Administrator

Enclosures: Map
Geoarchaeological Sensitivity Assessment and Work Plan for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT
P.O. BOX 219000
SACRAMENTO, CA 95821-9000

September 23, 2016

Honorable Leland Kinter, Chairman
Yocha Dehe Wintun Nation
P.O. Box 18
Brooks, CA 95606-0018

Subject: Division of Flood Management – Lower Elkhorn Basin Levee Setback; Geoarchaeology Investigation Plan

Dear Honorable Leland Kinter,

The California Department of Water Resources (DWR) is planning to improve flood facilities in the Lower Elkhorn Basin and Sacramento Bypass areas of the flood system. DWR proposes to construct a levee setback as part of this improvement effort as well as remove all or portions of the existing Yolo Bypass East Levee south of Interstate 5 and the Sacramento Bypass North Levee. Portions of the local reclamation district cross levees, which bisect the basin, would also be removed. DWR is proposing to use borrow for the planned setback levee from segments of the existing levee that would be removed, and from the agricultural lands between the existing levees and proposed future levee. The project area is within Yolo County and is shown on Attachment 1.

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Sincerely,

for

Eric Koch
Acting Chief
Division of Flood Management

cc: Shelly Amrhein, DWR
Anecita Agustinez, DWR
Geneva Kraus, U.S. Army Corps of Engineers
Tribal Administrator

Enclosures: Map
Geoarchaeological Sensitivity Assessment and Work Plan for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California

STATE OF CALIFORNIA - CALIFORNIA NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT
P.O. BOX 219000
SACRAMENTO, CA 95821-9000

September 23, 2016

Honorable Rhonda Morningstar Pope, Chairperson
Buena Vista Rancheria of Me-Wuk Indians
1418 20th Street, Suite 200
Sacramento, CA 95811

Subject: Division of Flood Management – Lower Elkhorn Basin Levee Setback; Geoarchaeology Investigation Plan

Dear Honorable Rhonda Morningstar Pope,

The California Department of Water Resources (DWR) is planning to improve flood facilities in the Lower Elkhorn Basin and Sacramento Bypass areas of the flood system. DWR proposes to construct a levee setback as part of this improvement effort as well as remove all or portions of the existing Yolo Bypass East Levee south of Interstate 5 and the Sacramento Bypass North Levee. Portions of the local reclamation district cross levees, which bisect the basin, would also be removed. DWR is proposing to use borrow for the planned setback levee from segments of the existing levee that would be removed, and from the agricultural lands between the existing levees and proposed future levee. The project area is within Yolo County and is shown on Attachment 1.

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Sincerely,

for

Eric Koch
Acting Chief
Division of Flood Management

cc: Shelly Amrhein, DWR
Anecita Agustinez, DWR
Geneva Kraus, U.S. Army Corps of Engineers
Ms. Denean Swenson, Tribal Administrator

Enclosures: Map
Geoarchaeological Sensitivity Assessment and Work Plan for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT
P.O. BOX 219000
SACRAMENTO, CA 95821-9000

September 23, 2016

Honorable Dr. Crystal Martinez, Chairperson
Ione Band of Miwok Indians
P.O. Box 699
Plymouth, CA 95669

Subject: Division of Flood Management – Lower Elkhorn Basin Levee Setback; Geoarchaeology Investigation Plan

Dear Honorable Dr. Crystal Martinez,

The California Department of Water Resources (DWR) is planning to improve flood facilities in the Lower Elkhorn Basin and Sacramento Bypass areas of the flood system. DWR proposes to construct a levee setback as part of this improvement effort as well as remove all or portions of the existing Yolo Bypass East Levee south of Interstate 5 and the Sacramento Bypass North Levee. Portions of the local reclamation district cross levees, which bisect the basin, would also be removed. DWR is proposing to use borrow for the planned setback levee from segments of the existing levee that would be removed, and from the agricultural lands between the existing levees and proposed future levee. The project area is within Yolo County and is shown on Attachment 1.

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Sincerely,

for

Eric Koch
Acting Chief
Division of Flood Management

cc: Shelly Amrhein, DWR
Anecita Agustinez, DWR
Geneva Kraus, U.S. Army Corps of Engineers
Tribal Administrator

Enclosures: Map
Geoarchaeological Sensitivity Assessment and Work Plan for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT
P.O. BOX 219000
SACRAMENTO, CA 95821-9000

September 23, 2016

Honorable Nicholas Fonseca, Chairman
Shingle Springs Band of Miwok Indians
P.O. Box 1340
Shingle Springs, CA 95682-1340

Subject: Division of Flood Management – Lower Elkhorn Basin Levee Setback; Geoarchaeology Investigation Plan

Dear Honorable Nicholas Fonseca,

The California Department of Water Resources (DWR) is planning to improve flood facilities in the Lower Elkhorn Basin and Sacramento Bypass areas of the flood system. DWR proposes to construct a levee setback as part of this improvement effort as well as remove all or portions of the existing Yolo Bypass East Levee south of Interstate 5 and the Sacramento Bypass North Levee. Portions of the local reclamation district cross levees, which bisect the basin, would also be removed. DWR is proposing to use borrow for the planned setback levee from segments of the existing levee that would be removed, and from the agricultural lands between the existing levees and proposed future levee. The project area is within Yolo County and is shown on Attachment 1.

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Sincerely,

for

Eric Koch
Acting Chief
Division of Flood Management

cc: Shelly Amrhein, DWR
Anecita Agustinez, DWR
Geneva Kraus, U.S. Army Corps of Engineers
Ernest Vargas, Tribal Administrator

Enclosures: Map
Geoarchaeological Sensitivity Assessment and Work Plan for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT
P.O. BOX 219000
SACRAMENTO, CA 95821-9000

September 23, 2016

Honorable Raymond Hitchcock, Chairman
Wilton Rancheria
9728 Kent Street
Elk Grove, CA 95624

Subject: Division of Flood Management – Lower Elkhorn Basin Levee Setback; Geoarchaeology Investigation Plan

Dear Honorable Raymond Hitchcock,

The California Department of Water Resources (DWR) is planning to improve flood facilities in the Lower Elkhorn Basin and Sacramento Bypass areas of the flood system. DWR proposes to construct a levee setback as part of this improvement effort as well as remove all or portions of the existing Yolo Bypass East Levee south of Interstate 5 and the Sacramento Bypass North Levee. Portions of the local reclamation district cross levees, which bisect the basin, would also be removed. DWR is proposing to use borrow for the planned setback levee from segments of the existing levee that would be removed, and from the agricultural lands between the existing levees and proposed future levee. The project area is within Yolo County and is shown on Attachment 1.

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Sincerely,

for

Eric Koch
Acting Chief
Division of Flood Management

cc: Shelly Amrhein, DWR
Anecita Agustinez, DWR
Geneva Kraus, U.S. Army Corps of Engineers
Tribal Administrator

Enclosures: Map
Geoarchaeological Sensitivity Assessment and Work Plan for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California

DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT
P.O. BOX 219000
SACRAMENTO, CA 95821-9000

September 23, 2016

Honorable Don Ryberg, Chairman
Tsi-Akim Maidu
P.O. Box 510
Browns Valley, CA 95918-0510

Subject: Division of Flood Management – Lower Elkhorn Basin Levee Setback; Geoarchaeology Investigation Plan

Dear Honorable Don Ryberg,

The California Department of Water Resources (DWR) is planning to improve flood facilities in the Lower Elkhorn Basin and Sacramento Bypass areas of the flood system. DWR proposes to construct a levee setback as part of this improvement effort as well as remove all or portions of the existing Yolo Bypass East Levee south of Interstate 5 and the Sacramento Bypass North Levee. Portions of the local reclamation district cross levees, which bisect the basin, would also be removed. DWR is proposing to use borrow for the planned setback levee from segments of the existing levee that would be removed, and from the agricultural lands between the existing levees and proposed future levee. The project area is within Yolo County and is shown on Attachment 1.

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Sincerely,

for

Eric Koch
Acting Chief
Division of Flood Management

cc: Shelly Amrhein, DWR
Anecita Agustinez, DWR
Geneva Kraus, U.S. Army Corps of Engineers
Tribal Administrator

Enclosures: Map
Geoarchaeological Sensitivity Assessment and Work Plan for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT
P.O. BOX 219000
SACRAMENTO, CA 95821-9000

September 23, 2016

Honorable Cosme Valdez, Chairman
Nashville Eldorado Miwok
P.O. Box 580986
Elk Grove, CA 95758

Subject: Division of Flood Management – Lower Elkhorn Basin Levee Setback; Geoarchaeology Investigation Plan

Dear Honorable Cosme Valdez,

The California Department of Water Resources (DWR) is planning to improve flood facilities in the Lower Elkhorn Basin and Sacramento Bypass areas of the flood system. DWR proposes to construct a levee setback as part of this improvement effort as well as remove all or portions of the existing Yolo Bypass East Levee south of Interstate 5 and the Sacramento Bypass North Levee. Portions of the local reclamation district cross levees, which bisect the basin, would also be removed. DWR is proposing to use borrow for the planned setback levee from segments of the existing levee that would be removed, and from the agricultural lands between the existing levees and proposed future levee. The project area is within Yolo County and is shown on Attachment 1.

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Sincerely,

for

Eric Koch
Acting Chief
Division of Flood Management

cc: Shelly Amrhein, DWR
Anecita Agustinez, DWR
Geneva Kraus, U.S. Army Corps of Engineers
Tribal Administrator

Enclosures: Map
Geoarchaeological Sensitivity Assessment and Work Plan for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT
P.O. BOX 219000
SACRAMENTO, CA 95821-9000

September 23, 2016

Honorable Charlie Wright, Chairman
Cortina Band of Indians
P.O. Box 1630
Williams, CA 95987

Subject: Division of Flood Management – Lower Elkhorn Basin Levee Setback: Geoarchaeology Investigation Plan

Dear Honorable Charlie Wright,

The California Department of Water Resources (DWR) is planning to improve flood facilities in the Lower Elkhorn Basin and Sacramento Bypass areas of the flood system. DWR proposes to construct a levee setback as part of this improvement effort as well as remove all or portions of the existing Yolo Bypass East Levee south of Interstate 5 and the Sacramento Bypass North Levee. Portions of the local reclamation district cross levees, which bisect the basin, would also be removed. DWR is proposing to use borrow for the planned setback levee from segments of the existing levee that would be removed, and from the agricultural lands between the existing levees and proposed future levee. The project area is within Yolo County and is shown on Attachment 1.

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Sincerely,

for

Eric Koch
Acting Chief
Division of Flood Management

cc: Shelly Amrhein, DWR
Anecita Agustinez, DWR
Geneva Kraus, U.S. Army Corps of Engineers
Tribal Administrator

Enclosures: Map
Geoarchaeological Sensitivity Assessment and Work Plan for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT
P.O. BOX 219000
SACRAMENTO, CA 95821-9000

September 23, 2016

Mr. Matthew Moore, Tribal Historic Preservation Officer
United Auburn Indian Community of the Auburn Rancheria
10720 Indian Hill Road
Auburn, CA 95603

Subject: Division of Flood Management – Lower Elkhorn Basin Levee Setback; Geoarchaeology Investigation Plan

Dear Mr. Matthew Moore,

The California Department of Water Resources (DWR) is planning to improve flood facilities in the Lower Elkhorn Basin and Sacramento Bypass areas of the flood system. DWR proposes to construct a levee setback as part of this improvement effort as well as remove all or portions of the existing Yolo Bypass East Levee south of Interstate 5 and the Sacramento Bypass North Levee. Portions of the local reclamation district cross levees, which bisect the basin, would also be removed. DWR is proposing to use borrow for the planned setback levee from segments of the existing levee that would be removed, and from the agricultural lands between the existing levees and proposed future levee. The project area is within Yolo County and is shown on Attachment 1.

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Sincerely,

for

Eric Koch
Acting Chief
Division of Flood Management

cc: Shelly Amrhein, DWR
Anecita Agustinez, DWR
Geneva Kraus, U.S. Army Corps of Engineers

Enclosures: Map
Geoarchaeological Sensitivity Assessment and Work Plan for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT
P.O. BOX 219000
SACRAMENTO, CA 95821-9000

September 23, 2016

Mr. Marcos Guerrero, Cultural Resources Manager
United Auburn Indian Community of the Auburn Rancheria
10721 Indian Hill Road
Auburn, CA 95604

Subject: Division of Flood Management – Lower Elkhorn Basin Levee Setback; Geoarchaeology Investigation Plan

Dear Mr. Marcos Guerrero,

The California Department of Water Resources (DWR) is planning to improve flood facilities in the Lower Elkhorn Basin and Sacramento Bypass areas of the flood system. DWR proposes to construct a levee setback as part of this improvement effort as well as remove all or portions of the existing Yolo Bypass East Levee south of Interstate 5 and the Sacramento Bypass North Levee. Portions of the local reclamation district cross levees, which bisect the basin, would also be removed. DWR is proposing to use borrow for the planned setback levee from segments of the existing levee that would be removed, and from the agricultural lands between the existing levees and proposed future levee. The project area is within Yolo County and is shown on Attachment 1.

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Sincerely,

for

Eric Koch
Acting Chief
Division of Flood Management

cc: Shelly Amrhein, DWR
Anecita Agustinez, DWR
Geneva Kraus, U.S. Army Corps of Engineers

Enclosures: Map
Geoarchaeological Sensitivity Assessment and Work Plan for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California

DEPARTMENT OF WATER RESOURCES
DIVISION OF FLOOD MANAGEMENT
P.O. BOX 219000
SACRAMENTO, CA 95821-9000

September 23, 2016

Mr. Steven Hutchason, Executive Director
Environmental Resources Department
Wilton Rancheria
9728 Kent Street
Elk Grove, CA 95624

Subject: Division of Flood Management – Lower Elkhorn Basin Levee Setback; Geoarchaeology Investigation Plan

Dear Mr. Steven Hutchason,

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Sincerely,

for
Eric Koch
Acting Chief
Division of Flood Management

cc: Shelly Amrhein, DWR
Anecita Agustinez, DWR
Geneva Kraus, U.S. Army Corps of Engineers

Enclosures: Map
Geoarchaeological Sensitivity Assessment and Work Plan for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California

I

Dunn, Hannah

From: Scott, Barry
Sent: Wednesday, December 28, 2016 7:21 AM
To: Scott, Barry
Subject: RE: Lower Elkhorn Basin Levee Setback Project

From: Kara Perry [mailto:KPerry@ssband.org]
Sent: Friday, November 04, 2016 2:42 PM
To: Nelson, Tim@DWR; valdezcome@comcast.net
Cc: Amrhein, Rochelle@DWR; Agustinez, Anecita S.@DWR
Subject: RE: Lower Elkhorn Basin Levee Setback Project

Good Afternoon Tim,

The Shingle Springs Band Of Miwok Indians would like to be involved in the consultation process for this project as well as being able to have a tribal representative on-site during ground disturbing activities.

Thank you
Kara Perry

Kara Perry
Cultural Outreach Coordinator
Cultural Resources Department

Phone: (530) 488-4049
Mobile: (530) 363-5123
Fax: (530) 558-2034
Email: kperry@ssband.org

Shingle Springs Band of Miwok Indians | P.O. Box 1340, Shingle Springs, CA 95682 |
www.shinglespringsrancheria.com

From: Nelson, Tim@DWR [mailto:Tim.Nelson@water.ca.gov]
Sent: Wednesday, October 26, 2016 11:08 AM
To: Kara Perry; valdezcome@comcast.net

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Sincerely,

Eric Koch
Acting Chief
Division of Flood Management

cc: Shelly Amrhein, DWR
Anecita Agustinez, DWR
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Tribal Administrator

Enclosures: Map
Geoarchaeological Sensitivity Assessment and Work Plan for the Lower Elkhorn Basin Levee Setback Project, Yolo County, California

Cc: Amrhein, Rochelle@DWR; Agustinez, Anecita S.@DWR
Subject: Lower Elkhorn Basin Levee Setback Project

The first email bounced back the initial emails. So, we try again.
Thanks
Tim

Hello Tribal Representatives,

You are receiving this email, because your tribe has potential cultural sites in the Lower Elkhorn Basin Levee Setback Project area. A letter was sent to your tribe on Aug. 31, 2016 offering an opportunity to consult on this project. DWR has heard nothing back, and we are giving another chance to respond for consultation. Currently, we are consulting with other tribes, and DWR wanted to confirm your participation. Now is this time to be heard as ground breaking will start soon.
Please respond whether your tribe is interested, deferring to other tribes, or have no interest in the project.
Thanks for your time.

Tim Nelson, P.E.
Dept. of Water Resources
NCRO- Tribal Liaison
3500 Industrial Blvd, Suite 100
West Sacramento, CA 95691
Office - (916) 376-1926
Fax - (916) 376-9676
Email - Tim.Nelson@water.ca.gov

STATE OF CALIFORNIA
NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone (916) 373-3710
Fax (916) 373-5471
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

Edmund G. Brown Jr., Governor

September 12, 2016

Shelly Amrhein
California Department of Water Resources
3464 El Camino Ave, Suite 150
Sacramento, CA 95821

RE: SCH#2016092015, Lower Elkhorn Basin Levee Setback, Yolo County

Dear Ms. Amrhein:

The Native American Heritage Commission has received the Notice of Preparation (NOP) for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code § 21000 et seq.), specifically Public Resources Code section 21084.1, states that a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, § 15064.5 (b) (CEQA Guidelines Section 15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an environmental impact report (EIR) shall be prepared. (Pub. Resources Code § 21080 (d); Cal. Code Regs., tit. 14, § 15064 subd.(a)(1) (CEQA Guidelines § 15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources with the area of project effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code § 21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code § 21084.3 (a)). **AB 52 applies to any project for which a notice of preparation or a notice of negative declaration or mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements.** If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. § 800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments. **Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.**

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
   a. A brief description of the project.
   b. The lead agency contact information.
   c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code § 21080.3.1 (d)).
   d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code § 21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code § 21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or environmental impact report. (Pub. Resources Code § 21080.3.1(b)).
   a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code § 65352.4 (SB 18). (Pub. Resources Code § 21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
   a. Alternatives to the project.
   b. Recommended mitigation measures.
   c. Significant effects. (Pub. Resources Code § 21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
   a. Type of environmental review necessary.
   b. Significance of the tribal cultural resources.
   c. Significance of the project's impacts on tribal cultural resources.
   d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code § 21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code sections 6254 (r) and 6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code § 21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
   a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
   b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code section 21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code § 21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
   a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code § 21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code section 21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code section 21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code § 21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code section 21084.3 (b). (Pub. Resources Code § 21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
        i. Planning and construction to avoid the resources and protect the cultural and natural context.
        ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
        i. Protecting the cultural character and integrity of the resource.
        ii. Protecting the traditional use of the resource.
        iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code § 21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a nonfederally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code § 815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code § 5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An environmental impact report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code sections 21080.3.1 and 21080.3.2 and concluded pursuant to Public Resources Code section 21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code section 21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code § 21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of

open space. (Gov. Code § 65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code § 65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code section 65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code sections 5097.9 and 5097.993 that are within the city's or county's jurisdiction. (Gov. Code § 65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have been already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:

a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
   a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, section 15064.5(f) (CEQA Guidelines section 15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
   b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
   c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code section 7050.5, Public Resources Code section 5097.98, and Cal. Code Regs., tit. 14, section 15064.5, subdivisions (d) and (e) (CEQA Guidelines section 15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions, please contact me at my email address: sharaya.souza@nahc.ca.gov.

Sincerely,

Sharaya Souza
Staff Services Analyst
cc: State Clearinghouse

MIWOK MAIDU United Auburn Indian Community of the Auburn Rancheria

Gene Whitehouse Chairman | John L. Williams Vice Chairman | Danny Rey Secretary | Jason Camp Treasurer | Calvin Moman Council Member

November 10, 2016

Shelly Amrhein
Department of Water Resources
Division of Flood Management
3464 El Camino Avenue, Suite 150
Sacramento, CA 95821

RE: Lower Elkhorn Levee Setback, UAIC Project Number: THPC-PRJ-2016-067

Dear Shelly Amrehin,

The United Auburn Indian Community (UAIC) has consulted with your department regarding the proposed project, the Lower Elkhorn Levee Setback Project. Thank you for requesting information regarding the proposed project. In response to your request, we conducted a complete records search of the cultural resource records and survey reports contained in our Tribal Historic Resources Information System that are within a 1/2 mile radius of the proposed project area. Our review of this information indicates that the search area contains recorded prehistoric-period cultural resources.

Enclosed is some additional information about the Tribal Historic Resources Information System and UAIC's Environmental Review, Assessment, and Compliance Program. Thank you for using our services. A billing statement and invoice is enclosed. Please remit payment in the form of a check made payable to the United Auburn Indian Community and mailed to the attention of the Finance & Accounting Department at 10720 Indian Hill Road in Auburn, California 95603. Payment is due within 30 days. We will be happy to discuss the results of the records search with you in greater detail once payment is received. Similarly, once payment is received, we will be happy to provide you with an environmentally sensitive area (ESA) map and GIS SHP file that depicts the boundaries of known cultural resources and areas that are sensitive for cultural resources.

The United Auburn Indian Community comprises Miwok and Southern Maidu (Nisenan) people whose ancestral territory includes the proposed project area. UAIC actively monitors development within its ancestral territory that could impact lifeways, cultural sites, and landscapes that are sacred or have ceremonial significance. We appreciate the documentation you submitted along with your request for information. We ask that you send us copies of any archaeological reports or cultural resource assessments that are completed for the project so that we can continue to monitor the project's potential impact on cultural resources that are important to UAIC.

We also ask that UAIC tribal representatives be allowed to observe and participate in all cultural resource surveys, including initial pedestrian surveys for the project. If tribal cultural resources

Tribal Office 10720 Indian Hill Road Auburn, CA 95603 (530) 883-2390 FAX (530) 883-2380

are identified within the project area, it is UAIC's policy that tribal monitors must be present for all ground disturbing activities. Finally, please be advised that UAIC's strong preference is to preserve tribal cultural resources in place and avoid them whenever possible. Subsurface testing and data recovery in areas with known or suspected tribal cultural resources must not occur without first consulting with UAIC and receiving UAIC's written consent.

If you have any questions about the results of the records search or UAIC's Environmental Review, Assessment, and Compliance Program, please contact Marcos Guerrero, UAIC's Cultural Resources Manager. He can be reached by phone at (530) 883-2364 or by email at mguerrero@auburnrancheria.com.

Sincerely,

Matt Moore
UAIC Tribal Historic Preservation Officer

Enclosures

1: UAIC Environmental Review, Assessment and Compliance Program
2: Invoice

Tribal Office 10720 Indian Hill Road Auburn, CA 95603 (530) 883-2390 FAX (530) 883-2380

Appendix G. Lower Elkhorn Basin Levee Setback Project Hydraulic Impact Analysis (Draft)

Appendix G

Lower Elkhorn Basin Levee Setback Project Hydraulic Impact Analysis (Draft)

Prepared by:

California Department of Water Resources

Division of Flood Management

May 2017

Table of Contents

Tables

Figures

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1. Introduction

The purpose of this hydraulic impact analysis is to identify potential impacts related to increased flood risk from the proposed Lower Elkhorn Basin Levee Setback (LEBLS) project. For this analysis, the differences in stages at various locations within the Sacramento River Flood Control System were used to quantify impacts for selected hydrologic events (i.e., approximate 100- and 200-year flood events). Four scenarios described in Section 3, "Hydraulic Modeling Methods," were modeled to represent the following different conditions for all action alternatives:

- Existing Conditions (existing conditions without LEBLS project)
- Existing With-Project (existing conditions with LEBLS project)
- Future Without-Project (future conditions without LEBLS project)
- Future With-Project (future conditions with LEBLS project)

2. Hydrologic Methods

2.1 Products and Tools

The Central Valley Hydrology Study (CVHS) products and tools were applied to develop the model hydrology. The CVHS was a joint project conducted by the U. S. Army Corps of Engineers (USACE) and California Department of Water Resources (DWR) to support future planning and implementation efforts to reduce flood risk in the Central Valley. The CVHS developed products and tools that can be applied for developing design storm hydrographs, water surface elevations (WSEs), and supporting risk analysis studies. This includes use of four specified historic flow patterns and the various scaled versions of that dataset.

CVHS tools were used to perform reservoir simulations, including reservoir operating rules and starting conditions, using the USACE Hydrologic Engineering Center (HEC) ResSIM software. The Task Order 34 Sacramento River Routing HEC-RAS model for the Sacramento River system (TO 34 SRR model) was used for hydraulic routing of the flows downstream as described in Section 3, "Hydraulic Modeling Methods."

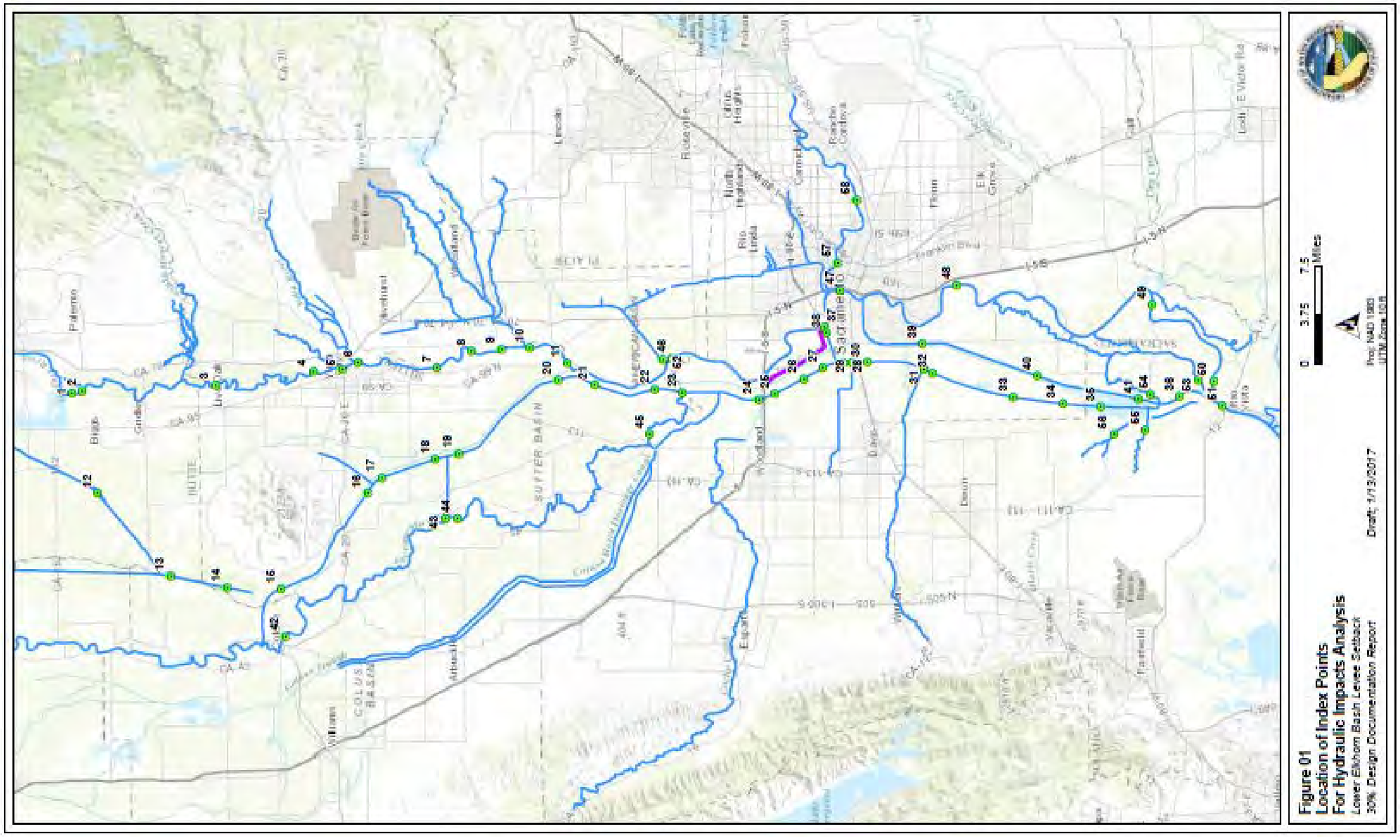
2.2 Reservoir Simulation

The Sacramento River HEC-ResSim system model, originally developed for CVHS by DWR and USACE, was updated for this analysis. Specifically, the forecast-based operation at Folsom Reservoir, which incorporates the new spillway, was configured into the model. The reservoir operation baseline condition and all with-project conditions are the same, so one model was developed. The selected events (as described below) were simulated using the updated reservoir operations model.

2.3 Event Selection

Specific scaled historic hydrologic events were used to identify potential impacts by comparing the without- and with-project conditions. The scaled event selection is based on the process used for the Sacramento River Basin-Wide Feasibility Study (BWFS) to support the Central Valley Flood Protection Plan (CVFPP) 2017 Update. During the process, DWR ran the full set of CVFPP Baseline HEC-RAS models. The full set of models include varying scales of historic flood events: 1956, 1965, 1986, and 1997. The simulated models were run without levee breaches while allowing overtopping. In-channel regulated flow-frequency curves were computed throughout the Sacramento River system for 15 index points on the main river stems and bypasses (Figure 1). Combined regulated flow-frequency curves were computed from the four storm events. Since the 1997 storm was found to be the dominant event among the four observed, the 1997 scaled event that produced similar peak flows as the combined regulated flow-frequency curve was chosen to represent the 100- and 200-year recurrence interval flows. The median representation of the Yolo Bypass system hydrology used two scaled historic events, 1997 x 95% and 1997 x 110%, which approximately correspond to the 100- and 200-year recurrence-interval flows, respectively.

Figure 1. Location of Index Points



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3. Hydraulic Modeling Methods

3.1 Topography and Datums

Topographic data were obtained from two sources: (1) Central Valley Floodplain Evaluation and Delineation (CVFED) LiDAR 2007 data developed by DWR, and (2) design-level topographic surveys and survey control reports. The vertical project datum is North American Vertical Datum, 1988 (NAVD 88) and the horizontal datum is the North American Datum, 1983 (NAD 83).

3.2 Model Selection

Hydraulic modeling was used to route the flows downstream through the river basin to compare without- and with-project peak stages. The TO 34 SRR model was used and enhanced from the TO 25 CVFED model by extending the river reaches to upstream forecast points, gages, and flood control reservoirs.

3.3 Calibration and Validation

The TO 25 CVFED model, from which the TO 34 SRR model was enhanced, was calibrated for the 1997 and 2006 flood events and reviewed and accepted by USACE, Sacramento District as part of the CVFED program. The TO 34 SRR model was validated by comparing the 1997 and 2006 events with recorded gage data and high water marks.

3.4 Downstream Boundary Condition

Downstream boundary conditions at the Sacramento River, Threemile Slough, and Georgiana Slough are represented by observed stage hydrographs during the 1997 storm event, which were obtained from USACE.

3.5 Modeling Scenarios

3.5.1 Existing Conditions Scenario

The Existing Conditions scenario includes the existing conditions as of September 2016 plus the authorized and funded projects (Early Implementation Project [EIP] funded by Propositions 1E and 84 and represented in the 2017 CVFPP Update system analysis). The Existing Conditions scenario also represents the No Project Alternative under the California Environmental Quality Act and the No Action Alternative under the National Environmental Policy Act (NEPA). The projects include the Folsom Joint Federal Project improvements and new dam operation guidelines as well as several levee improvement and setback projects throughout the basin that have been completed or are under construction. These detailed projects are listed below.

- Hamilton City Flood Damage Reduction and Ecosystem Restoration Project Phase 1: This USACE project is located on the west levee of the Sacramento River at Hamilton City. The project is a 6.8-mile setback levee to provide flood risk reduction to the community and agricultural areas. The

setback and levee raise has been applied to the Existing Condition geometry from Sacramento River Mile (RM) 200.782 to RM 198.262.

- Feather River Levee Improvement Project: Feather River East Levee was setback from RM 104.85 to RM 97.50.
- Star Bend Levee Setback Project: Feather River West Levee was setback at RM 98.6 for 0.75 Mile.
- Bear River Levee Setback Project: Bear River North Levee was setback from RM 3.4 to RM 1.43.
- Natomas Levee Improvement Program (NLIP).
- Sacramento River East Levee Project: The Sacramento River East Levee was raised from RM 78.933 to RM 67.132.
- Natomas Cross Canal South Levee: This levee was raised from RM 5.162 to RM 0.154.
- Pleasant Grove Canal South Levee: This levee was raised from RM 0.55 to RM 0.
- Southport Levee Improvement Project: Sacramento River West Levee was setback from RM 56.8 to RM 52.6.
- American River Common Features Project 1996/1999 sites.
- Folsom Dam Joint Federal Project: Includes water control manual update considering Folsom Dam raise and forecast-based operations as of December 2016.
- Marysville Ring Levee.
- Sutter Basin Project – Feather River West Levee Project.

EIP projects are included in the Existing Conditions since, although a few of the projects are undergoing a phased implementation and have not been fully constructed, these projects are upstream of the project site and/or have no contribution to any hydraulic impacts resulting from the LEBLS project.

3.5.2 Existing With-Project Scenario

The Existing With-Project scenario is the same as Existing Conditions with the addition of each of the four LEBLS project action alternatives to determine the effects of each action alternative. LEBLS project features are detailed in Chapter 3, “Alternatives.”

3.5.3 Future Without-Project Scenario

The Future Without-Project scenario is the same as Existing Conditions with the addition of the features in the USACE American River Common Features General Reevaluation Report (ARCF GRR) recommended plan. Those features include widening the Sacramento Bypass by approximately 1,500 feet and extending the Sacramento Weir by the same length. The Sacramento Bypass setback levee alignment is consistent with the LEBLS project alignment except for the tie-in connection with the existing Sacramento Bypass Levee (instead of at the extended weir). This scenario is provided for informational purposes but is not used to compare impacts of the alternatives.

3.5.4 Future With-Project Scenario

The Future With-Project scenario is the same as the Existing With-Project scenario with the addition of the LEBLS project and the Sacramento Weir and Bypass expansions (consistent with the ARCF GRR and Future Without-Project scenario). This scenario is also the cumulative effects scenario.

4. Hydraulic Modeling Results

Hydraulic model results for the four scenarios are shown in Tables 1 through 4.

Table 1. Peak Water Surface Elevations for Model Scenarios – Alternative 2

No.	Indicator Location	Existing Stage (feet)		FWOP Stage (feet)		EWP Stage (feet)		FWP Stage (feet)		EWP (Alternative 2) vs. Existing Conditions Change in Stage (feet)		FWOP vs. Existing Conditions Change in Stage (feet)		FWP (Alternative 2 and cumulative) vs. Existing Conditions Change in Stage (feet)	
		100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year
1	Feather River Upstream of Cherokee Canal Diversion	126.60	127.05	126.60	127.05	126.60	127.05	126.60	127.05	0	0	0	0	0	0
2	Feather River Downstream of Cherokee Canal Diversion	121.56	122.05	121.56	122.05	121.56	122.05	121.56	122.05	0	0	0	0	0	0
3	Feather River Downstream of Honcut Creek Confluence	84.88	85.11	84.88	85.11	84.88	85.11	84.88	85.11	0	0	0	0	0	0
4	Feather River Upstream of Jack Slough Confluence	77.56	77.99	77.56	77.99	77.56	77.99	77.56	77.99	0	0	0	0	0	0
5	Feather River Upstream of Yuba River Confluence	75.14	75.76	75.14	75.76	75.14	75.76	75.14	75.76	0	0	0	0	0	0
6	Feather River Downstream of Yuba River Confluence	73.95	74.65	73.95	74.65	73.95	74.65	73.95	74.65	0	0	0	0	0	0
7	Feather River at Boyd's Landing	64.81	65.62	64.80	65.61	64.81	65.62	64.80	65.61	0	0	-0.01	-0.01	-0.01	-0.01
8	Feather River Upstream of Mainstem Setback	62.04	62.85	62.03	62.85	62.03	62.85	62.03	62.84	-0.01	0	-0.01	0	-0.01	-0.01
9	Feather River Upstream of Bear River Confluence	57.62	58.37	57.61	58.36	57.61	58.36	57.60	58.36	-0.01	-0.01	-0.01	-0.01	-0.02	-0.01
10	Feather River Downstream of Bear River Confluence	56.07	56.85	56.06	56.84	56.06	56.83	56.05	56.83	-0.01	-0.02	-0.01	-0.01	-0.02	-0.02
11	Feather River Upstream of Sutter Bypass Confluence	51.61	52.69	51.58	52.65	51.58	52.65	51.56	52.63	-0.03	-0.04	-0.03	-0.04	-0.05	-0.06
12	Cherokee Canal Downstream of Cherokee Bypass	87.38	87.80	87.38	87.80	87.38	87.80	87.38	87.80	0	0	0	0	0	0
13	Butte Sink Downstream of Cherokee Canal	69.83	70.52	69.83	70.52	69.83	70.52	69.83	70.52	0	0	0	0	0	0
14	Butte Sink Upstream of Sutter Bypass	66.83	67.98	66.83	67.98	66.83	67.98	66.83	67.98	0	0	0	0	0	0
15	Sutter Bypass Downstream of Butte Sink	65.87	66.95	65.87	66.95	65.87	66.95	65.87	66.94	0	0	0	0	0	-0.01
16	Sutter Bypass Upstream of Wadsworth Canal Confluence	55.75	57.10	55.73	57.08	55.73	57.08	55.73	57.08	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02
17	Sutter Bypass Downstream of Wadsworth Canal Confluence	54.65	56.01	54.63	55.99	54.63	55.99	54.62	55.98	-0.02	-0.02	-0.02	-0.02	-0.03	-0.03
18	Sutter Bypass Upstream of Tisdale Bypass Confluence	52.35	53.68	52.32	53.65	52.32	53.65	52.31	53.64	-0.03	-0.03	-0.03	-0.03	-0.04	-0.04
19	Sutter Bypass Downstream of Tisdale Bypass Confluence	51.85	53.16	51.82	53.14	51.82	53.13	51.80	53.12	-0.03	-0.03	-0.03	-0.02	-0.05	-0.04
20	Sutter Bypass Upstream of Feather River Confluence	49.47	50.66	49.43	50.62	49.43	50.61	49.41	50.59	-0.04	-0.05	-0.04	-0.04	-0.06	-0.07
21	Sutter Bypass Downstream of Feather River Confluence	46.73	47.87	46.66	47.80	46.66	47.79	46.62	47.75	-0.07	-0.08	-0.07	-0.07	-0.11	-0.12
22	Sutter Bypass Upstream of Fremont Weir	43.21	44.21	43.08	44.09	43.07	44.07	43.00	44.00	-0.14	-0.14	-0.13	-0.12	-0.21	-0.21
23	Yolo Bypass Downstream of Fremont Weir	41.13	42.08	41.02	41.96	40.95	41.88	40.89	41.83	-0.18	-0.2	-0.11	-0.12	-0.24	-0.25
24	Yolo Bypass Upstream of I-5	35.43	36.44	35.30	36.33	34.72	35.78	34.71	35.79	-0.71	-0.66	-0.13	-0.11	-0.72	-0.65
25	Yolo Bypass Downstream of I-5	33.67	34.65	33.55	34.55	33.01	34.02	33.04	34.06	-0.66	-0.63	-0.12	-0.1	-0.63	-0.59
26	Yolo Bypass Upstream of Sacramento Bypass-1	32.08	33.10	31.96	33.01	31.69	32.73	31.75	32.82	-0.39	-0.37	-0.12	-0.09	-0.33	-0.28
27	Yolo Bypass Upstream of Sacramento Bypass-2	31.25	32.27	31.13	32.18	31.01	32.06	31.10	32.17	-0.24	-0.21	-0.12	-0.09	-0.15	-0.1
28	Yolo Bypass Downstream of Sacramento Bypass	30.66	31.68	30.84	31.89	30.76	31.81	30.85	31.92	0.1	0.13	0.18	0.21	0.19	0.24
29	Yolo Bypass Upstream of I-80	30.48	31.49	30.65	31.69	30.57	31.62	30.67	31.73	0.09	0.13	0.17	0.2	0.19	0.24
30	Yolo Bypass Near West Sacramento	29.71	30.63	29.87	30.82	29.80	30.75	29.88	30.84	0.09	0.12	0.16	0.19	0.17	0.21
31	Yolo Bypass Downstream of Putah Creek	27.53	28.42	27.69	28.59	27.62	28.53	27.70	28.62	0.09	0.11	0.16	0.17	0.17	0.2
32	Yolo Bypass at Lisbon	27.31	28.20	27.47	28.38	27.40	28.31	27.48	28.40	0.09	0.11	0.16	0.18	0.17	0.2
33	Yolo Bypass Downstream of Lisbon	24.51	25.43	24.66	25.60	24.60	25.53	24.68	25.62	0.09	0.1	0.15	0.17	0.17	0.19
34	Yolo Bypass Upstream of Reclamation District 2068	21.80	22.85	21.97	23.03	21.90	22.96	21.99	23.05	0.1	0.11	0.17	0.18	0.19	0.2
35	Yolo Bypass Upstream of Cache Slough	20.08	21.09	20.24	21.25	20.17	21.19	20.25	21.27	0.09	0.1	0.16	0.16	0.17	0.18
36	Cache Slough Upstream of Steamboat Slough	14.05	15.11	14.13	15.21	14.10	15.18	14.15	15.23	0.05	0.07	0.08	0.1	0.1	0.12
37	Sacramento Bypass at Sacramento Weir-1	32.93	34.08	31.89	32.98	31.58	32.65	31.76	32.86	-1.35	-1.43	-1.04	-1.1	-1.17	-1.22
38	Sacramento Bypass at Sacramento Weir-2	32.44	33.57	31.58	32.67	31.30	32.37	31.45	32.54	-1.14	-1.2	-0.86	-0.9	-0.99	-1.03
39	Deep Water Ship Channel - Downstream of Tie-in	17.03	18.09	17.13	18.22	17.09	18.18	17.14	18.24	0.06	0.09	0.1	0.13	0.11	0.15

Table 1. Peak Water Surface Elevations for Model Scenarios – Alternative 2

No.	Indicator Location	Existing Stage (feet)		FWOP Stage (feet)		EWP Stage (feet)		FWP Stage (feet)		EWP (Alternative 2) vs. Existing Conditions Change in Stage (feet)		FWOP vs. Existing Conditions Change in Stage (feet)		FWP (Alternative 2 and cumulative) vs. Existing Conditions Change in Stage (feet)	
		100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year
40	Deep Water Ship Channel - Midway	17.02	18.09	17.12	18.21	17.08	18.18	17.13	18.24	0.06	0.09	0.1	0.12	0.11	0.15
41	Deep Water Ship Channel - Towards the End	17.01	18.08	17.10	18.21	17.07	18.17	17.12	18.24	0.06	0.09	0.09	0.13	0.11	0.16
42	Sacramento River Downstream of Colusa	67.00	67.59	66.99	67.59	66.99	67.59	66.99	67.59	-0.01	0	-0.01	0	-0.01	0
43	Sacramento River Upstream of Tisdale Bypass	53.19	55.64	53.17	55.64	53.16	55.64	53.15	55.64	-0.03	0	-0.02	0	-0.04	0
44	Sacramento River Downstream of Tisdale Bypass	52.86	55.01	52.84	55.01	52.83	55.01	52.82	55.01	-0.03	0	-0.02	0	-0.04	0
45	Sacramento River Downstream of Knights Landing	42.57	43.51	42.47	43.41	42.41	43.35	42.36	43.30	-0.16	-0.16	-0.1	-0.1	-0.21	-0.21
46	Sacramento River at Verona	41.72	42.71	41.40	42.38	41.51	42.48	41.33	42.29	-0.21	-0.23	-0.32	-0.33	-0.39	-0.42
47	Sacramento River at I Street	34.22	35.44	32.41	33.55	33.41	34.57	32.31	33.46	-0.81	-0.87	-1.81	-1.89	-1.91	-1.98
48	Sacramento River at Freeport	27.90	28.93	26.53	27.41	27.25	28.23	26.48	27.34	-0.65	-0.7	-1.37	-1.52	-1.42	-1.59
49	Sacramento River Downstream of Georgiana Slough	17.17	17.71	16.61	17.08	16.90	17.44	16.59	17.06	-0.27	-0.27	-0.56	-0.63	-0.58	-0.65
50	Sacramento River Upstream of Cache Slough	12.63	13.28	12.61	13.27	12.62	13.29	12.61	13.28	-0.01	0.01	-0.02	-0.01	-0.02	0
51	Sacramento River at Rio Vista	12.23	12.88	12.25	12.90	12.25	12.90	12.25	12.91	0.02	0.02	0.02	0.02	0.02	0.03
52	Natomas Cross Canal	41.82	42.80	41.52	42.48	41.62	42.58	41.45	42.40	-0.2	-0.22	-0.3	-0.32	-0.37	-0.4
53	Steamboat Slough Upstream Sacramento River	12.73	13.40	12.68	13.37	12.71	13.40	12.69	13.38	-0.02	0	-0.05	-0.03	-0.04	-0.02
54	Miner Slough Upstream Cache Slough	16.89	17.95	16.98	18.07	16.94	18.03	16.99	18.10	0.05	0.08	0.09	0.12	0.1	0.15
55	Lindsey Slough Upstream Yolo Bypass	17.45	18.44	17.56	18.56	17.51	18.52	17.58	18.58	0.06	0.08	0.11	0.12	0.13	0.14
56	Cache Slough Upstream Yolo Bypass	18.34	19.30	18.47	19.43	18.42	19.38	18.49	19.45	0.08	0.08	0.13	0.13	0.15	0.15
57	American River Upstream of SR 160 Bridge	37.28	38.71	35.99	37.40	36.69	38.09	35.92	37.34	-0.59	-0.62	-1.29	-1.31	-1.36	-1.37
58	American River Upstream of Fair Oaks	51.33	53.54	51.24	53.41	51.27	53.48	51.24	53.41	-0.06	-0.06	-0.09	-0.13	-0.09	-0.13

Notes: FWOP = Future Without-Project; EWP = Existing With-Project; FWP = Future With-Project
Source: Data compiled by California Department of Water Resources in 2017

Table 2. Peak Water Surface Elevations for Model Scenarios – Alternative 3

No.	Indicator Location	Existing (No Action Alternative) Stage (feet)		FWOP Stage (feet)		EWP Stage (feet)		FWP Stage (feet)		EWP (Alternative 3) vs. Existing Conditions Change in Stage (feet)		FWOP vs. Existing Conditions Change in Stage (feet)		FWP (Alternative 3 and Cumulative) vs. Existing Conditions Change in Stage (feet)	
		100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year
1	Feather River Upstream of Cherokee Canal Diversion	126.60	127.05	126.60	127.05	126.6	127.05	126.60	127.05	0	0	0	0	0	0
2	Feather River Downstream of Cherokee Canal Diversion	121.56	122.05	121.56	122.05	121.56	122.05	121.56	122.05	0	0	0	0	0	0
3	Feather River Downstream of Honcut Creek Confluence	84.88	85.11	84.88	85.11	84.87	85.1	84.87	85.10	-0.01	-0.01	0	0	-0.01	-0.01
4	Feather River Upstream of Jack Slough Confluence	77.56	77.99	77.56	77.99	77.57	77.99	77.57	77.99	0.01	0	0	0	0.01	0
5	Feather River Upstream of Yuba River Confluence	75.14	75.76	75.14	75.76	75.15	75.77	75.15	75.77	0.01	0.01	0	0	0.01	0.01
6	Feather River Downstream of Yuba River Confluence	73.95	74.65	73.95	74.65	73.95	74.66	73.95	74.66	0	0.01	0	0	0	0.01
7	Feather River at Boyd's Landing	64.81	65.62	64.80	65.61	64.84	65.65	64.84	65.65	0.03	0.03	-0.01	-0.01	0.03	0.03
8	Feather River Upstream of Mainstem Setback	62.04	62.85	62.03	62.85	62.09	62.9	62.09	62.90	0.05	0.05	-0.01	0	0.05	0.05
9	Feather River Upstream of Bear River Confluence	57.62	58.37	57.61	58.36	57.71	58.46	57.70	58.45	0.09	0.09	-0.01	-0.01	0.08	0.08
10	Feather River Downstream of Bear River Confluence	56.07	56.85	56.06	56.84	56.06	56.84	56.05	56.83	-0.01	-0.01	-0.01	-0.01	-0.02	-0.02
11	Feather River Upstream of Sutter Bypass Confluence	51.61	52.69	51.58	52.65	51.58	52.65	51.56	52.63	-0.03	-0.04	-0.03	-0.04	-0.05	-0.06
12	Cherokee Canal Downstream of Cherokee Bypass	87.38	87.80	87.38	87.80	87.38	87.8	87.38	87.80	0	0	0	0	0	0
13	Butte Sink Downstream of Cherokee Canal	69.83	70.52	69.83	70.52	69.83	70.52	69.83	70.52	0	0	0	0	0	0
14	Butte Sink Upstream of Sutter Bypass	66.83	67.98	66.83	67.98	66.83	67.98	66.83	67.98	0	0	0	0	0	0
15	Sutter Bypass Downstream of Butte Sink	65.87	66.95	65.87	66.95	65.87	66.95	65.87	66.94	0	0	0	0	0	-0.01
16	Sutter Bypass Upstream of Wadsworth Canal Confluence	55.75	57.10	55.73	57.08	55.73	57.08	55.73	57.07	-0.02	-0.02	-0.02	-0.02	-0.02	-0.03
17	Sutter Bypass Downstream of Wadsworth Canal Confluence	54.65	56.01	54.63	55.99	54.63	55.99	54.62	55.98	-0.02	-0.02	-0.02	-0.02	-0.03	-0.03
18	Sutter Bypass Upstream of Tisdale Bypass Confluence	52.35	53.68	52.32	53.65	52.32	53.65	52.31	53.64	-0.03	-0.03	-0.03	-0.03	-0.04	-0.04
19	Sutter Bypass Downstream of Tisdale Bypass Confluence	51.85	53.16	51.82	53.14	51.82	53.13	51.80	53.12	-0.03	-0.03	-0.03	-0.02	-0.05	-0.04
20	Sutter Bypass Upstream of Feather River Confluence	49.47	50.66	49.43	50.62	49.43	50.61	49.40	50.59	-0.04	-0.05	-0.04	-0.04	-0.07	-0.07
21	Sutter Bypass Downstream of Feather River Confluence	46.73	47.87	46.66	47.80	46.66	47.79	46.62	47.75	-0.07	-0.08	-0.07	-0.07	-0.11	-0.12
22	Sutter Bypass Upstream of Fremont Weir	43.21	44.21	43.08	44.09	43.07	44.06	42.99	43.99	-0.14	-0.15	-0.13	-0.12	-0.22	-0.22
23	Yolo Bypass Downstream of Fremont Weir	41.13	42.08	41.02	41.96	40.93	41.87	40.87	41.81	-0.2	-0.21	-0.11	-0.12	-0.26	-0.27
24	Yolo Bypass Upstream of I-5	35.43	36.44	35.30	36.33	34.62	35.69	34.62	35.69	-0.81	-0.75	-0.13	-0.11	-0.81	-0.75
25	Yolo Bypass Downstream of I-5	33.67	34.65	33.55	34.55	32.87	33.88	32.90	33.93	-0.8	-0.77	-0.12	-0.1	-0.77	-0.72
26	Yolo Bypass Upstream of Sacramento Bypass-1	32.08	33.10	31.96	33.01	31.6	32.65	31.67	32.74	-0.48	-0.45	-0.12	-0.09	-0.41	-0.36
27	Yolo Bypass Upstream of Sacramento Bypass-2	31.25	32.27	31.13	32.18	30.97	32.03	31.07	32.14	-0.28	-0.24	-0.12	-0.09	-0.18	-0.13
28	Yolo Bypass Downstream of Sacramento Bypass	30.66	31.68	30.84	31.89	30.76	31.81	30.86	31.93	0.1	0.13	0.18	0.21	0.2	0.25
29	Yolo Bypass Upstream of I-80	30.48	31.49	30.65	31.69	30.57	31.62	30.67	31.74	0.09	0.13	0.17	0.2	0.19	0.25
30	Yolo Bypass Near West Sacramento	29.71	30.63	29.87	30.82	29.8	30.75	29.89	30.85	0.09	0.12	0.16	0.19	0.18	0.22
31	Yolo Bypass Downstream of Putah Creek	27.53	28.42	27.69	28.59	27.62	28.53	27.71	28.63	0.09	0.11	0.16	0.17	0.18	0.21
32	Yolo Bypass at Lisbon	27.31	28.20	27.47	28.38	27.4	28.31	27.49	28.41	0.09	0.11	0.16	0.18	0.18	0.21
33	Yolo Bypass Downstream of Lisbon	24.51	25.43	24.66	25.60	24.6	25.53	24.68	25.63	0.09	0.1	0.15	0.17	0.17	0.2
34	Yolo Bypass Upstream of Reclamation District 2068	21.80	22.85	21.97	23.03	21.9	22.96	22.00	23.06	0.1	0.11	0.17	0.18	0.2	0.21
35	Yolo Bypass Upstream of Cache Slough	20.08	21.09	20.24	21.25	20.17	21.19	20.26	21.28	0.09	0.1	0.16	0.16	0.18	0.19
36	Cache Slough Upstream of Steamboat Slough	14.05	15.11	14.13	15.21	14.1	15.18	14.15	15.23	0.05	0.07	0.08	0.1	0.1	0.12
37	Sacramento Bypass at Sacramento Weir-1	32.93	34.08	31.89	32.98	31.37	32.41	31.67	32.77	-1.56	-1.67	-1.04	-1.1	-1.26	-1.31
38	Sacramento Bypass at Sacramento Weir-2	32.44	33.57	31.58	32.67	31.2	32.27	31.35	32.44	-1.24	-1.3	-0.86	-0.9	-1.09	-1.13
39	Deep Water Ship Channel - Downstream of Tie-in	17.03	18.09	17.13	18.22	17.09	18.18	17.14	18.25	0.06	0.09	0.1	0.13	0.11	0.16

Table 2. Peak Water Surface Elevations for Model Scenarios – Alternative 3

No.	Indicator Location	Existing (No Action Alternative) Stage (feet)		FWOP Stage (feet)		EWP Stage (feet)		FWP Stage (feet)		EWP (Alternative 3) vs. Existing Conditions Change in Stage (feet)		FWOP vs. Existing Conditions Change in Stage (feet)		FWP (Alternative 3 and Cumulative) vs. Existing Conditions Change in Stage (feet)	
		100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year
40	Deep Water Ship Channel - Midway	17.02	18.09	17.12	18.21	17.08	18.18	17.14	18.24	0.06	0.09	0.1	0.12	0.12	0.15
41	Deep Water Ship Channel - Towards the End	17.01	18.08	17.10	18.21	17.07	18.17	17.12	18.24	0.06	0.09	0.09	0.13	0.11	0.16
42	Sacramento River Downstream of Colusa	67.00	67.59	66.99	67.59	66.99	67.59	66.99	67.59	-0.01	0	-0.01	0	-0.01	0
43	Sacramento River Upstream of Tisdale Bypass	53.19	55.64	53.17	55.64	53.16	55.64	53.15	55.64	-0.03	0	-0.02	0	-0.04	0
44	Sacramento River Downstream of Tisdale Bypass	52.86	55.01	52.84	55.01	52.83	55.01	52.82	55.01	-0.03	0	-0.02	0	-0.04	0
45	Sacramento River Downstream of Knights Landing	42.57	43.51	42.47	43.41	42.4	43.34	42.34	43.29	-0.17	-0.17	-0.1	-0.1	-0.23	-0.22
46	Sacramento River at Verona	41.72	42.71	41.40	42.38	41.51	42.48	41.31	42.28	-0.21	-0.23	-0.32	-0.33	-0.41	-0.43
47	Sacramento River at I Street	34.22	35.44	32.41	33.55	33.46	34.61	32.25	33.40	-0.76	-0.83	-1.81	-1.89	-1.97	-2.04
48	Sacramento River at Freeport	27.90	28.93	26.53	27.41	27.29	28.27	26.44	27.29	-0.61	-0.66	-1.37	-1.52	-1.46	-1.64
49	Sacramento River Downstream of Georgiana Slough	17.17	17.71	16.61	17.08	16.92	17.45	16.58	17.04	-0.25	-0.26	-0.56	-0.63	-0.59	-0.67
50	Sacramento River Upstream of Cache Slough	12.63	13.28	12.61	13.27	12.63	13.29	12.61	13.28	0	0.01	-0.02	-0.01	-0.02	0
51	Sacramento River at Rio Vista	12.23	12.88	12.25	12.90	12.25	12.91	12.26	12.92	0.02	0.03	0.02	0.02	0.03	0.04
52	Natomas Cross Canal	41.82	42.80	41.52	42.48	41.62	42.58	41.43	42.39	-0.2	-0.22	-0.3	-0.32	-0.39	-0.41
53	Steamboat Slough Upstream Sacramento River	12.73	13.40	12.68	13.37	12.72	13.4	12.69	13.38	-0.01	0	-0.05	-0.03	-0.04	-0.02
54	Miner Slough Upstream Cache Slough	16.89	17.95	16.98	18.07	16.94	18.04	17.00	18.10	0.05	0.09	0.09	0.12	0.11	0.15
55	Lindsey Slough Upstream Yolo Bypass	17.45	18.44	17.56	18.56	17.51	18.52	17.58	18.59	0.06	0.08	0.11	0.12	0.13	0.15
56	Cache Slough Upstream Yolo Bypass	18.34	19.30	18.47	19.43	18.42	19.38	18.49	19.45	0.08	0.08	0.13	0.13	0.15	0.15
57	American River Upstream of SR 160 Bridge	37.28	38.71	35.99	37.40	36.72	38.11	35.87	37.29	-0.56	-0.6	-1.29	-1.31	-1.41	-1.42
58	American River Upstream of Fair Oaks	51.33	53.54	51.24	53.41	51.28	53.48	51.24	53.41	-0.05	-0.06	-0.09	-0.13	-0.09	-0.13

Notes: FWOP = Future Without-Project; EWP = Existing With-Project; FWP = Future With-Project
Source: Data compiled by California Department of Water Resources in 2017

Table 3. Peak Water Surface Elevations for Model Scenarios – Alternative 4

No.	Indicator Location	Existing (No Action Alternative) Stage (feet)		FWOP Stage (feet)		EWP Stage (feet)		FWP Stage (feet)		EWP (Alternative 4) vs. Existing Conditions Change in Stage (feet)		FWOP vs. Existing Conditions Change in Stage (feet)		FWP (Alternative 4 and Cumulative) vs. Existing Conditions Change in Stage (feet)	
		100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year
1	Feather River Upstream of Cherokee Canal Diversion	126.60	127.05	126.60	127.05	126.6	127.05	126.60	127.05	0	0	0	0	0	0
2	Feather River Downstream of Cherokee Canal Diversion	121.56	122.05	121.56	122.05	121.56	122.05	121.56	122.05	0	0	0	0	0	0
3	Feather River Downstream of Honcut Creek Confluence	84.88	85.11	84.88	85.11	84.87	85.1	84.87	85.10	-0.01	-0.01	0	0	-0.01	-0.01
4	Feather River Upstream of Jack Slough Confluence	77.56	77.99	77.56	77.99	77.57	77.99	77.57	77.99	0.01	0	0	0	0.01	0
5	Feather River Upstream of Yuba River Confluence	75.14	75.76	75.14	75.76	75.15	75.77	75.15	75.77	0.01	0.01	0	0	0.01	0.01
6	Feather River Downstream of Yuba River Confluence	73.95	74.65	73.95	74.65	73.95	74.66	73.95	74.66	0	0.01	0	0	0	0.01
7	Feather River at Boyd's Landing	64.81	65.62	64.80	65.61	64.84	65.65	64.84	65.65	0.03	0.03	-0.01	-0.01	0.03	0.03
8	Feather River Upstream of Mainstem Setback	62.04	62.85	62.03	62.85	62.09	62.9	62.09	62.90	0.05	0.05	-0.01	0	0.05	0.05
9	Feather River Upstream of Bear River Confluence	57.62	58.37	57.61	58.36	57.71	58.46	57.71	58.46	0.09	0.09	-0.01	-0.01	0.09	0.09
10	Feather River Downstream of Bear River Confluence	56.07	56.85	56.06	56.84	56.06	56.85	56.06	56.84	-0.01	0	-0.01	-0.01	-0.01	-0.01
11	Feather River Upstream of Sutter Bypass Confluence	51.61	52.69	51.58	52.65	51.59	52.67	51.57	52.65	-0.02	-0.02	-0.03	-0.04	-0.04	-0.04
12	Cherokee Canal Downstream of Cherokee Bypass	87.38	87.80	87.38	87.80	87.38	87.8	87.38	87.80	0	0	0	0	0	0
13	Butte Sink Downstream of Cherokee Canal	69.83	70.52	69.83	70.52	69.83	70.52	69.83	70.52	0	0	0	0	0	0
14	Butte Sink Upstream of Sutter Bypass	66.83	67.98	66.83	67.98	66.83	67.98	66.83	67.98	0	0	0	0	0	0
15	Sutter Bypass Downstream of Butte Sink	65.87	66.95	65.87	66.95	65.87	66.95	65.87	66.95	0	0	0	0	0	0
16	Sutter Bypass Upstream of Wadsworth Canal Confluence	55.75	57.10	55.73	57.08	55.74	57.09	55.73	57.08	-0.01	-0.01	-0.02	-0.02	-0.02	-0.02
17	Sutter Bypass Downstream of Wadsworth Canal Confluence	54.65	56.01	54.63	55.99	54.64	56	54.63	55.99	-0.01	-0.01	-0.02	-0.02	-0.02	-0.02
18	Sutter Bypass Upstream of Tisdale Bypass Confluence	52.35	53.68	52.32	53.65	52.34	53.66	52.32	53.65	-0.01	-0.02	-0.03	-0.03	-0.03	-0.03
19	Sutter Bypass Downstream of Tisdale Bypass Confluence	51.85	53.16	51.82	53.14	51.83	53.15	51.82	53.13	-0.02	-0.01	-0.03	-0.02	-0.03	-0.03
20	Sutter Bypass Upstream of Feather River Confluence	49.47	50.66	49.43	50.62	49.45	50.63	49.43	50.61	-0.02	-0.03	-0.04	-0.04	-0.04	-0.05
21	Sutter Bypass Downstream of Feather River Confluence	46.73	47.87	46.66	47.80	46.69	47.82	46.65	47.79	-0.04	-0.05	-0.07	-0.07	-0.08	-0.08
22	Sutter Bypass Upstream of Fremont Weir	43.21	44.21	43.08	44.09	43.13	44.13	43.06	44.07	-0.08	-0.08	-0.13	-0.12	-0.15	-0.14
23	Yolo Bypass Downstream of Fremont Weir	41.13	42.08	41.02	41.96	41.04	41.97	40.98	41.92	-0.09	-0.11	-0.11	-0.12	-0.15	-0.16
24	Yolo Bypass Upstream of I-5	35.43	36.44	35.30	36.33	35.14	36.16	35.12	36.16	-0.29	-0.28	-0.13	-0.11	-0.31	-0.28
25	Yolo Bypass Downstream of I-5	33.67	34.65	33.55	34.55	33.28	34.26	33.30	34.29	-0.39	-0.39	-0.12	-0.1	-0.37	-0.36
26	Yolo Bypass Upstream of Sacramento Bypass-1	32.08	33.10	31.96	33.01	31.59	32.62	31.65	32.71	-0.49	-0.48	-0.12	-0.09	-0.43	-0.39
27	Yolo Bypass Upstream of Sacramento Bypass-2	31.25	32.27	31.13	32.18	30.96	32	31.05	32.11	-0.29	-0.27	-0.12	-0.09	-0.2	-0.16
28	Yolo Bypass Downstream of Sacramento Bypass	30.66	31.68	30.84	31.89	30.75	31.79	30.84	31.89	0.09	0.11	0.18	0.21	0.18	0.21
29	Yolo Bypass Upstream of I-80	30.48	31.49	30.65	31.69	30.56	31.59	30.65	31.70	0.08	0.1	0.17	0.2	0.17	0.21
30	Yolo Bypass Near West Sacramento	29.71	30.63	29.87	30.82	29.79	30.73	29.87	30.82	0.08	0.1	0.16	0.19	0.16	0.19
31	Yolo Bypass Downstream of Putah Creek	27.53	28.42	27.69	28.59	27.61	28.51	27.69	28.60	0.08	0.09	0.16	0.17	0.16	0.18
32	Yolo Bypass at Lisbon	27.31	28.20	27.47	28.38	27.39	28.29	27.47	28.38	0.08	0.09	0.16	0.18	0.16	0.18
33	Yolo Bypass Downstream of Lisbon	24.51	25.43	24.66	25.60	24.59	25.51	24.66	25.60	0.08	0.08	0.15	0.17	0.15	0.17
34	Yolo Bypass Upstream of Reclamation District 2068	21.80	22.85	21.97	23.03	21.89	22.94	21.97	23.03	0.09	0.09	0.17	0.18	0.17	0.18
35	Yolo Bypass Upstream of Cache Slough	20.08	21.09	20.24	21.25	20.16	21.17	20.24	21.25	0.08	0.08	0.16	0.16	0.16	0.16
36	Cache Slough Upstream of Steamboat Slough	14.05	15.11	14.13	15.21	14.09	15.16	14.14	15.21	0.04	0.05	0.08	0.1	0.09	0.1
37	Sacramento Bypass at Sacramento Weir-1	32.93	34.08	31.89	32.98	31.37	32.4	31.91	33.01	-1.56	-1.68	-1.04	-1.1	-1.02	-1.07
38	Sacramento Bypass at Sacramento Weir-2	32.44	33.57	31.58	32.67	31.19	32.25	31.61	32.71	-1.25	-1.32	-0.86	-0.9	-0.83	-0.86
39	Deep Water Ship Channel - Downstream of Tie-in	17.03	18.09	17.13	18.22	17.08	18.16	17.13	18.22	0.05	0.07	0.1	0.13	0.1	0.13

Table 3. Peak Water Surface Elevations for Model Scenarios – Alternative 4

No.	Indicator Location	Existing (No Action Alternative) Stage (feet)		FWOP Stage (feet)		EWP Stage (feet)		FWP Stage (feet)		EWP (Alternative 4) vs. Existing Conditions Change in Stage (feet)		FWOP vs. Existing Conditions Change in Stage (feet)		FWP (Alternative 4 and Cumulative) vs. Existing Conditions Change in Stage (feet)	
		100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year
40	Deep Water Ship Channel - Midway	17.02	18.09	17.12	18.21	17.07	18.16	17.12	18.22	0.05	0.07	0.1	0.12	0.1	0.13
41	Deep Water Ship Channel - Towards the End	17.01	18.08	17.10	18.21	17.06	18.15	17.11	18.22	0.05	0.07	0.09	0.13	0.1	0.14
42	Sacramento River Downstream of Colusa	67.00	67.59	66.99	67.59	67	67.59	66.99	67.59	0	0	-0.01	0	-0.01	0
43	Sacramento River Upstream of Tisdale Bypass	53.19	55.64	53.17	55.64	53.18	55.64	53.17	55.64	-0.01	0	-0.02	0	-0.02	0
44	Sacramento River Downstream of Tisdale Bypass	52.86	55.01	52.84	55.01	52.85	55.01	52.83	55.01	-0.01	0	-0.02	0	-0.03	0
45	Sacramento River Downstream of Knights Landing	42.57	43.51	42.47	43.41	42.49	43.42	42.43	43.38	-0.08	-0.09	-0.1	-0.1	-0.14	-0.13
46	Sacramento River at Verona	41.72	42.71	41.40	42.38	41.57	42.54	41.39	42.36	-0.15	-0.17	-0.32	-0.33	-0.33	-0.35
47	Sacramento River at I Street	34.22	35.44	32.41	33.55	33.47	34.62	32.42	33.57	-0.75	-0.82	-1.81	-1.89	-1.8	-1.87
48	Sacramento River at Freeport	27.90	28.93	26.53	27.41	27.3	28.28	26.53	27.42	-0.6	-0.65	-1.37	-1.52	-1.37	-1.51
49	Sacramento River Downstream of Georgiana Slough	17.17	17.71	16.61	17.08	16.92	17.45	16.61	17.09	-0.25	-0.26	-0.56	-0.63	-0.56	-0.62
50	Sacramento River Upstream of Cache Slough	12.63	13.28	12.61	13.27	12.62	13.28	12.61	13.27	-0.01	0	-0.02	-0.01	-0.02	-0.01
51	Sacramento River at Rio Vista	12.23	12.88	12.25	12.90	12.24	12.9	12.25	12.91	0.01	0.02	0.02	0.02	0.02	0.03
52	Natomas Cross Canal	41.82	42.80	41.52	42.48	41.68	42.64	41.5	42.47	-0.14	-0.16	-0.3	-0.32	-0.32	-0.33
53	Steamboat Slough Upstream Sacramento River	12.73	13.40	12.68	13.37	12.71	13.39	12.69	13.37	-0.02	-0.01	-0.05	-0.03	-0.04	-0.03
54	Miner Slough Upstream Cache Slough	16.89	17.95	16.98	18.07	16.93	18.02	16.98	18.08	0.04	0.07	0.09	0.12	0.09	0.13
55	Lindsey Slough Upstream Yolo Bypass	17.45	18.44	17.56	18.56	17.5	18.5	17.56	18.56	0.05	0.06	0.11	0.12	0.11	0.12
56	Cache Slough Upstream Yolo Bypass	18.34	19.30	18.47	19.43	18.41	19.37	18.47	19.43	0.07	0.07	0.13	0.13	0.13	0.13
57	American River Upstream of SR 160 Bridge	37.28	38.71	35.99	37.40	36.72	38.12	35.99	37.40	-0.56	-0.59	-1.29	-1.31	-1.29	-1.31
58	American River Upstream of Fair Oaks	51.33	53.54	51.24	53.41	51.28	53.48	51.24	53.41	-0.05	-0.06	-0.09	-0.13	-0.09	-0.13

Notes: FWOP = Future Without-Project; EWP = Existing With-Project; FWP = Future With-Project
Source: Data compiled by California Department of Water Resources in 2017

Table 4. Peak Water Surface Elevations for Model Scenarios – Alternative 5

No.	Indicator Location	Existing (No Action Alternative) Stage (feet)		FWOP Stage (feet)		EWP Stage (feet)		FWP Stage (feet)		EWP (Alternative 5) vs. Existing Conditions Change in Stage (feet)		FWOP vs. Existing Conditions Change in Stage (feet)		FWP (Alternative 5 and Cumulative) vs. Existing Conditions Change in Stage (feet)	
		100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year
1	Feather River Upstream of Cherokee Canal Diversion	126.60	127.05	126.60	127.05	126.6	127.05	126.60	127.05	0	0	0	0	0	0
2	Feather River Downstream of Cherokee Canal Diversion	121.56	122.05	121.56	122.05	121.56	122.05	121.56	122.05	0	0	0	0	0	0
3	Feather River Downstream of Honcut Creek Confluence	84.88	85.11	84.88	85.11	84.87	85.1	84.87	85.10	-0.01	-0.01	0	0	-0.01	-0.01
4	Feather River Upstream of Jack Slough Confluence	77.56	77.99	77.56	77.99	77.57	77.99	77.57	77.99	0.01	0	0	0	0.01	0
5	Feather River Upstream of Yuba River Confluence	75.14	75.76	75.14	75.76	75.15	75.77	75.15	75.77	0.01	0.01	0	0	0.01	0.01
6	Feather River Downstream of Yuba River Confluence	73.95	74.65	73.95	74.65	73.95	74.66	73.95	74.66	0	0.01	0	0	0	0.01
7	Feather River at Boyd's Landing	64.81	65.62	64.80	65.61	64.84	65.65	64.84	65.65	0.03	0.03	-0.01	-0.01	0.03	0.03
8	Feather River Upstream of Mainstem Setback	62.04	62.85	62.03	62.85	62.09	62.9	62.09	62.90	0.05	0.05	-0.01	0	0.05	0.05
9	Feather River Upstream of Bear River Confluence	57.62	58.37	57.61	58.36	57.71	58.46	57.71	58.46	0.09	0.09	-0.01	-0.01	0.09	0.09
10	Feather River Downstream of Bear River Confluence	56.07	56.85	56.06	56.84	56.06	56.85	56.06	56.84	-0.01	0	-0.01	-0.01	-0.01	-0.01
11	Feather River Upstream of Sutter Bypass Confluence	51.61	52.69	51.58	52.65	51.59	52.67	51.57	52.65	-0.02	-0.02	-0.03	-0.04	-0.04	-0.04
12	Cherokee Canal Downstream of Cherokee Bypass	87.38	87.80	87.38	87.80	87.38	87.8	87.38	87.80	0	0	0	0	0	0
13	Butte Sink Downstream of Cherokee Canal	69.83	70.52	69.83	70.52	69.83	70.52	69.83	70.52	0	0	0	0	0	0
14	Butte Sink Upstream of Sutter Bypass	66.83	67.98	66.83	67.98	66.83	67.98	66.83	67.98	0	0	0	0	0	0
15	Sutter Bypass Downstream of Butte Sink	65.87	66.95	65.87	66.95	65.87	66.95	65.87	66.95	0	0	0	0	0	0
16	Sutter Bypass Upstream of Wadsworth Canal Confluence	55.75	57.10	55.73	57.08	55.74	57.09	55.73	57.08	-0.01	-0.01	-0.02	-0.02	-0.02	-0.02
17	Sutter Bypass Downstream of Wadsworth Canal Confluence	54.65	56.01	54.63	55.99	54.64	56	54.63	55.99	-0.01	-0.01	-0.02	-0.02	-0.02	-0.02
18	Sutter Bypass Upstream of Tisdale Bypass Confluence	52.35	53.68	52.32	53.65	52.34	53.67	52.32	53.65	-0.01	-0.01	-0.03	-0.03	-0.03	-0.03
19	Sutter Bypass Downstream of Tisdale Bypass Confluence	51.85	53.16	51.82	53.14	51.83	53.15	51.82	53.13	-0.02	-0.01	-0.03	-0.02	-0.03	-0.03
20	Sutter Bypass Upstream of Feather River Confluence	49.47	50.66	49.43	50.62	49.45	50.64	49.43	50.62	-0.02	-0.02	-0.04	-0.04	-0.04	-0.04
21	Sutter Bypass Downstream of Feather River Confluence	46.73	47.87	46.66	47.80	46.7	47.83	46.66	47.79	-0.03	-0.04	-0.07	-0.07	-0.07	-0.08
22	Sutter Bypass Upstream of Fremont Weir	43.21	44.21	43.08	44.09	43.14	44.14	43.07	44.07	-0.07	-0.07	-0.13	-0.12	-0.14	-0.14
23	Yolo Bypass Downstream of Fremont Weir	41.13	42.08	41.02	41.96	41.05	41.99	40.99	41.93	-0.08	-0.09	-0.11	-0.12	-0.14	-0.15
24	Yolo Bypass Upstream of I-5	35.43	36.44	35.30	36.33	35.18	36.2	35.17	36.20	-0.25	-0.24	-0.13	-0.11	-0.26	-0.24
25	Yolo Bypass Downstream of I-5	33.67	34.65	33.55	34.55	33.34	34.32	33.36	34.35	-0.33	-0.33	-0.12	-0.1	-0.31	-0.3
26	Yolo Bypass Upstream of Sacramento Bypass-1	32.08	33.10	31.96	33.01	31.68	32.71	31.74	32.80	-0.4	-0.39	-0.12	-0.09	-0.34	-0.3
27	Yolo Bypass Upstream of Sacramento Bypass-2	31.25	32.27	31.13	32.18	30.99	32.03	31.08	32.14	-0.26	-0.24	-0.12	-0.09	-0.17	-0.13
28	Yolo Bypass Downstream of Sacramento Bypass	30.66	31.68	30.84	31.89	30.74	31.78	30.84	31.89	0.08	0.1	0.18	0.21	0.18	0.21
29	Yolo Bypass Upstream of I-80	30.48	31.49	30.65	31.69	30.56	31.59	30.65	31.70	0.08	0.1	0.17	0.2	0.17	0.21
30	Yolo Bypass Near West Sacramento	29.71	30.63	29.87	30.82	29.78	30.72	29.87	30.82	0.07	0.09	0.16	0.19	0.16	0.19
31	Yolo Bypass Downstream of Putah Creek	27.53	28.42	27.69	28.59	27.61	28.5	27.69	28.59	0.08	0.08	0.16	0.17	0.16	0.17
32	Yolo Bypass at Lisbon	27.31	28.20	27.47	28.38	27.39	28.29	27.47	28.38	0.08	0.09	0.16	0.18	0.16	0.18
33	Yolo Bypass Downstream of Lisbon	24.51	25.43	24.66	25.60	24.58	25.51	24.66	25.60	0.07	0.08	0.15	0.17	0.15	0.17
34	Yolo Bypass Upstream of Reclamation District 2068	21.80	22.85	21.97	23.03	21.88	22.94	21.97	23.03	0.08	0.09	0.17	0.18	0.17	0.18
35	Yolo Bypass Upstream of Cache Slough	20.08	21.09	20.24	21.25	20.16	21.17	20.24	21.25	0.08	0.08	0.16	0.16	0.16	0.16
36	Cache Slough Upstream of Steamboat Slough	14.05	15.11	14.13	15.21	14.09	15.16	14.13	15.21	0.04	0.05	0.08	0.1	0.08	0.1
37	Sacramento Bypass at Sacramento Weir-1	32.93	34.08	31.89	32.98	31.48	32.52	31.95	33.05	-1.45	-1.56	-1.04	-1.1	-0.98	-1.03
38	Sacramento Bypass at Sacramento Weir-2	32.44	33.57	31.58	32.67	31.31	32.38	31.65	32.75	-1.13	-1.19	-0.86	-0.9	-0.79	-0.82
39	Deep Water Ship Channel - Downstream of Tie-in	17.03	18.09	17.13	18.22	17.07	18.16	17.13	18.22	0.04	0.07	0.1	0.13	0.1	0.13

Table 4. Peak Water Surface Elevations for Model Scenarios – Alternative 5

No.	Indicator Location	Existing (No Action Alternative) Stage (feet)		FWOP Stage (feet)		EWP Stage (feet)		FWP Stage (feet)		EWP (Alternative 5) vs. Existing Conditions Change in Stage (feet)		FWOP vs. Existing Conditions Change in Stage (feet)		FWP (Alternative 5 and Cumulative) vs. Existing Conditions Change in Stage (feet)	
		100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year	100-year	200-year
40	Deep Water Ship Channel - Midway	17.02	18.09	17.12	18.21	17.07	18.15	17.12	18.22	0.05	0.06	0.1	0.12	0.1	0.13
41	Deep Water Ship Channel - Towards the End	17.01	18.08	17.10	18.21	17.05	18.15	17.10	18.21	0.04	0.07	0.09	0.13	0.09	0.13
42	Sacramento River Downstream of Colusa	67.00	67.59	66.99	67.59	67	67.59	66.99	67.59	0	0	-0.01	0	-0.01	0
43	Sacramento River Upstream of Tisdale Bypass	53.19	55.64	53.17	55.64	53.18	55.64	53.17	55.64	-0.01	0	-0.02	0	-0.02	0
44	Sacramento River Downstream of Tisdale Bypass	52.86	55.01	52.84	55.01	52.85	55.01	52.83	55.01	-0.01	0	-0.02	0	-0.03	0
45	Sacramento River Downstream of Knights Landing	42.57	43.51	42.47	43.41	42.5	43.43	42.44	43.39	-0.07	-0.08	-0.1	-0.1	-0.13	-0.12
46	Sacramento River at Verona	41.72	42.71	41.40	42.38	41.58	42.56	41.39	42.37	-0.14	-0.15	-0.32	-0.33	-0.33	-0.34
47	Sacramento River at I Street	34.22	35.44	32.41	33.55	33.52	34.67	32.45	33.59	-0.7	-0.77	-1.81	-1.89	-1.77	-1.85
48	Sacramento River at Freeport	27.90	28.93	26.53	27.41	27.34	28.32	26.55	27.44	-0.56	-0.61	-1.37	-1.52	-1.35	-1.49
49	Sacramento River Downstream of Georgiana Slough	17.17	17.71	16.61	17.08	16.93	17.47	16.62	17.09	-0.24	-0.24	-0.56	-0.63	-0.55	-0.62
50	Sacramento River Upstream of Cache Slough	12.63	13.28	12.61	13.27	12.62	13.28	12.61	13.27	-0.01	0	-0.02	-0.01	-0.02	-0.01
51	Sacramento River at Rio Vista	12.23	12.88	12.25	12.90	12.24	12.9	12.25	12.91	0.01	0.02	0.02	0.02	0.02	0.03
52	Natomas Cross Canal	41.82	42.80	41.52	42.48	41.69	42.65	41.51	42.48	-0.13	-0.15	-0.3	-0.32	-0.31	-0.32
53	Steamboat Slough Upstream Sacramento River	12.73	13.40	12.68	13.37	12.71	13.39	12.69	13.37	-0.02	-0.01	-0.05	-0.03	-0.04	-0.03
54	Miner Slough Upstream Cache Slough	16.89	17.95	16.98	18.07	16.93	18.01	16.98	18.08	0.04	0.06	0.09	0.12	0.09	0.13
55	Lindsey Slough Upstream Yolo Bypass	17.45	18.44	17.56	18.56	17.5	18.5	17.56	18.56	0.05	0.06	0.11	0.12	0.11	0.12
56	Cache Slough Upstream Yolo Bypass	18.34	19.30	18.47	19.43	18.4	19.36	18.47	19.43	0.06	0.06	0.13	0.13	0.13	0.13
57	American River Upstream of SR 160 Bridge	37.28	38.71	35.99	37.40	36.76	38.15	36.01	37.42	-0.52	-0.56	-1.29	-1.31	-1.27	-1.29
58	American River Upstream of Fair Oaks	51.33	53.54	51.24	53.41	51.28	53.48	51.24	53.42	-0.05	-0.06	-0.09	-0.13	-0.09	-0.12

Notes: FWOP = Future Without-Project; EWP = Existing With-Project; FWP = Future With-Project
Source: Data compiled by California Department of Water Resources in 2017

5. Wind Setup and Wave Run-up

This analysis was performed to assess the potential increase in stage along the levees due to wind setup and wave run-up. The procedures follow the USACE Sutter Basin Feasibility Study (Sutter Study; USACE 2011) along with three main guidance documents: *Coastal Engineering Manual* (EM), 1110-2-1100 (USACE 2008); *Hydrologic Engineering Requirements for Reservoirs*, EM 1110-2-1420 (USACE 1997); and *Shore Protection Manual* (SPM) (USACE 1984). The Sutter Report follows these three documents overall, but uses revised Hurdle and Stive (1989) wave forecasting equations to estimate significant wave height, peak wave period, and limiting duration required for estimating wave run-up.

5.1 Inputs

This analysis was based on initial estimates of annual maximum hourly wind speed (maximum probable) at eight orbital directions taken directly from the Sutter Report. The fetch length for this analysis was estimated based on a fetch normal to the levee, +45° (counterclockwise) off the normal, and -45° (clockwise) off the normal. Three analysis sites (LEBL1, LEBL2, LEBL3) were considered to maximize fetch length or wind speed so that maximum run-up values could be estimated for the setback levee. The site that provided maximum combined wind setup and wave run-up was selected for analysis.

Estimated 200-year WSEs from the hydraulic analysis were used to compute fetch depth. The terrain and bathymetry data required to estimate flow depth were obtained from the CVFED Program. Fetch depths were estimated as the average hydraulic depths (the ratio of cross-sectional area and top width) calculated along the fetch radials.

5.2 Results

The preliminary wind setup and wave run-up analysis results for the three sites are displayed in Table 5. The run-up estimates are based on a waterside levee slope of 4:1 (horizontal:vertical). Among the sites considered, an overall maximum run-up of 9.08 feet and maximum wind setup of 1.25 feet was estimated at Site LEBL3 (Table 5). Also, the total water level (TWL) for the maximum probable wind speed is shown in Table 5.

Table 5. Wind Wave Analysis Results for the Maximum Probable Wind Speed and 1997 x 110% River Stage

Site[1]	Wind Stress[2] *UA* (mph)	Fetch Length[3] *F* (miles)	Depth[4] *d* (feet)	Wave Height *Hs* (feet)	Wave Period *Tp* (second)	Wave Run-up *Ru2%* (feet)	Wind Setup *Swind* (feet)	Total Water Level *TWL* (feet, NAVD88)
LEBL1 (RM 49.288)	105.8 (65.0)	3.040 (Northwest)	14.96 (33.84)	5.06	3.82	7.01	0.61	41.46
LEBL2 (RM 46.973)	82.5 (56.5)	7.855 (South)	15.12 (32.67)	4.74	4.07	7.24	1.18	41.09
LEBL3 (RM 44.729)	105.8 (65)	6.444 (Northwest)	15.52 (31.88)	5.85	4.60	9.08	1.25	42.21

Notes:
[1] River Mile (RM) based on TO 34 CVFED model for YOLO R06 Reach
[2] 1-hour most probable wind stress (UA, maximum of the annual maximum 1-hour wind stress values) and corresponding 1-hour wind speed, in parentheses
[3] Fetch length measured along a direction that produces the maximum run-up. Direction shown in parentheses.
Average fetch depth (d). River stage (static water level) in NAVD88 at the site location shown in parentheses.
Source: Data compiled by California Department of Water Resources in 2017

6. Impact Analysis

6.1 Study Area and Index Points

The study area includes channel reaches downstream and upstream of the project site that would be influenced by changes in flows and corresponding WSEs. This study area was defined by comparing the Existing Conditions and Existing With-Project results. The selected event model runs resulted in hydraulic changes from approximately the Sutter Bypass confluence with the Feather River to the Sacramento River at Rio Vista, including flows in the lower Sutter Bypass, Yolo Bypass, Sacramento Bypass, and Deepwater Ship Channel. The index points were selected to evaluate the hydraulic impacts throughout the study area (see Figure 1).

6.2 Peak Stage Increases

The comparison of results between Existing Conditions and the Existing With-Project scenario, as shown in Tables 1 through 4, reflects the reduced WSEs along the Yolo Bypass immediately upstream of the Sacramento Bypass confluence and increase in WSEs immediately downstream of the Sacramento Bypass confluence under all alternatives. The stage reduction along the Yolo Bypass between the Fremont Weir and the confluence with the Sacramento Bypass is due to the LEBLS project under the Existing With-Project scenario. More water is drawn out of the Sacramento River to the Sacramento Bypass, which increases WSEs along the Yolo Bypass downstream of the Sacramento Bypass confluence by a smaller amount than the larger WSEs decreases in the Sacramento River near Sacramento. The increase in WSEs in the Yolo Bypass gradually dissipates moving downstream towards the Sacramento-San Joaquin Delta (Delta). For Alternative 2, the maximum increase in WSE of 0.10 foot appears at the Yolo Bypass, immediately downstream of the Sacramento Bypass confluence for the 100-year flood event. At Rio Vista, the increase is reduced to 0.02 foot (see Table 1). The maximum stage reduction on the Sacramento River at the I Street Bridge due to the LEBLS project is 0.81 foot for the 100-year flood event.

The comparison of results between Existing Conditions and the Future With-Project scenario (cumulative scenario), reflects the same pattern as described in the previous scenario but with different magnitudes. WSEs are reduced along Yolo Bypass between the Fremont Weir and the confluence with the Sacramento Bypass due to the combined effects of the ARCF GRR that expands the Sacramento Weir/Bypass, and the LEBLS project. More water is drawn out of the Sacramento River through the Sacramento Weir to the Bypass which increases WSEs along the Yolo Bypass downstream of the Sacramento Bypass confluence. The increase in WSEs gradually dissipates moving downstream towards the Delta. Under Alternative 2, the maximum increase in WSE of 0.19 foot appears at the Yolo Bypass immediately downstream of the Sacramento Bypass confluence for the 100-year flood event. On the Sacramento River at Rio Vista, the WSE increase is reduced to 0.02 foot as shown in Table 3. Under Alternative 2, the maximum decrease in WSE of 1.91 feet occurs on the Sacramento River at the I Street Bridge due to the combined effects of the ARCF GRR Sacramento Weir/Bypass expansion and the LEBLS project.

Comparisons under the 200-year event display a similar pattern of changes to that of the 100-year event, but with slightly greater magnitudes. These differences are shown in Tables 1 through 4 for Alternatives 2 through 5, respectively.

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8. Acronyms

ARCF	American River Common Features
BWFS	Sacramento River Basin-Wide Feasibility Study
CVFED	Central Valley Floodplain Evaluation and Delineation
CVFPP	Central Valley Flood Protection Plan
CVHS	Central Valley Hydrology Study
DWR	California Department of Water Resources
EIP	Early Implementation Program
EWP	Existing With-Project Scenario
FWOP	Future Without-Project Scenario
FWP	Future With-Project Scenario
GRR	General Reevaluation Report
HEC	U. S. Army Corps of Engineers Hydrologic Engineering Center
LEBL	Lower Elkhorn Basin Levee
LEBLS	Lower Elkhorn Basin Levee Setback
LiDAR	Light Detection and Ranging
NAD	North American Datum
NAVD	North American Vertical Datum
RM	River Mile
SPM	Shore Protection Manual
TO	Task Order
TWL	Total Water Level
WSE	Water Surface Elevation

Appendix H. Lower Elkhorn Basin Levee Setback Project Agricultural Economics Modeling Report (Draft)

Appendix H

Lower Elkhorn Basin Levee Setback Project Agricultural Economics Modeling Report (Draft)

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California Department of Water Resources

Division of Flood Management

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Chapter 1. Introduction

This agricultural economic impact analysis evaluates the primary and secondary annual agricultural economic impacts resulting from changes in agricultural land use (crops) caused by a proposed levee setback along the Yolo Bypass in the Lower Elkhorn Basin (Lower Basin). Some crops currently protected by the existing levee would be located inside the Yolo Bypass and subject to more frequent flooding because of the levee setback. It is anticipated that these crops would be converted to a different crop compatible with more frequent flooding. The remaining crops behind the levee setback would have improved flood protection. Finally, some crops would be displaced by the proposed levee setback footprint. Other impacts (benefits) associated with the levee setback, such as improved flood protection in urban areas downstream of the Lower Basin, are qualitatively described.

Chapter 2. Study Region and Analysis Period

2.1 Study Region

The study region is Yolo County. The Lower Basin is upstream of the Sacramento metropolitan area and is surrounded by leveed portions of the Sacramento River to the east, Yolo Bypass to the west, and the Sacramento Weir to the south. Interstate 5 is the northern boundary. The Lower Basin comprises about 5,874 acres, of which about 5,141 acres (88%) were in agricultural production in 2016. The Elkhorn Upper Basin (Upper Basin) is north of Interstate 5 between the Yolo Bypass and the Sacramento River. Figure 1 shows the study region.

Cross levees subdivide the Lower Basin into 3 separate reclamation districts (RD 827, RD 785, and RD 537) each requiring its own pump station for dewatering following flood events. RD 1600 is in the Upper Basin. These reclamation districts are shown in Figure 2.

2.2 Analysis Period

Project construction is scheduled to begin in 2020; therefore, the 50- year economic analysis period will be 2020-2070.

Chapter 3. Agricultural Impacts

The impact analysis includes primary and secondary economic impacts:

3.1 Primary Economic Impacts

Primary (or direct) economic impacts are the changes in the value of goods and services and/or the reduction in costs, damage, or losses to those directly affected by the project (i.e., primarily the growers in the Lower Basin). Primary annual economic impacts include:

- Total crop revenue. Total crop revenue is the total value of crop production and is a function of crop types, acres, yields, and commodity prices received.
- Operating costs. Crop variable production costs excluding land and overhead costs.
- Expected annual flood damage. Crops located on the landside of the existing and proposed levee setback are subject to expected annual damage (EAD) which is a function of hydrologic, hydraulic, geotechnical, and economic considerations.
- Expected annual flood losses. Crops that will be located on the water side of the proposed levee setback will be subject to more frequent flooding within the Yolo Bypass which may delay planting and therefore reduce yields and crop revenue. These flood losses are a function of crop type, crop planting windows, and last date wet assumptions (compared to crop planting windows) within the Yolo Bypass.
- Net crop revenue. Net crop revenue is total crop revenue minus the operating costs and flood damage/losses described above.
- Employment. Number of full-time jobs associated with crop production.

Primary economic impacts are evaluated using a spreadsheet analysis with these inputs:

- Crop types and acreage. For years prior to 2016, crop types and acreages were identified using California Department of Water Resources (DWR) Yolo County 2008 and 2014 land use surveys (summer conditions). Cropping patterns for 2015 were based upon grower input. Cropping patterns for 2016 were based upon observed changes since 2014. Future year (2020) without- and with-project crop types and acres were developed with grower input.
- Crop yields. Crop yields between 2010 and 2015 were identified using Yolo County Agricultural Crop Reports.
- Crop prices. Crop prices received by the growers between 2010 and 2015 were identified using Yolo County Agricultural Crop Reports.
- Crop operating costs. Crop variable production costs were identified using various UC Davis Cooperative Extension crop budgets.

- Employment. Crop machine and non-machine labor hour information were obtained from various UC Cooperative Extension crop budgets. Total crop hours were converted to full-time equivalents.

- Crop expected annual flood damage. Annual crop flood damage/acre estimates were originally developed for the Sacramento and San Joaquin Rivers Comprehensive Study (2001) and updated for the 2012 and 2017 Central Valley Flood Protection Plans (CVFPP) flood risk analyses. These are described in the DWR *Handbook for Assessing Value* (HAV).

- Crop expected annual flood losses. Crop planting windows and yield reductions due to flood-related delayed planting are based on published information (crop budgets and Howitt, et al).

- Levee failure probabilities. Levee failure probabilities without- and with-project are based on HEC-Flood Damage Analysis (FDA) expected annual exceedance probability (AEP) results from the 2017 CVFPP flood risk analysis.

3.2 Secondary Economic Impacts

Secondary "ripple" economic impacts are the changes in values that accrue to persons other than those primarily affected by the project (the direct impacts). Secondary economic impacts include:

- Indirect effects. Indirect effects are the interindustry linkages resulting from a firm (i) purchasing inputs to produce its products and (ii) then shipping its products to markets or to other firms for further processing. Examples of interindustry effects in an agricultural economy include the purchases of farm products (e.g., seed and fertilizer) required to grow the crops and expenditures by mills to process the farm products for final consumption.

- Induced effects. Induced effects occur when employees and business proprietors spend their income (e.g., wages and profits) in other businesses in the region (e.g., going out to a restaurant).

- Total effects. Total effects are the sum of the direct, indirect, and induced effects.

An input-output (I/O) analysis is used to evaluate secondary economic impacts and IMPLAN is a recognized model for conducting these analyses. For the Lower Basin analysis a subscription was purchased for on-line access to a Yolo County IMPLAN model. For each of the effects described above, IMPLAN estimates output, value added, and employment. Output is the total gross revenue for products produced which includes intermediary products used in production (e.g., fertilizer). Value added is the difference between the value of goods produced and the cost of materials and supplies used in producing them. Value added consists of employee compensation, proprietor income, and taxes on production and imports. Because it excludes intermediate products used in production, value added is a preferred metric compared to output. Employment includes the number of full-time, seasonal, and part-time employees.

Chapter 4. Without-Project Conditions

The identification of without-project conditions is critical for the agricultural (or any other) impact analysis because these are the baseline for identifying changes associated with the project (with-project conditions). Without-project conditions include existing and future without-project conditions:

4.1 Existing Conditions

For an agricultural impact analysis the focus is upon changes in land use, i.e. cropping patterns. Using DWR Yolo County land use surveys, Lower Basin cropping patterns were identified for 2008 and 2014. Cropping patterns for 2015 were based upon grower input. Cropping patterns for 2016 were based upon observed changes since 2014. These cropping patterns are for summer growing conditions when the land use surveys were conducted. However, because of crop rotational requirements, cropping patterns in the winter can be different. Winter cropping patterns were estimated for 2016 based on observed conditions in the Lower Basin. Table 1 shows the Lower Basin without-project summer land use for 2008, 2014, 2015, and 2016. Table 2 shows Lower Basin without-project winter land use for 2016 based on observed conditions. There are about 5,874 acres in the Lower Basin, of which about 4,874 acres (88%) were in crop production in 2016.

4.2 Future Conditions

Because project construction is scheduled for 2020, a likely without-project "future year" cropping pattern for 2020 was developed with grower input. Table 1 also shows the projected 2020 Lower Basin summer cropping pattern and Table 2 shows projected Lower Basin winter land use for 2020. The 2020 cropping pattern will be used for comparison with the with-project conditions described below.

Figure 3 shows changes in summer cropping patterns from 2008 through 2016 as well as projected changes to 2020. Between 2008 and 2020 there are expected increases of deciduous (primarily walnuts), truck (primarily processing tomatoes), and field crops with expected decreases in grain and hay crops.

4.3 With-Project Conditions

The proposed project will set back the Yolo Bypass levee along the western boundary of the Lower Basin, generally following the alignment of County Road 124. In addition to the No Project Alternative (Alternative 1), there are four alternative levee setback alignments shown in Figures 4-7. Alternative 2 is the preferred alternative. Whichever levee setback alignment is selected, there will be some crop acres currently protected by the existing Yolo Bypass levee that will be (a) on the water side of the new levee setback and subject to flooding within the Yolo Bypass; (b) on the land (and therefore protected) side of the new levee setback; and (c) within the new levee footprint and therefore removed from production. Table 3 summarizes the acreage expected to be on the water side, land side, and included in the new levee setback footprint for the five alternatives. Table 4 shows the Alternative 2 2020 land use for the water side, land side, and levee footprint, before crop substitution on the water side, based on projected 2020 conditions. Table 5 shows the same information except with the crop substitution (expected to be rice as described below) on the water side.

Chapter 5. Primary Agricultural Impacts

As the result of setting back the Yolo Bypass levee, primary (direct) agricultural impacts will likely occur because of these changes from 2020 without- to with-project conditions:

5.1 Conversion of land side to water side crops

Some crops currently protected by the existing Yolo Bypass levee will be on the water side of the new levee setback. Crops currently (2016) on the proposed water side of the setback levee (primarily to the west of County Road 124) include sunflowers in the northern portion, safflower in the central portion, and walnuts in the southern portion along the Sacramento Bypass. However, by 2020 the sunflowers are expected to be replaced with processing tomatoes. A new levee setback will likely result in changes in crops compatible with flooding within the Yolo Bypass, including delayed planting (compared to the crop's planting window) because of flooding (i.e. last day wet) which could reduce crop yields. Based on grower input, it is assumed that the substitute crop will be rice which has been grown on the water side of the existing Lower basin Yolo Basin levee for several years. Other crops may be possible depending upon market conditions, water availability, and restored ground elevations on the water side of the levee setback after construction is completed. Rice has a planting window of April 14 through May 20 (sometimes into June) but its yield could be reduced by as much as 100% if planting is delayed beyond May 15th due to flooding in the Yolo Bypass (Howitt, et al; 2013). In this draft report, a 10% reduction in yield due to late rice planting is being used. This number is subject to change if better information becomes available.

Crops that would be located within the Sacramento Weir along the southern edge of the Lower Basin will be converted to native vegetation (about 222 acres).

5.2 Improved flood protection for land side crops

The remaining crops on the land side of the new levee setback should receive improved flood protection and thus lower expected annual damage (EAD). To estimate EAD, crop annual flood damage/acre estimates originally developed for the Sacramento and San Joaquin Rivers Comprehensive Study (2001) and updated for the 2012 and 2017 Central Valley Flood Protection Plans' flood risk analyses were applied to without- and with-project crop acres on the land side of the existing and proposed levee setback for all alternatives. These estimates take into account monthly cultivation costs, harvest costs, gross income, and flooding probabilities. However, unlike for a structure, the crop annual flood damage/acre estimates assume a crop is damaged as soon as it gets wet; thus, they are not a function of depth but rather wetted area. These damage estimates also take into account the duration of flooding: short-term (less than 5 days of inundation) and long-term (5 days or greater inundation). Duration of flooding is important for permanent crops (such as walnuts) with potential re-establishment costs. For this analysis the average of short- and long-term annual crop flood damage/acre estimates was used.

The annual crop flood damage estimates must be adjusted for the expected annual frequency of flooding. The 2012 and 2017 CVFPP flood risk analyses developed HEC-FDA models for 100+ impact areas in the Central Valley including Elkhorn (SAC35), which includes the Upper and Lower Basins. In addition to expected annual damage (EAD), a key output of the HEC-FDA models is expected annual

exceedance probability (AEP), or the expected annual chance of flooding in an area taking into account hydrologic and hydraulic (H&H) and geotechnical information as well as the uncertainty for each of those parameters. To assess EAD and AEP, index points are assigned to river reaches bordering an impact area. These index points are meant to be representative of the H&H and geotechnical characteristics along the entire river reach. For Elkhorn (SAC35), index points were assigned in the Upper Basin along the Sacramento River (SAC35a) and along the Yolo Bypass (SAC35) in the Lower Basin (Figure 8). Thus, levee failure probabilities can be compared along both waterways for the Lower Basin (assuming that the AEP values for the Upper Basin along the Sacramento River are also representative for the Lower Basin). For the SAC35a index point along the Sacramento River, the 2017 CVFPP 2013 Baseline AEP is 0.014 or about a 1.4% annual chance of flooding (or about a 71 year level of protection). For the SAC35 index point along the Yolo Bypass, the 2013 Baseline AEP is 0.027, or about a 2.7% annual chance of flooding (or 37 year level of protection). Thus, the levee along the Yolo Bypass is the weak link and an improvement to at least 1.4% annual chance of flooding could be expected with the levee setback, constrained by the levee protection along the Sacramento River which would then become the weak link.

5.3 Loss of crops because of setback levee footprint

Some crops will be displaced by the new levee setback footprint.

5.4 Primary economic impact analysis input values

Table 4 shows the estimated Alternative 2 2020 summer land use before the substitution of rice in the water side portion of the Lower Basin. Table 5 shows the same information except rice has been substituted for the other crops in the water side portion, except for about 222 acres that would be within the Sacramento Weir to be converted to native vegetation. Table 6 shows the assumed Lower Basin yields and prices (averages of 2013-2015 values obtained from Yolo County crop reports), operating costs obtained from various UC Cooperative Extension crop budgets, and labor hours which were also obtained from those crop budgets. Table 7 shows annual crop flood damage/acre estimates obtained from the DWR *Handbook for Assessing Value* that were used for the 2017 CVFPP flood risk analysis. All dollar values are expressed in 2016 dollars based on USDA (National Agricultural Statistics Service) prices received and paid indexes.

Chapter 6. Secondary Agricultural Impacts

Secondary economic impacts are the changes in values that accrue to persons other than those primarily affected by the project (the direct impacts). Secondary economic impacts include the indirect, induced, and total effects described above and these were estimated using a Yolo County IMPLAN model. To "run" the model requires results from the primary (direct) economic impact analysis, either total crop revenue (output) or net crop revenue impacts for each alternative. Based on those direct impacts, IMPLAN estimates the annual indirect, induced, and total impacts for output, value added, and employment. Included in the value added impacts are changes in federal, state, and local taxes. Local taxes include changes in county production-related sales taxes and property taxes which would be of interest to Yolo County. Changes in property taxes were also estimated outside of IMPLAN using specific project information regarding loss of crop acreages resulting from the levee footprint and changes in crop types and values on the water side of the new levee setback, including the conversion of 22 acres to native habitat along the Sacramento Weir.

Chapter 7. Primary Agricultural Impact Results

Primary (direct) annual economic impact results are shown in Tables 8-11 for each alternative based on projected 2020 without- and with-project land use conditions. Each table shows total crop revenue, operating costs (excluding land and overhead costs), expected annual flood damage, expected annual flood losses, net crop revenue, and employment for without- and with-project conditions. The with-project conditions include land and water side conditions. Changes between the without- and with-project conditions are the annual impacts. For the with-project land use on the water side of the levee setback it is assumed that rice would be the crop replacing 2020 without-project crops, except for the 222 acres within the Sacramento Weir. Reductions in expected annual damage reflect the benefits of improved flood protection resulting from the new levee setback.

Table 12 summarizes the primary (direct) annual economic impacts. The net annual crop revenue impacts range from about $460,734 (Alternative 5) to about $482,315 (Alternative 3). For Alternative 2, the preferred alternative, the annual net revenue impact is about $464,074. Of this amount, about $235,812 is attributable to crop loss due to the new levee footprint.

For comparison, the total gross value of Yolo County 2015 agricultural production was about $661.8 million (including about $30 million in animal production such as cattle and calves). The total crop revenue impact for Alternative 2 is about $1.6 million (Table 12), or about 0.2% of the total 2015 county agricultural production.

The present value of these annual net revenue impacts is shown in Table 13. Present value was computed over a 50 year analysis period (2020-2070) using discount rates of 3% and 6%. For Alternative 2, the present value with a 3% discount rate is about $11.9 million and about $7.3 million with a 6% discount rate.

Table 12 also summarizes the primary annual employment impacts for each alternative. These were estimated using labor hours/acre estimates from UC Extension Crop Budgets for the various crops. These are expressed as the number of full-time jobs although it is recognized that agricultural employment is likely to include both full-time and part-time employees. The impacts range from -1.6 (Alternatives 5) to -7.0 (Alternative 3), with -4.8 for Alternative 2.

7.1 Secondary Agricultural Impact Results

The results of the IMPLAN secondary (I/O) impact analysis are shown in Tables 14-17 for each alternative. These tables show the direct, indirect, induced, and total effects for employment, value added, and output, of which value added is the preferred metric. To “run” the IMPLAN model, the total annual crop revenue (i.e., output) impact from each alternative (Table 12) was input into the model. For Alternative 2 (Table 14), the annual direct output effect is about -$1.6 million with a total output effect (including direct, indirect, and induced effects) of about -$2.5 million, or a multiplier of about 1.5. The associated direct value added effect is about -$607 thousand and the total value added effect (including direct, indirect, and induced effects) is about -$1.2 million, or a multiplier of about 1.9.

A comparison of the annual primary and secondary impacts estimated by the LEBLS spreadsheet and IMPLAN analyses is shown in Table 18 for Alternative 2. For primary (direct) impacts, the LEBLS analysis estimates total crop revenue (output) impacts based on DWR county land use information, Yolo County crop reports, and UC Cooperative Extension crop budgets. The LEBLS analysis then estimates changes in operating costs (excluding land and overhead costs) and the two flood-related impacts--expected annual damage and expected annual losses. Net crop revenue is estimated by deducting the operating and flood-related costs. The LEBLS total crop revenue (output) impact is input into IMPLAN to "run" the analysis. IMPLAN then computes value added and output impacts. Value added includes employee compensation, proprietor income, and production-related taxes; thus, it is a larger value than net crop revenue. However, the IMPLAN value added does not include the two flood-related costs (expected annual damage and expected annual flood losses). IMPLAN computes the direct, indirect, induced, and total effects.

Included in the value added effects are annual county taxes on production and imports, including sales taxes and property taxes (Table 19). For Alternative 2 the total annual (direct, indirect, and induced) production-related tax effect is about -$3,634. Of this amount, about -$2,760 are property tax losses which are estimated within IMPLAN using national, state, and local financial accounts and relationships which are not based upon actual acreage changes within the project area.

For a comparison, property tax changes were also estimated outside of IMPLAN using project-specific information, including:

- Footprint acres.
- Change in cropping patterns and acreages on water side of proposed levee setback, excluding 222 acres within Sacramento Weir to be converted to native vegetation.
- Land side field crop market values of $12,000/acre (which may not be the same as assessed values).
- Water side rice market value of $10,000/acre (which may not be the same as an assessed value).
- Property tax rate of 1.0%.

Estimated property tax impacts based on project information are shown in Table 20 for Alternative 2. The estimated total annual property tax impact for this alternative is about $99,750, most of which is associated with foregone revenues from the crops displaced by the levee footprint ($59,040). Table 21 summarizes the estimated (and rounded) annual property tax impacts for all of the alternatives based on project information.

IMPLAN also estimates direct, indirect, induced and total employment effects which include full-time, seasonal, and part-time employees. The IMPLAN employment impacts were higher than those computed using the LEBLS analysis. For example, for Alternative 2, the LEBLS analysis estimated direct employment effect of -4.8 (Table 12) whereas IMPLAN estimates a direct effect of -14.6 employees (table 14). This difference is probably due to several factors, including (a) the LEBLS analysis estimates full-time employees vs. the IMPLAN full-time, seasonal, and part-time employees; and (b) the LEBLS analysis uses UC Crop Extension crop budget labor hour information and the IMPLAN analysis uses national employment relationships information.

A couple of caveats regarding the IMPLAN analysis:

- This analysis assumes that all of the crop production inputs (i.e. fertilizer etc.) are purchased in Yolo County which is probably unreasonable; thus, it is a maximum impact.
- The output (i.e. total revenue) value used to "run" IMPLAN excludes flood related losses; thus, results are probably overstated. Annual flood related losses (expected annual damage on the landside and yield reductions on the water side) for Alternative 2 total about $120k.

Chapter 8. Other Impacts

Other impacts potentially associated with the proposed levee setback include:

8.1 Construction

The proposed project would require substantial construction and labor expenses over several months, starting in 2020. Expenditures on construction goods, materials, equipment and labor that occur within the Yolo County study region (primary impacts) would generate additional economic benefits as spending ripples through the local economy via inter-industry industry linkages and additional household spending by employees and proprietors (secondary impacts). The key is identifying how much of these construction purchases originate in the study region and how many employees reside there compared to commuting to the work site from outside the study region. Purchases of construction materials and employees living outside of the study region could result in "leakages" to other areas such as Sacramento and surrounding cities which would benefit those other areas but not Yolo County.

IMPLAN can estimate secondary impacts resulting from construction expenditures. For example, the estimated cost of constructing Alternatives 2 and 3 (both the same length) is about $147 million (the direct output effect). Using IMPLAN, the total output direct, indirect, and induced effects is about $196 million (Table 22). The corresponding direct and total value added effects are about $80 and $109 million, respectively; and, the corresponding direct and total employment effects are about 441 and 790, respectively. Table 23 shows the same information for the shorter Alternatives 3 and 4. However, these estimates assume that all construction expenditures would occur within Yolo County, which is unlikely. At this time it is not known how much of the construction expenditures would occur within Yolo County. But, for example, if it is assumed that 50% of the expenditures would occur within Yolo County, then all of the above effects would be reduced by about 50%.

8.2 Consolidated number of reclamation districts

Cross levees currently subdivide the Lower Basin into 3 separate reclamation districts (RD 827, RD 785, and RD 537) each requiring its own pump station for dewatering following flood events (Figure 2). The longer alternatives (Alternatives 2 and 3) would remove these cross levees and consolidate the 3 reclamation districts (and possibly include RD 1600 located in the Upper Basin) into one reclamation district. Consolidation of the reclamation districts should reduce the administrative costs of providing flood protection in the Lower Basin. For the shorter alternatives (Alternatives 4 and 5), consolidation of reclamation districts may still occur.

8.3 Reduced long-term operation, maintenance, repair, rehabilitation, and replacement (OMRR&R) costs

Long-term OMRR&R costs should be reduced with a new levee compared to the existing Yolo Bypass levee, with greater cost reductions for the longer alternatives (Alternatives 2 and 3) compared to the shorter alternatives (Alternatives 4 and 5). Dewatering pumping costs should also be reduced because each of the reclamation districts has its own pump station, so 3 pump stations can be replaced with 1

new pump station at the southern end of the Lower Basin as a result of reclamation district consolidation. Figure 9 shows the existing RD 537 pump station.

8.4 Improved flood protection in the Lower Basin

The above analysis included reductions in crop EAD on the land side of the proposed levee setback because of improved levee protection provided by the new levee setback. In addition, there are about 30 residential single family residences, one restaurant/bar, and numerous agricultural sheds and related structures that would also benefit from improved flood protection which has not been quantified for this analysis. However, 2 options are available to estimate reductions in flood damage (EAD) for these structures if future analysis is desired:

- HEC-FDA. A HEC-FDA model (SAC35) was developed for the Elkhorn impact area for the 2012 and 2017 CVFPP flood damage analyses. The structural inventory (based on 2010 parcel information) for this model would include residential and commercial structures (but not agricultural structures such as sheds) in the Lower Basin and in the Upper Basin. In addition, the 2017 CVFPP HEC-FDA models have been configured to reflect systemwide H&H and geotechnical assumptions pertinent to that analysis which may not be applicable for this analysis (for example, assumptions of baseline 200-year level of protection for urban areas based on appropriate H&H and geotechnical inputs). Thus, the 2017 CVFPP HEC-FDA (SAC35) model cannot be used without significant changes.

- FRAM. DWR has a Flood Rapid Assessment Model (FRAM) to conduct more simplified, spreadsheet analyses of flood damage reduction benefits (i.e., changes in EAD) in rural areas. FRAM could be used to estimate flood damage reduction benefits for these residential and commercial structures by exporting them from the HEC-FDA (SAC35) inventory (which includes information such as square footage, number of stories, age of structure, ground elevation, and depreciated replacement value) based on a GIS analysis. They could then be included in a FRAM model along with assumptions about potential levee failure probabilities (from SAC35) and assumed flood depths without-and with-project. The above land side crop flood damage analysis used spreadsheet methods and data (such as the crop damage/acre estimates and levee failure probabilities) similar to a FRAM analysis.

8.5 Improved flood protection outside the Lower Basin

Widening of the Yolo Bypass accomplished with a Lower Basin levee setback should reduce stages in the Sacramento River which should result in downstream flood reduction benefits, especially for West Sacramento and other cities in the Sacramento metropolitan region. Although these benefits can be quantified using HEC-FDA, any quantification must be done in the context of projects planned or under construction to provide legislatively mandated 200-year level of protection for urban area by 2025 (Senate Bill 5; 2007). For example, the West Sacramento Levee Improvement Program (WSLIP) is well underway that will provide 200-year level of protection. Because the WSLIP would be included in the HEC-FDA without-project baseline conditions, benefits that might otherwise be attributable to the Lower Basin levee setback (with-project condition) would be reduced. Thus, HEC-FDA has not been used to quantify these benefits. However, stage reductions on the Sacramento River as a result of the Lower Basin levee setback have been computed which can be used as an indicator of system resiliency reinforcing flood damage reduction benefits expected to result from implementation of the WSLIP. For example, Sacramento River stage reductions at I Street and further downstream at Freeport are expected to be about -0.87 and -0.69 feet, respectively, for 200-year conditions. Yolo Bypass stage reductions for

200-year conditions upstream and downstream of I-5 near Woodland are expected to be about -0.66 and -0.64 feet, respectively. The Lower Basin levee setback will widen the Sacramento Bypass which will result in more flows in the Yolo Bypass, but stage increases in the Yolo Bypass near West Sacramento are expected to be only about 0.11 feet for 200-year conditions.

8.6 Improved roads and traffic flow patterns

County Road 124 extends from north to south in the western portion of the Lower Basin (Figure 2). Although currently paved, it needs serious repairs and in the central portion of the Lower basin it is located on top of the Yolo Bypass levee. The longer alternatives (Alternatives 2 and 3) would straighten and repave County Road 124 for its entire length in the Lower Basin and locate it along the land side of the levee setback. A gravel road would be located on top of the levee setback for maintenance purposes. The shorter alternatives (Alternatives 4 and 5) would also improve County Road 124 but for shorter lengths.

8.7 Remediated Bryte landfill

The non-operational Bryte land fill (about 5 acres) is located in the southwest corner of the Lower Basin (Figure 2) and is currently maintained by a private landowner. The landfill will be relocated within the southern end of the levee setback and the Sacramento Area Flood Control Agency and the new consolidated reclamation district will assume maintenance responsibilities.

8.8 Future recreation and ecosystem restoration opportunities

Although not identified as project objectives at this time, a levee setback should provide future recreation and ecosystem restoration opportunities on the water side of the levee setback.

Chapter 9. Conclusions

This agricultural economic impact analysis evaluates the primary and secondary annual agricultural economic impacts resulting from changes in agricultural land use (crops) caused by a proposed levee setback along the Yolo Bypass in the Lower Basin. Some crops currently protected by the existing levee would be located inside the Yolo Bypass and subject to more frequent flooding because of the levee setback. It is anticipated that these crops would be converted to a different crop (rice) compatible with more frequent flooding, although crops along the Sacramento Weir would be converted to native habitat (about 222 acres). The remaining crops behind the levee setback would have improved flood protection. Finally, some crops would be displaced by the proposed levee setback footprint.

The primary (direct) annual net crop revenue impacts range from about -$460,734 (Alternative 5) to about -$482,315 (Alternative 3). For Alternative 2, the preferred alternative, the annual net crop revenue impact is about -$464,074. Of this amount, about $235,813 is attributable to crop loss due to the new levee footprint. For comparison, the total gross value of Yolo County 2015 agricultural production was about $661.8 million. The total crop revenue impact for Alternative 2 is about $1.6 million, or about 0.2% of the total 2015 county agricultural production, which does not appear to be a significant annual impact from a countywide perspective. Over a 50 year analysis period, the present value of the annual net crop revenue impacts ranges from about -$7.3 to -$12.4 million, depending upon the alternative and discount rate. For Alternative 2, the present value with a 3% discount rate is about -$11.9 million and about -$7.3 million with a 6% discount rate.

Secondary "ripple" economic impacts were also estimated. These are the changes in values that accrue to persons other than those primarily affected by the project (i.e., the direct impacts to the growers), including indirect (interindustry linkages), induced (household spending), and total (direct, indirect, and induced) effects which were estimated using a Yolo County IMPLAN model. Based on the annual total crop revenue (output) impacts described above, IMPLAN estimates the annual indirect, induced, and total impacts for output (gross revenue) , value added (the difference between the value of goods produced and the cost of materials and supplies used in producing them), and employment. Value added is the preferred metric because it excludes the costs of intermediary products used in production but it includes employee compensation, proprietor income, and taxes on production and imports. For Alternative 2, the annual direct value added effect is about -$607 thousand and the total (direct, indirect, and induced) value added effect is about -$1.2 million, or a multiplier of about 1.9. Included in the value added impacts are changes in local taxes such as county production-related sales taxes and property taxes. The total (direct, indirect, and induced) production-related annual tax effect is about -$3.6 thousand, including about -$2.8 thousand in property taxes. However, changes in property taxes were also estimated outside of IMPLAN using specific project information regarding loss of crop acreages resulting from the levee footprint and changes in crop types and values on the water side of the new levee setback. Using this method the estimated annual property tax losses are about -$**9**9.7 thousand for Alternative 2.

Other impacts (benefits) associated with the levee setback were qualitatively described, including impacts resulting from construction expenditures within the county, consolidated number of reclamation districts, reduced long-term OMRR&R costs, improved non-agricultural flood protection in the Lower Basin, improved flood protection outside of the Lower Basin, improved roads and traffic flow

patterns within the Lower Basin, remediated operation of the Bryte landfill, and potential for recreation and ecosystem restoration opportunities at the project site.

Chapter 10. Sources

California Department of Water Resources:

- County Land Use Surveys (http://www.water.ca.gov/landwateruse/lusrvymain.cfm)
- *Flood Rapid Assessment Model* (FRAM)(December 2008)
- *Handbook for Assessing Value of State Flood Management Investments* (HAV)(June 2014)
- 2007 California Flood Legislation Summary
- 2017 CVFPP HEC-FDA model for Elkhorn Basin (SAC35)
- Lower Elkhorn Basin Levee Setback Project Stage Summaries (GEI; 01/23/2017)

Howitt, Richard, et al; Agricultural and Economic Impacts of Yolo Bypass Fish Habitat Proposals, April 2013.

IMPLAN Yolo County online software, Huntersville, NC.

UC Cooperative Extension Sample Production Costs (crop budgets):

- Sunflowers for Seed (Sacramento Valley; 2011)
- Safflower (Sacramento County; 1989)
- Small Grain Silage (San Joaquin Valley south; 2013)
- Alfalfa Hay (Sacramento Valley and Northern San Joaquin Valley flood irrigation; 2015)
- Rice (Sacramento Valley medium grain; June 2016)
- Processing Tomatoes (Sacramento Valley and Northern Delta furrow irrigated; 2014)
- English Walnuts (Sacramento Valley micro sprinkler irrigated; 2015)

Yolo County Agricultural Crop Reports (2012-2015)

Table 1. Lower Basin Summer Without-Project Land Use

DWR Land Use Classification	2008	2014	2015	2016	2020 Projected
Field					
Safflower	108	515	690	690	690
Corn		302			
Sudan		21	21	21	21
Beans (dry)		26	113	113	26
Miscellaneous	35				
Sunflowers		109	410	410	72
Subtotal	*143*	*973*	*1,234*	*1,234*	*809*
Grain and Hay					
Grain and hay	2,218	1,363	263	263	263
Wheat					
Subtotal	*2,218*	*1,363*	*263*	*263*	*263*
Pasture					
Alfalfa/alfalfa mixtures	989	753	753	753	753
Rice					
Rice					
Wild rice					
Subtotal					
Truck and Nursery/Berry					
Beans (green)		128			
Melons/squash/cucumbers		51	51	51	51
Onions/garlic	22	48	48	48	48
Tomatoes (processing)	663	669	1,141	1,141	1,479
Mixed (4 or more)		15	15	15	15
Miscellaneous		50	34	34	34
Subtotal	*685*	*991*	*1,290*	*1,290*	*1,628*
Deciduous Fruits/Nuts					
Miscellaneous	2	2	2	2	2
Walnuts	674	789	1,328	1,328	1,415
Subtotal	*676*	*791*	*1,330*	*1,330*	*1,417*
Idle					
Land not cropped but cropped in past 3 years	22	2	2	2	2
New lands being prepared for crop production					
Subtotal	22	2	2	2	2
Semi agricultural					
Farmsteads (with residence)	52	54	54	54	54
Farmsteads (w/o residence)	21	22	22	22	22
Miscellaneous	263	226	220	220	220
Subtotal	*336*	*301*	*296*	*296*	*296*
Urban					

Lawn area (irrigated)	1	1	1	1	1
Single family residence	1	1	1	1	1
Railroad right of way	37	15	15	15	15
Paved area	15	37	37	37	37
Subtotal	*54*	*54*	*54*	*54*	*54*
Native/Riparian Vegetation					
Native vegetation	383	265	265	265	265
Riparian vegetation		232	232	232	232
Marsh lands/tules/sedges		9	9	9	9
Trees/shrubs/other	115	99	99	99	99
Permanent duck marsh	206				
Subtotal	*703*	*604*	*604*	*604*	*604*
Water Surface	48	46	46	46	46
Total Basin Land Use	**5,874**	**5,874**	**5,874**	**5,874**	**5,874**

Table 2. Lower Basin Winter Without-Project Land Use

DWR Land Use Classification	2016	2020 Projected
Field		
Safflower	54	
Corn		
Sudan	21	21
Beans (dry)	26	26
Miscellaneous		
Sunflowers	90	73
Subtotal	*192*	*120*
Grain and Hay		
Grain and hay	263	263
Wheat	1,010	690
Subtotal	*1,273*	*953*
Pasture		
Alfalfa/alfalfa mixtures	753	753
Rice		
Rice		
Wild rice		
Subtotal		
Truck and Nursery/Berry		
Beans (green)		
Melons/squash/cucumbers	51	51
Onions/garlic	48	48
Tomatoes (processing)		
Mixed (4 or more)	15	15
Miscellaneous	50	34
Subtotal	*164*	*149*
Deciduous Fruits/Nuts		
Miscellaneous	2	2
Walnuts	1,265	1,415
Subtotal	*1,267*	*1,417*
Idle		
Land not cropped but cropped in past 3 years	1,224	1,482
New lands being prepared for crop production		
Subtotal	*1,224*	*1,482*
Semi agricultural		
Farmsteads (with residence)	54	54
Farmsteads (w/o residence)	22	22
Miscellaneous	220	220
Subtotal	*296*	*296*
Urban		
Lawn area (irrigated)	1	1

DWR Land Use Classification	2016	2020 Projected
Single family residence	1	1
Railroad right of way	15	15
Paved area	37	37
Subtotal	*54*	*54*
Native/Riparian Vegetation		
Native vegetation	265	265
Riparian vegetation	232	232
Marsh lands/tules/sedges	9	9
Trees/shrubs/other	99	99
Permanent duck marsh		
Subtotal	*604*	*604*
Water Surface	46	46
Total Basin Land Use	**5,874**	**5,874**

Table 3. With-Project Alternatives Acreage Summary

Project Area	Alternatives				
	1 (No Project)	2	3	4	5
Water Side	0	1,042	1,313	892	621
Land Side	5,874	4,340	4,072	4,686	4,953
Levee Footprint	0	492	489	296	299
Total	**5,874**	**5,874**	**5,874**	**5,874**	**5,873**

Table 4. Alternative 2 2020 Summer Land Use (Before Water Side Crop Substitution)1

DWR Land Use Classification	Water Side	Land Side	Levee Footprint	Total
Field				
Safflower[2]	469	28	193	690
Sudan		21		21
Beans (dry)		26		26
Sunflowers		72		72
Subtotal	*469*	*148*	*193*	*809*
Grain and Hay				
Grain and hay	21	242		263
Wheat				
Subtotal	*21*	*242*		*263*
Pasture				
Alfalfa/alfalfa mixtures	45	668	41	753
Rice				
Rice				
Wild rice				
Subtotal				
Truck and Nursery/Berry				
Melons/squash/cucumbers	10	28	19	51
Onions/garlic		48		48
Tomatoes (processing)	226	1,136	118	1,479
Mixed (4 or more)		15		15
Miscellaneous		34		34
Subtotal	*236*	*1,262*	*130*	*1,628*
Deciduous Fruits/Nuts				
Miscellaneous		2		2
Walnuts	155	1,199	61	1,415
Subtotal	*155*	*1,201*	*61*	*1,417*
Idle				
Land not cropped but cropped in past 3 years		2		2
Semi agricultural				
Farmsteads (with residence)	1	49	4	54
Farmsteads (w/o residence)	1	16	4	22
Miscellaneous	24	181	16	220
Subtotal	*26*	*246*	*24*	*296*
Urban				
Lawn area (irrigated)		1		1
Single family residence		1		1
Railroad right of way		15		15
Paved area	8	21	8	37
Subtotal	*8*	*38*	*8*	*54*
Native/Riparian Vegetation				

DWR Land Use Classification	Water Side	Land Side	Levee Footprint	Total
Native vegetation	69	171	26	265
Riparian vegetation	2	230		232
Marsh lands/tules/sedges	1	8		9
Trees/shrubs/other	2	97		99
Permanent duck marsh				
Subtotal	*73*	*505*	*26*	*604*
Water Surface	10	27	9	46
Total Basin Land Use	**1,042**	**4,339**	**492**	**5,874**

Notes:

1. Based on projected 202 land use conditions.
2. Replaced by wheat in winter.

Table 5. Alternative 2 2020 Summer Land Use (After Water Side Crop Substitution) 1

DWR Land Use Classification	Water Side	Land Side	Levee Footprint	Total
Field				
Safflower[2]		28	193	221
Sudan		21		21
Beans (dry)		26		26
Miscellaneous				
Sunflowers		72		72
Subtotal		*148*	*193*	*340*
Grain and Hay				
Grain and hay		243		243
Wheat				
Subtotal		*243*		*243*
Pasture				
Alfalfa/alfalfa mixtures		668	41	709
Rice				
Rice	703			703
Wild rice				
Subtotal	*703*			*703*
Truck and Nursery/Berry				
Melons/squash/cucumbers		28	19	41
Onions/garlic		48		48
Tomatoes (processing)		1,136	118	1,253
Mixed (4 or more)		15		15
Miscellaneous		34		34
Subtotal		*1,262*	*130*	*1,392*
Deciduous Fruits/Nuts				
Miscellaneous		2		2
Walnuts		1,199	61	1,260
Subtotal		*1,201*	*61*	*1,262*
Idle				
Land not cropped but cropped in past 3 years		2		2
Semi agricultural				
Farmsteads (with residence)	1	49	4	54
Farmsteads (w/o residence)	1	16	4	22
Miscellaneous	24	181	16	220
Subtotal	*26*	*246*	*24*	*296*
Urban				
Lawn area (irrigated)		1		1
Single family residence		1		1
Railroad right of way		15		15
Paved area	8	21	8	37
Subtotal	*8*	*38*	*8*	*54*

DWR Land Use Classification	Water Side	Land Side	Levee Footprint	Total
Native/Riparian Vegetation				
Native vegetation	291[3]	171	26	265
Riparian vegetation	2	230		232
Marsh lands/tules/sedges	1	8		9
Trees/shrubs/other	2	97		99
Permanent duck marsh				
Subtotal	*295*	*505*	*26*	*604*
Water Surface	10	27	9	46
Total Basin Land Use	**1,042**	**4,339**	**492**	**5,874**

Notes:

1. Based on projected 2020 land use conditions
2. Replaced by wheat in winter.
3. Includes 222 acres in Sacramento Weir.

Table 6. Lower Basin Yields, Prices Received, Operating Costs, and Labor Hours

DWR Land Use Classification	Yields[1] (tons/acre)	Prices[1,2] ($/ton)	Operating Costs[2,3] ($/acre)	Labor Hours[,4] (hours/acre)
Field				
Safflower	1.12	$444	$102	2.5
Sudan	NA	NA	NA	NA
Beans (dry)	NA	NA	NA	NA
Sunflowers	NA	$1,308[5]	$483	4.86
Grain and Hay				
Grain and hay	2.79	$146	$497	1.51
Wheat	2.54	$185	$497[6]	1.51
Pasture				
Alfalfa/alfalfa mixtures	6.01	$155	$611	14.84
Rice				
Rice	4.21	$348	$1,210	4.52
Truck and Nursery/Berry				
Melons/squash/cucumbers				
Onions/garlic	NA	NA	NA	NA
Tomatoes (processing)	45.59	$69	$2,827	22.38
Mixed (4 or more)	NA	NA	NA	NA
Miscellaneous	NA	NA	NA	NA
Deciduous Fruits/Nuts				
Miscellaneous	NA	NA	NA	NA
Walnuts	1.42	$2,911	$2,214	7.06

Notes:

1. 2013-2015 averages (Source: Yolo County crop reports)
2. Prices and operating costs updated to 2016 dollars using USDA prices received and paid indexes.
3. Operating costs exclude land and overhead costs. (Source: UC Cooperative Extension crop budgets).
4. Machine and non-machine hours (Source: UC Cooperative Extension crop budgets).
5. Sunflower prices are revenue$/acre.
6. Not found in crop budgets but assumed to be the same as wheat.
7. NA—prices/ yields not found in Yolo County crop reports. For now these crops are excluded from the analysis but this should not significantly affect the results since these crops are on land side. Analysis can be updated if information is obtained from growers or other sources.

Table 7. Lower Basin Annual Crop Flood Damage/Acre Estimates1

DWR Land Use Classification	Short-Term Damage/ Acre ($2014)[2]	Long-Term Damage/ Acre ($2014)[3]	Average Damage/ Acre ($2014)	Average Damage/ Acre ($2016)[4]
Field				
Safflower	$337	$373	$355	$365
Sudan				
Beans (dry)	$342	$363	$353	$362
Sunflowers				
Average				*$366*
Grain and Hay				
Grain and hay				
Wheat				
Pasture				
Alfalfa/alfalfa mixtures	$547	$1,057	$802	$824
Rice				
Rice				
Truck and Nursery/Berry				
Melons/squash/cucumbers	$652	$652	$652	$670
Onions/garlic				
Tomatoes (processing)	$947	$947	$947	$973
Mixed (4 or more)				
Miscellaneous				
Average				*$822*
Deciduous Fruits/Nuts				
Miscellaneous				
Walnuts	$739	$4,120	$2,430	$2,497
Idle[5]	$291	$291	$291	$299
Semi agricultura[l5]	$291	$291	$291	$299

Notes:

1. These estimates take into account monthly cultivation costs, harvests costs, gross income, and monthly flooding probabilities, Source: DWR *Handbook for Assessing Value*; Table 3-5 (Sacramento Valley) (6/2014)
2. Short-term is less than 5 days inundation.
3. Long-term is 5 days or greater inundation.
4. Prices adjusted using Gross Domestic Product Implicit Price Deflator (https://fred.stlouisfed.org/series/GDPDEF).
5. Clean-up costs only.

Table 8. Alternative 2 Primary Annual Economic Impacts ($2016)

Primary Economic Impacts	Without New Levee Setback	With New Levee Setback			Annual Impacts[2]
	Land Side	Land Side	Water Side	Total[1]	
Total Crop Revenue[3]	$11,458,213	$8,828,931	$1,029,078	$9.858,009	-$1,600,204
- Operating Costs[4]	$8,354,694	$6,445,907	$851,170	$7,297,077	-$1,057,617
- Expected Annual Damage [5]	$164,646	$68,341	$0	$68,341	-$96,304
- Expected Annual Losses [6]	$0	$0	$17,791	$17,791	$17,791
Net Crop Revenue	**$2,938,873**	**$2,314,683**	**$160,117**	**$2,474,800**	**-$464,074**
Employment [7]	27.8	21.5	1.5	23.0	-4.8

Notes:

1. Adjusted for acreage loss caused by change in levee footprint.
2. Changes in direct annual economic effects between without- and with- project conditions.
3. Function of crop types, acres, yields, and prices received.
4. Crop production costs excluding land, and overhead costs.
5. Expected annual damage caused by levee failure.
6. Expected annual losses caused by delayed planting date in Yolo Bypass.
7. Number of full-time jobs.

Table 9. Alternative 3 Primary Annual Economic Impacts ($2016)

Primary Economic Impacts	Without New Levee Setback	With New Levee Setback			Annual Impacts[2]
	Land Side	Land Side	Water Side	Total[1]	
Total Crop Revenue[3]	$11,458,213	$8,035,285	$1,394,800	$9,430,086	-$2,028,127
- Operating Costs[4]	$8,354,694	$5,730,989	$1,153,666	$6,884,655	-$1,470.039
- Expected Annual Damage[5]	$164,646	$64,760	$0	$64,760	-$99,886
- Expected Annual Losses[6]	$0	$0	$24,113	$24,113	$24,113
Net Crop Revenue	**$2,938,873**	**$2,239,536**	**$217,021**	**$2,456,557**	**-$482,316**
Employment[7]	27.8	18.7	2.1	20.8	-7.0

Notes:

1. Adjusted for acreage loss caused by change in levee footprint.
2. Changes in direct annual economic effects between without- and with- project conditions.
3. Function of crop types, acres, yields, and prices received.
4. Crop production costs excluding land and overhead costs.
5. Expected annual damage caused by levee failure.
6. Expected annual losses caused by delayed planting date in Yolo Bypass.
7. Number of full-time jobs.

Table 10. Alternative 4 Primary Annual Economic Impacts ($2016)

Primary Economic Impacts	Without New Levee Setback	With New Levee Setback			Annual Impacts[2]
	Land Side	Land Side	Water Side	Total[1]	
Total Crop Revenue[3]	$11,458,213	$9,9099,397	$832,105	9,931,502	-$1,526,711
- Operating Costs[4]	$8,354,694	$6,698,284	$688,250	$7,386,534	-$968,160
- Expected Annual Damage[5]	$164,646	$70,770	$0	$70,770	-$93,876
- Expected Annual Losses[6]	$0	$0	$14,386	$14,386	$14,386
Net Crop Revenue	**$2,938,873**	**$2,330,343**	**$129,470**	**$2,459,812**	**-$479,061**
Employment [7]	27.8	22.8	1.2	24.0	-3.8

Notes:

1. Adjusted for acreage loss caused by change in levee footprint.
2. Changes in direct annual economic effects between without- and with- project conditions.
3. Function of crop types, acres, yields, and prices received.
4. Crop production costs excluding land and overhead costs.
5. Expected annual damage caused by levee failure.
6. Expected annual losses caused by delayed planting date in Yolo Bypass.
7. Number of full-time jobs.

Table 11. Alternative 5 Primary Annual Economic Impacts ($2016)

Primary Economic Impacts	Without New Levee Setback	With New Levee Setback			Annual Impacts[2]
	Land Side	Land Side	Water Side	Total[1]	
Total Crop Revenue[3]	$11,458,213	$9,893,173	$466,397	$10,359,570	-$1,098,643
- Operating Costs[4]	$8,354,694	$7,413,250	$385,765	$7,799,016	-$555,678
- Expected Annual Damage[5]	$164,646	$74,353	$0	$74,352	-$90,294
- Expected Annual Losses[6]	$0	$0	$8,063	$8,063	$8,063
Net Crop Revenue	**$2,938,873**	**$2,405,571**	**$72,568**	**$2,478,139**	**-$460,734**
Employment [7]	27.8	25.5	0.7	26.2	-1.6

Notes:

1. Adjusted for acreage loss caused by change in levee footprint.
2. Changes in direct annual economic effects between without- and with- project conditions.
3. Function of crop types, acres, yields, and prices received.
4. Crop production costs excluding land, and overhead costs.
5. Expected annual damage caused by levee failure.
6. Expected annual losses caused by delayed planting date in Yolo Bypass.
7. Number of full-time jobs.

Table 12. Primary Annual Impact Assessment Results Summary (2020 Conditions; $2016)

Primary Economic Impacts[1,2]	Alternatives			
	2	3	4	5
Total Annual Crop Revenue[3]	-$1,600,204	-$2,028,127	-$1,526,711	-$1,098,643
- Operating Annual Costs[4]	-$1,057,617	-$1,470,039	-$968,160	-$555,678
- Expected Annual Damage[5]	-$96,304	-$99,886	-$93,876	-$90,294
- Expected Annual Losses[6]	$17,791	$24,113	$14,386	$8,063
Net Annual Crop Revenue	-$464,074	-$482,315	-$479,061	-$460,734
Employment[7]	-4.8	-7.0	-3.8	-1.6

Notes:

1. Adjusted for acreage loss caused by change in levee footprint.
2. Changes in direct annual economic effects between without- and with- project conditions.
3. Function of crop types, acres, yields, and prices received.
4. Crop production costs excluding land and overhead costs.
5. Expected annual damage caused by levee failure.
6. Expected annual losses caused by delayed planting date in Yolo Bypass.
7. Number of full- time jobs.

Table 13. Present Worth Analysis ($2016)1

Alternatives	Discount Rate	
	3%	6%
2	-$11,940,515	-$7,314,670
3	-$12,409,877	-$7,602,198
4	-$12,326,126	-$7,550,893
5	-$11,854,577	-$7,262,025

Notes:

1. 50-year analysis period (2020-2070).

Table 14. Alternative 2 IMPLAN Secondary Annual Impacts (2020 Conditions; $2016)

Impact Type	Employment	Value Added[4]	Output[5]
Direct Effect[1]	-14.6	-$607,054	-$1,600,204
Indirect Effects[2]	-5.2	-$369,583	-$556,782
Induced effects[3]	-2.3	-$187,767	-$307,708
Total Effects	-22.1	-$1,164,403	-$2,464,694

Notes:

1. The initial production changes (output) made by the growers as a result of this Lower Basin alternative.
2. The impact of growers buying goods and services from other businesses.
3. The impact of growers and workers re-spending their income in the economy.
4. The difference between total output (total crop revenue) and the cost of intermediate inputs.
5. The change in total crop revenue (output) associated with this Lower Basin alternative (Table 8). [Note: This is the value that "runs" the I/O analysis.]

Table 15. Alternative 3 IMPLAN Secondary Annual Impacts (2020 Conditions; $2016)

Impact Type	Employment	Value Added[4]	Output[5]
Direct Effect[1]	-19.5	-$810,764	-$2,028,127
Indirect Effects[2]	-6.6	-$468,416	-$705,676
Induced effects[3]	-3.0	-$247,186	-$405,081
Total Effects	-29.0	-$1,526,366	-$3,138,884

Notes:

1. The initial production changes made by the growers as a result of this Lower Basin alternative.
2. The impact of growers buying goods and services from other businesses.
3. The impact of growers and workers re-spending their income in the economy.
4. The difference between total output (total crop revenue) and the cost of intermediate inputs.
5. The change in total crop revenue 9output) associated with this Lower Basin alternative (Table 9). [Note: This is the value that "runs" the I/O analysis.]

Table 16. Alternative 4 IMPLAN Secondary Annual Impacts (2020 Conditions; $2016)

Impact Type	Employment	Value Added[4]	Output[5]
Direct Effect[1]	-8.9	-$368,287	-$1,526,711
Indirect Effects[2]	-4.9	-$352,609	-$531,211
Induced effects[3]	-1.6	-$132,211	-$216,677
Total Effects	-15.4	-$853,106	-$2,274,598

Notes:

1. The initial production changes made by the growers as a result of this Lower Basin alternative.
2. The impact of growers buying goods and services from other businesses.
3. The impact of growers and workers re-spending their income in the economy.
4. The difference between total output (total crop revenue) and the cost of intermediate inputs.

5. The change in total crop revenue (output) associated with this Lower Basin alternative (Table 10). [Note: This is the value that "runs" the I/O analysis.]

Table 17. Alternative 5 IMPLAN Secondary Annual Impacts (2020 Conditions; $2016)

Impact Type	Employment	Value Added[4]	Output[5]
Direct Effect[1]	-8.9	-$368,287	-$1,098,643
Indirect Effects[2]	-3.6	-$253,742	-$382,267
Induced effects[3]	-1.4	-$118,122	-$193,578
Total Effects	-13.8	-$749,151	-$1,674,488

Notes:

1. The initial production changes made by the growers as a result of this Lower Basin alternative.
2. The impact of growers buying goods and services from other businesses.
3. The impact of growers and workers re-spending their income in the economy.
4. The difference between total output (total crop revenue) and the cost of intermediate inputs.
5. The change in total crop revenue associated with this Lower Basin alternative (Table 11). [Note: This is the value that "runs" the I/O analysis.]

Table 18. Comparison of LEBLS and IMPLAN Annual Primary and Secondary Impact Results for Alternative 2 ($2016)

Impact Type	Primary (Direct)		Secondary			
	LEBLS	IMPLAN	IMPLAN Indirect Effects	IMPLAN Induced Effects	IMPLAN Total Effects[1]	Multiplier[2]
Total Crop Revenue (Output)	-$1,600,204	-$1,600,204	-$556,782	-$307,708	-$2,464,694	1.5
-Operating Costs[3]	-$1,057,617	-----	-----	-----	-----	
-Expected Annual Damage	-$96,304	-----	-----	-----	-----	
-Expected Annual Losses	$17,791	-----	-----	-----	-----	
Value Added[4]	-----	-$607,054	-$369,583	-$187,767	-$1,164,403	1.9
Net Crop Revenue	-$464,074	-----	-----	-----	-----	

Notes:

1. Sum of IMPLAN primary (direct), indirect, and induced effects.
2. IMPLAN total effects compared to IMPLAN primary (direct) effects.

3. Excludes land and overhead costs.
4. Includes employee compensation, proprietor income, and production-related taxes.

Table 19. IMPLAN Total Annual County Production and Import Taxes Effects1 ($2016)

Alternatives	Sales Tax	Property Tax	Other Taxes, Fines, Fees	Total
2	-$185	-$2,760	-$689	-$3,634
3	-$239	-$3,553	-$887	-$4,679
4	-$158	-$2,352	-$587	-$3,097
5	-$123	-$1,830	-$457	-$2,410

Notes:
1. Includes direct, indirect, and induced effects.

Table 20. Alternative 2 Annual County Property Tax Impacts1 ($2016)

Affected Areas	Acres	Assumed Value/Acre	Total Value	Tax Rate	Annual Taxes
Footprint	492	$12,000	$5,904,000	1.0%	$59,040
Water Side					
Without Project[2]	703	$12,000	$8,440,440	1.0%	$84,404
With Project[3]	703	$10,000	$7,033,700	1.0%	$70,337
Difference					$14,067
Sacramento Weir[4]	222	$12,000	$2,664,000	1.0%	$26,640
Water Side Subtotal					$40,707
Total[5]					$99,747

Notes:
1. Computed with project information and not using IMPLAN.
2. Primarily field crops. (Source: LEBLS team)
3. Replacement crop of rice. (Source: UC Cooperative Extension rice budget (Sacramento Valley).
4. Acreages not planted in Sacramento Weir on water side of levee setback.
5. Sum of taxes within footprint and the difference in taxes due to change in land use on water side.

Table 21. Summary of Annual Property Tax Impacts1 ($2016)

Alternatives	Levee Footprint	Water Side[2]	Total
2	-$59,000	-$41,000	-$100,000
3	-$59,000	-$46,000	-$104,000
4	-$36,000	-$38,000	-$74,000
5	-$36,000	-$33,000	-$69,000

Notes:

1. Computed with project information and not using IMPLAN
2. Includes reduction in taxes due to switch to rice and acres not planted in Sacramento Weir.

Table 22. Alternatives 2 and 3 IMPLAN Secondary Construction Impacts ($2016)

Impact Type	Employment	Value Added[4]	Output
Direct Effect[1]	441.2	$79,672,511	$145,556,115
Indirect Effects[2]	172.9	$14,253,477	$26,297,099
Induced effects[3]	175.6	$14,587,963	$23,010,637
Total Effects	789.8	$108,513,950	$195,772,851

Notes:

1. The construction expenditure (output) associated with these Lower Basin alternatives (both about 7 miles in length). [Note: This is the value that "runs" the I/O analysis.]
2. The impact of contractors buying goods and services from other businesses.
3. The impact of project managers and workers re-spending their income in the economy.
4. The difference between total output (total construction expenditures) and the cost of intermediate inputs.

Table 23. Alternatives 4 and 5 IMPLAN Secondary Construction Impacts ($2016)

Impact Type	Employment	Value Added[4]	Output
Direct Effect[1]	315.2	$56,908,936	$103,968,654
Indirect Effects[2]	123.5	$10,181,065	$18,783,642
Induced effects[3]	125.4	$10,419,973	$17,985,455
Total Effects	564.1	$77,509,965	$139,837,750

Notes:

1. The construction expenditure (output) associated with these Lower Basin alternatives (both about 5 miles in length). [Note: This is the value that "runs" the I/O analysis.]
2. The impact of contractors buying goods and services from other businesses.
3. The impact of project managers and workers re-spending their income in the economy.
4. The difference between total output (total construction expenditures) and the cost of intermediate inputs.

Figure 1. Study Region

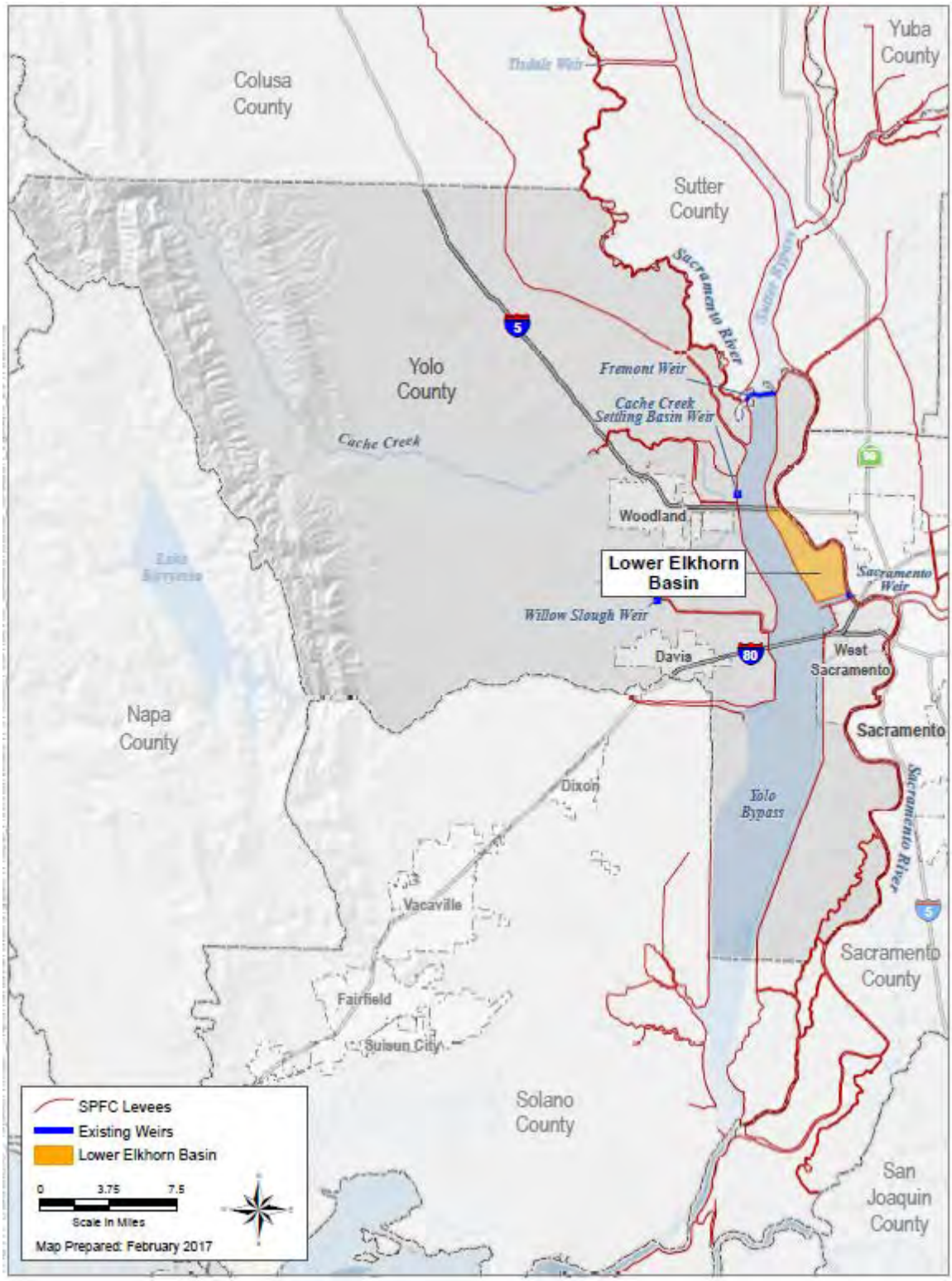
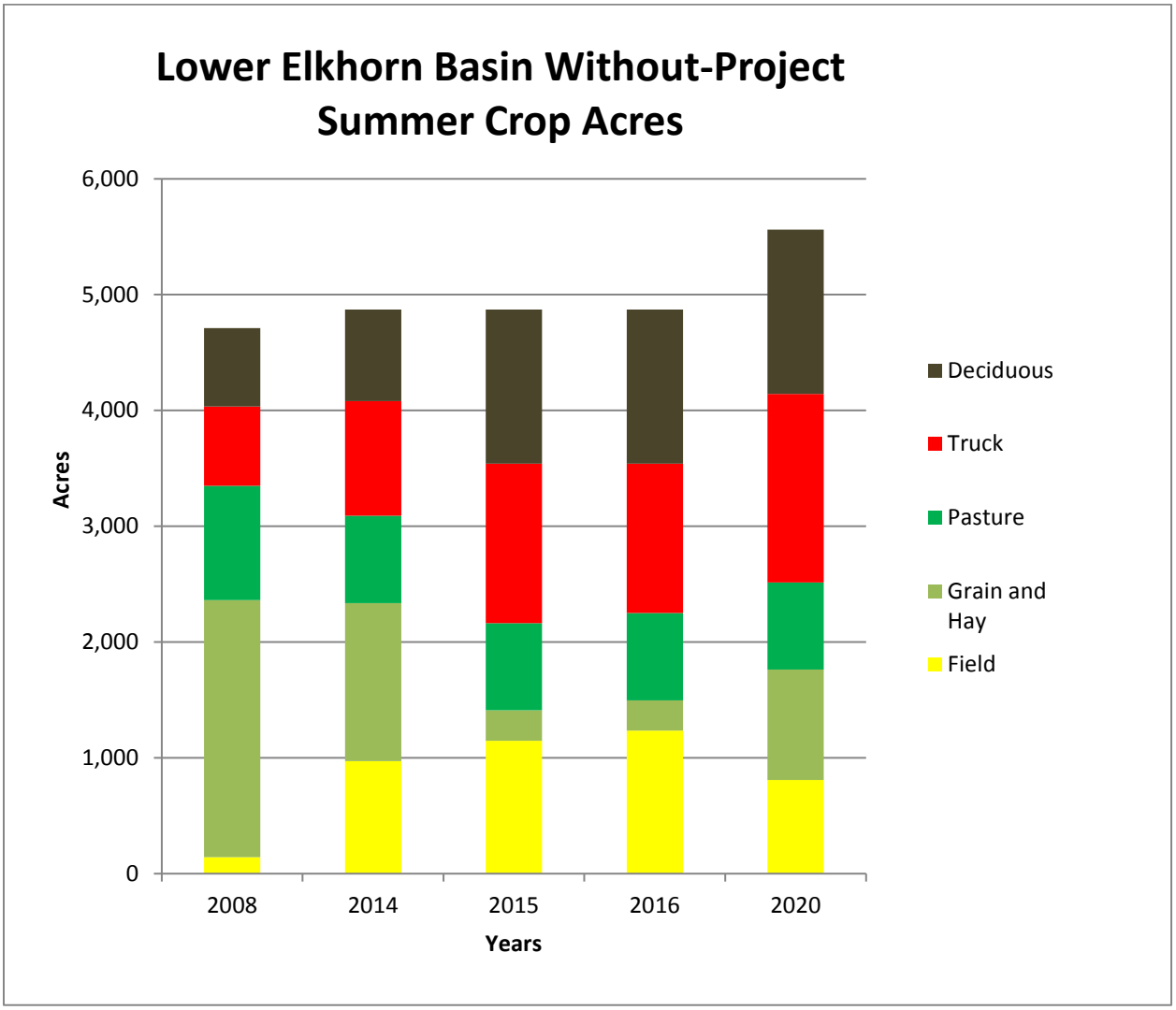


Figure 2. Lower Basin Reclamation Districts

Figure 3. Lower Basin Without-Project Summer Crop Acres



Sources:
2008 and 2014: DWR Yolo County land use surveys.
2015: grower input
2016: observed cropping patterns.
2020: grower input.

Figure 4. Alternative 2 Levee Setback Alignment

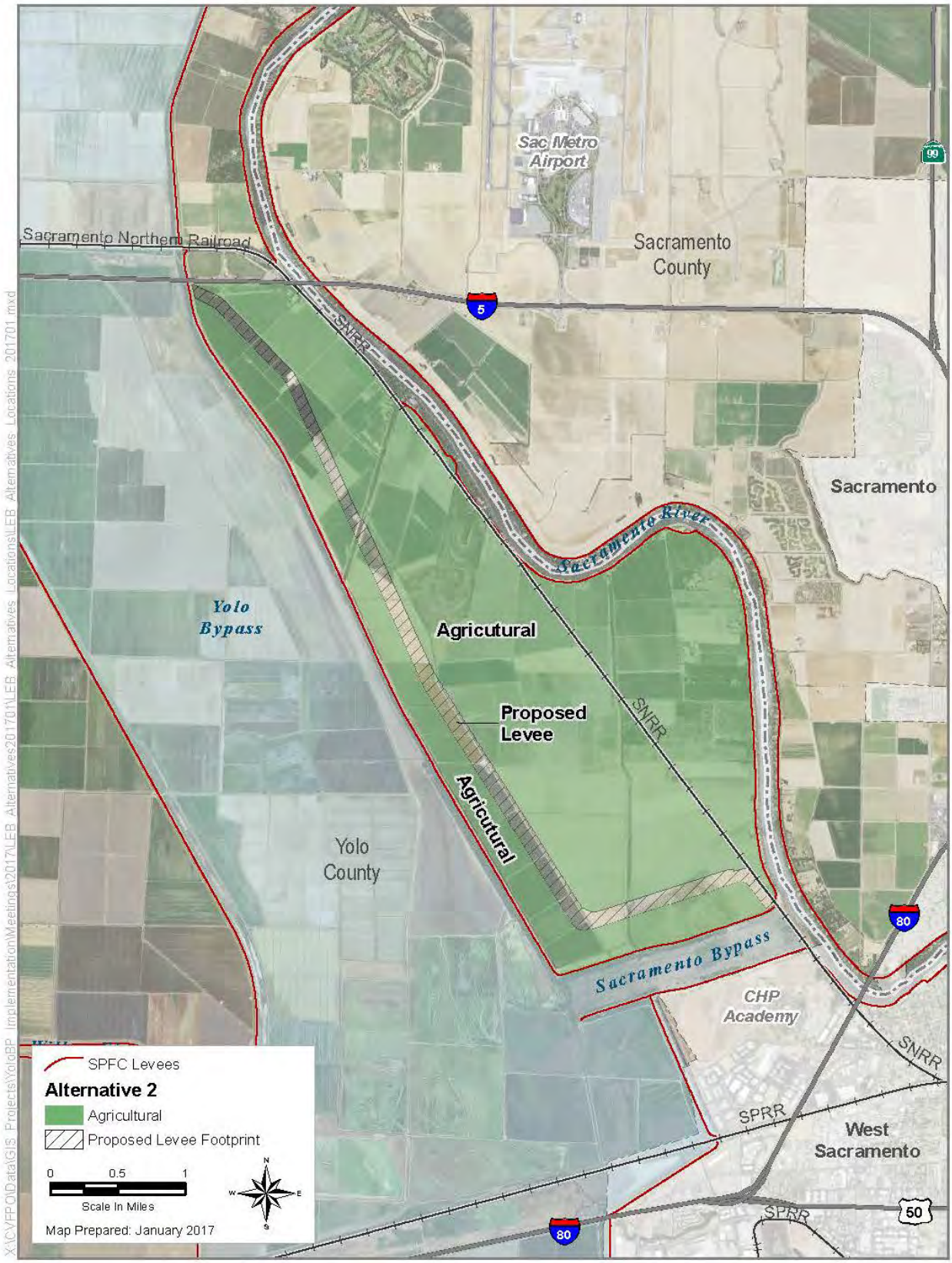


Figure 5. Alternative 3 Levee Setback Alignment

Figure 6. Alternative 4 Levee Setback Alignment

Figure 7. Alternative 5 Levee Setback Alignment

Figure 8. Location of HEC-FDA Elkhorn impact area index points

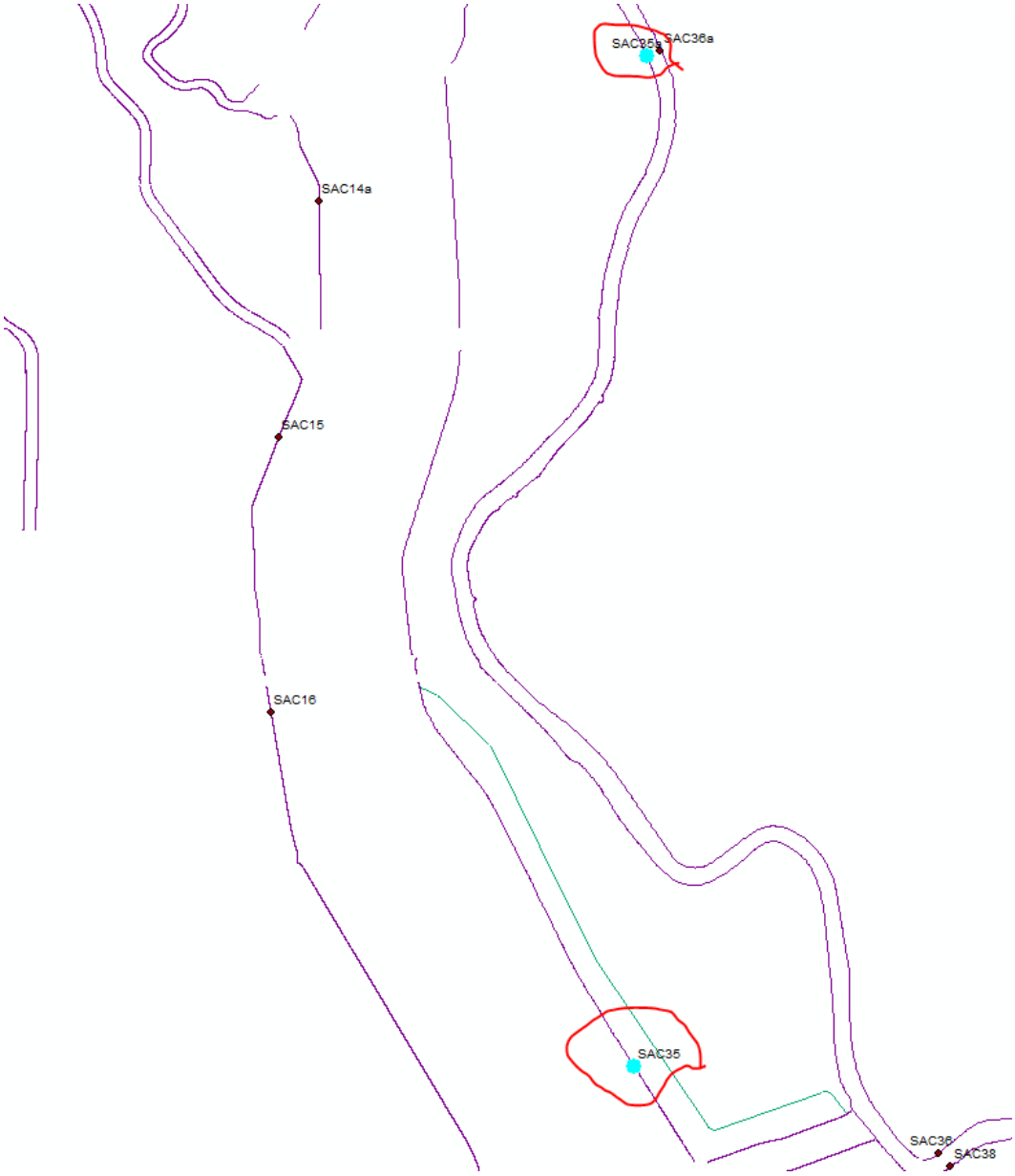


Figure 9. Existing RD 537 pump station

Source: Cowdin personal picture (February 2017)

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Appendix I. Traffic and Transportation Data

Alternative 2 - Reuse Scenario — On road truck trips
Vehicle Trips During Peak Hour — On road commuter vehicle
Calculation of Equivalent Trips
Notes: All Peak Hour trips equivalent basis = 2x HDT/10 + LDT/2

Construction Phase/Vehicle Type	EMFAC2011 Class	Year 1 Daily One-Way Trips	Year 2 Daily One-Way Trips	Notes:	Year 1Peak Hourly Trips	Year 2Peak Hourly Trips
Mobilization					**17**	**17**
Equipment/supply Transport Trucks	HDT	10	10	On road	2	2
Construction Workers	LDA-LDT	30	30		15	15
Site Preparation/Stripping					**16**	**16**
Highway Dump Truck	HDT	4	4	On road	0.8	0.8
Highway Dump Truck	HDT	4	4	Onsite only		
Construction Workers	LDA-LDT	30	30		15	15
Structure Demolition					**8**	**8**
Highway Dump Truck	HDT	16	16	On road	3.2	3.2
Construction Workers	LDA-LDT	10	10		5	5
Existing Road Removal					**13**	**11**
Highway Dump Truck	HDT	40	30	On road	8	6
Construction Workers	LDA-LDT	10	10		5	5
Trench Excavation and Forcemain Installation					**5**	**5**
Highway Dump Truck	HDT	280	110	Onsite only		
Construction Workers	LDA-LDT	10	10		5	5
New Road Construction					**15**	**12**
Aggregate and Asphalt Truck	HDT	24	12	On road	4.8	2.4
Construction Workers	LDA-LDT	20	20		10	10
New Levee/Seepage Berm & Soil Borrow Extraction					**25**	**15**
Onsite Dump Truck	HDT	6150	4100	Onsite only		
Offsite Dump Truck	HDT	0	0	On road	0	0
Water Truck	HDT	2	2	Onsite only		
Lubricating/Fuel Truck	T7 Utility	2	2	On road	0.4	0.4
Construction Workers	LDA-LDT	50	30		25	15
Offsite Borrow Material Transport					**0**	**465**
Highway Dump Truck	HDT	0	2300	On road	0	460
Construction Workers	LDA-LDT	0	10		0	5
Cutoff Wall Installation (Open Trench Method)					**12**	**8**
Highway Dump Truck	HDT	8	14	Onsite only		
Material Transit Truck	HDT	8	14	On road	1.6	2.8
Construction Workers	LDA-LDT	20	10		10	5
Erosion Protection Installation					**150**	**150**
Highway Dump Truck	HDT	700	700	On road	140	140
Construction Workers	LDA-LDT	20	20		10	10
Relief Well Installation					**5**	**0**
Construction Workers	LDA-LDT	10	0		5	0
Existing Pump Station Removal					**6**	**6**
Highway Dump Truck	HDT	4	4	On road	0.8	0.8
Construction Workers	LDA-LDT	10	10		5	5
Pump Station Installation					**5**	**0**
Concrete Transit Truck	HDT	2	0	On road	0.4	0
Construction Workers	LDA-LDT	10	0		5	0
Existing Levee Degrade					**10**	**10**
Highway Dump Truck	HDT	5200	6900	Onsite only		
Water Truck	HDT	2	2	Onsite only		
Construction Workers	LDA-LDT	20	20		10	10
Ecosystem Project Elements					**0**	**10**
Water Truck	HDT	0	1	Onsite only		
Construction Workers	LDA-LDT	0	20		0	10
Site Restoration and Demobilization					**10**	**10**
Equipment/supply Transport Trucks	HDT	26	26	On road	5.2	5.2
Construction Workers	LDA-LDT	10	10		5	5

Alternative 2 - Reuse Scenario

Schedule of vehicles - equivalent trip basis

	apr	may	jun	jul	aug	sept	oct	nov	dec	apr	may	jun	jul	aug	sept	oct	nov
	Year 1 (2018)									**Year 2 (2019)**							
Construction Activity	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Mobilization	17									17							
Site Preparation/Stripping	16	16	16							16							
Structure Demolition	8									8							
Existing Road Removal	13									11							
Trench Excavation and Forcemain Installation		5	5								5						
New Road Construction			15	15	15						12	12					
New Levee/Seepage Berm & Soil Borrow Extraction	25	25	25	25	25	25	25				15	15	15	15	15		
Offsite Borrow Material Transport											465	465	465	465	465		
Cutoff Wall Installation (Open Trench Method)			12	12	12	12	12						8	8	8		
Erosion Protection Installation						150	150								150	150	
Relief Well Installation					5	5											
Existing Pump Station Removal					6									6			
Pump Station Installation					5	5											
Existing Levee Degrade							10	10	10							10	10
Ecosystem Project Elements																10	
Site Restoration and Demobilization							10									10	
Total Peak Hour Equivalent Vehicle Trips (need to allocate to haul/access routes)	79	46	73	52	68	197	207	10	10	52	498	493	488	494	638	180	10

Alternative 2 - Long Haul Scenario — On road truck trips
Vehicle Trips During Peak Hour — On road commuter vehicle
Calculation of Equivalent Trips
Notes: All Peak Hour trips equivalent basis = 2x HDT/10 + LDT/2

Construction Phase/Vehicle Type	EMFAC20 11 Class	Year 1 Daily One-Way Trips	Year 2 Daily One-Way Trips	Notes:	Year 1Peak Hourly Trips	Year 2Peak Hourly Trips
Mobilization					**50**	**50**
Equipment/supply Transport Trucks	HDT	10	10	On road	20	20
Construction Workers	LDA-LDT	30	30		30	30
Site Preparation/Stripping					**68**	**68**
Highway Dump Truck	HDT	4	4	On road	8	8
Highway Dump Truck	HDT	4	4	Onsite only		
Construction Workers	LDA-LDT	30	30		60	60
Structure Demolition					**52**	**52**
Highway Dump Truck	HDT	16	16	On road	32	32
Construction Workers	LDA-LDT	10	10		20	20
Existing Road Removal					**100**	**80**
Highway Dump Truck	HDT	40	30	On road	80	60
Construction Workers	LDA-LDT	10	10		20	20
Trench Excavation and Forcemain Installation					**20**	**20**
Highway Dump Truck	HDT	280	110	Onsite only		
Construction Workers	LDA-LDT	10	10		20	20
New Road Construction					**88**	**64**
Aggregate and Asphalt Truck	HDT	24	12	On road	48	24
Construction Workers	LDA-LDT	20	20		40	40
New Levee/Seepage Berm & Soil Borrow Extraction					**9320**	**6208**
Onsite Dump Truck	HDT	1536	1024	Onsite only		
Offsite Dump Truck	HDT	4608	3072	On road	9216	6144
Water Truck	HDT	2	2	Onsite only		
Lubricating/Fuel Truck	T7 Utility	2	2	On road	4	4
Construction Workers	LDA-LDT	50	30		100	60
Offsite Borrow Material Transport					**0**	**4620**
Highway Dump Truck	HDT	0	2300	On road	0	4600
Construction Workers	LDA-LDT	0	10		0	20
Cutoff Wall Installation (Open Trench Method)					**56**	**48**
Highway Dump Truck	HDT	8	14	Onsite only		
Material Transit Truck	HDT	8	14	On road	16	28
Construction Workers	LDA-LDT	20	10		40	20
Erosion Protection Installation					**1440**	**1440**
Highway Dump Truck	HDT	700	700	On road	1400	1400
Construction Workers	LDA-LDT	20	20		40	40
Relief Well Installation					**20**	**0**
Construction Workers	LDA-LDT	10	0		20	0
Existing Pump Station Removal					**28**	**28**
Highway Dump Truck	HDT	4	4	On road	8	8
Construction Workers	LDA-LDT	10	10		20	20
Pump Station Installation					**24**	**0**
Concrete Transit Truck	HDT	2	0	On road	4	0
Construction Workers	LDA-LDT	10	0		20	0
Existing Levee Degrade					**40**	**40**
Highway Dump Truck	HDT	5200	6900	Onsite only		
Water Truck	HDT	2	2	Onsite only		
Construction Workers	LDA-LDT	20	20		40	40
Ecosystem Project Elements					**0**	**40**
Water Truck	HDT	0	1	Onsite only		
Construction Workers	LDA-LDT	0	20		0	40
Site Restoration and Demobilization					**72**	**72**
Equipment/supply Transport Trucks	HDT	26	26	On road	52	52
Construction Workers	LDA-LDT	10	10		20	20

Alternative 2 - Long Haul Scenario
Schedule of vehicles - equivalent trip basis

	apr	may	jun	jul	aug	sept	oct	nov	dec	apr	may	jun	jul	aug	sept	oct	nov
	Year 1 (2018)									**Year 2 (2019)**							
Construction Activity	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Mobilization	50									50							
Site Preparation/Stripping	68	68	68							68							
Structure Demolition	52									52							
Existing Road Removal	100									80							
Trench Excavation and Forcemain Installation		20	20								20						
New Road Construction			88	88	88						64	64					
New Levee/Seepage Berm & Soil Borrow Extraction	9320	9320	9320	9320	9320	9320	9320				6208	6208	6208	6208	6208		
Offsite Borrow Material Transport											4620	4620	4620	4620	4620		
Cutoff Wall Installation (Open Trench Method)			56	56	56	56	56						48	48	48		
Erosion Protection Installation						1440	1440								1440	1440	
Relief Well Installation					20	20											
Existing Pump Station Removal					28									28			
Pump Station Installation					24	24											
Existing Levee Degrade							40	40	40							40	40
Ecosystem Project Elements																40	
Site Restoration and Demobilization							72									72	
Total Peak Hour Equivalent Vehicle Trips (need to allocate to haul/access routes)	9,590	9,408	9,552	9,464	9,536	10,860	10,928	40	40	250	10,912	10,892	10,876	10,904	12,316	1,592	40

Alternative 4 - Reuse Scenario — On road truck trips
Vehicle Trips During Peak Hour — On road commuter vehicle
Calculation of Equivalent Trips
Notes: All Peak Hour trips equivalent basis = 2x HDT/10

Construction Phase/Vehicle Type	EMFAC2011 Class	Year 1Daily One-Way Trips	Year 1Peak Hourly Trips	Notes:
Mobilization			**17**	
Equipment/supply Transport Trucks	HDT	10	2	On Road
Construction Workers	LDA-LDT	30	15	
Site Preparation/Stripping			**16**	
Highway Dump Truck	HDT	4	0.8	On Road
Highway Dump Truck	HDT	4		Onsite Only
Construction Workers	LDA-LDT	30	15	
Structure Demolition			**8**	
Highway Dump Truck	HDT	16	3.2	On Road
Construction Workers	LDA-LDT	10	5	
Existing Road Removal			**19**	
Highway Dump Truck	HDT	68	13.6	On Road
Construction Workers	LDA-LDT	10	5	
Trench Excavation and Forcemain Installation			**99**	
Highway Dump Truck	HDT	470	94	Onsite Only
Construction Workers	LDA-LDT	10	5	
New Road Construction			**18**	
Aggregate and Asphalt Truck	HDT	40	8	On Road
Construction Workers	LDA-LDT	20	10	
New Levee/Seepage Berm & Soil Borrow Extraction			**25**	
Onsite Dump Truck	HDT	6400		Onsite Only
Offsite Dump Truck	HDT	0	0	On Road
Water Truck	HDT	1		Onsite Only
Lubricating/Fuel Truck	T7 Utility	2	0.4	On Road
Construction Workers	LDA-LDT	50	25	
Offsite Borrow Material Transport			**309**	
Highway Dump Truck	HDT	1520	304	On Road
Construction Workers	LDA-LDT	10	5	
Cutoff Wall Installation (Open Trench Method)			**12**	
Highway Dump Truck	HDT	10		Onsite Only
Material Transit Truck	HDT	10	2	On Road
Construction Workers	LDA-LDT	20	10	
Erosion Protection Installation			**158**	
Highway Dump Truck	HDT	740	148	On Road
Construction Workers	LDA-LDT	20	10	
Relief Well Installation			**5**	
Construction Workers	LDA-LDT	10	5	
Existing Pump Station Removal			**6**	
Highway Dump Truck	HDT	4	0.8	On Road
Construction Workers	LDA-LDT	10	5	
Pump Station Installation			**5**	
Concrete Transit Truck	HDT	2	0.4	On Road
Construction Workers	LDA-LDT	10	5	
Existing Levee Degrade			**10**	
Highway Dump Truck	HDT	5400		Onsite Only
Water Truck	HDT	2		Onsite Only
Construction Workers	LDA-LDT	20	10	
Ecosystem Project Elements			**10**	
Water Truck	HDT	1		Onsite Only
Construction Workers	LDA-LDT	20	10	
Site Restoration and Demobilization			**10**	
Equipment/supply Transport Trucks	HDT	26	5.2	On Road
Construction Workers	LDA-LDT	10	5	

Alternative 4 - Reuse Scenario

Schedule of vehicles - equivalent trip basis

	apr	may	jun	jul	aug	sept	oct	nov	dec
	Year 1 (2018)								
Construction Activity	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Mobilization	17								
Site Preparation/Stripping	16	16	16						
Structure Demolition	8								
Existing Road Removal	19								
Trench Excavation and Forcemain Installation		99	99						
New Road Construction			18	18	18				
New Levee/Seepage Berm & Soil Borrow Extraction	25	25	25	25	25	25	25		
Offsite Borrow Material Transport						309			
Cutoff Wall Installation (Open Trench Method)			12	12	12	12	12		
Erosion Protection Installation						158	158		
Relief Well Installation					5	5			
Existing Pump Station Removal					6				
Pump Station Installation					5	5			
Existing Levee Degrade							10	10	10
Ecosystem Project Elements								10	
Site Restoration and Demobilization							10		
Total Peak Hour Equivalent Vehicle Trips (need to allocate to haul/access routes)	85	140	170	55	72	515	216	20	10

Alternative 4 - Long Haul Scenario — On road truck trips
Vehicle Trips During Peak Hour — On road commuter vehicle
Calculation of Equivalent Trips
Notes: All Peak Hour trips equivalent basis = 2x HDT/10 + LDT/2

Construction Phase/Vehicle Type	EMFAC2011 Class	Year 1Daily One-Way Trips	Year 1Peak Hourly Trips	Notes:
Mobilization			**17**	
Equipment/supply Transport Trucks	HDT	10	2	On Road
Construction Workers	LDA-LDT	30	15	
Site Preparation/Stripping			**16**	
Highway Dump Truck	HDT	4	0.8	On Road
Highway Dump Truck	HDT	4		Onsite Only
Construction Workers	LDA-LDT	30	15	
Structure Demolition			**8**	
Highway Dump Truck	HDT	16	3.2	On Road
Construction Workers	LDA-LDT	10	5	
Existing Road Removal			**19**	
Highway Dump Truck	HDT	68	13.6	On Road
Construction Workers	LDA-LDT	10	5	
Trench Excavation and Forcemain Installation			**99**	
Highway Dump Truck	HDT	470	94	Onsite Only
Construction Workers	LDA-LDT	10	5	
New Road Construction			**18**	
Aggregate and Asphalt Truck	HDT	40	8	On Road
Construction Workers	LDA-LDT	20	10	
New Levee/Seepage Berm & Soil Borrow Extraction			**985**	
Onsite Dump Truck	HDT	1600		Onsite Only
Offsite Dump Truck	HDT	4800	960	On Road
Water Truck	HDT	1		Onsite Only
Lubricating/Fuel Truck	T7 Utility	2	0.4	On Road
Construction Workers	LDA-LDT	50	25	
Offsite Borrow Material Transport			**309**	
Highway Dump Truck	HDT	1520	304	On Road
Construction Workers	LDA-LDT	10	5	
Cutoff Wall Installation (Open Trench Method)			**12**	
Highway Dump Truck	HDT	10		Onsite Only
Material Transit Truck	HDT	10	2	On Road
Construction Workers	LDA-LDT	20	10	
Erosion Protection Installation			**158**	
Highway Dump Truck	HDT	740	148	On Road
Construction Workers	LDA-LDT	20	10	
Relief Well Installation			**5**	
Construction Workers	LDA-LDT	10	5	
Existing Pump Station Removal			**6**	
Highway Dump Truck	HDT	4	0.8	On Road
Construction Workers	LDA-LDT	10	5	
Pump Station Installation			**5**	
Concrete Transit Truck	HDT	2	0.4	On Road
Construction Workers	LDA-LDT	10	5	
Existing Levee Degrade			**10**	
Highway Dump Truck	HDT	5400		Onsite Only
Water Truck	HDT	2		Onsite Only
Construction Workers	LDA-LDT	20	10	
Ecosystem Project Elements			**10**	
Water Truck	HDT	1		Onsite Only
Construction Workers	LDA-LDT	20	10	
Site Restoration and Demobilization			**10**	
Equipment/supply Transport Trucks	HDT	26	5.2	On Road
Construction Workers	LDA-LDT	10	5	

Alternative 4 - Long Haul Scenario

Schedule of vehicles - equivalent trip basis

	apr	may	jun	jul	aug	sept	oct	nov	dec
	Year 1 (2018)								
Construction Activity	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Mobilization	17								
Site Preparation/Stripping	16	16	16						
Structure Demolition	8								
Existing Road Removal	19								
Trench Excavation and Forcemain Installation		99	99						
New Road Construction			18	18	18				
New Levee/Seepage Berm & Soil Borrow Extraction	985	985	985	985	985	985	985		
Offsite Borrow Material Transport						309			
Cutoff Wall Installation (Open Trench Method)			12	12	12	12	12		
Erosion Protection Installation						158	158		
Relief Well Installation					5	5			
Existing Pump Station Removal					6				
Pump Station Installation					5	5			
Existing Levee Degrade							10	10	10
Ecosystem Project Elements								10	
Site Restoration and Demobilization							10		
Total Peak Hour Equivalent Vehicle Trips (need to allocate to haul/access routes)	1,045	1,100	1,130	1,015	1,032	1,475	1,176	20	10

Appendix J. Regional Trails Information

Potential Recreational Trail Opportunities for the

Lower Elkhorn Basin Levee Setback Project

Prepared by Lower Sacramento/Delta North RFMP Team - May 4, 2017

The California Department of Water Resources (DWR) has expressed an interest in identifying recreational components that could be integrated into the Lower Elkhorn Basin Levee Setback Project (Lower Elkhorn Project). In addition, the Lower Sacramento/Delta North Regional Flood Management Plan Team (RFMP Team) is developing a Regional Trails Initiative that may include extending a regional trail connection north from the City of West Sacramento. Based on this alignment of interests, the RFMP team identified five recreational trail options that could be integrated into the Lower Elkhorn Project. These options are not exhaustive but are intended to represent a range of approaches to integrating recreational trails into the Lower Elkhorn Project. Also, the individual components of each option are not exclusive; they can be combined with other options as appropriate. For example, the educational placards and way-finding signage identified in Option 5 can be integrated into any of the options.

The RFMP team is requesting that DWR include these recreational trail components in the project description for the Lower Elkhorn Project and that the environmental impacts of their implementation be evaluated in the Lower Elkhorn Project Draft EIR/EIS. The agency(ies) responsible for repairing and maintaining these trail alignments has/have not been identified in the descriptions. Yolo County would not be one of the agencies responsible for their repair or maintenance.

The following is the list of potential recreational trail options for consideration:

Option 1 – New Levee Waterside Toe Bike Path/Hiking Trail

Install a paved or gravel-lined bike path/hiking trail on the waterside toe of the new Lower Elkhorn levee that would extend west from the Sacramento Weir and turn north as the new levee turns north, continuing along the levee's waterside toe until the levee intersects with County Road 22 north of Interstate 5. A gravel parking lot would be constructed within the expanded Sacramento Bypass to accommodate trail users. The parking lot would be designed to be regularly inundated and would be accessed from a ramp constructed along the southern face of the new Sacramento Bypass setback levee. Bicyclists could use this alignment to form a 15-mile loop connected to County Road 22/Old River Road.

Option 2 – Tule Canal Remnant Levee Bike Path/Hiking Trail

Install a paved or gravel-lined bike path/hiking trail on the east side of the Tule Canal generally along the alignment of the existing riparian corridor and the remnant levee. Similar to Option 1, this alignment would extend west from the Sacramento Weir along the waterside toe of the new Lower Elkhorn levee but would not turn north until it reaches the east side of the Tule Canal. The trail would continue north to its intersection with County Road 22 north of Interstate 5.

Much of the existing Yolo Bypass east levee is proposed to be removed to provide soil material for the new setback levee, although some segments would remain to provide wind wave protection. The path/trail would extend either up and over, or along the sides, of the remnant levee segments. The trail would take advantage of the shade provided by the Tule Canal's existing riparian tree canopy to the extent practical. Similar to Option 1, a gravel parking lot would be constructed within the expanded Sacramento Bypass to accommodate trail users and a 15-mile bicycle loop would be formed by connecting to County Road 22/Old River Road.

Option 3 – Top of Setback Levee Bike Path/Hiking Trail

This option would be similar to Option 1 but the path/trail would be located along the top of the new setback levee rather than along the waterside toe. The path/trail would extend west from the Sacramento Weir and then north to the levee's intersection with County Road 22 north of Interstate 5. Parking would be provided in the existing dirt lot directly northeast of the northern terminus of the Sacramento Weir, east of Old River Road. Similar to Option 1, this alignment would form a 15-mile bicycle loop connected to County Road 22/Old River Road.

Option 4 – Combined Top of Levee/Landside Levee Toe and County Road 124 Bike Path

This option would use the same southern alignment as Option 3. A paved bike trail would extend west along the top of the new setback levee from the Sacramento Weir and would continue north as the levee turns north. However, at the levee's intersection with the northeast-oriented segment of County Road 124, a ramp would be provided to connect the levee-top bike trail to CR 124. A new Class 2 bike path (i.e., a striped bike path within the existing roadway right-of-way) would extend northeast from the levee along CR 124 to its intersection with Old River Road. This option would also include a parallel trail alongside the landside levee toe that would provide continuous access when the top of the levee is closed for operations and maintenance purposes. This parallel trail would be either located directly along the landside toe of the levee or within the right-of-way of the realigned County Road 124 adjacent to the levee. Parking for this option would be provided at both the existing dirt lot directly northeast of the northern terminus of the Sacramento Weir and at the Elkhorn Boat Launch near the intersection of CR 124 and Old River Road. Bicyclists could use this alignment to form a 12-mile loop connected to Old River Road. If hunting were to occur within the levee setback area, this option would have the least potential for conflicts between trail users and hunters of the five options identified.

Option 5 - Tule Canal Access Hiking Trail

This option is intended to provide primarily pedestrian access to the Tule Canal without providing through access to the north. The alignment for this option would be similar to Option 2 but the unpaved trail would terminate at the location where CR 124 extends to the northeast. The purpose of this option would be to provide one-way in and one-way out access to the Tule Canal riparian corridor for native plant walks, bird watching, general wildlife viewing, and environmental education purposes. Recreational components that could be integrated into this option include bird blinds, picnic areas, interpretive trails, educational placards, and way-finding signage. Parking would be provided in the existing dirt lot directly northeast of the northern terminus of the Sacramento Weir, east of Old River Road.

DRAFT

N

County Road 22

I-5

Old River Road

Sacramento River

County Road 124

Option 3

Option 2

Option 1

Option 4

Option 5

Yolo Bypass

Gravel Parking Lot

Sacramento Bypass

Legend

- Setback Levee Alignment
- Option 1
- Option 2
- Option 3
- Option 4
- Option 5
- Gravel Parking Area

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Lower Elkhorn Setback Levee
Recreational Trail Alternatives

0 3,000
Scale in Feet

Date: 6/13/2017 Time: 9:46:13 AM
Path: R:_Flood Control\SAFCA\LowerSR_NDelta\RFMP & IWMP\Tasks\2017-05 Lower Elkhorn Setback Levee with Recreational Trail Alternatives\ArcMap\Lower Elkhorn Setback Levee Recreational Trail Alternatives.mxd