Job and Stimulus Benefits of Matilija Dam Removal

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BAY AREA COUNCIL
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Summary Findings

Matilija Dam, constructed by Ventura County in 1947 on Matilija Creek near Ojai, California, no longer functions as intended. Sediment has filled the reservoir, eliminating water storage while starving the Ventura River ecosystem of replenishing sands and cobbles. Over multiple decades, the County, stakeholders, and a host of funding partners have built significant momentum around removing the dam, with the goal of restoring access to upstream habitat for the endangered steelhead trout and completing necessary infrastructure improvements to protect downstream communities from future flood risks. While these attributes of the Matilija Dam Ecosystem Restoration Project are well documented, this report seeks to provide a greater understanding of the job and economic benefits associated with the comprehensive dam removal effort.

The Matilija Dam Ecosystem Restoration Project ("Project") is a collaboration of the Ventura County Public Works Agency - Watershed Protection ("County"), local stakeholders, and funding partners to improve water and climate resilience in California's Ventura River watershed. Removing the obsolete Matilija Dam and improving associated watershed infrastructure will benefit residents and visitors who depend on the river for flood protection, water supplies, river crossings, and recreation. These investments will also restore and sustain the native wildlife and ecosystems of the Ventura River from headwaters to estuary.

Significant economic benefits are also associated with the Project. The estimated $165 million to be spent across the suite of project components will catalyze job creation and stimulate the local, regional, and statewide economy. The chart below outlines the economic impact of the Project for the local Ventura County economy, the seven-county Southern California regional economy, and the statewide economy.

Economic Impacts of Matilija Dam Ecosystem Restoration Project by Geography

	Employment (Full-time equivalent job years)	Jobs per $1 million	Economic Output (millions)	Economic Output Multiplier
Ventura County	**1,958.61**	**11.85**	**$277.73**	**1.68**
Direct	1,235.15		$165.03	
Indirect	332.27		$51.78	
Induced	391.19		$60.91	
7-County Southern CA Region	**2,192.18**	**13.27**	**$328.54**	**1.99**
Direct	1,235.15		$165.03	
Indirect	455.58		$82.70	
Induced	501.45		$80.80	
State of California	**2,303.77**	**13.94**	**$346.84**	**2.10**
Direct	1,235.15		$165.03	
Indirect	498.27		$89.37	
Induced	570.35		$92.44	

Analysis: Bay Area Council Economic Institute using IMPLAN

Note: All dollar amounts are reported in 2020 present value equivalents

Due to the scale of the Project, this analysis includes investments that prepare the downstream infrastructure for the removal of the dam and the deconstruction of Matilija Dam itself. In addition to the dam removal, the infrastructure components include two bridge reconstructions, three levee projects, and a number of water diversion system improvements. A project map in Appendix A provides additional information, as does the section on Project Impact Detail.

For this analysis, it is assumed all essential downstream components and dam removal will be designed, funded, and implemented during the 10-year period, 2020 to 2029. Post-construction monitoring, habitat restoration, recreation enhancements, adaptive management, and project management will continue for another five to 10 years, ending by 2040.

In total, the $165 million invested in the entire Matilija Dam Ecosystem Restoration Project results in the impacts depicted on the previous page across the three different geographies over the 20-year project timeline. Key results of the analysis include the following:

- **The Project supports 2,300 full-time equivalent job-years in the State of California, nearly 2,000 of which are within Ventura County.**
- **In addition to jobs, the Project provides nearly $350 million in total economic output for California ($2.1 million of impact for every $1.0 million invested).**

The chart on the previous page also shows the two key economic impacts studied here: employment (in full-time equivalent job-years) and economic output (or the total value of all transactions associated with the initial spending). The results show three impact categories, which are also explained further in the Methods section of this analysis:

- Direct, which captures effects connected to the initial spending;
- Indirect, which encompasses spending made by contractors, such as the purchase of equipment or materials; and
- Induced, which totals additional spending that stems from wages associated with the Project as they are spent.

The economic output multiplier indicates the total value of transactions that are generated as a result of one dollar of initial expenditure. The multiplier effect grows as the geography studied gets larger—this pattern is typical as larger geographies have less spending leakage to other surrounding areas. As a state with a diverse set of industries and a large labor pool, the California model has very limited immediate leakage to other states. The model assumes that all of the Project's initial capital and labor inputs come from within California. The project team confirmed that all existing project contracts are with firms headquartered in-state, and that the vast majority of future contracts will also be California-based.[1]

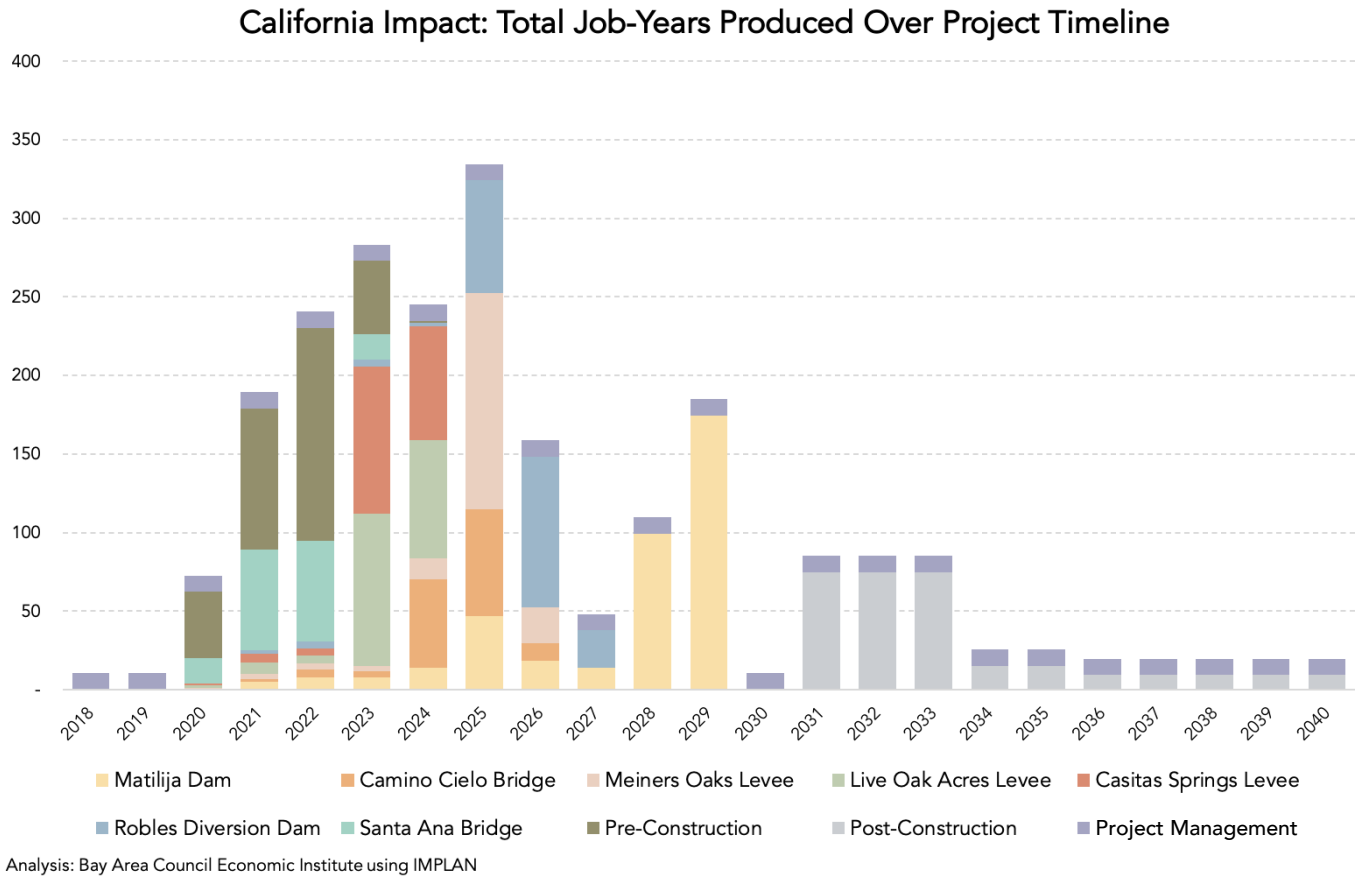
The major difference in the employment estimates across all three geographical models is related to induced impact. This is the result of the impact that project-related wages will have on local economies across the state—even those outside of the immediate project area. For example, labor income spent in the retail, healthcare, or tourism industries in surrounding counties as a result of increased wages from the Project stimulates those local economies via an induced impact. The statewide model has a higher number of jobs supported because it incorporates these indirect and induced impacts not just for the design and construction workers employed in Ventura County—likely living in the Southern California region where the Project is taking place—but also the earnings of all contractors in cities across the state such as Oakland, Rancho Cordova, and Folsom.

The impacts on the statewide economy for each project component, including pre-construction and post-construction spending, project management, and major infrastructure projects, are shown in the first table on the following page. The chart at the bottom of the page shows that the majority of the jobs in California are created in the first 10 years of the Project. This reflects the timelines of the infrastructure components that encompass the greatest amounts of spending. The last 10 years of the Project support a more consistent level of employment, reflecting the timelines of spending associated with various post-construction elements (monitoring, continued project management, etc.).

California: Economic Impacts of Matilija Dam Ecosystem Restoration Project

	Employment (Full-time equivalent job years)	Jobs per $1 million	Economic Output (millions)	Economic Output Multiplier
Matilija Dam Removal	387.12	14.83	$55.59	2.13
Camino Cielo Bridge	146.12	14.04	$22.19	2.13
Meiners Oaks Levee	185.36	13.79	$29.04	2.16
Live Oak Acres Levee	186.84	12.91	$30.85	2.13
Casitas Springs Levee	177.23	12.94	$29.11	2.13
Robles Diversion Dam	205.32	14.79	$29.54	2.13
Santa Ana Bridge	160.02	12.24	$26.56	2.03
Pre-Construction Activities	315.54	12.48	$53.03	2.10
Post-Construction Activities	300.69	17.45	$35.06	2.03
Project Management	239.53	13.55	$35.89	2.03
TOTAL IMPACT	**2,303.77**	**13.94**	**$346.84**	**2.10**

Analysis: Bay Area Council Economic Institute using IMPLAN



Analysis: Bay Area Council Economic Institute using IMPLAN

Work crew at Casitas Springs Levee

Methods

This analysis quantifies the job creation and total economic output of the Matilija Dam Ecosystem Restoration Project. The Project in total is currently estimated to cost approximately $180 million in nominal dollars (Appendix B), based on the best current estimates from project consultants and the County of design and implementation costs and schedules for each component.

The spending is spread across the capital and labor costs of seven infrastructure components, project management, pre-construction activities (including environmental compliance, recreation and mitigation planning, and real property acquisitions), and post-construction activities (including native plant restoration, recreation enhancements, and long-term monitoring and adaptive management). These estimates are then discounted to 2020 present values, yielding a total investment of $165 million. *All results are stated as 2020 present value equivalents.*

Economic impact is commonly measured through an input-output model that relies on national data to quantify the relationship between industries, their suppliers, and their customers. This report uses the IMPLAN modeling system to estimate the economic impacts on Ventura County, the seven-county Southern California region (see below for definition), and the state of California using 2018 industry, transaction, and wage data. IMPLAN examines the effect of a change in wages or employment due to an activity, and then analyzes its cumulative impact as the initial spending flows through the economy.

For the purposes of this report, the key outputs of the IMPLAN model are:

Employment: This measure captures the number of full-time equivalent job-years produced. For example, two 40-hour-per-week jobs that each last for six months would result in one full-time equivalent job-year in the model. Similarly, two 40-hour-per-week jobs lasting two years each would result in four full-time equivalent job-years (or four full-year equivalent jobs). The following table summarizes the concept of a full-time equivalent job-year through several examples that all equal a total of four full-time equivalent job-years:

Full-time equivalent job years	Jobs Calculation
4	One 40-hour-per-week full-time job lasting four years.
4	Two 40-hour-per-week full-time jobs each lasting two years.
4	Four 40-hour-per-week full-time jobs each lasting one year.
4	Eight 40-hour-per-week full-time jobs each lasting six months.
4	Eight 20-hour-per-week part-time jobs each lasting one year.

Project components with spending activities that typically employ lower-wage workers tend to have higher job creation multipliers, while industries with higher-wage workers have a lower employment impact per dollar spent. For example, a given amount of spending might support one full-time equivalent job-year for an engineering design consultant, while that same amount of spending is likely to support multiple full-time equivalent job-years for an hourly worker employed as a revegetation field technician.

Economic Output: The measure of total economic activity related to the initial activity, reflecting the total spending by firms, organizations, and households that is made possible by the initial input. Economic output counts the total value of all transactions that can be traced back to the original expenditure until those dollars leave the geography, are saved by households, or become profit for businesses.

These two economic impacts are each broken down as direct, indirect, or induced effects. The direct effects derive from the initial project-related investment. For example, the hiring of a construction contractor and the subsequent wages paid to an equipment operator are direct effects. The indirect effects are the transactions that flow from the areas of initial spending—for example, construction companies hired to remove a dam will need to purchase equipment or materials. Lastly, the model generates induced impacts, which derive from spending created by the wages related to the initial activity. In this example, as construction workers spend their wages, they create impacts in restaurants, retail, the healthcare system, and in other sectors.

Local, Regional and Statewide Impacts: Three geographies were defined in order to assess the impact on the local, regional, and statewide economy. The local economy for the Project is Ventura County. The regional economy refers to a seven-county Southern California region, including Ventura, Santa Barbara, Los Angeles, Orange, San Diego, San Bernardino, and Riverside counties. The statewide economy is defined as the 58 counties in the state.

For all three geographies, the direct impact is the same—and is calculated as the direct investment amount discounted back to 2020 based on the years of projected expenditures. Higher indirect and induced impacts for the larger geographies reflect how initial spending in the local economy expands across the regional and statewide economy—creating both jobs and output in local-serving industries such as food service, entertainment, retail, and healthcare. For example, if construction workers employed by one of the contractors live in various counties surrounding Ventura County, and spend most of their wages in their home counties, this impact is captured in the regional model. Additionally, the California model reflects those same impacts of earnings circulating in the economy on a statewide scale.

To build an IMPLAN model, numerous assumptions must be made as to how the expenditures are initially made. Most significantly, each analysis must assign investment values to industries. For each project component, industries that reflect the activities were selected and spending allocations were assigned to each industry based on expenditure breakdowns from documentation provided by the County and project consultants. The mix of spending—including the wages and capital expenditures associated with each industry—determines each component's job production potential and economic output.

Full industry spending allocations are outlined in Appendix B. The expenditure values in the same table reflect the latest assumptions for nominal total costs summed across the years when dollars are spent, as well as discounted equivalents with a 2020 present value.

Sediment accumulation in Matilija Reservoir

Project Impact Detail

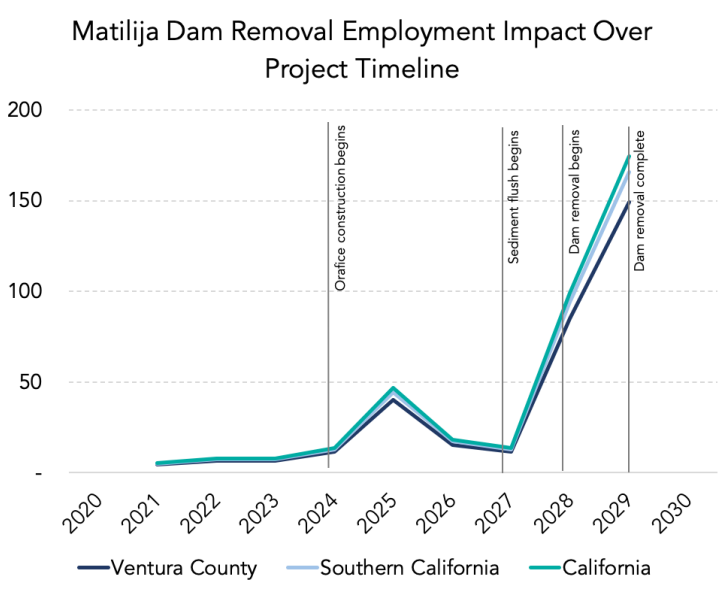
The Matilija Dam Ecosystem Restoration Project consists of numerous components taking place over approximately two decades: an initial 10-year period (2020-2029) of intensive planning, design, and implementation; and a subsequent period of up to 10 years for post-removal monitoring, adaptive management, and habitat restoration. To better understand the economic impacts summarized previously, this section breaks out the employment and economic impacts of each component of the $165 million total project investment.

1. Matilija Dam Removal

Total Spending (2020 present value dollars): $26,100,256

Timeline: 2021-2029

Background: Matilija Dam no longer provides the flood control and water supply benefits for which it was originally constructed due to the accumulation of reservoir sediment and the resultant loss of approximately 98 percent of its original storage capacity. In its current condition, the dam is a financial burden to its owner, Ventura County, and poses long-term risks to downstream communities. Removal of the dam will restore access to headwaters habitat for the federally endangered Southern California steelhead; enhance downstream riparian and floodplain habitats through improved natural sediment transport; and replenish the Ventura River estuary and near-shore coastal habitats with sands and cobbles. In addition to these environmental benefits, the dam removal activities will stimulate the economy and support employment.



Impact Overview:

- The $26.1 million in spending to execute the Matilija Dam removal results in 387 full-time equivalent job-years created across the state. Per one million dollars spent, 12.68 job-years are created in Ventura County, 14.07 job-years in Southern California, and 14.83 job-years in California.
- The dam removal has an economic output multiplier of 2.13, meaning each dollar spent on this component results in $1.13 in additional economic activity. Total economic output related to this component statewide is estimated at $55.6 million.

These findings are in line with economic impact analyses for other dam removals in the western U.S., which are summarized at the end of this section. An analysis of the economic impact of removing four dams on the Klamath River found a statewide impact of 21.5 jobs per $1 million spent and an economic output multiplier of 2.35 (compared to 2.13 for Matilija Dam).[2] Another study examining a dam deconstruction on the Lower Snake River in a nine-county region in Washington and Idaho found that $789.4 million in present value spending results in $1.4 billion in economic output, a slightly lower multiplier effect (1.79) when compared to the regional findings for the Matilija Dam removal (2.00).[3]

Employment Impact: Matilija Dam Removal

	Employment (Full-time equivalent job years)				
	Direct	Indirect	Induced	**Total**	**Per $1 million**
Ventura County	215.09	45.74	70.05	**330.88**	**12.68**
Seven-County Southern CA Region	215.09	63.72	88.53	**367.34**	**14.07**
California	215.09	71.89	100.14	**387.12**	**14.83**

Analysis: Bay Area Council Economic Institute using IMPLAN

Economic Output: Matilija Dam Removal

	Economic Output (millions)				
	Direct	Indirect	Induced	**Total**	**Economic Output Multiplier**
Ventura County	$26.10	$7.15	$10.90	**$44.16**	**1.69**
Seven-County Southern CA Region	$26.10	$11.78	$14.27	**$52.15**	**2.00**
California	$26.10	$13.15	$16.34	**$55.59**	**2.13**

Analysis: Bay Area Council Economic Institute using IMPLAN

2. Camino Cielo Bridge

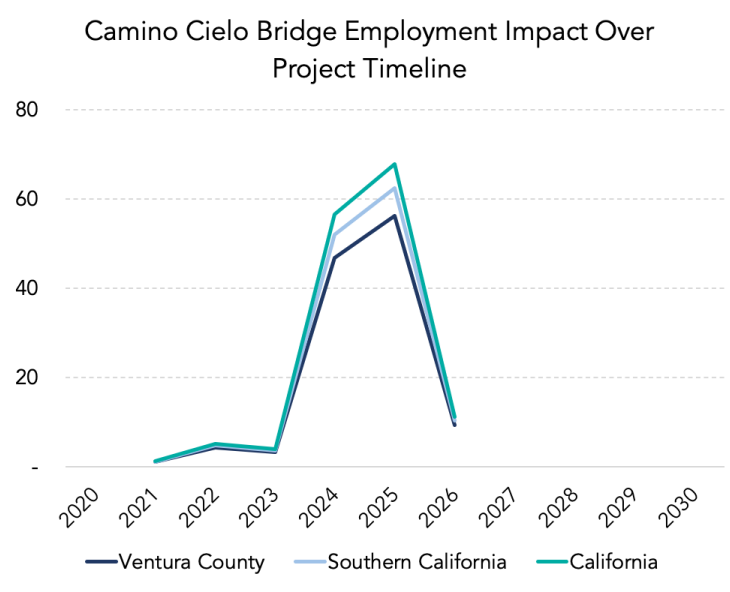
Total Spending (2020 present value dollars): $10,407,313

Timeline: 2021-2026

Background: The current river crossing at Camino Cielo incurs damage during every major storm. A new replacement bridge will resolve this recurring problem and prepare the infrastructure for increased sediment flows following the removal of Matilija Dam.

Impact Overview:

- The $10.4 million in spending to replace the Camino Cielo Bridge results in 146 full-time equivalent job-years created in California. Per one million dollars spent, 11.65 job-years are created in Ventura County, 12.92 job-years in Southern California, and 14.04 job-years in California.
- The bridge reconstruction has a total economic output effect of $22.2 million in California. With an economic output multiplier of 2.13, each dollar spent on this component results in an additional $1.13 in economic activity.



A similar study examining the economic impact of various types of infrastructure redevelopment (including bridges) in California found that one million dollars invested in infrastructure improvements results in 18.6 job-years in the state and supports $2 million in overall economic output.[4] This study analyzed projects statewide, thus differential wage rates may explain the divergence with job production numbers found in the chart below.

Employment Impact: Camino Cielo Bridge

	Employment (Full-time equivalent job years)				
	Direct	Indirect	Induced	**Total**	**Per $1 million**
Ventura County	76.98	19.86	24.36	**121.2**	**11.65**
Seven-County Southern CA Region	76.98	26.81	30.65	**134.44**	**12.92**
California	76.98	31.05	38.09	**146.12**	**14.04**

Analysis: Bay Area Council Economic Institute using IMPLAN

Economic Output: Camino Cielo Bridge

	Economic Output (millions)				
	Direct	Indirect	Induced	**Total**	**Economic Output Multiplier**
Ventura County	$10.41	$3.07	$3.79	**$17.27**	**1.66**
Seven-County Southern CA Region	$10.41	$5.02	$4.93	**$20.36**	**1.96**
California	$10.41	$5.64	$6.14	**$22.19**	**2.13**

Analysis: Bay Area Council Economic Institute using IMPLAN

Flood Protection Improvements

Background: Three levee components will provide improved flood protection for communities downstream of Matilija Dam. The existing levees do not meet FEMA standards, so a new levee near Meiners Oaks as well as rehabilitation projects at Live Oak Acres and Casitas Springs will reduce the risks faced by these communities under current and future conditions.

The findings across the three levee components are consistent with other impact analyses for similar investments, which are also highlighted at the end of this section. One study examining the impacts of levee improvements in two California cities (Lathrop and Manteca) found that $170 million invested in levee improvements would yield $362 million in economic output and 1,900 job-years—an impact of 11.17 job-years per one million dollars of initial investment.[5]

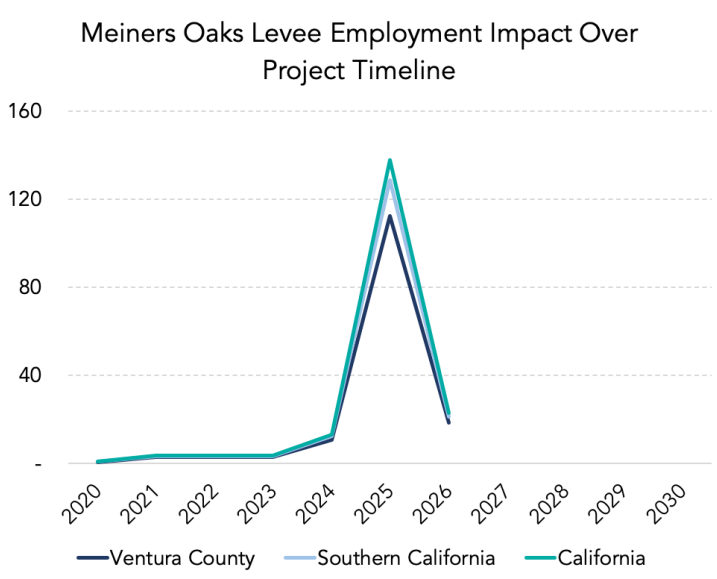
3. Meiners Oaks Levee

Total Spending (2020 present value dollars): $13,440,543

Timeline: 2020-2026

Impact Overview:

- The $13.4 million in spending to build the new Meiners Oaks Levee results in 185 full-time equivalent job-years created in California. Per one million dollars spent, 11.26 job-years are created in Ventura County, 12.87 job-years in Southern California, and 13.79 job-years in California.
- The levee improvements add $29.0 million to California's total economic output. The Meiners Oaks Levee project has an economic output multiplier of 2.16 statewide, thus each dollar spent on this component results in an additional $1.16 in economic activity.



Employment Impact: Meiners Oaks Levee

	Employment (Full-time equivalent job years)				
	Direct	Indirect	Induced	**Total**	**Per $1 million**
Ventura County	96.02	23.77	31.49	**151.28**	**11.26**
Seven-County Southern CA Region	96.02	35.76	41.16	**172.94**	**12.87**
California	96.02	40.23	49.11	**185.36**	**13.79**

Analysis: Bay Area Council Economic Institute using IMPLAN

Economic Output: Meiners Oaks Levee

	Economic Output (millions)				
	Direct	Indirect	Induced	**Total**	**Economic Output Multiplier**
Ventura County	$13.44	$3.75	$4.90	**$22.10**	**1.64**
Seven-County Southern CA Region	$13.44	$6.91	$6.64	**$26.99**	**2.01**
California	$13.44	$7.61	$7.98	**$29.04**	**2.16**

Analysis: Bay Area Council Economic Institute using IMPLAN

Levee construction in Ventura County

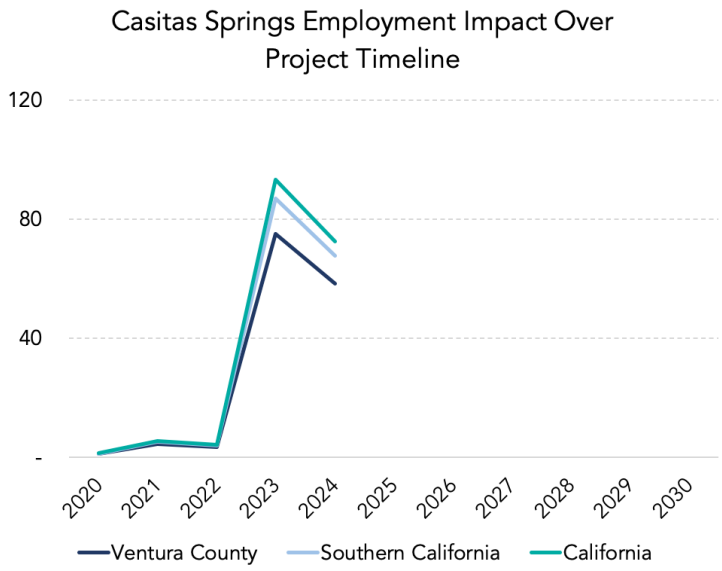
4. Casitas Springs Levee

Total Spending (2020 present value dollars): $13,697,456

Timeline: 2020-2024

Impact Overview:

- The $13.7 million in spending to upgrade the Casitas Springs Levee results in 177 full-time equivalent job-years in California. Per one million dollars spent, 10.40 job-years are created in Ventura County, 12.05 job-years in Southern California, and 12.94 job-years in California.
- The Casitas Springs Levee improvements also add $29.1 million in total economic output. The Casitas Springs Levee project has an economic output multiplier of 2.13, meaning each dollar spent on this component results in an additional $1.13 in economic activity.



Employment Impact: Casitas Springs Levee

	Employment (Full-time equivalent job years)				
	Direct	Indirect	Induced	**Total**	**Per $1 million**
Ventura County	88.59	24.51	29.33	**142.43**	**10.40**
Seven-County Southern CA Region	88.59	37.52	38.99	**165.10**	**12.05**
California	88.59	41.93	46.71	**177.23**	**12.94**

Analysis: Bay Area Council Economic Institute using IMPLAN

Economic Output: Casitas Springs Levee

	Economic Output (millions)				
	Direct	Indirect	Induced	**Total**	**Economic Output Multiplier**
Ventura County	$13.70	$3.88	$4.57	**$22.15**	**1.62**
Seven-County Southern CA Region	$13.70	$7.22	$6.30	**$27.22**	**1.99**
California	$13.70	$7.87	$7.55	**$29.11**	**2.13**

Analysis: Bay Area Council Economic Institute using IMPLAN

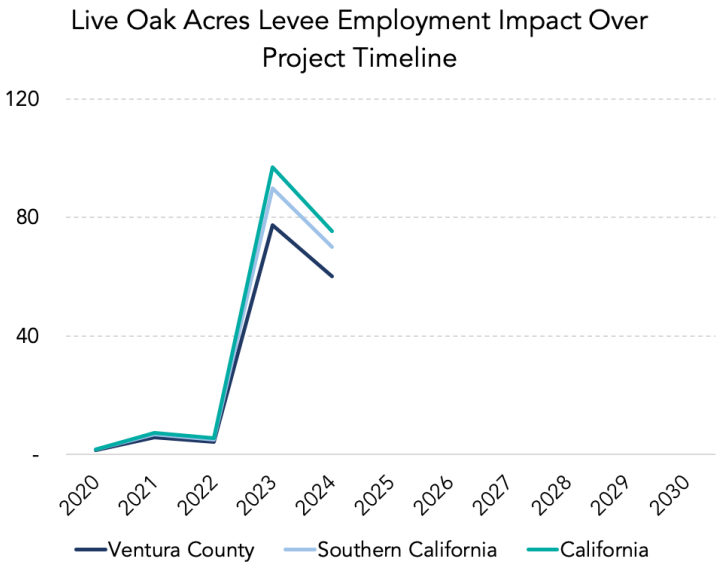
5. Live Oak Acres Levee

Total Spending (2020 present value dollars): $14,472,597

Timeline: 2020-2024

Impact Overview:

- The $14.5 million in spending to upgrade the Live Oak Acres Levee results in 187 full-time equivalent job-years created in California. Per one million dollars spent, 10.31 job-years are created in Ventura County, 11.98 job-years in Southern California, and 12.91 job-years in California.
- The levee improvements also add $30.9 million to the state's total economic output. With an economic output multiplier of 2.13, each dollar spent on this component results in an additional $1.13 in economic activity in California.



Employment Impact: Live Oak Acres Levee

	Employment (Full-time equivalent job years)				
	Direct	Indirect	Induced	**Total**	**Per $1 million**
Ventura County	92.81	25.83	30.51	**149.15**	**10.31**
Seven-County Southern CA Region	92.81	39.85	40.76	**173.42**	**11.98**
California	92.81	44.65	49.38	**186.84**	**12.91**

Analysis: Bay Area Council Economic Institute using IMPLAN

Economic Output: Live Oak Acres Levee

	Economic Output (millions)				
	Direct	Indirect	Induced	**Total**	**Economic Output Multiplier**
Ventura County	$14.47	$4.09	$4.75	**$23.32**	**1.61**
Seven-County Southern CA Region	$14.47	$7.70	$6.58	**$28.75**	**1.99**
California	$14.47	$8.40	$7.98	**$30.85**	**2.13**

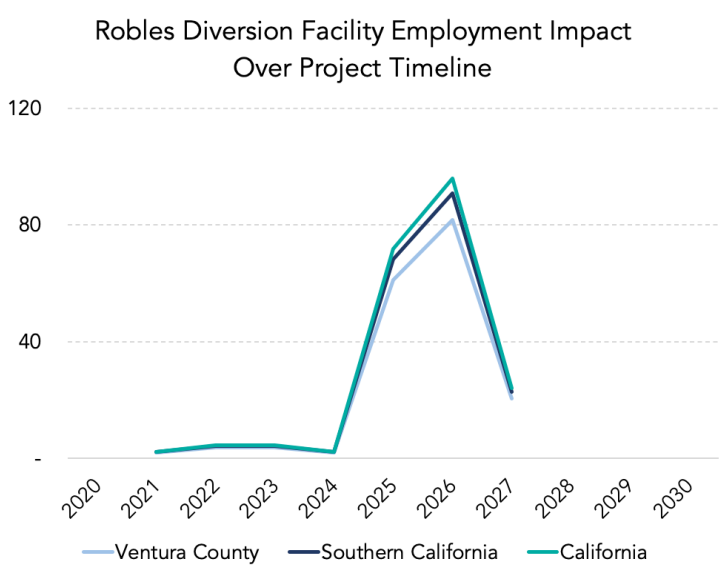
Analysis: Bay Area Council Economic Institute using IMPLAN

6. Robles Diversion Facility

Total Spending (2020 present value dollars): $13,885,102

Timeline: 2020-2024

Background: The Robles Diversion Facility provides for the conveyance of water from the Ventura River into storage at Lake Casitas for distribution by the Casitas Municipal Water District. Improved infrastructure, increased maintenance, and/or other measures and upgrades will transport fine and coarse sediment as part of dam removal, address current and future water supply reliability challenges, and improve steelhead migration both to and from the Ventura River headwaters.



Impact Overview:

- The $13.9 million in spending to upgrade and improve the Robles Diversion Facility infrastructure and operations results in 205 full-time equivalent job-years created in California. Per one million dollars spent, 12.60 job-years are created in Ventura County, 14.03 job-years in Southern California, and 14.79 job-years in California.
- This component adds $29.5 million in total economic output. It has an economic multiplier of 2.13, meaning each dollar spent results in an additional $1.13 in economic activity in California.

Employment Impact: Robles Diversion Facility

	Employment (Full-time equivalent job years)				
	Direct	Indirect	Induced	**Total**	**Per $1 million**
Ventura County	115.26	23.59	36.13	**174.98**	**12.60**
Seven-County Southern CA Region	115.26	33.80	45.71	**194.77**	**14.03**
California	115.26	38.07	51.99	**205.32**	**14.79**

Analysis: Bay Area Council Economic Institute using IMPLAN

Economic Output: Robles Diversion Facility

	Economic Output (millions)				
	Direct	Indirect	Induced	**Total**	**Economic Output Multiplier**
Ventura County	$13.89	$3.78	$5.63	**$23.29**	**1.68**
Seven-County Southern CA Region	$13.89	$6.45	$7.36	**$27.70**	**2.00**
California	$13.89	$7.17	$8.48	**$29.54**	**2.13**

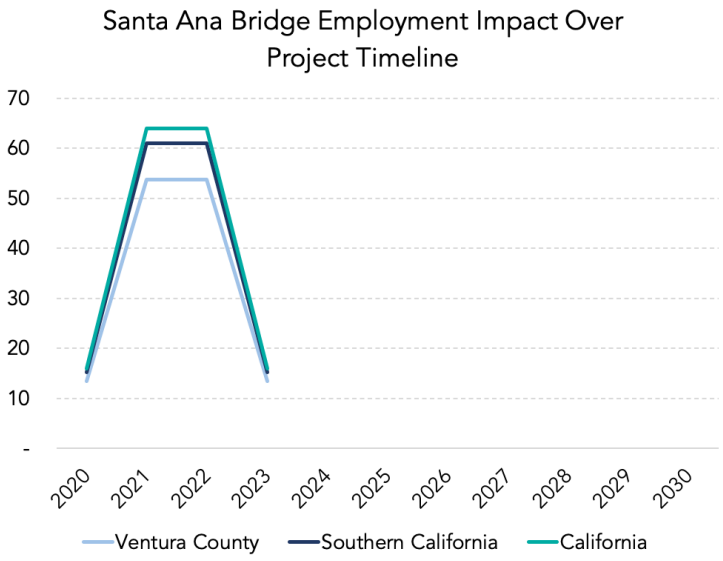
Analysis: Bay Area Council Economic Institute using IMPLAN

7. Santa Ana Bridge

Total Spending (2020 present value dollars): $13,070,019

Timeline: 2020-2023

Background: The Santa Ana Bridge is seismically deficient and in its current state creates a bottleneck in the Ventura River floodplain. A 2019 implementation grant from the California Department of Fish and Wildlife supports construction that will result in a longer, wider, and taller replacement bridge that improves fish passage and enhances natural sediment transport; eliminates the need to excavate around the bridge following major storms; and adds capacity for increased sediment flows following the removal of Matilija Dam.



Impact Overview:

- The $13.1 million in spending to update the Santa Ana Bridge results in 160 full-time equivalent job-years in California. Per one million dollars spent, 10.29 job-years are created in Ventura County, 11.67 job-years in Southern California, and 12.24 job-years in California.
- The bridge reconstruction also adds $26.6 million to the state's economic output. With an economic output multiplier of 2.03 statewide, each dollar spent on the bridge results in an additional $1.03 in economic activity.[6]

Employment Impact: Santa Ana Bridge

	Employment (Full-time equivalent job years)				
	Direct	Indirect	Induced	**Total**	**Per $1 million**
Ventura County	82.82	24.79	26.90	**134.51**	**10.29**
Seven-County Southern CA Region	82.82	34.90	34.79	**152.51**	**11.67**
California	82.82	37.88	39.32	**160.02**	**12.24**

Analysis: Bay Area Council Economic Institute using IMPLAN

Economic Output: Santa Ana Bridge

	Economic Output (millions)				
	Direct	Indirect	Induced	**Total**	**Economic Output Multiplier**
Ventura County	$13.07	$3.91	$4.19	**$21.18**	**1.62**
Seven-County Southern CA Region	$13.07	$6.72	$5.61	**$25.40**	**1.94**
California	$13.07	$7.14	$6.34	**$26.56**	**2.03**

Analysis: Bay Area Council Economic Institute using IMPLAN

Pre-Construction, Post-Construction, and Project Management

Background: Successful execution of the Project will require a variety of undertakings that are separate from the individual infrastructure components summarized above, but which still must be implemented as part of the Project before, during, and/or after dam removal. This section details the impact from these activities. They are grouped into three different expenditure categories: pre-construction activities, post-construction activities, and project management.

Pre-construction activities include environmental compliance, water supply alternatives planning and design, recreation planning, property acquisitions, and utility relocations. Post-construction activities include reservoir site native plant restoration, post-construction monitoring, adaptive management to address residual flood and/or water supply risks, and recreation plan implementation. Project management includes general project oversight, legal support, risk management, public outreach, and grants administration.

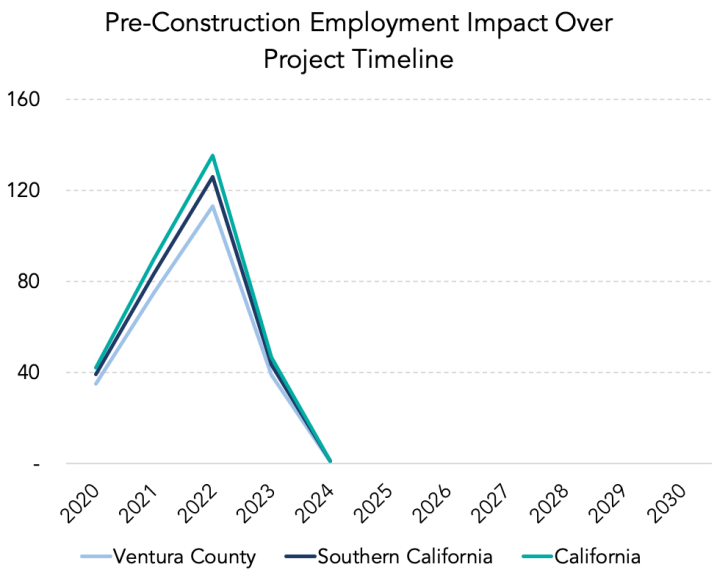
8. Pre-Construction Activities

Total Spending (2020 present value dollars): $25,275,840

Timeline: 2020-2024

Impact Overview:

- The $25.3 million in expenditures on pre-construction activities yield 315 full-time equivalent job-years in California. Per one million dollars, 10.42 job-years are created in Ventura County, 11.61 job-years in Southern California, and 12.48 job-years in California.
- These activities also add $53.0 million to California's economic output. The statewide total output multiplier for pre-construction spending is 2.10, meaning each dollar spent on this component results in an additional $1.10 in economic activity.



Employment Impact: Pre-Construction

	Employment (Full-time equivalent job years)				
	Direct	Indirect	Induced	**Total**	**Per $1 million**
Ventura County	151.84	64.14	47.49	**263.47**	**10.42**
Seven-County Southern CA Region	151.84	80.72	60.92	**293.48**	**11.61**
California	151.84	88.82	74.88	**315.54**	**12.48**

Analysis: Bay Area Council Economic Institute using IMPLAN

Economic Output: Pre-Construction

	Economic Output (millions)				
	Direct	Indirect	Induced	**Total**	**Economic Output Multiplier**
Ventura County	$25.28	$10.16	$7.39	**$42.82**	**1.69**
Seven-County Southern CA Region	$25.28	$14.27	$9.83	**$49.37**	**1.95**
California	$25.28	$15.53	$12.23	**$53.03**	**2.10**

Analysis: Bay Area Council Economic Institute using IMPLAN

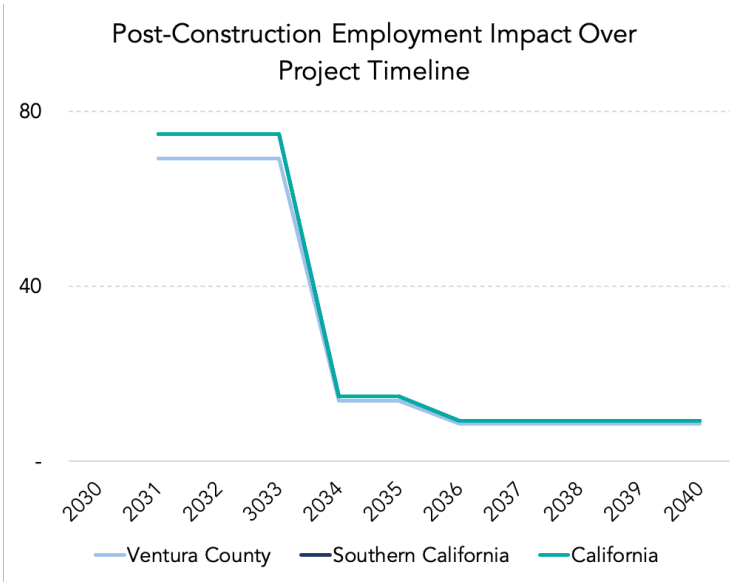
9. Post-Construction Activities

Total Spending (2020 present value dollars): $17,008,754

Timeline: 2031-2040

Impact Overview:

- The $17.0 million in expenditures on environmental monitoring, recreation plan implementation, reservoir site native plant restoration, and adaptive management yields 300 full-time equivalent job-years in California. Per one million dollars spent, 16.16 job-years are created in Ventura County, 17.43 job-years in Southern California, and 17.45 job-years in California.
- These activities also contribute an additional $35.1 million to the state's economic output. With an economic output multiplier of 2.03, each dollar spent on this component results in an additional $1.03 in economic activity.
- This category is notable for its heavy concentration of impact within the Southern California region and limited additional impact across the rest of California. Unlike other areas of spending in the Project, post-construction spending is not assumed to require inputs from outside of the local area. The industries where spending is concentrated (i.e., environmental consulting and landscape services) are assumed to be sourced entirely from within the region. Minimal spending leakage to other counties accounts for the slight difference in the regional and statewide impacts.



Employment Impact: Post-Construction

	Employment (Full-time equivalent job years)				
	Direct	Indirect	Induced	**Total**	**Per $1 million**
Ventura County	188.38	37.19	52.85	**278.42**	**16.16**
Seven-County Southern CA Region	188.38	46.84	65.20	**300.42**	**17.43**
California	188.38	47.00	65.31	**300.69**	**17.45**

Analysis: Bay Area Council Economic Institute using IMPLAN

Economic Output: Post-Construction

	Economic Output (millions)				
	Direct	Indirect	Induced	**Total**	**Economic Output Multiplier**
Ventura County	$17.01	$5.45	$8.23	**$30.69**	**1.78**
Seven-County Southern CA Region	$17.01	$7.51	$10.49	**$35.01**	**2.03**
California	$17.01	$7.54	$10.51	**$35.06**	**2.03**

Analysis: Bay Area Council Economic Institute using IMPLAN

Trail improvements in Ventura County

10. Project Management

Total Spending (2020 present value dollars): $17,676,914

Timeline: 2020-2040

Impact Overview:

- The $17.7 million in expenditures on ongoing project management support 239 full-time equivalent job-years over the life of the Project. Per one million dollars spent, 12.01 job-years are created in Ventura County, 13.45 job-years in Southern California, and 13.55 job-years in California.
- These activities also add $35.9 million to the state's economic output, with a total economic output multiplier of 2.03.

Employment Impact: Project Management

	Employment (Full-time equivalent job years)				
	Direct	Indirect	Induced	**Total**	**Per $1 million**
Ventura County	127.36	42.85	42.08	**212.29**	**12.01**
Seven-County Southern CA Region	127.36	55.66	54.74	**237.76**	**13.45**
California	127.36	56.75	55.42	**239.53**	**13.55**

Analysis: Bay Area Council Economic Institute using IMPLAN

Economic Output: Project Management

	Economic Output (millions)				
	Direct	Indirect	Induced	**Total**	**Economic Output Multiplier**
Ventura County	$17.68	$6.52	$6.55	**$30.75**	**1.74**
Seven-County Southern CA Region	$17.68	$9.11	$8.79	**$35.58**	**2.01**
California	$17.68	$9.32	$8.90	**$35.89**	**2.03**

Analysis: Bay Area Council Economic Institute using IMPLAN

Comparison to Other Studies

The findings in this report are largely consistent with other studies that have utilized IMPLAN to quantify the economic benefits of infrastructure projects. While the following list is not an exhaustive review of the literature, it does provide a means of comparison to the analysis completed here for the Matilija Dam Ecosystem Restoration Project. It should be noted that comparisons across projects are imperfect due to the different assumptions that go into each analysis. Geographies also play a significant role in multiplier effects, as lower average wages in a geography will create higher overall jobs output per dollar spent.

Infrastructure Project / Study Area	Project Type	Economic Impact	Employment Impact
Klamath River, California	Dam Removal	**2.35x multiplier**: $100 million in spending results in $235 million statewide impact	21.5 jobs per $1 million spent
Lower Snake River, nine counties in Washington & Idaho	Dam Removal	**1.79x multiplier**: $789.4 million in spending results in $1.4 billion in economic output in 9-county region	12.2 job per $1 million spent
San Joaquin - Sacramento River watershed, California	Levee Improvements	**2.13x multiplier**: $170 million in spending results in $362 million in economic output in California	11.2 jobs per $1 million spent
Oregon Watershed Enhancement Board Grants, statewide	Watershed Improvements	**1.90x - 2.40x mulitplier** Calculated across multiple projects	16.3 jobs per $1 million spent
San Joaquin River, eight counties in California	Watershed Improvements	Not calculated	14.1 jobs per $1 million spent
California High-Speed Rail Initial 10 years, California	Transportation Infrastructure	**1.64x multiplier**: $3.6 billion in spending results in $5.9 billion statewide impact	9.2 jobs per $1 million spent
Multiple projects, U.S. Department of the Interior, nationwide	Ecosystem Restoration	**2.20x multiplier**: Calculated across multiple projects	12.9 jobs per $1 million spent
Matilija Dam Ecosystem Restoration Project			
Ventura County		**1.68x multiplier**	11.9 jobs per $1 million spent
7-County Southern CA Region	Dam Removal / Watershed Improvements	**1.99x multiplier**	13.3 jobs per $1 million spent
State of California		**2.10x multiplier**	13.9 jobs per $1 million spent

Spill over Matilija Dam

Conclusion

The results presented in this report show that the initial $165 million in Matilija Dam Ecosystem Restoration Project spending will stimulate the local, regional, and statewide economy through both job creation and economic output over the next 20 years, with most benefits accruing over the first five to 10 years. Key findings of this study include:

- The Project supports 2,300 full-time equivalent job-years in the State of California, nearly 2,000 of which are found within Ventura County.
- These findings equate to nearly 140 full-year equivalent jobs supported in California by every $10 million invested in the Project over its anticipated 20-year life.
- In addition to jobs, the Project will provide nearly $350 million in total economic impact for California—$21 million of impact for every $10 million invested—stemming from increases in labor income, expenditures for project inputs, and project-related wages being spent across the state.

These findings show that there is a substantial economic multiplier effect derived from dam removal and associated project components, more than doubling the initial $165 million investment.

In addition to the economic benefits detailed in this analysis, there are other community and environmental benefits that will result from the multi-faceted Project. These include increased flood protection and water supply reliability for local communities, new and improved recreation access throughout the watershed, and a restored habitat ecosystem for the steelhead fish population. While beyond the scope of this study, these benefits are critical to consider when evaluating the full economic and environmental impacts of the Project and may be an appropriate focus of future research to quantify the value of these effects.

Appendix A: Project Component Map

Appendix B: Expenditure Inputs Breakdown by Project Component

Activity	Industry Name	IMPLAN Code	Percent Activity's Spending	Nominal Spending[7]	Present Value Spending (2020 dollars)[8]
Matilija Dam Removal					
Pre-Construction Management	Environmental and other technical consulting services	463	**100%**	$375,000	$312,124
Design Contract	Specialized design services	458	**100%**	$1,500,000	$1,248,497
Construction Management	Environmental and other technical consulting services	463	**100%**	$3,625,000	$3,017,202
Construction Contract			**100%**		
Labor	Construction of other new nonresidential structures	56	**55%**	$14,221,900	$11,837,338
Materials			**10%**		
	Other concrete product manufacturing	207	7.5%	$1,939,350	$1,614,182
	Other fabricated metal manufacturing	259	2.5%	$646,450	$538,061
Equipment	Commercial and industrial machinery and equipment rental and leasing	453	**35%**	$9,050,300	$7,532,851
TOTAL				$31,358,000	$26,100,256
Santa Ana Bridge					
Construction Management	Environmental and other technical consulting services	463	**100%**	$1,401,938	$1,364,671
Construction Contract					
Labor	Maintenance and repair construction of highways, streets, bridges, and tunnels	62	**33%**	$3,968,250	$3,862,765
Materials			**50%**		
	Other concrete product manufacturing	207	25%	$3,006,250	$2,926,337
	Other fabricated metal manufacturing	259	25%	$3,006,250	$2,926,337
Equipment	Commercial and industrial machinery and equipment rental and leasing	453	**17%**	$2,044,250	$1,989,909
TOTAL				$13,426,938	$13,070,019

Appendix B: Expenditure Inputs Breakdown by Project Component (Cont'd)

Activity	Industry Name	IMPLAN Code	Percent Activity's Spending	Nominal Spending	Present Value Spending (2020 dollars)
Camino Cielo Bridge					
Pre-Construction Management	Environmental and other technical consulting services	463	100%	$161,214	$149,601
Design Contract	Specialized design services	458	100%	$644,854	$598,400
Construction Management	Environmental and other technical consulting services	463	100%	$1,500,000	$1,391,943
Construction Contract			100%		
Labor	Maintenance and repair construction of highways, streets, bridges, and tunnels	62	44%	$3,920,033	$3,637,643
Materials			36%		
	Other concrete product manufacturing	207	18%	$1,603,650	$1,488,127
	Other fabricated metal manufacturing	259	18%	$1,603,650	$1,488,127
Equipment	Commercial and industrial machinery and equipment rental and leasing	453	20%	$1,781,833	$1,653,474
TOTAL				$11,215,234	$10,407,313
Meiners Oaks Levee					
Pre-Construction Management	Environmental and other technical consulting services	463	100%	$208,750	$192,063
Design Contract	Specialized design services	458	100%	$835,000	$768,253
Construction Management	Environmental and other technical consulting services	463	100%	$1,500,000	$1,380,094
Construction Contract			100%		
Labor	Construction of other new nonresidential structures	56	36%	$4,343,233	$3,996,048
Materials	Other concrete product manufacturing	207	40%	$2,895,489	$2,664,032
Equipment	Commercial and industrial machinery and equipment rental and leasing	453	24%	$4,825,814	$4,440,053
TOTAL				$14,608,286	$13,440,543

Appendix B: Expenditure Inputs Breakdown by Project Component (Cont'd)

Activity	Industry Name	IMPLAN Code	Percent Activity's Spending	Nominal Spending	Present Value Spending (2020 dollars)
Live Oak Levee					
Pre-Construction Management	Environmental and other technical consulting services	463	100%	$237,500	$225,148
Design Contract	Specialized design services	458	100%	$950,000	$900,590
Construction Management	Environmental and other technical consulting services	463	100%	$1,500,000	$1,421,985
Construction Contract			100%		
Labor	Construction of other new nonresidential structures	56	20%	$2,515,823	$2,384,975
Materials	Other concrete product manufacturing	207	65%	$8,176,425	$7,751,168
Equipment	Commercial and industrial machinery and equipment rental and leasing	453	15%	$1,886,867	$1,788,731
TOTAL				$15,266,615	$14,472,597
Casitas Springs Levee					
Pre-Construction Management	Environmental and other technical consulting services	463	100%	$183,750	$173,997
Design Contract	Specialized design services	458	100%	$735,000	$695,987
Construction Management	Environmental and other technical consulting services	463	100%	$1,500,000	$1,420,383
Construction Contract			100%		
Labor	Construction of other new nonresidential structures	56	23%	$2,770,694	$2,623,630
Materials	Other concrete product manufacturing	207	60%	$7,227,898	$6,844,254
Equipment	Commercial and industrial machinery and equipment rental and leasing	453	17%	$2,047,904	$1,939,205
TOTAL				$14,465,246	$13,697,456

Appendix B: Expenditure Inputs Breakdown by Project Component (Cont'd)

Activity	Industry Name	IMPLAN Code	Percent Activity's Spending	Nominal Spending	Present Value Spending (2020 dollars)
Robles Diversion Dam					
Pre-Construction Management	Environmental and other technical consulting services	463	**100%**	$250,000	$226,068
Design Contract	Specialized design services	458	**100%**	$1,000,000	$904,272
Construction Management	Environmental and other technical consulting services	463	**100%**	$1,653,000	$1,494,762
Construction Contract			**100%**		
Labor	Construction of other new nonresidential structures	56	**55%**	$6,848,600	$6,193,000
Materials			**20%**		
	Other concrete product manufacturing	207	15%	$1,867,800	$1,689,000
	Other fabricated metal manufacturing	259	5%	$622,600	$563,000
Equipment	Commercial and industrial machinery and equipment rental and leasing	453	**25%**	$3,113,000	$2,815,000
TOTAL				$15,355,000	$13,885,102
Pre-Construction					
Additional Environmental Compliance	Environmental and other technical consulting services	463	**100%**	$3,473,000	$3,376,918
Water Supply Alternatives Pre-Construction Mgmt.	Environmental and other technical consulting services	463	**100%**	$125,000	$121,542
Water Supply Alternatives Design	Specialized design services	458	**100%**	$500,000	$486,168
Recreation Plan	Environmental and other technical consulting services	463	**100%**	$200,000	$194,467
Real Estate & Utility Relocations			**100%**		
	Other real estate	447	**50%**	$10,848,500	$10,548,373
	Construction of new power and communication structures	52	**50%**	$10,848,500	$10,548,373
TOTAL				$25,995,000	$25,275,840

Appendix B: Expenditure Inputs Breakdown by Project Component (Cont'd)

Activity	Industry Name	IMPLAN Code	Percent Activity's Spending	Nominal Spending	Present Value Spending (2020 dollars)
Post-Construction					
Native Plant Restoration	Landscape and horticultural services	477	**100%**	$2,471,000	$1,975,123
Post-Construction Monitoring	Environmental and other technical consulting services	463	**100%**	$6,556,000	$5,240,349
Adaptive Management (Including Water Supply Alternatives)	Environmental and other technical consulting services	463	**100%**	$10,252,000	$8,194,640
Recreation Plan Implementation	Museums, historical sites, zoos, and parks	501	**100%**	$2,000,000	$1,598,642
TOTAL				$21,279,000	$17,008,754
Project Management					
General Project Management	Environmental and other technical consulting services	463	**100%**	$6,465,000	$6,095,325
Owner Legal Support	Legal services	455	**100%**	$10,344,000	$9,752,520
Public Outreach and Grant Management	Grantmaking, giving, and social advocacy organizations	522	**100%**	$1,940,000	$1,829,069
TOTAL				$18,749,000	$17,676,914
Total Project Spending				**$181,718,318**	**$165,034,795**

Note: All expenditure inputs that are not apportioned into Labor, Materials, and Equipment in Appendix B use default IMPLAN settings for their apportionment.

Notes

1. A few of the Project's more specialized tasks—such as parts of the dam removal—may be contracted to out-of-state-headquartered firms. This analysis assumes that unallocated contracts are fulfilled within California, thus providing an upper bound for economic impacts. Even if contracts are awarded to out-of-state firms, only the income generated on the contract would fall outside of California, and therefore any adjustments to the state's economic benefits would be relatively minimal.

2. Kruse, Sarah A., Scholz, Astrid J., "Preliminary Economic Assessment of Dam Removal: The Klamath River." Ecotrust. January 2006. Retrieved from: http://archive.ecotrust.org/workingpapers/WPS2_Klamath_Dam_Assess.pdf. Kruse and Scholz based their job and economic multipliers on construction multipliers for California as a whole (p11), then applied those values to two different cost estimates for removing all four dams (Copco 1, Copco 2, Iron Gate, and JC Boyle) as well as a mid-range cost estimate that excludes JC Boyle (Table 5, p12).

3. ECONorthwest. "Lower Snake River Dams Economic Tradeoffs of Removal." July 2019. Retrieved from: https://static1.squarespace.com/static/597fb96acd39c34098e8d423/t/5d41bbf522405f0001c67068/1564589261882/LSRD_Economic_Tradeoffs_Report.pdf

4. Gallo, David, Koehler, Gus. "The Impact of Fiscal 2006-07 Community Redevelopment Agency Activities on the California Economy." Time Structures, Inc. July 2009. Retrieved from: https://www.researchgate.net/profile/Gus_Koehler/publication/235792409_The_Impact_of_Fiscal_2006-07_Community_Redevelopment_ Agency_Activities_on_the_California_Economy/links/0deec530cbe026730d000000/The-Impact-of-Fiscal-2006-07-Community-Redevelopment-Agency-Activities-on-the-California-Economy.pdf.

5. Michael, Jeffrey, et. al. "Economic Benefits of Investments to Comply with SB 5 Requirements." Center for Business and Policy Research. June 2015. Retrieved from: https://www.ci.lathrop.ca.us/sites/default/files/fileattachments/public_works page/1961/2015_06_22_sb5report.pdf.

6. The difference between the regional and statewide impact for this component is less significant than the others analyzed here due to the fact that the design has already been completed, and thus is not included in the analysis. For many of the other components, the design and associated project management costs take place outside of the seven- county region and are captured in the statewide but not the regional model, resulting in the larger difference.

7. Nominal spending amounts are derived from consultant documentation, which include project estimates completed in 2017, estimates for escalation in project expenditures made in 2020, and fixed amounts based on proposed grant budgets or grants already awarded. The $181.7 million in total nominal spending as well as component breakouts and anticipated schedules were provided by the project team for the purposes of this analysis.

8. Present value calculations are completed using pre-programmed IMPLAN deflators for future spending and are based on the projected timelines of future spending by component. Deflators differ by industry. For example, spending in construction is discounted by 1.97% per year while spending on environmental consulting is discounted at 2.15% per year.

About the Bay Area Council Economic Institute

Since 1990, the Bay Area Council Economic Institute has been the leading think tank focused on the economic and policy issues facing the San Francisco Bay Area, one of the most dynamic regions in the United States and the world's leading center for technology and innovation. A valued forum for stakeholder engagement and a respected source of information and fact-based analysis, the Institute is a trusted partner and adviser to both business leaders and government officials across the State of California. Through its economic and policy research and its many partnerships, the Institute addresses major factors impacting the competitiveness, economic development, and quality of life of the region and the state, including infrastructure, globalization, science and technology, and health policy.

It is guided by a Board of Advisors drawn from leaders in the corporate, academic, non-profit, and government sectors. The Institute is housed at and supported by the Bay Area Council, a public policy organization that includes hundreds of the region's largest employers and is committed to keeping the Bay Area the world's most competitive economy and best place to live.

About this Report

This report was prepared by the Bay Area Council Economic Institute with support from the Resources Legacy Fund. It builds on a number of prior local, regional, and statewide economic assessments completed by the Institute, as well as international case studies involving topics as diverse as climate resilience, energy, trade, technology, manufacturing, healthcare, and education.

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Page 5: Ventura County Public Works Agency – Watershed Protection, circa 2007.

Page 7: Paul Jenkin, Matilija Coalition, July 2020.

Page 11: Ventura County Public Works Agency – Watershed Protection, October 2017.

Page 18: Ojai Valley Land Conservancy, February 2020.

Page 21: Paul Jenkin, Matilija Coalition, March 2018.

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