Long-Term Operation – Draft Environmental Impact Statement

Appendix Q – Regional Economics Technical Appendix

July 2024

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Appendix Q Regional Economics Technical Appendix

This appendix presents regional economic conditions and potential economic effects relevant to the specific industries in which potential economic effects could occur, such as municipal and industrial (M&I) water uses, agriculture, fishing, recreation and hydropower.

Q.1 Background Information

Q.1.1 Regional Economics

Regional economic data is presented at a county level, with data compiled using Impact Planning and Analysis (IMPLAN) data files for 2021 (the most recent complete data set available) from a variety of sources, including, but not limited to, the United States Bureau of Economic Analysis, the United States Bureau of Labor, and the U.S. Census Bureau. This section presents IMPLAN data and results for economic output, employment, and labor income. Output is the dollar value of industry production. Employment is measured as the number of jobs. Labor income is the dollar value of total payroll (including benefits) for each industry plus income received by self-employed individuals.

Q.1.1.1 Trinity River Region

The Trinity River Region includes Trinity, Humboldt, and Del Norte counties.

Employment, Labor Income, and Output

Table Q-1 presents employment, labor income, and output by industry for the combined regional economies of the Trinity River Region in 2021. In 2021, services provided the most jobs (39,565 jobs) in the region, followed by government (16,917 jobs) and trade (10,227 jobs). Services also had the highest output ($5,849 million) of all industries in the region, followed by government ($2,070 million) and trade ($1,708 million). Services and government were the top industries in terms of labor income in 2021.

Table Q-1. Summary of 2021 Regional Economy in the Trinity River Region

Industry	Employment (in jobs)	Output (in dollars)[a]	Labor Income (in dollars)[b]
Agriculture	5,617	$512	$230
Mining	172	$75	$2
Construction	5,561	$945	$399
Manufacturing	3,965	$1,823	$233
TIPU	2,435	$442	$134
Trade	10,227	$1,708	$510
Service	39,565	$5,849	$1,952
Government	16,917	$2,070	$1,450
Total	**84,459**	**$13,424**	**$4,910**

Source: IMPLAN Group 2023.
TIPU = Transportation, Information, Power, and Utilities.
[a] Output is the dollar value of industry production. Values are in millions of 2021 dollars.
[b] Labor income is the dollar value of total payroll for each industry, including employee compensation and proprietor income. Values are in millions of 2021 dollars.

Table Q-2 presents the civilian labor force unemployment and the unemployment rate for counties in the Trinity River Region.

Table Q-2. Summary of 2021 Unemployment (UE) Statistics in the Trinity River Region

Area	Civilian Labor Force UE in 2011	Civilian Labor Force UE in 2021	UE Rate in 2011	UE Rate in 2021
Trinity County	4,993	282	17.3%	6.3%
Humboldt County	12,169	3,661	12.0%	6.2%
Del Norte County	44,950	708	10.4%	7.6%
Trinity River Region [a]	**62,112**	**4,651**	**11.1%**	**6.4%**
STATE OF CALIFORNIA	**2,186,155**	**1,381,915**	**11.9%**	**7.3%**

Sources: Bureau of Labor Statistics 2011, 2021.
[a] Calculated sum of unemployed labor force in all Trinity River Region counties.

Household Income

Table Q-3 presents median and mean household income and per capita income in Trinity River Region counties relative to California. Median, mean, and per capita income for all three Trinity River Region counties is lower than the state average.

Table Q-3. 2017–2021 Trinity River Region Household and Per Capita Income

Area	Median Household Income	Mean Household Income	Per Capita Income
Trinity County	$42,206	$62,784	$29,312
Humboldt County	$53,350	$75,434	$31,044
Del Norte County	$53,280	$69,915	$24,708
Trinity River Region [a]	**$49,612**	**$69,378**	**$28,355**
STATE OF CALIFORNIA	**$84,097**	**$119,149**	**$41,276**

Source: U.S. Census Bureau 2021.
All income in 2024 dollars.
[a] Calculated average of median, mean, and per capital income for all Trinity River Region counties.

Q.1.1.2 Sacramento Valley Region

The Sacramento Valley Region includes Butte, Colusa, El Dorado, Glenn, Nevada, Placer, Plumas, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba counties. Solano County is also located within the Sacramento Valley; however, Solano County is discussed under San Francisco Bay Area Region.

Employment, Labor Income, and Output

Table Q-4 presents employment, labor income, and output by industry for the combined regional economies of the Sacramento Valley Region in 2021.

In 2021, services provided the most jobs (397,026) in the area, followed by trade (88,031) and government (88,530). Services also had the highest output ($64,914 million) of all industries in the region, followed by trade ($15,923 million) and government ($13,162 million). Services and government were the top industries in terms of labor income in 2021.

Table Q-4. Summary of 2021 Regional Economy in the Sacramento Valley Region

Industry	Employment (in jobs)	Output (in dollars)[a]	Labor Income (in dollars)[b]
Agriculture	33,675	$3,871	$1,665
Mining	1,154	$594	$65
Construction	59,801	$10,950	$4,647
Manufacturing	29,239	$12,296	$2,074
TIPU	28,677	$7,474	$2,142
Trade	88,031	$15,923	$4,598
Service	397,026	$64,914	$22,863
Government	88,530	$13,162	$8,644
Total	**726,133**	**$129,184**	**$46,698**

Source: IMPLAN Group 2023.
TIPU = Transportation, Information, Power, and Utilities.
[a] Output is the dollar value of industry production. Values are in millions of 2021 dollars.
[b] Labor income is the dollar value of total payroll for each industry, including employee compensation and proprietor income. Values are in millions of 2021 dollars.

Table Q-5 presents the civilian labor force unemployment and the unemployment rate for the counties in the Sacramento Valley.

Table Q-5. Summary of 2021 Unemployment (UE) Statistics in the Sacramento Valley Region

Area	Civilian Labor Force UE in 2011	Civilian Labor Force UE in 2021	UE Rate in 2011	UE Rate in 2021
Butte County	2,077	6,311	15.8%	6.9%
Colusa County	6,956	1,342	10.7%	12.5%
El Dorado County	57,582	5,232	15.1%	5.7%
Glenn County	9,559	876	16.2%	6.9%
Nevada County	604,297	2,630	12.2%	5.6%
Placer County	10,188	9,388	16.4%	5.0%
Plumas County	20565	700	17.9%	9.5%
Sacramento County	55,365	49,679	10.5%	7.0%
Shasta County	7,033	4,975	10.0%	6.8%
Sutter County	5,523	4,069	11.3%	9.0%
Tehama County	142,910	1,826	9.3%	7.2%
Yolo County	74,483	6,196	16.8%	5.8%
Yuba County	19,157	2,604	11.0%	8.5%
Sacramento Valley Region [a]	**1,015,695**	**95,828**	**13.3%**	**7.4%**
STATE OF CALIFORNIA	**2,186,155**	**1,381,915**	**11.9%**	**7.3%**

Sources: Bureau of Labor Statistics 2011, 2021.
[a] Calculated sum of unemployed labor force in all Sacramento Valley Region counties.

Household Income

Table Q-6 presents household income and per capita income in Sacramento Valley counties relative to California. All counties except Placer and El Dorado counties within the Sacramento Valley Region have lower median household, mean household, and per capita incomes than the state average.

Table Q-6. 2017–2021 Sacramento Valley Region Household and Per Capita Income

Area	Median Household Income	Mean Household Income	Per Capita Income
Butte County	$59,863	$84,766	$33,424
Colusa County	$61,861	$80,856	$28,063
El Dorado County	$88,770	$123,342	$48,953
Glenn County	$56,332	$70,801	$25,100
Nevada County	$74,617	$103,903	$43,777
Placer County	$99,734	$127,176	$48,580

Area	Median Household Income	Mean Household Income	Per Capita Income
Plumas County	$57,885	$80,975	$35,139
Sacramento County	$76,422	$99,141	$36,152
Shasta County	$61,937	$84,215	$33,507
Sutter County	$67,003	$91,829	$30,932
Tehama County	$52,901	$79,138	$30,976
Yolo County	$78,386	$109,841	$38,805
Yuba County	$62,666	$77,817	$27,163
Sacramento Valley [a]	**$69,106**	**$93,369**	**$35,429**
STATE OF CALIFORNIA	**$84,097**	**$119,149**	**$41,276**

Source: U.S. Census Bureau 2021.
All income in 2024 dollars.
[a] Calculated average of median, mean, and per capital income for all Sacramento Valley Region counties.

Q.1.1.3 San Joaquin Valley Region

The San Joaquin Valley Region includes Stanislaus, San Joaquin, Merced, Madera, Fresno, Kings, Tulare, and Kern counties. Changes in Central Valley Project (CVP) and State Water Project (SWP) operations are not anticipated to affect Calaveras, Mariposa, and Tuolumne counties and are not discussed in this section.

Employment, Labor Income, and Output

Table Q-7 presents employment, labor income, and output by industry for the combined regional economies of the San Joaquin Valley Region in 2021. In 2021, services provided the most jobs (697,285) in the region, followed by government (243,364) and agriculture (219,477). Services also had the highest output ($107,151 million) of all industries in the region, followed by manufacturing ($55,551 million) and government ($33,861 million). Services and government were the top industries in terms of labor income in 2021.

Table Q-7. Summary of 2021 Regional Economy in the San Joaquin Valley Region

Industry	Employment (in jobs)	Output (in dollars)[a]	Labor Income (in dollars)[b]
Agriculture	219,477	$31,604	$14,527
Mining	9,637	$7,517	$1,174
Construction	85,095	$14,990	$6,061
Manufacturing	99,252	$55,551	$7,442
TIPU	100,109	$20,569	$7,223
Trade	185,390	$34,932	$9,471
Service	697,285	$107,151	$37,484
Government	243,364	$33,861	$24,108
Total	**1,639,609**	**$306,175**	**$107,490**

Source: IMPLAN Group 2023.
TIPU = Transportation, Information, Power, and Utilities.
[a] Output is the dollar value of industry production. Values are in millions of 2021 dollars.
[b] Labor income is the dollar value of total payroll for each industry, including employee compensation and proprietor income. Values are in millions of 2021 dollars.

Table Q-8 presents the civilian labor force unemployment and the unemployment rate for counties in the San Joaquin Valley.

Table Q-8. Summary of 2021 Unemployment (UE) Statistics in the San Joaquin Valley Region

Area	Civilian Labor Force UE in 2011	Civilian Labor Force UE in 2021	UE Rate in 2011	UE Rate in 2021
Stanislaus County	88,801	20,042	9.5%	8.4%
San Joaquin County	1,473	28,972	13.5%	8.7%
Madera County	13,035	5,476	9.7%	8.8%
Merced County	20,296	11,935	9.5%	10.4%
Fresno County	116,228	40,741	13.1%	9.2%
Tulare County	12,483	21,435	16.2%	10.7%
Kings County	51,190	5,386	16.5%	9.6%
Kern County	159,880	38,555	10.5%	10.0%
San Joaquin Valley Region [a]	**463,386**	**172,542**	**12.3%**	**9.5%**
STATE OF CALIFORNIA	**2,186,155**	**1,381,915**	**11.9%**	**7.3%**

Sources: Bureau of Labor Statistics 2011, 2021.
[a] Calculated sum of unemployed labor force in all San Joaquin Valley counties.

Household Income

Table Q-9 presents household income and per capita income in San Joaquin Valley Region counties relative to California. All counties in the San Joaquin Valley Region have median household, mean household, and per capita incomes lower than the state average.

Table Q-9. San Joaquin Valley Region Household and Per Capita Income

Area	Median Household Income	Mean Household Income	Per Capita Income
Stanislaus County	$68,368	$89,007	$29,195
San Joaquin County	$74,962	$97,178	$30,628
Madera County	$66,709	$83,780	$24,759
Merced County	$58,861	$79,592	$24,521
Fresno County	$61,276	$83,892	$27,295
Tulare County	$57,394	$77,575	$23,706

Area	Median Household Income	Mean Household Income	Per Capita Income
Kings County	$63,267	$77,920	$23,483
Kern County	$58,824	$80,195	$25,328
San Joaquin Valley [a]	**$63,708**	**$83,642**	**$26,114**
STATE OF CALIFORNIA	**$84,097**	**$119,149**	**$41,276**

Source: U.S. Census Bureau 2021.
All income in 2024 dollars.
[a] Calculated average of median, mean, and per capital income for all San Joaquin Valley Region counties.

Q.1.1.4 San Francisco Bay Area Region

The San Francisco Bay Area Region includes Alameda, Contra Costa, Napa, San Benito, Santa Clara, and Solano counties that are within the CVP and SWP service areas.

Employment, Labor Income, and Output

Table Q-10 presents employment, labor income, and output by industry for the combined regional economies of the San Francisco Bay Area Region in 2021. In 2021, services provided the most jobs (1,633,302) in the area, followed by trade (239,865) and manufacturing (270,716). Services also had the highest output ($526,885 million) of all industries in the region, followed by manufacturing ($220,945 million) and trade ($67,816 million). Services and manufacturing were the top industries in terms of labor income in 2021.

Table Q-10. Summary of 2021 Regional Economy in the San Francisco Bay Area Region

Industry	Employment (in jobs)	Output (in dollars)[a]	Labor Income (in dollars)[b]
Agriculture	15,974	$1,471	$946
Mining	1,395	$673	$40
Construction	135,358	$29,894	$14,171
Manufacturing	270,716	$220,945	$65,012
TIPU	112,658	$23,965	$11,242
Trade	239,865	$67,816	$24,150
Service	1,633,302	$526,885	$231,835
Government	213,500	$34,250	$27,844
Total	**2,622,768**	**$905,899**	**$375,240**

Source: IMPLAN Group 2023.
TIPU = Transportation, Information, Power, and Utilities.
[a] Output is the dollar value of industry production. Values are in millions of 2021 dollars.
[b] Labor income is the dollar value of total payroll for each industry, including employee compensation and proprietor income. Values are in millions of 2021 dollars.

Table Q-11 presents the civilian labor force unemployment and the unemployment rate for the counties in the San Francisco Bay Area Region.

Table Q-11. Summary of 2021 Unemployment (UE) Statistics in the San Francisco Bay Area Region

Area	Civilian Labor Force UE in 2011	Civilian Labor Force UE in 2021	UE Rate in 2011	UE Rate in 2021
Alameda County	1,589	49,105	17.9%	6.1%
Contra Costa County	2,456	34,478	21.6%	6.4%
Santa Clara County	4,169	47,605	14.8%	4.7%
San Benito County	83,665	2,318	12.3%	7.2%
Napa County	131,000	4,132	13.4%	6.0%
Solano County	10,674	14,860	11.9%	7.5%
San Francisco Bay Area Region [a]	**233,553**	**152,498**	**15.3%**	**6.3%**
STATE OF CALIFORNIA	**2,186,155**	**1,381,915**	**11.9%**	**7.3%**

Sources: Bureau of Labor Statistics 2011, 2021.
[a] Calculated sum of unemployed labor force in all San Francisco Bay Area Region counties.

Household Income

Table Q-12 presents household income and per capita income in the San Francisco Bay Area Region relative to California. The mean and median household incomes for all counties in the San Francisco Bay Area Region are higher than the state average.

Table Q-12. 2017–2021 San Francisco Bay Area Region Household and Per Capita Income

Area	Median Household Income	Mean Household Income	Per Capita Income
Alameda County	$112,017	$148,638	$53,815
Contra Costa County	$110,455	$151,026	$53,656
Santa Clara County	$140,258	$189,352	$65,052
San Benito County	$95,606	$118,804	$37,238
Solano County	$89,648	$111,110	$39,068
Napa County	$97,498	$136,193	$49,641
San Francisco Bay Area Region [a]	**$107,580**	**$142,521**	**$49,745**
STATE OF CALIFORNIA	**$84,097**	**$119,149**	**$41,276**

Source: U.S. Census Bureau 2021.
All income in 2024 dollars.
[a] Calculated average of median, mean, and per capital income for all San Francisco Bay Area Region counties.

Q.1.1.5 Central Coast Region

The Central Coast Region includes San Luis Obispo and Santa Barbara counties served by the SWP.

Employment, Labor Income, and Output

Table Q-13 presents employment, labor income, and output by industry for the combined regional economies of the Central Coast Region in 2021. In 2021, services provided the most jobs (256,137) in the area, followed by government (58,266) and trade (45,501). Services also had the highest output ($43,085 million) of all industries in the region, followed by manufacturing ($9,953 million) and government ($8,639 million). Services and government were the top industries in terms of labor income in 2021.

Table Q-13. Summary of 2021 Regional Economy in the Central Coast Region

Industry	Employment (in jobs)	Output (in dollars)[a]	Labor Income (in dollars)[b]
Agriculture	33,567	$3,218	$1,877
Mining	1,011	$857	$119
Construction	27,674	$5,095	$2,192
Manufacturing	22,136	$9,953	$1,953
TIPU	16,310	$2,934	$764
Trade	45,501	$8,357	$2,776
Service	256,137	$43,085	$16,180
Government	58,266	$8,639	$6,139
Total	**460,602**	**$82,138**	**$32,000**

Source: IMPLAN Group 2023.
TIPU = Transportation, Information, Power, and Utilities.
[a] Output is the dollar value of industry production. Values are in millions of 2021 dollars.
[b] Labor income is the dollar value of total payroll for each industry, including employee compensation and proprietor income. Values are in millions of 2021 dollars.

Table Q-14 presents the civilian labor force unemployment and the unemployment rate for the counties in the Central Coast Region.

Table Q-14. Summary of 2021 Unemployment (UE) Statistics in the Central Coast Region

Area	Civilian Labor Force UE in 2011	Civilian Labor Force UE in 2021	UE Rate in 2011	UE Rate in 2021
San Luis Obispo County	80,528	7,082	10.3%	5.2%
Santa Barbara County	13,981	12,565	13.9%	5.8%
Central Coast Region [a]	**94,509**	**19,647**	**10.7%**	**5.6%**
STATE OF CALIFORNIA	**2,186,155**	**1,381,915**	**11.9%**	**7.3%**

Sources: Bureau of Labor Statistics 2011, 2021.
[a] Calculated sum of unemployed labor force in all Central Coast Region counties.

Household Income

Table Q-15 presents household income and per capita income in the Central Coast Region relative to California.

Table Q-15. 2017–2021 Central Coast Region Household and Per Capita Income

Area	Median Household Income	Mean Household Income	Per Capita Income
San Luis Obispo County	$82,514	$107,113	$41,407
Santa Barbara County	$84,356	$120,192	$40,634
Central Coast Region [a]	**$83,435**	**$113,653**	**$41,021**
STATE OF CALIFORNIA	**$84,097**	**$119,149**	**$41,276**

Source: U.S. Census Bureau 2021.
All income in 2024 dollars.
[a] Calculated average of median, mean, and per capital income for all Central Coast Region counties.

Q.1.1.6 South Coast Region

The South Coast Region includes Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties, portions of which are served by the SWP.

Employment, Labor Income, and Output

Table Q-16 presents employment, labor income, and output by industry for the combined regional economies of the South Coast Region in 2021.

In 2021, services provided the most jobs (8,000,817) in the area, followed by trade (1,487,581) and government (1,366,301). Services also had the highest output ($1,549,389 million) of all industries in the region, followed by manufacturing ($359,564 million) and trade ($324,242 million). Services and government were the top industries in terms of labor income in 2021.

Table Q-16. Summary of 2021 Regional Economy in the South Coast Region

Industry	Employment (in jobs)	Output (in dollars)[a]	Labor Income (in dollars)[b]
Agriculture	61,410	$5,433	$3,345
Mining	11,196	$6,696	$803
Construction	686,446	$125,629	$52,222
Manufacturing	726,379	$359,564	$75,034
TIPU	812,667	$139,791	$52,094
Trade	1,487,581	$324,242	$99,584

Industry	Employment (in jobs)	Output (in dollars)[a]	Labor Income (in dollars)[b]
Service	8,000,817	$1,549,389	$582,474
Government	1,366,301	$228,795	$155,900
Total	**13,152,797**	**$2,739,539**	**$1,021,456**

Source: IMPLAN Group 2023.
TIPU = Transportation, Information, Power, and Utilities.
[a] Output is the dollar value of industry production. Values are in millions of 2021 dollars.
[b] Labor income is the dollar value of total payroll for each industry, including employee compensation and proprietor income. Values are in millions of 2021 dollars.

Table Q-17 presents the civilian labor force unemployment and the unemployment rate for counties in the South Coast Region.

Table Q-17. Summary of 2021 Unemployment (UE) Statistics in the South Coast Region

Area	Civilian Labor Force UE in 2011	Civilian Labor Force UE in 2021	UE Rate in 2011	UE Rate in 2021
Ventura County	35,356	24,928	17.4%	6.2%
Los Angeles County	24,989	445,871	12.4%	8.9%
Orange County	40,614	92,743	16.8%	6.0%
San Diego County	913	99,863	17.0%	6.5%
Riverside County	8,479	82,839	18.5%	7.3%
San Bernardino County	3,892	73,515	15.2%	7.4%
South Coast Region [a]	**114,243**	**819,759**	**15.8%**	**7.7%**
STATE OF CALIFORNIA	**2,186,155**	**1,381,915**	**11.9%**	**7.3%**

Sources: Bureau of Labor Statistics 2011, 2021.
[a] Calculated sum of unemployed labor force in all South Coast Region counties.

Household Income

Table Q-18 presents household income and per capita income in the South Coast Region relative to California.

Table Q-18. 2017–2021 South Coast Region Household and Per Capita Income

Area	Median Household Income	Mean Household Income	Per Capita Income
Ventura County	$94,150	$123,929	$41,863
Los Angeles County	$76,367	$109,499	$37,924
Orange County	$100,485	$134,820	$46,099
San Diego County	$88,240	$118,474	$42,696

Area	Median Household Income	Mean Household Income	Per Capita Income
Riverside County	$76,066	$100,004	$32,079
San Bernardino County	$70,287	$91,380	$28,443
South Coast Region [a]	**$84,266**	**$113,018**	**$38,184**
STATE OF CALIFORNIA	**$84,097**	**$119,149**	**$41,276**

Source: U.S. Census Bureau 2021.
All income in 2024 dollars.
[a] Calculated average of median, mean, and per capital income for all South Coast Region counties.

Q.1.2 Agricultural Economics

California is the highest producer (by value) of agricultural commodities in the United States. California accounted for over 11.8% of the nation's total agricultural value (cash farm receipts) in 2021 (California Department of Food and Agriculture 2022). According to the California Department of Food and Agriculture's *2021-2022 Agricultural Statistics Review* (2022), in 2021 the San Joaquin Valley Region counties accounted for approximately 64% ($39.2 million) of the agricultural produce (by value) in California. Sacramento Valley counties accounted for approximately 15% ($9.1 million). South Coast counties accounted for approximately 10% ($5.9 million) followed by Central Coast, and San Francisco Bay counties at 5% ($3.0 million) and 3% ($2.0 million).

Table Q-19 summarizes farm and farm tenure characteristics by region.

Table Q-19. Farm and Farm Tenure Characteristics by Region.

Characteristic	Trinity River	Sacramento Valley	San Joaquin Valley	San Francisco Bay Area	Central Coast	South Coast
Number of farms	1,124	14,145	22,429	5,120	3,816	12,174
Median farm size [a]	118	494	419	91	61	35
Land in farms [a]	706,613	4,028,430	8,895,167	1,745,436	1,646,358	904,430
Total cropland [a]	30,233	1,711,969	5,128,203	348,447	392,620	435,673
Irrigated land [a]	29,808	1,446,452	4,304,867	238,784	195,691	307,163
Full owners [b]	933	11,807	19,152	4,024	3,238	11,928
Part owners [b]	214	2,087	3,894	603	408	610
Tenants [b]	151	1,654	2,278	603	617	1,148

Source: U.S. Department of Agriculture 2014, 2019.
[a] Land is measured in acres.
[b] 2017 Agricultural Census data (U.S. Department of Agriculture 2019) is not available for Farm Tenure Characteristics. Information for full owners, part owners, and tenants comes from the 2012 Agricultural Census (U.S. Department of Agriculture 2014).

In response to changes in CVP and SWP water operations, growers could idle fields or increase agricultural production. Table Q-20 presents key regional economics for the crop sectors that would be impacted by changes in CVP and SWP operation.

Table Q-20. Summary of 2022 Regional Economy for Select Farming Sectors

Industry	Trinity River	Sacramento Valley	San Joaquin Valley	San Francisco Bay Area	Central Coast	South Coast
GRAIN SECTOR						
Employment [a]	1	1,927	155	16	11	83
Output [b]	$157	$116,888	$30,245	$2,172	$4,375	$17,061
Labor Income [c]	$106	$783,786	$111,801	$8,523	$1,836	$10,115
VEGETABLES AND MELON FARMING						
Employment [a]	143	1,797	8,081	2,377	5,820	7,069
Output [b]	$11,505	$65,927	$585,150	$110,234	$869,059	$755,664
Labor Income [c]	$6,994	$309,869	$2,096,965	$299,811	$339,550	$398,087
FRUIT FARMING/TREE NUT FARMING						
Employment [a]	80	15,336	53,353	4,465	8,434	16,779
Output [b]	$5,609	$466,523	$4,090,689	$178,016	$1,017,054	$1,321,460
Labor Income [c]	$3,726	$1,645,974	$10,573,786	$471,796	$438,097	$810,080
GREENHOUSE, NURSERY, AND FLORICULTURE PRODUCTION						
Employment [a]	442	833	2,229	1,181	1,928	10,188
Output [b]	$44,538	$40,767	$153,293	$73,386	$297,303	$1,153,052
Labor Income [c]	$27,415	$154,416	$520,239	$194,647	$123,900	$621,811
ALL OTHER CROP FARMING						
Employment [a]	224	3,360	7,418	1,253	398	3,645
Output [b]	$3,191	$45,850	$180,427	$19,513	$12,266	$102,690
Labor Income [c]	$2,527	$85,604	$451,162	$40,999	$6,201	$78,454

Source: IMPLAN Group 2023.

[a] Employment is measured in number of jobs.

[b] Output is the dollar value of industry production. Values are in thousands of 2022 dollars.

[c] Income is the dollar value of total payroll for each industry, including employee compensation and proprietor income. Values are in thousands of 2022 dollars.

Q.1.3 Commercial and Recreational Fisheries Economics

The commercial and recreational ocean salmon fisheries along the Southern Oregon/Northern California Coast (SONCC) are affected by the population of salmon that rely upon the Northern California rivers, including the Trinity, Sacramento and San Joaquin rivers. Changes in CVP and SWP water operations would affect the flow patterns and water quality of the Sacramento and San Joaquin rivers and the survivability of the salmon that use those rivers for habitat, as described in Appendix O, *Fish and Aquatic Resources Technical Appendix*. This technical appendix discusses the economic contributions of the Pacific Coast salmon fishery.

Management of the California ocean salmon fishery is a combined effort of the California Department of Fish and Wildlife (CDFW) and the Pacific Fishery Management Council (PFMC), a regional council of the National Oceanic and Atmospheric Administration. CDFW manages salmon harvest from the shoreline to three nautical miles off the California coast. From three nautical miles to 200 nautical miles offshore is managed by PFMC. PFMC is responsible for developing the Pacific Coast Salmon Fishery Management Plan that guides management of the ocean commercial and recreational fishery in California, Oregon, and Washington (Pacific Fishery Management Council 2022). The annual ocean salmon fishery regulations promote the maximum amount of harvest while ensuring that suitable population levels are maintained (National Oceanic and Atmospheric Administration Fisheries 2023a).

Q.1.3.1 Commercial Salmon Fishery along the Southern Oregon and Northern California Coasts

Ocean salmon fishing plays a large role in the overall California commercial ocean fishery industry. Chinook Salmon (*Oncorhynchus tshawytscha*) ranked within the top 10 commercially harvested ocean species in each of the last 10 years (National Oceanic and Atmospheric Administration Fisheries 2023b). In 2008 and 2009, commercial and recreational salmon fishing along the coast of California and portions of Oregon were restricted in response to low Sacramento River Fall-Run Chinook Salmon and Coho Salmon (*Oncorhynchus kisutch*) numbers. According to state and federal fishery scientists, the 2023 projection for Sacramento River Fall-Run Chinook Salmon was one of the lowest forecasts since 2008 (California Department of Fish and Wildlife 2023a). Ocean salmon sport fisheries in California were closed through mid-May 2023 (California Department of Fish and Wildlife 2023b). Most of the commercial and recreational fisheries south of Cape Falcon, Oregon were closed through mid-May 2023 to conserve Klamath River Fall-Run Chinook Salmon and Sacramento River Fall-Run Chinook Salmon (National Oceanic and Atmospheric Administration Fisheries 2023c). Key California salmon target stocks are forecast to have 2024 abundance levels that, while higher than 2023, are well below average. The Pacific Coast Salmon Fishery Management Plan authorizes only low levels of fishing on these stocks. Commercial fishing alternatives propose a limited number of small quota fisheries, and would require vessel-based weekly trip limits that would apply in each open period. In-season action would be taken to close remaining season dates if total catch is expected to reach the harvest limit. On recommendation from California and Oregon agency representatives and industry advisors, the National Marine Fisheries Service took in-season action to cancel ocean salmon fishery seasons between Cape Falcon, Oregon and the U.S./Mexico border that were scheduled to open prior to May 16, 2024 (California Department of Fish and Wildlife 2024a). On April 10, 2024, PFMC recommended the closure of California's commercial and recreational ocean salmon fisheries through the end of the year to

CDFW and the National Marine Fisheries Service (California Department of Fish and Wildlife 2024b). Recreational salmon fishing is closed into 2025 from the Oregon/California border to the U.S./Mexico border (89 *Federal Register* 4453).

The economic contribution of the California commercial ocean salmon fishery extends beyond the revenues received by fishermen. Supporting industries include fish processors, boat manufacturers, repair, and maintenance. The economic contribution of the commercial ocean salmon fishery to support industries can be estimated using Input-Output models. When the commercial fishery is reduced or absent, the net impact on local communities will depend on the economic base of the community and on people's responses to the reduced fishery. These economic contributions are estimated by PFMC using the Input-Output model for Pacific Coast Fisheries (IO-PAC). As summarized in Table Q-21 economic impacts from reduced commercial ocean salmon fisheries were estimated by management area.

Table Q-21. Estimated Economic Impacts to Commercial Fishery Support Industries by Management Area

Year	Klamath Management Zone, OR [a]	Klamath Management Zone, CA [b]	Fort Bragg	San Francisco	Monterey	Total
2001–2005	1,143	1,012	7,644	18,430	4,970	33,199
2006–2010	339	278	1,703	3,424	639	6,383
2011	290	525	4,664	2,954	720	9,153
2012	394	769	4,287	13,570	4,100	23,120
2013	685	2,036	11,187	21,702	2,202	37,812
2014	1,327	955	7,152	10,595	623	20,652
2015	574	427	4,885	5,117	943	11,946
2016	142	63	1,725	4,969	1,043	7,942
2017	103	33	400	5,545	1,298	7,379
2018 [c]	466	650	1,023	9,124	1,192	12,455
2019	198	264	743	19,201	4,710	25,116
2020	201	24	1,131	22,035	2,233	25,624
2021	214	421	4,738	20,232	3,256	28,861

Source: Pacific Fishery Management Council 2022.
All values in thousands of 2021 dollars.
[a] Klamath Management Zone, Oregon represents the area from Humbug Mountain to the Oregon-California border and includes landings at the Brookings port and season length and quota values for the entire area including Chetco River Ocean Terminal Area between Twin Rocks and the Oregon-California border. Data for Brookings, Oregon include values from landings outside of the Klamath Management Zone.
[b] Klamath Management Zone, California represents the area from Oregon-California border to Humboldt South Jetty and includes landings at the Crescent City and Eureka ports.
[c] Preliminary prices.

Q.1.3.2 Recreational Salmon Fishery along the Southern Oregon and Northern California Coasts

PFMC and CDFW also manage the recreational (ocean sport) fishery. The economic contribution of the ocean sport salmon fishery can be estimated using Input-Output models. Economic contributions are estimated by PFMC using IO-PAC, as summarized in Table Q-22.

Table Q-22. Estimated Economic Impacts to Recreation Fisheries Support Industries by Management Area

Year	Klamath Management Zone, OR [a]	Klamath Management Zone, CA [b]	Fort Bragg	San Francisco	Monterey	Total
2001–2005	860	1,149	2,316	10,301	4,148	18,774
2006–2010	361	539	788	2,962	1,223	5,873
2011	314	1,346	1,942	6,225	3,363	13,190
2012	950	2,897	1,956	11,055	5,489	22,347
2013	1,047	2,827	2,355	13,303	3,498	23,030
2014	879	2,007	2,361	10,788	3,261	19,296
2015	451	925	1,565	9,273	1,708	13,922
2016	210	889	1,214	8,491	865	11,669
2017	101	0	559	10,640	1,572	12,872
2018 [c]	351	700	1,337	13,091	1,512	16,991
2019	223	785	1,056	11,609	3,354	17,027
2020	316	456	600	8,444	472	10,288
2021	310	226	1,069	8,959	3,638	14,202

Source: Pacific Fishery Management Council 2022.
All values in thousands of 2021 dollars.
[a] Klamath Management Zone, Oregon represents the area from Humbug Mountain to the Oregon-California border and includes landings at the Brookings port and season length and quota values for the entire area including Chetco River Ocean Terminal Area between Twin Rocks and the Oregon-California border. Data for Brookings, Oregon include values from landings outside of the Klamath Management Zone.
[b] Klamath Management Zone, California represents the area from Oregon-California border to Humboldt South Jetty and includes landings at the Crescent City and Eureka ports.
[c] Preliminary prices.

Q.2 Evaluation of Alternatives

This section describes the technical background for the evaluation of environmental consequences associated with the action alternatives and the No Action Alternative.

Q.2.1 Methods and Tools

The regional economic effects evaluated in this environmental impact statement (EIS) include changes to employment, income, or output that could result from implementation of the project alternatives. The analysis uses quantitative and qualitative methods to evaluate the potential regional economic effects.

Q.2.1.1 Municipal and Industrial Water Supply Effects

Regional economic effects from changes to M&I water supply were evaluated quantitatively using California Water Economics Spreadsheet Tool (CWEST) and IMPLAN models.

CWEST is a spreadsheet representation of urban water supplies and costs for CVP and SWP project water agencies. Attachment Q.2, *CWEST Model Documentation*, presents a detailed discussion on CWEST Model and Modeling Methodology. CWEST estimates how CVP and SWP M&I contractors will meet current or future water demand levels at the lowest economic cost, subject to constraints. The model assumes that each CVP and SWP M&I contractor uses its contract delivery (modeled in CalSim 3), local supplies, and imported water (if applicable) to meet annual demand. When available project supplies are lower than demand, CWEST assumes the CVP and SWP M&I contractor will use local stored supplies, purchase or transfer water on a market, or short its customers—all of which result in an economic cost. CWEST uses water supply costs that represent the specific situation and supply conditions for each CVP and SWP M&I contractor. Transfer and groundwater pumping costs vary by contractor. CWEST uses per costs acre foot for fixed yield and temporary supplies from Urban Water Management Plans (UWMPs) and other sources, as detailed further in Attachment Q.2.

The water supply portfolio estimated using CWEST is input into the IMPLAN model to analyze changes in regional economics. IMPLAN is an input-output software and data package, which calculates the economic impacts of a change in value of production. Attachment Q.1, *IMPLAN Modeling Documentation*, presents detailed discussion on the IMPLAN Model and Modeling Methodology. As described in detail in Attachment Q.1, CWEST modeling results were be processed through IMPLAN to identify regional economic development impacts of the action alternatives.

IMPLAN estimates effects of various economic measures, including employment, labor income, and total value output. Employment is the number of jobs, including full-time, part-time, and seasonal positions. Labor income consists of employee compensation and proprietor's income. Value of output is the dollar value of production. IMPLAN estimates these economic measures through three types of effects: (1) direct effects, which reflect changes in final demand; (2) indirect effects, which capture changes in expenditures within the region in industries supplying goods and services; and (3) induced effects, which captures changes in expenditures of household income. IMPLAN estimates effects on an annual basis. The 2022 IMPLAN data sets were used for this analysis.

Q.2.1.2 Agricultural Water Supply Effects

Regional economic effects from changes to agricultural water supply were evaluated quantitatively using the Statewide Agricultural Production (SWAP) and IMPLAN models.

Changes to agricultural production estimated using SWAP are input into the IMPLAN model to analyze changes in regional economics. The SWAP model is a regional agricultural production and economic optimization model that simulates the decisions of farmers across 93 percent of agricultural land in California. The SWAP analysis is based on comparisons of alternatives at 2040 conditions in which the sustainability requirements of the Sustainable Groundwater Management Act (SGMA) are assumed to be in effect. The SWAP model incorporates these constraints to govern whether and to what amount project water users can utilize groundwater to offset reductions in surface water deliveries. SWAP model results are estimated for both below normal (used as a proxy for overall average) and dry conditions, defined according to the yearly Sacramento River Index values associated with the water deliveries from the CalSim 3 operations model. Attachment Q.3, *SWAP Model Documentation*, presents detailed discussion on the SWAP Model and Modeling Methodology. SWAP modeling results were processed through IMPLAN to identify RED impacts of the action alternatives. IMPLAN is used to estimate the regional effects of crop production in the regions. Direct, indirect, and induced effects from an industry change are analyzed. Direct effects would occur in the agricultural sectors. Expenditures of affected regional industries, including purchases of inputs, cause indirect effects. Expenditure of household income causes induced effects. Attachment Q.1 presents detailed discussion on the IMPLAN Model and Modeling Methodology.

Regional economic effects from changes to agricultural water supply to regions outside the SWAP model area of analysis (i.e., San Francisco Bay Area Region, Central Coasts Region and South Coast Region) were evaluated qualitatively.

Q.2.1.3 Fisheries Effects

Changes in CVP and SWP operations under the alternatives could change the salmon population. Commercial, sport, and tribal fishing primarily rely upon Fall-Run Chinook Salmon because the populations of other runs of salmon are substantially lower. Specific population changes for Fall-Run Chinook Salmon are not projected in this EIS. Therefore, this appendix presents a qualitative analysis of potential changes in socioeconomic factors under the alternatives compared to the No Action Alternative.

Q.2.1.4 Recreational Effects

Changes in reservoir levels under the alternatives could impact recreational use and spending in the region. Recreation (Leisure and Hospitality sector)[1] is in the top three industries in terms of employment in Trinity, El Dorado and Napa counties within the project study area. The alternatives are not expected to impact reservoir levels and recreational use and spending in Napa County or Lake Tahoe in El Dorado County. This analysis only considers potential recreational use and spending effects on regional economics in Trinity County forecast from changes to Trinity Lake levels under the alternatives. Regional economic effects from changes to Trinity Lake levels were evaluated qualitatively using CalSim 3 reservoir lake levels. The qualitative approach utilized was informed by an analysis presented in a U.S. Forest Service Study, *Estimating the Economic Impacts of Recreation Response to Resource Management Alternatives* (English et al. 1995). However, the quantitative components of that analysis were not carried

[1] Leisure and Hospitality sector under service-providing industries, includes NAIC codes 71 Arts, Entertainment, Recreation and NAIC code 72 Accommodation and Food Services.

forward for two reasons. First, the approach related to economic effects focused on drought versus non-drought conditions (a binary approach), rather than the incremental changes associated with the alternatives being analyzed in this document. Second the approach relied on visitor expenditure data developed by user surveys completed in the 1990s. Escalation of the price level of the visitor expenditure data from the English et al. study would not align with standard economic practice given the potential for changes in the composition of visitor spending patterns in the intervening decades since the development of that survey and other economic, social and environmental factors that could influence visitor expenditures that would not be accurately captured through price escalations.

Q.2.1.5 Hydropower Effects

Changes in CVP and SWP operations under the alternatives could affect hydropower use and generation. Changes in hydropower generation and use were estimated using LTGen and SWP Power (see Appendix U, *Power Technical Appendix*, for details on LTGen and SWP Power modeling). This appendix presents a qualitative evaluation of potential changes in socioeconomic factors under the alternatives in comparison to the No Action Alternative.

Q.2.2 No Action Alternative

Under the No Action Alternative, Reclamation would continue with current operation of the CVP, as described in the 2020 Record of Decision and subject to the 2019 Biological Opinions. The 2020 Record of Decision for the CVP and the 2020 Incidental Take Permit for the SWP represent current management direction or intensity pursuant to 43 CFR § 46.30.

The No Action Alternative is based on 2040 conditions. Changes that would occur over that time frame without implementation of the action alternatives are not analyzed in this technical appendix. However, the changes to regional economics that are assumed to occur by 2040 under the No Action Alternative are summarized in this section.

Conditions in 2040 would be different than existing conditions because of the following factors:

- Climate change and sea-level rise
- General plan development throughout California, including increased water demands in portions of the Sacramento Valley

By the end of September, the surface water elevations at CVP reservoirs generally decline. It is anticipated that climate change would result in more short-duration high-rainfall events and less snowpack in the winter and early spring months. The reservoirs would be full more frequently by the end of April or May by 2040 than in recent historical conditions, potentially resulting in increased CVP/SWP water supplies, recreation, and hydropower generation in the spring if water is released. However, as the water is released in the spring, there would be less snowpack to refill the reservoirs. This condition would reduce reservoir storage, thereby decreasing CVP/SWP water supplies, recreation, and hydropower generation. Decreases in water supply and hydropower generation could result in an increase in water supply and power costs needed to develop alternate water and/or power supplies. Increases in costs to end users could result in decrease in discretionary income and could result in less discretionary spending in the regional economy.

Under the No Action Alternative, land uses in 2040 would occur in accordance with adopted general plans. Development under the general plans could affect water supply and power demands, depending on the type and location of development. Infill projects where areas are already developed could increase density but would be done in compliance with applicable zoning and general plan policies. Development in non-urbanized areas could convert natural or rural areas to developed areas, resulting in increased water supply demand and increased power use to supply water. These increases in water supply for M&I contractors could result in an increase in water supply costs needed to develop alternate water supplies to serve that increased demand. For agricultural contractors, this could result in an increase in groundwater pumping costs. Increases in costs to end users could result in decrease in discretionary income and could result in less discretionary spending in the regional economy.

The No Action Alternative would also rely upon increased use of Livingston-Stone National Fish Hatchery during droughts to increase production of winter-run Chinook salmon. However, this component requires no physical changes to the facility nor operational changes to water supply that could have an economic impact.

Q.2.3 Alternative 1

Q.2.3.1 Potential M&I Water Supply-Related Changes to the Regional Economies

Trinity River Region

There are no M&I CVP or SWP water service contractors in the Trinity River Region. Therefore, there would be no regional economic effects from changes to CVP and SWP M&I water supply deliveries in the Trinity River Region under Alternative 1.

Sacramento River Region

Alternative 1 would increase water supply deliveries to M&I water contractors in the Sacramento River Region on average by approximately 100 acre-feet per year (AFY) compared to the No Action Alternative. These increases in CVP and SWP M&I water supplies under Alternative 1 would help meet anticipated increases in future water demands and would reduce the need for reliance on water transfers and development of alternate water supplies in the region to meet these demands.

Table Q-23 summarizes the average annual water supply costs for M&I water supplies. Average annual water supply costs are expected to be reduced by approximately $115,000 under Alternative 1 compared to the No Action Alternative. These changes are mostly due to reductions in costs forecast for water transfers and for the development of alternate water supplies. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under Alternative 1, there would be a reduction in water supply costs and consequently, it is assumed that water rates paid by customers would be lower when compared to the No Action Alternative. This reduction in water rates would result in an increase in disposable income and could result in more discretionary spending in the regional economy.

Table Q-23. Sacramento River Region Municipal and Industrial Water Supply Costs under Alternative 1

Municipal and Industrial	**Alternative 1 compared to No Action Alternative**
Average Annual CVP/SWP Deliveries (TAF) [a]	0.1
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	$3
New Fixed Yield Supply (TAF) [c]	(0.3)
Annual New Supply Cost (thousand dollars) [d]	($196)
Surface/Groundwater Storage Costs (thousand dollars) [e]	$0
Lost Water Sales Revenues (thousand dollars) [f]	$103
Transfer Costs (thousand dollars) [g]	($38)
Shortage Costs (thousand dollars) [h]	$694
Groundwater Pumping Costs (thousand dollars) [i]	$13
Excess Water Costs (thousand dollars) [j]	$0
Average Annual Changes in Water Supply Costs (thousand dollars)	**($115)**

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2023 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the No Action Alternative. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-24 summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income. An increase in disposable income in the area would result in an increase in spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-24. Sacramento River Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 1 Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Agriculture	Less than 0.1	$74	$184
Mining	Less than 0.1	$2	$92
Construction	Less than 0.1	$492	$2,512
Manufacturing	Less than 0.1	$149	$1,193
TIPU	Less than 0.1	$502	$2,455
Trade	0.1	$3,336	$13,241
Service	0.3	$18,384	$59,646
Government	Less than 0.1	$983	$2,698
Total	**0.4**	**$23,923**	**$82,022**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars.

San Joaquin River Region

Alternative 1 would increase water supply deliveries to M&I water contractors in the San Joaquin River Region on average by approximately 27,600 AFY compared to the No Action Alternative. These increases in CVP and SWP M&I water supplies under Alternative 1 would help meet anticipated increases in future water demands and would reduce the need for reliance on groundwater pumping in the region to meet these demands.

Table Q-25 summarizes the average annual water supply costs for M&I water supplies. Average annual water supply costs are expected to be reduced by approximately $12.5 million under Alternative 1 compared to the No Action Alternative. These changes are mostly due to reductions in costs forecast for groundwater pumping and for the development of alternate water supplies. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under Alternative 1, water supply costs would reduce compared to the No Action Alternative and, consequently, it is assumed that water rates paid by customers would be lower when compared to the No Action Alternative. This reduction in water rates would result in an increase in disposable income and could result in more spending in the regional economy.

Table Q-26 summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income. An increase in disposable income in the area would result an increase in spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-25. San Joaquin River Region Municipal and Industrial Water Supply Costs under Alternative 1 Compared to the No Action Alternative

Municipal and Industrial	**Alternative 1 compared to No Action Alternative**
Average Annual CVP/SWP Deliveries (TAF) [a]	27.6
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	$692
Alternate Water Supply Deliveries (assumed new supply) (TAF) [c]	(13.2)
Annualized Alternate Supply Costs (thousand dollars) [d]	($9,674)
Water Storage Costs (thousand dollars) [e]	$909
Lost Water Sales Revenues (thousand dollars) [f]	$403
Transfer Costs (thousand dollars) [g]	$373
Shortage Costs (thousand dollars) [h]	$937
Groundwater Pumping Costs (thousand dollars) [i]	($6,142)
Excess Water Costs (thousand dollars) [j]	$907
Average Annual Changes in Water Supply Costs (thousand dollars)	**($12,533)**

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2023 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the No Action Alternative. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-26. San Joaquin River Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 1 Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Agriculture	0.2	$8,675	$37,441
Mining	0.0	$1,392	$13,287
Construction	0.5	$40,165	$218,814
Manufacturing	0.3	$17,420	$225,190
TIPU	2.0	$55,356	$229,882
Trade	7.7	$317,469	$1,353,371
Service	29.8	$1,414,929	$4,946,488
Government	0.6	$57,529	$149,070
Total	**41.1**	**$1,912,935**	**$7,173,544**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars.

San Francisco Bay Area Region

Alternative 1 would increase water supply deliveries to M&I water contractors in the San Francisco Bay Area Region on average by approximately 43,300 AFY compared to the No Action Alternative. These increases in CVP and SWP M&I water supplies under Alternative 1 would help meet anticipated increases in future water demands and would reduce the need for reliance on groundwater pumping in the region to meet these demands.

Table Q-27 summarizes the average annual water supply costs for M&I water supplies. Average annual water supply costs are expected to reduce by approximately $34.1 million under Alternative 1 compared to the No Action Alternative. These changes are mostly due to reductions in costs forecast for water transfers, lost water sales revenue, shortage costs, excess water costs, and groundwater pumping under Alternative 1. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under Alternative 1, there would be reduction in water supply costs, and, consequently, it is assumed that water rates paid by customers would be lower when compared to the No Action Alternative. This reduction in water rates would result in an increase in disposable income and could result in more discretionary spending in the regional economy.

Table Q-28 summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income. An increase in disposable income in the area may increase spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-27. San Francisco Bay Area Region Municipal and Industrial Water Supply Costs under Alternative 1 Compared to the No Action Alternative

Municipal and Industrial	**Alternative 1 compared to No Action Alternative**
Average Annual CVP/SWP Deliveries (TAF) [a]	43.3
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	$1,692
Alternate Water Supply Deliveries (assumed new supply) (TAF) [c]	0.0
Annualized Alternate Supply Costs (thousand dollars) [d]	$0
Water Storage Costs (thousand dollars) [e]	$7
Lost Water Sales Revenues (thousand dollars) [f]	($2,658)
Transfer Costs (thousand dollars) [g]	($365)
Shortage Costs (thousand dollars) [h]	($1,180)
Groundwater Pumping Costs (thousand dollars) [i]	($346)
Excess Water Costs (thousand dollars) [j]	($3,152)
Average Annual Changes in Water Supply Costs (thousand dollars)	**($34,100)**

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2024 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the No Action Alternative. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-28. San Francisco Bay Area Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 1 Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Agriculture	0.7	$33,434	$61,621
Mining	0.0	$1,197	$19,988
Construction	1.6	$150,533	$717,104
Manufacturing	1.2	$124,481	$1,557,021
TIPU	3.5	$144,289	$552,640
Trade	15.9	$993,215	$3,431,806
Service	80.5	$5,769,062	$17,860,782
Government	1.2	$193,732	$341,465
Total	**104.7**	**$7,409,943**	**$24,542,427**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars.

Central Coast Region

Alternative 1 would increase water supply deliveries to M&I water contractors in the Central Coast Region on average by approximately 9,600 AFY compared to the No Action Alternative. With these increases in CVP and SWP M&I water supplies under Alternative 1, the need for future investment in alternate water supplies by Central Coast Region M&I contractors would be reduced.

Table Q-29 summarizes the average annual water supply costs for M&I water supplies. Average annual water supply costs are expected to decrease by approximately $2.2 million under Alternative 1 compared to the No Action Alternative. These changes are primarily due to reductions in costs forecast for groundwater pumping. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under Alternative 1, there would be reduction in water supply costs, and, consequently, it is assumed that water rates paid by customers would be lower when compared to the No Action Alternative. This reduction in water rates would result in an increase in disposable income and could result in more discretionary spending in the regional economy.

Table Q-30 summarizes the regional economic effects to employment, labor income, and revenue from increased water supply costs and decreased disposable income. An increase in disposable income in the area may increase discretionary spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-29. Central Coast Region Municipal and Industrial Water Supply Costs Under Alternative 1 Compared to the No Action Alternative

Municipal and Industrial	**Alternative 1 compared to No Action Alternative**
Average Annual CVP/SWP Deliveries (TAF) [a]	9.6
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	$2,048
Alternate Water Supply Deliveries (assumed new supply) (TAF) [c]	0.0
Annualized Alternate Supply Costs (thousand dollars) [d]	$0
Water Storage Costs (thousand dollars) [e]	$0
Lost Water Sales Revenues (thousand dollars) [f]	$0
Transfer Costs (thousand dollars) [g]	$0
Shortage Costs (thousand dollars) [h]	$0
Groundwater Pumping Costs (thousand dollars) [i]	($4,246)
Excess Water Costs (thousand dollars) [j]	$0
Average Annual Changes in Water Supply Costs (thousand dollars)	**($2,198)**

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2023 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the No Action Alternative. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-30. Central Coast Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 1 Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Agriculture	0.1	$2,603	$5,503
Mining	0.0	$569	$6,640
Construction	0.1	$6,575	$37,440
Manufacturing	0.0	$1,608	$37,861
TIPU	0.4	$7,950	$38,435
Trade	1.3	$58,177	$248,892
Service	7.0	$345,144	$1,233,632
Government	0.1	$14,393	$37,074
Total	**9.0**	**$437,018**	**$1,645,477**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars.

South Coast Region

Alternative 1 would increase water supply deliveries to M&I water contractors in the South Coast Region on average by approximately 467,800 AFY compared to the No Action Alternative. These increases in CVP and SWP M&I water supplies under Alternative 1 would help meet anticipated increases in future water demands and would reduce the need for reliance on groundwater pumping in the region to meet these demands.

Table Q-31 summarizes the average annual water supply costs for M&I water supplies. Average annual water supply costs are expected to reduce by approximately $274.3 million under Alternative 1 compared to the No Action Alternative. These changes are mostly due to reductions in costs forecast for securing alternate water supplies, shortage costs, lost sales revenue costs, and excess water costs. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under Alternative 1, there would be a reduction in water supply costs, and, consequently, it is assumed that water rates paid by customers would be lower when compared to the No Action Alternative. This reduction in water rates could result in an increase in disposable income and could result in more discretionary spending in the regional economy.

Table Q-32 summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income. An increase in disposable income in the area would result an increase in spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-31. South Coast Region Municipal and Industrial Water Supply Costs Under Alternative 1 compared to the No Action Alternative

Municipal and Industrial	**Alternative 1 compared to No Action Alternative**
Average Annual CVP/SWP Deliveries (TAF) [a]	467.8
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	$73,744
Alternate Water Supply Deliveries (assumed new supply) (TAF) [c]	(145.0)
Annualized Alternate Supply Costs (thousand dollars) [d]	($249,609)
Water Storage Costs (thousand dollars) [e]	($4,012)
Lost Water Sales Revenues (thousand dollars) [f]	($40,277)
Transfer Costs (thousand dollars) [g]	($3,898)
Shortage Costs (thousand dollars) [h]	($62,367)
Groundwater Pumping Costs (thousand dollars) [i]	($20,735)
Excess Water Costs (thousand dollars) [j]	($29,492)
Average Annual Changes in Water Supply Costs (thousand dollars)	**($274,279)**

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2023 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the No Action Alternative. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-32. South Coast Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 1 Compared to the No Action Alternative

Industry	**Employment (in jobs)**	**Labor Income (in dollars)**	**Output (in dollars)**
Agriculture	6.4	$252,329	$577,115
Mining	0.4	$27,017	$466,218
Construction	13.7	$919,751	$5,075,291
Manufacturing	16.7	$1,394,981	$14,561,189

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
TIPU	61.2	$2,391,484	$8,664,547
Trade	190.0	$9,672,148	$37,312,304
Service	1,046.4	$59,059,467	$193,870,015
Government	17.5	$2,152,785	$5,544,588
Total	**1,352.5**	**$75,869,962**	**$266,071,267**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars.

Q.2.3.2 Potential Agriculture-Related Changes to the Regional Economy

Trinity River Region

There are no agricultural lands irrigated with CVP and SWP water supplies in the Trinity River Region. Therefore, there would be no regional economic effects from changes to CVP and SWP agricultural water supply deliveries in the Trinity River Region under Alternative 1.

Sacramento River Region

Alternative 1 would increase average annual agricultural water supply deliveries by 4,501 AFY during average conditions and by 13,632 AFY during dry conditions in the Sacramento River Region. As summarized in Table Q-33, these increases in annual agricultural water supplies are expected to result in increases to irrigated acreage under average and dry conditions. However, gross revenue in the Sacramento River Region is forecast to decrease under the average and dry conditions. In several cases, the economic analysis provided by the SWAP model indicates that the change in aggregate gross revenue in the Sacramento Valley moves in the opposite direction from the change in acreage and/or water supply in the Sacramento Valley. This can occur due to a combination of reasons.

First, changes in production caused by water supply changes in the San Joaquin Valley can induce production to shift from the San Joaquin to the Sacramento Valley (or vice versa). Second, these crop shifts tend to occur disproportionately in relatively high-value crops such as fruits and vegetables. As a result, a reduction in total irrigated acres in the Sacramento Valley, for example, can mask a relative shift in acreage among crop types. This relative shift can cause an overall reduction in acreage but at the same time an overall increase in gross revenue. Such offsetting shifts can occur between the aggregate crop categories (such as between vegetable farming and grain farming), but also between individual crops aggregated into a single crop category (such as between rice and wheat in the grain farming category).

Under Alternative 1, reductions in gross revenue results from a rise in the forecast acreage of grain farming alongside a smaller reduction in the forecast acreage of fruit and vegetable farming. Gross revenue per acre from fruit and vegetable farming is much higher than grain farming. This difference in per acre revenue between the two farming types, drives the net reduction in forecast gross revenue.

Table Q-34 summarizes the regional economic effects to employment, labor income, and revenue from increased agricultural water supply to the region. Changes to irrigated acreage and agricultural revenue would affect businesses and individuals who support farming activities, such as farm workers, fertilizer and chemical dealers, wholesale and agricultural service providers, truck transport, and others involved in crop production and processing. The changes in agricultural revenue results presented below include price adjustments for crops that reflect both demand shifts from current conditions to 2040 (fixed price revenue) and price changes caused by alternative-driven changes in crop production/ supply shifts (price effect revenue). Since IMPLAN assumes fixed prices, regional economic effects were estimated using the fixed price agricultural revenue results. Price effect revenue results would primarily result in changes to proprietor income and are not expected to result in substantial impacts on the regional economy.

Table Q-33. Sacramento River Region Agricultural Water Supply Costs under Alternative 1 Compared to the No Action Alternative

Agricultural	Alternative 1 compared to No Action Alternative
AVERAGE CONDITIONS [a]	
Average Annual CVP/SWP Deliveries (AF)	4,501
Irrigated Acreage (acres)	955
Total Agricultural Revenue (dollars)	**($29,468,177)**
Fixed Price Agricultural Revenue (dollars)[b]	($5,271,281)
Price Effects Agricultural Revenue (dollars)[c]	($24,196,896)
DRY CONDITIONS [d]	
Average Annual CVP/SWP Deliveries (AF)	13,632
Irrigated Acreage (acres)	4,379
Total Agricultural Revenue (dollars)	**($26,514,130)**
Fixed Price Agricultural Revenue (dollars) [b]	$6,218,854
Price Effects Agricultural Revenue (dollars) [c]	($32,732,984)

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2024 dollars. Numbers in parentheses represent negative values. Values are an annual change between the No Action Alternative and the Action Alternatives under 2040 conditions.
[a] Average Conditions refers to an average of all year types in the CalSIM simulation period.
[b] Agricultural Revenue based on fixed prices for agricultural products, current price used in the analysis.
[c] Agricultural Revenue based on projected price effect for agricultural products based on changes to irrigated acreage in the Central Valley and other global effects on crop prices.
[d] Dry Conditions refer to an average of dry years only, using Sacramento River Index.

Table Q-34. Sacramento River Region Agricultural Water Supply Related Regional Economic Effects under Alternative 1 Compared to the No Action Alternative under Average Conditions

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
AVERAGE CONDITIONS			
Agriculture	(78.6)	($1,507,090)	($5,493,980)
Mining	Less than (0.1)	$100	($720)
Construction/Utilities	(0.1)	($10,890)	($52,630)
Manufacturing	(0.1)	($11,360)	($116,130)
TIPU	(0.5)	($9,480)	($44,220)
Trade	(1.5)	($72,150)	($285,660)
Service	(6.0)	($348,790)	($1,127,830)
Government	(0.2)	($18,620)	($54,180)
Total	**(86.9)**	**($1,978,280)**	**($7,175,350)**
DRY CONDITIONS			
Agriculture	48.8	$1,232,100	$6,793,830
Mining	0.0	$480	$6,840
Construction/Utilities	0.2	$22,520	$115,730
Manufacturing	0.2	$26,800	$354,000
TIPU	0.9	$26,230	$122,800
Trade	1.9	$110,720	$498,570
Service	9.2	$445,610	$1,794,150
Government	0.3	$31,450	$92,550
Total	**61.5**	**$1,895,910**	**$9,778,470**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Numbers in parentheses represent negative values. Regional economic results based on fixed price agricultural revenue

San Joaquin River Region

Alternative 1 would increase average annual agricultural water supply deliveries by 466,371 AFY during average conditions and by 318,194 AFY during dry conditions in the San Joaquin River Region. As summarized in Table Q-35, these increases in annual agricultural water supplies are expected to result in increases in irrigated acreage under average and dry conditions. These increases in irrigated acreage are expected to result in an increase in gross revenue in the region. The forecast reduction in price effect agricultural revenue under the average condition is driven by a shift in forecast higher value fruit and vegetable farming to other lower value crop farming.

Table Q-36 summarizes the regional economic effects to employment, labor income, and revenue from increased agricultural water supply to the region. Changes to irrigated acreage and agricultural revenue would affect businesses and individuals who support farming activities, such as farm workers, fertilizer and chemical dealers, wholesale and agricultural service providers, truck transport, and others involved in crop production and processing. The changes in agricultural revenue results presented below includes price adjustments for crops that reflect both demand shifts from current conditions to 2040 (fixed price revenue) and price changes caused by alternative-driven changes in crop production/ supply shifts (price effect revenue). Since IMPLAN assumes fixed prices, regional economic effects were estimated using the fixed price agricultural revenue results. Price effect revenue results would primarily result in changes to proprietor income and are not expected to result in substantial impacts on the regional economy.

Table Q-35. San Joaquin River Region Agricultural Water Supply Costs under Alternative 1 Compared to the No Action Alternative

Agricultural	Alternative 1 compared to No Action Alternative
AVERAGE CONDITIONS [a]	
Average Annual CVP/SWP Deliveries (AF)	466,371
Irrigated Acreage (acres)	91,372
Total Agricultural Revenue (dollars)	**$337,015,698**
Fixed Price Agricultural Revenue (dollars) [b]	$340,903,626
Price Effects Agricultural Revenue (dollars) [c]	($3,887,928)
DRY CONDITIONS [d]	
Average Annual CVP/SWP Deliveries (AF)	318,194
Irrigated Acreage (acres)	87,164
Total Agricultural Revenue (dollars)	$411,948,803
Fixed Price Agricultural Revenue (dollars) [b]	$403,605,245
Price Effects Agricultural Revenue (dollars) [c]	$8,343,558

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2024 dollars. Numbers in parentheses represent negative values. Values are an annual change between the No Action Alternative and the Action Alternatives under 2040 conditions.
[a] Average Conditions refers to an average of all year types in the CalSIM simulation period.
[b] Agricultural Revenue based on fixed prices for agricultural products, current price used in the analysis.
[c] Agricultural Revenue based on projected price effect for agricultural products based on changes to irrigated acreage and other global effects on crop prices.
[d] Dry Conditions refer to an average of dry years only, using Sacramento River Index.

Table Q-36. San Joaquin River Region Agricultural Water Supply Related Regional Economic Effects under Alternative 1 Compared to the No Action Alternative under Average Conditions

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
AVERAGE CONDITIONS			
Agriculture	3,280.3	$85,146,950	$367,540,510
Mining	0.8	$88,660	$617,270
Construction/Utilities	10.9	$950,970	$5,132,220
Manufacturing	12.5	$1,013,260	$13,188,510
TIPU	37.7	$1,327,800	$5,371,740
Trade	122.8	$5,955,220	$27,532,530
Service	475.4	$20,997,460	$81,141,740
Government	11.4	$1,238,220	$3,555,890
Total	**3,951.7**	**$116,718,540**	**$504,080,410**
DRY CONDITIONS			
Agriculture	2,939.6	$87,120,960	$436,346,460
Mining	0.7	$81,510	$642,100
Construction/Utilities	13.4	$1,147,160	$6,184,980
Manufacturing	15.8	$1,273,680	$16,232,350
TIPU	44.4	$1,562,880	$6,307,570
Trade	144.1	$7,086,840	$32,692,650
Service	550.8	$24,162,480	$93,740,830
Government	13.4	$1,454,370	$4,171,230
Total	**3,722.3**	**$123,889,880**	**$596,318,170**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Regional economic results based on fixed price agricultural revenue.

San Francisco Bay Area Region

Alternative 1 is expected to increase average annual agricultural water supply deliveries in the San Francisco Bay Area Region by 5,000 AFY under average conditions and by 7,000 AFY under dry conditions. Increase in agricultural water supply in the region could result in an increase in irrigated acreage and agricultural revenues in the region. This increase in agricultural revenues would result in more spending to the region economy.

Central Coast Region

CVP and SWP water supply deliveries to the Central Coast Region affected by Alternative 1 are primarily delivered to M&I water contractors. Therefore, there are no forecast changes in irrigated lands under Alternative 1. Consequently, there would be no impacts to regional economy from changes in deliveries to agricultural contractors in the Central Coast Region under Alternative 1.

South Coast Region

Alternative 1 is expected to increase average annual agricultural water supply deliveries in the South Coast Region by 3,000 AFY under average conditions and by 2,000 AFY under dry conditions. Increase in agricultural water supply in the region could result in an increase in irrigated acreage and agricultural revenues in the region. This increase in agricultural revenue would result in more spending to the region economy.

Q.2.3.3 Potential Fisheries-Related Changes to the Regional Economy

The commercial and recreational (ocean sports) ocean salmon fishery along the SONCC are affected by the population of salmon that rely upon the Northern California rivers, including the Sacramento and San Joaquin rivers. As described in detail in Appendix O, annual average Central Valley Chinook salmon abundance (includes Spring, Winter, Fall and late-Fall runs) in the Bay under Alternative 1 compared to the No Action Alternative would be negligeable. There would be minimal impacts to commercial and recreational ocean salmon harvest under Alternative 1 compared to the No Action Alternative. Consequently, revenues received by fisherman from changes to ocean salmon harvest would be minimal. Ocean fisheries support industries such as fish processors, boat manufacturers, repair and maintenance would see no changes in revenue. Overall fisheries related changes to the regional economy under Alternative 1 would be minimal.

As discussed in Appendix O, coho salmon, fall-run and spring-run Chinook salmon impacts under Alternative 1 would be minor in comparison to the No Action Alternative. These salmon populations are extremely important to the Yurok Tribe and Hoopa Valley Tribe as part of their lives, cultural traditions, ceremonies, and community health (Bureau of Reclamation 2012). Fifty percent of the total available salmon in the Trinity River is the federally protected harvest for the Yurok and Hoopa Valley tribes (U.S. Department of the Interior 1993). Each tribe determines the use of the harvest. Changes in salmon population in the Trinity River would change salmon landings by the Yurok and Hoopa Valley tribes. The tribes would sell a portion of or all their landings which would affect revenues and disposable incomes to the tribes. Since salmon populations in the Trinity River would not be adversely impacted under Alternative 1, salmon landings would also not be adversely impacted.

Q.2.3.4 Potential Impacts to Regional Recreational Economics

As described in detail in Appendix S, *Recreation Technical Appendix*, average water elevations in Trinity Reservoir under Alternative 1 would effectively remain the same when compared to the No Action Alternative. Given the limited changes in Trinity Reservoir levels forecast under Alternative 1, limited impacts are forecast on camping, day use opportunities at the campgrounds surrounding Trinity Reservoir, and recreational fishing access. These limited effects on water elevations in Trinity Reservoir would result in negligible impacts to recreational visitation and recreational revenue.

Q.2.3.5 Potential Impacts to Regional Economics from Changes to Hydropower

As described in detail in Appendix U, the CVP net hydropower generation would be slightly lower over the long-term and over dry and critically dry years under Alternative 1 compared to the No Action Alternative. The hydropower generated by the CVP is marketed and transmitted by the Western Area Power Administration (WAPA) Sierra Nevada Region. As CVP annual and plant-in-service power costs increase (including Central Valley Project Improvement Act Environmental Restoration Funds), and available energy for sale decreases, the net unit cost of CVP power may increase. Typically, increases in power costs would be passed on to customers through rate increases. Rate increases would result in a decrease in disposable income and could result in less discretionary spending in the regional economy.

Under Alternative 1 compared with the No Action Alternative, SWP annual energy generation would be higher for the long-term average and annual energy generation would be higher for dry and critically dry years, but the energy required to move the water would also be higher for both long-term average and in dry and critically dry years resulting in a reduction in average net generation for both year types. The SWP net generation over the long-term would be lower by 42% and the annual net generation would be lower by 72% for dry and critically dry years under Alternative 1 compared with the No Action Alternative.

Power generated by the SWP is transmitted by the Pacific Gas and Electric Company (PG&E), Southern California Edison, and California Independent System Operator (ISO) through other facilities (California Department of Water Resources 2022). The SWP also markets energy in excess of the SWP demands to a utility and members of the WSPP, formerly known as the Western Systems Power Pool. A decrease in SWP net generation would increase the need for the development of other alternative supplies which could result in an overall increase in power cost. Typically, increases in power costs would be passed on to customers through rate increases. Rate increases would result in a decrease in disposable income and could result in less discretionary spending in the regional economy.

Q.2.4 Alternative 2

Q.2.4.1 Potential M&I Water Supply-Related Changes to the Regional Economies

Trinity River Region

There are no M&I CVP or SWP water service contractors in the Trinity River Region. Therefore, there would be no regional economic effects from changes to CVP and SWP M&I water supply deliveries in the Trinity River Region under Alternative 2.

Sacramento River Region

Alternative 2 would increase water supply deliveries to M&I water contractors in the Sacramento River Region under the Without TUCP phases and decrease supplies under the With TUCP phase, details provided in summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income to CVP and SWP M&I contractors. These effects are presented as a range for the Alternative 2 phases. An increase in disposable income in the area could result in an increase in discretionary spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-37. These increases in CVP and SWP M&I water supplies under Alternative 2 would help meet anticipated increases in future water demands and would reduce the need for reliance on water transfers and development of alternate water supplies in the region to meet these demands. However, reliance on groundwater increases in the region under all phases due to forecast groundwater costs being lower than forecast surface water costs. These estimates include the anticipated effects of SGMA. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under Alternative 2 phases, there would be a reduction in water supply costs and consequently, water rates would be lower than the No Action Alternative. This reduction in water rates would result in an increase in disposable income and could result in more discretionary spending in the regional economy.

[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-38 summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income to CVP and SWP M&I contractors. These effects are presented as a range for the Alternative 2 phases. An increase in disposable income in the area could result in an increase in discretionary spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-37. Sacramento River Region Municipal and Industrial Water Supply Costs under Alternative 2 phases compared to No Action Alternative

Municipal and Industrial	Alt2wTUCPwoVA compared to NAA	Alt2woTUCPwoVA compared to NAA	Alt2woTUCPDeltaVA compared to NAA	Alt2woTUCPAllVA compared to NAA
Average Annual CVP/SWP Deliveries (TAF) [a]	(0.3)	0	9.8	6.2
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	($14)	($3)	$443	$271
New Fixed Yield Supply (TAF) [c]	(0.2)	(1.7)	(5.9)	(4.8)
Annual New Supply Cost (thousand dollars) [d]	($40)	($1,050)	($3,836)	($3,109)
Surface/Groundwater Storage Costs (thousand dollars) [e]	$0	$0	$0	$0
Lost Water Sales Revenues (thousand dollars) [f]	($44)	($32)	($175)	$601
Transfer Costs (thousand dollars) [g]	($176)	($271)	($910)	$63
Shortage Costs (thousand dollars) [h]	($163)	$234	$166	$536
Groundwater Pumping Costs (thousand dollars) [i]	$128	$250	$129	$119
Excess Water Costs (thousand dollars) [j]	$0	$0	$0	$0
Average Annual Changes in Water Supply Costs (thousand dollars)	($146)	($1,107)	($4,349)	($2,055)

NAA = No Action Alternative; Alt2wTUCPwoVA = Alternative 2 With TUCP Without VA; Alt2woTUCPwoVA = Alternative 2 Without TUCP Without VA; Alt2woTUCPDeltaVA = Alternative 2 Without TUCP Delta VA; Alt2woTUCPAllVA = Alternative 2 Without TUCP Systemwide VA; CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.

All costs in 2023 dollars. Numbers in parentheses represent negative values.

[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.

[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.

[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.

[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.

[e] Storage Costs include put and take costs.

[f] Loss of revenue from retail water sales.

[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.

[h] Estimated consumer surplus loss due to water shortages.

[i] Cost savings from reduction in groundwater pumping between the action alternatives and the NAA. Negative refers to savings and positive refers to costs.

[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-38. Sacramento River Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 2 phases Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Agriculture	0.1	$90–$2,800	$230–$6,970
Mining	0	$0–$80	$120–$3,490
Construction	0.2	$620–$18,620	$3,190–$94,990
Manufacturing	0.1	$190–$5,630	$1,510–$45,130
TIPU	1	$640–$18,990	$3,120–$92,840
Trade	0.1–2.8	$4,240–$126,180	$16,810–$500,750
Service	0.4–12	$23,340–$695,240	$75,730–$2,255,670
Government	0.3	$1,250–$37,170	$3,420–$102,020
Total	**0.6–16.4**	**$30,370–$904,700**	**$104,130–$3,101,860**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Results presented as a range for all Alternative 2 phases.

San Joaquin River Region

Alternative 2 would increase water supply deliveries to M&I water contractors in the San Joaquin River Region under all phases, details provided in summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income to CVP and SWP M&I contractors. These effects are presented as a range for the Alternative 2 phases. An increase in disposable income in the area would result in an increase in discretionary spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-39. These increases in CVP and SWP M&I water supplies under Alternative 2 would help meet anticipated increases in future water demands and would reduce shortage costs. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under Alternative 2 phases, M&I project water deliveries would increase. The CWEST model then estimates a corresponding reduction in reliance on more costly water sources to meet demand. By meeting a larger portion of demand with comparatively lower cost project water, there would be a reduction in water supply costs and consequently, water rates would be lower than the No Action Alternative. This would result in an increase in disposable income and could result in more discretionary spending in the regional economy.

[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-40 summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income to CVP and SWP M&I contractors. These effects are presented as a range for the Alternative 2 phases. An increase in disposable income in the area would result in an increase in discretionary spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-39. San Joaquin River Region Municipal and Industrial Water Supply Costs under the Alternative 2 Phases Compared to the No Action Alternative

Municipal and Industrial	Alt2wTUCPwoVA compared to NAA	Alt2woTUCPwoVA compared to NAA	Alt2woTUCPDeltaVA compared to NAA	Alt2woTUCPAllVA compared to NAA
Average Annual CVP/SWP Deliveries (TAF) [a]	2.7	2.4	1.2	1.4
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	$43	$57	$31	$43
New Fixed Yield Supply (TAF) [c]	(8.3)	(9.9)	(10)	(10)
Annual New Supply Cost (thousand dollars) [d]	($4,257)	($6,323)	($6,443)	($6,389)
Surface/Groundwater Storage Costs (thousand dollars) [e]	$929	$862	$862	$873
Lost Water Sales Revenues (thousand dollars) [f]	$9	($51)	($31)	($11)
Transfer Costs (thousand dollars) [g]	$302	$847	$905	$822
Shortage Costs (thousand dollars) [h]	($157)	($109)	($62)	($89)
Groundwater Pumping Costs (thousand dollars) [i]	($251)	$46	$380	$345
Excess Water Costs (thousand dollars) [j]	$921	$865	$866	$866
Average Annual Changes in Water Supply Costs (thousand dollars)	**($2,303)**	**($3,697)**	**($3,431)**	**($3,451)**

NAA = No Action Alternative; Alt2wTUCPwoVA = Alternative 2 With TUCP Without VA; Alt2woTUCPwoVA = Alternative 2 Without TUCP Without VA; Alt2woTUCPDeltaVA = Alternative 2 Without TUCP Delta VA; Alt2woTUCPAllVA = Alternative 2 Without TUCP Systemwide VA; CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2023 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the NAA. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-40. San Joaquin River Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 2 phases Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars	Output (in dollars)
Agriculture	0–0.1	$1,590–$2,560	$6,880–$11,040
Mining	Less than 0.1	$260–$410	$2,440–$3,920
Construction	0.1	$7,380–$11,850	$40,210–$64,550
Manufacturing	0.1	$3,200–$5,140	$41,380–$66,430
TIPU	0.4–0.6	$10,170–$16,330	$42,240–$67,810
Trade	1.4–2.3	$58,340–$93,650	$248,690–$399,220
Service	5.5–8.8	$260,000–$417,380	$908,940–$1,459,120
Government	0.1–0.2	$10,570–$16,970	$27,390–$43,970
Total	**7.5–12.1**	**$351,510–$564,280**	**$1,318,170–$2,116,060**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Results presented as a range for all Alternative 2 phases.

San Francisco Bay Area Region

Alternative 2 would increase water supply deliveries to M&I water contractors in the San Francisco Bay Area Region under all phases, details provided in summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income. These effects are presented as a range for the Alternative 2 phases. An increase in disposable income in the area would result in an increase in spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-41. These increases in CVP and SWP M&I water supplies under Alternative 2 would help meet anticipated increases in future water demands and would reduce transfer costs, shortage costs and excess water costs under the Without TUCP phases. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under the Without TUCP Alternative 2 phases, there would be a reduction in water supply costs and consequently, water rates would be lower than the No Action Alternative. This water rates reduction would result in an increase in disposable income and could result in more discretionary spending in the regional economy.

[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-42 summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income. These effects are presented as a range for the Alternative 2 phases. An increase in disposable income in the area would result in an increase in spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-41. San Francisco Bay Area Region Municipal and Industrial Water Supply Costs under the Alternative 2 Phases Compared to the No Action Alternative

Municipal and Industrial	Alt2wTUCPwoVA compared to NAA	Alt2woTUCPwoVA compared to NAA	Alt2woTUCPDeltaVA compared to NAA	Alt2woTUCPAllVA compared to NAA
Average Annual CVP/SWP Deliveries (TAF) [a]	3.1	5.9	6.1	7.1
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	$69	$274	$285	$480
New Fixed Yield Supply (TAF) [c]	0	0	0	0
Annual New Supply Cost (thousand dollars) [d]	$0	$0	$0	$0
Surface/Groundwater Storage Costs (thousand dollars) [e]	($91)	$4	($5)	($35)
Lost Water Sales Revenues (thousand dollars) [f]	$2,075	($5,078)	($5,325)	($5,998)
Transfer Costs (thousand dollars) [g]	$372	($53)	($81)	($184)
Shortage Costs (thousand dollars) [h]	$1,036	($2,593)	($2,669)	($3,069)
Groundwater Pumping Costs (thousand dollars) [i]	($55)	$29	$10	$20
Excess Water Costs (thousand dollars) [j]	($332)	($389)	($374)	($345)
Average Annual Changes in Water Supply Costs (thousand dollars)	$2,039	($5,214)	($5,491)	($6,062)

NAA = No Action Alternative; Alt2wTUCPwoVA = Alternative 2 With TUCP Without VA; Alt2woTUCPwoVA = Alternative 2 Without TUCP Without VA; Alt2woTUCPDeltaVA = Alternative 2 Without TUCP Delta VA; Alt2woTUCPAllVA = Alternative 2 Without TUCP Systemwide VA; CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2024 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the NAA. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-42. San Francisco Bay Area Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 2 phases Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Agriculture	0.1	($2,000)–$5,940	($3,680)–$10,950
Mining	Less than 0.1	($70)–$210	($1,200)–$3,550
Construction	(0.1)–0.3	($9,000)–$26,760	($42,880)–$127,480
Manufacturing	(0.1)–0.2	($7,440)–$22,130	($93,100)–$276,790
TIPU	(0.2)–0.6	($8,630)–$25,650	($33,040)–$98,240
Trade	(0.9)–2.8	($59,390)–$176,570	($205,200)–$610,080
Service	(4.8)–14.3	($344,960)–$1,025,570	($1,067,980)–$3,175,130
Government	(0.1)–0.2	($11,580)–$34,440	($20,420)–$60,700
Total	**(6.3)–18.6**	**($443,080)–$1,317,270**	**($1,467,510)–$4,362,940**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Numbers in parentheses represent negative values. Results presented as a range for all Alternative 2 phases.

Central Coast Region

Alternative 2 would increase water supply deliveries to M&I water contractors in the Central Coast Region under all phases, details provided in summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income. These effects are presented as a range for the Alternative 2 phases. An increase in disposable income in the area could result in an increase in discretionary spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-43. These increases in CVP and SWP M&I water supplies under Alternative 2 would help meet future water demands with reduced reliance on groundwater use in the region. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under the Alternative 2 phases, there would be a reduction in water supply costs and consequently, water rates would be lower than the No Action Alternative. This reduction in water rates would result in an increase in disposable income and could result in more discretionary spending in the regional economy.

[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-44 summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income. These effects are presented as a range for the Alternative 2 phases. An increase in disposable income in the area could result in an increase in discretionary spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-43. Central Coast Region Municipal and Industrial Water Supply Costs Under the Alternative 2 Phases Compared to the No Action Alternative

Municipal and Industrial	Alt2wTUCPwoVA compared to NAA	Alt2woTUCPwoVA compared to NAA	Alt2woTUCPDeltaVA compared to NAA	Alt2woTUCPAllVA compared to NAA
Average Annual CVP/SWP Deliveries (TAF) [a]	1.6	1.4	1.4	1.3
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	$344	$304	$309	$292
New Fixed Yield Supply (TAF) [c]	0	0	0.0	0.0
Annual New Supply Cost (thousand dollars) [d]	$0	$0	$0	$0
Surface/Groundwater Storage Costs (thousand dollars) [e]	$0	$0	$0	$0
Lost Water Sales Revenues (thousand dollars) [f]	$0	$0	$0	$0
Transfer Costs (thousand dollars) [g]	$0	$0	$0	$0
Shortage Costs (thousand dollars) [h]	$0	$0	$0	$0
Groundwater Pumping Costs (thousand dollars) [i]	($704)	($620)	($620)	($586)
Excess Water Costs (thousand dollars) [j]	$0	$0	$0	$0
Average Annual Changes in Water Supply Costs (thousand dollars)	($360)	($316)	($311)	($294)

NAA = No Action Alternative; Alt2wTUCPwoVA = Alternative 2 With TUCP Without VA; Alt2woTUCPwoVA = Alternative 2 Without TUCP Without VA; Alt2woTUCPDeltaVA = Alternative 2 Without TUCP Delta VA; Alt2woTUCPAllVA = Alternative 2 Without TUCP Systemwide VA; CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2023 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the NAA. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-44. Central Coast Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 2 phases Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Agriculture	Less than 0.1	$350–$430	$740–$900
Mining	Less than 0.1	$80–$90	$890–$1,090
Construction	Less than 0.1	$880–$1,080	$5,010–$6,130
Manufacturing	Less than 0.1	$220–$260	$5,060–$6,200
TIPU	Less than 0.1	$1,060–$1,300	$5,140–$6,300
Trade	0.2–0.2	$7,780–$9,530	$33,290–$40,760
Service	0.9–1.1	$46,170–$56,530	$165,010–$202,050
Government	Less than 0.1	$1,930–$2,360	$4,960–$6,070
Total	**1.2–1.5**	**$58,450–$71,580**	**$220,100–$269,500**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Results presented as a range for all Alternative 2 phases.

South Coast Region

Alternative 2 would increase water supply deliveries to M&I water contractors in the South Coast Region under all phases, details provided in summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income to CVP and SWP M&I contractors. These effects are presented as a range for the Alternative 2 phases. An increase in disposable income in the area would result in an increase in discretionary spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region and would primarily occur in the services sector.

Table Q-45. These increases in CVP and SWP water supplies would help meet future water demands without development of other alternative water supplies. Additionally, increased water supplies under Alternative 2 phases would reduce storage costs, groundwater pumping costs and excess water costs under all phases. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under the Alternative 2 phases, there would be a reduction in water supply costs and consequently, water rates would be lower than the No Action Alternative. This water rates reduction would result in an increase in disposable income and could result in more discretionary spending in the regional economy.

[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-46 summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income to CVP and SWP M&I contractors. These effects are presented as a range for the Alternative 2 phases. An increase in disposable income in the area would result in an increase in discretionary spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region and would primarily occur in the services sector.

Table Q-45. South Coast Region Municipal and Industrial Water Supply Costs Under the Alternative 2 Phases compared to the No Action Alternative

Agricultural	Alt2wTUCPwoVA compared to NAA	Alt2woTUCPwoVA compared to NAA	Alt2woTUCPDeltaVA compared to NAA	Alt2woTUCPAllVA compared to NAA
Average Annual CVP/SWP Deliveries (TAF) [a]	64.3	53.1	43.7	43.4
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	$10,610	$8,843	$7,581	$7,522
New Fixed Yield Supply (TAF) [c]	(37.7)	(12.5)	(5.6)	(9)
Annual New Supply Cost (thousand dollars) [d]	($74,891)	($21,809)	($10,025)	($17,950)
Surface/Groundwater Storage Costs (thousand dollars) [e]	($321)	($1,417)	($988)	($233)
Lost Water Sales Revenues (thousand dollars) [f]	$18,615	$21,336	$6,319	$9,979
Transfer Costs (thousand dollars) [g]	$526	$509	($1,185)	($1,109)
Shortage Costs (thousand dollars) [h]	$33,036	$33,678	$3,288	$7,697
Groundwater Pumping Costs (thousand dollars) [i]	($4,602)	($3,704)	($3,971)	($3,883)
Excess Water Costs (thousand dollars) [j]	($2,081)	($4,245)	($2,974)	($2,770)
Average Annual Changes in Water Supply Costs (thousand dollars)	($52,143)	($487)	($5,243)	($8,444)

NAA = No Action Alternative; Alt2wTUCPwoVA = Alternative 2 With TUCP Without VA; Alt2woTUCPwoVA = Alternative 2 Without TUCP Without VA; Alt2woTUCPDeltaVA = Alternative 2 Without TUCP Delta VA; Alt2woTUCPAllVA = Alternative 2 Without TUCP Systemwide VA; CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2023 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the NAA. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-46. South Coast Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 2 phases Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Agriculture	Less than 0.1–1.2	$450–$47,970	$1,020–$109,710
Mining	Less than 0.1–0.1	$50–$5,140	$830–$88,630
Construction	Less than 0.1–2.6	$1,630–$174,850	$9,010–$964,860
Manufacturing	Less than 0.1–3.2	$2,480–$265,200	$25,850–$2,768,220
TIPU	0.1–11.6	$4,250–$454,640	$15,380–$1,647,210
Trade	0.3–36.1	$17,170–$1,838,770	$66,250–$7,093,420
Service	1.9–198.9	$104,860–$11,227,760	$344,230–$36,856,500
Government	Less than 0.1–3.3	$3,820–$409,260	$9,840–$1,054,080
Total	**2.4–257.1**	**$134,710–$14,423,590**	**$472,430–$50,582,630**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars.

Q.2.4.2 Potential Agriculture-Related Changes to the Regional Economy

Trinity River Region

There are no agricultural lands irrigated with CVP and SWP water supplies in the Trinity River Region. Therefore, there would be no regional economic effects from changes to CVP and SWP agricultural water supply deliveries in the Trinity River Region under Alternative 2.

Sacramento River Region

Average annual agricultural water supply deliveries are expected to decrease under all phases of Alternative 2 during average and dry conditions. As summarized in summarizes the regional economic effects to employment, labor income, and revenue from increased agricultural water supply to the region. Changes to irrigated acreage and agricultural revenue would affect businesses and individuals who support farming activities, such as farm workers, fertilizer and chemical dealers, wholesale and agricultural service providers, truck transport, and others involved in crop production and processing. The changes in agricultural revenue results presented below includes price adjustments for crops that reflect both demand shifts from current conditions to 2040 (fixed price revenue) and price changes caused by alternative-driven changes in crop production/ supply shifts (price effect revenue). Since IMPLAN assumes fixed prices, regional economic effects were estimated using the fixed price agricultural revenue results. Price effect revenue results would primarily result in changes to proprietor income and are not expected to result in substantial impacts on the regional economy.

Table Q-47, these decreases in annual agricultural water supplies are expected to result in reductions in irrigated acreage under average and dry conditions. This decrease in irrigated acreage would result in a decrease in gross revenue under the without Voluntary Agreement (VA) phases. Under the Delta VA and Systemwide VA phases, gross revenue increases would primarily be driven by an increase in higher value fruit and vegetable farming in the region.

[d] Dry Conditions refer to an average of dry years only, using Sacramento River Index.

Table Q-48 summarizes the regional economic effects to employment, labor income, and revenue from increased agricultural water supply to the region. Changes to irrigated acreage and agricultural revenue would affect businesses and individuals who support farming activities, such as farm workers, fertilizer and chemical dealers, wholesale and agricultural service providers, truck transport, and others involved in crop production and processing. The changes in agricultural revenue results presented below includes price adjustments for crops that reflect both demand shifts from current conditions to 2040 (fixed price revenue) and price changes caused by alternative-driven changes in crop production/ supply shifts (price effect revenue). Since IMPLAN assumes fixed prices, regional economic effects were estimated using the fixed price agricultural revenue results. Price effect revenue results would primarily result in changes to proprietor income and are not expected to result in substantial impacts on the regional economy.

Table Q-47. Sacramento River Region Agricultural Water Supply Costs under the Alternative 2 Phases Compared to the No Action Alternative

Agricultural	Alt2wTUCPwoVA compared to NAA	Alt2woTUCPwoVA compared to NAA	Alt2woTUCPDeltaVA compared to NAA	Alt2woTUCPAllVA compared to NAA
AVERAGE CONDITIONS [a]				
Average Annual CVP/SWP Deliveries (AF)	(2,472)	(14,597)	(16,266)	(102,891)
Irrigated Acreage (acres)	(650)	(4,640)	(5,076)	(7,038)
Total Agricultural Revenue (dollars)	**($2,840,014)**	**($6,270,365)**	**$9,088,928**	**$5,301,906**
Fixed Price Agricultural Revenue (dollars) [b]	$6,951,870	($6,629,340)	($5,035,894)	($8,632,321)
Price Effects Agricultural Revenue (dollars) [c]	($9,791,884)	$358,975	$14,124,822	$13,934,228
DRY CONDITIONS [d]				
Average Annual CVP/SWP Deliveries (AF)	(16,207)	(17,918)	(13,157)	(75,255)
Irrigated Acreage (acres)	(5,094)	(5,589)	(4,320)	(5,093)
Total Agricultural Revenue (dollars)	**($1,061,621)**	**($959,636)**	**$17,410,780**	**$13,515,505**
Fixed Price Agricultural Revenue (dollars) [b]	($4,030,276)	($6,867,121)	($928,146)	($2,198,675)
Price Effects Agricultural Revenue (dollars) [c]	$2,968,656	$5,907,485	$18,338,925	$15,714,181

NAA = No Action Alternative; Alt2wTUCPwoVA = Alternative 2 With TUCP Without VA; Alt2woTUCPwoVA = Alternative 2 Without TUCP Without VA; Alt2woTUCPDeltaVA = Alternative 2 Without TUCP Delta VA; Alt2woTUCPAllVA = Alternative 2 Without TUCP Systemwide VA; CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2024 dollars. Numbers in parentheses represent negative values.
[a] Average Conditions refers to an average of all year types in the CalSIM simulation period.
[b] Agricultural Revenue based on fixed prices for agricultural products, current price used in the analysis.
[c] Agricultural Revenue based on projected price effect for agricultural products based on changes to irrigated acreage in the Central Valley and other global effects on crop prices.
[d] Dry Conditions refer to an average of dry years only, using Sacramento River Index.

Table Q-48. Sacramento River Region Agricultural Water Supply Related Regional Economic Effects under Alternative 2 Phases Compared to the No Action Alternative under Average Conditions

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
AVERAGE CONDITIONS			
Agriculture	(112.1)–27.1	($2,188,870)–$1,128,820	($9,224,470)–$7,609,420
Mining	0–0	($320)–$500	($5,790)–$7,520
Construction/ Utilities	(0.3)–0.3	($24,070)–$26,290	($121,950)–$134,280
Manufacturing	(0.2)–0.2	($26,840)–$32,230	($334,290)–$420,060
TIPU	(1)–1	($26,440)–$29,630	($123,800)–$138,480
Trade	(2.6)–2.1	($135,180)–$124,750	($580,390)–$561,970
Service	(11.5)–9.9	($609,270)–$471,650	($2,217,660)–$1,941,570
Government	(0.3)–0.3	($36,670)–$35,800	($107,070)–$105,820
Total	**(128)–40.9**	**($3,047,660)–$1,849,670**	**($12,715,420)–$10,919,120**
DRY CONDITIONS			
Agriculture	(82.6)–(16.4)	($1,678,660)–($214,880)	($7,314,500)–($988,200)
Mining	0–0	($190)–($60)	($3,970)–($570)
Construction/ Utilities	(0.2)–0	($18,240)–($860)	($91,930)–($5,270)
Manufacturing	(0.2)–0	($20,430)–($550)	($249,370)–($11,490)
TIPU	(0.8)–(0.1)	($19,430)–($1,640)	($90,880)–($7,810)
Trade	(2)–(0.2)	($103,700)–($7,840)	($441,140)–($35,650)
Service	(8.8)–(1)	($467,240)–($55,430)	($1,675,830)–($176,090)
Government	(0.2)–0	($27,900)–($1,570)	($81,440)–($4,070)
Total	**(94.8)–(17.7)**	**($2,336,120)–($282,830)**	**($9,949,060)–($1,229,150)**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Numbers in parentheses represent negative values. Regional economic results based on fixed price agricultural revenue.

San Joaquin River Region

Average annual agricultural water supply deliveries are expected to decrease under all phases of Alternative 2 except under the With TUCP phases during average conditions. As summarized in summarizes the regional economic effects to employment, labor income, and revenue from increased agricultural water supply to the region. Changes to irrigated acreage and agricultural revenue would affect businesses and individuals who support farming activities, such as farm workers, fertilizer and chemical dealers, wholesale and agricultural service providers, truck transport, and others involved in crop production and processing. The changes in agricultural

revenue results presented below includes price adjustments for crops that reflect both demand shifts from current conditions to 2040 (fixed price revenue) and price changes caused by alternative-driven changes in crop production/ supply shifts (price effect revenue). Since IMPLAN assumes fixed prices, regional economic effects were estimated using the fixed price agricultural revenue results. Price effect revenue results would primarily result in changes to proprietor income and are not expected to result in substantial impacts on the regional economy.

Table Q-49, these decreases in annual agricultural water supplies are expected to result in decreases to irrigated acreage under average and dry conditions and resulting decreases in gross revenue.

[d] Dry Conditions refer to an average of dry years only, using Sacramento River Index.

Table Q-50 summarizes the regional economic effects to employment, labor income, and revenue from increased agricultural water supply to the region. Changes to irrigated acreage and agricultural revenue would affect businesses and individuals who support farming activities, such as farm workers, fertilizer and chemical dealers, wholesale and agricultural service providers, truck transport, and others involved in crop production and processing. The changes in agricultural revenue results presented below includes price adjustments for crops that reflect both demand shifts from current conditions to 2040 (fixed price revenue) and price changes caused by alternative-driven changes in crop production/ supply shifts (price effect revenue). Since IMPLAN assumes fixed prices, regional economic effects were estimated using the fixed price agricultural revenue results. Price effect revenue results would primarily result in changes to proprietor income and are not expected to result in substantial impacts on the regional economy.

Table Q-49. San Joaquin River Region Agricultural Water Supply Costs under the Alternative 2 Phases Compared to the No Action Alternative

Agricultural	Alt2wTUCPwoVA compared to NAA	Alt2woTUCPwoVA compared to NAA	Alt2woTUCPDeltaVA compared to NAA	Alt2woTUCPAllVA compared to NAA
AVERAGE CONDITIONS [a]				
Average Annual CVP/SWP Deliveries (AF)	25,174	(43,226)	(147,690)	(146,691)
Irrigated Acreage (acres)	4,701	(14,994)	(47,732)	(47,769)
Total Agricultural Revenue (dollars)	**$10,539,670**	**($77,924,918)**	**($230,121,696)**	**($235,054,538)**
Fixed Price Agricultural Revenue (dollars) [b]	$10,206,990	($91,966,281)	($260,780,574)	($259,246,483)
Price Effects Agricultural Revenue (dollars) [c]	$332,681	$14,041,363	$30,658,878	$24,191,945
DRY CONDITIONS [d]				
Average Annual CVP/SWP Deliveries (AF)	(65,257)	(76,311)	(143,168)	(125,338)
Irrigated Acreage (acres)	(22,585)	(26,171	(47,500)	(41,527)
Total Agricultural Revenue (dollars)	**($136,474,579)**	**($157,033,454)**	**($278,060,260)**	**($245,679,932)**
Fixed Price Agricultural Revenue (dollars) [b]	($132,016,236)	($158,083,027)	($285,564,878)	($250,030,156)
Price Effects Agricultural Revenue (dollars) [c]	($4,458,343)	$1,049,573	$7,504,618	$4,350,224

NAA = No Action Alternative; Alt2v1wTUCP = Alternative 2 With TUCP Without VA; Alt2v1woTUCP = Alternative 2 Without TUCP Without VA; Alt2v2woTUCP = Alternative 2 Without TUCP Delta VA; Alt2v3woTUCP = Alternative 2 Without TUCP Systemwide VA; CVP = Central Valley Project; SWP = State Water Project; AF = acre-feet.

All costs in 2024 dollars. Numbers in parentheses represent negative values.

[a] Average Conditions refers to an average of all year types in the CalSIM simulation period.

[b] Agricultural Revenue based on fixed prices for agricultural products, current price used in the analysis.

[c] Agricultural Revenue based on projected price effect for agricultural products based on changes to irrigated acreage in the Central Valley and other global effects on crop prices.

[d] Dry Conditions refer to an average of dry years only, using Sacramento River Index.

Table Q-50. San Joaquin River Region Agricultural Water Supply Related Regional Economic Effects under Alternative 2 Phases Compared to the No Action Alternative under Average Conditions

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
AVERAGE CONDITIONS			
Agriculture	(1,613)–187.3	($52,108,390)–$3,805,980	($282,267,110)–$10,851,130
Mining	(0.4)–0	($45,830)–$4,660	($391,270)–$25,100
Construction/ Utilities	(8.8)–0.3	($750,780)–$24,500	($4,045,380)–$132,980
Manufacturing	(10.6)–0.2	($850,420)–$20,870	($10,751,750)–$300,850
TIPU	(28.6)–1.1	($1,011,260)–$37,860	($4,075,190)–$155,010
Trade	(92.7)–3.7	($4,590,630)–$167,550	($21,167,480)–$778,100
Service	(352.1)–15.1	($15,400,010)–$693,940	($59,817,130)–$2,596,140
Government	(8.6)–0.3	($937,960)–$36,180	($2,689,800)–$104,050
Total	**(2,114.5)–208.1**	**($75,665,870)–$4,791,540**	**($384,985,070)–$14,943,360**
DRY CONDITIONS			
Agriculture	(1,579.5)–(709.1)	($54,324,930)–($25,009,790)	($309,299,570)–($143,245,310)
Mining	(0.4)–(0.2)	($44,850)–($21,460)	($404,120)–($195,110)
Construction/ Utilities	(9.7)–(4.6)	($819,480)–($390,700)	($4,415,370)–($2,104,110)
Manufacturing	(11.7)–(5.6)	($936,080)–($448,750)	($11,749,590)–($5,652,810)
TIPU	(31.1)–(14.7)	($1,096,070)–($522,520)	($4,416,100)–($2,102,920)
Trade	(101.2)–(47.1)	($5,020,500)–($2,364,310)	($23,116,470)–($10,904,700)
Service	(383)–(178.1)	($16,725,120)–($7,719,900)	($64,998,200)–($30,304,390)
Government	(9.4)–(4.4)	($1,019,370)–($482,530)	($2,920,100)–($1,384,270)
Total	(2,125.9)–(963.9)	($79,986,400)–($36,959,960)	($421,319,520)–($195,893,620)

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Numbers in parentheses represent negative values. Regional economic results based on fixed price agricultural revenue.

San Francisco Bay Area Region

Alternative 2 phases are expected to decrease average annual agricultural water supply deliveries in the San Francisco Bay Area Region by up to 2,000 AFY under average conditions and by up to 3,000 AFY under dry conditions. Decreases in agricultural water supply in the region could result in a decrease in irrigated acreage and agricultural revenues in the region. This would result in less spending in the regional economy.

Central Coast Region

CVP and SWP water supply deliveries to the Central Coast Region affected by Alternative 2 are primarily delivered to M&I water contractors. Therefore, there are no forecast changes in irrigated lands under the Alternative 2 phases. Consequently, there would be no changes in deliveries to agricultural contractors in the Central Coast Region under the Alternative 2 phases.

South Coast Region

Water supply deliveries to the South Coast Region affected by Alternative 2 are primarily delivered to M&I water contractors. Therefore, there are no forecasted changes in water deliveries for agriculture or changes in irrigated lands under the Alternative 2 phases. Resulting impacts to water rates and the regional economy would be minimal.

Q.2.4.3 Potential Fisheries-Related Changes to the Regional Economy

The commercial and recreational (ocean sports) ocean salmon fishery along the SONCC are affected by the population of salmon that rely upon the Northern California rivers, including the Sacramento and San Joaquin rivers. As described in detail in Appendix O, annual average Central Valley Chinook salmon abundance (includes Spring, Winter, Fall and late-Fall runs) in the Bay under the Alternative 2 phases compared to the No Action Alternative would be negligeable. There would be minimal impacts to commercial and recreational ocean salmon harvest under Alternative 2 phases compared to the No Action Alternative. Consequently, revenues received by fisherman from changes to ocean salmon harvest would be minimal. Ocean fisheries support industries such as fish processors, boat manufacturers, repair and maintenance would see no changes in revenue. Overall fisheries related changes to the regional economy under Alternative 2 phases would be minimal.

As discussed in Appendix O, coho salmon, fall-run and spring-run Chinook salmon impacts under the Alternative 2 phases would be minor in comparison to the No Action Alternative. These salmon populations are extremely important to the Yurok Tribe and Hoopa Valley tribes as part of their lives, cultural traditions, ceremonies, and community health (Bureau of Reclamation 2012). Fifty percent of the total available salmon in the Trinity River is the federally protected harvest for the Yurok and Hoopa Valley tribes (U.S. Department of the Interior 1993). Each tribe determines the use of the harvest. Changes in salmon population in the Trinity River would change salmon landings by the Yurok and Hoopa Valley tribes. The tribe would sell a portion or all of their landings which would affect revenues and disposable incomes to the tribes. Since salmon population would not be adversely impacted under the Alternative 2 phases, salmon landings would not be adversely impacted.

Q.2.4.4 Potential Impacts to Regional Recreational Economics

As described in detail in Appendix S, the average elevation of Trinity River would be lower compared to the No Action Alternative by approximately one to three feet between October through June. From July through September, average water elevation under the Alternative 2 phases in comparison to No Action Alternative would be between two to five feet lower. Seasonal fluctuations in water levels would remain the same throughout the year under all phases.

The minimum elevations of Trinity Reservoir, under all phases of Alternative 2 would remain the same as the No Action Alternative from January through March. From April through October, all phases of Alternative 2 would have a higher minimum elevation compared to the No Action Alternative except for the Without TUCP and With Delta VA phase. From October through December, all three Alternative 2 Without TUCP phases would have lower minimum elevation compared to the No Action Alternative. Under Alternative 2 Without TUCP and With Delta VA, the minimum December water elevation in Trinity Lake may be less than 2,170 feet, making the Minersville boat ramp unusable.

When Trinity Reservoir levels fall below 2,170 feet and all the boat ramps on the lake are unusable, recreational visitation could substantially decrease and cause adverse regional economic impacts to Trinity County. However, the lowering of reservoir levels is expected to occur in the off season (December) when recreational visitation to the lake is expected to be low. Given the limited changes in Trinity Lake levels forecast under Alternative 2 in comparison to the No Action Alternative and reservoir levels remaining above 2,170 feet with the exception of December in the off season when visitation is low, limited impacts are forecast on camping, day use opportunities at the campgrounds surrounding Trinity Reservoir, and recreational fishing access. Consequently, Alternative 2 is not expected to have a substantial impact to recreational visitation, recreational revenue and recreational regional economics in Trinity County.

Q.2.4.5 Potential Impacts to Regional Economics from Changes to Hydropower

As described in detail in Appendix U, the CVP net hydropower generation would be similar or slightly higher over the long-term and over dry and critically dry years under the Alternative 2 phases compared to the No Action Alternative. The hydropower generated by the CVP is marketed and transmitted by the WAPA Sierra Nevada Region. As CVP annual and plant-in-service power costs increase (including Central Valley Project Improvement Act Environmental Restoration Funds), and available energy for sale decreases, the net unit cost of CVP power may slightly decrease. Typically, decreases in power costs would be passed on to customers through rate decreases. These power rate decreases would result in a slight increase in disposable income and could result in more discretionary spending in the regional economy.

Under Alternative 2 phases compared to the No Action Alternative, SWP net generation over the long-term would be slightly lower for both long-term average and in dry and critically dry years. Power generated by the SWP is transmitted by PG&E, Southern California Edison, and California ISO through other facilities (California Department of Water Resources 2022). The SWP also markets energy in excess of the SWP demands to a utility and members of the WSPP, formerly known as the Western Systems Power Pool. A decrease in SWP net generation would increase the need for the development of other alternative supplies which could result in an overall increase in power cost. Typically, increases in power costs would be passed on to customers through rate increases. These power rate increases would result in a decrease in disposable income and could result in less discretionary spending in the regional economy.

Q.2.5 Alternative 3

Q.2.5.1 Potential M&I Water Supply-Related Changes to the Regional Economies

Trinity River Region

There are no M&I CVP or SWP water service contractors in the Trinity River Region. Therefore, there would be no regional economic effects from changes to CVP and SWP M&I water supply deliveries in the Trinity River Region under Alternative 3.

Sacramento River Region

Alternative 3 would reduce water supply deliveries to M&I water contractors in the Sacramento River Region on average by approximately 15,600 AFY compared to the No Action Alternative. These decreases in CVP and SWP M&I water supplies under Alternative 3 would increase the need for development of other alternative water supplies to help meet future water demands.

Table Q-51 summarizes the average annual water supply costs for M&I water supplies. Average annual water supply costs are expected to increase by approximately $7.1 million under Alternative 3 compared to the No Action Alternative. Cost increases are mostly due to the development of alternative water supply, transfers costs, groundwater pumping costs, and storage costs. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under Alternative 3, there would be an increase in water supply costs and consequently, water rates would be higher than the No Action Alternative. This would result in a decrease in disposable income and could result in less discretionary spending in the regional economy.

Table Q-51. Sacramento River Region Municipal and Industrial Water Supply Costs under Alternative 3 compared to No Action Alternative

Municipal and Industrial	Alternative 3 compared to No Action Alternative
Average Annual CVP/SWP Deliveries (TAF) [a]	(15.6)
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	($450)
New Fixed Yield Supply (TAF) [c]	7.5
Annual New Supply Cost (thousand dollars) [d]	$5,196
Surface/Groundwater Storage Costs (thousand dollars) [e]	$0
Lost Water Sales Revenues (thousand dollars) [f]	$913
Transfer Costs (thousand dollars) [g]	$1,143
Shortage Costs (thousand dollars) [h]	$833
Groundwater Pumping Costs (thousand dollars) [i]	$268
Excess Water Costs (thousand dollars) [j]	$0
Average Annual Changes in Water Supply Costs (thousand dollars)	**$7,070**

All costs in 2023 dollars. Numbers in parentheses represent negative values.
CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the No Action Alternative. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-52 summarizes the regional economic effects to employment, labor income, and revenue from increased water supply costs and decreased disposable income to CVP and SWP M&I contractors. A decrease in disposable income in the area would result in a decrease in discretionary spending in the region and could result in an adverse impact to the regional economy. Decreases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-52. Sacramento River Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 3 Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Agriculture	(0.1)	($4,560)	($11,320)
Mining	0.0	($130)	($5,680)
Construction	(0.4)	($30,260)	($154,430)
Manufacturing	(0.1)	($9,150)	($73,360)
TIPU	(1.6)	($30,870)	($150,920)
Trade	(4.5)	($205,120)	($814,060)
Service	(19.4)	($1,130,220)	($3,666,960)
Government	(0.5)	($60,420)	($165,840)
Total	**(26.7)**	**($1,470,730)**	**($5,042,570)**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Numbers in parentheses represent negative values.

San Joaquin River Region

Alternative 3 would reduce water supply deliveries to M&I water contractors in the San Joaquin River Region on average by approximately 54,200 AFY compared to the No Action Alternative. These decreases in CVP and SWP M&I water supplies would increase the need for development of other alternative water supplies to help meet future water demands.

Table Q-53 summarizes the average annual water supply costs for M&I water supplies. Average annual water supply costs are expected to increase by approximately $17.3 million under Alternative 3 compared to the No Action Alternative. Cost increases are mostly due to the development of alternative water supply, transfers costs, groundwater pumping costs, and storage costs. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under Alternative 3, there would be an increase in water supply costs and consequently, water rates would be higher than the No Action Alternative. This water rates increase would result in a decrease in disposable income and could result in less discretionary spending in the regional economy.

Table Q-53. San Joaquin River Region Municipal and Industrial Water Supply Costs under Alternative 3 Compared to the No Action Alternative

Municipal and Industrial	**Alternative 3 compared to No Action Alternative**
Average Annual CVP/SWP Deliveries (TAF) [a]	(54.2)
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	($1,947)
Alternate Water Supply Deliveries (assumed new supply) (TAF) [c]	(2.1)
Annualized Alternate Supply Costs (thousand dollars) [d]	$2,069
Water Storage Costs (thousand dollars) [e]	$741
Lost Water Sales Revenues (thousand dollars) [f]	($144)
Transfer Costs (thousand dollars) [g]	$3,493
Shortage Costs (thousand dollars) [h]	($1,211)
Groundwater Pumping Costs (thousand dollars) [i]	$11,706
Excess Water Costs (thousand dollars) [j]	$1,400
Average Annual Changes in Water Supply Costs (thousand dollars)	**$17,319**

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2023 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.

[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the No Action Alternative. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-54 summarizes the regional economic effects to employment, labor income, and revenue from increased water supply costs and decreased disposable income to CVP and SWP M&I contractors. A decrease in disposable income in the area would result in a decrease in discretionary spending in the region and could result in an adverse impact to the regional economy. Decreases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-54. San Joaquin River Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 3 Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars	Output (in dollars)
Agriculture	(0.3)	($11,990)	($51,740)
Mining	Less than (0.1)	($1,920)	($18,360)
Construction	(0.7)	($55,500)	($302,370)
Manufacturing	(0.3)	($24,070)	($311,180)
TIPU	(2.8)	($76,490)	($317,670)
Trade	(10.6)	($438,700)	($1,870,190)
Service	(41.2)	($1,955,250)	($6,835,410)
Government	(0.8)	($79,500)	($206,000)
Total	**(56.7)**	**($2,643,420)**	**($9,912,920)**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Numbers in parentheses represent negative values.

San Francisco Bay Area Region

Alternative 3 would reduce water supply deliveries to M&I water contractors in the San Francisco Bay Area Region on average by approximately 115,400 AFY compared to the No Action Alternative. These decreases in CVP and SWP M&I water supplies would increase the need for development of other alternative water supplies to help meet future water demands.

Table Q-55 summarizes the average annual water supply costs for M&I water supplies. Average annual water supply costs are expected to increase by approximately $26.5 million under Alternative 3 compared to the No Action Alternative. Cost increases are mostly due to the development of alternative water supply, transfers costs, groundwater pumping costs, and storage costs. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under Alternative 3, there would be an increase in water supply costs and consequently, water rates would be higher than the No Action Alternative. This increase in water rates would result in a decrease in disposable income and could result in less discretionary spending in the regional economy.

Table Q-55. San Francisco Bay Area Region Municipal and Industrial Water Supply Costs under Alternative 3 Compared to the No Action Alternative

Municipal and Industrial	**Alternative 3 compared to No Action Alternative**
Average Annual CVP/SWP Deliveries (TAF) [a]	(115.4)
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	($4,287)
Alternate Water Supply Deliveries (assumed new supply) (TAF) [c]	(0.2)
Annualized Alternate Supply Costs (thousand dollars) [d]	($9)
Water Storage Costs (thousand dollars) [e]	$143
Lost Water Sales Revenues (thousand dollars) [f]	$18,687
Transfer Costs (thousand dollars) [g]	$2,749
Shortage Costs (thousand dollars) [h]	$9,014
Groundwater Pumping Costs (thousand dollars) [i]	$2,041
Excess Water Costs (thousand dollars) [j]	$7,211
Average Annual Changes in Water Supply Costs (thousand dollars)	**$26,534**

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2023 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the No Action Alternative. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-56 summarizes the regional economic effects to employment, labor income, and revenue from increased water supply costs and decreased disposable income to CVP and SWP M&I contractors. A decrease in disposable income in the area would result in a decrease in discretionary spending in the region and could result in an adverse impact to the regional economy. Decreases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-56. San Francisco Bay Area Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 3 Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars	Output (in dollars)
Agriculture	(0.6)	($26,020)	($47,950)
Mining	Less than (0.1)	($930)	($15,550)
Construction	(1.3)	($117,130)	($558,000)
Manufacturing	(0.9)	($96,860)	($1,211,550)
TIPU	(2.8)	($112,270)	($430,020)
Trade	(12.3)	($772,840)	($2,670,370)
Service	(62.7)	($4,489,040)	($13,897,890)
Government	(0.9)	($150,750)	($265,700)
Total	**(81.5)**	**($5,765,840)**	**($19,097,030)**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Numbers in parentheses represent negative values.

Central Coast Region

Alternative 3 would reduce water supply deliveries to M&I water contractors in the Central Coast Region on average by approximately 18,900 AFY compared to the No Action Alternative. These decreases in CVP and SWP M&I water supplies would increase the need for development of other alternative water supplies to help meet future water demands.

Table Q-57 summarizes the average annual water supply costs for M&I water supplies. Average annual water supply costs are expected to increase by approximately $4.2 million under Alternative 3 compared to the No Action Alternative. Cost increases are mostly due to increased groundwater pumping costs. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under Alternative 3, there would be an increase in water supply costs and consequently, water rates would be higher than the No Action Alternative. This water rates increase would result in a decrease in disposable income and could result in less discretionary spending in the regional economy.

Table Q-57. Central Coast Region Municipal and Industrial Water Supply Costs Under Alternative 3 Compared to the No Action Alternative

Municipal and Industrial	**Alternative 3 compared to No Action Alternative**
Average Annual CVP/SWP Deliveries (TAF) [a]	(18.9)
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	($4,054)
Alternate Water Supply Deliveries (assumed new supply) (TAF) [c]	0.0
Annualized Alternate Supply Costs (thousand dollars) [d]	$0
Water Storage Costs (thousand dollars) [e]	$0
Lost Water Sales Revenues (thousand dollars) [f]	$0
Transfer Costs (thousand dollars) [g]	$0
Shortage Costs (thousand dollars) [h]	$0
Groundwater Pumping Costs (thousand dollars) [i]	$8,340
Excess Water Costs (thousand dollars) [j]	$0
Average Annual Changes in Water Supply Costs (thousand dollars)	**$4,286**

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 20*23* dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the No Action Alternative. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-58 summarizes the regional economic effects to employment, labor income, and revenue from increased water supply costs and decreased disposable income to CVP and SWP M&I contractors. A decrease in disposable income in the area would result in a decrease in discretionary spending in the region and could result in an adverse impact to the regional economy. Decreases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-58. Central Coast Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 3 Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Agriculture	(0.1)	($5,080)	($10,730)
Mining	Less than (0.1)	($1,110)	($12,950)
Construction	(0.2)	($12,820)	($73,010)
Manufacturing	Less than (0.1)	($3,130)	($73,830)
TIPU	(0.7)	($15,500)	($74,950)
Trade	(2.5)	($113,440)	($485,330)
Service	(13.6)	($673,010)	($2,405,530)
Government	(0.2)	($28,060)	($72,290)
Total	**(17.5)**	**($852,150)**	**($3,208,620)**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Numbers in parentheses represent negative values.

South Coast Region

Alternative 3 would reduce water supply deliveries to M&I water contractors in the South Coast Region on average by approximately 736,100 AFY compared to the No Action Alternative. These decreases in CVP and SWP M&I water supplies would increase the need for development of other alternative water supplies to help meet future water demands.

Table Q-59 summarizes the average annual water supply costs for M&I water supplies. Average annual water supply costs are expected to increase by approximately $1,112.9 million under Alternative 3 compared to the No Action Alternative. Cost increases are mostly due to the development of alternative water supply, lost water sale revenue, transfers costs, and groundwater pumping costs. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under Alternative 3, there would be an increase in water supply costs and consequently, water rates would be higher than the No Action Alternative. This increase in water rates would result in a decrease in disposable income and could result in less discretionary spending in the regional economy.

Table Q-59. South Coast Region Municipal and Industrial Water Supply Costs Under Alternative 3 compared to the No Action Alternative

Municipal and Industrial	**Alternative 3 compared to No Action Alternative**
Average Annual CVP/SWP Deliveries (TAF) [a]	(736.1)
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	($119,773)
Alternate Water Supply Deliveries (assumed new supply) (TAF) [c]	442.2
Annualized Alternate Supply Costs (thousand dollars) [d]	$1,049,739
Water Storage Costs (thousand dollars) [e]	($3,548)
Lost Water Sales Revenues (thousand dollars) [f]	$126,537
Transfer Costs (thousand dollars) [g]	$9,299
Shortage Costs (thousand dollars) [h]	($14,780)
Groundwater Pumping Costs (thousand dollars) [i]	$33,987
Excess Water Costs (thousand dollars) [j]	$16,632
Average Annual Changes in Water Supply Costs (thousand dollars)	**$1,112,874**

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2023 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the No Action Alternative. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-60 summarizes the regional economic effects to employment, labor income, and revenue from increased water supply costs and decreased disposable income to CVP and SWP M&I contractors. A decrease in disposable income in the area would result in a decrease in discretionary spending in the region and could result in an adverse impact to the regional economy. Decreases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-60. South Coast Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 3 Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Agriculture	(26.1)	($1,023,810)	($2,341,620)
Mining	(1.8)	($109,620)	($1,891,660)
Construction	(55.6)	($3,731,850)	($20,592,750)
Manufacturing	(67.9)	($5,660,070)	($59,081,330)
TIPU	(248.4)	($9,703,330)	($35,155,990)
Trade	(770.8)	($39,244,280)	($151,392,900)
Service	(4,245.7)	($239,630,980)	($786,618,360)
Government	(71.2)	($8,734,820)	($22,496,900)
Total	(**5,487.6**)	**($307,838,760)**	**($1,079,571,510)**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Numbers in parentheses represent negative values.

Q.2.5.2 Potential Agriculture-Related Changes to the Regional Economy

Trinity River Region

There are no agricultural lands irrigated with CVP and SWP water supplies in the Trinity River Region. Therefore, there would be no regional economic effects from changes to CVP and SWP agricultural water supply deliveries in the Trinity River Region under Alternative 3.

Sacramento River Region

Alternative 3 is expected to decrease average annual agricultural water supply deliveries by 79,652 AFY during average conditions and by 86,124 AFY during dry conditions in the Sacramento River Region. As summarized in Table Q-61, these decreases in annual agricultural water supplies are expected to result in reductions in irrigated acreage under average and dry conditions. This decrease in irrigated acreage is expected to result in a decrease to gross revenue during dry conditions. However, gross revenue during the average conditions would increase in comparison to No Action Alternative. This increase in gross revenue is due to an increase in fruit and vegetable farming. Gross revenue per acre from fruit and vegetable farming is much higher than grain farming, resulting in a net increase in gross revenue even though overall acreage decreases.

Table Q-62 summarizes the regional economic effects to employment, labor income, and revenue from increased agricultural water supply to the region. Changes to irrigated acreage and agricultural revenue would affect businesses and individuals who support farming activities, such as farm workers, fertilizer and chemical dealers, wholesale and agricultural service providers, truck transport, and others involved in crop production and processing. The changes in agricultural revenue results presented below includes price adjustments for crops that reflect both demand shifts from current conditions to 2040 (fixed price revenue) and price changes caused by

alternative-driven changes in crop production/ supply shifts (price effect revenue). Since IMPLAN assumes fixed prices, regional economic effects were estimated using the fixed price agricultural revenue results. Price effect revenue results would primarily result in changes to proprietor income and is not expected to result in substantial impacts on the regional economy.

Table Q-61. Sacramento River Region Agricultural Water Supply Costs under Alternative 3 Compared to the No Action Alternative

Agricultural	Alternative 3 compared to No Action Alternative
AVERAGE CONDITIONS [a]	
Average Annual CVP/SWP Deliveries (AF)	(79,652)
Irrigated Acreage (acres)	(22,818)
Total Agricultural Revenue (dollars)	**$42,875,763**
Fixed Price Agricultural Revenue (dollars) [b]	($25,890,608)
Price Effects Agricultural Revenue (dollars) [c]	$68,766,372
DRY CONDITIONS [d]	
Average Annual CVP/SWP Deliveries (AF)	(86,124)
Irrigated Acreage (acres)	(21,123)
Total Agricultural Revenue (dollars)	**($29,494,710)**
Fixed Price Agricultural Revenue (dollars) [b]	($54,861,273)
Price Effects Agricultural Revenue (dollars) [c]	$25,366,563

CVP = Central Valley Project; SWP = State Water Project; AF = acre-feet.
All costs in 2024 dollars. Numbers in parentheses represent negative values.
[a] Average Conditions refers to an average of all year types in the CalSIM simulation period.
[b] Agricultural Revenue based on fixed prices for agricultural products, current price used in the analysis.
[c] Agricultural Revenue based on projected price effect for agricultural products based on changes to irrigated acreage in the Central Valley and other global effects on crop prices.
[d] Dry Conditions refer to an average of dry years only, using Sacramento River Index.

Table Q-62. Sacramento River Region Agricultural Water Supply Related Regional Economic Effects under Alternative 3 Compared to the No Action Alternative under Average Conditions

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
AVERAGE CONDITIONS			
Agriculture	(543.3)	($8,872,180)	($27,921,490)
Mining	Less than (0.1)	($1,830)	($26,690)
Construction/Utilities	(0.9)	($89,310)	($457,040)
Manufacturing	(0.7)	($95,450)	($1,247,790)

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
TIPU	(3.9)	($106,590)	($500,740)
Trade	(9.4)	($494,320)	($2,160,870)
Service	(43.8)	($2,267,030)	($8,570,570)
Government	(1.2)	($138,750)	($406,040)
Total	**(603.3)**	**($12,065,460)**	**($41,291,230)**
DRY CONDITIONS			
Agriculture	(684.0)	($14,077,750)	($58,398,410)
Mining	Less than (0.1)	($1,350)	($31,660)
Construction/Utilities	(1.7)	($154,950)	($775,480)
Manufacturing	(1.4)	($174,220)	($2,097,960)
TIPU	(6.3)	($161,500)	($755,130)
Trade	(16.7)	($871,640)	($3,688,950)
Service	(72.2)	($3,849,500)	($13,899,040)
Government	(2.1)	($237,640)	($696,290)
Total	**(784.5)**	**($19,528,550)**	**($80,342,920)**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Numbers in parentheses represent negative values.
Regional economic results based on fixed price agricultural revenue

San Joaquin River Region

Alternative 3 is expected to decrease average annual agricultural water supply deliveries by 1,146,414 AFY during average conditions and by 821,700 AFY during dry conditions in the San Joaquin River Region. As summarized in Table Q-63, these decreases in annual agricultural water supplies are expected to result in decreases to irrigated acreage and gross revenue under average and dry conditions.

Table Q-64 summarizes the regional economic effects to employment, labor income, and revenue from increased agricultural water supply to the region. Changes to irrigated acreage and agricultural revenue would affect businesses and individuals who support farming activities, such as farm workers, fertilizer and chemical dealers, wholesale and agricultural service providers, truck transport, and others involved in crop production and processing. The changes in agricultural revenue results presented below includes price adjustments for crops that reflect both demand shifts from current conditions to 2040 (fixed price revenue) and price changes caused by alternative-driven changes in crop production/ supply shifts (price effect revenue). Since IMPLAN assumes fixed prices, regional economic effects were estimated using the fixed price agricultural revenue results. Price effect revenue results would primarily result in changes to proprietor income and are not expected to result in substantial impacts on the regional economy.

Table Q-63. San Joaquin River Region Agricultural Water Supply Costs under Alternative 3 Compared to the No Action Alternative

Agricultural	Alternative 3 compared to No Action Alternative
AVERAGE CONDITIONS [a]	
Average Annual CVP/SWP Deliveries (AF)	(1,146,414)
Irrigated Acreage (acres)	(303,764)
Total Agricultural Revenue (dollars)	**($1,589,887,127)**
Fixed Price Agricultural Revenue (dollars) [b]	($1,549,446,863)
Price Effects Agricultural Revenue (dollars) [c]	($40,440,264)
DRY CONDITIONS [d]	
Average Annual CVP/SWP Deliveries (AF)	(821,700)
Irrigated Acreage (acres)	(210,633)
Total Agricultural Revenue (dollars)	**($1,178,875,182)**
Fixed Price Agricultural Revenue (dollars) [b]	($1,261,011,447)
Price Effects Agricultural Revenue (dollars) [c]	$82,136,265

CVP = Central Valley Project; SWP = State Water Project; AF = acre-feet.
All costs in 2024 dollars. Numbers in parentheses represent negative values.
[a] Average Conditions refers to an average of all year types in the CalSIM simulation period.
[b] Agricultural Revenue based on fixed prices for agricultural products, current price used in the analysis.
[c] Agricultural Revenue based on projected price effect for agricultural products based on changes to irrigated acreage and other global effects on crop prices.
[d] Dry Conditions refer to an average of dry years only, using Sacramento River Index.

Table Q-64. San Joaquin River Region Agricultural Water Supply Related Regional Economic Effects under Alternative 3 Compared to the No Action Alternative under Average Conditions

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
AVERAGE CONDITIONS			
Agriculture	(11,366.0)	($338,222,190)	($1,678,041,470)
Mining	(2.9)	($332,670)	($2,613,150)
Construction/Utilities	(53.1)	($4,552,010)	($24,533,110)
Manufacturing	(62.8)	($5,070,640)	($64,996,190)
TIPU	(174.6)	($6,213,070)	($25,049,430)
Trade	(558.3)	($27,762,970)	($128,349,230)
Service	(2,133.7)	($92,884,440)	($364,203,960)

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Government	(52.8)	($5,735,920)	($16,478,780)
Total	**(14,404.2)**	**($480,773,910)**	**($2,304,265,320)**
DRY CONDITIONS			
Agriculture	(8,215.4)	($260,048,150)	($1,366,771,060)
Mining	(2.1)	($244,450)	($2,022,390)
Construction/Utilities	(43.6)	($3,717,610)	($20,031,260)
Manufacturing	(52.1)	($4,194,190)	($53,387,830)
TIPU	(141.5)	($5,032,530)	($20,275,130)
Trade	(452.6)	($22,595,660)	($104,368,560)
Service	(1,722.4)	($74,834,490)	($293,610,810)
Government	(42.8)	($4,644,830)	($13,336,260)
Total	**(10,672.5)**	**($375,311,910)**	**($1,873,803,300)**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Numbers in parentheses represent negative values. Regional economic results based on fixed price agricultural revenue.

San Francisco Bay Area Region

Alternative 3 is expected to decrease average annual agricultural water supply deliveries in the San Francisco Bay Area Region by 30,000 AFY under average conditions and by 14,000 AFY under dry conditions. Decrease in agricultural water supply in the region could result in a decrease in irrigated acreage and agricultural revenues in the region. This would result in less spending in the regional economy.

Central Coast Region

CVP and SWP water supply deliveries to the Central Coast Region affected by Alternative 3 are primarily delivered to M&I water contractors. Therefore, there are no forecasted changes in irrigated lands under Alternative 3. Consequently, there would be no impacts to regional economy from changes in deliveries to agricultural contractors in the Central Coast Region under Alternative 3.

South Coast Region

Alternative 3 is expected to decrease average annual agricultural water supply deliveries in the South Coast Region by 4,000 AFY under average conditions and by 1,000 AFY under dry conditions. Decreased agricultural water supply in the region could result in a decrease in irrigated acreage and agricultural revenues in the region. This decrease in agricultural would result in less spending in the regional economy.

Q.2.5.3 Potential Fisheries-Related Changes to the Regional Economy

The commercial and recreational (ocean sports) ocean salmon fishery along the SONCC are affected by the population of salmon that rely upon the Northern California rivers, including the Sacramento and San Joaquin rivers. As described in detail in Appendix O, annual average Central Valley Chinook salmon abundance (includes Spring, Winter, Fall and late-Fall runs) in the Bay under Alternative 3 is expected to be negligible in comparison to the No Action Alternative. There would be minimal impacts to commercial and recreational ocean salmon harvest under Alternative 3 compared to the No Action Alternative. Consequently, revenues received by fisherman from changes to ocean salmon harvest would be minimal. Ocean fisheries support industries such as fish processors, boat manufacturers, repair and maintenance would see no changes in revenue. Overall fisheries related changes to the regional economy under Alternative 3 would be minimal.

As discussed in Appendix O, impacts to coho salmon, fall-run and spring-run Chinook salmon under Alternative 3 would be minor in comparison to the No Action Alternative. These salmon populations are extremely important to the Yurok Tribe and Hoopa Valley tribes as part of their lives, cultural traditions, ceremonies, and community health (Bureau of Reclamation 2012). Fifty percent of the total available salmon in the Trinity River is the federally protected harvest for the Yurok and Hoopa Valley tribes (U.S. Department of the Interior 1993). Each tribe determines the use of the harvest. Changes in salmon population in the Trinity River would change salmon landings by the Yurok and Hoopa Valley tribe. The tribe would sell a portion or all of their landings which would affect revenues and disposable incomes to the tribes. Salmon landings would not be negatively impacted under Alternative 3. Therefore, there would be no adverse effects to tribal revenue and disposable incomes.

Q.2.5.4 Potential Impacts to Regional Recreational Economics

As described in detail in Appendix S, average water elevations in Trinity Reservoir under Alternative 3 would be slightly higher, by approximately two to four feet, compared to the No Action Alternative. Given the small increases in Trinity Reservoir levels forecast under Alternative 3 limited impacts are anticipated on camping, day use opportunities at the campgrounds surrounding Trinity Reservoir, and recreational fishing access. These minor effects on water elevations in Trinity Reservoir are not expected to negatively impact recreational visitation and recreational revenue. Consequently, there would be no adverse effects on the regional economy in Trinity County.

Q.2.5.5 Potential Impacts to Regional Economics from Changes to Hydropower

As described in detail in Appendix U, the CVP net hydropower generation would be higher over the long-term and over dry and critically dry years under Alternative 3 compared to the No Action Alternative. The hydropower generated by the CVP is marketed and transmitted by the WAPA Sierra Nevada Region. As CVP annual and plant-in-service power costs increase (including Central Valley Project Improvement Act Environmental Restoration Funds), and available energy for sale decreases, the net unit cost of CVP power may decrease. Typically, decreases in power costs would be passed on to customers through rate decreases. This decrease in power rates would result in an increase in disposable income and could result in more discretionary spending in the regional economy.

Under Alternative 3 compared to the No Action Alternative, SWP annual energy generation would be lower for both the long-term average and for dry and critically dry years , but the energy required by the SWP to move the water would also be lower for both the long-term average and for dry and critically dry years. The SWP net generation would be increased under Alternative 3 relative to the No Action Alternative. Under Alternative 3 compared with the No Action Alternative, the long-term average net generation would be 77% higher, and the average net generation would be 88% higher for dry and critically dry years. Power generated by the SWP is transmitted by PG&E, Southern California Edison, and California ISO through other facilities (California Department of Water Resources 2022). The SWP also markets energy in excess of the SWP demands to a utility and members of the WSPP, formerly known as the Western Systems Power Pool. An increase in SWP net generation would decrease the need for the development of other alternative supplies which could result in an overall decrease in power cost. Typically, decrease in power costs would be passed on to customers through rate decreases. This reduction in power rates would result in an increase in disposable income and could result in more discretionary spending in the regional economy.

Q.2.6 Alternative 4

Q.2.6.1 Potential M&I Water Supply-Related Changes to the Regional Economies

Trinity River Region

There are no M&I CVP or SWP water service contractors in the Trinity River Region. Therefore, there would be no regional economic effects from changes to CVP and SWP M&I water supply deliveries in the Trinity River Region under Alternative 4.

Sacramento River Region

Alternative 4 would reduce water supply deliveries to M&I water contractors in the Sacramento River Region on average by approximately 15,600 AFY compared to the No Action Alternative. These decreases in CVP and SWP M&I water supplies under Alternative 4 would increase the need for development of other alternative water supplies to help meet future water demands.

Table Q-65 summarizes the average annual water supply costs for M&I water supplies. Average annual water supply costs are expected to increase by approximately $274,000 under Alternative 4 compared to the No Action Alternative. Cost increases are mostly due to the development of alternative water supply, transfers costs, groundwater pumping costs, and storage costs. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under Alternative 4, there would be an increase in water supply costs and consequently, water rates would be higher than the No Action Alternative. This rate increase would result in a decrease in disposable income and could result in less discretionary spending in the regional economy.

Table Q-65. Sacramento River Region Municipal and Industrial Water Supply Costs under Alternative 4 compared to No Action Alternative

Municipal and Industrial	**Alternative 4 compared to No Action Alternative**
Average Annual CVP/SWP Deliveries (TAF) [a]	(0.4)
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	($18)
New Fixed Yield Supply (TAF) [c]	0.4
Annual New Supply Cost (thousand dollars) [d]	$317
Surface/Groundwater Storage Costs (thousand dollars) [e]	$0
Lost Water Sales Revenues (thousand dollars) [f]	($4)
Transfer Costs (thousand dollars) [g]	($64)
Shortage Costs (thousand dollars) [h]	($207)
Groundwater Pumping Costs (thousand dollars) [i]	$43
Excess Water Costs (thousand dollars) [j]	$0
Average Annual Changes in Water Supply Costs (thousand dollars)	**$274**

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2023 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the No Action Alternative. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-66 summarizes the regional economic effects to employment, labor income, and revenue from increased water supply costs and decreased disposable income to CVP and SWP M&I contractors. A decrease in disposable income in the area would result in a decrease in discretionary spending in the region and could result in an adverse impact to the regional economy. Decreases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-66. Sacramento River Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 4 Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Agriculture	Less than (0.1)	($180)	($440)
Mining	Less than (0.1)	($10)	($220)
Construction	Less than (0.1)	($1,170)	($5,980)
Manufacturing	Less than (0.1)	($350)	($2,840)
TIPU	(0.1)	($1,200)	($5,850)
Trade	(0.2)	($7,950)	($31,550)
Service	(0.8)	($43,800)	($142,110)
Government	Less than (0.1)	($2,340)	($6,430)
Total	**(1.0)**	**($57,000)**	**($195,420)**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Numbers in parentheses represent negative values.

San Joaquin River Region

Alternative 4 would increase water supply deliveries to M&I water contractors in the San Joaquin River Region on average by approximately 3,300 AFY compared to the No Action Alternative. These increases in CVP and SWP M&I water supplies would help meet future water demands without development of other alternative water supplies. Additionally, increased water supplies under Alternative 1 would reduce reliance on groundwater pumping in the region.

Table Q-67 summarizes the average annual water supply costs for M&I water supplies. Average annual water supply costs are expected to reduce by approximately $2.5 million under Alternative 4 compared to the No Action Alternative. Cost reductions are mostly due to reduced reliance on groundwater pumping and development of alternate water supplies. Typically, water supply cost increases or decreases are passed on to water customers through water rate increases or decreases, respectively. Under Alternative 4, water supply costs would reduce compared to the No Action Alternative and, consequently, water rates would be lower than the No Action Alternative. This reduction in water rates would result in an increase in disposable income and could result in more discretionary spending in the regional economy.

Table Q-68 summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income to CVP and SWP M&I contractors. An increase in disposable income in the area would result an increase in discretionary spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-67. San Joaquin River Region Municipal and Industrial Water Supply Costs under Alternative 4 Compared to the No Action Alternative

Municipal and Industrial	Alternative 4 compared to No Action Alternative
Average Annual CVP/SWP Deliveries (TAF) [a]	3.3
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	$69
Alternate Water Supply Deliveries (assumed new supply) (TAF) [c]	(8.4)
Annualized Alternate Supply Costs (thousand dollars) [d]	($4,324)
Water Storage Costs (thousand dollars) [e]	$931
Lost Water Sales Revenues (thousand dollars) [f]	$27
Transfer Costs (thousand dollars) [g]	$164
Shortage Costs (thousand dollars) [h]	($49)
Groundwater Pumping Costs (thousand dollars) [i]	($357)
Excess Water Costs (thousand dollars) [j]	$923
Average Annual Changes in Water Supply Costs (thousand dollars)	**($2,567)**

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2023 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the No Action Alternative. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-68. San Joaquin River Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 4 Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Agriculture	Less than 0.1	$1,780	$7,670
Mining	Less than 0.1	$290	$2,720
Construction	0.1	$8,230	$44,820
Manufacturing	0.1	$3,570	$46,120
TIPU	0.4	$11,340	$47,080

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Trade	1.6	$65,020	$277,200
Service	6.1	$289,800	$1,013,140
Government	0.1	$11,780	$30,530
Total	**8.4**	**$391,810**	**$1,469,280**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars.

San Francisco Bay Area Region

Alternative 4 would increase water supply deliveries to M&I water contractors in the San Francisco Bay Area Region on average by approximately 4,000 AFY compared to the No Action Alternative. Under Alternative 4, though the average water supplies are increasing, yields in dry and critical dry years are reduced in comparison to No Action Alternative. Consequently, transfer costs, lost water sale revenue costs and shortage costs are expected to increase under Alternative 4 in comparison to the No Action Alternative. Table Q-69 summarizes the average annual water supply costs for M&I water supplies. Average annual water supply costs are expected to increase by approximately $1.9 million under Alternative 4 compared to the No Action Alternative. This increase water supply costs and water rates would result in a decrease in disposable income and less discretionary spending in the regional economy.

Table Q-70 summarizes the regional economic effects to employment, labor income, and revenue from increased water supply costs and decreased disposable income to CVP and SWP M&I contractors. A decrease in disposable income in the area may decrease discretionary spending in the region.

Table Q-69. San Francisco Bay Area Region Municipal and Industrial Water Supply Costs under Alternative 4 Compared to the No Action Alternative

Municipal and Industrial	Alternative 4 compared to No Action Alternative
Average Annual CVP/SWP Deliveries (TAF) [a]	4
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	$104
Alternate Water Supply Deliveries (assumed new supply) (TAF) [c]	0
Annualized Alternate Supply Costs (thousand dollars) [d]	$0
Water Storage Costs (thousand dollars) [e]	($107)
Lost Water Sales Revenues (thousand dollars) [f]	$2,002
Transfer Costs (thousand dollars) [g]	$369
Shortage Costs (thousand dollars) [h]	$1,013
Groundwater Pumping Costs (thousand dollars) [i]	($88)
Excess Water Costs (thousand dollars) [j]	($368)
Average Annual Changes in Water Supply Costs (thousand dollars)	**$1,912**

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2023 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the No Action Alternative. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-70. San Francisco Bay Area Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 4 Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Agriculture	Less than (0.1)	($1,870)	($3,460)
Mining	Less than (0.1)	($70)	($1,120)
Construction	(0.1)	($8,440)	($40,210)
Manufacturing	(0.1)	($6,980)	($87,300)
TIPU	(0.2)	($8,090)	($30,990)
Trade	(0.9)	($55,690)	($192,420)
Service	(4.5)	($323,470)	($1,001,460)
Government	(0.1)	($10,860)	($19,150)
Total	**(5.9)**	**($415,470)**	**($1,376,110)**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Numbers in parentheses represent negative values.

Central Coast Region

Alternative 4 would increase water supplies to M&I water contractors in the Central Coast Region on average by approximately 1,600 AFY compared to the No Action Alternative. With these increases in CVP and SWP water supplies, Central Coast Region M&I contractors would reduce reliance on groundwater pumping in the region.

Table Q-71 summarizes the average annual water supply costs for M&I water supplies. Average annual water supply costs are expected to decrease by approximately $370,000 under Alternative 4 compared to the No Action Alternative. Cost decreases are primarily due to the reduction in groundwater pumping costs. Water supply cost decreases are passed on to water customers through water rate decreases. This decrease in water rates would result in an increase in disposable income and could result in more discretionary spending in the regional economy.

Table Q-72 summarizes the regional economic effects to employment, labor income, and revenue from increased water supply costs and decreased disposable income to CVP and SWP M&I contractors. An increase in disposable income in the area may increase discretionary spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-71. Central Coast Region Municipal and Industrial Water Supply Costs Under Alternative 4 Compared to the No Action Alternative

Municipal and Industrial	**Alternative 4 compared to No Action Alternative**
Average Annual CVP/SWP Deliveries (TAF) [a]	1.6
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	$353
Alternate Water Supply Deliveries (assumed new supply) (TAF) [c]	0
Annualized Alternate Supply Costs (thousand dollars) [d]	$0
Water Storage Costs (thousand dollars) [e]	$0
Lost Water Sales Revenues (thousand dollars) [f]	$0
Transfer Costs (thousand dollars) [g]	$0
Shortage Costs (thousand dollars) [h]	$0
Groundwater Pumping Costs (thousand dollars) [i]	($723)
Excess Water Costs (thousand dollars) [j]	$0
Average Annual Changes in Water Supply Costs (thousand dollars)	**($370)**

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2023 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the No Action Alternative. Negative refers to savings and positive refers to costs.

[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-72. Central Coast Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 4 Compared to the No Action Alternative

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Agriculture	Less than 0.1	$440	$930
Mining	Less than 0.1	$100	$1,120
Construction	Less than 0.1	$1,110	$6,300
Manufacturing	Less than 0.1	$270	$6,370
TIPU	0.1	$1,340	$6,470
Trade	0.2	$9,790	$41,900
Service	1.2	$58,100	$207,660
Government	Less than 0.1	$2,420	$6,240
Total	**1.5**	**$73,570**	**$276,990**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars.

South Coast Region

Alternative 4 would increase water supply deliveries to M&I water contractors in the South Coast Region on average by approximately 66,600 AFY compared to the No Action Alternative. With these increases in CVP and SWP M&I water supplies, South Coast Region M&I contractors would not need to invest in alternate water supplies under Alternative 4. Additionally, increased water supplies under Alternative 4 would reduce groundwater pumping costs and excess water costs in the region.

Table Q-73 summarizes the average annual water supply costs for M&I water supplies. Average annual water supply costs are expected to decrease by approximately $63.8 million under Alternative 4 compared to the No Action Alternative. Cost decreases are primarily due to the reduction in groundwater pumping costs. Water supply cost decreases are passed on to water customers through water rate decreases. This decrease in water rates would result in an increase in disposable income and could result in more discretionary spending in the regional economy.

Table Q-74 summarizes the regional economic effects to employment, labor income, and revenue from decreased water supply costs and increased disposable income to CVP and SWP M&I contractors. An increase in disposable income in the area may increase discretionary spending in the region and could benefit the regional economy. Increases in spending would result in induced impacts in the region that would primarily occur in the services sector.

Table Q-73. South Coast Region Municipal and Industrial Water Supply Costs Under Alternative 4 Compared to the No Action Alternative

Municipal and Industrial	**Alternative 4 compared to No Action Alternative**
Average Annual CVP/SWP Deliveries (TAF) [a]	66.6
Delivery Cost for CVP/SWP Deliveries (thousand dollars) [b]	$10,950
Alternate Water Supply Deliveries (assumed new supply) (TAF) [c]	(39.5)
Annualized Alternate Supply Costs (thousand dollars) [d]	($73,997)
Water Storage Costs (thousand dollars) [e]	($309)
Lost Water Sales Revenues (thousand dollars) [f]	$4,861
Transfer Costs (thousand dollars) [g]	$340
Shortage Costs (thousand dollars) [h]	$13,573
Groundwater Pumping Costs (thousand dollars) [i]	($3,659)
Excess Water Costs (thousand dollars) [j]	($1,992)
Average Annual Changes in Water Supply Costs (thousand dollars)	**($63,806)**

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2023 dollars. Numbers in parentheses represent negative values.
[a] CalSim III simulated CVP/SWP project water deliveries for Sacramento River region contractors.
[b] Cost to deliver CVP and SWP deliveries (line items 1 in table above) based on Reclamation CVP Municipal and Industrial Ratebooks and Bulletin 132-10 rates.
[c] Alternate water supply deliveries in this region include new groundwater and surface water development and permanent water transfers.
[d] Annualized cost to develop alternate water supplies. This cost typically includes development cost and additional delivery costs where applicable.
[e] Storage Costs include put and take costs.
[f] Loss of revenue from retail water sales.
[g] Cost to purchase and deliver transfer water purchases on annual spot market, or other annual options if applicable.
[h] Estimated consumer surplus loss due to water shortages.
[i] Cost savings from reduction in groundwater pumping between the action alternatives and the No Action Alternative. Negative refers to savings and positive refers to costs.
[j] Cost savings from contract water not used to meet demand or reduce groundwater pumping. Negative refers to savings and positive refers to costs.

Table Q-74. South Coast Region Municipal and Industrial Water Supply Related Regional Economic Effects under Alternative 4 Compared to the No Action Alternative

Industry	**Employment (in jobs)**	**Labor Income (in dollars)**	**Output (in dollars)**
Agriculture	1.5	$58,700	$134,260
Mining	0.1	$6,290	$108,460
Construction	3.2	$213,960	$1,180,670
Manufacturing	3.9	$324,520	$3,387,390

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
TIPU	14.2	$556,340	$2,015,650
Trade	44.2	$2,250,050	$8,680,030
Service	243.4	$13,739,110	$45,100,320
Government	4.1	$500,810	$1,289,850
Total	**314.6**	**$17,649,780**	**$61,896,630**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars.

Q.2.6.2 Potential Agriculture-Related Changes to the Regional Economy

Trinity River Region

There are no agricultural lands irrigated with CVP and SWP water supplies in the Trinity River Region. Therefore, there would be no regional economic effects from changes to CVP and SWP agricultural water supply deliveries in the Trinity River Region under Alternative 4.

Sacramento River Region

Alternative 4 is expected to increase average annual agricultural water supply deliveries by 7,342 AFY during average conditions and decrease deliveries by 2,785 AFY during dry conditions in the Sacramento River Region. As summarized in Table Q-75, these increases in annual agricultural water supplies are expected to result in increases to irrigated acreage under average conditions. Under dry conditions, the decrease in deliveries would result in a decrease to irrigated acreage. Under dry conditions, a small increase in vegetable crop acreage in the Sacramento Valley produces a large increase in gross revenue that more than offsets decline in other crop categories. As a result, the total gross revenue from farming increases relative to No Action Alternative under dry conditions, even though the total Sacramento Valley acreage declines.

Table Q-76 summarizes the regional economic effects to employment, labor income, and revenue from increased agricultural water supply to the region. Changes to irrigated acreage and agricultural revenue would affect businesses and individuals who support farming activities, such as farm workers, fertilizer and chemical dealers, wholesale and agricultural service providers, truck transport, and others involved in crop production and processing. The changes in agricultural revenue results presented below includes price adjustments for crops that reflect both demand shifts from current conditions to 2040 (fixed price revenue) and price changes caused by alternative-driven changes in crop production/ supply shifts (price effect revenue). Since IMPLAN assumes fixed prices, regional economic effects were estimated using the fixed price agricultural revenue results. Price effect revenue results would primarily result in changes to proprietor income and are not expected to result in substantial impacts on the regional economy.

Table Q-75. Sacramento River Region Agricultural Water Supply Costs under Alternative 4 Compared to the No Action Alternative

Agricultural	Alternative 4 compared to No Action Alternative
AVERAGE CONDITIONS [a]	
Average Annual CVP/SWP Deliveries (AF)	7,342
Irrigated Acreage (acres)	1,316
Total Agricultural Revenue (dollars)	**($2,634,621)**
Fixed Price Agricultural Revenue (dollars)[b]	$10,504,555
Price Effects Agricultural Revenue (dollars)[c]	($13,139,177)
DRY CONDITIONS [d]	
Average Annual CVP/SWP Deliveries (AF)	(2,785)
Irrigated Acreage (acres)	(814)
Total Agricultural Revenue (dollars)	**$4,189,104**
Fixed Price Agricultural Revenue (dollars) [b]	$7,132,756
Price Effects Agricultural Revenue (dollars) [c]	($2,943,652)

- All costs in 2024 dollars. Numbers in parentheses represent negative values.

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet

[a] Average Conditions refers to an average of all year types in the CalSIM simulation period.

[b] Agricultural Revenue based on fixed prices for agricultural products, current price used in the analysis.

[c] Agricultural Revenue based on projected price effect for agricultural products based on changes to irrigated acreage in the Central Valley and other global effects on crop prices.

[d] Dry Conditions refer to an average of dry years only, using Sacramento River Index.

Table Q-76. Sacramento River Region Agricultural Water Supply Related Regional Economic Effects under Alternative 4 Compared to the No Action Alternative under Average Conditions

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
AVERAGE CONDITIONS			
Agriculture	124.7	$2,634,570	$11,387,060
Mining	0.0	$670	$10,450
Construction/Utilities	0.4	$37,940	$192,940
Manufacturing	0.3	$43,880	$564,480
TIPU	1.5	$42,970	$201,180
Trade	3.5	$194,520	$856,980
Service	16.1	$807,470	$3,157,950

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Government	0.5	$55,250	$162,700
Total	**147.1**	**$3,817,270**	**$16,533,740**
DRY CONDITIONS			
Agriculture	43.6	$1,353,290	$7,750,700
Mining	0.0	$420	$6,770
Construction/Utilities	0.3	$25,680	$130,350
Manufacturing	0.2	$30,990	$396,020
TIPU	1.0	$28,280	$132,140
Trade	2.2	$126,270	$559,440
Service	10.0	$492,630	$1,965,670
Government	0.3	$35,950	$106,150
Total	**57.7**	**$2,093,510**	**$11,047,240**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Regional economic results based on fixed price agricultural revenue

San Joaquin River Region

Alternative 4 is expected to increase average annual agricultural water supply deliveries by 53,305 AFY during average conditions and decrease by 27,470 AFY during dry conditions in the San Joaquin River Region. As summarized in Table Q-77, these increases in annual agricultural water supplies are expected to result in increases to irrigated acreage and gross revenue under average conditions. Under dry conditions, the decrease in deliveries would result in a decrease to irrigated acreage and gross revenue.

Table Q-78 summarizes the regional economic effects to employment, labor income, and revenue from increased agricultural water supply to the region. Changes to irrigated acreage and agricultural revenue would affect businesses and individuals who support farming activities, such as farm workers, fertilizer and chemical dealers, wholesale and agricultural service providers, truck transport, and others involved in crop production and processing. The changes in agricultural revenue results presented below includes price adjustments for crops that reflect both demand shifts from current conditions to 2040 (fixed price revenue) and price changes caused by alternative-driven changes in crop production/ supply shifts (price effect revenue). Since IMPLAN assumes fixed prices, regional economic effects were estimated using the fixed price agricultural revenue results. Price effect revenue results would primarily result in changes to proprietor income and are not expected to result in substantial impacts on the regional economy.

Table Q-77. San Joaquin River Region Agricultural Water Supply Costs under Alternative 4 Compared to the No Action Alternative

Agricultural	Alternative 4 compared to No Action Alternative
AVERAGE CONDITIONS [a]	
Average Annual CVP/SWP Deliveries (AF)	53,305
Irrigated Acreage (acres)	14,094
Total Agricultural Revenue (dollars)	**$51,027,645**
Fixed Price Agricultural Revenue (dollars)[b]	$55,587,280
Price Effects Agricultural Revenue (dollars)[c]	($4,559,635)
DRY CONDITIONS [d]	
Average Annual CVP/SWP Deliveries (AF)	(27,470)
Irrigated Acreage (acres)	(10,343)
Total Agricultural Revenue (dollars)	**($67,106,943)**
Fixed Price Agricultural Revenue (dollars) [b]	($61,065,020)
Price Effects Agricultural Revenue (dollars) [c]	($6,041,923)

CVP = Central Valley Project; SWP = State Water Project; TAF = thousand acre-feet.
All costs in 2024 dollars. Numbers in parentheses represent negative values.
[a] Average Conditions refers to an average of all year types in the CalSIM simulation period.
[b] Agricultural Revenue based on fixed prices for agricultural products, current price used in the analysis.
[c] Agricultural Revenue based on projected price effect for agricultural products based on changes to irrigated acreage and other global effects on crop prices.
[d] Dry Conditions refer to an average of dry years only, using Sacramento River Index.

Table Q-78. San Joaquin River Region Agricultural Water Supply Related Regional Economic Effects under Alternative 3 Compared to the No Action Alternative under Average Conditions

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
AVERAGE CONDITIONS			
Agriculture	500.4	$13,282,390	$59,859,750
Mining	0.1	$12,980	$92,310
Construction/Utilities	1.7	$150,150	$810,610
Manufacturing	2.0	$160,750	$2,069,530
TIPU	6.0	$208,180	$842,780
Trade	19.8	$951,110	$4,385,050
Service	62.2	$2,723,630	$11,530,040

Industry	Employment (in jobs)	Labor Income (in dollars)	Output (in dollars)
Government	1.5	$162,520	$470,470
Total	**593.7**	**$17,651,710**	**$80,060,540**
DRY CONDITIONS			
Agriculture	(311.9)	($11,410,530)	($66,365,280)
Mining	(0.1)	($9,980)	($92,520)
Construction/Utilities	(2.2)	($185,320)	($997,620)
Manufacturing	(2.7)	($214,180)	($2,702,390)
TIPU	(6.9)	($247,490)	($995,060)
Trade	(21.9)	($1,110,080)	($5,126,000)
Service	(42.9)	($1,675,270)	($9,996,510)
Government	(1.2)	($134,340)	($399,770)
Total	**(389.8)**	**($14,987,190)**	**($86,675,150)**

TIPU = Transportation, Information, Power, and Utilities.
All costs in 2024 dollars. Numbers in parentheses represent negative values. Regional economic results based on fixed price agricultural revenue.

San Francisco Bay Area Region

Alternative 4 is expected to decrease average annual agricultural water supply deliveries in the San Francisco Bay Area Region by less than 1,000 AFY under average conditions and by 1,000 AFY under dry conditions. Decrease in agricultural water supply in the region could result in a decrease in irrigated acreage and agricultural revenues in the region. This would result in less spending in the regional economy.

Central Coast Region

CVP and SWP water supply deliveries to the Central Coast Region affected by Alternative 4 are primarily delivered to M&I water contractors. Therefore, there are no forecast changes in irrigated lands under Alternative 4. Consequently, there would be no impacts to regional economy from changes in deliveries to agricultural contractors in the Central Coast Region under Alternative 4.

South Coast Region

Water supply deliveries to the South Coast Region affected by Alternative 4 are primarily delivered to M&I water contractors. Therefore, there are no forecasted changes in water deliveries for agriculture or changes in irrigated lands under the Alternative 4 phases. Resulting impacts to water rates and the regional economy would be minimal.

Q.2.6.3 Potential Fisheries-Related Changes to the Regional Economy

The commercial and recreational (ocean sports) ocean salmon fishery along the SONCC are affected by the population of salmon that rely upon the Northern California rivers, including the Sacramento and San Joaquin rivers. As described in detail in Appendix O, annual average Central Valley Chinook salmon abundance (includes Spring, Winter, Fall and late-Fall runs) in the Bay under Alternative 4 is expected to be negligible in comparison to the No Action Alternative. There would be minimal impacts to commercial and recreational ocean salmon harvest under Alternative 4 compared to the No Action Alternative. Consequently, revenues received by fisherman from changes to ocean salmon harvest would be minimal. Ocean fisheries support industries such as fish processors, boat manufacturers, repair and maintenance would see no changes in revenue. Overall fisheries related changes to the regional economy under Alternative 4 would be minimal.

As discussed in Appendix O, coho salmon, fall-run and spring-run Chinook salmon impacts under Alternative 4 would be negligeable in comparison to the No Action Alternative. These salmon populations are extremely important to the Yurok Tribe and Hoopa Valley tribes as part of their lives, cultural traditions, ceremonies, and community health (Bureau of Reclamation 2012). Fifty percent of the total available salmon in the Trinity River is the federally protected harvest for the Yurok and Hoopa Valley tribes (U.S. Department of the Interior 1993). Each tribe determines the use of the harvest. Changes in salmon population in the Trinity River would change salmon landings by the Yurok and Hoopa Valley tribes. The tribes would sell a portion or all of their landings which would affect revenues and disposable incomes to the tribe. Since salmon population would not be negatively impacted under Alternative 4, salmon landings would not be adversely impacted. Therefore, there would be no adverse effects to revenue and disposable incomes.

Q.2.6.4 Potential Impacts to Regional Recreational Economics

As described in detail in Appendix S, average water elevations in Trinity Reservoir under Alternative 4 in comparison to No Action Alternative would be slightly lower, by up to one to three feet between January through June. From July through December, average water elevation under Alternative 4 in comparison to No Action Alternative would be between three to five feet lower. However, seasonal fluctuations would remain approximately the same under Alternative 4 in comparison to No Action Alternative. The minimum elevations of Trinity Reservoir, under Alternative 4 are similar to or higher than elevations under the No Action Alternative in all months except between November through January. From November through January, minimum elevations of Trinity Reservoir could be lower by up to eight feet in comparison to No Action Alternative. Trinity Reservoir levels are never lower than 2,170 feet under Alternative 4. When Trinity Reservoir levels fall below 2,170 feet and all the boat ramps on the reservoir are unusable, recreational visitation could substantially decrease and cause adverse regional economic impacts to Trinity County. Given the limited changes in Trinity Reservoir levels forecast under Alternative 4 in comparison to the No Action Alternative and reservoir levels remaining above 2,170 feet, limited impacts are forecast on camping, day use opportunities at the campgrounds surrounding Trinity Reservoir, and recreational fishing access. Consequently, there would be no adverse effects on recreational visitation, recreational revenue, and the recreational regional economy in Trinity County under Alternative 4.

Q.2.6.5 Potential Impacts to Regional Economics from Changes to Hydropower

As described in detail in Appendix U, the CVP net hydropower generation would be slightly higher over the long-term and over dry and critically dry years under Alternative 4 compared to the No Action Alternative. The hydropower generated by the CVP is marketed and transmitted by the WAPA Sierra Nevada Region. As CVP annual and plant-in-service power costs increase (including Central Valley Project Improvement Act Environmental Restoration Funds), and available energy for sale decreases, the net unit cost of CVP power may decrease. Typically, decreases in power costs would be passed on to customers through rate decreases. This reduction in power rates would result in an increase in disposable income and could result in more discretionary spending in the regional economy.

Under Alternative 4 compared to the No Action Alternative, SWP net generation over the long-term would be lower for both long-term average and in dry and critically dry years. Power generated by the SWP is transmitted by PG&E, Southern California Edison, and California ISO through other facilities (California Department of Water Resources 2022). The SWP also markets energy in excess of the SWP demands to a utility and members of the WSPP, formerly known as the Western Systems Power Pool. A decrease in SWP net generation would increase the need for the development of other alternative supplies which could result in an overall increase in power cost. Typically, increase in power costs would be passed on to customers through rate increases. This increase in rates would result in a decrease in disposable income and could result in less discretionary spending in the regional economy.

Q.2.7 Mitigation Measures

No avoidance and minimization measures or additional mitigation measures have been identified.

Q.2.8 Summary of Impacts

Table Q-79. Impact Summary Table

Impact	Alternative	Magnitude and Direction of Impacts [a]	Potential Mitigation Measures
Potential M&I-related changes to the regional economy	No Action Alternative	Land use changes would occur in accordance with adopted general plans, development could affect water supply and power demands, depending on the type and location of development. Development in non-urbanized areas could convert natural or rural areas to developed areas, resulting in increased water supply demand and increased power use to supply water. These increase in water supply for M&I contractors could result in an increase in water supply costs. [b]	–

Impact	Alternative	Magnitude and Direction of Impacts [a]	Potential Mitigation Measures
	Alternative 1	• **Trinity River Region:** No Impacts • **Sacramento River Region:** Increase of <1 job, $23.9 thousand (K) in labor income, $82.0 K in revenue • **San Joaquin River Region:** Increase of 41 jobs, $1.9 million (M) in labor income, $7.1 M in revenue • **San Francisco Bay Area Region:** Increase of 105 jobs, $7.4 M in labor income, $24.5 M in revenue • **Central Coast Region:** Increase of 9 jobs, $0.4 M in labor income, $1.6 M in revenue • **South Coast Region:** Increase of 1352 jobs, $75.8 M in labor income, $266.1 M in revenue	–
	Alternative 2	• **Trinity River Region:** No Impacts • **Sacramento River Region:** Increase of <1 to 16 jobs, $30.3 K to $0.9 M in labor income, $0.1 M to $3.1 M in revenue • **San Joaquin River Region:** Increase of 7 to 12 jobs, $0.3 M to $0.5 M in labor income, $1.3M to $2.1 M in revenue • **San Francisco Bay Area Region:** Decrease of 6.3 jobs to Increase of 18 jobs, Decrease of $0.4 M to Increase of $1.3 M in labor income, Decrease of $1.5 M to Increase of $4.4 M in revenue • **Central Coast Region:** Increase of <2 jobs, $58.4 K to $71.6 K in labor income, $0.2 M to $0.3 M in revenue • **South Coast Region:** Increase of 2 to 257 jobs, $0.1 M to $14.4 M in labor income, $0.5 M to $50.6 M in revenue	–
	Alternative 3	• **Trinity River Region:** No Impacts • **Sacramento River Region:** Decrease of 26 jobs, $1.4 M in labor income, $5.0 M in revenue • **San Joaquin River Region:** Decrease of 56 jobs, $2.6 M in labor income, $9.9 M in revenue • **San Francisco Bay Area Region:** Decrease of 81 jobs, $5.7 M in labor income, $19.1 M in revenue • **Central Coast Region:** Decrease of 17 jobs, $0.8 M in labor income, $3.2 M in revenue • **South Coast Region:** Decrease of 5,487 jobs, $307.8 M in labor income, $1,079 M in revenue	–

Impact	Alternative	Magnitude and Direction of Impacts [a]	Potential Mitigation Measures
	Alternative 4	• **Trinity River Region:** No Impacts • **Sacramento River Region:** Decrease of <1 job, $57 K in labor income, $0.1 M in revenue • **San Joaquin River Region:** Increase of 8 jobs, $0.4 M in labor income, $1.5 M in revenue • **San Francisco Bay Area Region:** Decrease of 6 jobs, $0.4 M in labor income, $1.4 M in revenue • **Central Coast Region:** Increase of 1 job, $73.5 K in labor income, $0.3 M in revenue • **South Coast Region:** Increase of 314 jobs, $17.7 M in labor income, $61.9 M in revenue	–
Potential agriculture-related changes to the regional economy	No Action Alternative	Land uses would occur in accordance with adopted general plans. Development in non-urbanized areas could convert natural or rural areas to developed areas, resulting in increased water supply demand and increased power use to supply water. This could result in an increase in groundwater pumping costs. Increases in costs to end users could result in decrease in discretionary income and could result in less discretionary spending in the regional economy.	–

	Alternative 1	• **Trinity River Region:** No Impacts
		• **Sacramento River Region:**
		  • Decrease of 86 jobs, $2.0 M in labor income, $7.1 M in revenue under Average Conditions
		  • Increase of 61 jobs, $1.9 M in labor income, $9.7 M in revenue under Dry Conditions
		• **San Joaquin River Region:**
		  • Increase of 3951 jobs, $116.7 M in labor income, $504.1 M in revenue under Average Conditions
		  • Increase of 3722 jobs, $123.9 M in labor income, $596.3 M in revenue under Dry Conditions
		• **San Francisco Bay Area Region:** More spending in the regional economy
		• **Central Coast Region:** No Impacts
		• **South Coast Region:** More spending in the regional economy
			–

Impact	Alternative	Magnitude and Direction of Impacts [a]	Potential Mitigation Measures

	Alternative 2	• **Trinity River Region:** No Impacts
		• **Sacramento River Region:**
		  • Decrease of 128 jobs to Increase of 41 jobs, Decrease of $3.0 M to Increase of $1.8 M in labor income, Decrease of $12.7 M to Increase of $10.9 M in revenue under Average Conditions
		  • Decrease of 18 to 95 jobs, Decrease of $0.3 M to $2.3 M in labor income, Decrease of $1.2 M to $9.9 M in revenue under Dry Conditions
		• **San Joaquin River Region:**
		  • Decrease of 2115 jobs to Increase of 208 jobs, Decrease of $75.3 M to Increase of $4.8 M in labor income, Decrease of $383 M to Increase of $14.9 M in revenue under Average Conditions
		  • Decrease of 964 to 2126 jobs, Decrease of $36.9 M to $80.0 M in labor income, Decrease of $195.8 M to $421.3 M in revenue under Dry Conditions
		• **San Francisco Bay Area Region:** Less spending in the regional economy
		• **Central Coast Region:** No Impacts
		• **South Coast Region:** Minimal impact to regional economy
			–

	Alternative 3	• **Trinity River Region:** No Impacts
		• **Sacramento River Region:**
		  • Decrease of 603 jobs, $12.1 M in labor income, $41.3 M in revenue under Average Conditions
		  • Decrease of 784 jobs, $19.5 M in labor income, $80.3 M in revenue under Dry Conditions
		• **San Joaquin River Region:**
		  • Decrease of 14,402 jobs, $480.7 M in labor income, $2.3 billion (B) in revenue under Average Conditions
		  • Decrease of 10,672 jobs, $375.3 M in labor income, $1.8 B in revenue under Dry Conditions
		• **San Francisco Bay Area Region:** Less spending in the regional economy
		• **Central Coast Region:** No Impacts
		• **South Coast Region:** Less spending in the regional economy
			–

Impact	Alternative	Magnitude and Direction of Impacts [a]	Potential Mitigation Measures

	Alternative 4	• **Trinity River Region:** No Impacts
		• **Sacramento River Region:**
		  • Increase of 147 jobs, $3.8 M in labor income, $16.5 M in revenue under Average Conditions
		  • Increase of 58 jobs, $2.1 M in labor income, $11.1 M in revenue under Dry Conditions
		• **San Joaquin River Region:**
		  • Increase of 593 jobs, $17.6 M in labor income, $80.1 M in revenue under Average Conditions
		  • Decrease of 390 jobs, $15 M in labor income, $86.7 M in revenue under Dry Conditions
		• **San Francisco Bay Area Region:** Less spending in the regional economy
		• **Central Coast Region:** No Impacts
		• **South Coast Region:** Minimal impact to regional economy
			–

Potential fisheries-related changes to the regional economy	No Action Alternative	• Increased ocean salmon fisheries would be beneficial to the regional economy. • No adverse impacts to Trinity River Region salmon population would result in no changes to regional economy	–
	Alternative 1	Changes in salmon population could potentially impact commercial and recreational ocean salmon harvest. Salmon harvest under Alternative 1 compared to No Action Alternative would be negligible. Consequently, revenues received by fisherman from changes to ocean salmon harvest would be minimal. Ocean fisheries support industries such as fish processors, boat manufacturers, repair, and maintenance would see no changes in revenue. Overall fisheries related changes to the regional economy under Alternative 1 would be minimal.	–
	Alternative 2	Changes in salmon population could potentially impact commercial and recreational ocean salmon harvest. Salmon harvest under the Alternative 2 phases compared to No Action Alternative would be negligible. Consequently, revenues received by fisherman from changes to ocean salmon harvest would be minimal. Ocean fisheries support industries such as fish processors, boat manufacturers, repair, and maintenance would see no changes in revenue. Overall fisheries related changes to the regional economy under Alternative 2 phases would be minimal.	–

Impact	Alternative	Magnitude and Direction of Impacts [a]	Potential Mitigation Measures
	Alternative 3	Changes in salmon population could potentially impact commercial and recreational ocean salmon harvest. Salmon harvest under Alternative 3 compared to No Action Alternative would be negligible. Consequently, revenues received by fisherman from changes to ocean salmon harvest would be minimal. Ocean fisheries support industries such as fish processors, boat manufacturers, repair, and maintenance would see no changes in revenue. Overall fisheries related changes to the regional economy under Alternative 3 would be minimal.	
	Alternative 4	Changes in salmon population could potentially impact commercial and recreational ocean salmon harvest. Salmon harvest under Alternative 4 compared to No Action Alternative would be negligible. Consequently, revenues received by fisherman from changes to ocean salmon harvest would be minimal. Ocean fisheries support industries such as fish processors, boat manufacturers, repair, and maintenance would see no changes in revenue. Overall fisheries related changes to the regional economy under Alternative 4 would be minimal.	–
Potential impacts to regional recreational economics	No Action Alternative	Continuation of existing regional economic conditions related to recreation	–
	Alternatives 1 ,3 and 4	No adverse effects to regional economy.	–
	Alternative 2	Some adverse and short-term impacts to regional economy.	–
Potential impacts to regional economics from changes to hydropower	No Action Alternative	Continuation of existing regional economic conditions related to hydropower	
	Alternative 1	• Less spending in the regional economy from CVP operations • Less spending in the regional economy from SWP operations	
	Alternative 2	• Slight increase in spending in the regional economy from CVP operations • Less spending in the regional economy from SWP operations	
	Alternative 3	• More spending in the regional economy from CVP operations • More spending in the regional economy from SWP operations	

Impact	Alternative	Magnitude and Direction of Impacts [a]	Potential Mitigation Measures
	Alternative 4	• More spending in the regional economy from CVP operations • Less spending in the regional economy from SWP operations	

[a] For the evaluation of alternatives, operation of the action alternatives is compared to the No Action Alternative.
[b] Under the No Action Alternative, Reclamation would operate the CVP consistent with the 2020 Record of Decision implementing the Proposed Action consulted upon for the 2019 Biological Opinions and the reasonable and prudent measures in the incidental take statements. DWR would operate the SWP consistent with the 2020 Record of Decision and the 2020 Incidental Take Permit for the SWP. Reclamation and DWR would operate consistent with authorizing legislation, water rights, contracts, and agreements as described by common components. The evaluation under the No Action Alternative is compared to existing conditions.

Q.2.9 Cumulative Impacts

Past, present, and reasonably foreseeable projects, described in Appendix Y, *Cumulative Impacts Technical Appendix*, may have cumulative effects on regional economics, to the extent that they could affect economic output, employment, and labor income.

Past and present actions contribute to the existing condition of the affected environment in the project area while reasonably foreseeable actions are those that are likely to occur in the future that are not speculative. Past, present, and reasonably foreseeable projects include actions to develop water storage capacity, water conveyance infrastructure, water recycling capacity, the reoperation of existing water supply infrastructure, including surface water reservoirs and conveyance infrastructure, and habitat restoration actions. The projects identified in Appendix Y that have the most potential to contribute to cumulative impact on regional economics are related to water supply, fisheries, recreation and hydropower (e.g. B.F. Sisk Dam Raise and Reservoir Expansion Project, Bay-Delta Water Quality Control Plan Update, Cache Slough Area Restoration).

The No Action Alternative would continue with the current operation of the CVP and may result in changes to the regional economy in the Sacramento River, San Joaquin River, San Francisco Bay, Central Coast, and South Coast regions. These changes may potentially contribute to cumulative impacts and were described and considered in the 2020 Record of Decision.

Q.2.9.1 Potential M&I-Related Changes to the Regional Economy

Compared to the No Action Alternative, Alternatives 1, all phases of Alternative 2, and Alternative 4 would improve water supply deliveries to North of Delta and South of Delta M&I contractors and could lessen cumulative impacts from reasonably foreseeable projects. Alternative 3 would decrease water supply deliveries to North of Delta and South of Delta M&I contractors and increase water rates to consumers, which could, in combination with the other projects, contribute to water supply shortages and cumulative impacts on those supplies.

Q.2.9.2 Potential Agriculture-Related Changes to the Regional Economy

Changes in water supply deliveries to Sacramento River Region and San Joaquin River Region agricultural contactors vary across alternatives and under average and dry conditions. Compared to the No Action Alternative, an increase in water supply deliveries increases revenue and farm labor under most alternatives and conditions. However, under Alternative 1, while water supply deliveries are forecast to improve, gross revenue in the Sacramento River Region is forecast to decrease under average and dry conditions due to a shift in some crop production from the Sacramento River Region to the San Joaquin River Region (and vice versa) which occurs disproportionally in relatively high-value crops. Similarly, increases in gross revenue typically coincide with increases in farm labor. An exception to this trend is under Alternative 3 in the Sacramento River Region, where under average conditions employment falls as revenue increases due to a change in cropping patterns.

Appendix Y lists past, present, and reasonably foreseeable projects that have or may potentially result in cumulative impacts to regional economics. Some projects would improve water supply reliability, and others would reduce water supply reliability. Similar to the effects described above for the action alternatives, improvements in agricultural water supply typically improve agricultural revenue and employment.

The action alternatives would have varying effects on agricultural revenue and employment depending on water year type and location, with none of the alternatives generating only improvements or only reductions in all locations and water year types. The projects described in Appendix Y could also have varying impacts with some generating positive improvements in agricultural revenue and employment and others generating negative effects. Each of the action alternatives could contribute to the cumulative impacts from reasonably foreseeable projects related to agricultural-dependent economic conditions.

Q.2.9.3 Potential Fisheries-Related Changes to the Regional Economy

Changes in salmon population could potentially increase impacts to commercial and recreational ocean salmon harvest. Compared to the No Action Alternative, salmon harvest under Alternative 1 would be negligible. Consequently, revenues received by fisherman from changes to ocean salmon harvest would be minimal. Other industries that ocean fisheries support, such as fish processors and boat manufacturers, would see no changes in revenue. Overall fisheries-related changes to the regional economy under Alternative 1 would be minimal. Alternative 2, Alternative 3 and Alternative 4 are expected to have negligible impacts to annual average Central Valley Chinook salmon abundance (includes spring, winter, fall and late-fall runs) in the Bay.

Past and present human activities have substantially changed aquatic habitats in the SONCC compared to historical conditions, contributing to cumulative adverse impacts on the ocean salmon fishing industry. In addition to the ongoing activities, several reasonably foreseeable projects may impact aquatic biological resources in the SONCC by affecting upstream salmon habitat. Some of the projects listed in Appendix Y could result in cumulative impacts. The action alternatives could have minimal contributions to the cumulative fisheries-related regional economic conditions.

The action alternatives are not likely to negatively impact salmon populations in the Trinity River and would not contribute to the cumulative impacts related to fisheries-dependent regional economic conditions in this region.

Q.2.9.4 Potential Recreation-Related Changes to the Regional Economy

Compared to the No Action Alternative, Alternatives 1 and 3 would result in water levels at Trinity Reservoir that are the same or slightly higher and would maintain recreational opportunities at Trinity Reservoir. Water levels at Trinity Reservoir under Alternative 2 and Alternative 4 compared to the No Action Alternative vary by month, though boat ramps remain usable throughout tourist season and limited impacts are forecast on camping, day use opportunities at the campgrounds surrounding Trinity Reservoir.

Appendix Y lists past, present, and reasonably foreseeable projects that have or could potentially result in cumulative effects related to recreation-related regional economics as they could impact water levels at Trinity Reservoir. The action alternatives, in combination with the other projects, could contribute to the cumulative recreation-related regional economic condition.

Q.2.9.5 Potential Hydropower-Related Changes to the Regional Economy

Compared to the No Action Alternative, each of the action alternatives would result in changes in long-term average CVP net generation rates. On a monthly basis, none of the reductions in CVP net generation under Alternatives 1, 2, and 4 would require the procurement of additional power given that net generation would remain positive for all of the alternatives. All of the action alternatives would result in negative long-term average SWP net generation levels. These reductions in SWP net generation would require the procurement of additional generation elsewhere within the California energy system.

Appendix Y lists past, present, and reasonably foreseeable projects that have or could potentially result in cumulative impacts on hydropower-related regional economics. Most of the projects identified are anticipated to improve water supplies in California to reduce impacts generated by climate change, sea-level rise, increased water allocated to improve habitat conditions, and future growth. If CVP and SWP water supply reliability increase, energy used to support the conveyance of CVP and SWP water supplies would also increase.

Some of the future reasonably foreseeable actions are anticipated to potentially reduce CVP and SWP water supply reliability (e.g., Water Quality Control Plan Update). If CVP and SWP water supply reliability decreases, energy used to support the conveyance of CVP and SWP water supplies also would also decrease.

The action alternatives potential impact on long-term average CVP and SWP net generation rates, in combination with the other projects, could contribute to the cumulative hydropower-related regional economic condition.

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