

CALFED

**TECHNICAL REPORT
ENVIRONMENTAL CONSEQUENCES**

REGIONAL ECONOMICS

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LIST OF ACRONYMS

AUM	Animal unit months
CALFED	CALFED Bay-Delta Program
CEQA	California Environmental Quality Act
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
IMPLAN	Impact Analysis for Planning
M&I	municipal and industrial
MAF	million acre-feet
NEPA	National Environmental Policy Act
PEIS	Programmatic Environmental Impact Statement
SWP	State Water Project

REGIONAL ECONOMICS

INTRODUCTION

This technical report discusses impacts on regional economics (including income, employment, and public finance) associated with implementing the CALFED Bay-Delta Program (CALFED).

For regional economics, the changes that result from CALFED alternatives would be realized as a combined effect of increases and decreases in income and employment as CALFED actions affect specific industrial sectors in the regional economy. CALFED actions could cause changes in the availability and cost of factors of production such as land and water. These changes would affect production, spending, and investment decisions in the agricultural resources, fisheries and aquatic ecosystem, power production and energy, and urban resources sectors. As a result, total output and final demands for the goods and services produced in these sectors could change. These changes in final demands would result in indirect and induced impacts in other sectors of the economy due to spending linkages. These secondary effects can be estimated as changes in employment, output, and income in the indirectly affected sectors.

For this analysis, the evaluation methodology has identified the overall level of magnitude, direction, and significance of some of the potential regional economic impacts based on the description of CALFED actions for each alternative and an estimate of the degree to which each CALFED action or component affects water and land use within each study area.

ASSESSMENT METHODS

The regional economic analysis was conducted using information provided by the other economic analyses with information from input-output models. The four economic sectors most likely to be directly impacted are (1) agricultural production, (2) commercial fishing and recreation, (3) municipal and industrial (M&I) water use, and (4) hydropower.

Figure 1 shows each of the CALFED programs, their direct effects in terms of actions and physical and economic impacts, the relationship between the other economic analyses and regional economics, and the relationship between regional economics and other socioeconomic analyses.

This section applies the projected economic changes of each sector to assess the general magnitude of direct and indirect impacts on regional economies. The primary economic indicators assessed are employment, personal income, and public finance.

The following assumptions were made for the analysis:

- Gross revenue per farmed acre is between \$500 and \$1000 per year.
- 50 direct jobs are created per 1 million dollars of agricultural revenue.
- Nonresidents spend 80% of their recreation expenses in the region of destination, and nonresidents account for 25% to 40% of expenditures depending on the region.

Employment multipliers were obtained from the input-output Impact Analysis for Planning

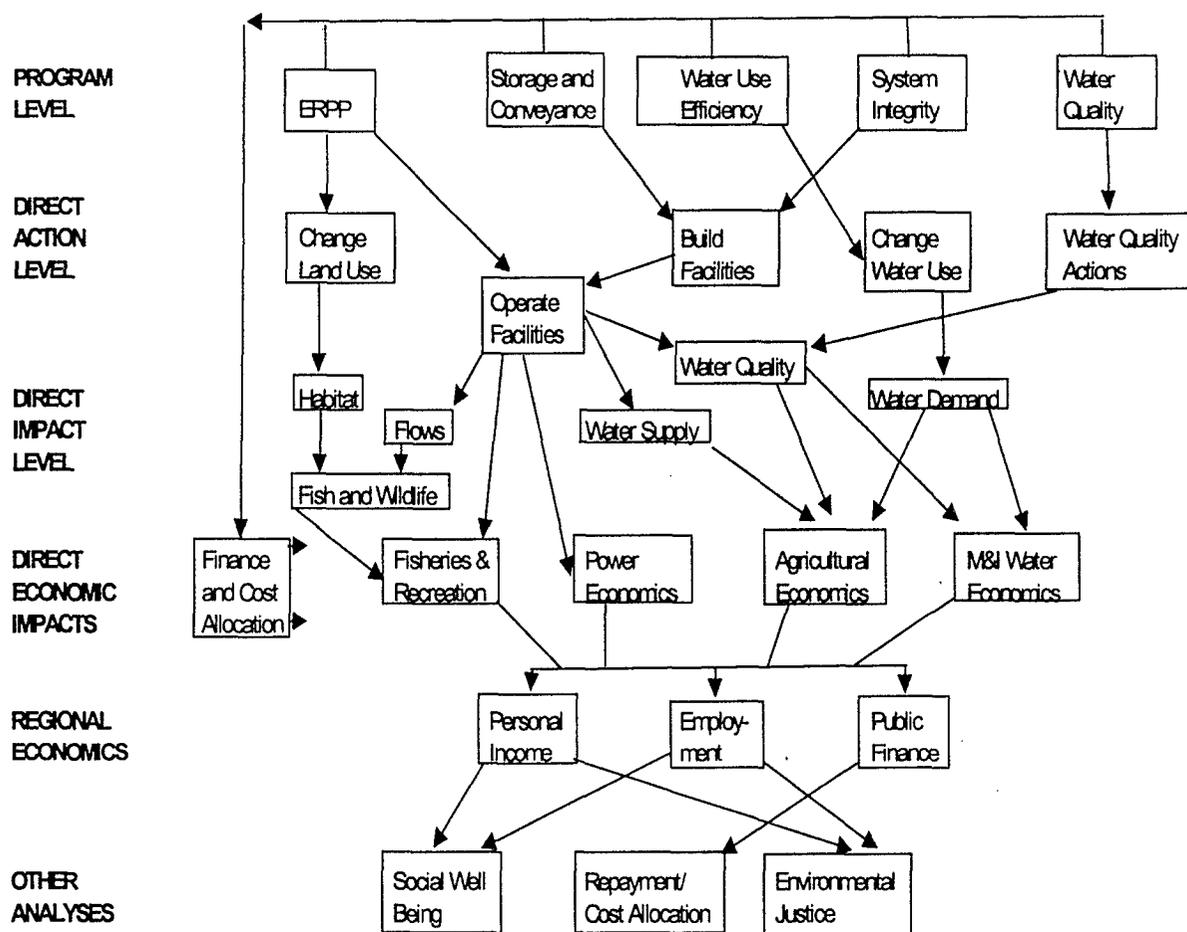


Figure 1. CALFED Bay-Delta Program Regional Economics Interaction with Other Economics and Environmental Resources

(IMPLAN) database to estimate secondary, or indirect, impact to employment levels.

Direct economic impacts of the alternatives were measured for activities occurring throughout California. Since the actual incidence of these direct impacts may be distributed across locations throughout the overall study area, secondary impacts related to direct impacts may occur in the region, causing greater impact, or they may occur outside the region through various leakages. "Leakages" are trade with the outside economy that reduces the net economic stimulus in the region. This

analysis does not count impacts caused by leakages across regions in the state.

The programmatic nature of this analysis does not support complete estimation of specific changes in economic values resulting from Program actions within each of the identified study areas. For this analysis, the evaluation methodology has identified the overall level of magnitude and direction of potential regional economic impacts based on the description of Program actions for each alternative and an estimate of the degree to which each Program

action or component affects water and land use within each region.

SIGNIFICANCE CRITERIA

Significance determinations are not required for economic impacts under National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). However, to assess the magnitude of impacts to employment levels, income generation, and public finance, the following criteria have been developed.

Levels of impact are identified for employment and income on the basis of potential changes in sectoral employment within each region.

ENVIRONMENTAL CONSEQUENCES

Comparison of No Action Alternative to Existing Conditions

The No Action Alternative regional economic structure is assumed to remain similar to existing conditions. It is assumed that the present structure of the California economy will continue with fast growth rates in the service and high-tech sectors, and slight declines in the heavy manufacturing, mining, and agriculture sectors. It is also assumed that overall baseline levels of production will continue to grow over the next two decades at a rate similar to the forecasted rate of population growth.

No Action Alternative economic data for each region are provided in Table 1. These data were obtained from the IMPLAN 1991 database and were increased by the forecast percent increase in population growth to year 2020. Population forecasts were obtained from the California Department of Finance. No IMPLAN data or population data are available for the statutory

Delta, but baseline levels of output, income, and employment are required for comparison to levels of impact from CALFED alternatives. These data are available on a county basis; but the Delta consists of parts of six counties and includes portions of the cities of Sacramento, West Sacramento, and Stockton.

Regional economic data (output, income, and employment) for the Delta were estimated as follows. First, shares of populations of each county in the Delta were estimated from data on populations of towns, cities, and Delta islands, and from analysis of recent maps of the urbanized areas. Then, IMPLAN data from the Bay Region, the Sacramento Valley Region and the San Joaquin Valley Region used for the Programmatic Environmental Impact Statement for the Central Valley Project Improvement Act (CVPIA) were reduced by the share of population estimated to live in the Delta. The reductions in output, income, and employment were added together to obtain the 1991 Delta Region values. Finally, these data were increased by the same percentage as the Bay Region's population growth to year 2020, in order to obtain year 2020 Delta Region estimates. The Bay Region population growth of 28% was used because it is much lower than average, and it is believed that Delta population growth will be less than the Central Valley average because of development restrictions in the Delta.

Comparison of CALFED Alternatives to No Action Alternative

The impacts to regional economics resulting from the Storage and Conveyance program element will vary by alternative, as discussed below. Impacts to regional economics resulting from other program elements, such as ecosystem restoration, do not vary substantially from one alternative to another at the programmatic level.

Region/Industry	Final Demand (Billion \$)	Total Industry Output (Billion \$)	Employment Compensation Income (Billion \$)	Property Income (Billion \$)	Total Place of Work Income (Billion \$)	Total Value Added (Billion \$)	Employment (1000s of Jobs)
Delta Region							
Agriculture, forestry, and fisheries	0.5	0.7	0.1	0.1	0.2	0.2	14
Mining	0.3	0.3	0.0	0.2	0.2	0.2	0
Construction	1.4	1.6	0.4	0.1	0.6	0.6	16
Manufacturing	3.7	4.5	1.1	0.7	1.8	1.9	26
Transportation, communications, and utilities	0.8	1.3	0.4	0.3	0.7	0.7	10
Wholesale and retail trade	1.7	2.1	1.1	0.3	1.3	1.7	50
Finance, insurance, and real estate	1.8	2.4	0.5	1.2	1.6	1.9	20
Services	2.4	3.3	1.5	0.6	2.1	2.2	67
Government enterprise and special industry	1.6	1.7	1.4	0.1	1.5	1.5	44
Total	14.1	18.0	6.3	3.7	10.1	10.9	248
Population, 1000s							445
Bay Region							
Agriculture, forestry, and fisheries	1.5	2.0	0.5	0.4	0.9	0.9	37
Mining	4.6	4.7	0.3	1.9	2.3	3.1	6
Construction	18.9	21.5	6.6	2.1	8.6	8.7	210
Manufacturing	84.2	101.8	26.2	18.1	44.4	45.7	558
Transportation, communication, and utilities	17.8	26.6	7.5	6.3	13.8	14.7	191
Wholesale and retail trade	29.7	37.1	18.7	5.4	24.1	29.9	799
Finance, insurance, and real estate	31.8	43.9	9.0	21.1	30.1	34.9	334
Services	45.0	65.5	29.3	13.1	42.4	43.1	1,237
Government enterprise and special industry	19.3	21.2	17.5	0.7	17.8	17.8	518
Total	252.9	324.3	115.6	69.2	184.4	198.9	3,891
Population, 1000s							6,273
Sacramento River Region							
Agriculture, forestry, and fisheries	3.1	4.5	0.5	1.0	1.6	1.7	97
Mining	1.3	1.4	0.1	0.9	1.0	1.1	3
Construction	14.8	16.4	4.3	1.3	5.6	5.7	176
Manufacturing	16.1	20.4	4.6	3.3	8.0	8.6	138
Transportation, communication, and utilities	5.1	9.6	2.6	2.5	5.1	5.5	76
Wholesale and retail trade	13.9	16.5	8.6	2.2	10.8	13.2	445
Finance, insurance, and real estate	15.6	20.6	3.7	9.6	13.3	16.4	181

Table 1. No Action Alternative Economic Levels, Year 2020, 1992 Dollars

Region/Industry	Final Demand (Billion \$)	Total Industry Output (Billion \$)	Employment Compensation Income (Billion \$)	Property Income (Billion \$)	Total Place of Work Income (Billion \$)	Total Value Added (Billion \$)	Employment (1000s of Jobs)
Sacramento River Region (Continued)							
Services	19.5	25.5	11.3	4.8	16.1	16.4	550
Government enterprise and special industry	19.6	21.6	16.0	2.1	18.1	18.1	515
Total	108.9	136.5	51.8	27.7	79.5	86.5	2,181
Population, 1000s						4,123	
San Joaquin River Region							
Agriculture, forestry, and fisheries	19.6	26.9	3.0	5.2	8.2	8.4	533
Mining	8.6	9.4	0.5	5.0	5.5	6.7	11
Construction	15.3	17.9	4.5	1.3	5.9	5.9	192
Manufacturing	34.0	41.3	7.5	5.6	13.2	14.2	240
Transportation, communication, and utilities	7.5	12.8	3.4	3.0	6.4	6.9	114
Wholesale and retail trade	14.7	18.9	10.0	2.6	12.6	15.3	513
Finance, insurance, and real estate	14.0	19.8	3.2	9.8	13.0	16.0	166
Services	20.3	26.0	11.3	4.7	16.0	16.3	566
Government enterprise and special industry	14.4	15.3	13.1	0.7	13.8	13.8	455
Total	148.4	188.3	56.6	37.9	94.5	103.6	2,790
Population, 1000s						5,911	
SWP and CVP Service Areas Outside the Central Valley							
Agriculture, forestry, and fisheries	11.2	15.1	2.9	3.1	5.9	6.0	305
Mining	11.0	11.6	0.9	4.2	5.1	7.5	20
Construction	74.0	84.6	23.0	8.1	31.2	31.4	879
Manufacturing	233.3	287.6	73.5	53.8	127.3	130.1	2,106
Transportation, communication, and utilities	38.1	71.5	19.4	17.7	37.1	39.6	556
Wholesale and retail trade	105.5	130.4	63.1	18.5	81.6	103.6	3,111
Finance, insurance, and real estate	115.8	159.1	28.8	80.0	108.8	127.8	1,221
Services	161.9	234.1	101.7	45.6	147.4	150.3	4,389
Government enterprise and special industry	70.8	78.8	63.2	2.4	65.6	65.6	2,022
Total	821.7	1,072.8	376.6	233.4	609.9	661.9	14,608
Population, 1000s						25,279	
SOURCE:							
CVPIA PEIS, 1997. Delta data developed with additional data on population of cities and towns.							

Table 1. No Action Alternative Economic Levels, Year 2020, 1992 Dollars (Continued)

Therefore, the discussions of environmental consequence associated with other program elements are not grouped by alternative. In those cases where no environmental impacts have been associated with a program element within a region, the program element is not discussed.

Overall, potential substantial adverse impacts for income, employment, and public finance are projected to occur in the Delta Region primarily due to CALFED effects on the agricultural sector in this area, and negligible to moderate adverse effects are expected in the Sacramento River Region and the San Joaquin River Region.

ALL REGIONS

AGRICULTURAL IMPACTS

Implementation of CALFED could directly affect crop acreages, the cost and supply of surface water, and costs of production. Crop acreages would be most directly affected by the Ecosystem Restoration Program, but to a lesser extent by the Water Use Efficiency Program, Levee System Integrity Program, Water Transfers, and Storage and Conveyance. Data on agricultural acreage loss was obtained as a range, and the direct impact was estimated by using a range from \$500 to \$1,000 of gross revenue per acre. This range was used because it is unclear what crops and value would be lost.

Employment multipliers from the IMPLAN database were obtained. Multipliers are provided in terms of jobs created per million dollars of output. A figure of 50 jobs per million dollars of agricultural revenue was adopted for this analysis.

The cost and supply of surface water may be affected by storage and conveyance components, and costs of production could be affected by the Water Quality Program, Water Use Efficiency Program, and Water Transfers.

Impacts would vary by region, depending not only on the different direct impacts of the alternatives, but also on the mix of crops currently grown, the composition and cost of water supplies, and other factors. Price changes would cause changes in gross revenues to irrigators from crop production. Changes in surface water availability cause changes in groundwater pumping, where groundwater is available, and consequently affect the cost of pumping in each region. Higher water costs stimulate increased investments in water-conserving irrigation equipment. Water transfers result in movements of water from agriculture to other regions and uses. The amount of water transfers affected is not estimated for this report.

FISHERIES, WILDLIFE, AND RECREATION IMPACTS

Implementation of CALFED could cause direct impacts on fish, wildlife, and recreation activities.

Direct economic impacts on fisheries and recreation involve several different economic sectors. Commercial fisheries are affected by the production of juvenile fish in the Bay-Delta and upstream rivers. Recreational fishing is important in the Bay-Delta and in upstream rivers and reservoirs. Recreation also involves surface water and in-river recreation opportunities unrelated to fishing; and these may be affected by storage, conveyance, and operations configurations. Wildlife viewing could be affected by changes in wildlife populations in and outside the Delta. This report includes general regional economic impacts of changes in recreational expenditures and revenues from commercial fishing.

The analysis considers the share of recreation expenses paid by nonresidents, the amount of expenditure paid in the region, and the pattern of expenditures by nonresidents. It was assumed that expenditure "increases" paid by residents would not affect the region because the increases would have been spent elsewhere

in the region. Nonresidents spend 80% of their recreation expenses in the region of destination; and nonresidents account for 25% to 40% of expenditures, depending on the region. Recreation expenses are spent on the following: service stations (27%), hotels and lodging (26%), eating and drinking (16%), miscellaneous retail (16%), and food stores (15%). Employment multipliers were obtained for each region from IMPLAN (1992).

M&I WATER SUPPLY IMPACTS

Implementation of CALFED could cause direct impacts on existing M&I water users through changes in water supply and cost. Both changes are included in the regional economic analysis as "income effects," in which differences in disposable income in a region for urban water customers represent changes in expenditures for other purchases. As urban water costs change, it was assumed that disposable income changes, dollar for dollar, in the opposite direction. Urban water costs are passed onto consumers, which reduces their disposable income available for other uses. Changes in consumer spending trigger rounds of indirect and induced impacts throughout the regional economy. These secondary effects are not considered here, because no information on costs of CALFED water supplies are available.

POWER IMPACTS

Potential direct impacts on power include change in production at existing facilities, increased production because of new facilities, and changes in power use for delivery of water. It currently is anticipated that all of the net change will be assigned either to the State Water Project (SWP) or Central Valley Project (CVP). In either case, the net effect is likely to be so small that there should be no discernible effect on price.

The regional impacts of changes in power use or production depend on where alternative sources of power are located. For example, if net power use increases, more power must be produced

somewhere else (net power use equals consumption minus production). If new generation capacity must be developed, beneficial economic impacts would occur near the location of the construction. If existing capacity was available, regional impacts would depend on where the owners of the capacity lived. Because no data were available for this draft, no analysis was included.

Some alternatives, especially components that retire irrigated land, would affect the amount of power use on farms. Any changes in on-farm power use are addressed qualitatively.

DELTA REGION

The Delta Region would experience the greatest relative effects for all considered CALFED alternatives variations since the Ecosystem Restoration Program, Water Quality Program, Water Use Efficiency Program, Levee System Integrity Program, and Water Transfers would most directly affect land and water resources used for production in the Delta Region. Tables 2 and 3 summarize regional economic effects for the Delta Region.

ALTERNATIVE 1

Implementation of Alternative 1 would have substantial economic impacts to employment, income, and public finance. The conversion of productive farmland, terrestrial and aquatic habitats for ecosystem restoration, levee system integrity, and storage and conveyance (Configuration 1C) would reduce farm revenues and labor requirements. Revenue lost is projected between \$58 and \$148 million per year, representing from 8 to 21% of regional agricultural revenue. Direct and indirect job loss would be between 2,900 and 7,400, representing 1.2 to 3.0% of regional jobs. The loss of property taxes would have a substantial negative effect on public finance for county and municipal jurisdictions within the area.

Alternative Configuration	Loss of Agricultural Revenue Annually (Million \$)		Regional Agricultural Revenue (%)		Annual Job Loss		Regional Jobs (%)	
	High	Low	High	Low	High	Low	High	Low
1A	148	58	21	8	7,400	2,925	3.0	1.2
1B	148	59	21	8	7,405	2,928	3.0	1.2
1C	148	59	21	8	7,420	2,935	3.0	1.2
2A	152	60	22	9	7,625	3,025	3.1	1.2
2B	152	60	22	9	7,625	3,025	3.1	1.2
2E	178	71	25	10	8,900	3,555	3.6	1.4
3A	154	61	22	9	7,700	3,038	3.1	1.2
3B	169	68	24	10	8,450	3,388	3.4	1.4
3E	168	68	24	10	8,425	3,400	3.4	1.4
3H	184	73	26	10	9,175	3,650	3.7	1.5
3I	162	64	23	9	8,075	3,200	3.3	1.3

SOURCE:
IMPLAN 1991.

Table 2. Regional Economic Impacts of CALFED Alternatives in the Delta Region—Loss of Agricultural Lands

Alternative Configuration	Recreation		M&I Water Supply	Annual Job Gain from Recreation	
	Increase in Expenditure (Million \$)		Supply Savings (Million \$)	Low	High
	Low	High			
1A	14	30	0	326	699
1B	20	36	0	466	838
1C	20	36	6	466	838
2A	11	28	2	256	652
2B	11	28	6	256	652
2E	29	56	6	675	1,304
3A	39	80	2	908	1,863
3B	39	80	8	908	1,863
3E	39	80	8	908	1,863
3H	39	80	8	908	1,863
3I	39	80	8	908	1,863

SOURCE:
IMPLAN 1991.

Table 3. Regional Economic Impacts of CALFED Alternatives in the Delta Region—Other Effects

Potential regional economic impacts from the Water Quality and Water Use Efficiency programs are expected to be negligible to low. Improved water quality and improved supply reliability through new storage and conveyance facilities (as proposed in Configuration 1C) would have beneficial effects on fishing and recreation industries, and for many Delta M&I water users. The costs associated with any additional water availability are unknown at this time; however, it is estimated that up to \$2.3 million could be saved by M&I industries. Recreational and fishery industries could increase regional spending from \$14 to \$36 million per year, creating between 300 and 850 jobs.

Construction and operation of storage facilities would generate new economic activity within the region during the construction phase, resulting in moderate beneficial impacts to income, employment, and expenditures. Most of these effects would be short term.

Additional storage and improved conveyance facilities would increase the supply and reliability of surface water flows. This could also benefit agricultural users and increase production levels. The effects on public finance and regional economics from the financing of storage and conveyance are currently unknown.

ALTERNATIVE 2

Implementation of Alternative 2 would have similar impacts as Alternative 1; however, more agricultural land may be converted for conveyance and storage facilities. This could increase the total regional loss of agricultural revenues to \$178 million per year, representing 25% of the regional total. Approximately 8,900 jobs, or 3.6% of regional employment, may be affected. Recreational and fisheries expenditures could increase from \$28 (Configuration 2A) to \$56 million per year (Configuration 2E), creating between 250 and 1,300 new jobs.

ALTERNATIVE 3

Implementation of Alternative 3 would have similar impacts as Alternative 2, except lost farm revenue could approach \$184 million under Configuration 3H. Under this scenario, more than 9,000 jobs may be lost. Due to increased business opportunities, the recreation and fisheries industries are expected to spend more under all Alternative 3 configurations than under the other alternatives. The forecasted amount would be between \$39 and \$80 million, creating up to 1,900 jobs. Configurations 3B, 3E, and 3I would include additional storage.

ALL ALTERNATIVES

The Delta Region would experience the greatest relative effects under all alternatives. The program elements would directly affect land and water resources used for agricultural production within the Delta area.

The Ecosystem Restoration Program would directly affect land and water resources used for agricultural production within the Delta area. There will be substantial losses to farm revenues, regional economics, and employment. Some of these effects would be offset anywhere from less than 10% to more than 30% by increased jobs and spending in the recreational and fisheries sectors. M&I water users could also realize up to \$2.6 million in annual savings from improved water quality and supply.

The Ecosystem Restoration Program could improve spawning, rearing, and survival conditions for anadromous fish species. Assuming other factors do not impede fish migration to the oceans, commercial fisheries would benefit.

Water use efficiency could improve the long-term viability of some lands by improving the profitability of some lands, but may indirectly result in changes in cropping patterns. Long-term viability can benefit regional economies that are predominantly based on local agricultural production.

The voluntary transfer of water that may occur out of the Delta region would not be expected to result in any significant economic impacts to this region.

BAY REGION

ALL ALTERNATIVES

None of the program elements are expected to produce long-term adverse economic effects on land and water resources within the Bay Region. Therefore, only negligible adverse impacts would occur to the regional economy. Public finances are not expected to be adversely impacted. Potential impacts on the regional economy of the Bay Region are presented in Table 4.

Implementation costs associated with the Water Quality and Water Use Efficiency programs would have short-term impacts on income generation. Over the long term, income generation might increase as a result of better regional water quality and supply.

Improved water quality and efficiency would benefit commercial fishing and recreation industries, and M&I water users. The resulting increase in recreational opportunities is expected to generate from \$3 to \$5 million in new spending under Alternatives 1 and 2, and from \$8 to \$12 million under Alternative 3. These expenditures would increase employment by a small amount: 0 to 50 persons in Alternatives 1 and 2, and 80 to 120 persons in Alternative 3.

Potential beneficial effects could result for commercial fishing from improved habitat, water quality, and flows, which could increase anadromous fish populations. Assuming other factors do not impede fish migration, commercial fisheries would experience positive economic benefits. Ocean harvest values could increase from the No Action level of \$33

million to \$36 million under Alternatives 1 and 2, and up to \$40 million under Alternative 3. Potential impacts on regional economics from recreation increases on the Bay Region are provided in Table 4. Additional water supplies created under Configurations 1C; 2B and 2E; and 3B, 3E, 3H, and 3I, could save M&I users from \$5 to \$17 million per year. Impacts from water quality and power production have not been estimated.

Water transfers may allow water to be imported into the Bay Region, augmenting existing supplies and providing future water supply reliability. This can benefit the regional economy as long as the source continues to be available. If the transfer is terminated, adverse economic impacts could occur as a result of the dependence on this water source.

There would not be any long-term detectable changes in employment, income, or economic output in the upper watersheds of the Bay Region. Restoration and structural improvement activities would produce temporary direct and indirect jobs and spending in the region, resulting in a negligible to minor beneficial economic impact. Once the projects are complete, employment, income, and economic output would return to near pre-project levels.

For all alternatives without new water storage or substantial water quality improvements, the Bay Region likely would experience negligible impacts on personal income, employment, and public finance. These impacts likely would result from recreation-related expenditures, and water quality and water use efficiency programs costs. For alternatives with storage or substantial water quality improvements, disposable income related to M&I water supply and water quality might be important, but overall impacts are anticipated to be negligible to low. The overall regional economic impacts for the Bay Region are expected to be small and not substantial.

Alternative Configuration	Recreation		M&I Water Supply	Annual Job Gain from Recreation	
	Increase in Expenditure (Million \$)		Supply Savings (Million \$)	Low	High
	Low	High			
1A	3	5	0	29	48
1B	3	5	0	29	48
1C	3	5	15	29	48
2A	0	2	5	0	19
2B	0	2	15	0	19
2D	3	5	15	29	48
2	3	5	15	29	48
3B	8	12	17	77	116
3	8	12	17	77	116
3H	8	12	17	77	116
3I	8	12	17	77	116

SOURCES:
IMPLAN 1991.

Table 4. Regional Economic Impacts of CALFED Alternatives in the Bay Region

SACRAMENTO RIVER REGION

Potential impacts on regional economics in the Sacramento River Region are presented in Tables 5 and 6. Table 6 shows impacts associated with loss of agricultural land, and Table 7 shows impacts on recreation and other resources. Job losses resulting from conversion of agricultural land could be from 650 to 3,300 annually; however, this amount is less than one-half of 1% of regional employment. Increases in employment related to recreation could create from 70 to 325 new jobs, offsetting less than 10% of the jobs lost in agriculture and related industries. Any impacts on M&I water supply economics and related regional effects would be small by comparison.

ALTERNATIVE 1

Implementation of Alternative 1 would have low to moderate impacts to employment, income, and public finance. Agricultural land would be converted under Configurations 1A

and 1B, and slightly more acres under Configuration 1C. Farm revenue loss is projected between \$13 and \$34 million per year under Configurations 1A and 1B and between \$22 and \$66 million under Configuration 1C. About 1% of the regional agricultural revenues could be affected. Between 650 and 3,300 jobs might be lost, representing less than 1% of all regional jobs. Since agricultural spending and income are a small share of total regional spending and income, the net effect on personal income, employment, and public finance would be negligible.

Some of the agricultural jobs losses will be mitigated by the construction and operation of storage and conveyance facilities under Configuration 1C. Construction and operation of storage facilities would generate new economic activity within the region during the construction phase, resulting in moderate beneficial impacts to income, employment, and expenditures. Most of these effects would be short term.

Alternative Configuration	Loss of Agricultural Revenue Annually (Million \$)		Regional Agricultural Revenue (%)		Annual Job Loss		Regional Jobs (%)	
	High	Low	High	Low	High	Low	High	Low
1A	34	13	0.8	0.3	1,700	650	0.1	0.0
1B	34	13	0.8	0.3	1,700	650	0.1	0.0
1C	66	22	1.5	0.5	3,300	1,100	0.2	0.1
2A	34	13	0.8	0.3	1,700	650	0.1	0.0
2B	66	22	1.5	0.5	3,300	1,100	0.2	0.1
2D	34	13	0.8	0.3	1,700	650	0.1	0.0
2E	66	22	1.5	0.5	3,300	1,100	0.2	0.1
3A	34	13	0.8	0.3	1,700	650	0.1	0.0
3B	66	22	1.5	0.5	3,300	1,100	0.2	0.1
3	66	22	1.5	0.5	3,300	1,100	0.2	0.1
3H	66	22	1.5	0.5	3,300	1,100	0.2	0.1
3I	66	22	1.5	0.5	3,300	1,100	0.2	0.1

Table 5. Regional Economic Impacts of CALFED Alternatives in the Sacramento River Region—Loss of Agricultural Lands

Alternative Configuration	Recreation		M&I Water Supply	Annual Job Gain from Recreation	
	Increase in Expenditure (Million \$)		Supply Savings (Million \$)	Low	High
	Low	High			
1A	7	14	0	82	163
1B	7	14	0	82	163
1C	13	26	2	151	303
2A	6	13	1	70	151
2B	12	25	2	140	291
2D	7	13	1	82	151
2E	13	26	2	151	303
3A	8	16	0	93	186
3B	14	28	1	163	326
3E	14	28	3	163	326
3H	14	28	3	163	326
3I	14	28	3	163	326

Table 6. Regional Economic Impacts of CALFED Alternatives in the Sacramento River Region—Other Effects

Additional negative regional economic impacts could result from costs of the Water Quality, Water Use Efficiency, and Levee System Integrity programs, and storage and conveyance. Costs are not yet available, so regional economic impacts cannot be quantified.

Improved water quality and improved supply reliability would benefit recreation and fisheries industries. Regional spending from these sectors would increase from \$3 to \$17 million per year, generating between 50 and 290 new jobs. The greatest benefit would be realized under Configuration 1C. Configuration 1C would also save M&I water users up to \$1.7 million.

ALTERNATIVE 2

Alternative 2 would have similar impacts as Alternative 1. Impacts from Configurations 2A and 2D would be similar to Configurations 1A and 1B, while impacts from Configurations 2B and 2E would mirror Configuration 1C. The only economic difference between the alternatives is that Configurations 2A and 2D would provide between \$0.1 and \$0.8 million in M&I water supply savings, compared to none under Configurations 1A and 1B.

ALTERNATIVE 3

Alternative 3 would have similar impacts as Alternative 1. Configuration 3A would convert fewer acres from production, while the other four configurations of Alternative 3 would each convert proportionally more. These resulting economic impacts would be similar to Alternative 1, Configurations 1A and 1C, respectively. Recreational and fisheries industries would benefit from increased opportunities, generating from \$8 to \$28 million in new spending. This would create between 90 and 330 new jobs.

ALL ALTERNATIVES

Restoration and structural improvement activities would produce temporary direct and indirect jobs and spending in the region,

resulting in negligible to minor beneficial economic impact. Once the projects are complete, employment, income, and economic output would return to near pre-project levels.

Implementation of upper watershed enhancements would result in retiring agricultural lands located adjacent to waterways in order to create a non-point source pollution buffer. Similarly, mining activities and cattle grazing would be restricted near waterways. Removal of land from productive use would likely have a negative effect on public finances and result in foregone economic opportunities. The magnitude of the impact, however, is expected to be minor and non-significant given the limited amount of acreage, animal unit-months (AUMs), and valid and patented mining sites affected. There would not be any long-term detectable changes in employment, income, or economic output.

Water use efficiency impacts are similar to those discussed for the Delta Region.

Increased levels of water transfers within or out of the region could have significant beneficial or adverse impacts, depending on the magnitude, timing, source of water, and pathway used to transport the water. Revenues generated by water transfers could augment local economies if the transfer proceeds are spent within the region. The transfer of water within the basin can help improve the reliability of water for local lands or communities that are water short. When temporary land fallowing or groundwater substitution is used as a source of water to transfer, adverse impacts could occur. These impacts would be minimal if appropriate protections are in place.

SAN JOAQUIN RIVER REGION

The form and amount of direct impacts on the San Joaquin River Region would be similar to those discussed for the Sacramento River Region, with a few exceptions. The San

Joaquin River Region stands to gain more than the Sacramento River Region from new water supplies, because the region is relatively water-scarce and water is relatively expensive.

Potential impacts on regional economics in the San Joaquin River Region are presented in Tables 7 and 8. Table 7 shows impacts associated with loss of agricultural land, and Table 8 shows impacts on other resources. Loss of agricultural land would result in a small reduction in agricultural revenue and employment relative to the entire economy. Job losses would be from 230 to 1,750. Increases in recreation and related industries would create from 50 to 300 jobs in the region. Any impacts on M&I water supply costs and related regional effects should be quite small by comparison.

ALTERNATIVE 1

Implementing Alternative 1 would have similar impacts in the San Joaquin River Region as the Sacramento River Region. The primary difference is that less agricultural land would be converted. The loss in revenue would be between \$5 and \$27 million, represent less than 0.1% of the regional total. Job loss would be between 200 and 1,350, also representing less than 0.1% of regional jobs. Therefore, effects to the regional economy would be negligible to low.

From \$3 to \$17 million in new spending would occur from the recreational and fisheries industry, generating between 50 and 300 new jobs. The greatest benefits would be realized under Configuration 1C.

ALTERNATIVE 2

Alternative 2 would be similar to Alternative 1, except that more productive agricultural land might be retired for ecosystem restoration and new storage and conveyance facilities. This additional loss in production would affect 0.1% of the total regional agricultural revenues and affect 0.1% of regional jobs. These effects are

considered to be low to moderate adverse economic impacts.

Some of the job loss and reduction in regional spending would be mitigated from the construction and operation of storage and conveyance facilities under Configurations 2B and 2E. Construction and operation of storage facilities would generate new economic activity within the region during the construction phase, resulting in moderate beneficial impacts to income, employment, and expenditures. Most of these effects would be short term.

From \$3 to \$17 million in new spending would occur from the recreational and fisheries industry, generating between 50 and 300 new jobs. The greatest benefits would be realized under Configurations 2B and 2E.

The San Joaquin River Region stands to gain more than most regions from new water supplies since the region is relatively water scarce and the cost is relatively expensive. M&I water supply may generate up to \$1.7 million per year.

ALTERNATIVE 3

Alternative 3 would have similar impacts as Alternative 2, Configurations 2B and 2E.

ALL ALTERNATIVES

Water use efficiency and upper watershed effects would be similar to those in the Sacramento River Region.

Alternative Configuration	Loss of Agricultural Revenue Annually (Million \$)		Regional Agricultural Revenue (%)		Annual Job Loss		Regional Jobs (%)	
	High	Low	High	Low	High	Low	High	Low
1A	11	5	0.0	0.0	550	232	0.0	0.0
1B	11	5	0.0	0.0	550	232	0.0	0.0
1C	27	12	0.1	0.0	1,350	582	0.0	0.0
2A	11	5	0.0	0.0	550	232	0.0	0.0
2B	35	16	0.1	0.1	1,750	782	0.1	0.0
2D	25	11	0.1	0.0	1,250	558	0.0	0.0
2E	35	16	0.1	0.1	1,750	782	0.1	0.0
3A	11	5	0.0	0.0	550	232	0.0	0.0
3B	35	16	0.1	0.1	1,750	782	0.1	0.0
3E	35	16	0.1	0.1	1,750	782	0.1	0.0
3H	35	16	0.1	0.1	1,750	782	0.1	0.0
3I	35	16	0.1	0.1	1,750	782	0.1	0.0

Table 7. Regional Economic Impacts of CALFED Alternatives in the San Joaquin River Region—Loss of Agricultural Lands

Alternative Configuration	Recreation		M&I Water Supply	Annual Job Gain from Recreation	
	Increase in Expenditure (Million \$)		Supply Savings (Million \$)	Low	High
	Low	High			
1A	3	8	0	51	135
1B	3	8	0	51	135
1C	8	17	4	135	287
2A	3	8	1	51	135
2B	8	17	4	135	287
2D	3	8	2	51	135
2E	8	17	4	135	287
3A	3	8	2	51	135
3B	8	17	4	135	287
3E	8	17	4	135	287
3H	8	17	4	135	287
3I	8	17	4	135	287

Table 8. Regional Economic Impacts of CALFED Alternatives in the San Joaquin River Region—Other Effects

Alternative Configuration	Recreation		M&I Water Supply	Annual Job Gain from Recreation	
	Increase in Expenditure (Million \$)		Supply Savings (Million \$)	Low	High
	Low	High			
1A	10	19	0	105	200
1B	10	19	0	105	200
1C	2	9	97	21	95
2A	10	19	31	105	200
2B	2	9	97	21	95
2D	2	9	56	21	95
2E	2	9	97	21	95
3A	10	19	47	105	200
3B	2	9	115	21	95
3E	2	9	115	21	95
3H	2	9	115	21	95
3I	2	9	115	21	0

Table 9. Regional Economic Impacts of CALFED Alternatives in the SWP and CVP Areas Outside the Central Valley Region

SWP AND CVP SERVICE AREAS OUTSIDE THE CENTRAL VALLEY

SWP and CVP Service Areas Outside the Central Valley would experience a pattern of impacts similar to those discussed for the Bay Region. The main differences are that water quality changes would be more important and beneficial, and potential benefits from fisheries and recreational fishing would be less.

Potential impacts on regional economics in the SWP and CVP Service Areas Outside the Central Valley are presented in Table 9. There is no identifiable effect on agricultural lands; effects on recreation and related employment range from a gain of 20 to a gain of 200 jobs annually. Impacts could be negative if, for example, recreationists spend more time in the Delta at the expense of the South Coast. Impacts related to M&I water supply savings could be as high as \$115 million per year.

COMPARISON OF PROGRAM ALTERNATIVES TO EXISTING CONDITIONS

Comparison of program alternatives to existing conditions indicates:

- All potentially significant adverse impacts that were identified when compared to the No Action Alternative would still be considered significant when compared to existing conditions.
- No additional significant environmental consequences have been identified when program effects are compared to existing conditions as opposed to No Action.

In summary, the conclusions regarding the significance of project effects on regional economics when compared to existing conditions would be similar to those compared to No Action.

MITIGATION STRATEGIES

None of the economic impacts would be considered significant; however, there would be substantial adverse effects from agricultural land conversion in many areas. The following measures would minimize the magnitude of adverse impact:

- Phase project elements to allow local economies to gradually adjust to new conditions.
- Minimize job loss to the extent possible by relocating facilities and shifting agriculture to new areas.
- Provide job referral and placement services, and job retraining.
- Minimize or avoid fallowing or shifting crops that require high input and output expenditures.
- Limit the amount of acreage that can be fallowed in a given area.
- Promote conjunctive use of surface and groundwater resources to encourage maintenance of agricultural production in selling regions without adversely impacting groundwater resources.
- Minimize the amount of water conservation that individual water transferors in a given region can incorporate.
- Limit the proximity and/or capacity of wells that can be used to develop water either for a direct groundwater transfer or groundwater substitution transfer.
- Operate a groundwater level monitoring program to determine whether pumping should be shifted, terminated, or reduced in any of the transferring pumps.

Mitigation measures for recreation sector employees are:

- Configure transfers to minimize effects on reservoir recreation.
- Ensure that all existing minimum instream flow requirements on affected rivers and reservoir minimum pools on affected reservoirs are met.

Mitigation measures for both agricultural and recreation sector employees are:

- Minimize job loss to the extent possible by relocating facilities and shifting agriculture to new areas.
- Provide job referral and placement services, and job retraining.
- Compensate local governments for increased demand for services resulting from labor displacement.
- Compensate workers displaced by specific transfers through such actions as augmenting unemployment insurance benefits.
- Promote geographically broad-based water transfers and ensure that no one localized area is involved in a disproportionately large amount of transfer activity.

POTENTIALLY SIGNIFICANT UNAVOIDABLE IMPACTS

No significant economic impacts are expected. Substantial effects on farm revenues and employment may occur as agricultural lands are transferred to other uses.

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