AIR QUALITY
SOILS
TRANSPORTATION
PUBLIC HEALTH
NOISE
SOCIAL WELL-BEING
CULTURAL RESOURCES
RECREATION
VISUAL RESOURCES

C-004627

water, a problem for urban water treatment facilities.

Some portions of the aquatic environment are adversely impacted by return flows. This includes adverse impacts from temperature and turbidity. Water that is diverted from a surface stream, to be routed across a field, but then returned to the stream, whether beneficially being used or not, increases in temperature and picks up sediments. The return flow then adversely impacts the temperature of the receiving stream, adversely impacting some aquatic species. Reduction of this occurrence has the potential to improve temperature conditions in many streams.

- In the urban sector, the following generally applies (text is from the draft *Water Use Efficiency Input Report*):

  Improved landscape efficiency or changes in types of landscape may reduce runoff. In an urban setting, landscape usually is not on a level area and often is sloped toward streets. Even with careful irrigation application and scheduling there can be surface runoff. Often the runoff will carry fertilizer, pesticides, and herbicides to the gutters and storm drains. Reduction of applied water will have water quality benefits since with less runoff there will be less introduction of contaminants into storm drains.

  However, according to a recent report by the Metropolitan Water District of Southern California and the U.S. Bureau of Reclamation, water conservation efforts in recent years have prompted many industries to increase internal recycling, which results in higher TDS concentrations in their waste streams. In addition, indoor water conservation measures reduce water use, increasing salinity concentrations of residential wastewater by 2 to 5 percent (Salinity Management Study, Phase 1 Progress Report, February 1997). Increased TDS levels in the waste stream will result in increased levels of TDS in treated wastewater, which in some areas is discharged back to usable surface waters. This could have adverse impacts to water quality.

- Section 5.4, p 5-65 - This section needs to be modified to reflect the comments above.

4. Air Quality

- Section 3.2 pp. 6-7 - Long Term Emissions - The document states that there will be a beneficial impact to air quality if agricultural land is retired. However, this is greatly dependent on the resulting use of that land. We need to note that as long as the land returns to habitat or other uses that have limited vehicle activity and maximum vegetative cover, there will be less emissions. This is true also for any land fallowing activities that are not permanent. However, if the land use is changed to urban uses (i.e., residential development, commercial/industrial) or to some recreational watersport activity on flooded lands (i.e., boating or jet skiing) there may be an increase in air emissions, though of a different kind.

- In general, shouldn't the report include discussion of possible growth inducing effects of a CALFED alternative and the impact of such growth on air quality. Or, alternatively, if an alternative improves reliability but relies heavily on water conservation in southern California to accomplish it, would that have growth limiting impacts and thus benefits to that region's air quality?

- Water transfers involving land fallowing can have a beneficial or adverse impact depending on the management of the fallowed ground. If a cover crop is planted or other vegetative matter grows, then there is less likelihood of fugitive dust. If, however, the fallowed land is kept barren, as is many times the case, fugitive dust may be greater than if the field was in standard production. Instances of barren fields during the late 80's drought created many dust storm problems, especially along the westside of the San Joaquin Valley. These storms even resulted in traffic accidents along I-5 and other major roadways.

- In general, agricultural water use efficiency measures could have the following impacts (text is from the draft *Water Use Efficiency Input Report*):

  On-farm improvements may result in reduced cultivation or field preparation activities which can result in reductions of particulate matter measuring 10 microns or less (referred to by the U.S. EPA as PM10) and vehicle emissions.

  Conversely, if increased water use efficiency is obtained through use of pressurized irrigation systems, increased emissions associated with pumping may occur. These emissions may be local if fossil fuels are used (e.g., diesel or natural gas) or regional if electricity is used. Temporary adverse effects to air quality may result from construction activities related to changes in on-farm irrigation systems (e.g., building tailwater ponds, trenching).

  District water use efficiency improvements could have beneficial impacts to air quality if efficiency improvements reduce maintenance activities along delivery systems (i.e., fewer weed control efforts because of canal lining). However, the activities may also increase other maintenance or operational activities and adversely impact air quality (i.e., cleaning lined canals of sediment). Changes in delivery systems, including regulating reservoirs and other flexibility improvements, will increase the energy necessary for delivery. This could adversely affect air quality.

  Reduction of vegetative growth, both agronomic crops and riparian vegetation, can result in increased soil and air temperatures. Heat from solar radiation that typically is moderated by plant evapotranspiration, including wetlands and other plant ecosystems surviving off current inefficiencies, would contribute directly to warming of the soil and ambient air. Increased air temperatures could result in increased evapotranspiration from remaining plants, thus possibly reducing the desired benefits.

  The net effect of improved water use efficiency on local and regional air quality needs further analysis. However, generally it is assumed that the net combination of specific

impacts does not have long-term adverse nor beneficial regional impacts.

- Urban conservation measures are unlikely to significantly affect air quality. To the extent that energy savings occur from reduced water and wastewater treatment associated with urban use, then air quality impacts associated with the production of energy may be reduced. In addition, it is feasible that less lawn area would exist if new, lower water using landscapes are installed. This would reduce the amount of lawn requiring mowing and thus reduce the associated impact from lawnmower exhaust. Short-term construction related impacts from urban conservation or reclamation programs could be adverse.

- Figure 5-1 - Both the water quality and water use efficiency programs have the potential for land conversion. The water quality program is considering land retirement as a tool to reduce drainage inflow to the San Joaquin River. The water use efficiency program may include land conversion (temporary or permanent) as a result of water transfer markets.

- Section 5.2.1.2, p. 12 - Water use efficiency will result in construction of tail water ponds, regulating reservoirs, new irrigation systems, land leveling or other land maintenance activities and many other agricultural as well as urban projects. Urban areas may construct local or regional recycling plants and distribution systems. All of these activities will have construction related impacts. Long-term impacts, whether beneficial or adverse, will not solely be the result of the economics of water. Other factors will influence conservation measures. Furthermore, water use efficiency actions are anticipated throughout the Central Valley, the Bay Area and the service areas outside the Central Valley. Impacts would thus occur in all air basins in the solution area.

5. Land Use Economics

- Section 5.2.1, p. 8-9, 15, 17, 19, - Water use efficiency measures are designed to work in coordination with other components to help meet the overall objectives of the Program. It is wrong to assume (end of paragraph on p.9) that efficient use will preclude the need for storage and conveyance options and thus have less impact on agricultural land use.

- Changes in land use may occur as a result of improvements in water use efficiency. In some instances, land may be removed from production because of increased costs and decreased profitability that may result from required efficiency improvements or increased district water charges (i.e., as part of tiered water pricing). If not profitable, land will typically not be used to produce agricultural commodities. On the other hand, improved efficiency may allow the continued viability of agriculture in some areas. This will tend to maintain the existing uses of agricultural lands and reduce the amount that may go out of production or being urbanized (in comparison to No Action or existing conditions).

  Efficiency improvements that result in greater water supply reliability but also higher annual cost may cause a shift in the types of crops grown. For instance, Westlands

Environmental Impacts Technical Reports: Comments regarding Characterization of Water Use Efficiency Impacts

1. Flood Control

- Executive summary - it is feasible that a CALFED solution may facilitate water transfers which results in more water being transfers. To the extent that such transfers involve water removed from storage in reservoirs (as a result of reoperation), additional space to store inflow and reduce the threat of downstream floods may result. For instance, if Yuba County Water Agency transfers water through reoperation of Bullard's Bar, they may have additional flood space available that did not exist otherwise.
- p. 14 - Need to reflect the potential for transfers to impact flood management (see above comment).
- p. 14 - On-farm improvements, such as tailwater recovery ponds or installation of pressurized systems (over gravity), can greatly reduce sediment transport from fields to streams and drains. Tailwater ponds allow sediment to settle and be contained on the field, though removal of it from the pond and placement back into the field is necessary. Pressurized systems typically do not generate surface runoff at rates that cause erosion and therefore, when properly designed and operated, do not create sediment transport problems. Sediment transport is not a significant issue in all agricultural areas, but does pose a problem in sandy or organic soils, such as occur in the Delta and areas of the San Joaquin Valley. In these areas, sediment in the runoff causes adverse impacts to receiving waters.
- On-farm efficiency improvements, especially drip and micro-irrigation systems, will result in increased reliance in groundwater sources. This is primarily because of the need for more frequent water delivery which most surface sources cannot meet. Increased groundwater pumping may also occur as a result of reductions in on-farm losses that previously supplied secondary users. Such secondary users who depended on this indirect source of surface water will most likely switch to groundwater as a replacement. Efficiency improvements will also reduce deep percolation which, in many cases, acts to recharge groundwater sources. If this form of recharge is diminished and no other recharge occurs, groundwater levels will most likely decrease. This could occur even with no change in the existing level of groundwater pumping. All of these actions combined may result in dropping groundwater levels and subsequent ground subsidence.

2. Geomorphology and Soils

- Generally, this document does not address any of the potential positive or adverse impacts associated with water use efficiency actions. Though our Program is policy oriented, it will result in the implementation of efficiency measures which will have impacts to sediment transport (field erosion), soil salinity, and ground subsidence.

- We anticipate some level of efficiency improvement, especially in the agricultural sector, to occur under No Action conditions. Such improvements will have some impact on soil salinity, sediment transport (field erosion) and ground subsidence. More impact would be anticipated as a result of the incremental difference from a CALFED alternative. Information on pp. 12-14 should be adjusted to recognize some effect of efficiency improvements under No Action.

- The anticipate beneficial and adverse impacts of water use efficiency under the CALFED alternatives is assumed to be consistent regardless of alternative or geographic location (with the exception of the Bay Region which does not have much agriculture). In general the benefits anticipated are as follows:

  Sediment Transport. On-farm improvements, such as tailwater recovery ponds or installation of pressurized systems (over gravity), can greatly reduce sediment transport from fields to streams and drains. Tailwater ponds allow sediment to settle and be contained on the field, though removal of it from the pond and placement back into the field is necessary. Pressurized systems typically do not generate surface runoff at rates that cause erosion and therefore, when properly designed and operated, do not create sediment transport problems. Sediment transport is not a significant issue in all agricultural areas, but does pose a problem in sandy or organic soils, such as occur in the Delta and areas of the San Joaquin Valley.

  At the district level, some efficiency improvements, such as canal lining or particular canal gates, can reduce flow velocities and reduce or eliminate erosion. Though, erosion from delivery systems is not a major problem in most areas since velocities are already quite slow.

  Soil salinity. Systematic under-irrigation should be avoided since it will lead to salinity build-up in the plant root zone. Salinity built-up will degrade the soil environment and adversely impact the soil's production ability. However, efficiency improvements are assumed to take into consideration salt leaching requirements to maintain the soil environment. Since leaching already occurs in most areas, efficiency improvements would not create any significant adverse nor beneficial impacts to long-term soil salinity.

  Ground subsidence. On-farm efficiency improvements, especially drip and micro-irrigation systems, will result in increased reliance in groundwater sources. This is primarily because of the need for more frequent water delivery which most surface sources cannot meet. Increased groundwater pumping may also occur as a result of reductions in on-farm losses that previously supplied secondary users. Such secondary users who depended on this indirect source of surface water will most likely switch to groundwater as a replacement.

  Efficiency improvements will also reduce deep percolation which, in many cases, acts

to recharge groundwater sources. If this form of recharge is diminished and no other recharge occurs, groundwater levels will most likely decrease. This could occur even with no change in the existing level of groundwater pumping.

All of these actions combined may result in dropping groundwater levels and subsequent ground subsidence. Groundwater levels should be closely monitored and active recharge programs established to ensure this does not occur.

- Other aspects of the water use efficiency program that target urban conservation, urban reclamation and water transfers are not anticipated to have any significant adverse or beneficial impact on geomorphology or soils with the exception of potential increased salinization of soils from use of reclaimed water if such use occurs.

3. Water Quality

- Section 2.2, p 2-6 - The initial part of the water use efficiency impacts is good. However, reference under direct long-term impacts to less Delta diversion occurring is mistaken. While it is true that conservation measures will result in some real water savings, most of these savings will be used to meet local demands in the areas implementing the conservation. For instance, if MWD gradually increases conservation levels by 0.5 million acre-feet annually, they will probably still divert the same amount of water from the Delta, but the increased reliability may reduce *future* demands by MWD on further Delta supplies. Therefore, there will probably be little to no reduction in current levels of Delta export as a result of efficiency measures. On upstream tributaries, however, decreases in applied water, though not creating any real water savings, can result in less diversion from surface sources. This can have ecosystem and water quality benefits (as described below).

  The premise that agricultural water savings will not be available for other purposes is wrong. While it is true that some real water savings developed by agriculture will be used locally to meet currently unmet demands, if the incentives are appropriate, there is nothing to stop the transfer of this water to other beneficial water supply purposes, environmental, urban, or other agriculture.

- Section 2.2, p 2-6, Direct short-term impacts - The reference to "leaking irrigation canals" should be removed. Instead, the paragraph may better read "Water recycling plants may be built, and the delivery, management, and application of irrigation water would be improved."

- Section 2.2, p. 2-7, second paragraph - Reduced water use, even when not providing real water savings, can reduce constituent loading in discharges, especially for agricultural discharges. For instance, excess fertilizers and eroded sediments that may be present in tailwater currently flow into drains and back into surface waters. If efficiency improvements reduce the amount of tailwater or actions are taken to reuse tailwater on the same or adjacent fields (tailwater return systems), sediments and excess agricultural chemicals will not be put into waterways. In addition, new irrigation technologies, such as

energy use, within operating constraints. Generation should include a value for ancillary services as discussed previously.

Because of these errors in unit energy values, any dollar results shown in the impact assessment are invalid.

Page 41: Discussion of Sites/Colusa Reservoir indicates as on-stream storage. We understand that it is an Off-Stream storage project and that water will have to be pumped in. Statement made that Sites would have a positive impact on energy resources, but if water has to be pumped in, this is probably not true.

Page 3, In addition to average capacity, capacity in a dry year or successive period of dry years should be analyzed to identify impacts on the system load carrying capability in such adverse condition.

Under section 3.2.1, a table of existing and proposed nameplate capacity ratings of the powerplants was mentioned, but it can not be found in the document.

Page 4, 1st. bullet: The maximum instantaneous cannot be estimated based on average month and year condition. Remove "instantaneous".

Page 5, for the purpose of assessing effects to the CVP and SWP power resources due to the CALFED proposals, discussion of Western's post 2004 marketing plan is more practicable.

Page 6, second bullet: indicates the forecasted market rate of power is the sum of the capacity, energy, and ancillary service values. It would be helpful to the reader to have it clarified as to whether this combination of rate is the same as composite rate.

Page 9, Suggest using $/MWH for all power values.

Page 13, section 5.1.1, Overall Study Area No-Action Resources Conditions , St. bullet indicates implementation of the CVPIA. It is not clear as to what extent the CVPIA mandate as it relates to power, was implemented for the No-Action alternative; especially, on the CVP Trinity River Division where operations at Clair Engle Reservoir and diversion to the Sacramento River have a very important role in determining generation from Trinity, Carr, and Spring Creek powerplants.

Page 17-18: With respect to power there needs to be more discussion about comparing No-Action to the Existing condition if the CVPIA mandates are implemented.

Page 22: The estimated price range should be $22.5/MHW to $30/MHW.

Page 25: As written, the energy used rate should be $26/MHW to $34/MHW. It is difficult to see why the energy used rate is higher than that of the generation rate.

TECHNICAL REPORTS- Transportation

General

If the purpose of the draft technical reports is to serve as appendices to the Programmatic EIR/EIS it would be helpful to incorporate a brief description of the three alternatives analyzed in the technical appendix.

Specific Comments - Affected Environment

Page 2, Section 2.0 Introduction line 8 correct "relects" to reflects.

Page 3 , Section 4.2.1 In general the terminology used for transportation descriptions is "controlled-access". Suggest line 1 be changed to read " The major controlled - access freeways that run north-south through the Delta are Interstate 5 and State Highway 99".

Page 4, Section 4.2.2 Southern Pacific is now owned by Union Pacific. References to Southern Pacific should be replaced with Union Pacific.

Page 4, Section 4.2.3 Need to define the term "commercial port" to include marinas or revise section to delete references to marinas. Line 12 refers to a commercial port located near Terminus, on the Little Potato Slough, believe the reference is to Tower Marina.

Page 5, Section 4.4 Line 1 revise to read " State Route 45" and the Sacramento River north from Knights landing.
Line 7 refers to "full-access freeways"- freeways are not usually considered full access but are normally referred to as "controlled access".

Page 5, Section 4.5.2 Line 4 refers to a rail line that follows the route of Interstate 5 through the San Joaquin Valley. I believe the reference may be to Highway 99 - since there is a rail route along I-5.

Page 6, Section 4.6.1 Line 13 states: "Interstates 15, 10 and 8 runs from east from Los Angeles toward Arizona". I-15 is considered North-South and I-8 originates in San Diego.

Specific Comments - Environmental Impacts

Page 2, 2.1 Summary of Potential Significant Impacts; It would be beneficial to the reader to have this broken into subsections that coincide with the regions i.e., Delta Region, Bay Region, Sacramento Region, etc.,.

Page 3,2.1 Line 1 refers the reader to the summary of potential impacts for the Delta Region for a discussion of the nature of these impacts. There is no discussion of relocation impacts although they are indirect it would be beneficial to mention that there are impacts of relocation (economics).

Page 3 Section 2.2 line 3 need to explain why there would be no mitigation for operational and

indirect impacts associated with relocation of road and rail lines. Are these impacts less than significant or are they unavoidable impacts of relocations. Page 2 states that there will be mitigation for temporary impacts.

Page 5 Section 5.1.1 Delta Region line 2 revise to read "trends in increased traffic patterns in this region are ...."

Page 5 Section 5.1.1 line 10 revise to read " but there is not sufficient existing information to evaluate the ...."

Page 5 Section 5.1.1 Second Paragraph, correct "unliked" to read unlikely.

Page 5 Section 5.1.1 Second Paragraph, last sentence revise to read: " Under the no action alternative, no impacts would be anticipated to railways and commercial shipping routes.

Page 6 Section 5.2.1 third paragraph last line - the rerouted ships would port at either Stockton or San Francisco, since these are the only two other commercial ports located within the study area.

Page 7 Section 5.2.1 last paragraph. This paragraph implies that the data developed for this section relied solely on information in a summary table, as opposed to obtaining the information through a completed analysis albeit a programmatic one. The receding information presented in the report implies an actual analysis based on existing information was completed. We assume a general traffic analysis associated for each alternative was completed and the paragraph should be changed to reflect this action.

Page 9 Section 5.3.3 Summary of Potential Significant Unavoidable Impacts appears to be an exact repeat of Section 2.3 Summary of Potential Significant Unavoidable Impacts it is confusing to the reader as to the distinguishing information in these two sections.

Page 9 Section 5.3.4 Direct Construction Related Impacts; Since the only impacts appear to be associated with the Ecosystem Restoration Program for Alternative I it might reduce the documents repetitions if this summary statement is simply made at the end of the subsection Ecosystem restoration Program as opposed to listing the other programs.

TECHNICAL REPORTS- Flood Control

General

Although the information provided is intended for a programmatic document it is somewhat difficult to review the level of potential impacts except in a very broad sense due to the very general nature of the proposed program alternatives. I assume that at the time a preferred alternative is developed a sense of the level of flood protection required for the Delta levees will be established or at a minimum a range of protection will be established. In addition, it would be helpful to identify in a general sense the area of levied islands that will protected and maintained

- Table 9, 11, 13, 15, 17, p. 47-49 - We need to be cautious in stating that increased storage will discourage conservation. While that may seem inherently true, the CALFED Program is intended to use all components together to meet the stated objectives of improving water quality, ecosystem health, levee stability and water supply reliability. Storage is not planned as a trade-off for conservation because storage is intended to have many other benefits toward the stated objectives. At the same time, water use efficiency is a common program and is anticipated to be implemented at equivalent levels in all alternatives.

7. Agricultural Economics

- Section 5.2 - The document should note the potential for improved water supply reliability as a result of efficiency improvements and that such gains in reliability may aid in securing annual financing necessary for most agricultural production.

- Section 5.2 - The document should also mention the potential adverse impact to water district budgets as a result of less delivered water or as a result of more irrigators switching to groundwater. This can impact the ability of the district to recapture fixed costs. Switching to groundwater is already occurring in areas of the Sacramento Valley because of, among other things, the increased cost of CVP water with the addition of the CVPIA restoration fund. A shift in cropping from row crop to trees is also adding to this phenomenon.

- Section 5.2 - should more reference to potential impacts of water transfers be included? It is feasible that the CALFED water use efficiency program may result in more water transfers occurring. This can create revenue sources for local users and districts that could be used to help fund more water conservation measures. If land fallowing is used to generate water for transfers could there be additional agricultural economic impacts?

8. Public Health and Environmental Hazards

- In general, water use efficiency improvements can result in the following impacts (text is from the draft *Water Use Efficiency Input Report*)

  Water use efficiency improvements may beneficially impact some aspects of public health. For instance, to the extent that efficiency improvements decrease residual wetland or seepage areas along delivery facilities or on farm fields, mosquito breeding and other vector habitat will be reduced. However, where this type of habitat currently exists is usually well displaced from human population areas. Therefore, further improvements may not be necessary.

  Because many efficiency improvements, both agricultural and urban, will include construction activities, the risk of contamination from hazardous materials, such as lubricants, fuels, and other elements, may increase. In the agricultural sector, long-term operation of pumping equipment included as part of some efficiency

improvements, including new groundwater wells, increases the risk of long-term contamination to groundwater sources.

At the same time, reduced deep percolation resulting from improved efficiency could reduce transport of nutrients, such as nitrogen, into groundwater sources. This would benefit those who rely on groundwater sources for domestic uses. Several groundwater wells throughout the valley have been contaminated by agricultural related constituents, such as nitrogen, at levels that are deemed unsafe to drink. Concern has been raised by the State Water Resources Control Board regarding the potential for further pollution of domestic groundwater wells from down-migration of fertilizers and other constituents used during agricultural production. To the extent that efficiency improvements allow for better utilization by the crop of such potential contaminants and decrease the chances for deep percolation, there may be beneficially impacts to future groundwater resources.

In addition to the possibility of reduced groundwater degradation, agricultural efficiency improvements can reduce the level of contaminants in surface waters that are of public concern. For instance, reduction in applied water on Delta farmland could result in reduced pumping of drainage water off Delta islands. This drainage water is typically laden with organic carbons, a major concern of public drinking water quality. Reducing drainage water could reduce the loading of organic carbons into surface waters of the Delta, the primary source for export water supplies.

In addition, areas along the westside of the San Joaquin Valley introduce selenium into surface waters. This constituent can also be harmful to public health if in high enough quantities. The reduction in runoff and deep percolation that flows to surface water could reduce selenium loading.

9. Noise

- p. 12, Section 5.2.2 - We should mention that efficiency improvements in the agricultural sector may also result in increased noise levels if existing gravity-fed irrigation systems are switched to pressurized systems which require pumping. In many instances, natural gas or diesel engines are used to drive the pumps. These can be noisier than and electric pump, however they are typically located away from residences. There will also be construction related noise impacts associated with one-time installation of new equipment and systems but also potentially with increased field maintenance activities, such as land leveling. On the contrary, improved irrigation in agriculture may result in fewer weed problems and less need to cultivate fields, thus fewer occurrences of noise from tractors and other equipment.

10. Social Well Being

- Generally in the urban sector, implementation of urban conservation measures is not likely to have significant impacts to social well being or community stability. In fact,

experience of the recent drought show that implementation of efficiency improvements such as toilet replacement may provide job and income for many in the community. Some water suppliers have implemented toilet replacement program that employ people from low income areas and provide revenues for schools. Such programs, while temporary, can benefit the local communities.

- In the agricultural sector, the following impact, though not significant, should be highlighted (text is from the draft Water Use Efficiency Input Report).

Community Stability. During the drought of early 1990's, many communities faced reduced employment resulting from significant reduction in cropped acreage. Farm laborers were left jobless. To the extent that efficiency improvements can help improve water supply reliability, employment opportunities will be maintained. This should contribute to the stability of many local agricultural communities.

However, efficiency improvements can also have adverse impacts on farm labor. One benefit of improved irrigation efficiency that may be experienced by a grower is reduced labor, whether because of less cultivation or changes in how crops are irrigated. Pressurized irrigation systems can have the biggest impact. Typically, what used to be the job of several laborers, now can be replaced by just one. It is estimated that as technology advances, 30 percent less labor is needed to perform the same job. So, for every three laborers now employed, only two may be employed once efficiency measures are implemented. California already is a global leader in the number of people that can be provided for by each employee. In some developing and third world countries, it may take more than 3 farmers just to feed 4 people. In California, one farmer can provide for more than 100 people.

Job opportunities will also be created by these efficiency improvements. As irrigation management improves, so must the knowledge of those irrigating or scheduling irrigations. This will result in the need for more skilled labor, at higher costs. In addition, the design and installation of new or improved on-farm or district water delivery systems will create more jobs for skilled laborers. It is conceivable that efficiency improvements, especially those that involve physical constructions will add to local employment for a long period of time.

Improved efficiencies often translate to higher crop yields and better quality of farm products. Such advances can increase on-farm direct income, benefitting the grower's net income. This often translates to additional economic activities. Increased income can also help the overall economy in total sales and purchase and increase tax revenues that strengthen vital functions such as schools, roads, and social and health services.

Food and Fiber Supply. Efficiency improvements can result in improved crop yields. Improvements in the yield per acre-foot of applied water, even with possible reduction in water supply, will result in greater production of food and fiber on the same land. As populations continue to increase, not only in the state, but in the nation and

globally, highly efficient food production will become a greater asset. Improved irrigation can help position our farmers to provide for a growing global population.

11. Visual Resources

- Section 1.0, p.1, last sentence - I think people might argue that service areas outside the Central Valley have few major visual resources. The Los Angles Basin has been changed just as much, if not more, than the San Francisco Bay Area!

- Section 2.1, p. 2, last sentence - This explains why it was assumed in Section 1 that the area outside the Central Valley has no major visual resources since this document assumes that the area from Fresno to Bakersfield is "outside the Central Valley". This document needs to reassess the solution area maps! The write-up in Sections 4.5 and 5 probably also has to be adjusted to appropriately address the fifth geographic region.

- Section 5.1.2, p. 10, Sacramento River Region - The last sentence in this paragraph refers to land retirement. It should be noted what context land retirement may occur under. Primarily, land retirement will occur as a result of the ERPP, the water quality program, and *possibly*, as a result of water transfer markets. Currently, the statement could be interpreted to mean that CALFED intends to retire land in this region for water supply purposes, which is not true. In addition, land retirement that occurs as a result of water transfers may leave land barren (fallow) for a few years before returning to cropped land. This may be an adverse impact on visual resources.

- Inefficiency in the delivery or application of irrigation water has created many individual plant and wildlife habitats, such as wetlands, riparian groves, grassy areas, and canal-bank habitat. These inadvertent habitats often provide beautiful scenery and add to the aesthetics of the local area. In many cases, these areas also harbor various forms of wildlife, including waterfowl and song-birds. Wildlife can be an integral part of the aesthetics of an area. Improvements in efficiency typically target reducing the same water that supplies these areas. Reduction in the supply would adversely impact, even eliminate, such habitats and could adversely affect the local aesthetics.

12. Recreation

- Section 5.1.1, p. 3, San Joaquin River Region-Resource Conditions - This paragraph seems out of place and mis-represents that effect of subsides (crop or water?). Is the CALFED Program assuming that, under No Action, land is retired in the San Joaquin Valley or is this just an assumption of this document? Other studies have shown that land in the San Joaquin Valley will be retired as a result of urbanization or soil salinization. Either of these do not make very good recreational uses. In addition, what is meant by the 'absence of subsidies'? Is this referring to what some people claim is a water subsidy or is this referring to crop subsidies. Either way, it is a matter of opinion and should not be reflected in this document in this manner. It may be wiser to state that no impacts to recreation are anticipated in this region under the No Action alternative.

- Section 5.1.2, p. 5, Water Use Efficiency - Actions taken at wetlands to modify dewatering would not be designed to adversely impact the wetland operation. Modifications would only be made if there is a benefit to other resources without an impact to the wetland.

- In general, efficiency improvements in the agricultural sector would result in the following:

  To the extent efficiency improvements reduce wetlands or riparian areas that survive off existing irrigation losses, and to the extent that changes in irrigation pricing act to induce crop changes or act as a disincentive to after-harvest flooding of fields (especially rice), the amount of beneficial waterfowl habitat may be reduced. This could have adverse impacts on the availability of lands for recreational hunting or for bird watching.

  At the same time, efficiency improvements may lead to reduced diversions, leaving more water for instream benefits. Instream benefits may include increased flow through a particular reach of stream for a particular year, changes in the timing of reservoir releases, and decreased diversion impacts on aquatic species. All of these may have a combined beneficial impact on recreational and commercial fishing, and other recreational activities such as boating (both instream and on reservoirs).

- Water transfers may have a beneficial impact to instream and reservoir recreation. For instance, transfers may allow water to be left in reservoirs or requirements may be placed on a transfer that dictate the timing such that there is an instream fishery benefit. Such actions could provide additional recreational benefits.

13. Riverine Hydraulics and Hydrodynamics

- This document does not address any of the Common Programs. Water use efficiency can have an impact, though maybe not significant, on riverine hydraulics. This is especially true for smaller tributaries where reducing diversions or modifying the timing of diversions and reservoir releases can have beneficial impacts to water quality and the ecosystem. Added together, many small modifications can result in benefits that are noteworthy and should be discussed. The ability to modify reservoir releases, reduce diversions, and leave water instream is a primary attribute of implementing conservation measures in areas like the Sacramento Valley where no "real" water savings exists.

- The following text provides a good overview of the impacts to surface water flow associated with water use efficiency improvements, primarily in the agricultural sector (text is from the draft Water Use Efficiency Input Report).

  Reduction in applied water can have both positive and negative impacts to surface water management. Secondary water users or habitat areas that indirectly use surface losses will no longer have access to this supply. Instead, these beneficial uses may have to obtain their water supplies directly from other surface sources or be adversely

impacts, such as urbanization, that is removing valuable, though maybe not ideal, habitat.

- Section 5, Impacts 2.1, etc., 3.1, etc., 4.1, etc. - The comments stated just above for Impacts 1.1, etc. also apply to the other regional write-ups.

19. Cultural Resources

- Generally, water use efficiency improvements will not impact cultural resources since the actions will be implemented on existing farmed and urbanized lands. However, there is a chance that construction projects necessary to implement some anticipated efficiency measures could adversely impact cultural resources. For instance, canal lining, new tailwater recovery ponds, and new urban water recycling plants and distribution pipelines will all result in construction activities. These would be considered moderate construction related impacts.

20. Surface Water Hydrology

- The potential impacts of water use efficiency are not mentioned at all in this report (with the minor exception of page 10, under 'Diversions'. We need to make qualitative reference to the potential impacts of reductions in applied water that may result from efficiency improvements. In addition, we need to recognize the potential impact an expanded water transfers market may have on surface water management.

- The following text provides a general overview of potential impacts from agricultural water use efficiency improvements (text is from the draft *Water Use Efficiency Input Report*):

  Efficiency improvements are intended to reduce losses associated with irrigation activities. Loss reduction is a reduction in applied water. This reduction can have both positive and negative impacts to surface water management. Secondary water users or habitat areas that indirectly use surface losses may no longer have the benefit of water supplied through inefficiencies. Instead, these beneficial uses may need to obtain their water supplies directly from other surface sources or otherwise be adversely impacted. For agricultural lands, this may mean that new diversion points are created on the river or new lands are annexed into existing water districts. Such new direct deliveries may adversely impact surface water management. In addition, habitat areas that currently benefit from the surface losses may incur adverse impacts which may require mitigation actions, such as direct delivery of water.

  The beneficial impacts of reduced applied water are associated with potential reductions in stream diversions and changes in the timing of reservoir releases. Currently, some portion of surface diversions flow across fields, into drains, and back to surface water bodies. This sometime unnecessary flow detour can be reduced through efficiency improvements. The result could be more water available to a particular stretch of stream or river, rather than being routed across fields and through drainage courses.

California agriculture produces an abundance of products including over 50% of the U.S. production of fruits, nuts, and vegetables on 3% of U. S. farmland. The economic value of agriculture to the communities of the Sacramento Valley, the Delta, and the San Joaquin Valley is far greater than the gross value of the farm products (farm gate value) or the number of direct farm-related jobs. There are two ways in which the agricultural industry impacts local and regional economies. First, to produce and harvest a crop requires a variety of inputs such as seed, fertilizer and chemicals, water, equipment and fuel, and labor. Then, after harvest, farm produce is transported, stored, processed, packaged, and marketed. These result in direct economic activity. Second, is the distribution of the income resulting from the initial direct economic activity. This income ~~reverberates or ripples through~~ supports local and regional economies as this farm and farm-related income is spent for food, housing, other consumer items, ~~entertainment, etc~~. Depending on the farm commodity produced, and the extent of value-added processing it receives, the economic multiplier effect can range from 1.8 to 4, with a general average of 2.7 often cited. According to California agricultural statistics for 1995, farm income totaled $22.1 billion and generated over $70 billion in related economic activity, resulting in an overall economic multiplier of 3.2.

~~However, the importance of agriculture to the economy of the Central Valley is even greater~~. A November, 1992 study by the University of California estimated that farming and farm-related industries in the Central Valley directly and indirectly create about three out of ten jobs and about 30% of personal income. State-wide agriculture and related activities account for about one in every ten jobs.

Sources:

California Agricultural Resource Directory, 1995. CDFA
California Agricultural Resource Directory, 1997. CDFA
The Measure of California Agriculture - Its Impact on the State Economy. UC Davis Agricultural Issues Center, 1992. UC DANR # 21517.
Risks, Challenges and Opportunities - Agriculture, Resources and Growth in a Changing Central Valley, American Farmland Trust, 1989.

Per Steve Shaffer
2/18/98
B-5651