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Socioeconomic Assessment of the Proposed Palo Verde Irrigation District Land Management, Crop Rotation and Water Supply Program

Final Report
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Prepared for

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EXECUTIVE SUMMARY

Palo Verde Irrigation District (PVID) and The Metropolitan Water District of Southern California (Metropolitan) have proposed a Land Management, Crop Rotation and Water Supply Program (Program) in the California portion of the Palo Verde Valley within PVID and below the Palo Verde Diversion Dam. The proposed Program would provide Metropolitan with a water supply option of approximately 25,000 acre-feet up to approximately 111,000 acre-feet of Colorado River water per year for 35 years. Although the exact agreement structure has not yet been arrived at, an estimated 60 to 70 landowner agreements, each with a term of 35 years, between Metropolitan and participants in the Palo Verde Valley are contemplated. Enrolled farmlands would receive a one-time entry payment plus bi-annual payments during years in which the land is removed from agricultural production.

Concurrent with the preparation of the environmental documentation for the proposed Program, PVID commissioned a socioeconomic assessment of the effects the Program would have on the local economy. The focus of this study was on third-party economic impacts. The analysis estimated changes in the economic welfare of businesses and individuals within the Blythe area not directly participating in the proposed Program. Changes in the economic welfare of Program participants were not part of this study.

Input-output (I/O) analysis using an IMPLAN model for the Blythe region was performed to translate direct changes in production activity and local spending due to the Program into changes to regional output, income, employment and tax receipts.

The socio-economic assessment identified three sources of direct economic change that would stem from the proposed Program:

- Reduced irrigated acreage and associated reductions in farm activity
- Spending of Program entry payments by farmers
- Spending of Program biannual payments by farmers

These direct changes were quantified and then incorporated into the IMPLAN I/O model of the Blythe economy. The I/O analysis estimated changes in:

- Income of non-Program participants
- Regional employment
- Tax receipts

Additionally, the assessment evaluated the:

- Distribution of impacts across industry sectors

- Potential effects on ARZC rail operations
- Potential effects on local school funding
- Potential impacts to river recreation and related businesses
- Potential impacts associated with changes in groundwater levels

Impacts were estimated for three scenarios of Program operation:

- Minimum acreage rotation
- Average acreage rotation
- Maximum acreage rotation

The assessment relied on the following data and models:

- Crop Production Adjustments were based on (1) data from the 1992-94 Test Program; (2) analysis of crop returns; (3) interviews with PVID staff.
- Farm Revenue Adjustments were calculated from Agricultural Commissioner data for Riverside and Imperial Counties from 1997 to 2001.
- Local Spending of Program Entry Payments was based on surveys of potential Program participants.
- Local Spending of Program Biannual Payments was based on survey results from the 1992-94 Test Program.
- Changes in Farm Input Purchases were calculated with data from the IMPLAN input-output model and UC Cooperative Extension production budget data.
- Changes in Regional Income, Employment, and Tax Receipts were estimated using IMPLAN Input-Output modeling software and a zip-code level database for the Blythe area.

Assessment Results

The following impacts were identified by the assessment:

- Income of Non-Participants would decrease over the 35-year Program term by a maximum of one percent, or a present value of $1.6 million, $9.6 million, and $21.4 million for the

minimum, average, and maximum scenarios, respectively. This is the cumulative, not annual, expected change in non-participant income.[1]

- Regional Employment would show a slight increase in the first five years of the Program due to local spending of Program entry payments and then decrease up to a maximum of two percent of baseline employment, or about 100 full-time-equivalent (FTE) jobs.[2] The estimated average annual reduction in employment over the 35-year Program term was 40 FTE jobs, 69 FTE jobs, and 93 FTE jobs for the minimum, average, and maximum scenarios, respectively. These results include some owner/operator labor that would be compensated by the Program and, thus, may be overstated.

- Regional Tax Receipts would be mostly unaffected by the proposed Program. For the minimum scenario local tax receipts were calculated to increase slightly. In present value terms, local tax receipts would increase $0.4 million for the minimum scenario, and decrease by $0.6 million and $2.1 million for the average and maximum scenarios, respectively. The maximum reduction in local tax receipts for any of the scenarios was 0.7 percent of baseline tax receipts.

- School Funding could experience a slight decrease due to the Program. In present value terms, the assessment concluded that over the 35-year Program term local school district funding could decrease by a maximum of $0.5 million, $1.1 million, and $2.0 million for the minimum, average, and maximum scenarios, respectively. As with the income, this is the cumulative, not annual, change over the 35-year Program term.

- Distribution of Impacts: The assessment indicated impacts of the Program would not be distributed uniformly throughout the Blythe economy. Adverse changes to non-participant income and employment would concentrate within the farm labor, farm services, and farm supply sectors. As much as 15 percent of farm sector employment could be affected by the Program under the maximum operation scenario. Lesser negative impacts would occur within the transportation sector. Positive impacts would occur mostly in the construction sector of the economy.

Table E.1 summarizes the results of the assessment. Changes to non-participant income, local tax receipts, and school funding are cumulative, not annual. Cumulative dollar impacts have been expressed in terms of present value using a six percent real discount rate. Employment changes are shown as the average annual change over the 35-year Program term. Employment is expressed in terms of full-time equivalent jobs.

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[1] Readers should note that these estimates do not refer to changes in business output, but rather income, which is defined as all income to workers paid by employers; self-employed income; interests, rents, royalties, dividends, and profit payments.
[2] A full-time equivalent job is equal to 2080 hours of labor per year.

Table E.1
Summary of Socio-economic Assessment*

	Program Operation Scenario		
	Minimum	Average	Maximum
Average annual change in FTE Jobs	-40	-69	-93
Present value of cumulative change in non-participant income	-$1.6 million	-$9.6 million	-$21.4 million
Present value cumulative change in local tax receipts	$0.4 million	-$0.6 million	-$2.1 million
Present value of cumulative change in local school funding	-$0.5 million	-$1.1 million	-$2.0 million

* Shown impacts do not account for the positive impacts of future community improvement programs.

Other Issues Addressed by the Assessment

Community leaders during interviews expressed concern that the proposed Program would adversely impact several regional assets important to the local economy. These were (1) ARZC rail operations, (2) river-based recreation and dependent businesses, and (3) local groundwater wells. With respect to each of these areas of concern, the assessment concluded:

- ARZC Rail Operations: For the minimum and average scenarios, the proposed Program could potentially reduce rail traffic on the ARZC spur-line serving Blythe by as much as 14 percent during the later years of the Program. However, during the first 10 to 24 years, only 4 percent of rail traffic is expected to be affected. For the maximum scenario as much as 15 percent of current rail demand could be affected by the proposed Program. ARZC has indicated that profitability of the spur-line is currently marginal. This is primarily due to the loss of alfalfa shipments to trucking competitors.[3] ARZC officials have suggested that a 25 percent reduction in spur-line traffic could result in closure of the line.[4] The maximum potential decrease in demand for rail service due to the Program under any of the Program scenarios was significantly below this level.

- River-based Recreation: The EIR for the proposed Program concluded that after accounting for potential cumulative impacts associated with future expected downstream diversions and river operations changes in river hydrology "would constitute a less-than-significant cumulative hydrologic impact."[5] The EIR for the proposed Program also concluded that "the

[3] Personal communication with Mr. Brad Chapman, ARZC, January 14, 2002.
[4] Letter dated October 9, 2001, to Ed Smith, General Manager, PVID, from Brad Chapman, ARZC.
[5] Palo Verde Irrigation District, "Environmental Impact Report for the Proposed Palo Verde Irrigation District Land Management, Crop Rotation and Water Supply Program." May 2002. Page 6-18

proposed Program would not directly affect riparian and aquatic vegetation along the Colorado River, its backwaters and other wetland areas supported by the river and PVID's Outfall Drain, and the proposed Program would have only negligible indirect effects on this vegetation. As a result, the proposed Program would have a less-than-significant impact on wildlife that utilize the vegetation as habitat."[6] Consequently, recreational activity and associated economic activity dependent on these natural assets is not expected to be adversely affected by the proposed Program.

- Groundwater Well Operations: The Draft EIR concluded that the proposed Program could reduce local groundwater levels by one to two feet within the valley. The Draft EIR concluded the change in groundwater elevation would constitute a less than significant impact and noted that (1) high groundwater levels caused by irrigation historically have been a problem in the Palo Verde Valley, affecting crops and constraining other human uses, and (2) a one-to-two foot decrease in groundwater levels would not affect the viability of water supply wells or groundwater availability within the Palo Verde Valley.[7]

Finally, it should be noted that several beneficial impacts of the proposed Program were not addressed because of insufficient data. These were:

- Farm Sector Stability: The proposed Program's entry and biannual payments would reduce debt/equity ratios for PVID farms and stabilize income. This would facilitate better terms for production and capital financing and help to stabilize the regional farm economy. The biannual payments would also help to insulate regional income and associated spending during periods when farm commodity prices are depressed.

- Reallocation of Farm Resources: The analysis did not quantify benefits of reallocating farm operator time and resources to other activities during periods when land is rotated out of production. Likewise, benefits associated with reallocation of farm resources to increase productivity on farm land remaining in production were not incorporated into the analysis.

- Metropolitan Water District Field Office: The analysis did not quantify benefits associated with operation of a field office within the Valley by Metropolitan Water District. This field office is expected to staff 1-2 full-time positions during the operation of the proposed Program.

- Program Administration Costs: The analysis did not incorporate annual costs that Metropolitan Water District would incur in the Palo Verde Valley due to Program administration.

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[6] Ibid. Page 4-78
[7] Ibid. Page 4-47.

Conclusion

The assessment results indicate that the proposed Program would cause a slight decrease in aggregate third-party income and employment within the Blythe area. Under the maximum Program operation scenario, changes to income and employment would not be expected to exceed two percent of baseline levels. For the average and minimum scenarios the total decrease in third-party income and employment would not be expected to exceed one percent of baseline levels. Negative impacts of the Program would center within the farm labor, services, and supply sectors. Beneficial impacts would concentrate primarily in the construction sectors, through on-farm investment of Program payments, and in the wholesale and retail sectors, through local spending of Program payments.

The assessment did not evaluate the type or the cost of future community improvement programs that, if implemented, would help offset the negative economic impacts of the proposed Program. Depending on the type of community improvement programs to be implemented, it is anticipated that the total cost of such community improvement programs would be less than the sum of the negative impacts presented in Table E-1. Community improvement programs to be implemented would aim to stimulate economic growth in the Palo Verde Valley and help create more jobs. Ongoing efforts between PVID, Metropolitan, and various representatives of the Palo Verde community resulted in the formation of an Ad-Hoc Scope Committee in January 2002. One of the main tasks of this Ad-Hoc Scope Committee is to establish a board that would be charged with the identification and implementation of the appropriate community improvement programs.

1. DESCRIPTION OF PROPOSED PROGRAM AND ASSESSMENT

1.1 Program Overview

The proposed Program would provide Metropolitan with a water supply option of approximately 25,000 acre-feet up to approximately 111,000 acre-feet of Colorado River water per year for 35 years. Although the exact agreement structure has not yet been arrived at, an estimated 60 to 70 landowner agreements, each with a term of 35 years, between Metropolitan and participants in the Palo Verde Valley are contemplated. Enrolled farmlands would receive a one-time entry payment plus bi-annual payments during years in which the land is removed from agricultural production.

Execution of contracts committing landowners to participate in the proposed Program would be voluntary. At Metropolitan's request and with specific notice periods, specific portions of farmlands subject to the contracts would not be irrigated for the requested period of time. Non-irrigation of farmlands would be rotated once every year up to once every five years, at the participant's option. In the event that a landowner fails to comply with its obligations, Metropolitan would have the right to require the non-irrigation of discrete parcels of land until compliance is attained. Program lands would not be irrigated beginning August 1 of each year through July 31 of the following year (a "contract year"). For each acre of Palo Verde Valley farmland not irrigated under the proposed Program, an amount of water equal to the amount of water "saved" by non-irrigation would be made available to Metropolitan. It is estimated that a net of approximately 4.2 acre-feet of Colorado River water is used by actively farming one acre of land within the Palo Verde Valley for one year (based on the diversion-less-return method).

1.2 Program Payments and Acreage Rotation

At a minimum, a total baseload area of 6,000 acres would not be irrigated each contract year of the proposed Program's 35 years. Participants would be required to comply with Metropolitan's request to increase the non-irrigated area from 6,000 acres to a maximum of 26,500 acres. Once increased, the increased area would not be irrigated for a minimum of two years and could be decreased on a minimum one-year notice by Metropolitan.

A maximum of approximately 29 percent of any one participant's land in the Palo Verde Valley would not be irrigated in any one contract year under the proposed Program, unless there is insufficient interest in the proposed Program, in which case the area of an individual farm that is not irrigated could be voluntarily increased up to a maximum of approximately 35 percent. (The Program's 29 and 35 percent values would be a guide—further adjustment could be necessary to recognize individual field sizes, connections to headgates, and other physical characteristics of the land.)

Up to a maximum of 24,000 acres per year in any 25-year period or 26,500 acres per year in any ten-year period during the 35-year Program may be taken out of irrigated production under the proposed Program. Metropolitan would exercise the increases such that the average non-irrigated area over the 35 years would equal at least 12,000 acres per year (approximately 13 percent of irrigated valley lands below Palo Verde Diversion Dam).

In exchange for an agreement/contract not to irrigate certain portions of farmlands at Metropolitan's request, Metropolitan would compensate participants with both a one-time Program entry payment and bi-annual compensation during active participation in the proposed Program. The one-time entry payment would depend on the maximum number of acres not to be irrigated in a contract year under the individual land contract. In addition, Metropolitan would pay participants a bi-annual payment per acre multiplied by the acreage not irrigated in that contract year under the land contract. Each participant would be responsible for payment of property taxes, PVID water toll and assessment fees, vegetation abatement, dust control and all other costs related to the Program lands. Metropolitan would also reimburse PVID for administrative costs associated with the proposed Program.

1.3 Program Implementation Scenarios Used For Assessment

This study evaluated socioeconomic impacts for three alternative Program implementation scenarios: (1) minimum operational; (2) average operational; and (3) maximum operational. The amount of acreage that would be rotated out of production by the Program for each scenario is shown in Table 1.

Table 1.
Acreage Reductions for
Three Program Operational Scenarios

Minimum Operational Scenario	
Program Years	Acres Per Year
2003 - 2026	6,000
2027-2037	24,000
Average Operational Scenario	
Program Years	Acres Per Year
2003 - 2012	6,000
2013 - 2037	24,000
Maximum Operational Scenario	
Program Years	Acres Per Year
2003 - 2027	24,000
2028 - 2037	26,500

For each scenario the analysis assumed 26,500 acres would be signed into the proposed Program during the initial two-year entry period and this acreage would receive one-time entry payments totaling approximately $82 million in 2001 constant dollars.[8] Total Program payments to participants over the life of the proposed Program for each scenario would depend on the quantity of acreage removed from production. The analysis assumed that the bi-annual payments would be set at $550 per acre for each year acreage is taken out of production.

Table 2 summarizes participant payments for each operational scenario. Payments are expressed in 2001 constant dollars.[9] The present value of Program payments was calculated using a real discount rate of six percent.[10]

Table 2.
Program Payments for
Three Program Operational Scenarios

Minimum Operational		
	Total (mil. $)	Present Value
Entry Payments	$82	$75
Bi-annual Payments	$214	$60
Total Payments	$296	$135
Average Operational		
	Total (mil. $)	Present Value
Entry Payments	$82	$75
Bi-annual Payments	$346	$106
Total Payments	$428	$181
Maximum Operational		
	Total (mil. $)	Present Value
Entry Payments	$82	$75
Bi-annual Payments	$453	$195
Total Payments	$535	$270

* Present value calculated using 6% discount rate

[8] Under the Maximum Operational scenario it is assumed additional acreage is enrolled after the two-year signup period. This acreage would not receive the entry payments.
[9] Actual Program payments would be escalated by some factor to adjust for inflation over time. This aspect of the proposed Program has not been finalized. Therefore it was deemed appropriate to conduct the analysis using constant dollars and real (inflation adjusted) discount rates.
[10] Assuming an average annual inflation rate of 2.5 percent a 6 percent real discount rate is roughly equivalent to an 8.5 percent nominal discount rate.

2. STUDY AREA

PVID contains approximately 131,228 acres in Riverside and Imperial counties, 104,500 acres of which are in the Palo Verde Valley. The remaining 26,728 acres of PVID are located on the Palo Verde Mesa, which forms the valley's western and northern borders, and would not be included in the proposed Program. The Colorado River, which acts as the boundary between Arizona and California, forms PVID's eastern and southern boundaries.

An estimated 91,000 acres of PVID's valley lands below Palo Verde Diversion Dam are irrigated, of which about 83,000 acres are in Riverside County and about 8,000 acres are in Imperial County. Only valley lands in PVID below the Palo Verde Diversion Dam would be eligible to participate in the proposed Program. Major crops planted in the Palo Verde Valley include alfalfa, cotton, wheat, sudan grass, melons, lettuce and other vegetables. Alfalfa and other forage crops dominate the crop mix, accounting for approximately 60 percent of planted acreage.

The principal city in the area is the city of Blythe. The city comprises approximately 27 square miles of incorporated area, a limited portion of which is in agriculture. The city's sphere-of-influence surrounds the incorporated city limits and comprises approximately 78 square miles. The sphere-of-influence extends from the Colorado River on the east, west to and including, the Blythe Airport, and from Second Avenue on the north to Eighteenth Avenue on the south.[11] The city is bisected from west to east by U.S. Highway I-10 which connects the greater Los Angeles area to Phoenix. U.S. Highway 95 runs north to Las Vegas and south to Yuma, while State Highway 78 extends southwest to Brawley. The area is also served by the Arizona & California Railroad (ARZC), with connections to Burlington Northern Santa Fe Railroad out of Barstow and Phoenix.[12]

According to the U. S. Census of 2000, the population of the incorporated city of Blythe was 20,463 persons, of which 8,308 were institutionalized individuals within the two nearby prisons. Excluding institutionalized persons, the Blythe community grew from 9,939 to 12,158 persons during the 1990 to 2000 decade, a growth of 22.3 percent. Most if not all of this growth is due to annexation of neighboring developed unincorporated areas and does not represent actual growth. Within the study area, the population remained relatively constant, dropping from 15,426 in 1990 to 15,242 in 2000, exclusive of the institutionalized population at the two prisons.

Housing units within the study area have grown only slightly over the period from 1990 to 2000. In 1990, the U.S. Census counted 6,222 housing units within the Program area; this figure had

[11] City of Blythe, "General Plan, Revised Draft," September 2001.
[12] City of Blythe and Blythe Chamber of Commerce, "Community Economic Profile of Blythe, Riverside County, California." 1998. According to representatives of the Arizona & California Railroad, the Blythe line accounts for about 4.5 percent of the railroad's shipping volume -- about 750 carloads annually out of a total shipping volume of about 16,500.

grown to 6,272 by 2000. Within the city of Blythe, however, housing units grew substantially from 3,489 in 1990 to 4,893 by 2000, or 40.2 percent. As with population, this increase was due primarily to annexation of neighboring unincorporated areas.

According to State Board of Equalization data compiled by the city, taxable sales were approximately $107 million in 1998.[13] Median household income, as of 1998, was $32,641.[14]

Census employment and payroll statistics are incomplete for the area.[15] Table 3 provides an estimate of study area employment developed using 1997 Economic Census and city of Blythe data. Total employment in the area is approximately 5,600 jobs. Approximately 50 percent of total employment is associated with the public sector, and roughly two-thirds of public sector employment is associated with the two state prisons in the area. Agricultural services, retail/wholesale trade, and accommodation and food services account for most of the private sector employment in the area.

Agricultural production and processing are major sources of economic activity in the region. Over the previous five years agricultural output has averaged approximately $100 million annually.[16] Field and seed crops, primarily hay and cotton, account for about 60 percent of total production value. Vegetable and melon production accounts for about 25 percent. The remaining 15 percent is associated with citrus crops. According to 1998 data compiled by the city, the agricultural sector contributed 864 jobs to the region, about 15 percent of total employment for the area.

[13] Ibid.
[14] Ibid. The city's data source for household income is the Inland Empire Economic Databank and Forecasting Center, University of California, Riverside, 1998.
[15] This is due to census disclosure rules for small sample areas.
[16] Riverside County Agricultural Commissioner's Office, "Palo Verde Valley Acreage and Agricultural Crop Report," 1996 - 2000.

Table 3.
Blythe Study Area Employment Statistics

Private Sector Employment 1/	No. of Establishments	No. of Employees	Annual Payroll ($1,000)
Agriculture 2/	NA	864	NA
Wholesale trade	19	161	4,508
Retail trade	70	865	13,606
Real estate & rental & leasing	10	19	267
Professional, scientific, & technical services	9	34	567
Administrative & support & waste management & remediation services	6	32	445
Educational services	1	D	D
Health care & social assistance	28	281	7,145
Arts, entertainment, & recreation	1	D	D
Accommodation & food services	45	603	5,150
Other services (except public administration)	13	69	1,503
Public Sector Employment 2/			
State Prisons	2	1,893	NA
Palo Verde Unified School Dist.	5	450	NA
Palo Verde Community College Dist.	1	60	NA
County of Riverside	1	120	NA
City of Blythe	1	101	NA
Palo Verde Irrigation District	1	81	NA
Total		5,633	

1/ 1997 Economic Census, except agriculture sector.
2/ City of Blythe and Blythe Chamber of Commerce, "Community Economic Profile of Blythe, Riverside County, California." 1998.
NA = Not Available; D = Not Disclosed

3. ESTIMATED FARM PRODUCTION ADJUSTMENTS

3.1 Changes in crop acreage, production value, and input purchases

Based on changes in cropping patterns observed during the 1992–1994 Test Program the crops expected to be affected by the proposed Program are (1) alfalfa and other hays, (2) cotton, and (3) wheat and other grains.[17] Mitchell (1994) estimated that the 1992–1994 Test Program resulted in the removal of approximately 18,600 acres of hay crops and 1,500 acres of grain crops.[18] Vegetable and melon production was found to be largely unaffected by the Test Program.[19] This was because growers shifted vegetable and melon production to acreage not enrolled in the Program. The ability of Program participants to shift vegetable and melon production to alternative acreage plus the higher return associated with this production suggested a similar adjustment in cropping would occur under the proposed Program. This assumption has important consequences for the labor impact estimates for the proposed Program. Hay, cotton, and grain require less labor per acre to produce than does the production of vegetable and melon crops. If subsequent analysis determined the Program reduced vegetable and melon acreage in the valley, impacts to employment and income would increase. However, given the farm economics of the region and based on discussions with local experts the likelihood that Program participants would voluntarily reduce vegetable and melon production because of the proposed Program was assumed low.

To model changes in farm production it was assumed that 75 percent of the acreage rotated out of production in any given Program year would have been planted to hay crops; 12.5 percent would have been planted to cotton; and 12.5 percent would have been planted to grains. Alfalfa was used as a proxy crop for hay production. Likewise, wheat was used as a proxy crop to represent grain crops.[20] Table 4 summarizes the changes in acreage and production value for

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[17] Great Western Research, "Palo Verde Test Land Fallowing Program, August 1, 1992 - July 31, 1994, Final Report." August 1995.

[18] Mitchell, David, "Regional Economic Impacts of the Palo Verde Test Land Fallowing Program." December 1994.

[19] Loh and Steding (1996) in a separate study concluded that the Test Program did result in a reduction in vegetable and melon production. This conclusion was based primarily on the fact that some participant farmers indicated that vegetables and melons would have been planted on acreage taken out of production. It did not, however, account for shifts in production on other acreage through double cropping. Participants and non-participants interviewed about the Test Program (Mitchell, 1994) indicated that the program did not have any significant impact on the production of melon or vegetable crops. At the start of the Test Program vegetable and melon acreage had steadily declined during the previous eight years due to changing market conditions and pest infestation. It is probable that the persistent trend in lower vegetable and melon production can better be explained by these factors than the Test Program.

[20] This simplification was deemed reasonable given the similarity in cultivation practices and input requirements for alfalfa as compared to other hay crops. The same is the case for wheat as compared to other grain crops.

each of the operational scenarios. Five-year average yields and prices for Riverside County were used to calculate value of production.[21]

Table 4.
Reduced Acreage and Production Value by Scenario

	Operational Scenario					
	Minimum		Average		Maximum	
Program Year	1-24	25-35	1-10	11-35	1-25	26-35
Reduced Crop Acreage (Ac./Yr.)						
Alfalfa	-4,500	-18,000	-4,500	-18,000	-18,000	-19,875
Cotton	-750	-3,000	-750	-3,000	-3,000	-3,313
Wheat	-750	-3,000	-750	-3,000	-3,000	-3,313
Total	-6,000	-24,000	-6,000	-24,000	-24,000	-26,500
Reduced Crop Value (mil. $/Yr.)						
Alfalfa	-3.5	-14.2	-3.5	-14.2	-14.2	-15.6
Cotton	-0.8	-3.1	-0.8	-3.1	-3.1	-3.5
Wheat	-0.2	-0.9	-0.2	-0.9	-0.9	-1.0
Total	-4.5	-18.2	-4.5	-18.2	-18.2	-20.1

It is important to note that the reductions in farm output shown in Table 4 do not translate one-for-one into reductions in regional income for non-participants of the Program. The distribution across factors of production of the decrease in farm output is shown in Table 5.[22] Approximately 30 percent of the decrease in farm output would affect non-participants of the Program within the Blythe area. The remaining 70 percent would either be associated with reduced purchases of imported farm inputs or reduced income to farm owner/operators. The latter would be directly compensated for the income loss through Program entry and biannual payments.

Some of the reduction in local farm input purchases shown in Table 5 would be offset by farm expenditures for land preparation, weed control, and erosion control that would be required of Program participants. Initial land preparation would include mowing or removing crops and the implementation of erosion control measures. In many cases, stubble residue would be left on the fields to help hold soil in place. Other techniques include establishment of ground cover supported solely by precipitation. Where leaving stubble residue, sod remnants or precipitation-based ground cover are not feasible, erosion control also could entail "clod plowing" -- plowing a field when the soil is wet to produce large clumps of soil that break into hard-crusted, erosion-

[21] As reported by the Riverside County Agricultural Commissioner's Office.
[22] Values in Table 5 are derived from the IMPLAN Model 1998 Base Data Set for economic activity occurring within the 92225 zip code.

resistant clods. In addition, some Program acreage may require additional expenditure to comply with Natural Resources Conservation Service regulations (NRCS).[23]

Weed control generally would involve periodic disking or chemical applications to the fields. Annual costs for these activities during the two-year Test Program were reported by Great Western Research (1995). Annual field preparation and maintenance expenditures for the proposed Program were estimated from this data and are summarized in Table 6.[24] The costs assume that Program acreage would rotate out of production for an average of three years.[25] Therefore annual field preparation costs are represented as one-third of the actual cost of field preparation. Weed and erosion control costs, on the other hand, would be incurred annually and therefore require no adjustment. Land preparation and weed/erosion control expenditures by Program participants would offset approximately ten percent of the reduction in local purchases of labor and materials shown in Table 5.

Table 5.
Distribution of Changes in Farm Output by Scenario
(million $ per year)

	Operational Scenario					
	Minimum		Average		Maximum	
Program Year	1-24	25-35	1-10	11-35	1-25	26-35
Income to Farm Owner/Operator	-2.2	-8.9	-2.2	-8.9	-8.9	-9.8
Imported production inputs	-0.9	-3.7	-0.9	-3.7	-3.7	-4.1
Locally procured production input	-0.5	-1.8	-0.5	-1.8	-1.8	-2.0
Employee compensation	-0.6	-2.5	-0.6	-2.5	-2.5	-2.7
Indirect business taxes	-0.3	-1.3	-0.3	-1.3	-1.3	-1.4
Total	-4.5	-18.2	-4.5	-18.2	-18.2	-20.1

[23] During the Test Land Fallowing Program, six percent of the acreage required special operations to comply with Natural Resources Conservation Service regulations.
[24] The analysis relied on land preparation and weed control costs as reported for the 1992-94 Test Program. These costs were not adjusted for general increases in the price level between 1992-94 and 1998, the baseline year for the input-output analysis conducted for this assessment. Using CPI to adjust reported land preparation costs would have increased the figures shown in Table 6 by approximately 8 percent.
[25] This assumption is based on information provided by Metropolitan Water District of Southern California.

Table 6.
Expected Annual Land Preparation and Maintenance Expenditures by Operational Scenario

Method	% of Test Program Acres	Cost Per Acre (1992-94 $)
Field Preparation		
Disking	27%	$10.55
Chem. App.	52%	$17.82
Plowed	14%	$23.25
Knifed	5%	$21.34
Subsoiled	2%	$14.00
Weighted Average Cost per Acre		$16.75
Average Annual Cost (1/3 of per acre cost)		$5.58
Annual Weed Control Costs		
Disking	59%	$17.93
Chem. App.	33%	$17.82
Plowed	8%	$23.25
Average Annual Cost		$18.32
Total Average Annual Cost ($/Acre)		$23.90

Cumulative Expenditures Over 35-Year Program	*Present Value (million $)*
Minimum Scenario	$2.9
Average Scenario	$5.2
Maximum Scenario	$8.4

3.2 Changes in farm output processing and transportation

The proposed Program would alter demand for farm processing and transportation within the region. The reduction in farm production would reduce demand for local cotton gins, commodity brokering (especially hay brokering), and transportation services.

The proposed Program could also reduce demand for rail service along the spur line of the Arizona and California Railroad (ARZC) serving Blythe. The ARZC line is connected to the national rail network via connections to the Burlington Northern and Santa Fe Railway and is therefore considered an important transportation asset to the region. The majority of rail traffic along the spur-line is related to farm production.

Table 7 reports average annual freight shipments on the ARZC spur line for the last two years.[26] The pallet lumber shipments shown in Table 7 supply a local firm producing vegetable and melon pallets for local growers. These shipments would not be affected by the proposed Program assuming vegetable and melon production is unaffected. Likewise, corn shipments shown in Table 7 are transshipped to the Imperial Valley for livestock feed, and would therefore not be affected by the proposed Program.

Table 7.
Average Annual Freight Shipments on the ARZC Spur Line to Palo Verde Valley

Commodity	Avg. Annual Carloads
Fertilizer	270
Wheat	191
Corn	54
Pallet lumber	230
Total	745

The proposed Program would reduce demand for fertilizer in the valley. Approximately 25 percent of the fertilizer shipments shown in Table 7 are offloaded in Blythe and shipped to fertilizer dealers outside of the Program area.[27] The proposed Program would potentially affect the remaining 75 percent of fertilizer shipments. Table 8 shows annual fertilizer usage for the major crops grown in PVID as well as the percent delivered by rail. This data was used along with the forecasted change in crop production for each operational scenario to estimate the potential change in fertilizer rail shipments that could be attributed to the proposed Program. The results are summarized in Table 9.[28]

[26]Data are from a letter dated October 9, 2001 to Ed Smith, General Manager PVID, from Brad Chapman, ARZC. The data exclude a one-time shipment of equipment for the Blythe Power Plant. The data also do not list alfalfa as a crop being transported by rail. Mr. Chapman, in a subsequent teleconference on January 14, 2002, stated that ARZC had previously shipped alfalfa to the Port of Los Angeles and hopes to in the future. Currently low ocean freight costs make it more cost effective for PVID growers to ship hay to the port via trucks. If ocean freight rates increase, rail is likely to again be cost-competitive with trucking. According to Mr. Chapman, when ocean freight rates were high, ARZC was handling almost all of the alfalfa export out of the valley. He estimates should ocean freight rates increase by several hundred dollars per container, ARZC could increase rail traffic out of Blythe by an additional 800 carloads.

[27] Email communication with Mr. Ed Smith, General Manager, PVID, dated January 29, 2002. The outlying areas are 20,000 to 25,000 acres in the Parker Valley, Butler Valley, and Wenden-Solome, Arizona.

[28] The estimated reduction shown in Table 9 assumed that carloads of fertilizer would decrease proportionately with the reduction in pounds of fertilizer brought into Blythe by rail.

The proposed Program could potentially affect ARZC wheat shipments. Approximately 20 percent of the wheat carloads shown in Table 7 are shipments to a local grain store operated by the Church of Jesus Christ of Latter Day Saints. Operators of this facility have indicated to ARZC that the proposed Program would not affect operations at this facility.[29] The remaining 80 percent of the wheat carloads represent shipments of high-quality durum wheat to Texas ports for export to Italy. Durum wheat receives a higher return than other wheat production in the valley and therefore Program participants may not choose to reduce its production to the same extent as other grains. To be conservative, however, the analysis assumed rail shipments of durum wheat would decrease proportionately with the amount of grain acreage taken out of production by the proposed Program. Table 10 summarizes the estimated potential reduction in the average annual rail carloads of wheat for the three operational scenarios.

Table 8.
Estimated Fertilizer Usage for Major Crops Grown in PVID

Crop	Lbs Fert. Per Acre 1/	PVID Acres	Total lbs Fert.	% Shipped by Rail 2/	Program Area Rail Shipments (lbs)
Hay	300	68,508	20,552,400	35%	7,193,340
Cotton	700	17,498	12,248,600	90%	11,023,740
Grain	700	7,059	4,941,300	100%	4,941,300
Melons	700	5,634	3,943,800	100%	3,943,800
Lettuce	750	2,362	1,771,500	95%	1,682,925
Other Veg	750	4,222	3,166,500	95%	3,008,175
Citrus	380	2,713	1,030,940	50%	515,470
Total		107,996	47,655,040		32,308,750

1/ With the exception of the lbs. per acre of fertilizer for citrus, Ed Smith, PVID General Manager, provided the information on fertilizer use shown in the table. Fertilizer use for citrus in PVID (50% lemons and 50% oranges) was estimated using University of California Cooperative Extension Crop Budgets for Coachella Valley.
2/ These estimates were provided by Ed Smith, General Manager, PVID.

Table 9.
Estimated Reduction in ARZC Fertilizer Rail Shipments

Operational Scenario	Program Years	Estimated Reduction in Fertilizer Usage (million lbs)	Estimated Reduction in Annual Rail Carloads
Minimum Operational	1 - 24	1.47	9
Minimum Operational	25 - 35	5.88	37
Average Operational	1-10	1.47	9

[29] Communication with Mr. Brad Chapman, January 14, 2002.

Average Operational	11 - 35	5.88	37
Maximum Operational	1 - 25	5.88	37
Maximum Operational	26 - 35	6.49	41

Table 10.
Estimated Reduction in ARZC Wheat Shipments

Analysis Scenario	Program Years	Estimated Reduction in Annual Rail Carloads
Minimum Operational	1 - 24	16
Minimum Operational	25 - 35	65
Average Operational	1-10	16
Average Operational	11 - 35	65
Maximum Operational	1 - 25	65
Maximum Operational	26 - 35	72

Table 11 summarizes the total potential change in ARZC carloads for the three operational scenarios. Under the maximum scenario, the proposed Program would reduce ARZC carloads along the Blythe spur-line by approximately 14 percent, on average, relative to current traffic. For the average scenario, rail traffic would decrease by about 3.4 percent during the first 10-years of the Program, and then by about 13.8 percent for the remainder of the Program. For the minimum scenario, ARZC carloads would decrease by about 3.4 percent during the first 24-years of the Program, and then by about 13.8 percent for the remainder of the Program.

Table 11.
Estimated Reduction in Average Annual Freight Shipments on the ARZC Spur Line to Palo Verde Valley

Analysis Scenario	Program Years	Estimated Reduction in Carloads	Estimated Reduction in Annual Rail Carloads
Minimum Operational	1 - 24	26	3.4%
Minimum Operational	25 - 35	103	13.8%
Average Operational	1-10	26	3.4%
Average Operational	11 - 35	103	13.8%
Maximum Operational	1 - 25	103	13.8%
Maximum Operational	26 - 35	114	15.2%

4. REINVESTMENT OF PROGRAM PAYMENTS

4.1 Disposition of Program Entry Payments

Participants signing up within the first two years of the proposed Program would receive an entry payment of $3,170 per enrolled acre. Entry payments would total approximately $82 million in 2001 constant dollars. The disposition of these payments has important implications for both the magnitude and incidence of economic impacts of the proposed Program. The analysis assumed that entry payments made to absentee landowners would be entirely spent outside the local economy.[30] Payments made to local landowners, on the other hand, were assumed to be partly spent locally and partly spent outside the region.

PVID records indicate that approximately 60 percent of the acreage served by PVID is owned locally.[31] The remaining 40 percent is owned by absentee landlords. The analysis therefore assumed that $49 million of the $82 million in entry payment would accrue to local landowners.

The analysis further assumed entry payments would be treated as ordinary income by the IRS.[32] A 40 percent state and federal combined effective tax rate was used to compute after-tax income from entry payments. Approximately $29 million in entry payments to local landowners would remain after taxes.

PVID landowners were surveyed by EcoPlan Associates, Inc. about their expectations for spending entry payments. EcoPlan completed interviews with 22 landowners accounting for 46 percent of the acreage served by PVID. Landowners were asked how they would apply entry payments to various investment/spending categories shown in Table 12.

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[30] This assumption probably results in our understating the amount of entry payments that would be spent locally. Interviews with potential participant landowners indicated that some absentee landowners contemplate using at least some of the entry payments for on-farm investments. The interview sample was not large enough to infer behavior to the full population of absentee landowners. To avoid understating potential adverse effects of the proposed Program, it was decided to assume that none of the entry payments to absentee landowners would be spent locally.

[31] This includes the valley's two largest landowners, The Corporation of Jesus Christ of Latter Day Saints and Fisher Ranch. The Corporation of Jesus Christ of Latter Day Saints is treated as local landowner for the purposes of this analysis because it has indicated through interviews that it anticipates directing 100 percent of signup payments into local on-farm investments.

[32] There continues to be discussion regarding how the Internal Revenue Service and State of California would treat the entry payments. Discussions with accounting experts (personal communication with Lawrence Smith, president of L.S. Smith, Inc. December 2001) suggest the likeliest outcome is that the payments would be treated as ordinary income for tax purposes. There is some possibility that the payments could be treated as capital gains, which would result in a lower tax liability. One possibility being discussed is placing easements on enrolled acres as a strategy for treating the payments as capital gains rather than ordinary income. While this is a possibility currently being explored by potential Program participants it differs from the current description of the proposed Program.

Table 12.
Assumed Disposition of Entry Payments to Local Landowners

Spending/Investment Category	*Percent of After-Tax Entry Payment Allocated(%)*	*Amount of Entry Payment Allocated ($ million)*
Spending Directly Affecting Local Economy		
Invest in Palo Verde Farm Improvements & Capital Equipment	49.4	14.6
Retire Palo Verde Farm Debt	23.2	6.8
Invest in Palo Verde Land & Other Businesses	3.9	1.2
Spend Locally on Current Consumption	2.6	0.8
Spending Not Directly Affecting Local Economy		
Retire Outside Area Debt	1.1	0.3
Invest Outside Area/Apply to Savings	19.3	5.7
Spend Out of Area on Current Consumption	0.0	0.2

Investment in existing farm operations within Palo Verde Valley accounted for the largest share of expected expenditure. Just under 50 percent of after-tax entry payments were earmarked by survey respondents for farm improvements and equipment purchases. Nearly all of the landowners interviewed stated farm improvement and equipment purchases would be through local vendors and contractors.

The second largest spending allocation of entry payments was retirement of PVID farm debt. Approximately 23 percent of after-tax entry payments to local landowners were allocated to local debt retirement by survey respondents. Early debt retirement would have the effect of increasing regional income. Production revenue that would otherwise have been used to make debt payments would be available for other household expenditures. To account for this change in local income, the analysis amortized at 6 percent over 15 years the debt local landowners indicated they would retire. This resulted in an increase in annual income of approximately $700,000. The analysis assumed this increase in local household income would last for 15 years.

The third largest spending allocation was investment outside of the Blythe area. PVID landowners indicated just over 19 percent of after-tax payments would be used for out-of-area investments. These investments would not have any impact on economic activity within the Blythe area and therefore were excluded from the analysis.

Survey respondents indicated only 3.9 percent of entry payments would pay for land acquisition or non-farm business investment. Comments from survey respondents suggest the great majority of this investment would be for farmland acquisition, which would affect local real estate services but otherwise have little impact on the local economy. Additionally, surveyed landowners expected to spend about 2.6 percent of entry payments on local non-farm goods and services, such as the purchase of new cars or trucks.

In summary, the survey of local landowners indicated that approximately $23.4 million of entry payments would be spent within the Blythe area. More than half of this spending would be for on-farm investment and farm equipment purchases. The analysis assumed spending of this type would be spread out over five years. This assumption was adopted for two reasons. First, many of the surveyed landowners indicated that farm investments would be spread over several years. Second, under the proposed Program participants would have the option to receive their entry payments over a five-year period rather than as a lump sum. Debt retirement was the second largest spending category benefiting the Blythe area economy. An increase in local area annual income of approximately $700,000 due to early debt retirement was assumed to persist for 15 years.

4.2 Disposition of Bi-annual Payments for Non-irrigated Acreage

As with the entry payments, the disposition of the bi-annual payments has important implications for the regional economic impacts associated with the proposed Program. Participant surveys from the 1992-1994 Test Program collected information about how Program payments were spent. Table 13 shows the disposition of Test Program payments.[33] Participants in the Test Program reported that 61.5 percent of Program payments were spent within the Blythe area. These expenditures were distributed between farm improvements, farm operations, rent, debt retirement, and a generic "other" category.

Table 13.
Disposition of Test Land Payments Reported by Participants

	Region Spent		
Expenditure Category	*Locally*	*Outside Valley*	*Grand Total*
Farm Improvements	11.4%	0.0%	11.4%
Farm Operations	36.8%	3.5%	40.3%
Land Rent	0.7%	3.0%	3.7%
Other	2.3%	3.7%	6.0%
Retire Debt	10.3%	28.3%	38.6%
Grand Total	61.5%	38.5%	100.0%

Farm operations accounted for almost 37 percent of Program payments spent locally. This included weed/erosion control costs, as well ass PVID tolls and assessments on enrolled acreage. On-farm improvements accounted for just over 11 percent of spending.[34] Test Program

[33] Great Western Research, "Palo Verde Test Land Fallowing Program, August 1, 1992 - July 31, 1994, Final Report." August 1995.
[34] During the 1992-94 Test Program this spending resulted in increased purchases of farm equipment and machinery from Blythe area equipment dealers. See Mitchell, David, "Regional Economic Impacts of the Palo Verde Test Land Fallowing Program." December 1994

expenditures to retire debt occurred both locally and outside the valley. Because the income changes from early debt retirement made possible by the bi-annual payments are very small they were ignored by the analysis.

Table 14 shows the disposition of the bi-annual payments assumed for the analysis of the proposed Program. Overall, it was assumed that 51 percent of the bi-annual payments would be spent within the Blythe area. Most of this spending is associated with farming operations.

Table 14.
Assumed Local Disposition of Bi-annual Program Payments
($ million)

	Operational Scenario					
	Minimum		Average		Maximum	
Program Year	1 - 24	25 - 35	1 - 10	11 - 35	1 - 25	26 - 35
Farm Improvements	0.38	1.51	0.38	1.51	1.51	1.67
Farm Operations	1.21	4.86	1.21	4.86	4.86	5.36
Land Rent	0.02	0.09	0.02	0.09	0.09	0.10
Other	0.08	0.30	0.08	0.30	0.30	0.34
Total	1.69	6.76	1.69	6.76	6.76	7.46
% of Total Bi-annual Payment	51%	51%	51%	51%	51%	51%

The analysis assumed that some of the allocation to farm operations would displace spending that otherwise would have occurred, and therefore would not represent an increase in economic activity. This is because this spending would be applied to land already in production. Interviews with growers and PVID representatives indicate that many farm operations in the valley operate with a minimal complement of hired labor. Program payments may allow some growers to hire more labor and make other expenditures that they would otherwise have foregone. The analysis therefore adopted the assumption that 50 percent of the expenditures in the farm operations category would represent a net increase in local spending.

5. REGIONAL ECONOMIC IMPACTS

An input-output model of the Blythe area economy was used to evaluate what effect the direct changes in economic activity discussed in the preceding report sections would have on local output, income, employment, and tax revenue. The analysis was performed using IMPLAN (Impact Analysis for Planning) modeling software and databases.[35] Output from the IMPLAN model includes total industry output, employment, income, and tax receipts for Blythe area economy. Total industry output is defined as the value of production by industry.

The IMPLAN analysis used a zip-code level data set for zip-code 92225.[36] The data supplied by IMPLAN was supplemented with locally developed employment and earnings data from the City of Blythe's "Community Economic Profile of Blythe, Riverside County, California (1998). Regional impacts were estimated for the minimum, average, and maximum operational scenarios.

5.1 Changes in Regional Income

The cumulative change in regional income of non-participants over the 35-year term of the proposed Program is summarized in Table 15 for the three operational scenarios. Regional income in Table 15 is defined as all income to workers paid by employers; self-employed income; interests, rents, royalties, dividends, and profit payments. These estimated do not include income from entry payments and biannual payments accruing to Program participants, nor do they include changes to income of Program participants caused by reductions in planted acreage.[37]

Changes in non-participant income stem from three sources: (1) local spending of Program entry payments, (2) local spending of Program biannual payments; and (3) reductions in farm acreage. The last row of the table shows the net impact of the proposed Program on non-participant regional income. Income changes for each Program year were converted to present value and then summed. Table 15 therefore shows the present value equivalent of the cumulative change in regional income over the 35 year Program term.

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[35] Input-output analysis is a technique used in economics for tracing resources and products within an economy. The system of producers and consumers is divided into different branches, which are defined in terms of the resources they require as inputs and what they produce as outputs. The quantities of input and output for a given time period, usually expressed in monetary terms, are entered into an input-output matrix within which one can analyze what happens within and across various sectors of an economy following a change in the demand or supply of one or more goods or services. The IMPLAN model is supplied and supported by The Minnesota IMPLAN Group, Inc. (MIG). The system was originally developed in the 1980s under the sponsorship of the U.S. Forest Service to support its land management planning activities.
[36] Although zip code 92666 is used for some Blythe addresses, the U.S. Census does not use the zip code 92226 for cross tabulating census data.
[37] Because participation in the proposed Program would be voluntary, welfare changes to participants were not evaluated as part of this study.

Table 15.
Present Value of Impacts to
Non Participant Income Over 35 Year Program Term
($ millions)

	Operational Scenario		
	Minimum	Average	Maximum
Program Entry Payments	8.9	8.9	8.9
Program Biannual Payments	6.3	11.2	18.2
Reduction in Farm Acreage	-16.8	-29.6	-48.4
Net Income Impact	-1.6	-9.6	-21.4

* All present values calculated using a 6% real discount rate.

Results of the input-output analysis indicate that the proposed Program would have both beneficial and adverse impacts on non-participant income. Program entry payments and biannual payments benefit the region, increasing the present value of non participant income by $15.2, $20.1, and $27.1 million for the minimum, average, and maximum operational scenarios, respectively. These income gains would be offset by income losses caused by reductions in farm acreage. On balance, the present value of non-participant income would be lower for each of the three operational scenarios than would be the case if farm production were maintained at baseline output levels.

In aggregate, the changes in non-participant income would be small relative to total regional income. For the minimum operational scenario the cumulative change in income is negligible. For the average and maximum operational scenarios the estimated change in regional income would be less than one percent of baseline income for the period.

5.2 Changes in Regional Employment

The average annual change in regional employment over the 35 year term of the proposed Program is shown in Table 16. Employment includes total wage and salary employees, as well as self-employed jobs in a region, for both full-time, part-time, and seasonal workers. IMPLAN results were post-processed using data from the Employment Development Department to convert job counts that include a mix of full-time, part-time, and seasonal positions to full-time-

equivalent (FTE) jobs.[38] The employment results shown in Table 16 are in terms of FTE jobs. These results include some owner/operator labor that would be compensated by the Program and, thus, may be overstated.

Table 16.
Average Annual Change in
Employment Over 35 Year Program Term
(Full-time Equivalent Jobs)

	Operational Scenario		
	Minimum	Average	Maximum
Program Entry Payments	8	8	8
Program Biannual Payments	17	28	37
Reduction in Farm Acreage	-65	-105	-137
Net Employment Impact	-40	-69	-93

As with impacts to regional income the Program would have both beneficial and adverse impacts. Spending of Program entry and biannual payments would increase regional employment. This gain in employment, however, would be offset by employment losses due to reductions in farm acreage. On balance, the proposed Program would reduce employment relative to baseline conditions for each operational scenario. Average annual employment would decrease by less than one percent of baseline employment for the minimum operational scenario. For the average and maximum operational scenarios, the estimated reduction would be less than two percent of baseline employment.

5.3 Changes in Regional Tax Revenues and School Funding

The proposed Program would also affect Blythe area sales and business tax receipts. Property tax revenue is not expected to be substantively affected by the proposed Program. Williamson Act subventions from the State to Riverside and Imperial counties could be affected by the Program, though these impacts were found to be negligible.[39]

[38] A full-time equivalent job is equal to 2080 hours per year. Thus a 40 hour per week job that lasted 6 months would be equal to 0.5 FTEs.

[39] The maximum potential for the proposed Program to affect Williamson Act subventions for these two counties has been estimated at approximately $34,000 per annum. The change in subvention revenue would not have a measurable effect on the city of Blythe. Memorandum from Helix Environmental Planning, Inc. to Palo Verde Irrigation District, dated 11/14/01.

Table 17 summarizes the expected changes in regional tax revenues. Under the minimum operational scenario the present value change in tax receipts was positive, increasing tax receipts by approximately $0.4 million. For the average and maximum operational scenarios, tax revenues would fall by $0.6 and $2.1 million, respectively.

The magnitude of change in tax receipts is less than one percent of the baseline level for each operational scenario. Overall, the analysis indicates the proposed Program would have negligible impacts on Blythe area tax receipts.

Table 17.
Present Value of Impacts to
Regional Tax Receipts Over 35 Year Program Term
($ millions)

	Operational Scenario		
	Minimum	Average	Maximum
Program Entry Payments	1.7	1.7	1.7
Program Biannual Payments	0.8	1.5	2.4
Reduction in Farm Acreage	-2.2	-3.8	-6.2
Net Tax Revenue Impact	0.4	-0.6	-2.1

School funding could be adversely affected by reductions in regional employment caused by the proposed Program. State funding of public schools is based in part on average daily attendance (ADA). Currently, the Palo Verde Unified School District (PVUSD) annually receives approximately $4,647 times PVUSD ADA. In most cases school ADA and employment are positively correlated. Figure 1 shows a plot of ADA versus employment level for Riverside county.[40]

[40] A similar analysis was done for PVUSD and the Blythe labor force. PVUSD ADA has been decreasing for about five years. Over this time the labor force grew steadily. This produced a relationship between ADA and labor force which is nearly the mirror opposite of that for all of Riverside County. Just relying on this simple relationship would suggest that decreasing Blythe's labor force would actually increase PVUSD ADA. Clearly this would be an extremely unlikely outcome. There must be other demographic and socioeconomic factors that explain the recent decrease in PVUSD ADA. Assuming these factors were identified and included in the analysis, it is supposed that a relationship between labor force and ADA much closer to the one observed for the whole of Riverside County would be obtained. The present analysis uses the countywide relationship to avoid understating potential impacts of the proposed program on school funding.

The relationship shown in Figure 1 was used to estimate the maximum potential change in ADA given the forecasted changes in employment discussed previously. Potential impacts to ADA are shown in Table 18.

Figure 1

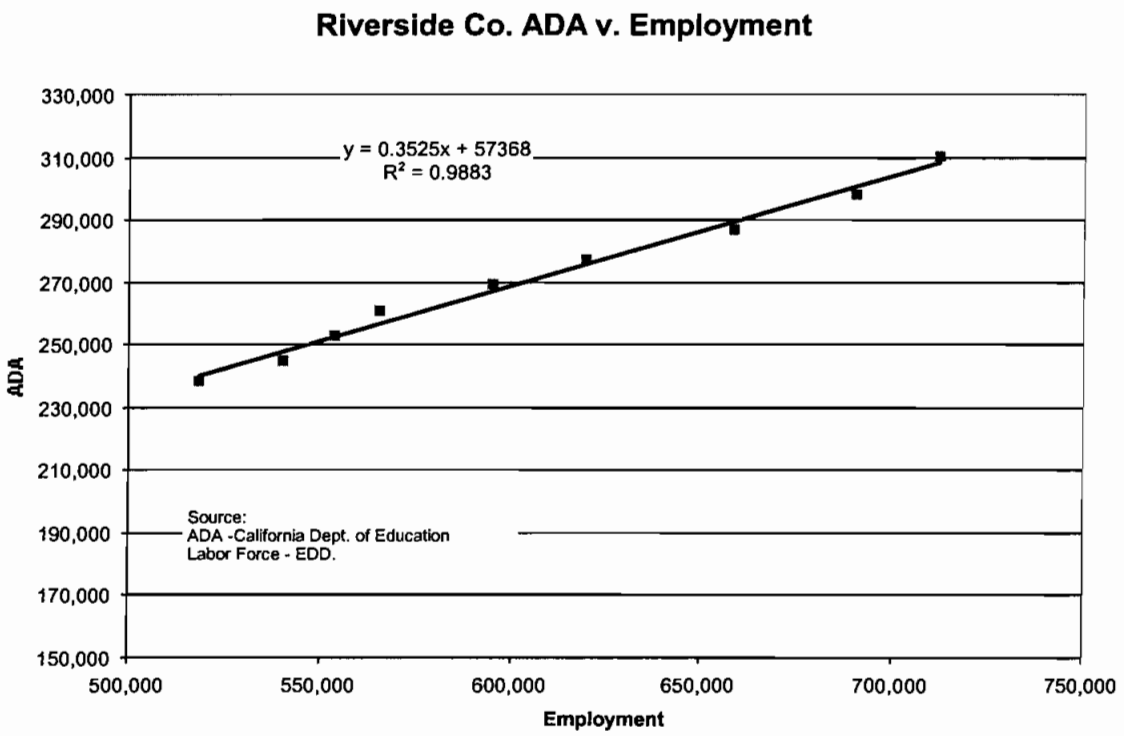

Table 19 shows the present value of the maximum potential impact to PVUSD state funding. This estimate is based on the current rate of state funding of $4,646.73 per ADA per year and a real discount rate of 5 percent. These impacts range from just under $600,000 for the minimum operational scenario to just over $2,000,000 for the maximum operational scenario.

It is important to emphasize that these estimates represent maximum potential impacts. As noted previously, PVUSD ADA has been trending downward in recent years even while California Employment Development Department (EDD) estimates of Blythe employment have steadily increased. It may be that the relationship between ADA and employment estimated for Riverside County overstates what could be expected to occur in Blythe

Table 18.
Maximum Potential Change in ADA Associated with Proposed PVID Land Management, Crop Rotation and Water Supply Program

	Net Change in Employment			Max. Potential Change in ADA		
Program Year	Min. Op.	Avg. Op.	Max. Op.	Min. Op.	Avg. Op.	Max. Op.
1	17	17	-56	6.1	6.1	-19.5
2	17	17	-56	6.1	6.1	-19.5
3	17	17	-56	6.1	6.1	-19.5
4	17	17	-56	6.1	6.1	-19.5
5	17	17	-56	6.1	6.1	-19.5
6	-24	-24	-98	-8.5	-8.5	-34.2
7	-24	-24	-98	-8.5	-8.5	-34.2
8	-24	-24	-98	-8.5	-8.5	-34.2
9	-24	-24	-98	-8.5	-8.5	-34.2
10	-24	-24	-98	-8.5	-8.5	-34.2
11	-24	-98	-98	-8.5	-34.2	-34.2
12	-24	-98	-98	-8.5	-34.2	-34.2
13	-24	-98	-98	-8.5	-34.2	-34.2
14	-24	-98	-98	-8.5	-34.2	-34.2
15	-24	-98	-98	-8.5	-34.2	-34.2
16	-24	-98	-98	-8.5	-34.2	-34.2
17	-24	-98	-98	-8.5	-34.2	-34.2
18	-24	-98	-98	-8.5	-34.2	-34.2
19	-24	-98	-98	-8.5	-34.2	-34.2
20	-24	-98	-98	-8.5	-34.2	-34.2
21	-24	-98	-98	-8.5	-34.2	-34.2
22	-24	-98	-98	-8.5	-34.2	-34.2
23	-24	-98	-98	-8.5	-34.2	-34.2
24	-24	-98	-98	-8.5	-34.2	-34.2
25	-98	-98	-98	-34.2	-34.2	-34.2
26	-98	-98	-107	-34.2	-34.2	-37.6
27	-98	-98	-107	-34.2	-34.2	-37.6
28	-98	-98	-107	-34.2	-34.2	-37.6
29	-98	-98	-107	-34.2	-34.2	-37.6
30	-98	-98	-107	-34.2	-34.2	-37.6
31	-98	-98	-107	-34.2	-34.2	-37.6
32	-98	-98	-107	-34.2	-34.2	-37.6
33	-98	-98	-107	-34.2	-34.2	-37.6
34	-98	-98	-107	-34.2	-34.2	-37.6
35	-98	-98	-107	-34.2	-34.2	-37.6

Table 19.
Present Value of Maximum Potential Impact to PVUSD ADA State Funding
Over 35 Year Program Term
($ million)

Program Operational Scenario	*Present Value Max. ADA Impact*
Minimum Operational Scenario	-0.5
Average Operational Scenario	-1.1
Maximum Operational Scenario	-2.0

5.5 Distribution of Economic Impacts By Industry Sector

The proposed Program would alter the pattern of economic activity within the Blythe area relative to the baseline condition. These changes would benefit some economic sectors while adversely impacting others. Table 20 summarizes the distribution of impacts to regional income over the 35 year Program term by industry sector. The values shown in Table 20 are cumulative impacts, not annual.

Table 20.
Present Value of Estimated Income Changes by Economic Sector
($ millions)

	Operational Scenario		
	Minimum	Average	Maximum
Agriculture	-4.7	-8.3	-13.6
Mining	0.0	0.0	0.0
Construction	3.2	4.1	5.6
Manufacturing	0.0	0.0	0.0
Trans. & Utilities	-0.4	-0.9	-1.6
Wholesale & Retail Trade	1.7	-0.1	-2.6
Financial Services	-1.3	-3.7	-7.1
Consumer Services	-0.3	-1.0	-2.1
Government	0.2	0.2	0.2
Domestic Services	0.0	0.0	0.0
Subtotal Local Economy	-1.6	-9.6	-21.4

* All present values calculated using a 6% real discount rate.

Negative changes in income would be largest within the agriculture sector. Farm labor and custom farm services, such as custom harvesting, chemical applicators, and hay brokering, would be adversely affected by the proposed Program. Local demand for these services would decrease roughly in proportion to the amount of acreage taken out of production in any given year.

Overall, wage income in the agricultural sector would be reduced by 4.4, 7.7, and 12.3 percent for the minimum, average, and maximum operational scenarios, respectively. During the maximum operational scenario, where about 25,000 acres, on average, would be rotated out of production by the proposed Program, approximately 15 percent of baseline farm labor could be affected.

Other sectors likely to be adversely affected by the proposed Program include transportation and financial and consumer services. Relative to baseline income, impacts to these sectors would be small, however. Trucking services for hay production, in particular, would be adversely affected by the proposed Program. As was discussed in section 4.3, the proposed Program could also reduce rail car loads on the ARZC Blythe spur-line by as much as 15 percent under the maximum scenario. Under the average and minimum scenarios, the proposed Program could reduce rail carloads by as much as 14 percent.

ARZC has indicated that profitability of the spur-line into Blythe is currently marginal. This is primarily due to the loss of alfalfa shipments to trucking competitors.[41] ARZC officials have suggested that a 25 percent reduction in spur-line traffic would result in closure of the line.[42] Spur-line closure would result in a number of community and economic impacts, including:

- Higher fertilizer costs
- Potentially higher trucking costs due to reduced competition from rail traffic
- Loss of the pallet manufacturer and attendant jobs
- Shut down of the grain elevator at the end of the spur-line, and loss of attendant jobs.
- Reduction in property values and associated property taxes.
- Loss of ability to attract businesses requiring rail service to the area.

The analysis of ARZC impacts did not indicate the proposed Program would cause a 25 percent decrease in ARZC rail shipments. Under the maximum scenario the estimated decrease in carloads was 15 percent.[43] For the average and minimum scenarios, the proposed Program would

[41] Personal communication with Mr. Brad Chapman, ARZC, January 14, 2002.
[42] Letter dated October 9, 2001, to Ed Smith, General Manager, PVID, from Brad Chapman, ARZC.
[43] ARZC's decision to continue or discontinue rail service to Blythe could depend on many factors other than the existing volume of rail traffic. The 25 percent threshold should not be considered firm within a constantly changing and highly competitive business environment. Ultimately, the decision to operate the spur-line rests with ARZC and must be consistent with both its short- and long-term management strategies for the railroad as a whole.

reduce rail traffic by less than four percent for the first 10 and 24 years of the Program, respectively.[44]

Effects of the proposed Program on the retail and wholesale trade sector are expected to be mixed. Under the minimum scenario the proposed Program is expected to increase income to this sector due to local spending of entry and biannual payments. For the average and maximum scenarios these gains would be offset by reductions in spending associated with reduced levels of farm production. Relative to baseline conditions, however, the estimated changes in income to the retail and wholesale trade sector would be less than one percent of baseline income. Some businesses within this sector, though, would be more adversely impacted. Businesses supplying farm chemicals and seed to PVID farms would be adversely affected by the proposed Program to a greater degree than other business in the sector. In contrast, however, the proposed Program's entry and biannual payments may benefit farm equipment dealers.[45] Retail and wholesale businesses not directly supplying the farm sector would likely experience only minor changes in demand (both beneficial and adverse) as a result of the proposed Program.

The proposed Program was estimated to benefit the construction sector. While the proposed Program itself would not involve new construction, investments in on-farm improvements associated with entry and biannual Program payments would accrue primarily to this sector. The input-output analysis estimated income accruing to this sector would increase by 7 to 13 percent depending on the operational scenario.

5.6 Program Impacts Not Quantified by the Socioeconomic Assessment

Three areas of economic activity identified through meetings with community representatives were not addressed by the socioeconomic impact assessment because the Draft Environmental Impact Report concluded the physical resources supporting these activities would not be impacted by the proposed Program. The activities of concern were: (1) river-related recreation and tourism, (2) wildlife-related recreation; and (3) operation of public and private groundwater wells.

- *River and Wildlife Related Recreation and Tourism*

Community leaders have expressed concern that tourism could be adversely impacted by the proposed Program through reduced recreational opportunities in the region. They attribute this

[44] Implementation of the proposed Program could potentially reduce the amount of alfalfa exported by PVID farms through the Port of Los Angeles, affecting future demand for ARZC. However, ocean freight rates represent ARZC's primary obstacle to regaining rail traffic. The long-term viability of the spur-line depends more on ARZC's ability to (1) regain at least some of the market for shipping alfalfa to the Port of Los Angeles, and (2) attract new business to the Blythe area that could be served by the rail line. Neither consideration is directly affected by the proposed Program.

possible decline to reduced Colorado River levels, thereby affecting boating opportunities, and to reduced fish and other animal populations, thereby affecting fishing and hunting. However, the EIR for the proposed Program indicates that such changes, if any, would not be significant, and, thus, the socioeconomic assessment would not reflect any impact on tourism. With respect to river levels, the EIR concluded that:

> The proposed Program would not affect the maximum release rate from Parker Dam, which is based on hydroelectric power generation needs, although it may reduce the amount of time that water is released at the maximum rate. Similarly, the proposed Program would not affect the minimum release rate from Parker Dam, currently set by the Bureau of Reclamation at 2,000 cfs for most situations ... Similar to existing conditions, the river's water level would continue to fluctuate daily between high and low surface elevations (which vary from season-to-season and year-to-year), but the amount of time that the river is at its highest level each day would be shorter.[46]

The EIR for the proposed Program also concluded that after accounting for potential cumulative impacts associated with future expected downstream diversions and river operations changes in river hydrology "would constitute a less-than-significant cumulative hydrologic impact."[47]

With respect to aquatic and terrestrial wildlife populations, the Draft EIR concluded:

> the proposed Program would not directly affect riparian and aquatic vegetation along the Colorado River, its backwaters and other wetland areas supported by the river and PVID's Outfall Drain, and the proposed Program would have only negligible indirect effects on this vegetation. As a result, the proposed Program would have a less-than-significant impact on wildlife that utilize the vegetation as habitat.[48]

and that

> the cumulative biological resources impact of these projects on the Colorado River would be less than significant under CEQA and, therefore, would not require mitigation under CEQA.[49]

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[45] During the Test Program equipment dealers in the Blythe area reported increased sales of farm equipment to farms participating in the program.
[46] Palo Verde Irrigation District, "Draft Environmental Impact Report for the Proposed Palo Verde Irrigation District Land Management, Crop Rotation and Water Supply Program." May 2002. Page 4-50.
[47] Ibid. Page 6-18
[48] Ibid. Page 4-78
[49] Ibid. Page 6-20

- *Operation of Public and Private Groundwater Wells*

Community leaders have also expressed concern that changes in groundwater levels caused by the proposed Program would adversely impact the operation of public and private groundwater wells within the study area. The EIR for the proposed Program, however, found that

> A reduction of one to two feet [in groundwater level] would be a less-than-significant impact to the ground water hydrology. This assessment is consistent with the following facts: (1) high groundwater levels caused by irrigation historically have been a problem in the Palo Verde Valley, affecting crops and constraining other human uses, and (2) a one-to-two foot decrease in groundwater levels would not affect the viability of water supply wells or groundwater availability within the Palo Verde Valley.[50]

In addition, several beneficial impacts of the proposed Program were not quantified because of inadequate data. These were:

- Farm finances - the proposed Program's entry and biannual payments would reduce debt/equity ratios for PVID farms. This would facilitate better terms for production and capital financing and help to stabilize the regional farm finances. The biannual payments would also help to insulate regional farm income during periods when farm commodity prices are depressed.

- Reallocation of farm resources - farm operator time and resources could be redeployed to other activities during periods when land is rotated out of production. Likewise, farm equipment could be redeployed to increase productivity on farm land remaining in production. Both of these beneficial impacts of the proposed Program are not incorporated into the analysis presented in the preceding sections of this report.

- Metropolitan Water District Field Office - the analysis did not quantify benefits associated with operation of a field office within the Valley by Metropolitan Water District. This field office is expected to staff 1-2 full-time positions during the operation of the proposed Program.

- Program Administration Payments to PVID - the analysis did not incorporate annual payments of $100,000 per year that Metropolitan Water District would make to PVID to cover incremental costs of Program administration.

[50] Ibid. Page 4-47.

5.7 Summary of Socioeconomic Impacts

To summarize, the assessment identified three sources of direct economic change to the Blythe economy:

- reduced irrigated acreage and associated reductions in farm activity
- local spending of Program entry payments
- local spending of program biannual payments

These direct changes were quantified and then incorporated into an input-output model of the Blythe economy. The input-output analysis estimated changes in Blythe area:

- income of non-Program participants
- employment
- Tax receipts

Additionally, the assessment evaluated the:

- distribution of impacts across industry sectors
- potential effects on ARZC rail operations
- potential effects on local school funding

Impacts were estimate for three scenarios of Program acreage rotation:

- minimum acreage rotation
- average acreage rotation
- maximum acreage rotation

Results

The following impacts were identified by the assessment:

- Income of Non-Participants would decrease by a maximum of one percent as a result of the Program, or a present value of $1.6 million, $9.6 million, and $21.4 million for the minimum, average, and maximum scenarios, respectively.

- Regional Employment would show a slight increase in the first five years of the Program due to local spending of Program entry payments and then decrease up to a maximum of two percent of baseline employment, or about 100 full-time-equivalent (FTE) jobs. The estimated average annual change in employment over the 35-year Program term was 40 FTE jobs, 69 FTE jobs, and 93 FTE jobs for the minimum, average, and maximum scenarios,

respectively. These results include some owner/operator labor that would be compensated by the Program and, thus, may be overstated.

- Regional Tax Receipts would be mostly unaffected by the proposed Program. For the minimum scenario local tax receipts were calculated to increase slightly. The input-output analysis calculated a maximum decrease of 0.7 percent. In present value terms, local tax receipts would increase $0.4 million for the minimum scenario, and decrease by $0.6 million and $2.1 million for the average and maximum scenarios, respectively.

- School Funding could experience a slight decrease due to the Program. In present value terms, the assessment concluded that over the 35-year Program term local school district funding could decrease by a maximum of $0.5 million, $1.1 million, and $2.0 million for the minimum, average, and maximum scenarios, respectively.

- Distribution of Impacts: The assessment indicated impacts of the Program would not be distributed uniformly throughout the Blythe economy. Adverse changes to non-participant income and employment would concentrate within the farm labor, farm services, and farm supply sectors. Lesser negative impacts would occur within the transportation sector. Positive impacts would occur mostly in the construction sector of the economy.

Study References

City of Blythe, "General Plan, Revised Draft," September 2001.

City of Blythe and Blythe Chamber of Commerce, "Community Economic Profile of Blythe, Riverside County, California." 1998.

Great Western Research, "Palo Verde Test Land Fallowing Program, August 1, 1992 - July 31, 1994, Final Report." August 1995.

Helix Environmental Planning, Inc., Memorandum to Palo Verde Irrigation District, dated 11/14/01.

Inland Empire Economic Databank and Forecasting Center, University of California, Riverside, 1998.

Minnesota IMPLAN Group 1999. IMPLAN Professional, Version 2.0. User's Guide, Analysis Guide, Data Guide. Stillwell, MN, April 1999.

Loh, Penn, and Anna Steding, "The Palo Verde Test Land Fallowing Program: A Model for Future California Water Transfers," Pacific Institute, March 1996.

Mitchell, David, "Regional Economic Impacts of the Palo Verde Test Land Fallowing Program." December 1994.

Palo Verde Irrigation District, "Draft Environmental Impact Report for the Proposed Palo Verde Irrigation District Land Management, Crop Rotation and Water Supply Program." May 2002.

Riverside County Agricultural Commissioner's Office, "Palo Verde Valley Acreage and Agricultural Crop Report," 1996 - 2000.

University of California Cooperative Extension, U.C. Cooperative Extension Sample Cost to Establish and Produce Alfalfa Hay, Imperial County, 2000-2001.

University of California Cooperative Extension, "U.C. Cooperative Extension Sample Cost to Produce Wheat, SJ Valley, 1999."

University of California Cooperative Extension, "U.C. Cooperative Extension Sample Cost to Produce Cotton, PVID, 1997."

University of California Cooperative Extension, "Establishment and Production Costs, Lemons, Coachella Valley, 1998."

University of California Cooperative Extension, "Establishment and Production Costs, Valencia Oranges, Coachella Valley, 1998."

ATTACHMENT A - CROP INPUT DEMANDS

COTTON PRODUCTION COSTS

Notes:
1. Costs adapted from U.C. Cooperative Extension Sample Cost to Produce Cotton, PVID, 1997.
2. Labor rates are 9.23/hr machine labor; 7.46/hr non-machine labor

FARM OPERATION

Preplant:	Operation Time (hrs/ac)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom Srvc	Total Cost
Subsoil	0.67	7.00	18.62	0.00		25.62
Disc 2x	0.50	6.00	9.26	0.00		15.26
List	0.20	2.00	3.36	0.00		5.36
Soil Test	0.00	0.00	0.00	0.00	1.00	1.00
Cultivate	0.14	2.00	2.24	0.00		4.24
Pre-Irrigate	0.50	4.00	0.00	5.00		9.00
Total Preplant Costs	2.01	21.00	33.47	5.00	1.00	60.47
Cultural:						
Plant	0.22	2.00	4.19	43.00	0.00	49.19
Bt Technology Fee	0.00	0.00	0.00	0.00	33.00	33.00
Cultivate	0.28	3.00	4.48	0.00	0.00	7.48
Irrigate	4.00	30.00	0.00	37.00	0.00	67.00
Fertilizer	0.77	9.00	13.61	21.00	0.00	43.61
Spot Spray Herbicide	0.16	2.00	2.59	12.00	0.00	16.59
Cotton Growth Regulator	0.49	5.00	7.92	22.00	0.00	34.92
Insecticide	0.20	2.00	3.23	6.00	0.00	11.23
Lay By Herbicide	0.16	2.00	2.59	7.00	0.00	11.59
Defoliate	0.25	3.00	4.04	27.00	0.00	34.04
Pick up Truck	0.76	9.00	4.79	0.00	0.00	13.79
Total Cultural Costs	7.31	67.00	47.45	175.00	33.00	322.45
Harvest:						
Harvest	0.33	4.00	17.83	21.00	0.00	42.83
Total Harvest Costs	0.33	4.00	17.83	21.00	0.00	42.83
Assessment:						
Assessments	0.00	0.00	0.00	22.00	0.00	22.00
Total Assessment Costs	0.00	0.00	0.00	22.00	0.00	22.00
Postharvest:						
Flail Chopper	0.20	2.00	3.76	0.00	0.00	5.76
Disc 2x - stuble disc	0.50	6.00	10.25	0.00	0.00	16.25
Total Postharvest Costs	0.70	8.00	14.01	0.00	0.00	22.01
TOTAL POTENTIAL CASH COSTS						469.75

ANNUAL SEED & CHEMICAL EXPENDITURES ($/ac)	
Fertilizer, Herbicide, Insecticide	116.00
Fuel & Lubricants	63.54
Seed	43.00
Total Seed & Chemical Expenditures	222.54

ANNUAL MACHINE REPAIRS ($/ac)	
Repairs	49.22

ANNUAL LABOR EXPENDITURE ($/ac)	
Irrigation field labor	34.00
Machine operation	66.00
Total Labor Expenditure	100.00

OTHER EXPENDITURES ($/ac)	
Custom Services	34.00
Assessments	22.00
Water Fees	42.00
Total Other Expenditures	98.00
Total Cash Expenditures	469.75

WHEAT PRODUCTION COSTS

Notes:
1. Costs adapted from U.C. Cooperative Extension Sample Cost to Produce Wheat, Double Cropped, SJ Valley, 1999.
2. Labor rates are 9.23/hr machine labor; 7.46/hr non-machine labor

Operation	Operation Time (hrs/ac)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom Srvc	Total Cost
Cultural:						
Chisel 2x	0.50	6	12	0	0	18
Finish Disc 2x	0.25	3	5	0	0	7
Pull Borders	0.04	0	0	0	0	1
Fertilize - preplant 100 lbs N	0.17	2	2	35	0	39
Plant	0.20	2	4	17	0	23
Fertilize - 40lbs N	0.00	0	0	5	0	5
Weed Control - post emerg.	0.00	0	0	5	8	13
Pull Tail Ditch	0.04	0	0	0	0	1
Fertilize (w/ first irrigation)	0.25	2	0	14	0	16
Irrigate 3x	0.00	0	0	39	0	39
Close Ditch	0.04	0	0	0	0	1
Pickup truck use	0.24	3	1	0	0	4
Total Cultural Costs	1.73	18	26	115	8	167
Harvest:						
Harvest - Combine	0	0	0	0	73	73
California Wheat Commission	0	0	0	2	0	2
Total Harvest Costs	0	0	0	2	73	75
TOTAL POTENTIAL CASH COSTS		18	26	117	81	242

ANNUAL SEED & CHEMICAL EXPENDITURES ($/ac)	
Fertilizer, Herbicide, Insecticide	59
Fuel & Lubricants	16
Seed	17
Total Seed & Chemical Expendituers	92

ANNUAL MACHINE REPAIRS ($/ac)	
Repairs	10

ANNUAL LABOR EXPENDITURE ($/ac)	
Irrigation field labor	
Machine operation	18
Total Labor Expenditure	18

OTHER EXPENDITURES ($/ac)	
Custom Services	83
Assessments	2
Water Fees	39
Total Other Expenditures	124
Total Cash Expenditures	244

ALFALFA HAY PRODUCTION COSTS

Notes:
1. Costs adapted from U.C. Cooperative Extension Sample Cost to Establish and Produce Alfalfa Hay, Imperial County, 2000-2001.
2. Assumes average stand life of 4 years.
3. Machine operating costs include cost for labor and equipment. If operated by grower labor component would not be a cash expense

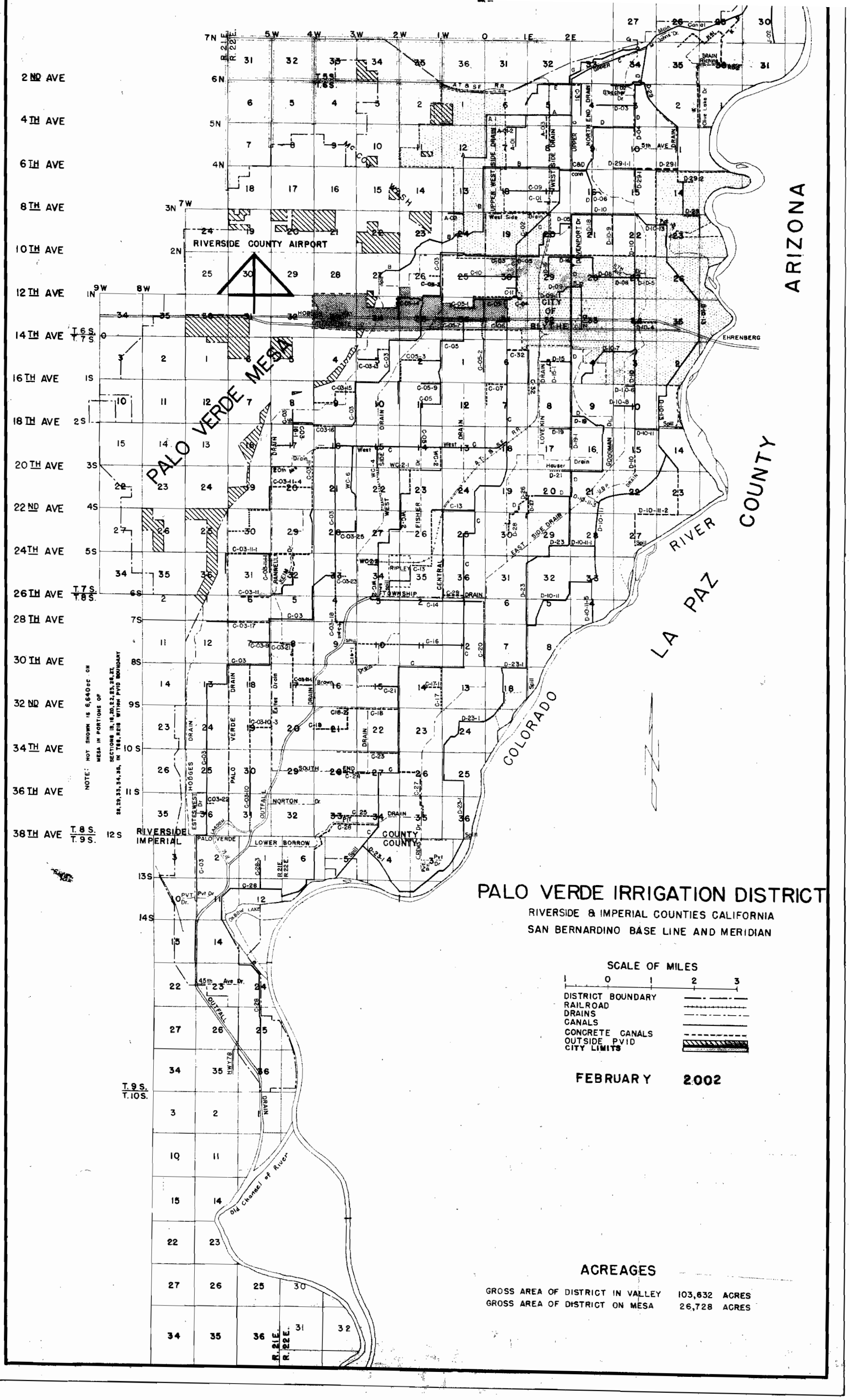
STAND ESTABLISHMENT

		Materials		Hand Labor		
Land Preparation	Mach. Op. Cost	Type/Amount	Cost	Hours	Dollars	Cost Per Acre
Subsoil	38.75					38.75
Disc 2x	23.00					23.00
Fertilize	8.00	250 lb 11-52-0	31.88			39.88
Border, cross check						0.00
& break borders	17.75					17.75
Flood		1/2 ac-ft	7.28	1.00	7.75	15.03
Disc 2x	23.00					23.00
Landplane 2x	24.00					24.00
Border, dump	14.00					14.00
Float	10.00					10.00
Total Land Preparation Costs						205.41
Planting						
Planting	10.50	25lb seed @ 1.70	42.50			53.00
Irrigate 2x		1 ac-ft	14.56	2.00	15.50	30.06
Weed control 1x	7.50	Herbicide	35.00			42.50
Insect control 1x	8.00	Insecticide	10.00			18.00
Total Planting Costs						143.56
TOTAL COST OF STAND ESTABLISHMENT (would be amortized over 4 years)						**348.97**

ANNUAL HAY PRODUCTION COSTS

Growing						
Weed control 2x	15.00	Herbicide 2 apps	28.00			43.00
Irrigate 16x		6.5 ac-ft	94.64	9.00	69.75	164.39
Fertilize	6.00	100lb P205 @ 0.26	26.00			32.00
Insect control 4x	8.00	Insecticide	50.00			82.00
Total Growing Costs						321.39
Harvest						
Swather 7x	54.25					54.25
Rake 12x	45.00					45.00
Bale	0.63 /bale	128 bales				80.64
Haul & stack	0.24 /bale	128 bales				30.72
Total Harvest Costs						210.61

ANNUAL COSTS PER ACRE	
1/4 STAND ESTABLISHMENT COST	87.24
ANNUAL GROWING COST	321.39
ANNUAL HARVEST COST	210.61
MISCELLANEOUS CASH OVERHEAD (insurance, legal/accounting, etc)	80.00
TOTAL COST	**699.24**
ANNUAL SEED & CHEMICAL EXPENDITURES ($/ac)	
Fertilizer, Herbicide, Insecticide (includes 1/4 cost for stand establishment)	123.22
Fuel & Lubricants (Includes 1/4 cost for stand establishment)	45.02
Seed (1/4 cost of stand establishment)	10.63
Total Seed & Chemical Expendituers	178.87
ANNUAL LABOR EXPENDITURE ($/ac)	
Irrigation field labor (includes 1/4 of irrigation labor cost for stand establishment)	75.56
Machine operation	42.20
Total Labor Expenditure	117.76
ANNUAL MACHINE REPAIRS ($/ac)	
Repairs (includes 1/4 of machine repairs for stand establishment)	30.07
ANNUAL CUSTOM EXPENDITURES ($/ac)	
Bale	80.64
Haul & stack	30.72
Total Custom	111.36
Miscellaneous	80.00
Water	100.10
Total	618.16


PALO VERDE IRRIGATION DISTRICT
RIVERSIDE & IMPERIAL COUNTIES CALIFORNIA
SAN BERNARDINO BASE LINE AND MERIDIAN
SCALE OF MILES
1 0 1 2 3
DISTRICT BOUNDARY
RAILROAD
DRAINS
CANALS
CONCRETE CANALS
OUTSIDE PVID
CITY LIMITS
FEBRUARY 2002
ACREAGES
GROSS AREA OF DISTRICT IN VALLEY 103,632 ACRES
GROSS AREA OF DISTRICT ON MESA 26,728 ACRES
ARIZONA
LA PAZ COUNTY
RIVER
COLORADO
PALO VERDE MESA
RIVERSIDE COUNTY AIRPORT
CITY OF BLYTHE
EHRENBERG
RIVERSIDE COUNTY
IMPERIAL COUNTY
2ND AVE
4TH AVE
6TH AVE
8TH AVE
10TH AVE
12TH AVE
14TH AVE
16TH AVE
18TH AVE
20TH AVE
22ND AVE
24TH AVE
26TH AVE
28TH AVE
30TH AVE
32ND AVE
34TH AVE
36TH AVE
38TH AVE
T.6S. T.7S.
T.7S. T.8S.
T.8S. T.9S.
T.9S. T.10S.
R.21E. R.22E.
NOTE: NOT SHOWN IS 6,640 ac. ON MESA IN PORTIONS OF SECTIONS 18, 19, 20, 21, 22, 23, 26, 27, 28, 29, 33, 34, 35, IN T6S, R21E WITHIN PVID BOUNDARY
WEST SIDE DRAIN
UPPER WEST SIDE DRAIN
NORTH END DRAIN
DAVENPORT DR
LOVEKIN
GOODMAN
EAST SIDE DRAIN
FISHER
CENTRAL
RIPLEY
TOWNSHIP
HODGES
ESTES
PALO VERDE
OUTFALL
NORTON
LOWER BORROW
OXBOW LAKE
HWY 78
Old Channel of River
Main Canal
Olive Lake Dr
45th Ave Dr.