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4.18 SOCIO-ECONOMICS

This section presents population estimates upon which wastewater flow projections were based. Existing and future population, housing, employment, and economic conditions are described. The impact analysis provides estimates for each alternative of increases in service charges and demand fees for wastewater services and describes numbers of buildings removed by alternative facilities. In addition, potential positive effects on the local agricultural economy and negative effects on the tourist economy are discussed. Overall effects on the local economy are also reviewed. There is a potential that the Project may need to use condemnation to obtain land for Project facilities. This is discussed in the Acquisition Options Report (Economic Planning Systems 1993).

IMPACTS EVALUATED IN OTHER SECTIONS

All impacts related to Socio-economics are discussed in this section.

AFFECTED ENVIRONMENT (SETTING)

Population, Housing, and Employment

The purpose of this section is to describe the existing and future population, housing and employment conditions that will be affected by the proposed Santa Rosa Subregional Long-Term Wastewater Project.

The Subregional System includes the cities of Santa Rosa, Sebastopol, Rohnert Park and Cotati. The system currently serves residential, commercial, and industrial uses within each city's incorporated boundaries, and could serve uses within the Spheres of Influence of the member jurisdictions if these are annexed in the future. There are also unincorporated areas which are served by the Subregional System as a result of the failure of the existing septic system: the Bellevue area, Roseland area and the Country Club area. There is very little growth potential in these areas so they are not included in the total Project area buildout projections.

This section presents existing conditions and buildout projections implied by each jurisdiction's General Plan as of April, 1994. The total projected growth designated by the General Plans of each jurisdiction was used as the basis for determining the size and physical specifications of each alternative. Buildout is the point at which areas included in the General Plan have been developed at their full capacity as designated in the General Plan. For example, at buildout all vacant land with land use designations for residential use will have been developed and no vacant residential parcels will remain.

The actual rate of growth projected in the Project area is not critical to the sizing of the Project. However, in order to provide an indication of the time frame implied by the

General Plan population, housing and employment buildout projections, the buildout projections from the General Plans of the affected cities were compared to the Association of Bay Area Governments (ABAG) projections for the Years 2000 and 2010 and both are presented in the following section (Association of Bay Area Governments 1995).

In this analysis, employment estimates are presented for five industry sectors, including agriculture and mining, manufacturing and wholesale, retail, service and "other jobs". Certain sectors have a larger impact on the generation of wastewater; therefore it is important to understand which sectors are projected to experience the greatest growth in order to more accurately estimate the sewage treatment capacity that will be required to serve total growth.

There are two geographical areas of interest in this analysis:

1. The Subregional System and its member jurisdictions; and
2. The “affected area”, the area that could be affected by implementing the Long-Term Project, including most of Sonoma County and the area of Marin County bordered on the west by Tomales Bay and on the Northeast by the Sonoma/Marin County line.

The data used in this section is taken from two sets of sources. The existing conditions are based on the Association of Bay Area Governments, Projections '94, which provides historical data and projections through 2010. The buildout projections are taken from each City's General Plan in effect in April 1994.

The General Plan buildout estimates are based on each jurisdiction's assessment of the development potential of vacant and under-utilized land within its Sphere of Influence. The buildout estimates were reviewed and confirmed by representatives of each City. The General Plans do not provide projections for employment by sector at buildout.

Affected Area

The affected area for this study extends from northern Marin County to the City of Healdsburg, encompassing almost all of Sonoma County. The area in Northern Marin County included in the affected environment is primarily agricultural and is not expected to experience significant growth. Therefore, demographic projections for this area are not discussed in detail.

The 1995 population in Sonoma County is estimated at 423,700. By 2010, the County is projected to increase to 528,700, with an annual average growth rate of 1.5 percent. A majority of the population growth in this area is projected to occur in Santa Rosa. Significant population growth is also projected in Windsor, Rohnert Park, and Petaluma.

Employment growth in Sonoma County is projected to grow at an annual average rate of 2.7 percent between 1995 and 2010, with the greatest growth occurring in the

manufacturing, wholesale and service sectors. The largest employment growth in the County is projected to occur in Santa Rosa, Rohnert Park, and Petaluma.

Total Subregional System Service Area

Population and Housing Units

The Subregional System's service area accounted for slightly less than 50 percent of Sonoma County's population and housing units in 1995 and is projected to increase to over 50 percent at buildout. The existing and projected population and occupied housing units for the total service area are shown in Table 4.18-1. Based on all the cities' General Plans (as in effect in April, 1994), the projected buildout population is 236,966 and 96,835 occupied housing units, an average of 2.45 persons per household. ABAG's 2010 projections show a slightly higher population by 2010. Based on information in their respective General Plans, the cities are expected to reach buildout beginning in the year 2000, with some not reaching buildout until well after the year 2010. The ABAG projections show somewhat higher numbers than do the cities' General Plans, because ABAG assumed 2.57 persons per household, which is higher than the General Plans' average assumption of 2.45. Thus, ABAG projections show higher populations in 2010 than the cities project at General Plan buildout, even though current growth rates show that buildout is likely to occur after 2010.

The ABAG forecasts show that Sonoma County is an attractive place to live and work, and that there is demand for housing and jobs in the area. The lower General Plan numbers reflect the policies of local jurisdictions to control the rate at which growth occurs.

Employment

The Subregional System's service area provides about 65 percent of the total employment in Sonoma County in 1995 and is projected to maintain the same share at buildout.

Future employment and population in the "Affected Area" will be discussed in the analysis of the potential impacts of the alternatives/components.

Subregional System Members

The population and housing units and employment data for each member of the Subregional System are shown in Tables 4.18-2 through 4.18-5.

Santa Rosa

The buildout estimates for Santa Rosa are based on the Santa Rosa General Plan 2010, completed in July 1991. Recent changes in the Santa Rosa General Plan are discussed in the Cumulative Projects Section, 3.5.

Table 4.18-1

Population, Housing Units, and Employment Data for Total Subregional System Service Area[1]

Data	1980[4]	1990[4]	1995[4]	2000[4]	2010[4]	Buildout[5]
Household Population	135,599	177,657	196,800	212,900	243,626	236,966
Persons per Household[2]	2.53	2.53	2.57	2.57	2.54	2.45
Occupied Housing Units[3]	53,360	70,237	82,680	82,680	96,050	96,835
Total Employment	65,270	99,640	122,900	122,900	157,040	127,431
Employment Breakdown						
Agriculture and Mining	2,037	2,150	2,250	2,250	2,230	n/a
Manufacturing and Wholesale	12,251	17,860	22,300	22,300	31,410	n/a
Retail	13,526	20,940	24,390	24,390	30,250	n/a
Service	16,857	29,780	41,940	41,940	54,250	n/a
Other	20,599	28,910	32,110	32,110	38,900	n/a

Sources: Association of Bay Area Governments, Projections '94 .1993; General Plans of all cities.

Notes:
1 The total service area includes Santa Rosa, South Park, Sebastopol, Rohnert Park, and Cotati.
2 Persons per household at buildout is calculated based on the total household population and the occupied housing units.
3 Occupied housing units is the total number of households.
4 Based on ABAG projections.
5 Based on General Plan projections of April, 1994.

Table 4.18-2

Population, Housing Units, and Employment Data for Santa Rosa and Sphere of Influence

Data	1980[3]	1990[3]	1995[3]	2000[3]	2010[3]	Buildout[4]
Household Population	100,160	126,840	142,000	154,600	177,100	174,500
Persons per Household [1]	2.48	2.49	2.54	2.55	2.52	2.39
Occupied Housing Units [2]	40,433	50,876	55,920	60,640	70,290	72,900
Total Employment	55,926	81,340	85,240	96,230	119,000	98,500
Employment Breakdown						
Agriculture and Mining	1,469	1,560	1,490	1,590	1,570	n/a
Manufacturing and Wholesale	10,741	14,030	15,470	17,110	21,610	n/a
Retail	11,382	17,010	17,080	19,480	22,580	n/a
Service	13,756	24,170	27,790	31,420	40,570	n/a
Other	18,578	24,570	23,410	26,720	32,670	n/a

Source: Association of Bay Area Governments, Projections '94, 1993; City of Santa Rosa, Santa Rosa 2010 General Plan 1991; Economic and Planning Systems, Inc. 1996

Notes:
1 Persons per household at buildout is calculated based on the total household population and the occupied housing units.
2 Occupied housing units is the total number of households.
3 Based on ABAG projections.
4 Based on General Plan projections

Table 4.18-3

Population, Housing Units, and Employment Data for Sebastopol

Data	1980[3]	1990[3]	1995[3]	2000[3]	2010[3]	Buildout[4]
Household Population	7,252	7,883	8,400	8,900	10,200	10,417
Persons per Household [1]	2.50	2.53	2.53	2.53	2.49	2.39
Occupied Housing Units [2]	2,898	3,112	3,320	3,520	4,100	4,359
Total Employment	3,220	4,890	5,070	6,140	6,810	6,600
Employment Breakdown						
Agriculture and Mining	407	420	430	460	460	n/a
Manufacturing and Wholesale	622	780	830	1,100	1,280	n/a
Retail	675	1,040	1,070	1,100	1,230	n/a
Service	975	1,800	1,870	2,440	2,570	n/a
Other	541	850	870	1,040	1,270	n/a

Source: Association of Bay Area Governments, Projects '94 1993; 1994 City of Sebastopol, General Plan, 1994; Economic and Planning Systems, Inc. 1996

Notes:
1 Persons per household at buildout is calculated based on the total household population and the occupied housing units.
2 Occupied housing units is the total number of households.
3 Based on ABAG projections.
4 Based on General Plan projections, April 1994.

Table 4.18-4

Population, Housing Units, and Employment Data for Rohnert Park

Data	1980[3]	1990[3]	1995[3]	2000[3]	2010[3]	Buildout[(4)]
Household Population	24,119	36,862	39,200	41,400	46,826	41,400
Persons per Household [1]	2.74	2.64	2.63	2.67	2.60	2.67
Occupied Housing Units [2]	8,813	13,965	14,900	15,510	18,010	15,510
Total Employment	5,280	12,030	14,870	18,850	28,430	20,000
Employment Breakdown						
Agriculture and Mining	119	120	130	150	150	n/a
Manufacturing and Wholesale	728	2,830	2,630	3,700	7,580	n/a
Retail	1,191	2,340	2,520	3,240	5,640	n/a
Service	1,969	3,550	6,440	7,700	10,440	n/a
Other	1,273	3,190	3,150	4,060	4,620	n/a

Source: Association of Bay Area Governments, Projections '94 1993; City of Rohnert Park, Second Draft City of Rohnert Park General Plan, 1994; Economic and Planning Systems, Inc., 1996

Notes:

1 Persons per household at buildout is calculated based on the total household population and the occupied housing units.
2 Occupied housing units is the total number of households.
3 Based on ABAG projections.
4 Based on General Plan projections as of April, 1994.

Sebastopol

The City of Sebastopol adopted a growth management ordinance in 1994 which limits the number of new housing units that can be built in the next 20 years and thus, limits the projected population. The ordinance was adopted to control growth that will otherwise exceed the City's sewage treatment capacity. However, the growth management ordinance affects the rate at which new development will occur and it does not affect the overall growth capacity within the existing city limits and Sphere of Influence. Thus, the buildout projections originally stated in the City's General Plan have been used in this analysis.

Rohnert Park

At buildout, the 1995 Rohnert Park General Plan projects a population of 41,400, which represents a slight decrease in Rohnert Park's relative share of the total service area population.

Cotati

Cotati is currently the smallest city in the service area. The 1985 Cotati General Plan projects a buildout population of 10,649.

Southpark Sanitation District

Population, housing and employment statistics are not available for the South Park County Sanitation District, because it does not have separate General Plan (the area is included in the Sonoma County General Plan) and ABAG does not provide projections for this area.

The following economic factors will be considered in assessing the impacts of the Long-Term Project:

1. Subregional System Service Charges and Demand Fees
2. Agricultural Economy
3. Tourism

Service Charges and Demand Fees

This section summarizes the existing service charges and demand fees in the Subregional System's member jurisdiction and provides a comparison between the service charges and demand fees in Santa Rosa and other similar communities in California.

Table 4.18-5

Population, Housing Units, and Employment Data for Cotati

Data	1980[3]	1990[3]	1995[3]	2000[3]	2010[3]	Buildout[4]
Household Population	4,068	6,072	7,200	8,000	9,500	10,649
Persons per Household [1]	2.74	2.66	2.68	2.66	2.60	2.62
Occupied Housing Units [2]	1,486	2,284	2,690	3,010	3,650	4,066
Total Employment	844	1,380	1,420	1,680	2,800	2,331
Employment Breakdown						
Agriculture and Mining	42	50	50	50	50	n/a
Manufacturing and Wholesale	160	220	240	390	940	n/a
Retail	278	550	500	570	800	n/a
Service	157	260	320	380	670	n/a
Other	207	300	310	290	340	n/a

Source: Association of Bay Area Governments, Projections '94 1993; Earth Metrics, Inc., City of Cotati EIR 1990; Economic and Planning Systems, Inc., 1996

Notes:
1 Persons per household at buildout is calculated based on the total household population and the occupied housing units.
2 Occupied housing units is the total number of households
3 Based on ABAG projections.
4 Based on General Plan projections as of April, 1994.

Existing Service Charges and Demand Fees

Table 4.18-6 shows the existing monthly service charges and demand fees (also referred to as connection fees) being charged by the member entities. As shown, the service charges range between $27.50 and $31.23 per month. The demand fees range between $2,000 and $6,360 per unit.

The City of Santa Rosa increased their service charge and demand fee in 1995 which are reflected in Table 4.18-6. The City also changed the method for calculating the demand fee for commercial uses. The new method is based on the projected flow of the user and pollutant loadings in the effluent.

Table 4.18-6

Existing Monthly Service Charges and Demand Fees in Member Entities
Single Family Dwellings

Member Entities	Monthly Service Charge	Demand Fee
Santa Rosa	$31.23	$5,000
Sebastopol	$30.50 [1]	$6,360
Rohnert Park	$27.70	$5,690
Cotati	$38.51 [2]	$7,883
South Park County Sanitation District	$27.50	$2,000

Source: State Water Resources Control Board, Division of Clean Water Programs, Wastewater User Charge Survey Report, 1995; City of Sebastopol, Sewer Billing Services, 1995; Economic and Planning Systems, Inc., 1995

(1) City has 2 month billing cycle. Based on base rate of $34.37 plus $2.59 per 100 cubic feet of wastewater discharge. Each residence has different discharge service so there isn't an average discharge. Based on City estimate, bill for single family residence with 3 people will be about $71 for two months.

(2) City has 2 months billing cycle. Based on assumption that an average person uses 5,002 gallons of water every two month in the off peak season. The charge is based on the base charge of $28 for a 3/4" meter, the standard for a single family unit, plus $3.63 per 1,000 gallons used. The example shown assumes an average of 2.7 persons per household.

Comparison of Service Charges and Demand Fees to Other Communities

Increased service charges and demand fees may be considered within the context of fees and charges being assessed throughout the state and in comparable communities. The demand fee and service charges in Santa Rosa have been compared to similar communities elsewhere in California with a population over 100,000, and that provide tertiary treatment level. Santa Rosa was also compared

with cities surveyed by the California State Water Resources Control Board, Division of Clean Water Programs (Economic and Planning Systems 1995a).

Santa Rosa's current service charge is the highest of any California city with over 100,000 population (the average is (11.61/month). The charge is also higher than the average charge for cities that provide tertiary treatment level ($18.94/month), but it is not the highest in the state. In terms of demand fees, Santa Rosa's rate of $5,000 is higher than the average for large cities ($2,055), those with tertiary treatment ($2,603), and all cities ($1,841) surveyed by the State.

The charges and fees have also been compared to the rates being assessed in Petaluma, Fairfield, Vallejo, Napa County, and parts of Marin County. The existing service charge in Santa Rosa is more than double the average rate charged in these areas, except for Napa. The existing demand fees, however, are somewhat less than those charged in Fairfield and Napa (see Table 2 in Appendix S-3 for the entire comparison).

Agricultural Economy

The following section presents an overview of the agricultural economy of Sonoma and northern Marin Counties and describes how the availability of reclaimed water may affect the local economy. Supporting data are provided in Tables 11-17 in Appendix S-3.

In order to test the economic viability of Project irrigation alternatives a set of "cropping scenarios" was developed for the 1%, 5% and 10% Discharge scenarios. The cropping scenarios reflect soil capabilities, soil limitations, and cropping restrictions as defined in *Irrigation Suitability Land Classification and Existing and Potential Agricultural Land Uses, Sebastopol and South County Reclamation Study Areas* and *Irrigation Suitability Land Classification and Existing and Potential Agricultural Land Uses, West County Reclamation Study Area* (Questa Engineering Corporation 1996b and c) and the *Irrigation Management Guidelines for West County and South County Alternatives* (Questa Engineering 1996d). Five levels of farming intensity were considered:

- vineyards and orchards;
- berry crops such as strawberries, blueberries, and raspberries;
- vegetable crops such as cool season vegetables (onions, swiss chard, lettuce, broccoli, green beans);
- forage, hay, or silage crops (irrigated hay, Sudan grass, field corn); and
- improved irrigated permanent pasture (with cross fencing for rotational management).

The cropping scenarios represent progressive levels of farming intensity. In general the higher the farming intensity the more inputs of labor and management are required and the greater the likelihood that the commodity grown can generate

higher potential income per acre. The more intensively farmed crops require higher capability soils and/or greater attention to soil management and erosion control. Three cropping scenarios (high tech, medium tech and low tech) were developed which distributed the available irrigable acreage among the five levels of farming intensity. The cropping scenarios are designed to test composite area-wide farming intensities with different degrees of investment (management and labor) and potential income generation. The three scenarios are described in the Methodology portion of this section.

The purpose of this assessment is to determine whether agricultural irrigation is a long-term, viable option for the Project. The economic viability will depend on the potential benefits to farmers of using reclaimed water and on the long-term prospects for the agricultural industry in Sonoma County. Also, because the costs of water storage facilities are high, there should be some certainty that there will be a long-term and stable demand for the reclaimed water along with a potential for cost recovery and cost justification.

Overview of the Agricultural Economy in Sonoma County

The value of Sonoma County agricultural production grew 11 percent in real terms between 1988 and 1994 from $305 million to $339 million (expressed in constant 1994 dollars). Wine grapes are the most valuable crop produced in Sonoma County representing 45 percent of total countywide agricultural value in 1994, followed by market milk representing 22 percent of total agricultural value. Between 1988 to 1994 the value of milk production in Sonoma County (not including manufactured products such as cheese and yogurt) declined by about 4 percent, while the value of wine grape production increased by 47 percent (1994 constant dollars). The decline in the value of milk produced in Sonoma County was due mainly to reductions in milk quota prices during that period (Rick Bennett, Co. Farm Advisor**,** Cooperative Extension**,** pers. comm., December 1995). Other million dollar crops in Sonoma County in 1994 included miscellaneous livestock and poultry, timber, vegetables, cattle and calves, miscellaneous livestock and poultry products, grapevines, apples, nursery products, oat silage, oat hay, turkeys, and sheep and lambs (Office of Agricultural Commissioner, 1994a).

The North Bay Dairy Industry

Sonoma County represents about three percent of total milk production in California. The Sonoma dairy industry reflects trends in the state's dairy industry, which has been marked by increased concentration of dairy farms, a decreasing number of dairies, increasing herd sizes, and increased milk production per cow. These changes are due in large part to technological changes in feeding and milking practices which require large capital investments in order to stay competitive. Another reason for increased herd sizes has been the increase in the cost of dairy animal waste management due to more stringent regulations required

by the Regional Water Quality Control Board. The number of dairies in Sonoma County has declined from 127 in 1988 to 113 in 1993, while the average dairy herd size has increased from 260 to 310 head. Estimates for 1995 suggest that the average Sonoma dairy herd size is now closer to 350 head, which is closer to the 1993 state average of 476 head per dairy herd.

Marin County has 48 dairy farms. Taken as whole, the North Bay (Sonoma and Marin Counties) milk market has experienced a decrease in the number of dairy farms. In 1993 there were 161 dairies in the North Bay as compared to 181 dairies in 1988. The average herd size increased from 251 to 292 between 1988 and 1993.

Future growth in the State's dairy industry is expected to occur mainly in the San Joaquin and Central Valleys (Tom Gossard, Economist, California Department of Agriculture Milk Pooling Branch, pers. comm., November 1994). Most North Bay dairies use dry-land farming techniques relying on oat hay, silage, pasture, and imported alfalfa hay, while the large San Joaquin Valley dairies use feed lots, have access to inexpensive water and have the climate and soils conducive to growing their own alfalfa hay. However, the availability of reclaimed water could decrease the production costs of North Bay dairy farmers by allowing locally grown irrigated forage and pasture to replace alfalfa hay imports. Current imported feed could be reduced from the typical 80 to 85 percent of total animal feed requirement to about 40 to 45 percent.

The future of the North Bay dairy industry is at least in part dependent on the continuation of the dairy price support system which is currently under review by the U.S. Congress. California milk marketing orders are legislated separately from national milk marketing orders. However, changes in the national pricing system are likely to be reflected in the State eventually. California dairies are not as dependent on government price supports as they were three to four years ago. The number of dairies nationwide producing manufactured milk products has declined, giving the California dairies a bigger share of the manufactured milk products market. The commercial price for manufactured milk products in California is often higher than the government support price (Donald Shippelhaute, California Department of Agriculture Milk Pooling Branch pers. comm., March 1996).

At this point it is too early to speculate on how Congressional changes to the milk marketing orders may affect the North Bay dairy farmer, although anything that will improve their competitiveness with the larger Central Valley dairies will be beneficial to the Sonoma and Marin agricultural economies. In the midwest, a number of dairies have begun to rely more heavily on pasture for dairy feeding. Such a strategy has resulted in lower production costs. The availability of irrigation water for dairy pasture in the North Bay might allow increased use of year-round permanent pasture with resulting savings in imported feed costs.

Current Reclaimed Water Agricultural Users

Most dairies in Sonoma County depend upon alfalfa hay imported from other regions of California as a primary source of forage.**)** However, in February 1995 the Subregional System had contracts with 55 Sonoma County farmers who use between three and four billion gallons of reclaimed water a year for irrigation. The primary use is for pasture and forage crops. In 1995, about 4,300 acres of agricultural land were under contract with the City and were being irrigated with reclaimed water (Dan Carlson, City of Santa Rosa, pers. comm, August 1995). The majority of the acres are irrigated pasture (33 percent) or a mix of pasture and forage (31 percent). The third largest category includes a mix of pasture and other crops such as pumpkins, vegetables, grapes, corn, and sod (15 percent). Grapes account for six percent of the irrigated acreage, urban uses about seven percent.

In addition to the contracts with private landowners, the City of Santa Rosa leases City-owned land to several farmers who have contracts for the use of reclaimed water. In February 1995, the City-owned farms totaled 1,458 acres, of which about 1,100 acres were being irrigated. The majority of this irrigated land is used for forage (63 percent) followed by a mix of pasture, fodder and pumpkins (28 percent). Based on the above numbers it can be seen that the majority of current reclaimed water users are dairies growing forage for their own use or for sale to other farmers.

Opportunities Provided by Increased Irrigation Water

The following section describes how the availability of reclaimed water could affect the various sectors of the Sonoma and northern Marin agricultural economy.

The three Project areas considered as potential recipients of reclaimed water are the South County area (Alternative 2), the West County area (Alternative 3) and the Sebastopol area which could be included with either alternative. The West County area consists of approximately 18,000 acres and incorporates the watersheds of Americano and Stemple Creeks and includes irrigation areas in Marin County. The South County Project area consists of approximately 16,500 acres and incorporates the flat valley lands immediately east of the Petaluma River and along Old Lakeville Road. The South County Project area also includes acreage east of Rohnert Park, along Adobe Road, and just north of Petaluma. The Sebastopol Project area consists of 2,800 acres and incorporates many existing apple orchards and vineyards east of Highway 116 and north of Bodega Highway.

The majority of the potential irrigation areas in the West and South County are not currently intensively farmed. Irrigated croplands account for less than five percent of these lands. The predominant agricultural use in both the West and South County areas is winter oat hay and dry pasture lands for beef cattle and

dairy operations. There are approximately 18 dairies in the West County and about four dairies in or close to the South County area. In the South County better soils and a higher percentage of flat lands account for more acreage in berry and vegetable crops, orchards and vineyards than in the West County.

The West County has a cooler and foggier climate. The warmer temperatures of the South County can potentially support a wider variety of crops and generate higher yields than in the West County. The lack of irrigation water has constrained agricultural development in the West County and to a lesser extent in the South County Project areas (Questa Engineering Corporation, 1996a). Agronomic studies prepared as part of this analysis indicate that Sonoma County's climate and soil types could allow for a wide variety of crop types if water supplies were available. Reclaimed water could be used to grow new acreage or increase existing yields for apples, vineyards, berry crops, vegetable crops, dairy forage, and irrigated pasture. The following section describes existing agricultural conditions in the potential irrigation areas and the potential capacity for increasing production given the availability of reclaimed water for irrigation. Table 4.18-7 summarizes the existing crop locations and opportunities for expansion. The existing acreage under crop cultivation described below for each of the areas may be less than total existing acreage. Areas that could potentially be irrigated within each potential irrigation area were selected based on parcel size and contiguity. Some smaller scattered parcels within each area were excluded due to the difficulty and expense of pumping and piping irrigation water to them. As indicated in Table 4.18-7, for many crops potential expansion will likely depend more on whether markets for these crops provide sufficient economic incentive for conversion rather than other factors such as soils and climate.

Apples

There are less than fifty acres of orchards in the West County area and few in the South County area. The shallow soils and generally poor drainage conditions in the West County area are not considered conducive for the deep rooting requirements for many fruit trees. The Sebastopol area has approximately 1,600 acres of apple orchards and there has been considerable interest expressed by farmers in obtaining irrigation water for orchards. Apples may be grown either as a drip or sprinkler-irrigated crop or as a dry crop. Many growers in Sebastopol have both irrigated and non-irrigated orchards, although the majority of apple orchards remain un-irrigated. Field tests have shown that apple yields can double from 20 tons to 40 tons per acre if irrigated, and can yield up to 65 tons per acre (Paul Vossen, Sonoma County Farm Advisor, UC Cooperative Extension, pers. comm., August 1995).

Table 4.18-7

Crop Expansion Opportunities

Crop	West County Project Area		South County Project Area		Sebastopol Project Area	
	Existing[1]	Future	Existing[1]	Future	Existing[1]	Future
Apples	Very few	Soils not considered well suited.	Very few	Unlikely	About 1600 acres	Significant potential for increased yields
Wine Grapes	None	Climate not considered suitable - expansion potential will be dictated by market forces.	About 300 acres	Some expansion potential	About 400 acres	Expansion potential will be dictated by market forces, some conversion from apples will continue
Berry Crops	Very few	Significant potential for expansion	Very few	Significant potential for expansion	Very few, some berries	Expansion potential will be dictated by market forces
Vegetable Crops	About 70 acres	Some potential for expansion	About 200 acres	Significant potential for expansion	Very few	Expansion potential will be dictated by market forces
Forage Crops	Dry oat hay winter crop	Potential for summer crops of Sudan grass and/or field corn for green chop or silage	Dry oat hay winter crop	Potential for summer crops of Sudan grass and/or field corn for green chop or silage	Very few	Expansion potential will be dictated by market forces
Irrigated Pasture	Less than 300 acres irrigated pasture in West and South County combined	Significant potential for permanent pasture with cross-fencing and rotational management	Less than 300 acres irrigated pasture in West and South County combined	Significant potential for permanent pasture with cross-fencing and rotational management	Very few	Expansion potential will be dictated by market forces

Sources: Questa Engineering Corporation, Cropping Scenarios for the West County and South County Alternatives, 1996; Economic & Planning Systems, Inc., 1996

Notes:

1 Existing acres shown within the Project areas may be less than total existing acres under production. Some smaller scattered parcels were excluded as it will be too costly to provide irrigation water to these areas.

Currently, Sonoma County has average apple yields of only 12 to 13 tons per acre mainly due to lack of irrigation and investment in new orchard technology. If irrigation were available Sebastopol apple growers could raise specialty apples such as the dwarf and semi-dwarf varieties Gala, Fuji, and Sierra Beauty. These apple varieties can reap a quick return on investment as they bear fruit in the second or third year after planting as opposed to standard apple trees that take 10 to 12 years to bear fruit (Paul Vossen, Sonoma County Farm Advisor, UC Cooperative Extension, pers. comm., August 1995).

Wine Grapes

The West County area has historically been viewed as being unsuitable for vineyards, although recently there has been interest expressed in growing cool-weather grape varietals. The South County area has about 300 acres of vineyards, mainly along Lakeville Highway. The Sebastopol area, on the other hand, contains micro-climates well-suited to cool-climate grape varieties and this area has about 400 acres of vineyards. Due to the higher returns on wine grapes (compared to dry-farmed apples) there has a been a gradual switch from apples to vines in the Sebastopol area. Wine grapes are not a water intensive crop, although in recent years most bulk-growers of grapes have converted from dry-farmed to drip-irrigated vines in order to improve yields. Grape vines currently yield on average about 4.5 tons per acre in Sonoma County. Because water does not appear to be a significant constraint to wine grape production in the Project area, it is not expected that the availability of water will significantly stimulate vineyard expansion (Questa Engineering Corporation 1996a).

Berries

Berry crops currently grown in Sonoma County include drip-irrigated bush berries, and strawberries. Very few acres of berry crops are currently being grown in Sonoma County due in part to a lack of irrigation water. Berry crops are characterized by relatively high value per acre and are typically marketed directly to the consumer either by on-farm sales, at farmer's markets, or sold directly to restaurants or retailers in the Bay Area.

Several thousand acres of gently sloping to moderately sloping lands are potentially suited to drip-irrigated strawberries, blueberries, and raspberries in the West and South County. Extensive conversion from oat hay land to berry crops is not expected in the short term, even with irrigation water, due to the lack of necessary farm machinery and suitable harvesting and shipping infrastructure. In the long-term, however, market conditions may encourage growers to raise these berry crops for local markets. One important advantage of specialty fruit crops is that they can

be grown on a small scale and that parcels of land that are too small for a commercial vineyard or truck farm could be used for berry crops.

Vegetable Crops

Most vegetable crops grown in Sonoma County are sold as specialty crops to farmer's markets and through other direct-sale methods. Vegetable crops currently grown in the West and South County areas include potatoes, squash, corn, pumpkins, and other row crops. In the West County area, there are about 30 acres of organically grown vegetables in the vicinity of Bodega Highway and Roblar Road and about 40 acres of dry-farmed potatoes. Even with irrigation water, extensive expansion of row crops in the West County Project area will be limited due to wet and poor quality soils and the lack of level land. However, over time, as fresh produce markets develop, it could become economical to increase production of salad greens, broccoli, green beans, onions, and swiss chard.

There are estimated to be about 150 acres of vegetable crops in the South County area grown mainly in the Tolay Valley and immediately east of Rohnert Park along Petaluma Hill Road. A variety of crops is produced in the Tolay Valley, including pumpkins, corn, and safflower. Lettuce, beans, peppers, and pumpkins are grown along Petaluma Hill Road for the local markets and organic fruit and vegetable stands. The flat valley floors and deep soils of these areas have potential, with additional irrigation water, to support a wider variety of vegetable crops, or increased production of existing vegetable crops.

There are estimated to be approximately 1,700 acres of high capability lands in the West County and 2,300 acres of high capability lands in the South County (Questa Engineering Corporation, 1996b and c). High capability lands are gently to moderately sloping lands (up to 10 percent slopes) with deep soils, that are suitable for the most intensively farmed vegetable crops, including drip-irrigated crops.

Forage crops and dry-farmed oat hay, either bailed or stored in barns, or chopped and put up as silage in plastic bags or bunkers, is the most extensive agricultural use the potential irrigation areas. The South County Project area produces more oat hay than the West County Project area. Currently irrigable lands are producing dry-farmed oat hay or silage in 60% of the South County and 30% of the West County areas. A very small percentage of oat hay and silage is sold; the majority of oat hay produced is used directly on the farms where it is grown, by ranchers and dairy operators. Dry-farmed oat hay production yields an average of 2.4 tons per acre in Sonoma County according to the Sonoma County Crop Reports. Sonoma dairy farmers are heavily dependent on imported feeds, despite the large oat hay production and extensive acreage in rangeland.

High-protein feeds such as alfalfa and grain are needed to insure good milk production from dairy cows. Often over 80 percent of the required dairy feed must be purchased by a typical West County dairy; slightly less feed is imported for dairy operations in South County.

In recent years, the high cost of alfalfa hay, imported from the Central Valley, has encouraged Sonoma dairy farmers to produce more forage locally. The climate and soils in the Project areas are not considered ideally suited for the production of alfalfa hay. However, in addition to oat hay, Sudan grass or field corn can be grown for green chop or silage in both the West and South County areas. Currently less than 200 acres are devoted to these other forage crops. The warmer South County climate is better suited for Sudan grass and field corn than the cooler West County.

Native Pasture and Irrigated Pasture

Although there is extensive native rangeland and dry-pasture grazed by beef cattle, sheep, and dairy animals, there are currently less than 300 acres of irrigated pasture in the West County and South County areas combined. Irrigable lands used for native range for dairy or beef cattle constitute 35% of the South County and 65% of the West County areas. Less than 200 acres in the West County area is currently used for irrigated pasture using liquid dairy wastes and on-farm reservoir storage. However, this cannot really be considered to be permanent irrigated pasture as it is principally a means for disposing of dairy waste. Dry native pasture yields approximately four animal unit months per acre while well managed permanent irrigated pasture, with cross fencing for rotational management, could be expected to yield 16 animal unit months per acre, which is the amount of feed required to maintain one animal unit (i.e., one cow, five sheep, or one and one-quarter horses) for a period of 30 days (Rick Bennett memorandum, 1995).

Tourism

This section provides an overview of tourism along the Russian River. The impact of the Project alternatives on the tourism industry along the Russian River must be considered within the context of the existing tourism market. The following describes key trends in tourism and the sources of tourism demand for the Russian River area.

Trends in Tourism

Tourism along the Russian River has fluctuated over the years, but generally the number of visitors to the area has been increasing. The Transient Occupancy Tax is the tax placed on all hotels/motels and campgrounds and is an indicator of tourism activity in the area. The Transient Occupancy Tax collected during the tourist season in the Russian River area increased by 40 percent from 1988 to

1994. However, growth has not been consistent, and there was a decline in the tax in 1989 and 1992.

In 1995, tourism was significantly lower than the same time in 1994, mainly as a result of the winter floods and damage to some of the big resorts. The Transient Occupancy Tax for the months of April, May, and June decreased by about 37 percent as compared to the same months in 1994, and the number of tourists as of June 1995 who had visited the Russian River Region Visitors Center was down by almost 2,000 (see Table 18 and 19 in Appendix S-3). While the resorts that are open are doing well, the reduction in the number of tourists has had a negative impact on all the businesses along the River.

Visitors to the Russian River come primarily from the San Francisco Bay Area, with additional market support provided by the Sacramento area and the Central Valley. Some out-of-state tourists also visit this area.

Summer and early Fall are the busiest seasons for tourism. Tourists come to the area for the activities the River offers as well as the proximity to both the vineyards and the ocean. The main recreational activities on the river include canoeing, inner-tubing, swimming, and fishing. Proximity to the Bay Area is an attraction to the Russian River area.

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

There are very few significance criteria, as defined by NEPA and CEQA, for socio-economic impacts. The first evaluation criterion is based on U.S. Environmental Protection Agency's (EPA) guidelines regarding affordable levels of wastewater service charges (U.S. EPA, 1993). The guidelines state that annual service charges are "difficult to afford" if they exceed 1.5 percent of the area's median household income.

Because there are several other important socio-economic issues for which it is not possible to develop quantitative criteria, this section includes discussion of several other potential Project effects for which there are no defined points of significance. This information is presented for information; no conclusions regarding significance of results have been drawn. Table 4-18-8 lists criteria and Table 4.18-9 presents the other socio-economic issues that are discussed in the remainder of this section.

Table 4.18-8

Evaluation Criteria with Points of Significance - Socio Economics

Evaluation Criterion	As Measured by	Point of Significance	Justification
1. Will the Project increase the service charge for wastewater?	The projected total service charge as a percent of the area's median household income	Greater than 1.5% in any of the jurisdictions	Guidelines set forth by the U.S. EPA
2. Will the Project result in loss of homes displaced by construction of Project facilities?	Number of homes or agricultural buildings lost.	Greater than 0 homes or buildings	Uniform Relocation Assistance and Real Property Acquisition Policies Act

Source: Economic & Planning Systems, 1996

Table 4.18-9

Other Issues - Socio-economics

Other Issues	As Measured by
3. Will the Project increase the demand fee for wastewater, resulting on decreased land values?	Decrease in land value per square foot.
4. Will the Project increase the value of agricultural production through irrigation?	Increase in value of crop; increase in value to dairy farmer; increase in value to apple farmer
5. Will the Project decrease the tourism economy through increased wastewater discharge?	Decrease in tourism demand
6. Will the Project have a net economic effect on the local economy?	Adverse and beneficial impacts as calculated by the Input-Output Model
7. Will the Project disproportionately affect low income or ethnic minority communities?	Evaluation of Environmental Justice - whether the affected area includes a higher proportion of low income and minority residents as compared to the County average

Source: Economic & Planning Systems, 1996

METHODOLOGY

The following section summarizes the methodology that was used for the various components of the economic impact analysis: the impact of increased sewer charges and rates on the economy, the agricultural impacts, the impact of increased wastewater discharge on Russian River tourism and the combined economic impact analysis. Five technical memoranda provide a detailed description of the background data and analytic models used. The technical memoranda are:

1. *Alternative Projects Construction Cost Estimates*, Parsons Engineering Science, Inc., November, 1995.
2. *Land Value Estimates*, Economic & Planning Systems, November, 1995.
3. *Cropping Scenarios for the West County and South County Reclamation Alternatives*, Questa Engineering, January 10, 1996.
4. *Agriculture Impact Analysis Methodology*, Economic & Planning Systems, March 1996.

Service Charges and Demand Fees

The methodology used to estimate the demand fees and service charges needed to finance each Project alternative is similar to that used by the City of Santa Rosa to develop their existing charges and demand fees. The methodology is described in detail in the memorandum, *Service Charge and Demand Fee Model* (Economic & Planning Systems 1995). The service charge and fee estimate have been prepared for the entire service area. Differences in charges and fees by member entities have not been prepared.

The following summarizes the key assumptions used to estimate the service charge and demand fee levels needed to finance each Project alternative.

Project Phasing

A majority of the improvements are projected to be phased in over the initial three year period, 1998 to 2000. The balance of the improvements are projected to occur in 2005 (Economic and Planning Systems 1996)..

Project Improvement Cost Allocation Estimates

The following section describes the calculations used to allocate the disposal, nitrogen removal, and treatment costs to demand fees and service charges. The allocation of the disposal costs is estimated separately from the treatment and nitrogen removal costs in order to credit the existing users for the portion of the disposal system that currently exists and credit existing and new users for the benefits of water conservation.

Disposal

Future wastewater disposal needs were calculated based on expected populations at buildout of the General Plans in effect in April 1994. Existing disposal capacity is estimated at 3,800 MG, and the future volume is expected to be 8,220 MG, a short fall of 4,420 MG. The share of the total disposal costs for existing users is estimated to be 52 percent of the disposal improvements costs, based on the existing users' share of total disposal volume. The future users generate a need for 48 percent of the disposal.

Nitrogen Removal

Nitrogen removal may be required as a water quality mitigation for higher levels of discharge. (Impacts associated with nitrogen levels in reclaimed water are discussed in the Surface Water Quality Section, 4.6). The nitrogen removal costs are needed by both new and existing users. The costs have been allocated based on the existing share of buildout system users equivalent dwelling units. Existing equivalent dwelling units are projected to be 89,955. This represents 73 percent of the total equivalent dwelling units at buildout. Therefore, existing users have been allocated 73 percent of the nitrogen removal costs.

Treatment

All of the treatment costs of the additional wastewater inflow allowed by headworks expansion have been allocated to new users and will be funded through demand fees.

Operation and Maintenance

All of the operating and maintenance costs are funded through service charges.

Calculation of Demand Fee and Service Charge

The total costs for each Project alternative are translated into the annual debt payment requirements assuming a 6.5 percent interest rate, 20 year term, 25 percent debt coverage ratio, and an issuance cost of 9 percent.

The gross demand fee is based on the total projected growth of households and employment in the Subregional System between 1997 and buildout, divided by the total costs allocated to new users. A fee credit is applied to the gross demand fee on an annual basis to reflect the fact that the new users will also pay for a portion of the debt service through the service charge. The fee credit declines over time. The annual service charge is based on the remaining amount of revenue that must be collected to cover the annual debt service and coverage fund, divided by the total number of users in the service area. As the communities reach buildout and new development declines, the service charge increases.

Project Costs Used in Analyses

As basis for evaluating alternatives, estimates of the construction costs, land acquisition costs, and operating and maintenance costs were prepared (Parsons Engineering Science, Inc. 1995b and Economic & Planning Systems 1995a). Table 4.18-10 summarizes Project cost estimates for each alternative.

Table 4.18-10

Project Cost Data
(1,000's)

Alternative	Disposal Costs	O&M Costs	Treatment Costs	Nitrogen Removal Costs
1 No Action (No Project)	$0	$0	$0	$0
2 South County Reclamation				
2A S. Co. - Tolay Extended	$312,326	$2,513	$10,000	$0
2B Adobe/Lakeville	$352,216	$2,411	$10,000	$0
2C Tolay Confined	$353,287	$2,627	$10,000	$0
2D Lakeville/Sears Point	$376,720	$3,153	$10,000	$0
3 West County Reclamation				
3A W. Co. - Two Rock	$246,410	$1,648	$10,000	$0
3B Bloomfield	$282,659	$1,745	$10,000	$0
3C W. Co. Carroll Road	$243,456	$1,753	$10,000	$0
3D W. Co. Valley Ford	$251,478	$1,785	$10,000	$0
3E W. Co. Huntley	$253,904	$1,713	$10,000	$0
4 Geysers Recharge	$208,252	$6,683	$10,000	$0
5 Discharge				
5A Discharge Russian River	$35,953	$97	$10,000	$28,000
5B Discharge Laguna	$18,352	$0	$10,000	$28,000

Source: Parson Engineering Science, Inc. 1995
Economic Planning Systems, Inc., 1996

Loss of Homes

The reservoir component of alternatives 2 and 3 is the only Project element that will result in loss of homes or agricultural buildings. The footprint of each reservoir was determined and the number of dwellings was counted. Houses within 25 feet of the construction zone were counted as lost.

Agricultural Impact Analysis

The following section briefly describes the methodology used to measure the effects of irrigation with reclaimed water on the Sonoma County and northern Marin County agricultural economy. Supporting tables are provided in Appendix S-3. A more detailed explanation of the methodology is provided in the technical memorandum titled Agricultural Impact Analysis Methodology (Economic & Planning Systems 1996).

In order to test the potential impact of the availability of reclaimed water for irrigation on the Sonoma agricultural economy, three cropping scenarios (low tech, medium-tech, and high-tech) were developed for the West and South County irrigation areas and the Sebastopol irrigation area, for the one percent discharge alternative (Questa Engineering Corporation, 1996b). These cropping scenarios were based on soil capability, micro-climates, and topography. The three scenarios represent different levels of farming intensity requiring increasing amounts of input for labor and management. The amount of reclaimed water available to the irrigation areas was held constant across all alternatives and scenarios.

The low tech scenario envisions a minimum level of labor and capital input and consequently the lowest return per acre on investment. In the low tech scenario, the majority of acreage will be used for irrigated pasture and a minimum amount of acreage will be used for higher value crops such as berry and vegetable crops. The medium tech cropping scenario envisions less irrigated pasture and more acres in forage crops such as oat hay and corn silage. The high tech cropping scenario envisions more acreage in berry and vegetable crops and less in irrigated pasture and forage crops (Table 4.18-11). The acreage shown in Table 4.18-11 represents net adjusted acreage by cropping scenario and alternative. Existing acreage under production has been subtracted from the total irrigated acreage in order to estimate the net impact of the new agricultural production.

Table 4.18-11

Net Adjusted Irrigated Acres by Area and Crop Type
for the Alternatives 2 and 3

Alternative / Crop Type / Cropping Scenario	Low Tech Scenario (acres)	Medium Tech Scenario (acres)	High Tech Scenario (acres)
West County			
Berry Crops	0	450	2,000
Vegetable Crops	50	450	1,350
Forage/Hay/Silage (1)	900	2,750	2,300
Irrigated Pasture (2)	4,500	2,400	1,000
Total (5)	**5,450**	**6,050**	**6,650**

Table 4.18-11

Net Adjusted Irrigated Acres by Area and Crop Type for the Alternatives 2 and 3

Alternative / Crop Type / Cropping Scenario	Low Tech Scenario (acres)	Medium Tech Scenario (acres)	High Tech Scenario (acres)
West County with Sebastopol			
Apples (3)	1,600	1,600	1,600
Vineyards (4)	0	0	0
Berry Crops	0	300	1,350
Vegetable Crops	50	400	1,150
Forage/Hay/Silage (1)	950	2,000	1,300
Irrigated Pasture (2)	2,850	1,550	750
Total (5)	**5,450**	**5,850**	**6,150**
South County			
Vineyards	0	100	1,100
Berry Crops	0	250	900
Vegetable Crops	50	650	750
Forage/Hay/Silage (1)	800	1,300	800
Irrigated Pasture (2)	2,400	1,150	300
Total (5)	**3,250**	**3,450**	**3,850**
South County w/Sebastopol			
Apples (3)	1,600	1,600	1,600
Vineyards (4)	0	0	0
Vineyards	0	250	600
Berry Crops	0	200	600
Vegetable Crops	100	500	1,000
Forage/Hay/Silage (1)	600	1,100	400
Irrigated Pasture (2)	1,500	450	200
Total (5)	**3,800**	**4,100**	**4,400**

Source: Questa Engineering Corporation, "Cropping Scenarios for the West County and South County Reclamation Alternatives", 1996a

Notes:

1 Irrigated forage/hay/silage represents a new use, so these acres are not subtracted from existing dry-farmed hay/silage.

2 Irrigated pasture represents a new use, so these acres are not subtracted from existing native pasture/rangeland.

3 Existing orchards in Sebastopol. These existing acres are included in order to estimate increased yields due to irrigation.

4 No net increase in the number of vineyards in Sebastopol is assumed as a result of irrigation.

5 Where there are existing similar uses in the Project area these acres are subtracted from the new irrigated acres except where noted above.

Average irrigated crop yields and gross crop values per ton were estimated for each crop by cropping scenario and alternative to measure the potential net new benefit to the local agricultural economy. All values are defined in gross expenditure terms as the purpose of this study is to look at the total benefit to the local agricultural economy. From the perspective of the individual farmer the total benefit will be reduced by production costs for each crop type.

All dollar values are expressed in terms of the maximum cumulative annual gross values available at completion of the Project. Production, and therefore the potential gross values, will be less in the early years of the Project as the irrigation systems will need to be phased in, and farm infrastructure and production practices will need to be adapted.

The increased value of permanent irrigated pasture due to irrigation was estimated based on an average gross value of about $608 per acre of irrigated pasture (Rick Bennett, memorandum 1995). The average gross value per acre was decreased by about $100 per acre to account for the value of existing native pasture and the gross value per acre for the West County areas were further reduced by 15 percent to account for the cooler climate and shorter growing season. Assumptions were made regarding how much of the new irrigated pasture might be used by dairy cows and how much might be used by non-dairy animals based on the number of dairies in each Project area. Average gross value increases due to irrigation will be $430 and $508 per acre for the West and South County areas, respectively.

From the farmer's perspective the gross values per acre will be reduced by the cost of converting from dry to irrigated pasture. The main cost to the farmer of converting to irrigated pasture will be labor. The farmer will also be responsible for installing and constructing fencing required for rotational pasture.

A prototypical distribution of forage crops likely to be grown in Sonoma County within the irrigation areas was assumed in order to estimate for the value of increased forage production under each alternative and cropping scenario. The distribution of forage crops included oat hay, oat silage, corn and Sudan grass silage, and green chop. Based on a five-year average of forage crop yields and gross values per ton, a weighted average yield and gross value per ton were derived for the assumed prototypical forage distribution. Weighted average yields were decreased 15 percent for the West County Alternative to account for the cooler climate and shorter growing season. A weighted average value per ton of $42 was multiplied by the tons of new forage produced for each area and cropping scenario to estimate the total value of the increased forage production.

The value of new fruit and vegetable crops produced for each area and cropping scenario was estimated based on five-year average gross yields and gross values per acre for each category of crop (Office of Agricultural Commissioner, 1989-1994a). Average gross yields and gross values per acre were decreased for the West County Area to account for the shorter growing season. The total new acreage of wine grapes, apples, berry, and vegetable crops under each alternative and cropping scenario was multiplied by the

appropriate gross yields per acre. In the case of apples it was assumed that there will be no net increase in the number of acres under production but that apple yields will double as a result of the availability of reclaimed water for irrigation.

Tourism Impact

This section describes the methodology used to evaluate the impacts of increasing the discharge of reclaimed water into the Russian River on the tourism economy. Trends in tourism economy were evaluated by examining the transient occupancy tax receipts since 1988. However, as the potential impacts are more qualitative, the primary source of data came from interviews with local resort owners and the Russian River Region Visitors Center, in order to assess the current tourism market, including the demographics of the tourists and the source of tourism demand for the River. Based on the interviews, the major factors that have affected and could potentially affect the tourism economy were identified. The flooding of the Russian River was indicated to have the biggest impact on tourism. Perceptions about wastewater discharge were also cited as a potential effect.

Combined Economic Impact

This section presents the methodology used for the combined economic impacts analysis. The combined measure of the economic impacts of the Project alternatives considers the benefits the Project has on the agricultural economy, the benefits of ongoing operations and maintenance, the impacts of increasing service charges and the additional property tax revenue and royalties generated by the geysers. In order to combine the various economic effects into a single measure and assess the impact the Project alternatives will have on the local economy, an Input-Output Model was used. The Input-Output Model estimates the multiplier effect that results from a change in final demand in the local economy.

This economic impacts analysis uses the IMPLAN input-output modeling framework developed by the Minnesota IMPLAN Group for the U.S. Forest Service. Input-output modeling is used extensively in economic analysis and resource planning to assess the impact of a planned activity on the economy. The specific IMPLAN model used for this analysis reflects the inter-industry relationships that existed in Sonoma County as of 1991.

An Input-Output Model tracks the intricate web of economic linkages that exist within the local economy. The model reflects the impact that a one dollar change in final demand will have on the County economy in terms of jobs and income. An Input-Output model allows one to estimate the extent to which an increase (or decrease) in sales of an existing firm or introduction of a new firm into the local economy leads to additional economic activity. Furthermore, the model allows one to estimate the extent to which an increase (or decrease) in consumer expenditures will affect the local economy.

Input-Output models can be prepared for various levels of geography, including counties, regions, states, or the nation. In this analysis, an Input-Output model was used for Sonoma County to quantify the sales, income, and job impacts of:

- the increase in agricultural production value
- the investment in the service area (cost of the alternatives);
- the ongoing operation and maintenance expenditures; and
- the reduction in personal expenditures in the service area as a result of the increase in service charges.

Definition of Terms used in the Input-Output Model

A multiplier analysis estimates the economic impacts that result from a change in final demand (sale of goods and services) for a specific commodity or group of commodities. Two types of multipliers are presented in this analysis: employment and income. The multipliers can be expressed in terms of the impact of a $1 million change in final demand or a one unit change in income or employment.

For example, the employment multiplier for the construction of new utilities in Sonoma County is 4.16, which means that for each new construction job, 3.16 additional jobs are created throughout the County. The income multiplier for this industry is 2.81. This implies that for each new dollar of employee compensation provided in this sector, $1.81 of income is generated throughout the County. The employment and income multipliers can also be expressed in terms of a $1 million change in final demand. For the utility construction industry, a $1 million increase in sales (final demand) creates 19.07 total jobs and a $985,000 change in total personal income throughout the Sonoma County economy.

The results of the multiplier analysis are expressed in terms of direct, indirect, and induced impacts. The direct impacts as used in this analysis are the direct increase in sales that are assumed to occur in the local economy. In addition, direct impacts will commonly include the "first order" impacts which are the inputs required to produce an additional unit of sales in the given industry. For example, if investment in utility construction increases, inputs are required from other sectors, including business services, real estate, and various manufacturing sectors. Although these impacts are commonly labeled direct impacts, in this analysis they have been combined with the indirect impacts.

Indirect impacts are the second-order impacts generated by the change in investment. The indirect impacts are the inputs required to produce the goods and services of suppliers to the utility construction industry.

Induced effects are the changes in regional household spending patterns that result from the changes in employment and income generated by both the direct and indirect effects. The induced effects measure the economic impact of the

personal expenditures that result from the change in employment and income. Taken together, these employment and income effects represent an economic multiplier.

No Action (No Project) Alternative

The income-output modeling framework has been used to measure the impact of the No Action Alternative. As defined in Chapter 3, future commercial and residential development will not occur after December 1997 because a growth moratorium will be imposed by the North Coast Regional Water Quality Control Board. This will curtail the normal increase in population and employment that might otherwise be expected in the Project area. While there may be some intensification of existing facilities throughout the County, the worst case condition presumes the loss of projected employment and household growth. These losses have been input into the income-output model to estimate the income and employment impacts of the No Action Alternative.

Environmental Justice

Environmental justice relates to whether a population is exposed to disproportionately high negative environmental impacts. To date, the focus has been on whether low income or minority populations are exposed to disproportionate impacts, as this has been the historical precedent. The concept is usually applied to projects that clearly involve strong negative environmental impacts, such as the location of toxic waste sites.

There is currently no official methodology for evaluating the impact of a Project from an environmental justice perspective. The Council on Environmental Quality has issued general guidelines and the U.S. Environmental Protection Agency is in the process of developing more detailed guidelines.

Population data are used to determine whether the Project will disproportionately impact low income and or ethnic minority residents. A disproportionate impact is measured by whether the affected area includes a higher proportion of low-income and or ethnic minority residents, relative to the average for the County. A significant deviation from the average county per capita income is assumed to be an average income of less than 80% of the average County per capita income. A significant deviation from the average county ethnic breakdown is assumed to be an additional 10% of non-white area residents relative to the average for the County.

Several steps were taken in compiling the ethnic breakdown and per capita income of the population in the affected area and the county as a whole. The affected area was assumed to be the census block groups which include the parcels where the proposed reservoirs, pump stations, storage tanks and pipelines will be located. The census tracts and block groups that corresponded with these parcels were identified and the 1990 U.S. Bureau of the Census was used to collect data for the census block groups in the affected area and the county as a whole. Some parcels, which lacked a site address, could not be linked to a particular census block group, and it was assumed that these parcels will

either fall in one of the selected census tract block groups, or will not have significantly different demographics from the identifiable census block groups.

ENVIRONMENTAL CONSEQUENCES (IMPACTS) AND MITIGATION MEASURES

The analyses presented below are organized differently than for other sections. Other sections analyze impacts by Project component, but this is not possible for the analysis of socio-economic effects, which are generally attributable to the alternative as a whole, and to the costs of the entire Project. Thus, the discussion below is organized by criteria and issues, rather than by component. For each criterion or issue, the overall impacts of each alternative, as a whole, are discussed.

Service Charge Increase

Table 4.18-12

Socio-economic Impacts by Criteria - Increased Service Charge

Evaluation Criterion	Point of Significance	Impact	Types of Impact[1]	Level of Significance
1. Will the Project increase the service charge for wastewater facilities?	The projected total service charge greater than 1.5% in any of the jurisdictions			
• Alt 1-No Action	1.1%	1.10%[3]	O&M	❍
• Alt 2A-Tolay A	2.1%	1.99%	O&M	●
• Alt 2B-Adobe Rd and Lakeville	2.1%	1.96%	O&M	●
• Alt 2C-Tolay C	2.3%	2.03%	O&M	●
• Alt 2D-Sears Pt and Lakeville	1.8%	2.19%	O&M	●
• Alt 3A-Two Rock	1.8%	1.69%	O&M	●
• Alt 3B-Bloomfield	1.8%	1.73%	O&M	●
• Alt 3C-Carroll Road	1.8%	1.72%	O&M	●
• Alt 3D-Valley Ford	1.8%	1.73%	O&M	●
• Alt 3E-Huntley	1.8%	1.71%	O&M	●
• Alt 4-Geysers Recharge	3.2%	3.14%	O&M	●

Table 4.18-12

Socio-economic Impacts by Criteria - Increased Service Charge

Evaluation Criterion	Point of Significance	Impact	Types of Impact[1]	Level of Significance
• Alt 5A-Discharge to River	1.2%	1.11%	O&M	❍
• Alt 5B-Discharge to Laguna	1.1%	1.09%	O&M	❍

Source: Parsons Engineering Science, Inc., 1996

Notes:

1. Type of Impact:

O&M Operation and Maintenance

2. Level of Significance:

❍ Less than significant impact; no mitigation proposed

● Significant impact before and after mitigation

3. Total service charge (existing plus Project increase). Maximum impact in any of the four cities for any year

Impact: 18.1. Will the Project increase the service charge for wastewater?

Analysis: *Significant; Alternatives 2, 3, and 4.*

The increase in the monthly service charge will result in the total service charge exceeding 1.5% of the median income in the cities of Santa Rosa, Cotati, and Sebastopol. As of the year 2017, when the service charge is projected to be greatest, the service charge will exceed 1.5% in Rohnert Park as well. See Table 4.18-4 and Figures 4.18-1.

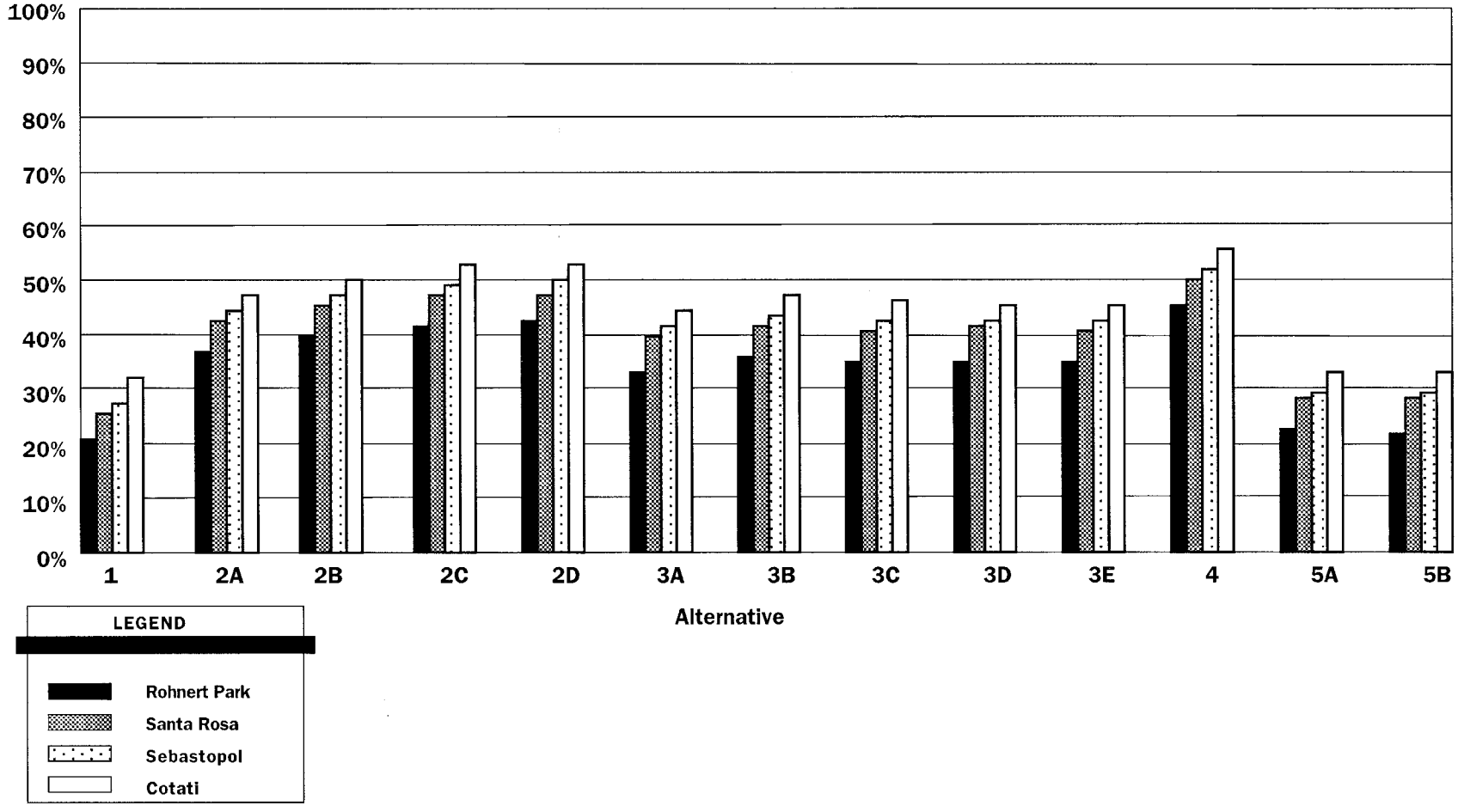
Table 4.18-13 shows the projected average monthly additional service charge for a single family dwelling as of Year 2000, 2005, 2010, and 2017 for each Project alternative. The year 2017 is used because it has the highest estimated fee. The figures are shown in 1995 constant dollars.

Less than Significant; Alternatives 1 and 5.

These alternatives do not exceed the significance criteria.

Mitigation: *Alternatives 2, 3, and 4.* No feasible mitigation has been identified

Alternatives 1 and 5. No mitigation is proposed. :



Source: Economic & Planning Systems

HARLAND BARTHOLOMEW & ASSOCIATES, INC.
PARSONS ENGINEERING SCIENCE, INC.
UNITS OF PARSONS INFRASTRUCTURE & TECHNOLOGY INC.
PARSONS

Santa Rosa Subregional Long-Term Wastewater Project

PERCENTAGE of HOUSEHOLDS FOR WHICH THE MONTHLY SERVICE CHARGE as of YEAR 2000 EXCEEDS 1.5% of INCOME

Figure 4.18-1

Table 4.18-13

Estimated Additional Average Monthly Service Charge[1]

Alternative	2000	2005	2010	Buildout-2017[2]
1 No Action (No Project)	$0.00	$0.00	$0.00	$0.00
2A So. Co. - Tolay Extended	$14.90	$25.80	$28.50	$33.90
2B So. Co. - Adobe/Lakeville	$17.80	$27.20	$29.40	$34.30
2C So. Co. - Tolay Confined	$19.90	$28.20	$31.20	$36.70
2D So. Co. - Lakeville/ Sears Point	$20.00	$31.70	$35.50	$42.40
3A W. Co. - Two Rock	$12.40	$18.90	$20.30	$23.70
3B W. Co. - Bloomfield	$14.00	$21.00	$22.20	$25.70
3C W. Co. - Carroll Road	$12.40	$19.20	$20.90	$24.60
3D W. Co. - Valley Ford	$12.80	$19.70	$21.40	$25.20
3E W. Co. - Huntley	$12.80	$19.50	$21.00	$24.50
4 Geysers Recharge	$23.20	$43.50	$57.90	$74.40
5A Russian River Discharge	$1.70	$2.00	$2.00	$2.20
5B Laguna Discharge	$0.70	$0.80	$0.60	$0.70

Source: Economic & Planning Systems, Inc., 1996

1 Estimated additional average monthly service charge per single family residence or equivalent. This additional service charge is expressed in 1995 consultant dollars and will be added to the existing service charges shown in Table 4.19-6, which range from $27.50 to $38.51.

Loss of Homes and Agricultural Buildings

Table 4.18-14

Socio-economic Impacts by Criteria - Loss of Homes

Evaluation Criterion	Point of Significance	Impact	Types of Impact[1]	Level of Significance[2]
18.2. Will the Project result in loss of homes displaced by construction of Project facilities?	Greater than 0 homes			
• Alt 1-No Project		None	P	==

Table 4.18-14

Socio-economic Impacts by Criteria - Loss of Homes

Evaluation Criterion	Point of Significance	Impact	Types of Impact[1]	Level of Significance[2]
• Alt 2A-Tolay A		4 houses	P	●
• Alt 2B-Adobe Rd and Lakeville		1 house	P	●
• Alt 2C-Tolay C		None	P	==
• Alt 2D-Sears Pt and Lakeville		None	P	==
• Alt 3A-Two Rock		2 houses	P	●
• Alt 3B-Bloomfield		None	P	==
• Alt 3C-Carroll Road		3 houses	P	●
• Alt 3D-Valley Ford		1 house	P	●
• Alt 3E-Huntley		4 houses	P	●
• Alt 4-Geysers Recharge		None	P	==
• Alt 5-Discharge		None	P	==

Source: Parsons Engineering Science, Inc. 1996

Notes:

1. Type of Impact:
P Permanent

2. Level of Significance:
◯ Less than significant impact; no mitigation proposed
● Significant impact before and after mitigation
== No Impact

Impact: 18.2 Will the Project result in loss of homes displaced by construction of Project facilities.

Analysis: *Significant*; *Alternatives 2A, 2B, 3A, 3C, 3D and 3E*.

Reservoir construction associated with both the West and South County Alternatives will result in loss of existing homes at the following reservoir sites: Tolay Extended, Adobe Road, Two Rock, Carroll Road, Valley Ford, and Huntley. Table 4.18-14 shows the number of homes and lost for each alternative.

Measure 2.2.27, Uniform Relocation Assistance, is adopted as part of the Project and will govern the acquisition of homes in accordance with the

Uniform Relocation Assistance and Real Property Acquisition Policies Act.

Less than Significant; Alternatives 2C, 2D and 3B.

There are no homes or agricultural buildings within the construction envelope for the Tolay Confined, Lakeville Hillside, Sears Point, or Bloomfield reservoirs. Pump stations facilities for Alternative 4 will not result in loss of homes or other buildings.

No Impact; Alternatives 1 and 5.

These alternatives will not require construction of new reservoirs or pump stations.

Mitigation: *Alternatives 2A, 2B, 3A, 3C, 3D and 3E.* No other feasible mitigation has been identified.

Alternatives 1, 2C, 2D, 3B, 4, and 5. No mitigation is proposed.

Increase in Demand Fees

Impact: 18.3. Will the Project increase the demand fee for wastewater resulting in decreased land values?

Analysis: Table 4.18-15 shows the projected additional demand fee for a single family dwelling in the year 2000 for each Project alternative. The figures are shown in 1995 constant dollars. The demand fee represents the change of the existing Santa Rosa fee. In Santa Rosa, 73 percent of the existing fee is earmarked to fund the Long-Term Project. The net demand fee includes a credit for debt service payments included in service charge.

Table 4.18-15

Estimated Additional Demand Fees by Alternative in the Year 2000

Alternative	2000	2005	2010	Buildout
1 No Action (No Project)	($3,650)	($3,700)	($3,700)	($3,650)
2A S. Co. - Tolay Extended	$4,069	$7,300	$5,300	$1,785
2B S. Co. - Adobe/Lakeville	$5,000	$8,600	$6,400	$2,467
2C S. Co. - Tolay Confined	$5,054	$8,700	$6,400	$2,522
2D S. Co. - Lakeville/Sears Point	$5,562	$9,400	$7,000	$2,869
3A W. Co. - Two Rock	$2,577	$5,100	$3,600	$732
3B W. Co. - Bloomfield	$3,407	$6,300	$4,500	$1,327
3C W. Co. - Carroll Road	$2,509	$5,000	$3,500	$684

Table 4.18-15

Estimated Additional Demand Fees by Alternative in the Year 2000[1]

Alternative	2000	2005	2010	Buildout
3D W. Co. - Valley Ford	$2,693	$5,300	$3,700	$815
3E W. Co. - Huntley	$2,748	$5,400	$3,800	$855
4 Geysers Recharge	$1,705	$3,900	$2,600	$134
5A Discharge - Russian River	($2,248)	($1,800)	($2,000)	($2,713)
5B Discharge - Laguna	($2,651)	($2,400)	($2,500)	($3,650)

Source: Economic & Planning Systems, Inc., 1996

1 Based on Net Demand Fee in 1995 dollars minus Long Term Project's share of existing fee. This additional demand fee will be added to the existing demand fees shown in Table 4.19-6, which range from $2,000 to $7,883.

2 For the purposes of calculating service charges, total buildout was assumed to occur by 2018.

An increase in the demand fee will primarily impact land prices in the service area in the long-term.

Table 4.18-16 shows the impact the increased demand fee may have on land values in the Subregional System. As shown on the table, Alternative 2D generates the largest impact.

Table 4.18-16

Decrease in Land Values Due to Increasein Demand Fees[1] in the Year 2000
Expressed as Reduction of Value per Square Foot

Alternative	Single Family Dwelling Unit			Office	Retail	Warehouse
	4 units / acre	6 units / acre	8 units / acre			
1 No Action	($0.32)	($0.51)	($0.66)	($0.33)	($0.29)	($0.15)
2A Tolay A	$0.37	$0.57	$0.73	$0.37	$0.33	$0.16
2B Adobe Rd and Lakeville	$0.45	$0.70	$0.90	$0.45	$0.40	$0.20
2C Tolay C	$0.45	$0.71	$0.91	$0.45	$0.40	$0.20
2D Sears Pt and Lakeville	$0.50	$0.78	$1.00	$0.50	$0.44	$0.22
3A Two Rock	$0.23	$0.36	$0.46	$0.23	$0.20	$0.10
3B Bloomfield	$0.31	$0.48	$0.61	$0.31	$0.27	$0.14

Table 4.18-16

Decrease in Land Values Due to Increasein Demand Fees[1] in the Year 2000
Expressed as Reduction of Value per Square Foot

Alternative	Single Family Dwelling Unit			Office	Retail	Warehouse
3C Carroll Road	$0.23	$0.35	$0.45	$0.23	$0.20	$0.10
3D Valley Ford	$0.24	$0.38	$0.48	$0.24	$0.22	$0.11
3E Huntley	$0.25	$0.38	$0.49	$0.25	$0.22	$0.11
4 Geysers Recharge	$0.15	$0.24	$0.31	$0.15	$0.14	$0.07
5A Discharge to River	($0.20)	($0.31)	($0.40)	($0.20)	($0.18)	($0.09)
5B Discharge to Laguna	($0.24)	($0.37)	($0.48)	($0.24)	($0.21)	($0.11)

Source: Parsons Engineering Science, Inc. 1996;
Economic & Planning Systems, Inc., 1996

Note:
1 Demand fee for 1 equivalent dwelling unit, using net demand fees.

The net demand fee required to finance the Project alternatives represents a maximum increase of over $7,000 per dwelling unit. Given the price competitive nature of real estate development, the projected fee increase will likely cause some changes in the type and pace of development in the service area. In the short-term, developers may delay development or reduce lot size and/or unit size in order to absorb the fee increase. In the long-term, the fee increase will most likely result in comparatively lower land prices in the service area. Further discussion and a comparison to 1995 land values has been presented in the technical memorandum, *Land Value Estimates* (Economic & Planning Systems 1995b).

Increased Value of Agricultural Production

Impact: 18.4. Will the Project increase the value of agricultural production through irrigation?

Analysis: Alternative 2 and Alternative 3, propose to use reclaimed water to irrigate between 3,800 and 6,500 acres of agricultural land. The purpose of this analysis is to compare the agricultural economic benefits of using a fixed amount of reclaimed water for irrigation. There is less irrigated acreage in Alternative 2 because the South County requires more irrigation water per acre due to the higher evapotranspiration rates. The high

evapotranspiration rates per crop per acre in the South County are due to lower annual rainfall and higher temperatures. The same amount of water can irrigate a larger area in the West County due to lower evapotranspiration rates associated with the cooler temperatures and higher annual rainfall. Therefore, although the crop yields are generally higher in the South County the total agricultural benefits from a fixed amount of irrigation water are greater in the West County due to the substantial acreage difference (between 2,200 and 2,800 more acres could be irrigated in West County than in South County under the three cropping scenarios).

Table 4.18-17 estimates the annual gross value of new crops.

Table 4.18-17

Summary of Annual Gross Value of New Irrigated Fruit, Vegetable, Pasture, and Forage Crops (thousands of dollars)

Alternative / Crop Type Cropping Scenario	Low Tech Scenario	Medium Tech Scenario	High Tech Scenario
West County			
Apples	$0	$0	$0
Wine Grapes	$0	$0	$0
Berry Crops	$0	$11,340	$50,400
Vegetable Crops	$740	$6,660	$19,980
Total Fruit & Vegetable Crops	$740	$18,000	$70,380
Pasture and Forage Crops	$2,375	$2,360	$1,539
Grand Total	$3,115	$20,360	$71,919
West County with Sebastopol			
Apples	$50,400	$50,400	$50,400
Wine Grapes	$0	$0	$0
Berry Crops	$0	$7,560	$34,020
Vegetable Crops	$740	$5,920	$17,020
Total Fruit & Vegetable Crops	$51,140	$63,880	$101,440
Pasture and Forage Crops	$1,687	$1,632	$950
Grand Total	$52,827	$65,512	$102,390
South County			
Apples	$0	$0	$0
Wine Grapes	$0	$497	$5,468

Table 4.18-17

Summary of Annual Gross Value of New Irrigated Fruit, Vegetable, Pasture, and Forage Crops (thousands of dollars)

Alternative / Crop Type Cropping Scenario	Low Tech Scenario	Medium Tech Scenario	High Tech Scenario
Berry Crops	$0	$4,175	$15,030
Vegetable Crops	$925	$12,025	$13,875
Total Fruit & Vegetable Crops	$925	$16,697	$34,373
Pasture and Forage Crops	$1,671	$1,320	$605
Grand Total	$2,596	$18,017	$34,978
South County with Sebastopol			
Apples	$50,400	$50,400	$50,400
Wine Grapes	$0	$1,243	$2,983
Berry Crops	$0	$3,340	$10,020
Vegetable Crops	$1,850	$9,250	$18,500
Total Fruit & Vegetable Crops	$52,250	$64,233	$81,903
Pasture and Forage Crops	$1,101	$852	$328
Grand Total	$53,351	$65,085	$82,231

Source: Economic & Planning Systems, 1996

Increased Value of New Irrigated Pasture and Forage Crops

The total value of new irrigated pasture is lowest for the High Tech Scenario because more acreage will be converted from pasture to higher value fruit and vegetable crops. Under the Low Tech Scenario, which assumes the least input of labor and capital, the number of acres of irrigated pasture will be maximized.

The total value of new irrigated forage crops is highest under the Medium Tech Scenario because the number of acres of irrigated forage crops is maximized under this scenario.

Increased Value of Dairy Forage to the Average North Bay Dairy Farmer

The value of dairy forage was compared to the number of milk cows in the forage market area to estimate the potential value per cow. This value can contribute to savings for a dairy farmer, assuming that local irrigated forage produced can reduce the costs of imported feeds. In the West

County the medium tech cropping scenario produced maximum annual savings of $56 per cow or $19,600 per year for the average sized dairy herd (350 cows), while in the South County area the maximum annual savings was estimated to be $62 per cow or $21,900 per year for the average dairy herd. The individual farmer will be subsidized for the first year of operation when converting from dry-farmed to irrigated crops The gross annual savings per cow will be reduced by labor costs in year one, and in subsequent years, by labor costs and the normal costs of production for forage crops.

Increased Value of New Irrigated Apples, Wine Grapes, Berry and Vegetable Crops

Substantial increases in value are possible under the high tech scenario (see Table 4.18-17).

Increased Value of Apple Production for a Typical 50-Acre Sonoma Orchard

An average Sebastopol apple grower with a 50-acre orchard could expect in a good year a maximum yield of 15 tons per acre for dry-farmed apples and could on average expect to generate about $150,000 per year or $3,000 gross revenue per acre. With the availability of reclaimed water for irrigation, the grower could switch to dwarf-stock varieties (Gala, Fuji and Sierra Beauty for example) which can yield as much as 35 tons per acre by the fifth year. Assuming these apples are marketed as specialty varieties, in the fifth year of production, the orchard could average about $1.3 million in gross revenues annually or about $26,000 per acre which is more than an eight-fold increase over the gross annual revenues ($150,000) from the dry-farmed apples.[1]

Increased Agricultural Land Values Due to Irrigation

A secondary impact resulting from the availability of reclaimed water for irrigation will be an increase in the value of agricultural land. It is difficult to predict the actual amount of the increase since property values vary by location and property characteristics such as zoning, parcel size, soil type, and Williamson Act status. (The Williamson Act is discussed in Section 4.2, Agriculture.) Agricultural lands that are not under Williamson Act contracts are re-assessed when the property is sold and changes ownership while agricultural land that is under Williamson Act will be re-assessed based on the changes in the net capitalized income generated by the crop grown on the land after the availability of irrigation water. Quantification of this differential is not possible due to the uncertainty regarding the percentage of lands receiving reclaimed water that will be under Williamson Act contracts.

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1 "Impacts of Irrigation Water" by Paul Vossen, Cooperative Extension for Sonoma County, University of California, January 8, 1996.

However, it is certain that there will be a one-time increase in the value of the land as a result of the availability of irrigation water, which will increase the net wealth of the agricultural landowners in the Project irrigation areas. For example, dry native pasture land in portions of Sonoma County currently sells for approximately $2,000 to $3,000 per acre. With the availability of irrigation water and the ability to grow year-round pasture, and depending on soil and climate conditions, the switch to higher value annual crops could increase the value of the land between two and five times. As these lands are sold and re-assessed there will be an increase in the property tax base which will in turn generate additional property tax revenues for the County of Sonoma.

For agricultural lands under a Williamson Act contract the increase will be less significant from a fiscal standpoint. For example the capitalized rent on non-irrigated pasture land is about $350 per acre which could increase to about $700 per acre for irrigated pasture and up to $1,700 an acre for orchards or vineyards. Therefore on 1,000 acres of agricultural land in the Project irrigation areas the assessed value under a Williamson Act contract could increase from $350,000 to $700,000 as a result of the availability of irrigation water.

Market Response

The following sections describe briefly how the market could respond to increased production of dairy forage crops and fruit and vegetable crops.

Dairy Industry

The dairy industry potentially stands to gain substantially from the availability of reclaimed water. Although milk production is not likely to increase, costs of production will go down with availability of water. Due to the complex restraints of the California milk marketing board quotas it is unlikely that milk production will increase as a result of available irrigation water. However, the high cost of alfalfa hay imports, currently at approximately $135 per ton, suggests that the ability to produce cheaper, locally-grown forage could improve the economics of Sonoma dairy farms by reducing the cost of a major factor of production. The average Sonoma dairy farm imports approximately 80 percent of all feed requirements in the West County. It will not be possible to entirely substitute all alfalfa hay imports with locally grown forage crops but the availability of irrigation could allow dairy farmers in the Project areas to reduce feed costs by growing more irrigated pasture and/or growing a summer crop of oat silage, corn or Sudan silage, or green chop. Some dairy farmers may also become net-exporters of forage to other farmers in the rest of Sonoma or Marin Counties.

Apples, Wine Grapes, Berry, and Vegetable Crops

There is a growing trend toward producing organic specialty fruit and vegetable crops to serve the large Bay Area consumer market for fresh produce. The consumers of the Bay Area are willing to pay a premium for unusual and exotic fresh produce and the large restaurant market contributes toward this demand for quality, locally produced fresh produce. The trend in fresh produce is toward direct marketing where supermarkets and restaurants contract directly with the farmer for a specific crop.

While the California Certified Organic Farmers (CCOF) has not taken a formal position on whether crops grown with reclaimed water could be certified organic, preliminary indications are that the answer will be a "qualified yes" for drip irrigated fruits and vegetables. The organic certification may be withheld from certain root crops and sprouts raised with reclaimed water sprinkler irrigation and the CCOF's position regarding salad greens is uncertain. However, the CCOF will study the issue and make a formal policy decision when requested for certification by a farmer using reclaimed water (Brian Baker, California Certified Organic Farmers, pers. comm., August 1995).

Interviews with representatives from farmers' markets and wholesale fruit and vegetable markets indicated that they did not see a problem in selling produce raised with reclaimed water. However, local growers of organic crops have noted a "perceptual problem" from customers regarding the use of reclaimed water for irrigation. Produce market representatives indicated that providing they could be satisfied that the reclaimed water had no heavy metals or levels of chemical residues any worse than tap water, they will not see a need to issue disclaimers (Bill Fujimoto, Monterey Foods, pers. comm., August 1995, and Lynn Bagley, Marin Farmers Market, pers. comm., August 1995). Some small scale Sonoma County farmers are already successfully using Santa Rosa's reclaimed water to grow vegetables (Paul Vossen, Sonoma County Farm Advisor, UC Cooperative Extension, pers. comm., August 1995).

The outlook for specialty crops of all types including locally made cheeses, salad greens, cut flowers, tomatoes, and berry crops can be expected to be strong as the Bay Area urban population expands. The availability of reclaimed water could enable new farmers to enter the market, as well as enable existing farmers to use fallow or under-utilized land more productively.

Summary of Agricultural Findings

In summary the total annual increase in gross value due to irrigation of all fruit, vegetable, wine grape, and forage crops ranges between $3.1 and $71.9 million in the annual income in West County and between $2.6 and $35.0 million in the South County depending on the cropping scenario (see Table 4.18-17). The Sebastopol area produces an additional $50.4 million due to increased apple yields, provided that most apple growers switch to the higher yielding new dwarf and semi-dwarf apple varieties.

The value of the increased local dairy forage production could exceed the gross crop values shown in this analysis if the ability to grow local forage and pasture ensures the long-term survival of the dairy industry in Sonoma and northern Marin counties. The North Bay dairy industry cannot currently compete effectively with the Central Valley, because the climate and availability of inexpensive water enables the Central Valley dairy farmers to feed locally-grown cheap alfalfa hay. North Bay dairy cows produce a high quality of milk due to the cool climate and the availability of pasture land.

Assuming that the current dairy price support system remains in place, the two factors that most threaten the dairy industry in the North Bay are the high cost of alfalfa hay and urban pressures that increase the price of agricultural land and increase the opportunities for urban dweller/agricultural landowner conflicts. The availability of reclaimed water to dairy farmers could substantially reduce the cost of imported feeds and improve the long-term viability of the dairy industry by reducing the competitive edge now enjoyed by the Central Valley dairy farmers. If they are able to produce more forage than they need, dairy farmers in the Project area may be able to secure a secondary income source from selling forage produced with reclaimed water to other dairy farmers in the region, to sheep and beef cattle ranchers, and to horse stables.

Potential Decrease in Tourism Economy

Impact: 18.5. Will the Project decrease the tourism economy through increased wastewater discharge?

Analysis: Tourism in the Russian River area has been affected by a number of factors over the last several years. In the early 1990s the region experienced a slight decline in the number of tourists as a result of the economic recession. Most recently, the winter floods have slowed tourism. The discharging of reclaimed water into the Russian River has also been cited as having a negative impact on tourism. This section examines the various factors that potentially affect tourism demand and the impact on the tourism economy of increasing reclaimed water discharge.

In 1995, floods had a major impact on tourism along the Russian River. The floods and the damage to the Russian River area received heavy media coverage throughout California. However, after the area was repaired and many of the businesses reopened, there was very little public coverage. Most of the resort owners blame the slow year on the negative publicity and the fact that many tourists believe the River towns are still seriously damaged by the floods.

The current reclaimed water discharge does not appear to have a major impact on tourism. There was a slight decline in the transient occupancy tax in 1992, the same year as the last accidental summer discharge into the Laguna. However, the decline was minimal and cannot readily be linked to the discharge that occurred. Most tourists are unaware of the reclaimed water discharge issue, unless there has been some occurrence that has received media coverage in the major cities nearby.

According to merchants in the area and City officials, misunderstandings about the nature of the river discharge has led to confusion among some tourists. There is a common misconception that reclaimed water is raw sewage and this problem is exaggerated by some of the negative publicity regarding the reclaimed water. Most of the resort owners who were interviewed feel confident that if the reclaimed water discharge is not overly publicized, it will not affect tourism.

Alternatives 2 and 3, West County and South County Reclamation Irrigation, would decrease existing annual average volume of discharged into the Russian River.

Alternative 4, Geysers Recharge, will decrease existing discharge levels. Discharge will be less than 1 percent of river flows.

Alternative 5, Discharge to the Laguna or Russian River, will increase the design discharge rate to 20 percent. The permitted discharge period between October and May will still be enforced, so the discharge will not occur during the heaviest tourist months of July through September. However, there may still be a negative perception associated with increased discharge.

Based on the assessment of the factors affecting the Russian River tourism economy, it is evident that publicity regarding events such as the floods and discharge, rather than the event itself, can have the most significant impact on the local tourism economy. Therefore, increasing the discharge of the reclaimed water may not impact the local tourism economy if it is accompanied by educational information and appropriate publicity. The success of publicity campaigns is hard to predict, but it will be important to publicize accurate information about the timing of the discharge season and the high quality of reclaimed water.

Net Economic Impact

Impact: 18.6. Will the Project have a net economic effect on the local economy?

Analysis: This section discusses the factors which contribute to the net economic impacts of the Project, including the benefits the Project has on the agricultural economy, the costs and benefits of ongoing operations and maintenance, and the impacts of increasing service charges.

Figure 4.18-2 shows the economic benefits and impacts of each alternative, in terms of total employment.

Those alternatives that include the reuse of water for agriculture (Alternatives 2 and 3) generate annual economic benefits of $50 to $60 million in the Sonoma and Marin counties' economy. The economic costs of the agricultural reuse alternatives range between $27 and $47 million. The Geysers Recharge Alternative is projected to have the largest economic impact due to the high cost of operation and maintenance. These costs will be offset by the additional property tax revenue and royalty payments that will accrue to Sonoma County.

In order to determine the economic benefits to the County from the Geysers Recharge Alternative it is necessary to determine how much additional electrical energy can be attributed directly to the extra steam which will result from the volume of water injected into the geothermal field. It is expected that wastewater injection into the geysers steamfield will have an immediate effect on increased electrical generation and will also extend the life of the steamfield. By increasing the pressure and flowrate of steam, it will take longer to reach the physical and economic limit of the power plants. If the life of the geysers is extended then the County will continue to enjoy the same benefits, property taxes and federal geothermal royalties as they do now but for a longer period of time. If there is a net increase in steam power produced the County could enjoy increased benefits in the Project startup year of 2000.

Property Taxes

According to the Sonoma County Assessors' office, responsible for assessing the real estate value of the geysers, in 1995 the assessed value of the geysers was $800 million, which generated approximately $1.6 million in annual property tax revenues for the Sonoma County General Fund.

The valuation of the geysers is dependent upon a variety of factors, including the price of alternative fuel sources. The property value of the geysers was at its highest during the 1970's, when alternative fuel prices were high. Today, the value has declined as alternative energy sources have dropped in price. Assuming that the valuation of the geysers remains similar to the current estimates, the injection of additional water

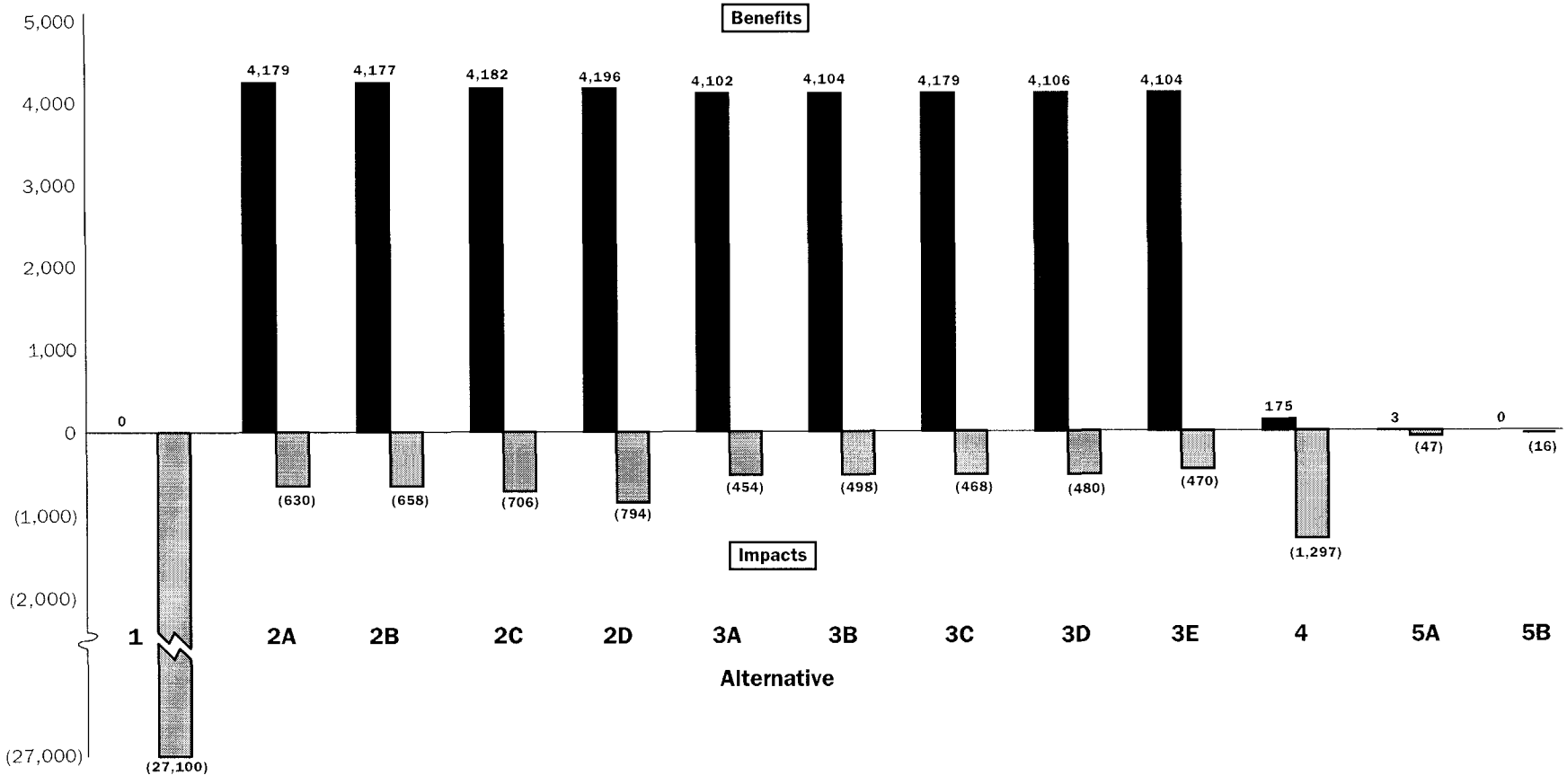
could extend the time period during which the County receives the approximately $1.6 million in property tax revenue per year. In addition, as the amount of electricity generated by the geysers increases with the accelerated steam flowrate, the County could re-assess the value of the geysers and receive a net increase in annual property taxes. However, there are so many factors that will affect the future value of the geysers, including fluctuations in future energy prices, changes in technology, and energy recovery rates, that it will be too speculative to estimate any future increases in property taxes.

Sonoma County also receives a share of federal geothermal royalties paid by UNOCAL. These royalties will also offset the high cost of the Geysers Recharge Alternative.

However, several issues make future projections of the amount of electrical power generation that will result from the Alternative uncertain. It has been estimated that the average annual volume of water to be delivered to the geysers will vary between 5,150 million gallons per year at Project start-up (about year 2000) and 6,350 million gallons per year by about 2020. Based on average unit energy recovery rates, as provided by UNOCAL and PG&E, it is expected that about 58,000 kilowatt-hours could be generated for every million gallons of water injected into the geothermal field. Based on this unit energy recovery value, the total annual energy production could range between 298 million kilowatt-hours in the Project startup year 2000 to about 413 million kilowatt hours by the year 2020.

UNOCAL pays a 12.5 percent royalty on steam produced from their federal leases at the geysers. Royalty is based on the value of electricity generated from the federal portion of the steam. Fifty percent of the federal royalties are collected by the U.S. Treasury and the other fifty percent is collected by the California Energy Commission. The State of California distributes 40 percent of the State's share of geothermal royalties to the local County of origin. Therefore, Sonoma County currently receives 20 percent of all federal royalties collected from the geothermal fields. According to the Sonoma County Administrator's Office, the County currently receives about $600,000 annually in geothermal royalties all of which are paid into the County General Fund.

It is estimated that between 20 and 40 percent of the additional steam will occur on federal leases. The other 60 to 80 percent of additional steam power will be produced from state and private leases which do not pay royalties to the County (Rich Estabrook, Petroleum Engineer, M.S., Bureau of Land Management, pers. comm., March 1996).



Source: Economic & Planning Systems

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PARSONS

Santa Rosa
Subregional Long-Term
Wastewater Project

DIRECT ECONOMIC IMPACTS of CHANGE In TOTAL EMPLOYMENT

Figure 4.18-2

Based on the current price for steam of $0.0162 per kilowatt[2] hour, using the annual energy recovery range described above of 298 to 368 million kilowatt-hours, and assuming that 20 percent of the power will be produced from federal leases, potential additional royalties to the Sonoma County General Fund could be in the range of $24,000 (year 2000) to $30,000 (year 2020) annually. However, the actual incremental royalties to the County will depend on future steam prices, recovery rates, and the extent to which additional steam power can be attributed directly to the additional water injection.

The Discharge Alternative generates very little economic benefit, but will still generate economic costs due to the increase in service charges. In terms of the net economic benefits, Alternatives 2 and 3 are projected to generate benefits that exceed the costs.

Table 4.18-18 shows the net economic impacts in terms of total income, direct employment, and total employment. The net direct employment impacts of Alternatives 2 and 3 are positive under all of the subalternatives.

Table 4.18-18

Annual Economic Benefits and Costs of Project Alternatives

Alternative	Total Income ($1000)	Direct Employment	Total Employment
Economic Benefits[1]			
1 No Project	0	0	0
2A Tolay Extended	$141,886	2,068	4,179
2B Adobe Rd and Lakeville	$141,781	2,068	4,177
2C Tolay Confined	$142,003	2,069	4,182
2D Sears Pt and Lakeville	$142,545	2,071	4,196
3A Two Rock	$140,019	2,028	4,102
3B Bloomfield	$140,119	2,029	4,104
3C Carroll Road	$140,127	2,029	4,105
3D Valley Ford	$140,160	2,029	4,106
3E Huntley	$140,086	2,029	4,104
4 Geysers Recharge	$6,886	30	175
5A Discharge to River	$100	0	3
5B Discharge to Laguna	$0	0	0

[2] Telephone conversation with Doug Hackley, UNOCAL, Santa Rosa Office, on April 4, 1996.

Table 4.18-18

Annual Economic Benefits and Costs of Project Alternatives

Alternative	Total Income ($1000)	Direct Employment	Total Employment
Economic Costs [2]			
1 No Project	($1,482,840)	(27,100)	(27,100)
2A Tolay Extended	($21,790)	(292)	(630)
2B Adobe Rd and Lakeville	($22,768)	(305)	(658)
2C Tolay Confined	($24,424)	(327)	(706)
2D Sears Pt and Lakeville	($27,469)	(368)	(794)
3A Two Rock	($15,733)	(210)	(454)
3B Bloomfield	($17,250)	(231)	(498)
3C Carroll Road	($16,223)	(217)	(468)
3D Valley Ford	($16,615)	(222)	(480)
3E Huntley	($16,291)	(218)	(470)
4 Geysers Recharge	($44,861)	(602)	(1,297)
5A Discharge to River	($1,651)	(21)	(47)
5B Discharge to Laguna	($574)	(7)	(16)
Net Economic Impacts			
1 No Project	($1,482,840)	(27,100)	(27,100)
2A Tolay A	$120,095	1,776	3,549
2B Adobe Rd and Lakeville	$119,012	1,762	3,518
2C Tolay C	$117,579	1,741	3,476
2D Sears Pt and Lakeville	$115,076	1,703	3,401
3A Two Rock	$124,286	1,818	3,647
3B Bloomfield	$122,869	1,797	3,606
3C Carroll Road	$123,904	1,811	3,636
3D Valley Ford	$123,544	1,806	3,625
3E Huntley	$123,795	1,810	3,633
4 Geysers Recharge	($37,974)	(571)	(1,122)
5A Discharge to River	($1,551)	(20)	(44)
5B Discharge to Laguna	($574)	(7)	(16)

Source: Parsons Engineering Science, Inc. 1996;
Economic & Planning Systems, Inc., 1996

Notes:
1 Includes benefits from agriculture and operating & maintenance expenditures.
2 Due to reduction of expenditures to offset the increased service charge.

While the economic benefits offset the costs of Alternatives 2 and 3, the benefits and costs do not accrue to the same population groups. The benefits primarily accrue to farmers who will use the reclaimed water and their suppliers. The service charge increase impacts all of the rate payers. The benefits of the use of reclaimed water for irrigation will more directly offset the impacts if the users of the reclaimed water were charged for the water.

Environmental Justice

Impact 18.7: Will the Project disproportionately affect low income or ethnic minority communities?

Analysis

Approximately 10% of the persons living in the affected area in 1989 were non-white, compared to 9.3 % for Sonoma County as a whole (See Table 4.18-19). The Project is, therefore, not expected to have a significantly negative impact on ethnic minorities.

There is less than a 1% difference between per capita income of persons in the affected area and Sonoma County as a whole (see Table 4.18-19). The Project is, therefore, not expected to have a significantly negative impact on low income communities.

Table 4.18-19

Demographics of Affected Area and Sonoma County

Item	Affected Area	Sonoma County
Persons by Race		
White	90.0%	90.7%
Black	1.7%	1.4%
American Indian, Eskimo or Aleut	0.8%	1.2%
Asian or Pacific Islander	2.5%	2.8%
Other Race	5.0%	3.9%
TOTAL	100.0%	100.0%
Per Capita Income	$17,777	$17,239

Sources: 1990 U.S. Bureau of the Census

Notes:

1 The affected area was assumed to include the census block groups in the parcels where the proposed reservoir sites, pump stations, storage tanks, and pipelines will be located.

No Action (No Project) Alternative

If a Long-Term Wastewater Project is not implemented, it is likely that no new development in the Santa Rosa service area will be permitted after 1997 (see Chapter 3, Description of the No Action Alternative). Furthermore, as previously noted, approximately 52 percent of disposal cost is attributable to inadequate disposal reliability for existing residents. Therefore, the wastewater system will continue to operate with an inadequate disposal system.

While it is difficult to predict the economic effects of the growth moratorium that is expected to be imposed if no Project is constructed, the following discussion provides an analysis of potential economic impacts of not constructing a Project.

Economic activity in the local economy is dependent upon a variety of factors, including household formation and labor force. As new households are formed, an array of goods and services are purchased. In many areas, 60 to 70 percent of the economic activity is dependent upon expenditures from local residents. If there is no new development in an area, those residents that are forming new households could be forced to move to other areas to find housing. That portion of the local economy that is dependent upon expenditures from new households, such as the building industry and retailers selling home furnishings and appliances, could lose significant market support. It is estimated that every new household supports between 1 to 2 new jobs in the economy as a result of the multiplier effect generated by the construction of their home and their ongoing personal expenditures in the local economy.

Constraints on household formation will also adversely affect the labor force in the local economy. This, in turn, will have impacts on existing and prospective businesses. In much the same manner as existing Marin County based businesses have been moving their offices north to Sonoma County due to a lack of expansion space in Marin, some firms located in the service area may be forced to move their entire operation if expansion opportunities are not available.

Furthermore, a growth moratorium will distort the structure of the local labor force. Without new housing development, prices of existing homes could be bid upward. This could squeeze out lower income and perhaps moderate income households. This effect, in combination with the out-migration of new households, may make it difficult for employers to fill entry level jobs and service jobs that pay lower wages.

Overall, the economic impact of the No Action Alternative may be much greater than the 27,100 future jobs and 28,200 future housing units that will not be permitted. The No Action Alternative could impact the income growth of existing residents and workers. Ultimately, a growth moratorium could force the local economy to change from the current relatively self-sufficient economy with a healthy, diverse employment base to a bedroom community that is dependent on other communities

CUMULATIVE IMPACTS

There are two impacts -- both significant -- identified in the Socio-economics section:

Impact: 18.1C. Will the Project plus cumulative projects increase the service charge for wastewater?

Analysis: The costs of Alternatives 2, 3, and 4 will increase wastewater service charges to a point exceeding 1.5 percent of the median income in the Project area.

In addition to the Project, there are other ongoing and potential projects that will increase service charges for water and wastewater in the Project area. The Annual Capital Improvement Program for the Santa Rosa Utilities Department for water and wastewater improvements averages about $3 million for wastewater projects and about the same for water projects. In addition to these regular expenditures for improving and upgrading existing facilities, there are several additional projects that could contribute to increased fees. Proposed improvements for the wastewater system include the possible conversion to ultraviolet disinfection, at a cost of $10 million, and a possible new wastewater line, the Todd Road trunk line, which could be built within the next 15 years at a cost of $7 million. Improvements to water service include new wells and seismic retrofit of the existing system, which could cost about $1 million per year over a period of five to seven years. Other projects may be determined to be necessary because of changing regulatory requirements. Because funding of these projects could occur by a variety of methods, including use of assessment districts, it is not possible to determine the amount of further service charge increase for each member of the Subregional System. However, these projects will collectively contribute to the total service charges for Subregional System users.

Impact: 18.2C. Will the Project plus cumulative projects result in loss of homes displaced by construction of Project facilities?

Analysis: The Tolay Extended, Adobe Road, Two Rock, Carroll Road, Valley Ford, and Huntley reservoir sites will all displace homes. No other cumulative projects that will displace homes in the Project area have been identified. Thus, this significant Project impact will not be any greater on a cumulative level.

SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Table 4.18-20

Summary of Significant Impacts and Mitigation Measures - Socio-economics

Impact	Level of Significance	Mitigation Measure
18.1. The Project may increase the service charge for wastewater.	Alt 2 - ● Alt 3 - ● Alt 4 - ●	No feasible mitigation has been identified.
18.2. The Project may result in loss of homes due to construction of facilities.	Alt 2A - ● Alt 2B - ● Alt 3A - ● Alt 3C - ● Alt 3D - ● Alt 3E - ●	No feasible mitigation has been identified.

Source: Economic & Planning Systems Inc., 1996

Notes:
● Significant impact before and after mitigation

SUMMARY OF IMPACTS BY ALTERNATIVE

Table 4.18-21

Summary of Impacts by Alternative -Socio-economics

	Alt 1	Alt 2A	Alt 2B	Alt 2C	Alt 2D	Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E	Alt 4	Alt 5A	Alt 5B
Increase in service charge	❍	●	●	●	●	●	●	●	●	●	●	❍	❍
Loss of Homes	--	●	●	==	==	●	==	●	●	●	==	==	--

Source: Economic & Planning Systems Inc., 1996

Notes: Level of Significance

❍ Less than significant impact; no mitigation proposed -- Not Applicable

● Significant impact before and after mitigation == No impact

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