Watersheds Coalition of Ventura County IRWMP
Proposition 50 Grant Proposal, Step 2

Attachment 11: Other Expected Benefits

See Exhibit D for detailed guidance on the preparation of this attachment. There is no page limitation for Attachment 11; however, applicants are encouraged to be clear and concise.

Benefits derived from the Proposal may extend beyond the water supply or water quality benefits described in Attachment 10. This attachment allows applicants to claim benefits other than water supply or water quality benefits. Qualitative analysis is acceptable if it is not feasible to quantify the benefits and the applicant provides adequate justification.

This attachment addresses benefits other than water supply or water quality. When possible, these other benefits were quantified. For each project in the Proposal, the following is provided:

- Narrative discussion of the estimates of without-project physical conditions.
- Narrative discussion of the estimates of with-project physical conditions.
- Description of methods used to estimate without- and with-project conditions.
- Description of the distribution of local, regional, and statewide benefits.
- Identification of beneficiaries.
- When the benefits will be received.
- Uncertainty of the benefits.
- Description of any adverse effects.

Additionally Table D-1 of the PSP has been completed, as applicable, for each project.

A summary of the costs and monetized benefits is presented in Attachment 10.

Calleguas Regional Salinity Management Project (Brine Line), Hueneme Outfall Rehabilitation (C-1)

Summary

To address a wide variety of water quality and water supply issues in the Calleguas Creek Watershed, the Calleguas Municipal Water District (Calleguas MWD) is implementing the 32-mile-long Calleguas Regional Salinity Management Project, also known as the Brine Line. The Brine Line will convey brine waste from local brackish groundwater desalters as well as excess recycled water, that cannot be put to beneficial reuse.

When Brine Line flows (both brine waste and excess reclaimed water) cannot be reused downstream for wetlands restoration/maintenance and agricultural reuse, the Brine Line flows will discharge into the Pacific Ocean through the rehabilitated Hueneme Outfall. The Hueneme Outfall Rehabilitation is critical for the overall Brine Line because it will enable discharge to the ocean when there is insufficient demand for beneficial use. Without an ocean discharge point, the Brine Line is infeasible.

The objectives of the Brine Line are to:

- Enable the development of new cost-effective local potable water supplies through the construction of brackish groundwater desalters.
- Remove salts from the Watershed to assist in achieving total maximum daily load (TMDL) in the surface waters of Calleguas Creek.
- Convey tertiary-treated effluent and brine for non-potable reuse farther downstream.

The Brine Line has the capacity to convey up to 45,000 acre-feet per year (AFY) of brine and recycled water flows and to remove up to 42,300 tons per year of salt. As discussed below, the Brine Line will operate in conjunction with six planned brackish groundwater desalters with an estimated total potable water production capacity of approximately 27,000 AFY, which will generate brine waste requiring disposal. In addition, wastewater treatment plants (WWTP) in the Watershed will discharge tertiary-treated wastewater to the Brine Line to comply with their discharge permits and achieve TMDLs.

When estimating costs and benefits for the Hueneme Outfall Rehabilitation, the other integrated components of the desalting and disposal process that are dependent on the Brine Line to move forward need to be considered.

The Brine Line will result in water supply, water quality, and other benefits, as summarized in Table C-1.1. The magnitude of benefits, monetized where possible, is reported in Table C-1.2.

TABLE C-1.1. BENEFITS SUMMARY

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Avoided Water Supply Costs to Local Water Suppliers	Monetization	Local, Regional
Avoided Water Supply Costs to Calleguas MWD	Qualitative	Regional
Avoided Water Supply Costs to Metropolitan	Qualitative	Regional
Increased Water Supply Reliability to Calleguas MWD Customers	Qualitative	Regional
Water Quality Benefits		
Avoided Fines for Wastewater Treatment Plant Permit Discharge Violations	Monetization	Regional
Reduced TDS in Potable Water Deliveries	Qualitative	Regional
Other Benefits		
Improved Regional Ecological and Habitat Values	Qualitative	Regional
Improved Regional Recreational Values	Qualitative	Regional
Improved Bay-Delta Ecological Values	Qualitative	Statewide
Agricultural Benefits	Qualitative	Regional

TABLE C-1.2. BENEFIT-COST ANALYSIS OVERVIEW

	Present Value
Costs – Total Capital and O&M (Hueneme Outfall Rehabilitation)	$17,709,425
Quantifiable Benefits	
Avoided Supply Costs to Local Water Suppliers	$15,272,652
Avoided Fines for Wastewater Treatment Plant Discharge Violations	$187,262
Total Benefits	$15,459,913
	Qualitative indicator*
Qualitative Benefits	
Avoided Water Supply Costs to Calleguas MWD	++
Avoided Water Supply Costs to Metropolitan	++
Increased Water Supply Reliability to Calleguas MWD Customers	++
Reduced TDS in Potable Water Deliveries	++
Improved Regional Ecological and Habitat Values	++
Improved Regional Recreational Values	+
Improved Bay-Delta Ecological Values	++
Agricultural Benefits	+

* Magnitude of effect on net benefits
\+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.

Brine Line

As mentioned previously, the Brine Line and associated desalters require that both the Brine Line (which includes the Hueneme Outfall Rehabilitation and the pipe necessary to deliver flows to the rehabilitated outfall) and individual desalters to generate benefits. In other words, the valuable desalted water generated is a "joint product" of the overall suite of projects. The Brine Line and desalters

are each "necessary" for generating benefits, but neither is "sufficient" on its own to generate benefits. This raises the issue of how to apportion benefits across the various necessary inputs to the joint product's value.

To apportion benefits between the desalters and the Brine Line, it is assumed that the benefits of the Brine Line and desalter components are proportional to the costs of each component. Thus, for example, if a single component (e.g., one desalter) accounts for 20% of the total combined costs, then it is assumed that 20% of the total joint benefits also can be attributed to that component.

Developing Estimates for the Desalters

Currently, there are at least six desalters that are slated to make use of the Brine Line: the Camarillo Groundwater Treatment Facility (Camarillo GWTF), South Las Posas Basin, Somis, West Simi and two desalters associated with the Renewable Water Resources Management Program for the Southern Reaches of the Calleguas Creek Watershed. Detailed information is only available for the Camarillo GWTF, which is used here as a representative case to scale proportionally benefits and costs for the other anticipated desalters. That is, benefits from the five other desalters are scaled according to water yield in comparison with water yield of the Camarillo GWTF. The capital costs are available for three other desalters and are used. Capital costs for two of the other desalters and O&M costs for all five other desalters are scaled from the Camarillo GWTF to the other facilities using the proportion of the expected water yield.

Total Benefits of the Suite of Necessary Projects

Total monetized benefits for the Brine Line are the sum of: 1) the sum of avoided costs of importing less water from Metropolitan, and 2) the avoided fines from meeting WWTP permit requirements.

Estimates for the joint product benefits of the relevant suite of projects (the Brine Line and desalters) are estimated as follows: Desalter water production present value benefits, including the portion attributable to the Brine Line, are $254.5 million which is estimated by multiplying the Calleguas MWD water rate (escalated as described below) times 27,000 AFY of desalter production capacity. Desalter production is increased to 27,000 AFY over a 6 year period. The value of avoided fines from permit violations totals $3.1 million assuming that fines start in 2011. Therefore, total present value benefits of the Brine Line and desalters are $257.6 million ($254.5 + $3.1 million, rounded), which is reported at the bottom of the benefits column in Table C-1.2a. How these benefits are apportioned across projects is discussed below.

Apportioning Benefits to Individual Project Components

The costs of the Hueneme Outfall Rehabilitation, the remainder of the Brine Line pipe, and the desalters (based on Camarillo GWTF) are summarized in Table C-1.1. These costs are the present value of all fixed (capital) costs and variable (O&M) costs for each. The total present value of all costs is $294.4 million. The Hueneme Outfall Rehabilitation costs $17.7 million, which is 6.0% of total costs. Therefore, it is assumed that 6.0% of total benefits, or 0.06 * $257.6, are the benefits attributable to the Hueneme Outfall Rehabilitation, which equals $15.4 million. Benefits for the Brine Line and the desalters are computed in similar fashion. For all components, benefits are greater than the costs, as reported in Table C-1.2a.

TABLE C-1.2A. PRESENT VALUE COSTS AND BENEFITS FROM THE BRINE LINE NETWORK (IN 2005 MILLIONS OF DOLLARS)

Component	Cost	% of Total Cost	Benefits	% of Total Benefits
Brine Line pipe	$76.6	26.0%	$67.0	26.0%
Hueneme Outfall Rehabilitation	$17.7	6.0%	$15.4	6.0%
All Desalters	$200.0	68.0%	$175.2	68.0%
Total	$294.4	100%	$257.6	100%

The "Without Project" Baseline

The mass of salts and minerals coming into the region is greater than the mass of salts and minerals leaving the region, which is having a deleterious impact on the ecosystems in the Watershed (Calleguas MWD, 1999). Salt constituents are currently flowing through surface waters and migrating into underlying aquifers (Kennedy/Jenks, 2003).

The Calleguas Creek Watershed has experienced salt accumulation in soils and groundwater supplies from historic and ongoing point and non-point source (NPS) pollution from urbanization and agriculture. Most of the groundwater in the Watershed contains high levels of total dissolved solids (TDS), chloride, sulfate, and boron resulting from the use of high TDS groundwater supplies, fertilizer use in agricultural activities, and discharges from wastewater plants. Continued use of water from these basins for domestic and agricultural irrigation needs and the resulting recharge to the basin has concentrated salts. In addition, saltwater intrusion in the coastal areas has been exacerbated by groundwater overdraft.

Groundwater pumpers must blend increasing quantities of imported water with the groundwater in order to meet drinking water standards. Increasing quantities of potable water has to be imported by Metropolitan from the already-stressed Bay-Delta region. The CALFED Bay-Delta Program has been developing long-term solutions (Calleguas MWD, 1999). Without the Brine Line, local water supplies could not construct brackish groundwater desalters, as there would be no mechanism for brine disposal. Underutilized groundwater supplies would remain unused and dependence on imported water supply would increase, negatively affecting the Bay-Delta ecosystem. Salts would continue to concentrate in the Calleguas Creek Watershed and TMDLs would not be achieved.

Description of Other Expected Benefits

Natural resources in the Calleguas Creek Watershed and in the Bay-Delta will benefit from several aspects of the Brine Line. First, the Brine Line will export salts out of the Watershed. The amount of salts removed from the Watershed through the Brine Line will total 42,300 tons of salt per year. As a result, salinity concentrations in Calleguas Creek will be lowered. Second, the Brine Line will carry some brine and a larger proportion of tertiary-treated wastewater. These Brine Line flows will be made available for wetland applications and suitable agricultural uses. Also, offset of up to 27,000 AFY of Metropolitan demand from Bay-Delta supplies will benefit natural resources in the Bay-Delta by reducing exports of water away from these sensitive areas. Thus, the Brine Line will assist in meeting Bay-Delta water quality and ecological objectives.

Many ecological benefits are difficult to monetize without a site-specific study. Nevertheless, improved ecosystem integrity has benefits for both people and wildlife. Ecological, recreational, and agricultural benefits are discussed below.

Improved Regional Ecological and Habitat Values

Improved Ecological Benefits: Mugu Lagoon

Mugu Lagoon is located at the terminus of Calleguas Creek and has been designated an Area of Special Biological Significance. It is one of the few remaining significant saltwater wetlands habitat in southern California (WMI, 2004). Mugu Lagoon is also an important habitat along the Pacific Flyway, a bird migration route running from Alaska south to Mexico. The wetlands are a critical resting area for migratory birds.

Mugu Lagoon faces numerous water quality problems stemming from land use practices, pollutant sources, and sedimentation (WMI, 2004). The Brine Line will remove salts from groundwater and surface water such that the flows in Calleguas Creek and Revolon Slough are less saline, which is critical because these surface waters are the main source of freshwater to Mugu Lagoon.

Ecological Benefits: Duck Club

The Ventura County Game Preserve, also known as the Duck Club, is a privately-owned area that consists of wetland areas that are artificially maintained, and serves as a wildlife refuge and offers duck hunting during the duck season. The area was initially developed to attract ducks and prevent them from destroying nearby crops. The Duck Club contains 463 acres of ponds that could potentially be filled with water year-round, if water were available. Currently, most of these ponds are only filled in the winter months due to limitations on groundwater pumping for groundwater management purposes. The mean annual water use of the Duck Club is 1,479 AFY. It is considered likely that the Duck Club will be interested in contracting with Calleguas MWD to take tertiary-treated effluent and brines from the Brine Line.

Improved Regional Recreation Values

Currently, recreation at the Duck Club is only possible during the winter months. Non-hunting activity, particularly wildlife viewing, during the rest of the year is a potential benefit, if the 463 acres of ponds could be filled year-round.

Improved Bay-Delta Ecological Values

Years of neglect to the Bay-Delta area have resulted in significant environmental damage. Fish species, including the Delta Smelt, Winter-run Chinook Salmon, Spring-run Chinook Salmon, and Sacramento Splittail, are classified as threatened or endangered species. Preserving the Delta's environmental condition is vital to maintaining and improving the viability of the Delta region. The Delta provides drinking water to 23 million people throughout California, supports a $31 billion agricultural industry, and serves as a home to 750 plant and animal species. While salmon runs and wildlife habitat have been improved in recent years, significant problems still exist. The population of certain species of open-water fish, including the delta smelt, has declined dramatically over the past few years. The levee system is aging and concerns about its strength and reliability have escalated since Hurricane Katrina. In addition, water quality problems still exist, and there is little consensus on how to manage water resources through storage.

The Brine Line will enable greater use of underutilized local groundwater resources, in lieu of imported SWP water from the Bay-Delta. Water left in the Delta will benefit Delta ecological values especially in the spring and winter when flow are dedicated to maintaining salinity levels in the Bay-Delta and to aiding spring and summer salmon runs.

Agricultural Benefits

Agriculture is the largest industry in Ventura County generating over $1 billion/year in crop value. A combination of tertiary-treated effluent and brine from the Brine Line will be made available to agricultural users for growing non-salt-sensitive crops, such as sod. This water can be used in lieu of groundwater or imported water, which can be directed to potable uses instead. The amount of water that agricultural users will demand from the Brine Line, and the timing of those demands is currently unknown.

Distribution of Project Benefits and Identification of Beneficiaries

This project provides the full range of types of project beneficiaries. At the local level, agencies with brackish groundwater desalters or wastewater treatment plants will benefit. Regionally, those dependent on supplies from Calleguas MWD will benefit from reduced demand on Calleguas MWD and Metropolitan facilities. The project also will provide statewide benefits by reducing demands on water supplies from the Bay-Delta.

Project Benefits Timeline Description

The Hueneme Outfall Rehabilitation is assumed to have a 50-year useful life. As discussed above, benefits are the sum of water supply avoided cost benefits from the desalters, and avoided fines. Benefits apportioned to the Hueneme Outfall Rehabilitation increase as desalters come on line and the output of desalter water increases, and are accrued over the useful life of the project.

Potential Adverse Effects from the Project

No adverse long-term impacts have been identified for the Brine Line. However, a California Environmental Quality Act (CEQA) document is being prepared and will address any potential adverse impacts.

Summary of Findings

Even though important categories of benefits have not been monetized, the potential benefit categories are numerous, and the benefits are potentially significant. This is especially true given that the Brine Line is a relatively large project. Categorical benefits are enumerated in Table C-1.3. They include ecological benefits to the local Watershed, including benefits to downstream ecological values at Mugu Lagoon and the Ventura County Game Preserve. Also included are potential recreation benefits at the Ventura County Game Preserve, ecological benefits to the Bay-Delta region from avoided Delta withdrawals, and agricultural benefits in the local Watershed from availability of non-potable water for irrigation.

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In most cases, omissions lead to a downward bias in benefits: the Brine Line is expected to be much more beneficial than the subset of benefits that can be monetized would indicate. Such issues are listed in Table C-1.4.

TABLE C-1.3. QUALITATIVE BENEFITS SUMMARY – OTHER BENEFITS

Benefit	Qualitative Indicator
Improved Regional Ecological and Habitat Values	++
Improved Regional Recreational Values	+
Improved Bay-Delta Ecological Values	++
Agricultural Benefits	+

TABLE C-1.4. OMISSIONS, BIASES, AND UNCERTAINTIES AND THEIR EFFECT ON THE PROJECT

Benefit or cost category	Likely impact on net benefits*	Comment
Improved regional ecological and habitat values.	++	It is uncertain how Mugu Lagoon and the Duck Club will be affected by availability of tertiary-treated effluent and brine waters made available by the Brine Line. The number of birds attracted to the Duck Club and level of human recreational visitation is uncertain.
Improved regional recreational values.		It is also uncertain how much Mugu Lagoon will benefit from improved freshwater inflows from Calleguas Creek. Similarly, other uncertainties include the number of birds attracted to Mugu Lagoon, and level of human recreational visitation. There is potential for substantial benefits.
Agricultural benefits	+	Tertiary-treated effluent and brine will be made available for suitable agricultural uses. This will provide an inexpensive water source for agriculture. However, agricultural viability depends on a number of input factors in addition to water availability, so ultimate effect of the Brine Line on agricultural values is unclear.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
- = Likely to decrease benefits.
-- = Likely to decrease net benefits significantly.
U = Uncertain, could be + or -.

References

1. Black & Veatch Corporation. 2005. Calleguas Municipal Water District 2005 Urban Water Management Plan. B&V Project 140898.100. September.

2. Calleguas Municipal Water District. 2005. Application for NPDES Permit: Report of Wastewater Discharge.

3. Kennedy/Jenks Consultants. 2003. NPDES Permit Application Report: Regional Salinity Management Program. K/J Project No. 02473.00. Prepared for Calleguas Municipal Water District, 2100 Olsen Road, Thousand Oaks, CA 91360-6800.

4. Kennedy/Jenks Consultants. 2005. Final Report: Feasibility Evaluation of Delivery of Brine Line Water to the Ventura Game Preserve. Prepared for the Calleguas Municipal Water District, 2100 Olsen Road, Thousand Oaks, CA 91360-6800.

5. Risk Management Professionals. 2005. City of Camarillo Urban Water Management Plan. December.

6. South Ormond Beach Wetland Restoration Project Spring 2000 Report. http://www.bren.ucsb.edu/research/2001Group_Projects/Ormond/Public/proposal.htm Accessed 6/12/06.

7. WMI. 2004. Calleguas Creek Watershed. WMI Chapter. October.

Camarillo Groundwater Treatment Facility (C-3)

Summary

The City of Camarillo currently delivers a combination of local groundwater and imported water to its customers. Approximately 63% of Camarillo's water is imported water delivered by the Calleguas MWD from Metropolitan (Risk Management Professionals, 2005). High levels of TDS and other constituents require that groundwater be blended with imported water to meet secondary maximum contaminant levels.

The Camarillo Groundwater Treatment Facility (Camarillo GWTF) is a 4 million gallon per day (mgd) brackish groundwater desalter to be located in the northeast portion of the City. Initial output of potable water for the City is anticipated to be 4,500 AFY, but will increase to the full 9,000 AFY capacity over time. Construction of the Camarillo GWTF is scheduled to be completed by the end of 2010.

The objectives of the Camarillo GWTF are to:

- Develop new local potable water supplies through the construction of a brackish groundwater desalter.
- Improve water quality.
- Reduce dependence on imported water.
- Increase water supply reliability.
- Reduce salts in the Watershed for ecological benefits.

The Camarillo GWTF will reduce the amount of water that needs to be imported from the Bay-Delta area and delivered by Calleguas MWD and Metropolitan to serve local demand. The Camarillo GWTF will allow Camarillo to use underutilized local groundwater sources, increasing the reliability of supply and improving water quality. If the Camarillo GWTF (and Brine Line, for brine disposal) are implemented, Camarillo's reliance on imported water is expected to decrease from 63% to 40%, significantly reducing their demands on Calleguas MWD and Metropolitan.

Camarillo GWTF and the Brine Line: Integration of Projects

The Camarillo GWTF (and other brackish groundwater desalters) cannot exist and provide benefits without the Brine Line (C-1) for disposal of waste brines from the treatment process. The Brine Line will remove up to 8,100 tons of salt from the Camarillo GWTF each year.

When benefits attributed specifically to the Camarillo GWTF are apportioned on the basis of cost, it is assumed that 12.5% of the benefits from the overall Brine Line can be attributed to the Camarillo GWTF. The Camarillo GWTF will result in the water supply,

water quality, and other benefits summarized in Table C-3.1. The magnitude of benefits, monetized where possible, is reported in Table C-3.2

TABLE C-3.1. BENEFITS SUMMARY

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Avoided Water Supply Costs to Camarillo	Monetization	Local
Avoided Water Supply Costs to Calleguas MWD	Qualitative	Regional
Avoided Water Supply Costs to Metropolitan	Qualitative	Local
Increased Water Supply Reliability to Camarillo Customers	Qualitative	Regional
Water Quality Benefits		
Avoided Fines for Wastewater Treatment Plant Permit Discharge Violations	Monetized	Local
Reduced TDS in Potable Water Deliveries	Physical quantification	Local
Other Benefits		
Improved Regional Ecological Values	Qualitative	Regional
Improved Bay-Delta Ecological Values	Qualitative	Statewide

TABLE C-3.2. BENEFIT-COST ANALYSIS OVERVIEW

	Present Value
Costs – Total Capital and O&M	$36.7 million
Quantifiable Benefits	
Avoided Water Supply Costs to Camarillo	$31,818,024
Avoided Fines for Wastewater Treatment Plant Permit Discharge Violations	$390,028
Total Benefits	$32,208,153
Qualitative Benefits	**Qualitative indicator***
Avoided Water Supply Costs to Calleguas MWD	++
Avoided Water Supply Costs to Metropolitan	+
Increased Water Supply Reliability to Camarillo Customers	++
Reduced TDS in Potable Water Deliveries	++
Improved Regional Ecological Values	+
Improved Bay-Delta Ecological Values	+

* Magnitude of effect on net benefits
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.

Overall Brine Line

As mentioned previously, the Brine Line and associated desalters require that both the Brine Line (which includes the Hueneme Outfall Rehabilitation and the pipe necessary to deliver flows to the rehabilitated outfall) and individual desalters to generate benefits. In other words, the valuable desalted water generated is a "joint product" of the overall suite of projects. The Brine Line and desalters are each "necessary" for generating benefits, but neither is "sufficient" on its own to generate benefits. This raises the issue of how to apportion benefits across the various necessary inputs to the joint product's value.

To apportion benefits between the desalters and the Brine Line, it is assumed that the benefits of the Brine Line and desalter components are proportional to the costs of each component. Thus, for example, if a single component (e.g., one desalter) accounts for 20% of the total combined costs, then it is assumed that 20% of the total joint benefits also can be attributed to that component.

Developing Estimates for the Desalters

Currently, there are at least six desalters that are slated to make use of the Brine Line: Camarillo GWTF, South Las Posas Basin, Somis, West Simi and two desalters associated with the Renewable Water Resources Management Program for the Southern Reaches of the Calleguas Creek Watershed. Detailed information is only available for the Camarillo GWTF, which is used here as a representative case to scale proportionally benefits and costs for the other anticipated desalters. That is, benefits from the five other desalters are scaled according to water yield in comparison with water yield of the Camarillo GWTF. The capital costs are available for three other desalters and are used. Capital costs for two of the other desalters and O&M costs for all five other desalters are scaled from the Camarillo GWTF to the other facilities using the proportion of the expected water yield.

Total Benefits of the Suite of Necessary Projects

Total monetized benefits for the Brine Line are the sum of: 1) the sum of avoided costs of importing less water from Metropolitan, and 2) the avoided fines from meeting WWTP permit requirements.

Estimates for the joint product benefits of the relevant suite of projects (the Brine Line and desalters) are estimated as follows: Desalter water production present value benefits, including the portion attributable to the Brine Line, are $254.5 million. The value of avoided fines from permit violations totals $3.1 million. Therefore, total present value benefits of the Brine Line and desalters are $257.6 million ($254.5 + $3.1 million), which is reported at the bottom of the benefits column in Table C-3.2a. How these benefits are apportioned across projects is discussed below.

Apportioning Benefits to Individual Project Components

The costs of the Brine Line and the desalters (based on the Camarillo GWTF) are summarized in Table C-3.1. These costs are the present value of all fixed (capital) costs and variable (O&M) costs for each. The total present value of all costs is $294.4 million. The Camarillo GWTF costs $36.7 million, which is 12.5% of total costs. Therefore, it is assumed that 12.5% of total benefits, or 0.125 * $257.6 million, are the benefits attributable to the Camarillo GWTF, which equals $32.2 million. Benefits for the Brine Line and the other desalters are computed in similar fashion.

TABLE C-3.2A.
PRESENT VALUE COSTS AND BENEFITS FROM THE BRINE LINE NETWORK
(IN 2005 MILLIONS OF DOLLARS)

Component	Cost	% of Total Cost	Benefits	% of Total Benefits
Brine Line Pipe	$76.6	26.0%	$67.0	26.0%
Hueneme Outfall Rehabilitation	$17.7	6.0%	$15.4	6.0%
Camarillo GWTF	$36.7	12.5%	$32.2	12.5%
All Other Desalters	$163.4	55.5%	$143.0	55.5%
Grand Total	$294.4	100%	$257.6	100%

The "Without Project" Baseline

The mass of salts and minerals coming into the region is greater than the mass of salts and minerals leaving the region, which is having a deleterious impact on the ecosystems in the Watershed (Calleguas MWD, 1999). Salt constituents are currently flowing through surface waters and

migrating into underlying aquifers (Kennedy\Jenks, 2003).

The Calleguas Creek Watershed has experienced salt accumulation in soils and groundwater supplies from historic and ongoing point and non-point source (NPS) pollution from urbanization and agriculture. Most of the groundwater in the Watershed contains high levels of total dissolved solids (TDS), chloride, sulfate, and boron resulting from the use of high TDS groundwater supplies, fertilizer use in agricultural activities, and discharges from wastewater plants. Continued use of water from these basins for domestic and agricultural irrigation needs and the resulting recharge to the basin has concentrated salts. In addition, saltwater intrusion in the coastal areas has been exacerbated by groundwater overdraft.

Groundwater pumpers must blend increasing quantities of imported water with the groundwater in order to meet drinking water standards. Increasing quantities of potable water has to be imported by Metropolitan from the already-stressed Bay-Delta region. The CALFED Bay-Delta Program has been developing long-term solutions (Calleguas MWD, 1999). Without the Brine Line, local water supplies could not construct brackish groundwater desalters, as there would be no mechanism for brine disposal. Underutilized groundwater supplies would remain unused and dependence on imported water supply would increase, negatively affecting the Bay-Delta ecosystem. Salts would continue to concentrate in the Calleguas Creek Watershed and TMDLs would not be achieved.

The City of Camarillo currently delivers a combination of local groundwater (37%) and imported water (63%) to its customers. Despite the availability of extraction rights and local groundwater, the relatively high levels of TDS and other constituents require that groundwater be blended with imported water from Calleguas MWD and Metropolitan. Declining water quality, in particular increased salinity, has reduced the effectiveness of blending (Calleguas, 2006; Black and Veatch Corporation, 2005). Without the Camarillo GWTF, in the next few years all water would need to be imported (City of Camarillo, 2006), negatively affecting the Bay-Delta ecosystem. There is no other feasible project to accomplish the same goals as the Camarillo GWTF.

Description of Other Expected Benefits

Natural resources in the Calleguas Creek Watershed will benefit from exports of salts out of the Watershed as a result of the Brine Line. The amount of salts removed from the Watershed through the Brine Line as a result of the Camarillo GWTF alone will be 8,100 tons of salt per year. Also, offset of 4,500 AFY growing to 9,000 AFY over time of Metropolitan demand from Bay-Delta supplies will benefit natural resources in the Bay-Delta by reducing exports of water away from these sensitive areas. Thus, the Brine Line will assist in meeting Bay-Delta water quality and ecological objectives.

Many ecological benefits are difficult to monetize without a site-specific study. Nevertheless, improved ecosystem integrity has benefits for both people and wildlife.

Improved Regional Ecological Values

Ecological Benefits: Mugu Lagoon

Mugu Lagoon within the Calleguas Creek basin is of special biological significance with state designation for fish and wildlife (Calleguas MWD, 2005). It is one of the few remaining significant saltwater wetlands habitat in southern California (WMI, 2004). Mugu Lagoon is an important habitat along the Pacific Flyway, a bird migration route running from Alaska south to Mexico. The wetlands are a critical resting area for migratory birds.

Mugu Lagoon is also facing water quality problems stemming from land use practices, pollutant sources, and sedimentation (WMI, 2004). Ecological systems in Mugu Lagoon will benefit from removal of salts from the Camarillo GWTF that are disposed of through the Brine Line, and resulting reduced salt concentrations of surface water flowing to the lagoon in Calleguas Creek.

Improved Bay-Delta Ecological Values

Years of neglect to the Bay-Delta area have resulted in significant environmental damage. Fish species, including the Delta Smelt, Winter-Run Chinook Salmon, Spring-Run Chinook Salmon, and Sacramento Splittail, are also classified as threatened or endangered species. Maintaining the

Delta's environmental condition is vital to maintaining and improving the viability of the Delta region. The Delta provides drinking water to 23 million people, supports a $31 billion agricultural industry, and serves as a home to 750 plant and animal species. While salmon runs and wildlife habitat have been improved in recent years, significant problems still exist. The population of certain species of open-water fish, including the delta smelt, has declined dramatically over the past few years. The levee system is aging and concerns about its strength and reliability have escalated since Hurricane Katrina. In addition, water quality problems still exist, and there is little consensus on how to manage water resources through storage.

The Camarillo GWTF will use underutilized local groundwater resources, in lieu of imported SWP water from the Bay-Delta. Water left in the Delta will benefit Delta ecological values especially during the spring and fall when operating rules dedicate flow to environmental values.

Distribution of Project Benefits and Identification of Beneficiaries

Table C-3.3 summarizes beneficiaries of the Camarillo GWTF. At the local level, the population of Camarillo will benefit. Regionally, those dependent on supplies from Calleguas MWD will benefit from reduced demand on Calleguas MWD facilities. The Camarillo GWTF also will provide statewide benefits by reducing demands on water supplies from the Bay-Delta region.

TABLE C-3.3.
PROJECT BENEFICIARIES SUMMARY

Local	Regional	Statewide
City of Camarillo Camarillo Sanitation District	Calleguas MWD and Metropolitan	Bay-Delta

Project Benefits Timeline Description

A 50-year useful life is assumed for the Camarillo GWTF. Water supply avoided cost benefits are assumed to increase linearly over time as plant output increases from 4,600 AFY to 9,000 AFY. The build-out of the capital construction for the Camarillo GWTF is scheduled to be completed over the next five years.

Potential Adverse Effects from the Project

There is no evidence to suggest that the Camarillo GWTF will result in any adverse effects. However, a CEQA document is being prepared and will address any potential adverse impacts.

Summary of Findings

Even though important categories of benefits have not been monetized, the potential benefit categories are numerous, and the benefits are potentially significant. Categorical benefits are enumerated in Table C-3.4. They include ecological benefits to the local Watershed, including benefits to the Mugu Lagoon. Also included are ecological benefits to the Bay-Delta region from avoided Delta withdrawals.

TABLE C-3.4.
QUALITATIVE BENEFITS SUMMARY – OTHER BENEFITS

Benefit	Qualitative Indicator
Improved Regional Ecological Values	+
Improved Bay-Delta Ecological Values	+

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In most cases, omissions lead to a downward bias in benefits: the Camarillo GWTF is expected to be much more beneficial than the subset of benefits that can be monetized would indicate. Such issues are listed in Table C-3.5.

TABLE C-3.4. OMISSIONS, BIASES, AND UNCERTAINTIES AND THEIR EFFECT ON THE PROJECT

Benefit or cost category	Likely impact on net benefits*	Comment
Improved regional ecological and values	+	It is uncertain how much Mugu Lagoon will benefit from improved freshwater inflows from Calleguas Creek. Other uncertainties include the number of birds attracted to Mugu Lagoon. There is potential for substantial benefits.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
- = Likely to decrease benefits.
-- = Likely to decrease net benefits significantly.
U = Uncertain, could be + or -.

References

1. Black & Veatch Corporation. 2005. Calleguas Municipal Water District 2005 Urban Water Management Plan. B&V Project 140898.100. September.

2. Calleguas Municipal Water District. 2005. Application for NPDES Permit: Report of Wastewater Discharge.

3. Kennedy/Jenks Consultants. 2003. NPDES Permit Application Report: Regional Salinity Management Program. K/J Project No. 02473.00. Prepared for Calleguas Municipal Water District, 2100 Olsen Road, Thousand Oaks, CA 91360-6800.

4. Kennedy/Jenks Consultants. 2005. Final Report: Feasibility Evaluation of Delivery of Brine Line Water to the Ventura Game Preserve. Prepared for the Calleguas Municipal Water District, 2100 Olsen Road, Thousand Oaks, CA 91360-6800.

5. Risk Management Professionals. 2005. City of Camarillo Urban Water Management Plan. December.

6. South Ormond Beach Wetland Restoration Project Spring 2000 Report. http://www.bren.ucsb.edu/research/2001Group_Projects/Ormond/Public/proposal.htm Accessed 6/12/06.

7. WMI. 2004. Calleguas Creek Watershed. WMI Chapter. October.

VCWWD1 Recycled Water System, Phase II (C-7)

Summary

The VCWWD1 Recycled Water System, Phase II (VCWWD1 Recycled Project), will enable Ventura County Waterworks District No. 1 (VCWWD1) to provide more recycled water from the Moorpark Wastewater Treatment Plant (MWTP) to agricultural irrigation sites within the VCWWD1 service area. Phase II of the VCWWD1 Recycled Project will construct a single 1.5 million gallon welded-steel aboveground tank and will add 3,565 linear feet (LF) of new pipelines, as well as a 2,600 LF extension of an existing pipeline.

This phase of the VCWWD1 Recycled Project is the second of three phases that VCWWD1 plans to implement in order to serve a total of 1,200 AFY of recycled water to 32 customers for reuse. Phase I has already been completed and serves 500 AFY to a golf course. Phase II will add 250 AFY and 13 new customers by 2008. Phase III will serve an additional 18 customers with 450 AFY of recycled water from the MWTP.

The VCWWD1 Recycled Project will enhance VCWWD1's ability to deliver recycled water to a larger customer base, potentially decrease the amount of potable water demand in the service area,

and reduce the volume of treated effluent discharged from the MWTP. The water supply, water quality, and other benefits of the VCWWD1 Recycled Project are summarized in Table C-7.1.

Those benefits best described qualitatively are summarized in Table C-7.2, along with an overview of the monetized benefits and costs of the VCWWD1 Recycled Project.

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TABLE C-7.1:
BENEFITS SUMMARY

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Avoided Water Supply Costs to VCWWD1	Monetization	Local
Increased Water Supply Reliability to VCWWD1 Customers	Qualitative	Local, Regional
Water Quality Benefits		
Improved Groundwater Quality	Qualitative	Local, Regional
Reduced Salt Discharges	Physical Quantification	Local, Regional
Other Benefits		
Avoided Wastewater Disposal Costs	Monetization	Local
Avoided Fertilizer Costs	Monetization	Local
Improved Bay-Delta Ecosystem Values	Qualitative	Statewide

TABLE C-7.2:
BENEFIT-COST ANALYSIS OVERVIEW

	Annualized	Present Value
Costs – Total Capital and O&M		$2,178,911
Monetizable Benefits		
Water Supply Benefits		$1,903,955
Other Benefits		$62,111
Total Benefits		$1,966,065
Qualitative Benefits	**Qualitative Indicator***	
Increased Water Supply Reliability to VCWWD1 customers	++	
Improved Groundwater Quality	+	
Reduced Salt Discharges	+	
Improved Bay-Delta Ecosystem Values	+	

+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.

The "Without Project" Baseline

Without the VCWWD1 Recycled Project, VCWWD1 would need to continue to provide 250 AFY of potable water to customers for agricultural use and construct new percolation ponds at the MWTP facility for effluent disposal.

VCWWD1 provides its customers a mix of local groundwater and imported State Water Project (SWP) water from the Metropolitan via the Calleguas MWD; a portion of the imported water is specifically for agricultural use. Agricultural water is considered an interruptible supply and is delivered at a lower rate than municipal and industrial (M&I) water. The current rate for agricultural water is $458/acre-feet (AF). Projected agricultural water demand is 3,021 AFY (VCWWD1 Urban Water Management Plan, 2005). VCWWD1's allocation for agricultural water from the Calleguas MWD is 2,733 AFY, which is 90% of demand. It was assumed that the remaining 10% of agricultural demand would be met with local groundwater.

As Ventura County continues to grow, the MWTP would receive increasing volumes of wastewater to treat. However, the facility lacks sufficient storage capacity for the additional treated effluent expected. VCWWD1 would need to construct two new percolation ponds by 2008 in order to dispose of the 250 AFY that will be offset by the VCWWD1 Recycled Project. The addition of two new percolation ponds, at $50,000 each, would cost $100,000. It was assumed that any operations or maintenance (O&M) costs in excess of existing costs would be nominal.

If these new percolation ponds are not constructed, the additional effluent discharged to the existing ponds would overflow into Arroyo Las Posas, a tributary to Calleguas Creek. Such discharges would not be acceptable because they would violate MWTP's discharge permit.

Description of Other Expected Benefits

The VCWWD1 Recycled Project will enable VCWWD1 to distribute 250 AFY of non-potable recycled water to customers for reuse that would otherwise be discharged to percolation ponds. The recycled water distributed will offset the demand for imported water from the SWP, and provide additional fertilizer value to agricultural users.

Avoided Wastewater Disposal Costs

The MWTP lacks sufficient storage capacity to treat additional effluent expected as a result of growth in the County. VCWWD1 would need to construct two new percolation ponds by 2008 in order to dispose of the 250 AFY that would be offset by the VCWWD1 Recycled Project. The addition of two new percolation ponds, at $50,000 each, would cost $100,000. It was assumed that any O&M costs in excess of existing costs would be nominal.

Avoided Fertilizer Costs

Delivery of recycled water from the VCWWD1 Recycled Project will reduce fertilizer use by agricultural recycled water users. Recycled water typically contains substantial amounts of nitrogen, phosphorus, and potassium (Kopec, 1993). Although an exact offset of fertilizer use from use of recycled water is difficult to estimate due to daily and seasonal nutrient variations in the recycled water and different nutrient needs for various crops, the potential fertilizer value of recycled water produced from the Irvine Ranch Water District recycled water plant has been estimated. The nitrogen level in recycled water produced for distribution by the VCWWD1 Recycled Project is less than 10 mg/L, which is less than half the concentration cited for the Irvine Ranch recycled water. An adjustment was made for the reduced nitrogen content of the recycled water produced for the VCWWD1 Recycled Project. Using a fertilizer price index for the United States from the Food and Agriculture Organization of the United Nations, the value of offset fertilizer use per AF of water applied is $17.64, when updated to 2005 dollars (based on Asano, 1981). When multiplied by the amount of recycled water to be delivered from the VCWWD1 Recycled Project (250 AFY), the total avoided fertilizer cost is roughly $4,000 per year.

Improved Bay-Delta Ecological Values

Phase II of the VCWWD1 Recycled Project will offset the demand on imported SWP water supplies by VCWWD1 via Metropolitan and Calleguas MWD. The VCWWD1 Recycled Project will offset 225 AFY of imported water. This water can remain in the Delta and contribute towards meeting Bay-Delta water supply, water quality, and ecosystem objectives.

Sensitive species, such as the Delta smelt and salmon, that are currently at risk will benefit from reduced Delta withdrawals. This reduction in withdrawals will especially contribute to the Delta ecosystem in the spring and winter, when flows are dedicated to maintaining the salinity balance in the Delta and to aiding spring and winter salmon runs.

Distribution of Project Benefits and Identification of Beneficiaries

The distribution of benefits is presented in Table C-7.3. The VCWWD1 Recycled Project will provide benefits both within the VCWWD1 service area and statewide. VCWWD1 will benefit from improved groundwater quality and increased local water supply reliability. By decreasing the demand for SWP water, the VCWWD1 Recycled Project will contribute to improving the ecosystem and water

quality in the sensitive Bay-Delta system, a benefit realized by the entire State of California.

TABLE C-7.3:
PROJECT BENEFICIARIES SUMMARY

Local	Regional	Statewide
Agricultural Irrigators (13 customers)	Calleguas MWD and Metropolitan VCWWD1 Down Gradient Groundwater Pumpers	Bay-Delta

Project Benefits Timeline Description

The additional 250 AFY of recycled water will be available to VCWWD1 for distribution upon the completion of Phase II in 2008. Benefits of the VCWWD1 Recycled Project will begin in 2009 and continue throughout the useful life of the VCWWD1 Recycled Project, which is assumed to be 30 years.

Potential Adverse Effects from the Project

Any potential short-term impacts associated with the construction of the storage tank and pipelines will be minimized. No long-term adverse effects are expected as a result of Phase II.

Summary of Findings

By increasing the amount of recycled water in VCWWD1's water supply portfolio, the VCWWD1 Recycled Project provides both agricultural and ecosystem benefits. Irrigating with recycled water allows agricultural users to cut back on fertilizer use. By making 250 AFY of recycled water available for irrigation, the VCWWD1 Recycled Project is expected to provide a fertilizer cost savings of over $4,000 per year; the total present value of savings to agricultural customers is $62,111. These savings are summarized in Table C-7.4 found at the end of this section.

The VCWWD1 Recycled Project enables VCWWD1 to decrease imported agricultural water demand by 225 AFY. This reduced use of SWP water (via Metropolitan and Calleguas MWD) contributes to the statewide goal to reduce stress on the sensitive Bay-Delta ecosystem. Table C-7.5 summarizes these benefits.

TABLE C-7.5: QUALITATIVE BENEFITS SUMMARY – OTHER BENEFITS

Benefit	Qualitative Indicator
Improved Bay-Delta Ecological Values	+

+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In this analysis, the main uncertainties are associated with the exact composition of the effluent and the distributed recycled water. Such issues are listed in Table C-7.6.

TABLE C-7.6: OMISSIONS, BIASES, AND UNCERTAINTIES AND THEIR EFFECT ON THE PROJECT

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Avoided Fertilizer Costs	U	The calculation for reduced fertilizer costs is based on best estimates from previous studies and was scaled down to account for the expected nitrate levels in the recycled water from the VCWWD1 Recycled Project. Variations in nitrate concentrations in the recycled water, as well as existing soil conditions and crops grown, could change the dollar value of this benefit.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
- = Likely to decrease benefits.
-- = Likely to decrease net benefits significantly.
U = Uncertain, could be + or -.

The VCWWD1 Recycled Project, by replacing 250 AFY of potable water with recycled water for irrigation, will provide benefits that extend throughout the VCWWD1 service area and statewide. Although these benefits to local growers and the Bay-Delta ecosystem have not been monetized, they do contribute to the overall benefit of the VCWWD1 Recycled Project.

References

1. 2005 Urban Water Management Plan, County of Ventura Waterworks District No. 1 (Prepared by Kennedy/Jenks Consultants).

Table C-7.4. Other Expected Benefits (C7) (All benefits should be in 2005 dollars)							
(a)	(b)	(c)	(d)	(e)	(f)	(h)	(i)
YEAR	Alternative: Avoided fertilizer cost due to recycled water use						
	Measure of Benefit: AF of recycled water			Complete these 2 columns if claiming $ Value for the Benefit			
	Without Proposal	With Proposal	Change Resulting from Proposal (c - b)	Unit $ Value	Annual $ Value (d x e)	Discount Factor	Discounted Benefits (g ÷ h)
2006	0	250	250.00	$17.64	$4,410.00	1.06	$4,160.38
2007	0	250	250.00	$17.64	$4,410.00	1.12	$3,924.88
2008	0	250	250.00	$17.64	$4,410.00	1.19	$3,702.72
2009	0	250	250.00	$17.64	$4,410.00	1.26	$3,493.13
2010	0	250	250.00	$17.64	$4,410.00	1.34	$3,295.41
2011	0	250	250.00	$17.64	$4,410.00	1.42	$3,108.88
2012	0	250	250.00	$17.64	$4,410.00	1.50	$2,932.90
2013	0	250	250.00	$17.64	$4,410.00	1.59	$2,766.89
2014	0	250	250.00	$17.64	$4,410.00	1.69	$2,610.27
2015	0	250	250.00	$17.64	$4,410.00	1.79	$2,462.52
2016	0	250	250.00	$17.64	$4,410.00	1.90	$2,323.13
2017	0	250	250.00	$17.64	$4,410.00	2.01	$2,191.63
2018	0	250	250.00	$17.64	$4,410.00	2.13	$2,067.58
2019	0	250	250.00	$17.64	$4,410.00	2.26	$1,950.55
2020	0	250	250.00	$17.64	$4,410.00	2.40	$1,840.14
2021	0	250	250.00	$17.64	$4,410.00	2.54	$1,735.98
2022	0	250	250.00	$17.64	$4,410.00	2.69	$1,637.72
2023	0	250	250.00	$17.64	$4,410.00	2.85	$1,545.02
2024	0	250	250.00	$17.64	$4,410.00	3.03	$1,457.56
2025	0	250	250.00	$17.64	$4,410.00	3.21	$1,375.06
2026	0	250	250.00	$17.64	$4,410.00	3.40	$1,297.23
2027	0	250	250.00	$17.64	$4,410.00	3.60	$1,223.80
2028	0	250	250.00	$17.64	$4,410.00	3.82	$1,154.53
2029	0	250	250.00	$17.64	$4,410.00	4.05	$1,089.18
2030	0	250	250.00	$17.64	$4,410.00	4.29	$1,027.52
2031	0	250	250.00	$17.64	$4,410.00	4.55	$969.36
2032	0	250	250.00	$17.64	$4,410.00	4.82	$914.49
2033	0	250	250.00	$17.64	$4,410.00	5.11	$862.73
2034	0	250	250.00	$17.64	$4,410.00	5.42	$813.90
2035	0	250	250.00	$17.64	$4,410.00	5.74	$767.83
2036	0	250	250.00	$17.64	$4,410.00	6.09	$724.36
2037	0	250	250.00	$17.64	$4,410.00	6.45	$683.36
Proposal Life			0				
						Total Present Value of	$62,110.63
Comment Box:							

Calleguas Creek Watershed Arundo/Tamarisk Programmatic EIR/EA, Permits and Pilot Removal Project (C-10)

Summary

The Calleguas Creek Watershed Arundo/Tamarisk Programmatic EIR/EA, Permits and Pilot Removal Project (Calleguas Arundo Removal Project) focuses on invasive weed removal by implementing a programmatic review and permitting process, a long-term implementation plan, and a pilot project for arundo and tamarisk removal in the entire Calleguas Creek Watershed. The Calleguas Arundo Removal Project will facilitate further removal of arundo and tamarisk in the Watershed, making smaller removal efforts more cost-effective in the future. The ultimate goal is to eradicate arundo and tamarisk from the Watershed. The Calleguas Arundo Removal Project will involve about 10 acres along Arroyo Simi and/or Arroyo Conejo. The density of arundo in this particular section of the channel is 50-75%.

The Calleguas Arundo Removal Project will result in water supply, water quality, and other benefits that are summarized in Table C-10.1. The magnitude of benefits, monetized where possible, is reported in Table C-10.2

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TABLE C-10.1: BENEFITS SUMMARY

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Increased Water Availability	Physical Quantification	Local, Regional
Water Quality Benefits		
Decreased Salinity	Qualitative	Local, Regional
Other Benefits		
Avoided Permitting Costs	Monetization	Local, Regional
Improved Habitat for Threatened and Endangered Species	Qualitative	Local, Regional
Improved Flood Protection and Erosion Mitigation	Qualitative	Local, Regional
Increased Fire Hazard Mitigation	Qualitative	Local, Regional
Improved Bay-Delta Ecological Values	Qualitative	Statewide

TABLE C-10.2: BENEFIT-COST ANALYSIS OVERVIEW

	Annualized	Present Value
Costs – Total Capital and O&M		$1,193,495
Monetizable Benefits		
Avoided Permitting Costs	$410,000/yr	$2,846,826
Qualitative Benefits	Qualitative Indicator*	
Decreased Salinity	+	
Increased Water Availability	++	
Improved Habitat Benefit for Threatened and Endangered Species	++	
Improved Flood Protection and Erosion Mitigation	++	
Increased Fire Hazard Mitigation	++	
Improved Bay-Delta Ecological Values	+	

* Magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.

Attachment 11: Other Expected Benefits

The "Without Project" Baseline

Of the 365 miles of stream channels within the Calleguas Creek Watershed, 244.9 miles have been evaluated for the presence of arundo. Of the total miles evaluated, 61.3%, or 150.2 miles, have some presence of arundo. Based on assumptions about average channel width, it is estimated that 1,639 acres in the Watershed are affected by arundo. Arundo spreads rapidly and dominates vegetation cover. Estimates of arundo spread are not available for the entire Watershed.

Tamarisk covers approximately 50 acres in the Watershed, and spreads at a similar rate as arundo. Tamarisk was introduced into the area after arundo, and if left unchecked, would likely spread to the same extent as arundo. Tamarisk and arundo are often found growing together because arundo tolerates tamarisk's salinity contributions (from leaf deposits), whereas most native species cannot.

Without the Calleguas Arundo Removal Project, arundo and tamarisk would continue to spread, covering a greater percentage of the Watershed and exacerbating the following negative impacts.

- Water Quality: Reduction in the shading of surface water, thereby resulting in reduction of bank-edge river habitat, higher water temperature, lower dissolved-oxygen content, elevated pH, conversion of ammonia to toxic unionized ammonia, and increasing soil salinity from leaf matter.
- Water Supply: Loss of surface and groundwater through heavy water consumption and rapid transpiration.
- Flooding: Obstruction of flood flows with associated damage to public facilities, including bridges and culverts, and to private property such as farmland.
- Erosion: Increased erosion of streambanks, associated damage to habitats and farmlands due to channel obstructions, and decreased bank stability associated with shallow-rooted arundo.
- Fire Hazards: Substantially increased danger of wildfire occurrences, intensity, and frequency, and a decreased role these channels play as a firebreak or buffer when infested with arundo.
- Native Habitats: Displacement of critical riparian habitat through monopolization of soil moisture by dense monocultures of arundo and tamarisk.
- Native Wildlife: Reduction in diversity and abundance of riparian-dependent wildlife due to decreased habitat quality, loss of food and cover, and increased water temperatures.
- Threatened and Endangered Species: Substantial reduction in suitable habitat available for state and federally listed species, such as the least Bell's vireo.

Description of Other Expected Benefits

Avoided Permitting Costs

The Calleguas Arundo Removal Project will include preparing and executing programmatic CEQA and National Environmental Policy Act (NEPA) documents and obtaining programmatic permits for arundo and tamarisk removal in the Calleguas Creek Watershed, as developed in the long-term implementation plan. This programmatic approach, as opposed to preparing individual CEQA/NEPA documentation and obtaining individual permits, will yield substantial administrative cost savings, as detailed below, from completing the analysis needed for the regulatory process. Prior experience with a similar project on the Ventura River required $60,000 to develop the CEQA documents and $20,000 for the actual arundo removal.

The same level of planning documentation and permits are required for every individual project, regardless of its size. If each project is approximately 10 acres, there could be 164 projects in the Watershed (as discussed earlier, it is estimated there are 1,639 acres of arundo in the Watershed). If it costs approximately $60,000 to prepare the CEQA document and an additional $40,000 to develop an implementation plan, NEPA document, and obtain regulatory permits, including, but not limited to a 404 Permit from the U.S. Army Corps of Engineers, a 401 certification from the RWQCB, a U.S. Fish and Wildlife Service Technical Assistance Letter or Biological Opinion, a Streambed

Alteration Agreement from the California Department of Fish and Game, and an encroachment permit from the Ventura County Watershed Protection District, it would cost approximately $16,400,000 to prepare the planning and permitting documentation. It is conservatively assumed that one quarter of this cost will be saved by completing the programmatic Environmental Impact Report (EIR)/Environmental Assessment (EA) and permitting through the Calleguas Arundo Removal Project. Therefore, the programmatic, permitting, and CEQA/NEPA documentation completed in advance will save $4.1 million in planning costs for individual projects. This cost savings is assumed to be spread out evenly over the next 10 years as the 164 projects are planned and permitted in the Watershed.

Improved Habitat for Threatened and Endangered Species

The Calleguas Arundo Removal Project will improve habitat for special-status species such as the least Bell's vireo, California red-legged frog, Southwestern pond turtle, Santa Ana sucker, Tidewater goby, Arroyo chub, and Southern Steelhead. It will also improve habitat for native, riparian-dependent species through improved cover and decreased water temperatures.

Improved Flood Protection and Erosion Mitigation

Arundo and tamarisk increase streambank erosion, which damages riparian habitat and farmland due to channel obstruction. Arundo, in particular, increases erosion due to its shallow root system, which reduces bank stability.

A Santa Ana Watershed Project Authority (SAWPA) document cites a report stating that cleanup of arundo debris washed downstream costs the public millions each year (Zembal and Hoffman, 2000). The SAWPA report also describes arundo-related damages to bridges in the area ranging from $260,000 for repairs to $8 million for new construction. This benefit is included as a qualitative benefit in the summary tables due to the difficulty in applying these values to the Calleguas Creek Watershed. However, it is useful in understanding the potential magnitude of arundo-related infrastructure impacts.

Increased Fire Hazard Mitigation

Arundo and tamarisk, with their dense stands around riparian areas, increase the danger of wildfire because riparian areas no longer serve as firebreaks. Removing these thick stands will restore Calleguas Creek's ability to act as a firebreak.

Improved Bay-Delta Ecological Values

As discussed previously, removal of arundo will result in greater availablity of groundwater and surface water. As the Calleguas Creek Watershed is heavily dependent upon imported water supply, the increase availability of local water resources will result in reduced demand for imported water. Water left in the Delta will benefit Delta ecological values, especially during the spring and winter, when flows are dedicated to maintaining the salinity balance in the Bay-Delta and to aiding spring and winter salmon runs.

Distribution of Project Benefits and Identification of Beneficiaries

Table C-10.3 shows the key Calleguas Arundo Removal Project beneficiaries. The Calleguas Arundo Removal Project will benefit the immediate area where the project is implemented, other areas of the Watershed where arundo and tamarisk will be removed in future projects, and downstream users in the Watershed benefiting from reduced erosion.

TABLE C-10.3.
PROJECT BENEFICIARY SUMMARY

Local	Regional	State
Calleguas Creek Watershed Bell's vireo, California red-legged frog, Southwestern pond turtle, Santa Ana sucker, Tidewater goby, Arroyo chub, and Southern Steelhead	Downstream Users	Bay-Delta

Project Benefits Timeline Description

The Calleguas Arundo Removal Project is expected to provide benefits in excess of 50 years. The projects that fall under the proposed plan are expected to result in complete removal of arundo and tamarisk. The stakeholder education and CEQA/NEPA disclosure process associated with the Calleguas Arundo Removal Project will educate landowners to avoid spreading the plants in the Watershed or from other watersheds, thus helping preserve the benefits. Benefits will begin accruing upon implementation of the Calleguas Arundo Removal Project. Benefits from the administrative efficiency afforded programmatic permitting will be realized as subsequent removal projects throughout the Watershed go through the planning and permitting process.

Potential Adverse Effects from the Project

The Calleguas Arundo Removal Project may have short-term impacts during removal work, but steps will be taken to avoid long-term disturbance to habitat and species in the area. However, a CEQA document is being prepared and will address any potential adverse impacts.

Summary of Findings

The expected cost savings from a preparing a programmatic EIR/EA are summarized in Table C-10.5 found at the end of this section. It is assumed that permitting and planning for each 10-acre removal project will cost $100,000, so individual permitting for arundo and tamarisk removal throughout the Watershed will cost $16.4 million. It is conservatively assumed that one quarter of this cost will be saved by using the information developed in the programmatic EIR/EA for future individual projects and individual permitting applications. It is assumed these projects will be implemented over the next 10 years, splitting the avoided permitting costs evenly across those years. The net present value of these avoided costs is $2.85 million.

Qualitative benefits are summarized in Table C-10.6.

TABLE C-10.6: QUALITATIVE BENEFITS SUMMARY – OTHER BENEFITS

Benefit	Qualitative Indicator
Improved Habitat for Threatened and Endangered Species	++
Improved Flood Protection and Erosion Mitigation	++
Increased Fire Hazard Mitigation	++
Improved Bay-Delta Ecosystem Values	+

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In this analysis, the main uncertainty is associated with the estimate of avoided planning and permitting costs associated with the EIR/EA from the Calleguas Arundo Removal Project. This issue is listed in Table C-10.7.

The Calleguas Arundo Removal Project will provide significant, monetized benefits from avoided permitting costs. Benefits that were not monetized will also significantly improve the ecosystem in the Calleguas Creek Watershed.

TABLE C-10.7:
OMISSIONS, BIASES, AND UNCERTAINTIES AND THEIR EFFECT ON THE PROJECT

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Avoided Permitting Costs	U	The estimate of avoided costs for permitting from the programmatic approach in the Calleguas Arundo Removal Project is based on a series of assumptions regarding the number of projects needed to totally remove arundo and tamarisk from the Watershed, the costs of permitting and planning for each, the percentage of total costs that will be saved by the programmatic approach, and the number of years over which the removal projects will be implemented. Changes to any of these assumptions will change the estimate of avoided planning and permitting costs.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
- = Likely to decrease benefits.
-- = Likely to decrease net benefits significantly.
U = Uncertain, could be + or -.

References

1. Santa Ana Watershed Project Authority. 2002. "Arundo Removal Protocol." Southern California Integrated Watershed Program. Accessed June 13, 2006. http://www.sawpa.org/arundo/documents/arundo%20removal%20protocol%202002.pdf

2. Zembal, R. and S. Hoffman. 2000. "Environmental Assessment of the Santa Ana Watershed Program. Fountain Valley, California.

Table C-10.5. Other expected benefits (All benefits should be in 2005 dollars)								
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Year	Benefit: Avoided permitting costs due to a programmatic rather than project-level approach					*Complete these columns if claiming economic benefits based on dollar value .*		
	Measure of benefit: _____ (Identify units for each water supply or water quality benefit to be measured)			Complete these 2 columns if claiming $ value for the benefit		Discounting calculations for economic benefits (If claiming $ value for the benefit)		
	Without proposal	With proposal	Avoided permitting costs (c - b)	Unit $ value	Annual $ value (d x e)	Total benefits (Sum of annual $ value for each benefit)	Discount factor	Discounted benefits (g ÷ h)
2006			0	$0.00	$0.00	$0.00	1.06	$0.00
2007			0	$0.00	$410,000.00	$410,000.00	1.12	$364,898.54
2008			0	$0.00	$410,000.00	$410,000.00	1.19	$344,243.91
2009					$410,000.00	$410,000.00	1.26	$324,758.40
2010					$410,000.00	$410,000.00	1.34	$306,375.85
2011					$410,000.00	$410,000.00	1.42	$289,033.82
2012					$410,000.00	$410,000.00	1.50	$272,673.42
2013					$410,000.00	$410,000.00	1.59	$257,239.07
2014					$410,000.00	$410,000.00	1.69	$242,678.37
2015					$410,000.00	$410,000.00	1.79	$228,941.86
2016					$410,000.00	$410,000.00	1.90	$215,982.89
2017					$0.00	$0.00	2.01	$0.00
2018					$0.00	$0.00	2.13	$0.00
2019					$0.00	$0.00	2.26	$0.00
2020					$0.00	$0.00	2.40	$0.00
2021					$0.00	$0.00	2.54	$0.00
2022					$0.00	$0.00	2.69	$0.00
2023					$0.00	$0.00	2.85	$0.00
2024					$0.00	$0.00	3.03	$0.00
2025					$0.00	$0.00	3.21	$0.00
2026					$0.00	$0.00	3.40	$0.00
2027					$0.00	$0.00	3.60	$0.00
2028					$0.00	$0.00	3.82	$0.00
2029					$0.00	$0.00	4.05	$0.00
2030					$0.00	$0.00	4.29	$0.00
2031					$0.00	$0.00	4.55	$0.00
2032					$0.00	$0.00	4.82	$0.00
2033					$0.00	$0.00	5.11	$0.00
2034					$0.00	$0.00	5.42	$0.00
2035					$0.00	$0.00	5.74	$0.00
2036					$0.00	$0.00	6.09	$0.00
2037					$0.00	$0.00	6.45	$0.00
2038					$0.00	$0.00	6.84	$0.00
2039					$0.00	$0.00	7.25	$0.00
2040					$0.00	$0.00	7.69	$0.00
2041					$0.00	$0.00	8.15	$0.00
2042					$0.00	$0.00	8.64	$0.00
2043					$0.00	$0.00	9.15	$0.00
2044					$0.00	$0.00	9.70	$0.00
2045					$0.00	$0.00	10.29	$0.00
2046					$0.00	$0.00	10.90	$0.00
2047					$0.00	$0.00	11.56	$0.00
2048					$0.00	$0.00	12.25	$0.00
2049					$0.00	$0.00	12.99	$0.00
2050					$0.00	$0.00	13.76	$0.00
2051					$0.00	$0.00	14.59	$0.00
2052					$0.00	$0.00	15.47	$0.00
2053					$0.00	$0.00	16.39	$0.00
2054					$0.00	$0.00	17.38	$0.00
2055					$0.00	$0.00	18.42	$0.00
2056					$0.00	$0.00	19.53	$0.00
Proposal life			0		$4,100,000.00	$4,100,000.00	…	
							Total present value of discounted benefits based on unit value [Sum of the values in Column (i)])	$2,846,826.12

Comment box:

Simi Valley Tapo Canyon Groundwater Treatment Plant (C-11)

Summary

The Simi Valley Tapo Canyon Water Treatment Plant (TCWTP) will use nanofiltration to enable usage of underutilized brackish groundwater in lieu of imported water for municipal and industrial (M&I) needs. The TCWTP will be initially sized for 1.0 mgd, producing up to 1,120 AFY and providing a safe, reliable yield even during multiple dry water years. The TCWTP will offset use of imported water from the Bay-Delta. The projected total surface water offset over the projected life of the TCWTP is over 50,000 acre-feet (AF); the annual offset will increase from 806 AF in 2006 to 1,120 AF in 2055.

In the future, the TCWTP could be linked to the Brine Line (C-1) to dispose of waste brine that will initially be disposed of locally through a combination of the public sewer system and reuse. However, implementation of the Brine Line is not essential for implementation of the TCWTP.

The water supply, water quality, and other benefits of the TCWTP are summarized in Table C-11.1. An overview of the monetized benefits and costs, along with those benefits with a qualitative indicator, are summarized in Table C-11.2

TABLE C-11.1. BENEFITS SUMMARY

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Avoided Water Supply Costs to Simi Valley	Monetization	Local, Regional
Avoided Water Supply Costs to Calleguas MWD and Metropolitan	Qualitative	Regional
Improved Water Supply Reliability to Simi Valley Customers	Qualitative	Local
Water Quality Benefits		
Reduced TDS in Potable Water Deliveries	Physical Quantification	Local
Other Benefits		
Improved Bay-Delta Ecological Values	Qualitative	Statewide

TABLE C-11.2. BENEFIT-COST ANALYSIS OVERVIEW

	Annualized	Present Value
Costs – Total Capital and O&M		$9,418,651
Monetizable Benefits		
Water Supply Benefits	$58,233/yr	$17,906,352
Total Benefits	$58,233/yr	$17,906,352
Qualitative Benefits	**Qualitative indicator***	
Avoided Water Supply Costs to Calleguas MWD and Metropolitan	+	
Improved Water Supply Reliability to Simi Valley Customers	++	
Reduced TDS in Potable Water Deliveries	+	
Improved Bay-Delta Ecological Value	+	

* Magnitude of effect on net benefits
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.

The "Without Project" Baseline

The groundwater quality in Tapo Canyon is currently considered unsuitable for M&I uses, with a TDS concentration of 1,580 mg/l. As such, imported water from Metropolitan (via Calleguas MWD) is used to meet 100% of the demand for potable water, which is currently about 24,000 AFY (Ventura County Waterworks District No. 8 (also known as City of Simi Valley), 2005). The without-project alternative scenario would be to continue delivery of 100% imported surface water to meet potable water demands. This would mean continuance of the water supply conditions (listed in more detail below), such as decreasing water supply delivery reliability, and increasing pressures on Bay-Delta water resources to meet increasing demands in Simi Valley.

The City of Simi Valley, where the TCWTP will be located, experienced steady growth in the residential, commercial, and industrial sectors during the 1990s and currently has an estimated population of over 121,000. It is projected that the population will exceed 140,000 by 2015, and will exceed 143,000 by 2030 (Ventura County Waterworks District No. 8, 2005). In the TCWTP area alone, the population is expected to grow from 80,000 in 2005 to over 108,000 by 2030, which will put considerably more pressure on water suppliers to meet demands using local and regional sources. With increasing demand on the Bay-Delta area, water suppliers are looking to address supply using local projects such as the TCWTP.

Description of Other Expected Benefits

Improved Bay-Delta Ecological Values

The TCWTP will offset the demand and dependency on imported water supplies from the SWP by Ventura County Waterworks District No. 8. This offset will increase from 860 AFY to 1,020 AFY over the next 50 years. This water can remain in the Bay-Delta and contribute towards meeting Bay-Delta water supply, water quality, and ecosystem objectives.

Sensitive species, such as the Delta smelt and salmon that are currently at risk will benefit from reduced Bay-Delta withdrawals. A reduction in withdrawals from the Bay-Delta will especially contribute to the Bay-Delta ecosystem in the spring and winter, when flows are dedicated to maintaining the salinity balance in the Bay-Delta and to aiding spring and winter salmon runs.

Distribution of Project Benefits and Identification of Beneficiaries

The TCWTP provides the full range of types of project beneficiaries. At the local level, the population of Simi Valley will benefit. Regionally, those dependent on supplies from Calleguas MWD and Metropolitan will benefit from reduced demand on Calleguas MWD and Metropolitan facilities. The TCWTP also will provide statewide benefits by reducing demands on water supplies from the Bay-Delta.

TABLE C-11.3.
PROJECT BENEFICIARIES SUMMARY

Local	Regional	Statewide
VCWWD No.8/ City of Simi Valley	Calleguas MWD and Metropolitan	Bay-Delta

Project Benefits Timeline Description

The TCWTP capital costs are assumed to be incurred in 2006, the first year of the TCWTP. With proper maintenance, it is assumed that the TCWTP will have a useful life in excess of 50 years. Therefore, the TCWTP lifetime, and the TCWTP benefits, are assumed to extend from 2006 to 2055.

Potential Adverse Effects from the Project

There is no evidence to suggest that the TCWTP will result in any adverse effects.

Summary of Findings

Even though important categories of benefits have not been monetized, they are significant. They are assessed qualitatively in Table C-11.4.

TABLE C-11.4: QUALITATIVE BENEFITS SUMMARY – OTHER BENEFITS

Benefit	Qualitative Indicator
Improved Bay-Delta Ecological Values	+

* Magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.

References

1. Ventura County Waterworks District No. 8. 2005. 2005 Urban Water Management Plan. December.

Fillmore Integrated Water Recycling and Wetlands Project, Phase IIA (SC-3)

Summary

The Fillmore Integrated Water Recycling and Wetlands Project involves constructing a wastewater treatment plant (WWTP) and recycled water system. The WWTP will produce Title 22 unrestricted recycled water for users within the City of Fillmore. Phase IIA (Fillmore Recycled Project) will distribute recycled water from this plant to public landscaping, wetlands, and agricultural users for both irrigation and subsurface drip irrigation (SDI) disposal fields. The project will also include a small wetlands to serve as a percolation area, to benefit wildlife, and to provide educational opportunities through a learning center kiosk on site. Based on information provided by Fillmore, the Fillmore Recycled Project will result in 2.9 mgd of irrigation water and disposal facilities sufficient to dispose of all of the effluent (2.8 mgd) during summer time to 2025 and 90 percent of the effluent (3.23 mgd) during the winter time to 2025.

The Fillmore Recycled Project is Phase IIA of three phases. The first phase involves treatment plant construction and will be completed in 2009. Funding sources other than Proposition 50 grants are being sought for this phase. Phase IIB is a future project that involves further expansion of the recycled water distribution system to serve new development.

The Fillmore Recycled Project will result in the water supply, water quality, and other benefits summarized in Table SC-3.1. The magnitude of benefits, monetized where possible, is reported in Table SC-3.

TABLE SC-3.1. BENEFITS SUMMARY

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Avoided potable water production	Monetization	Local
Water Quality Benefits		
Avoided discharge to Santa Clara River	Qualitative	Regional
Avoided fines for non-compliance	Qualitative	Local
Other Benefits		
Avoided fertilizer costs	Monetization	Local

TABLE SC-3.2. BENEFIT-COST ANALYSIS OVERVIEW

	Present Value
Costs – Total Capital and O&M	$12,052,562
Monetizable Benefits	
Water Supply Benefits	$492,048
Other Benefits	$39,453
Total Benefits	$531,501
	Qualitative indicator*
Qualitative Benefits	
Avoided discharge to Santa Clara River	++
Avoided fines for non-compliance	+

* Magnitude of effect on net benefits
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.

The "Without Project" Baseline

The City of Fillmore is supplied by groundwater from the Fillmore Basin, which is currently its only source of supply. The long-term trends in groundwater level and groundwater quality data show that the Fillmore Basin is not in overdraft, and is not projected to be in overdraft with current projected demands through 2025. Without the Fillmore Recycled Project, Fillmore would continue to pump and deliver potable groundwater to meet non-potable demands, which is an unnecessary use of potable water.

Fillmore is currently in violation of its waste discharge requirements under its National Pollutant Discharge Elimination System (NPDES) permit for chlorides, and the RWQCB has issued a waste discharge requirement (WDR) with interim NPDES surface water discharge limits for compliance by September 10, 2009. Without construction of the Fillmore Recycled Project, Fillmore would have to discharge its wastewater effluent to the Santa Clara River, which would violate its permit requirements. The chloride levels in the effluent would negatively impact downstream surface water users, reducing crop yields for agricultural irrigators and potentially result in a need for additional treatment by M&I diverters.

The other alternatives available for complying with the chloride requirement in its discharge permit would be substantially more expensive than the Fillmore Recycled Project. One alternative would be to construct a reverse osmosis treatment system for the wastewater and a brine concentrate disposal pipeline to the ocean. This alternative would cost tens of millions of dollars, substantially more than the $12 million for the Fillmore Recycled Project.

Without the Fillmore Recycled Project or a more expensive alternative, Fillmore would fail to comply with its discharge permit and would be subject to tens of thousands of dollars in fines every day until compliance is achieved. Compliance with the discharge permit requires construction of both the WWTP along with the Fillmore Recycled Project by September 10, 2009. If Fillmore continued to discharge to the Santa Clara River because the Fillmore Recycled Project was not constructed and alternative disposal was not available, then fines could start from September 11, 2009 and could continue for several months if not years. As a comparison of the potential magnitude of fines, if the duration of fines were 3 months, at $10,000 per day the total fines would be $900,000 while if the fines were reduced to $5,000 per day, the total fines would be $450,000. If the duration of fines were one year, at $10,000 per day the total fines would be $3.65 million while if the fines were reduced to $5,000 per day, the total fines would be $1.825 million.

Description of Other Expected Benefits

Avoided Fertilizer Costs

Delivery of recycled water will allow for reduced fertilizer use for schools, parks and greenbelts to be

served by the Fillmore Recycled Project. Recycled water can contain substantial amounts of nitrogen, phosphorus, and potassium (Kopec, 1993). Although exact offset of fertilizer use from use of recycled water is difficult to estimate due to daily and seasonal nutrient variations in the recycled water, an estimate has been made of the potential fertilizer value of recycled water produced from the Irvine Ranch Water District recycled water plant. Recycled water produced for this project will be denitrified, with a nitrogen concentration of approximately 8 mg/l. This is about one-third of the concentration cited for the Irvine Ranch recycled water. An adjustment was made for the reduced nitrogen content of the recycled water produced for this project. Using a fertilizer price index for the United States from the Food and Agriculture Organization of the United Nations, the value of offset fertilizer use per acre-foot of water applied is $17.64, when updated to 2005 dollars (based on Asano, 1981). When multiplied by the initial amount of recycled water to be delivered from this project, the total avoided fertilizer cost is $2,646 per year. The present value of avoided fertilizer costs over the life of the Fillmore Recycled Project is $39,453.

Distribution of Project Benefits and Identification of Beneficiaries

Table SC-3.3 summarizes project beneficiaries. This project will benefit the City of Fillmore through lower water provision costs and downstream users will benefit as a result of higher quality streamflows.

TABLE SC-3.3.
PROJECT BENEFICIARY SUMMARY

Local	Regional	Statewide
City of Fillmore C Street Park users	Downstream users on the Santa Clara River	Bay-Delta

Project Benefits Timeline Description

The useful life of the recycled water treatment distribution system installed under this phase of the project is expected to last at least 30 years. Benefits from the project will begin accruing as soon as the plant is on-line in 2009.

Potential Adverse Effects from the Project

There are likely to be short-term impacts during the construction phase of this project. No long-term impacts are anticipated.

Summary of Findings

Table SC-3.4 found at the end of this section summarizes the avoided cost of fertilizer application as a result of recycled water use is based on an estimate of the fertilizer value of recycled water delivered from another recycled water facility. The fertilizer value estimate has been adjusted for lower nitrogen content of the Fillmore Recycled Project, and has been adjusted for changes in fertilizer prices over time. The estimated value of avoided fertilizer costs is $2,646 starting in 2009, and grows to $4,234 in 2038. The present value of avoided fertilizer costs is $39,453.

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In this analysis, the main uncertainties are associated with the hydrological data used in this analysis; these issues are listed in Table SC-3.6.

TABLE SC-3.6.
OMISSIONS, BIASES, AND UNCERTAINTIES AND THEIR EFFECT ON THE PROJECT

Benefit or cost category	Likely impact on net benefits*	Comment
Avoided Fertilizer Costs	U	The calculation for reduced fertilizer costs is based on best estimates from previous studies and was scaled to account for denitrification of recycled water from the treatment plant. Variations in nutrient concentrations from expected values in the recycled water could change the estimated value of this benefit.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
- = Likely to decrease benefits.
-- = Likely to decrease net benefits significantly.
U = Uncertain, could be + or -.

References

1. Asano, T. (Boyle Engineering) 1981. Evaluation of agricultural irrigation projects using reclaimed water. Agreement 8-179-215-2. Office of Water Recycling. California State Water Resources Control Board. Sacramento, CA.

2. California State Parks http://www.parks.ca.gov/pages/24317/files/followthepacificflyway.pdf. Accessed May 17, 2006

3. City of Fillmore. 2005. Urban Water Management Plan.

4. Kopec, David, Charles Mancino, and Douglas Nelson. 1993. Using Effluent Water on Your Golf Course. USDA Green Section Record. July/ August.

Table SC-3.4. Other expected benefits (All benefits should be in 2005 dollars)													
(a)	(b)	(c)	(d)	(e)	(f)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Year	Benefit: Avoided fertilizer use					Benefit: Water saved by removal of arundo					*Complete these columns if claiming economic benefits based on dollar value .*		
	Measure of benefit: AF recycled water used for irrigation			Complete these 2 columns if claiming $ value for the benefit		Measure of benefit: _Acre-feet per year			Complete these 2 columns if claiming $ value for the benefit		Discounting calculations for economic benefits (If claiming $ value for the benefit)		
	Without proposal	With proposal	Change resulting from proposal (c - b)	Unit $ value	Annual $ value (d x e)	Without proposal	With proposal	Change resulting from proposal (c - b)	Unit $ value	Annual $ value (d x e)	Total benefits (Sum of annual $ value for each benefit)	Discount factor	Discounted benefits (g ÷ h)
2006			0		$0.00			0		$0.00	$0.00	1.06	$0.00
2007			0		$0.00			0		$0.00	$0.00	1.12	$0.00
2008			0		$0.00			0		$0.00	$0.00	1.19	$0.00
2009	0	150	150	$17.64	$2,646.00	0	31.7	31.7			$2,646.00	1.26	$2,095.88
2010	0	154.5	154.5	$17.64	$2,725.38	0	31.7	31.7			$2,725.38	1.34	$2,036.56
2011	0	159	159	$17.64	$2,804.76	0	31.7	31.7			$2,804.76	1.42	$1,977.25
2012	0	163.5	163.5	$17.64	$2,884.14	0	31.7	31.7			$2,884.14	1.50	$1,918.12
2013	0	168	168	$17.64	$2,963.52	0	31.7	31.7			$2,963.52	1.59	$1,859.35
2014	0	172.5	172.5	$17.64	$3,042.90	0	31.7	31.7			$3,042.90	1.69	$1,801.09
2015	0	177	177	$17.64	$3,122.28	0	31.7	31.7			$3,122.28	1.79	$1,743.46
2016	0	181.5	181.5	$17.64	$3,201.66	0	31.7	31.7			$3,201.66	1.90	$1,686.59
2017	0	186	186	$17.64	$3,281.04	0	31.7	31.7			$3,281.04	2.01	$1,630.58
2018	0	190.5	190.5	$17.64	$3,360.42	0	31.7	31.7			$3,360.42	2.13	$1,575.50
2019	0	195	195	$17.64	$3,439.80	0	31.7	31.7			$3,439.80	2.26	$1,521.43
2020	0	199.5	199.5	$17.64	$3,519.18	0	31.7	31.7			$3,519.18	2.40	$1,468.43
2021	0	204	204	$17.64	$3,598.56	0	31.7	31.7			$3,598.56	2.54	$1,416.56
2022	0	208.5	208.5	$17.64	$3,677.94	0	31.7	31.7			$3,677.94	2.69	$1,365.86
2023	0	213	213	$17.64	$3,757.32	0	31.7	31.7			$3,757.32	2.85	$1,316.35
2024	0	217.5	217.5	$17.64	$3,836.70	0	31.7	31.7			$3,836.70	3.03	$1,268.08
2025	0	222	222	$17.64	$3,916.08	0	31.7	31.7			$3,916.08	3.21	$1,221.05
2026	0	226.5	226.5	$17.64	$3,995.46	0	31.7	31.7			$3,995.46	3.40	$1,175.29
2027	0	231	231	$17.64	$4,074.84	0	31.7	31.7			$4,074.84	3.60	$1,130.79
2028	0	235.5	235.5	$17.64	$4,154.22	0	31.7	31.7			$4,154.22	3.82	$1,087.56
2029	0	240	240	$17.64	$4,233.60	0	31.7	31.7			$4,233.60	4.05	$1,045.61
2030	0	240	240	$17.64	$4,233.60	0	31.7	31.7			$4,233.60	4.29	$986.42
2031	0	240	240	$17.64	$4,233.60	0	31.7	31.7			$4,233.60	4.55	$930.59
2032	0	240	240	$17.64	$4,233.60	0	31.7	31.7			$4,233.60	4.82	$877.91
2033	0	240	240	$17.64	$4,233.60	0	31.7	31.7			$4,233.60	5.11	$828.22
2034	0	240	240	$17.64	$4,233.60	0	31.7	31.7			$4,233.60	5.42	$781.34
2035	0	240	240	$17.64	$4,233.60	0	31.7	31.7			$4,233.60	5.74	$737.11
2036	0	240	240	$17.64	$4,233.60	0	31.7	31.7			$4,233.60	6.09	$695.39
2037	0	240	240	$17.64	$4,233.60	0	31.7	31.7			$4,233.60	6.45	$656.03
2038	0	240	240	$17.64	$4,233.60	0	31.7	31.7			$4,233.60	6.84	$618.89
Proposal life			0		$0.00			951		$0.00	$0.00	…	
											Total present value of discounted benefits based on unit value [Sum of the values in Column (i)])		$39,453.29

Comment box:

Ventura River Watershed Protection Project (V-1)

Summary

The Ventura River Watershed Protection Project will develop a comprehensive plan to address water supply reliability, groundwater recharge, habitat restoration, water quality, recreation, and flood management issues throughout the Ventura River Watershed. The Ventura River Watershed Protection Project will produce a hydrologic and water quality model based on the U.S. EPA Hydrologic Simulation Program – FORTRAN (HSPF). This model will be used to evaluate water supply reliability and basin yield and develop a water budget. This project also includes implementation activities such as surface water quality monitoring, Ojai Basin groundwater monitoring, arundo removal and habitat restoration, and watershed council website development. The anticipated removal of Matilija Dam in 2009 and the resulting loss of water storage make developing and implementing a comprehensive water plan even more critical.

Benefits attributable to the planning elements of the Ventura River Watershed Protection Project are difficult to quantify and allocate because, in general, planning is intended to identify necessary projects to further develop the direct benefits. Therefore, this benefit-cost analysis identifies the many critical issues the planning will address, how the planning will facilitate improvements in these areas, and qualitatively assesses the expected benefits.

The Ventura River Watershed Protection Project will result in water supply, water quality, and other benefits that are summarized in Table V-1.1. The qualitatively assessed magnitude of benefits is reported in Table V-1.2.

TABLE V-1.1: BENEFITS SUMMARY

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Maintain a Sustainable Watershed	Qualitative	Local, Regional
Manage Demand and Supply for Planned Growth	Qualitative	Local, Regional
Increase Water Supply by Removing Arundo	Physical Quantification	Local, Regional
Fill Data Gaps for Comprehensive Planning	Qualitative	Local, Regional
Water Quality Benefits		
Protect Surface Water Quality	Qualitative	Local, Regional
Protect Groundwater Quality	Qualitative	Local, Regional
Other Benefits		
Improved Flood Control	Qualitative	Local, Regional
Improved Recreation	Qualitative	Local, Regional
Protect Threatened and Endangered Species	Qualitative	Local, Regional
Restore Habitat and Remove Arundo	Physical Quantification	Local, Regional

TABLE V-1.2: BENEFIT-COST ANALYSIS OVERVIEW

	Annualized	Present Value
Costs – Total Capital and O&M		$1,799,776
Qualitative Benefits	Qualitative Indicator*	
Maintain a Sustainable Watershed	++	
Manage Demand and Supply for Planned Growth	+	
Increase Water Supply by Removing Arundo	+	
Fill Data Gaps for Comprehensive Planning	+	
Protect Surface Water Quality	++	
Protect Groundwater Quality	++	
Improved Flood Control	+	
Improved Recreation	+	
Protect Threatened and Endangered Species	++	
Restore Habitat and Remove Arundo	+	

* Magnitude of effect on net benefits.
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.

The "Without Project" Baseline

The Ventura River Watershed encompasses approximately 223 square miles, half of which lie within the Los Padres National Forest. The Ventura River drains into the Pacific Ocean after passing through the Ventura River Estuary, a 100-acre freshwater and saltwater marsh. The Ventura River Watershed provides important riparian and wetland habitats for a wide variety of native wildlife species, including 26 special status species. This Watershed contains both Lake Casitas and Matilija Reservoir. Lake Casitas is an important water supply source. Matilija Reservoir was originally constructed for flood control, with some ancillary water supply benefits, and is scheduled for removal in 2009. Much of the Watershed is undeveloped, with two cities in the middle and lower Watersheds: Ojai and Ventura.

Currently there are three stakeholder groups organized for the Ventura River Watershed: The Ventura River Steelhead Restoration and Recovery Plan Group, the Ventura River Habitat Conservation Plan (HCP) Group, and the Matilija Dam Ecosystem Restoration Steering and Executive Committees. While there is often overlap in stakeholder involvement, each group is primarily focused on one particular issue within the Watershed. Both the Steelhead Restoration and Recovery Plan and HCP groups are concentrating their efforts on mitigating impacts to endangered species, particularly the Southern Steelhead. Furthermore, the Matilija Dam project Steering Committee's focus is primarily on the potential removal of the Matilija Dam.

Previous studies have been limited and not performed in such a way as to provide a comprehensive watershed level planning approach using hydrology, hydraulic, and water quality models for surface water and groundwater. The lack of this comprehensive effort has impeded efforts to protect and enhance water supply, water quality, and habitat resources on a watershed-wide basis. Previous efforts have been small in scope and have not been integrated with other efforts in order to provide an overall benefit to the entire watershed.

The Ventura River Watershed Protection Project is vital to addressing the water supply reliability needs, water quality impacts, and habitat degradation known to exist in the Watershed. Without this project, a comprehensive, known watershed management tool will not be developed and implemented, and ultimately the Watershed will continue to suffer from the lack of a watershed-wide regional resource management planning perspective.

The following sections summarize without project conditions for some key benefits categories, including flood control, recreation, and threatened and endangered species.

Attachment 11: Other Expected Benefits

Flood Control

The Ventura River State of the Watershed Report (RWQCB, 2002) points to the seasonal (and at times catastrophic) winter floods that can significantly alter the path of the river channel, topography of the Ventura River floodplain and its delta, and location of estuarine wetlands as another major influence on habitats. Major flooding occurs in the Watershed irregularly, with the potential for more than one flood in any given year. Floods that cause extensive damage have historically occurred once every 12 years, on the average. Flows in the Ventura River are governed by precipitation (rainfall and snowmelt), discharge from springs, seepage in and out of groundwater aquifers, and by storage and release of flows from reservoirs, particularly Matilija Reservoir and Lake Casitas.

Damaging floods in Ventura County were reported as early as 1862. Since then, on average, floods causing damage have occurred every five years. A 1945 report by the Ventura County Watershed Protection District (VCWPD) reported that floods of sufficient magnitude to cause extensive damage occurred in 1862, 1867, 1884, 1911, 1938, 1941, 1943, and 1944 (Warren, 1945). The largest and most damaging recorded natural floods in the Santa Clara River and Ventura River Watersheds occurred in 1969. During these floods, the 50- and 100-year peak discharge levels were reached in many channels. The combined effects of the 1969 flood were disastrous: 13 people lost their lives and property damages were estimated at $320 million (2005 dollars). Homes in Casitas Springs, Live Oak Acres, and Fillmore were flooded and 3,000 residents in Santa Paula and several families in Fillmore were evacuated twice.

In addition, both the Oak View and Ventura wastewater treatment plants were severely damaged by flooding and raw sewage was discharged into the Ventura River. The untreated sewage polluted the river and the beach. In addition, sewer trunk lines were broken along the Ventura River and its tributary San Antonio Creek. Suspended sediment concentrations and discharge in many streams greatly exceeded any previously measured levels in the flood-affected areas.

Without the improved understanding of the river's hydrology and flood risks the project will provide, it will be difficult to implement corrective and preventative measures to reduce the vulnerability of the Watershed to damaging floods.

Recreation

There are many outdoor recreational pursuits available within and adjacent to the Ventura River Watershed. The Watershed has parks, campgrounds, golf courses, retreat facilities, and 10 miles of equestrian trails. Most recreational access to Matilija Creek is in the upper portions of the Watershed, several miles above the Matilija Dam within the Los Padres National Forest, which is managed by the U.S. Forest Service. Trails in the Matilija Watershed lead to the Matilija Wilderness area and into the larger Los Padres National Forest. Other recreational resources include the Emma Wood State Beach, Surfer's Point, the Ventura River Group Camp, and the City of Ventura's Seaside Wilderness Park located adjacent to the estuary. Birdwatchers and others enjoy the estuary. The adjacent shoreline is also heavily used by residents and tourists, and provides a large source of income for the local community.

The Ventura River Watershed Protection Project is needed to develop a comprehensive plan that affords access to these and other recreational assets within the Watershed, while educating users as to the fragile nature of riparian, mareine and coastal ecosystems so their benefits can be enjoyed in perpetuity.

Threatened and Endangered Species

The diversity of aquatic and upland community types within the Ventura River Watershed provides habitat for a wide variety of resident and migratory wildlife species, including several special status species. Of particular importance are the habitat types within the main stem and the estuary, which are known to provide habitat for several status species including critical habitat for the federally endangered Southern Steelhead (*Oncorhynchus mykiss*), as described above, and tidewater goby (*Eucyclogobius newberryi*).

The riverine, lacustrine, and palustrine systems associated with the Ventura River, Matilija Creek, and Matilija Reservoir support a variety of habitat types, including sensitive riparian and emergent wetland habitats. Riparian and emergent wetlands occur throughout the Ventura River, and provide wildlife with shade, protection from predators, foraging habitat, and nesting and breeding habitats. Birds constitute the most abundant wildlife group within the Watershed and are represented by a wide variety of aquatic and upland species. Over 26 special status species are

known or expected to occur within the Ventura River Watershed. Table V-1.3 summarizes special status species in the Watershed.

TABLE V-1.3: SPECIAL STATUS SPECIES IN THE VENTURA RIVER WATERSHED

	Federally Listed Species	Sensitive Species
Fish	Southern Steelhead	Arroyo Chub
	Tidewater goby	
Amphibians	California Red-Legged Frog	Western Spadefoot Toad
Reptiles		Southwestern Pond Turtle
		Silvery Legless Lizard
		Coastal Western Whiptail
		Two-Striped Garter Snake
Birds	Western Snowy Plover	Cooper's Hawk
	Southwestern Willow Flycatcher	Tricolored Blackbird
	California Condor	Southern California Rufous-Crowned Sparrow
	California Brown Pelican	Great Egret
	California Least Tern	Great Blue Heron
	Least Bell's Vireo	Lawrence's Goldfinch
		Vaux's Swift
		Olive-Sided Flycatcher
		Black Swift
		Yellow Warbler
		White-Tailed Kite
		Yellow-Breasted Chat
		Osprey
		Double-Crested Cormorant
		White-Faced Ibis
Mammals		Pallid Bat
		Ringtail

The Southern Steelhead run on the Ventura River is estimated to have been 4,000 to 5,000 before 1948 when a prolonged drought and the construction of Matilija Dam occurred. The largest runs occurred in Coyote and Matilija Creeks (Casitas MWD et al., 1997). It was estimated that a minimum average run of between 2,000 and 2,500 adult Southern Steelhead annually entered the Matilija tributary, representing about half of the adult Southern Steelhead entering the Watershed. Historical records indicate that in the 1880s, the Ventura River was advertised as a trout-fishing stream for tourists (Clanton and Jarvis, 1946, as cited in Moore, 1980; Ventura County, 1973). Flows were apparently adequate to support fish throughout most of the mainstem except during droughts. Sections of the mid to upper Matilija Creek are thought to have been the primary spawning habitat (USFS, 1997). Runs of Southern Steelhead were reported to have started after the rains in the fall and lasted until early April, with schools of trout averaging 10 to 13 pounds each (Henke, 1970, as cited in Ventura County, 1973). Trout fishing helped support a tourist industry in San Buenaventura. Trout fishing contests were held as late as 1948. Local hotels reserved the ground floors for fishing guests during the trout season and it was estimated in 1946 that trout and Southern Steelhead sport fisheries of the Ventura River Watershed contributed $100,000 to the county's economy (just over $1 million in 2005 dollars; Clanton and Jarvis, 1946, as cited in Ventura County, 1973).

Construction of the Matilija Dam in 1948 cut off access to spawning areas on the Matilija tributary. The Robles Diversion Dam, constructed on the Ventura River, and Casitas Dam on Coyote Creek, further reduced the spawning areas. In addition, many holes and other habitat areas have been filled in and riparian habitat

has been removed (Ventura County, 1973; Keep the Sespe Wild, 1994). By 1980, only about one or two hundred Southern Steelhead entered the river to spawn (Moore, 1980). In addition to physical barriers, water development operations and water diversions, including groundwater extraction, significantly affect survival and growth rates.

In 1973, a County Fish and Game Commission report made several management recommendations, including the development of a flood control plan and a comprehensive land use plan for the river area. This land use plan has not yet been implemented.

Without the Ventura River Watershed Protection Project, efforts to enhance habitat for special status species will lack coordination. Without these planning efforts, policy gaps are likely to go unnoticed, and it will be more difficult to identify the most valuable opportunities for riparian restoration, and removal of in-stream barriers to migration.

Invasive Species

Arundo Donax, a significant problem in the Watershed, is an invasive exotic plant that has rapidly spread through and degraded riparian ecosystems throughout Southern California. Arundo readily invades riparian channels, especially in disturbed areas, is very competitive, and is difficult to control. This plant out-competes and displaces the native vegetation and seriously degrades the habitat quality of the area. It grows in wet areas and uses prodigious amounts of water to fuel its incredible rate of growth. Under optimal conditions, arundo can grow more than three inches per day. All evidence indicates that arundo provides no food for wildlife, and, at best, very poor habitat for some nesting birds or shelter/shade for native amphibians. The impacts of the continued presence of arrundo are described previously for the Calleguas Arundo Removal Project (C-10).

Without the Ventura River Watershed Protection Project, invasive species will continue to impact native habitat for wildlife and the need for invasive species removal will persist.

Description of Other Expected Benefits

This section describes how the Ventura River Watershed Protection Project is expected to benefit the categories described in the baseline section.

Improved Flood Control

A through understanding of the flood risks, the river's hydrology, and potential actions that can be implemented to reduce flood damage are needed in the Ventura River Watershed. The Ventura River Watershed Protection Project will model the many parameters that play a role in how, when, and where flooding occurs. Without this basic level of understanding, implementing both corrective and preventative measures is premature and of questionable merit.

Improved Recreation

The Ventura River Watershed Protection Project will provide the information necessary to identify additional opportunities for enhancement of existing recreational facilities, particularly linking existing trails, and provide resources to the public on how to limit their impacts on sensitive ecological areas while recreating. This project will also enhance recreational areas, including supporting efforts to repair the eroded beachfront at Surfer's Point.

Protect Threatened and Endangered Species

The Ventura River Watershed Protection Project will include a Habitat Protection Plan to implement a comprehensive arundo and noxious weed control program, identify in-stream barriers to wildlife and migration throughout the Watershed, propose solutions to policy gaps, and evaluate the feasibility of establishing upland buffers to protect riparian zones.

This project will benefit Southern Steelhead by developing a watershed-wide management plan, as recommended by the County Fish and Game Commission. This watershed protection plan will ensure that there are sufficient habitat and passage throughout the Watershed to improve the Southern Steelhead population.

Restore Habitat and Remove Arundo

Arundo removal enhances water supply reliability, groundwater recharge, estuarine and marine habitat improvement, and special-status species habitat improvement, as well as spawning and migration of aquatic organisms. The Ventura River Watershed Protection Project will complement other efforts in the

Watershed to remove this invasive weed, specifically arundo removal along the mainstem of the Ventura River being undertaken through the Matilija Dam Ecosystem Restoration Project.

The Ventura River Watershed Protection Project will implement a 40-acre pilot arundo removal project along a major tributary to the Ventura River, such as San Antonio Creek. The project will implement various strategies for removing arundo and will evaluate these different methods for ease-of-use, cost-effectiveness, and habitat impacts. The project will also include the establishment of native vegetation to restore the impacted area and remove the potential for re-establishment by non-natives.

Distribution of Project Benefits and Identification of Beneficiaries

Table V-1.3 summarizes key project beneficiaries. The Ventura River Watershed Protection Project will benefit local M&I and agricultural water users in the Ventura River Watershed, and local, regional, and state water management organizations.

Two identified disadvantaged communities lie within the Ventura River Watershed in adjacent census tracts. Both communities are located in the City of Ventura near the coast. The project will benefit these two communities.

TABLE V-1.3: PROJECT BENEFICIARY SUMMARY

Local	Regional	State
Meiners Oaks County Water District Ojai Basin Groundwater Management Agency Golden State Water Company Ventura River County Water District Cities/Communities of San Buenaventura, Casitas Springs, Meiners Oaks, Mira Monte, Oak View, Ojai Unincorporated Areas	Casitas Municipal Water District Ventura County Watershed Protection District	Bay-Delta

Project Benefits Timeline Description

Project benefits will begin accruing as coordination among agencies improves, data gaps are addressed and filled, and planning for the Watershed is improved. It is assumed that the plan will benefit the basin for at least 50 years.

Potential Adverse Effects from the Project

No adverse effects are anticipated from the Ventura River Watershed Protection Project.

Summary of Findings

Table V-1.6 lists the benefits that have been assessed qualitatively: Comprehensive management of this Watershed will improve the effectiveness of various management procedures currently being pursued in the Watershed.

Table V-1.6: Qualitative Benefits Summary – Other Benefits

Benefit	Qualitative Indicator
Improved Flood Control	+
Improved Recreation	+
Protect Threatened and Endangered Species	++
Restore Habitat and Remove Arundo	+

References

1. RWQCB, 2002
2. Casitas MWD et al., 1997
3. Clanton and Jarvis, 1946, as cited in Moore, 1980; Ventura County, 1973.
4. USFS, 1997
5. Henke, 1970, as cited in Ventura County, 1973.

6. Ventura County, 1973; Keep the Sespe Wild, 1994

7. Moore, 1980

San Antonio Spreading Grounds Rehabilitation (V-2)

Summary

The San Antonio Spreading Grounds Rehabilitation will redevelop abandoned diversion infrastructure and spreading basins in order to increase groundwater recharge in the Ojai Valley Groundwater Basin and improve fish passages above the existing damaged diversion infrastructure. Estimates based on historical use of these spreading grounds suggests up to 500 AFY could be recharged to the aquifer. Recharge water will originate from wet season flows on San Antonio Creek and captured stormwater, so the spreading grounds will recharge water that would otherwise flow to waste and is not needed for fish and wetland or riparian areas. The San Antonio Spreading Grounds Rehabilitation will significantly improve water supply reliability in the Ojai Valley by enabling greater recharge of stormwater that is currently lost to the basin. Increased water supply will also improve groundwater quality, which has been impaired during droughts.

The project will enhance upstream fish habitat. Moreover, the additional Basin recharge may also result in augmentation of dry-period releases from the Basin into downstream portions of San Antonio Creek (typically a gaining stream) because of (a) the retention of water within the Basin following wet periods, and (b) higher Basin water tables, which may result in increased artesian conditions. These dry-period releases of Basin groundwater may add water to the lower reaches of San Antonio Creek and the Ventura River, which are prime Southern Steelhead habitat, during the drier periods of the year when adequate stream flows are most limited

The San Antonio Spreading Grounds Rehabilitation will result in water supply and quality benefits summarized in Table V-2.1. The magnitude of benefits, monetized where possible, is reported in Table V-2.2.

TABLE V-2.1: BENEFITS SUMMARY

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Avoided Water Supply Costs	Monetization	Local
Improved Water Supply Reliability	Qualitative	Local, Regional
Additional Hydrologic Data for Improved Basin Management	Qualitative	Local, Regional
Water Quality Benefits		
Reduced TDS Concentration in Groundwater	Qualitative	Local, Regional
Reduced Nitrate Concentration in Groundwater	Qualitative	Local, Regional
Other Benefits		
Improved Habitat for Threatened and Endangered Species	Qualitative	Local, Regional
Improved Fisheries Management	Qualitative	Local, Regional
Improved Downstream Riparian Habitat	Qualitative	Local, Regional
Improved Flood Protection	Qualitative	Local, Regional
Agricultural Benefits	Qualitative	Local, Regional
Reduced Conflict between Agricultural and M&I Users	Qualitative	Local, Regional

TABLE V-2.2: BENEFIT-COST ANALYSIS OVERVIEW

	Annualized	Present Value
Costs – Total Capital and O&M		$3,243,681
Quantifiable Benefits		
Water Supply Benefits	$243, 915 - $280,000/yr	$4,077,000
Qualitative Benefits	Qualitative Indicator*	
Improved Water Supply Reliability	++	
Additional Hydrologic Data for Improved Basin Management	+	
Reduced TDS Concentration in Groundwater	+	
Reduced Nitrate Concentration in Groundwater	+	
Improved Habitat for Threatened and Endangered Species	+	
Improved Fisheries Management	+	
Improved Downstream Riparian Habitat	+	
Improved Flood Protection	+	
Agricultural Benefits	+	
Reduced Conflict between Agricultural and M&I Users	++	

* Magnitude of effect on net benefits.
\+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.

The "Without Project" Baseline

Without this project, no additional recharge would occur and the Ojai Valley would continue to rely on the existing mix of groundwater and surface water from Lake Casitas served by the Casitas Municipal Water District (Casitas MWD). Both of these water sources are vulnerable due to supply restrictions. The valley's annual demand currently is 8,000 to 10,000 AFY. The basin's safe yield is estimated at 5,000 AFY. It is relatively shallow, and therefore vulnerable to dewatering and diminished quality during droughts. During water shortages, water is withdrawn from a deeper, lower-quality aquifer. During the 1987-1991 drought, TDS levels in the water pumped from the basin exceeded 500 mg/L. Supplies in Lake Casitas are vulnerable due to increasing water demands from other users, higher

in-stream flow requirements for Southern Steelhead, and expected decommissioning of the Matilija Dam, beginning in 2009. The Matilija Reservoir currently provides 1,600 to 2,000 AFY to local users, so decommissioning will further stress supplies.

Additionally, Casitas MWD is projected to raise its water rates in real terms into the future, thereby increasing the costs of Casitas MWD surface water and likely increasing withdrawals of basin groundwater by agricultural users. This would further exacerbate restricted supplies in the basin because less Casitas MWD surface water would be recharged from application on overlying agricultural lands.

Description of Other Expected Benefits

This section describes expected benefits for special status species, riparian habitat, flood protection, and agriculture attributable to the San Antonio Spreading Grounds Rehabilitation.

Improved Habitat for Threatened and Endangered Species

San Antonio Creek provides habitat for 26 threatened and endangered species including Tidewater goby, California red-legged frog, and Least Bell's vireo. This project will include riparian habitat restoration, including revegetation of disturbed areas. This is expected to improve the amount of suitable habitat in the project area.

Improved Fisheries Management

Benefits to aquatic species, including Southern Steelhead, are expected from removing or improving existing in-stream barriers. The project will improve fish passage past the current damaged diversion structure and low-flow, concrete road crossings, which are impediments to passage. The diversion intake structure will also be equipped with a National Marine Fisheries Service approved fish screen to prevent fingerlings from entering the diversion canal.

Improved Downstream Riparian Habitat

Groundwater recharge into this shallow, unconfined aquifer will increase groundwater levels which will provide additional flows into San Antonio Creek and Ventura River, with the potential to maintain and improve late season flows, and thereby improve riparian habitat.

Improved Flood Protection

The San Antonio Spreading Grounds Rehabilitation will marginally reduce flood control risks by improving stormwater catchment in the spreading grounds. The project area has been impacted by floods in the recent past, including in 2005.

Agricultural Benefits

Agricultural groundwater users in the Ojai Valley will benefit from increased groundwater levels, and the resulting greater pumping efficiency (greater pump yield using the same amount of energy due to greater pump head). No information was available on the number of wells serving agricultural users in the basin. However, it is known that there are 70 additional wells in the basin that serve agricultural and domestic water users other than those served by the retail water purveyors (Ojai Basin Groundwater Management Plan, 1994 (estimated)).

Reduced Conflict between Agricultural and M&I Users

With greater amounts of groundwater available to be pumped sustainably in the basin, conflicts between agricultural and municipal and industrial (M&I) water users over available supplies are expected to be reduced.

Distribution of Project Benefits and Identification of Beneficiaries

The San Antonio Spreading Grounds Rehabilitation will benefit local M&I and agricultural groundwater users in Ojai Basin and other users of Lake Casitas water in the region. Table V-2.3 summarizes key project beneficiaries.

TABLE V-2.3: PROJECT BENEFICIARIES SUMMARY

Local	Regional	State
Ojai Basin Groundwater Management Agency	Casitas Municipal Water District	Bay-Delta
Golden State Water Company	Ventura County Watershed Protection District	
Agricultural Users	Southern Steelhead	

Project Benefits Timeline Description

The useful life of the San Antonio Spreading Grounds Rehabilitation is expected to be 50 years. Benefits described above will begin after construction is complete, and accrue over the life of the project.

Potential Adverse Effects from the Project

There may be short-term adverse effects associated with the construction phase of the San Antonio Spreading Grounds Rehabilitation. However, a CEQA document is being prepared and will address any potential adverse impacts.

Summary of Findings

The San Antonio Spreading Grounds Rehabilitation is expected to generate substantial benefits beyond water quality and water supply. These benefits include improved habitat for special status species, and improved Southern Steelhead passage due to removing or improving existing in-stream barriers. The project also will improve downstream habitat by increasing artesian flow into San Antonio Creek. The project will marginally improve flood control in the project area, achieved by improving stormwater catchment using the spreading grounds. The San Antonio Spreading Grounds Rehabilitation is expected to provide benefits to agricultural users in the area by increasing groundwater pumping yields, and reducing existing conflicts between agricultural and M&I users over water availability. These benefits, and a qualitative assessment of their expected magnitude, are summarized in Table V-2.

TABLE V-2.4: QUALITATIVE BENEFITS SUMMARY – OTHER BENEFITS

Benefit	Qualitative Indicator
Improved Habitat for Threatened and Endangered Species	+
Improved Fisheries Management	+
Improved Downstream Riparian Habitat	+
Improved Flood Protection	+
Agricultural Benefits	+
Reduced Conflict between Agricultural and M&I Users	++

References

1. Ojai Basin Groundwater Management Agency. 1994. Ojai Basin Groundwater Management Plan.

Senior Canyon Mutual Water Company Automation Upgrades Project (V-6)

Summary

The Senior Canyon Mutual Water Company Automation Upgrades Project (Senior Canyon Upgrades) will automate Senior Canyon Mutual Water Company's (SCMWC's) water supply, treatment and distribution system. The Senior Canyon Upgrades entail the installation of automated instrumentation and controls that will measure fluctuations in water levels and eliminate the current problem of storage tank overflow. The current system is generally inefficient and frequently experiences both overflow and turbidity problems. The new system is expected to conserve 42 AFY of water that is currently lost to seepage, lack of storage capacity, and other issues related to the nature of the manual system.

The increase in demands as a result of increasing water loss and inefficiency has caused SCMWC to increase its demand for water from the Casitas MWD. This places a greater demand on Casitas MWD water supplies from the Ventura River at the same time that Casitas MWD has had to decrease its surface water intake from the Ventura River for the purpose of assisting the endangered Southern Steelhead. As a result, demand for Casitas MWD water is expected to continue to exceed available supply in the coming years. The current deficit is 415 AFY.

The Senior Canyon Upgrades are part of Casitas MWD's water conservation plan designed to ensure that it can meet its safe yield requirements during a long-term drought, as well as to better manage releases required to benefit the endangered Southern Steelhead. As the local water wholesaler, Casitas MWD is considered to be the primary backup supply for the Watershed during a drought. Although Casitas MWD has an entitlement to Bay-Delta supplies, there is not currently a connection to the SWP.

By improving SCMWC's water treatment and conveyance efficiency, the Senior Canyon Upgrades will increase the reliability of local and regional water supplies, and assure local water quality. By alleviating some of the stress on Casitas MWD's supply, the project helps assist Casitas MWD in meeting its safe yield requirements and protecting Southern Steelhead. The overall benefits of the Senior Canyon Upgrades are summarized in Table V-6.1. Those benefits best described qualitatively are summarized in Table V-6.2 along with an overview of the monetized benefits and costs of the Senior Canyon Upgrade.

TABLE V-6.1. BENEFITS SUMMARY

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Avoided water supply costs	Monetization	Local
Improved local water supply reliability	Qualitative	Local, Regional
Improved regional water supply reliability	Qualitative	Regional
Water Quality Benefits		
Avoided water quality standard violations	Qualitative	Local
Other Benefits		
Preservation of stream flows for Southern Steelhead	Qualitative	Local, Regional

TABLE V-6.2. BENEFIT-COST ANALYSIS OVERVIEW

	Annualized	Present Value
Costs – Total Capital and O&M		$767,646
Monetizable Benefits		
Avoided water supply costs		$ 302,787
	Qualitative indicator*	
Qualitative Benefits		
Improved local water supply reliability	++	
Improved regional water supply reliability	+	
Avoided water quality standard violations	+	
Preservation of stream flows for Southern Steelhead	++	

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.

The "Without Project" Baseline

SCMWC serves approximately 700 people in Senior Canyon. A portion of the water supply is provided by local sources: a lateral well and two spring/creek diversions. Although this amount varies from year to year, it generally ranges from between 225 AFY to 350 AFY (roughly 1/3 of total water use). The remainder of SCMWC's water supply (between 500 AFY and 550 AFY) is purchased from Casitas MWD. As a result of the continued failures within SCMWC's current manual system, the trend in the past few years has been an increase in the demand for water from Casitas MWD by several hundred acre-feet per year. This trend has continued despite recent increases in water rates charged by Casitas MWD to SCMWC.

Without the automated upgrades and improvement to SCMWC's existing water treatment and distribution system, inefficiencies will persist and probably worsen, requiring Senior Canyon to demand even more water from Casitas MWD. Casitas MWD will continue to face water demands that exceed the available supply.

Casitas MWD is implementing several programs to address the current deficit of 415 AFY of water available for supply. With very few opportunities to eliminate water use in the region, Casitas MWD is pursuing an array of conservation efforts, including some with savings of less than 20 AFY. In the short term, the continued use of SCMWC's manual water distribution system will impede Casitas MWD's conservation efforts by 42 AFY. As inefficiencies in the system progress, the demand for water from Casitas MWD and the burden on its existing water supply deficit are expected to increase.

If Casitas MWD is unable to meet its safe yield requirements, Casitas MWD may not be able to maintain the level in Lake Casitas needed to maintain releases for Southern Steelhead. Water releases for Southern Steelhead can be reduced when lake levels fall, thereby posing a threat to Southern Steelhead migration and rearing habitat[1].

Description of Other Expected Benefits

Preservation of Stream Flows for Southern Steelhead

As a result of the Biological Opinion (BO) that Casitas MWD received from NOAA Fisheries in 2003, Casitas MWD is required to bypass water from its diversion on the Ventura River in order to maintain the requisite flow regimes and river depths necessary for the preservation of the endangered Southern Steelhead population. A water supply and demand analysis conducted at the time of the BO indicated that as a result of these releases at the diversion, total water supplies would fall below demand.

By enabling SCMWC to fully utilize their local water supplies, the Senior Canyon Upgrades will offset

[1] NOAA's Biological Opinion, Authorization for the construction and future operation of the Robles Diversion Fish Passage Facility, March 31, 2003.

demand for Casitas MWD water by 42 AFY. The elimination of 10 percent of the 415 AFY water supply demand deficit will help Casitas MWD achieve its goal of meeting its safe yield requirements and thereby reduce the risk of not meeting instream flow requirements for maintenance of Southern Steelhead populations.

Distribution of Project Benefits and Identification of Beneficiaries

The Senior Canyon Upgrades will provide benefits both within Senior Canyon and throughout the Ventura River Watershed. The short-term increases in local water supply reliability will benefit the approximately 700 water users in Senior Canyon. The long-term increases in local water supply reliability, and subsequent decrease in dependency on Casitas MWD water will benefit residents throughout the Watershed whose water utilities rely on Casitas MWD water for backup supply during droughts. A summary of project beneficiaries is presented in Table V-6.3.

TABLE V-6.3.
PROJECT BENEFICIARIES SUMMARY

Local	Regional	Statewide
SCMWC	Casitas MWD Southern Steelhead	Bay-Delta

Project Benefits Timeline Description

The expected completion date for the upgrades to the SCMWC system is 2007. The improvements to the efficiency of the system, which will permit full utilization of local groundwater, will be realized at this time and the benefits will continue through the 30-year life of the project (until 2036).

Potential Adverse Effects from the Project

The negative impacts will be temporary during installation of the new instrumentation and controls associated with the automation system. During installation, the current water treatment and distribution will have to be temporarily shut down. During the shut-down, Senior Canyon will have to purchase all of its water from Casitas MWD.

Summary of Findings

The contribution of SCMWC's upgraded system helps reach Casitas MWD's overall goal of eliminating its water supply demand deficit and supports Casitas MWD's efforts to promote the preservation of the Southern Steelhead population in the Ventura River. A qualitative assessment of this benefit is presented in Table V-6.

TABLE V-6.4. QUALITATIVE BENEFITS SUMMARY – OTHER BENEFITS

Benefit	Qualitative Indicator
Preservation of stream flows for Southern Steelhead	++

\+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly

References

1. NOAA's Biological Opinion, Authorization for the construction and future operation of the Robles Diversion Fish Passage Facility, March 31, 2003.