

**WATER CONSERVATION
SUSTAINABLE AGRICULTURAL MANAGEMENT (SAM)
PROJECT**

Rancho California Water District

Project Information Form

Applying for:

Urban Agricultural

1. (Section A) **Urban or Agricultural Water Use Efficiency Implementation Project**

- (a) implementation of Urban Best Management Practice, # _____
- (b) implementation of Agricultural Efficient Water Management Practice, # _____
- (c) implementation of other projects to meet California Bay-Delta Program objectives, Targeted Benefit # or Quantifiable Objective #, if applicable

- (d) Specify other: _____

2. (Section B) **Urban or Agricultural Research and Development; Feasibility Studies, Pilot, or Demonstration Projects; Training, Education or Public Information; Technical Assistance**

- (e) research and development, feasibility studies, pilot, or demonstration projects
- (f) training, education or public information programs with statewide application
- (g) technical assistance
- (h) other

3. Principal applicant (Organization or affiliation):

Rancho California Water District

4. Project Title:

Water Conservation Sustainable Agricultural Management (SAM) Project

5. Person authorized to sign and submit proposal and contract:

Name, title	Brian Brady, General Manager
Mailing address	42135 Winchester Road
	Temecula, CA 92590
Telephone	(951) 296-6900
Fax.	(951) 296-6860
E-mail	

6. Contact person (if different):	Name, title.	Perry Louck, Director of Planning
	Mailing address.	42135 Winchester Road
		Temecula, CA 92590
	Telephone	(951) 296-6900
	Fax.	(951) 296-6860
	E-mail	LouckP@ranchowater.com

7. Grant funds requested (dollar amount): \$886,378
(from Table C-1, column VI)

8. Applicant funds pledged (dollar amount): \$113,500

9. Total project costs (dollar amount): \$921,039
(from Table C-1, column IV, row n)

10. Percent of State share requested (%): 88%
(from Table C-1)

11. Percent of local share as match (%): 12%
(from Table C-1)

12. Is your project locally cost effective?
Locally cost effective means that the benefits to an entity (in dollar terms) of implementing a program exceed the costs of that program within the boundaries of that entity.
(If yes, provide information that the project in addition to Bay-Delta benefit meets one of the following conditions: broad transferable benefits, overcome implementation barriers, or accelerate implementation.)

(a) yes, see discussion pages 9 & 27
 (b) no

11. Is your project required by regulation, law or contract?
 If no, your project is eligible. (a) yes
 (b) no

If yes, your project may be eligible only if there will be accelerated implementation to fulfill a future requirement and is not currently required.

Provide a description of the regulation, law or contract and an explanation of why the project is not currently required.

12. Duration of project (month/year to month/year): August , 2005 - July 2007

13. State Assembly District where the project is to be conducted: District 64

14. State Senate District where the project is to be conducted: District 36

15. Congressional district(s) where the project is to be conducted: Districts 43 and 44

16. County where the project is to be conducted: Riverside County

17. Location of project (longitude and latitude) Longitude 33 degrees, 29 min N and latitude 117 degrees, 13 min west

18. How many service connections in your service area (urban)? 36,138 urban, 1676 ag

19. How many acre-feet of water per year does your agency serve? 74,000

20. Type of applicant (select one):
- (a) City
 - (b) County
 - (c) City and County
 - (d) Joint Powers Authority
 - (e) Public Water District
 - (f) Tribe
 - (g) Non Profit Organization
 - (h) University, College
 - (i) State Agency
 - (j) Federal Agency
 - (k) Other
 - (i) Investor-Owned Utility
 - (ii) Incorporated Mutual Water Co.
 - (iii) Specify _____

21. Is applicant a disadvantaged community? If 'yes' include annual median household income.
 (a) yes, _____ median household income
 (b) no
 (Provide supporting documentation.)

B-15c. Statement of Work, Section 1: Relevance and Importance

Goals and Objectives

The purpose of the Water Conservation Sustainable Agricultural Management (SAM) Project is to explore new technologies and integrated water management practices to improve water use efficiency in avocado groves located in the Rancho California Water District (RCWD). An integrated avocado grove irrigation technology demonstration site, coupled with the development of a comprehensive sustainable management practices assessment workbook for avocados, will allow avocado growers and project cooperators to estimate past, present and future water savings. This information will allow the project to implement a local incentive-based pilot project that provides financial rewards in the form of rate reductions to avocado growers and farm managers that achieve measurable reductions in water use compared to baseline water use data.

The project will be comprised of several integrated components including the following:

1. Development of a Sustainable Management Practices Workbook for Avocados that includes a self-assessment for best management practices that allows growers to identify areas for improvement in water use efficiency, water quality and related desired outcomes.
2. Development of an Agricultural Technology Demonstration Center that provides growers the opportunity to experience new technologies first-hand on a working orchard to encourage the adoption of proven water management technologies.
3. Water Conservation Incentive (Discount Water Rate) Program that provides incentives for incremental discounts of up to 10 percent on current and future commodity rates.
4. Irrigation Water Management Toll-Free Hotline for growers enrolled in the Water Conservation Incentive Program to access historical weather and ET reference data for crop irrigation adjustments.
5. Water Conservation Infrastructure Development to assist growers in the adoption of new technologies that will be featured at the Agricultural Technology Demonstration Center, particularly remote sensing technologies such as weather stations, soil moisture monitoring equipment, remotely controlled irrigation valves, and others.

The SAM program allows growers to continue to thrive in an environment characterized by increasing costs for water, energy, labor and agronomic materials, increasingly competitive markets, regulatory constraints and encroaching urban development.

A key desired outcome for the SAM project is the widespread development and execution of sustainable strategies, including water management strategies in the local grower community which includes some 1,676 agricultural connections serving 8,000 to 10,000 acres of avocados and citrus and 1,800 acres of winegrapes. The mission for the development and implementation of this project is to provide local growers with tools with which to voluntarily:

- Assess the sustainability of current practices
- Identify areas of excellence and areas where improvements can be made, and
- Develop action plans to increase an operation's sustainability and efficiency

The project will be guided by sustainability values including the following:

- Produce the best quality avocados, citrus, grapes and wine possible
- Provide leadership in protecting the environment and conserving natural resources
- Maintain the long-term viability of agricultural lands
- Support the economic and social well-being of the grower community
- Respect and communicate with neighbors and community members; respond to their concerns in a considerate manner
- Support research and education as well as monitor and evaluate existing practices to expedite continual improvements

Project Contribution in Support of Bay-Delta Program Goals

Rancho California Water District (RCWD) is dependent to a significant degree on the importation of California Water Project (CWP) water to fully satisfy local demand. Currently, RCWD's water demands are satisfied with a combination of local groundwater (approx. 30%), imported supplies (approx. 65%) including a significant portion of that amount from the CWP through Metropolitan Water District (MWD). In addition, RCWD will rely on imported water to supplement its supply to satisfy future increases in potable water demand. To the extent that improvements in agriculture water use efficiency temper that demand, this project will contribute to and be consistent with Bay-Delta program goals. In general, the components of this project contribute to those goals in the following ways:

The Sustainable Management Practices Workbook provides a system to link quantifiable measures of irrigation and related practices (soil management, pest management, employee training, etc.) to grower assessments of their current state of management practices. The workbook allows growers to assess the level of sustainability for management practices in an integrated system that covers all major farm management areas. Once growers have assessed their management practices, they can identify areas that need the most attention to improve water use efficiency, water quality and related desired outcomes, and choose appropriate technologies to adopt best practices. The Sustainable Management Practices Workbook component will foster new investments in reclaimed water and desalination technologies and infrastructure because it lengthens the payback period for such investments as it ensures future agricultural water uses. The Workbook will also offer broad applicability to other avocado growers and other agricultural crops in the state. See Table 1 below for workbook chapters and their relevance to CALFED goals and water use efficiency objectives.

Table 1. Proposed list of 10 integrated chapters for the sustainable management practices assessment workbook for avocados and their relevance to CALFED Goals and water use efficiency (WUE) objectives

Proposed Avocado Workbook Chapters	Relevance to CALFED Goals & WUE Objectives
Horticultural Practices	Will focus on overall tree health which reduces water, fertilizer & pesticide needs. Increases water use efficiency & improves water quality.
Soil Management	Will focus on soil management practices that address planning, monitoring, erosion control & technologies that reduce water use, fertilizer use, & erosion thus increasing WUE & water quality.
Water Management	Will focus on water management practices that address planning, monitoring, erosion control, nutrient leaching, & irrigation technology & efficiency (See Table 4, Appendix C for the list of criteria from the SWP vineyard water management chapter).
Pest Management	Will focus on pest management practices that reduce the use of agricultural chemicals that negatively impact water quality through off-site movement.
Fruit Quality	Will focus on improving fruit quality & yield – the economic drivers that determine how willing & able growers are to embrace & implement other sustainable management practices. Food safety and water runoff quality are both addressed in this chapter.
Ecosystem Management	Will focus on defining & placing in context ecosystem functions & process; bioregions & watersheds; management, & enhancement & restoration of habitats & communities. This chapter integrates ecosystem thinking & doing in the context of farming. Critical to understanding & managing long-term water use efficiency & water quality.
Energy Efficiency	Will focus on planning, implementation, monitoring, goals and results of energy efficient management practices. Important to overall operational efficiency and a component of irrigation efficiency.
Material Handling	Will focus on planning, implementation, monitoring, goals and results of material handling. Important for hazardous materials pollution prevention including protecting surface and groundwater quality
Human Resources	Will focus on employee recruiting, training, skills development, performance reviews and incentive programs in the context of sustainable management practices including improving water use efficiency and water quality
Neighbours and Community	Will focus on planning, implementation, monitoring, goals and results of neighbour outreach and community involvement. Includes criteria on community water quality and supplies, erosion control, smart growth, etc.

The Technology Demonstration and Infrastructure Development components of this proposal encourage the voluntary adoption by growers of technologies and management practices that improve the accuracy and efficiency of soil moisture monitoring and irrigation scheduling. Remote sensing systems, in particular, have demonstrated locally their potential to help growers of winegrapes to reduce water use and to greatly improve irrigation efficiency (IE). We seek especially to transfer this technology from the wine country to the high-water-use avocado-growing region where the greatest unrealized potential for water savings exists. This is consistent with the CALFED objective of maintaining local flexibility in the implementation of water use management practices and efficiency improvements while building on existing water use efficiency efforts like the PRISM Irrigation Scheduling Program described above.

The Conservation Incentive component supports the Bay-Delta objective of emphasizing incentive-based voluntary actions over regulatory intervention. Growers enrolled in the program can qualify incrementally for water rate discounts as they progress through steps including an evaluation of irrigation system performance, implementation of system improvements, adoption of CIMIS-based irrigation scheduling practices, assessment of overall sustainable management practices via the workbook, and verification that target standards for application uniformity and irrigation efficiency have been achieved. To assure that performance standards are maintained, and to continue to qualify for a discounted rate, growers will be required to have their irrigation systems evaluated and re-certified every two years. This program offers an added bonus in that it contributes to protection of the impaired Santa Margarita Watershed by preventing contamination via deep percolation and runoff of irrigation water carrying agricultural chemicals including nitrates.

The Irrigation Water Management Toll-Free Hotline component complements the Conservation Incentive Program by providing crop-specific CIMIS-based irrigation advisories on a daily basis to all growers and urban landscape operators in the region whether enrolled in the program or not. This assures that at least some rational basis for irrigation scheduling is available to all.

Project Consistency with Local and Regional Water Management Plans

This project is consistent with BMPs identified by the State Agricultural Water Management Task Force which call for the implementation of practices which improve irrigation efficiency with an eye toward the need for water conservation as well as the protection of ground and surface water from contamination by nitrates and other agricultural chemicals being carried by runoff or deep percolation of inefficiently applied irrigation water. The project lies in the Santa Margarita Watershed, which embraces the last free-flowing river in southern California. The river is listed as impaired due to contamination by agricultural chemicals including leachable nitrates. Accordingly, the San Diego Regional Board, the Santa Margarita River Water Master, Rancho California Water District and the Santa Margarita River Watershed Council consider the upper watershed, which includes the project area, a potential source of contamination and a target for implementation of efficient agricultural water management practices.

The SAM project implements, builds upon and adapts previously successful programs that have been or are currently active in the local area and statewide including:

- The award winning¹ Code of Sustainable Winegrowing Practices Self-Assessment Workbook for the California Wine Community – the project seeks to adapt this workbook for local avocado growers with broad transferability beyond the local growing regions [Appendix A].²
- The San Jacinto Basin Resource Conservation District Irrigation Water Management Mobile Lab Evaluation and Irrigation Scheduling Program – the lab since 1994 has provided local growers of trees and vines with irrigation system evaluations at no cost using protocols developed by the Irrigation Training and Research Center at California State Polytechnic University at San Luis Obispo. This project would feature this evaluation service through which local growers could qualify incrementally for discounts of up to 10 percent on current and future commodity rates.
- The PRISM Irrigation Water Management Program – conducted in cooperation with the Temecula Winegrowers Association, PRISM has been responsible for dramatic reductions of water use by local growers of winegrapes through a combination of strategies including irrigation system evaluations; the implementation of regulated deficit irrigation (RDI) strategies; leaf water potential analysis, and soil moisture monitoring using a network of remote sensors. The remote sensing network was the subject of a successful feasibility study funded by DWR in 2003/2004 in which it was demonstrated that remote sensing of soil moisture could produce both water and labor savings when compared with more conventional means of irrigation scheduling. The PRISM Program received the Commissioners Award from the US Bureau of Reclamation for its water conservation efforts in 2003 [Appendix B]. The SAM project includes a demonstration component, which will highlight and adapt technologies used in the PRISM program as well as additional innovations with potential for improving irrigation water management among growers of trees and vines, particularly avocado growers.
- Irrigation Water Management Toll-Free Hotline – After a temporary loss of sponsorship, the IWM Hotline will be reactivated under the SAM program via sponsorship by the applicant. The Hotline is an important component for local conservation efforts in that it provides local growers with a rational (CIMIS-based) basis for scheduling using validated crop coefficients developed by local researchers. The Hotline also provides a reference ET variance percentage used by those with seasonal irrigation schedules (based on historical averages) to update their schedules for actual conditions. The Hotline also provides weekly irrigation quantities for avocados, citrus and winegrapes on traditional spacings based on ETs obtained from three area CIMIS stations.

¹ The Sustainable Winegrowing Practices Program received a 2004 Governor’s Environmental and Economic Leadership Awards (GEELA).

² “...The Code of Sustainable Winegrowing Practices has tremendous potential to assist other agricultural sectors.” Quote from A.G. Kawamura, Secretary, CDFR in the 2004 California Wine Community Sustainability Report Executive Summary.

Water Demand and Savings

The potential for thus far unrealized water savings is especially great in the avocado growing region west of Temecula. The area embraces 6,878 planted acres of avocados (6,614 bearing acres) according to the most recently available County Agricultural Commissioners Report (2003). Crop value was \$53.9 million but the specter of competition from imported fruit looms. Water use for mature trees ranges from 2.61 to as much as 10.0 acre feet per acre depending on the wide variety of irrigation “strategies” in use. Water required for mature trees based on the most generous set of validated crop coefficients would be 4.4 acre feet including a 15 percent leaching fraction when adjusted for “good” application uniformity of 0.85 (total required water including rainfall). Irrigation system evaluation records, maintained by the San Jacinto Basin RCD since 1994 document water savings of 0.4 acre feet per acre evaluated over the period. In the district’s Santa Rosa Division, which is dominated by the avocado growing region, Ag water use at 26,018 acre feet is 77 percent of total sales. With 1,093 agricultural accounts in the division, the scale of potential savings becomes readily apparent.

Estimating that 100 evaluations per year can be completed under the Ag Conservation Incentive program on orchards averaging 8.4 acres, projected savings from this component of the program alone would lie in the range of 336 to 445 acre feet per year or 672 to 890 acre feet over two years as proposed. If it is assumed that the project would be institutionalized after two years, total potential water savings for 6,878 planted acres on the above basis is in the range of 2,750 to 3,645 acre-feet with a retail value of up to \$1.6 million.

B15-d. Statement of Work, Section 2: Technical/Scientific Merit, Feasibility

Methods, Procedures and Facilities

Task List and Schedule 1 – Code of Sustainable Practices Component

The project will design and produce a sustainable management practices assessment workbook for avocados by employing the methods and procedures utilized in the award-winning Code of Sustainable Winegrowing Practices (SWP) Program. **Figure 1** below presents a stepwise flow diagram of methods and procedures adapted from the SWP program that will be used for this project (see shaded boxes 1-6). The figure includes project next steps following the publication of a sustainable management practices assessment workbook for avocados (see non-shaded boxes 7-9). Steps 7, 8 and 9 are not part of this grant application but will be pursued by the project cooperators to begin upon completion of the workbook in July, 2007.

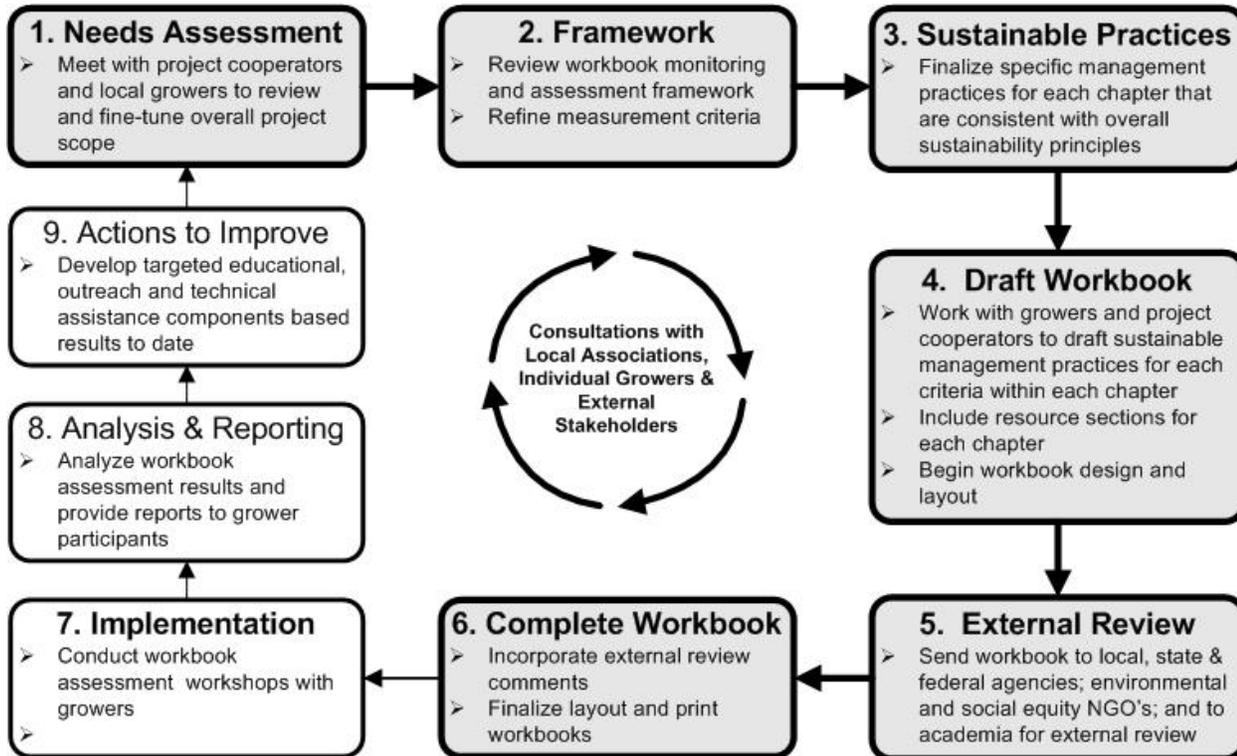


Figure 1. Flow diagram of stepwise methods and procedures to produce a sustainable management practices workbook for avocados.

The workbook will focus on management practices in several categories consistent with overarching sustainability principles: sensitivity to the environment, social responsibility and responsiveness, and economic feasibility.

A series of facilitated focus group sessions (6) and individual interviews (25-30) with project cooperators, local growers and broader stakeholders will be conducted by SureHarvest staff and consultants from August 2005 through January 2006 to accomplish tasks 1, 2 and 3 as described in the Task List and Schedule table below.

Participants in the focus group sessions and interviews will include representatives from the following organizations: Rancho California Water District, San Jacinto Basin Resource Conservation District; California Avocado Commission, CalAvo Growers, The Nature Conservancy, University of California, U.S. Bureau of Reclamation, local growers, and other organizations as appropriate.

Task	Timeline (Date(s) of Work)	Evidence of Completion (Deliverables)	Projected Cost
Task 1: Conduct Needs Assessment	August 2005 through October 2005	Needs assessment report based on results of focus groups and interviews	\$14,750
Task 2. Review Workbook Monitoring and Assessment Framework	September 2005 through November 2005	Report on revised workbook monitoring and assessment framework based on results of focus groups and interviews	\$16,900
Task 3. Finalize Sustainable Practices	September 2005 through January 2006	Report on final chapter and criteria lists based on results of focus groups and interviews	\$29,950
Task 4. Draft Workbook	February 2006 through November 2006	Hardcopy of draft workbook	\$211,000
Task 5. Facilitate Workbook External Review	December 2006 through March 2007	Revised workbook that includes reviewer comments	\$25,000
Task 6. Complete Workbook Writing, Design and Printing	April 2007 through July 2007	Completed and printed workbook	\$62,400
Component Grand Total			\$360,000

Additional details for Tasks 1-6 are provided in Appendix C.

Task List and Schedule 2 – Agricultural Technology Demonstration Center

The technology center will be developed on a 40-acre site, centrally located in the avocado production area of de Luz in the Santa Rosa Mountains. This site currently has 22 acres of avocado orchard and 7 acres of vineyard in rolling hills terrain. This terrain is very typical of the production region. The site feature technologies such as remote sensing weather stations, soil moisture monitoring technology such as C-Probes, GroPoint sensors, ET controllers, remotely controlled irrigation valves, pressure and volumetric monitors and computerized field data acquisition, transmission and processing to improve the accuracy and efficiency of weather monitoring, irrigation and the application of agrichemicals.

Task	Timeline (Date(s) of Work)	Evidence of Completion (Deliverables)	Projected Cost
Select Site	December 2004 (Completed)	Committee Minutes – Site Map & As Builts	None
Select Demonstration Site Equipment	December 2004	Purchase Records, Budget Detail	None
Purchase equipment, installation and maintenance agreement	July 2005	Project Invoice; field verification	\$51,386
System de-bugging	July 1-October 31, 2005	Field Journal; Q1 Report	\$1,500
Staff Training	Ongoing	Program Mgr. Certification	\$1,400
Irrigation System Evaluation Completed	Aug 2005	Evaluation Results Reports (Avos + Winegrapes)	\$1,600
Program Ops: monitoring and scheduling begins	Aug 2005	Readiness certification; Q1 Report	N/A
Tissue Sampling and Analysis: N,P, K and micronutrients	Sep, Mar, May July	Analysis Results	\$500
Preparation and transmission of site irrigation schedules	Aug 2005-June 2007	Weekly schedules Moisture Data Records Evaporation Reports Seasonal Summaries	\$1,540
Public Outreach	Ongoing after site readiness – Aug 2005 thru June 2007	Guest List Visitor Record Special Event Documentation Periodic Q Reports	\$2,040
Data Compilation and Report Preparation	May, June 2007	Final Project Report	20% share; \$1,000
Component Subtotal			\$60,966
Indirect Costs @ 19.4% (not incl. equipment)			\$1,762
Component Grand Total			\$62,728

Task List and Schedule 3 – Water Conservation Incentive Program Component

This is a phased irrigation system performance assessment, conservation and water management program that allows growers who may qualify, upon enrollment incremental discounts of up to 10 percent on current and future commodity rates.

Task	Timeline (Date(s) of Work)	Evidence of Completion (Deliverables)	Projected Cost
RCWD determine incentive rate structure	Jan-Jun 2005	Adopted RCWD policy	N/A
SJBRCDC hire, train additional staff (2 FTE)	August 2005	Cal Poly Certification	\$3,000
RCWD publicize incentive program	August-October 2005	Publicity materials	N/A
Conduct evaluations; certify incremental qualifications for discounts (includes staff time and mileage for two years)	August 2005-June 2007	Evaluation Reports, Seasonal Performance Evaluation Reports, Seasonal Irrigation Schedules, Eligibility Certifications	\$181,033
Purchase supplies	Ongoing	Invoices	\$2,500
Vehicle Insurance	Ongoing	Certificate	\$3,600
Complete 7 quarterly and one Final Report	Ongoing	Completed Reports	\$1,900
Subtotal			\$192,033
Indirect costs @ 19.4%			\$37,254
Component subtotal			\$229,287
Purchase, lease additional equipment including mobile lab vehicle replacement	August 2005	Sale/Lease Agreement	\$32,000
Component Grand Total			\$261,287

Task List and Schedule 4 – Irrigation Water Management Toll-Free Hotline

Growers enrolled in the Water Conservation Incentive Program are provided the number for a toll-free “IWM Hotline” providing daily/weekly reference ET, reference ET percentage variance from historical weekly averages, gross precipitation, effective rainfall and weekly net irrigation requirements in gallons for avocados, citrus and winegrapes in growing areas served by three local CIMIS stations. Enrollees will also be provided a rain gauge with which to adjust recommended weekly crop irrigation quantities for effective rainfall amounts on their specific properties.

Task	Timeline (Date(s) of Work)	Evidence of Completion (Deliverables)	Projected Costs
Edit and Update Hotline Script	August 2005	Updated Script	N/A
Test Phone line and messaging system	August 2005	Test Complete	N/A
Record Hotline Info 5 days/week, 2 years	August 2005 thru July 2007	Periodic Reports; Script File	18,096
Indirect Costs @ 19.4%			\$3,510
Component Grand Total			\$21,606

Task List and Schedule 5 – Water Conservation Infrastructure Development

This component will include establishment of the appropriate data transmission (telemetry) infrastructure (gateway devices, computer base station, microwave relays to assure quality telemetry).

Task	Timeline (Date(s) of Work)	Evidence of Completion (Deliverables)	Projected Costs
Conduct Wine Country Telemetry Survey	August 2005	Telemetry GIS Map	\$2,500
Purchase, install and program required telemetry relays (estimate 2 needed)	August 2005	Invoices, Photo documentation	\$3,829
Conduct avocado country telemetry survey	Aug/Sep 2005	Telemetry GIS Map	\$7,500
Purchase, install and program required telemetry relays (estimate 6 needed)	Aug/Sep 2005	Invoices, Photo documentation	\$10,288
System debugging	Sep 2005	Periodic Reports	\$5,000

Maintenance Agreement: 2 yrs			\$1,000
Indirect costs @ 19.4% (not incl. equipment)			\$2,910
Component Grand Total			\$33,027

Virtually all components of the SAM project could proceed immediately given application approval. The project proposes to transfer proven technologies only, adopt and adapt demonstrably successful projects while “marketing” and expanding enrollment in the IWM Evaluation program as the qualifying criteria for the Conservation Incentive (discount rate) Program.

Environmental Documentation

Not applicable. Equipment to be installed for this project will be retrofitted to an existing winegrape/avocado ranch. Accordingly no ag grading permit or CEQA documentation is required. Establishment of the telemetry infrastructure involves the installation of solar-powered microwave radio relays with a minimal footprint (2.5 square inches) and a maximum height with a three-pole set of 10 feet. It has been observed that they make great raptor scouting perches.

B-15e. Statement of Work, Section 3: Monitoring and Assessment

Estimates of Total Expected Water Savings

Estimates of expected water savings are based on the historical record of irrigation system evaluations performed by the Irrigation Water Management Mobile Lab of the San Jacinto Basin Resource Conservation District since 1994. These records have consistently documented a reduction in water use averaging 0.4 to 0.53 acre feet per acre evaluated as a function of improved application uniformity, better monitoring of rainfall and appropriate and consistent irrigation scheduling leading to significant improvements in irrigation efficiency. For our purposes here, IE is defined as the percentage of irrigation water beneficially used in relation to irrigation water applied.

Estimating that 100 evaluations per year can be completed under the Ag Conservation Incentive program on orchards averaging 8.4 acres, projected savings from this component of the program alone would lie in the range of 336 to 445 acre feet per year or 672 to 890 acre feet over two years as proposed. If it is assumed that the project would be institutionalized after two years, total potential water savings for 6,878 planted acres on the above basis is in the range of 2,750 to 3,645 acre-feet with a retail value of up to \$1.6 million.

A second database which may provide some insight into the potential for water savings attributable to the adoption of new technology may be derived from the experience of the PRISM Irrigation Scheduling program in managing winegrape irrigation in the Temecula Valley since 1998. By 2003, winegrape water use was reduced from an average of 22 inches per season to 8.7 inches, representing cumulative savings of nearly 1,400 acre feet. Largely responsible for the reduction was the implementation of regulated deficit irrigation practices which have no applicability in avocados or citrus; however improvements were noted which were attributed to aggressive maintenance and season-long irrigation system performance evaluations on the largest vineyards which were consistent with Irrigation Lab evaluations of other microirrigation systems in the region.

This project proposes to strengthen the telemetry infrastructure in the wine country while establishing a new infrastructure to support the adoption of remote sensing technology in the avocado growing region.

One statistical study completed through the PRISM program compared the difference in scheduled water use featuring the use of a portable soil moisture-monitoring device vs. the C-Probe remote sensing system. The study suggested a .07 acre-foot improvement in seasonal water use, which could be attributed to the increased sensitivity and continuous monitoring capability of the C-Probe system. Since it has been our practice to implement several management practices simultaneously, it is somewhat difficult to estimate reductions based on the adoption of new technologies alone. We believe the primary benefit of remote sensing technology is that it allows the manager to more closely monitor the results of irrigation practices and to adjust accordingly.

Project Monitoring and Evaluation Plan 1: Development of a Sustainable Management Practices Workbook for Avocados

See page 10 **Figure 1** for a flow diagram of stepwise methods and procedures to produce a sustainable management practices workbook for avocados. The timeline and deliverables for each of the six tasks is presented in Section 2. The use of interviews and focus groups for tasks 1, 2, and 3 with project cooperators, local growers, and broader stakeholders will help ensure that the development of the workbook remains focused and relevant.

Project Monitoring and Evaluation Plans 2&5 – Ag Demonstration Technology Center and Infrastructure Development Components

Project monitoring of this component begins with adherence to the task/timeline outlined in the Statement of Work, Section 2. The desired outcome of this component is the adoption by local growers of technologies being used in the Demonstration grove and vineyard. The exclusive vendors for the subject equipment in our area (Western Farm Services and Computerized Irrigation Systems) will assist us in documenting the extent of newly installed equipment.

Project Monitoring and Evaluation Plan 3 – Water Conservation Incentive Program

Grower participation in this program will be monitored and documented by the San Jacinto Basin RCD Irrigation Lab. Documentation will include field data collection sheets and the Results and Recommendations Report using the protocol and analytical software provide by the Cal Poly Irrigation Training and Research Center. This evaluation process will measure and document “before and after” application uniformity. Base line water use for the 12 months preceding cooperator enrollment will be obtained for the subject water meter from readily available RCWD records. Irrigation Efficiency for a minimum three to 12-month period will be computed after irrigation system improvements have been completed and program-recommended scheduling practices have been implemented. Progress in relation to, or achievement of program standards for application uniformity (AU) and irrigation efficiency will be documented. Certification by the Irrigation Lab to RCWD of grower eligibility for the appropriate discount level will be provided and documented. The Project Final Report will document actual water savings while comparing the extent of correlation between actual and scheduled water use using Irrigation Lab and RCWD records.

Project Monitoring and Evaluation Plan 4 – Irrigation Water Management Toll-Free Hotline

The Hotline is an integral element of the Conservation Incentive program in that it is the main source of CIMIS reference ET information used to compute the scheduling solution. The Hotline provides ET variance-from-normal percentages used to update Seasonal Irrigation Guidelines (based on historical averages) for actual weather conditions. This component is the cornerstone for the refined irrigation scheduling method recommended by the Irrigation Lab. Seasonal Guidelines are provided to all program participants and include custom scheduling factors such as application uniformity and soil characteristics unique to each operation. The Hotline vendor (Verizon) provides a monthly tally of calls to the Hotline, which will document extent of use and serve as a check on the extent to which program participants are using recommended scheduling methods.

B-15f. Qualifications of the Applicants and Cooperators

1. Resumes

Resumes of the project managers, and key project participators are included in Appendix D.

2. Role of Project Managers and Cooperators:

Preliminary planning for this project was initiated last November when Rancho California Water District convened a project committee, which includes the following representatives:

- Perry Louck – RCWD Director of Planning, Committee Chair
- Dr. Jeff Dlott – President, SureHarvest, principal in the development of the Code of Sustainable Winegrape Growing Practices Workbook
- Ben Drake – Drake Enterprises Farm Management and RCWD Director
- Bob Coleman – CalAvo Growers
- Meena Westford – USBR Water Conservation Field Services Program Manager
- Guy Witney – California Avocado Commission
- Gary Bender – UC Cooperative Extension Farm Advisor
- Jim Gilmore – San Jacinto Basin RCD Program Manager, Irrigation Lab Team Leader
- Michele Barefoot – President, Agraria Consulting, Sustainability Program Consultant

In broad strokes, the committee identified SAM project components as described in section one, explored funding modes and opportunities and areas of responsibility for project development.

Dr. Dlott will serve as contractual project manager for development of the Sustainable Management Practices Workbook for Avocados using a technical development team representing appropriate local interests for the workbook adaptation and development process. The process will include both local and external reviewers as workbook chapters become available. SureHarvest staff and consultants have extensive experience in conducting needs assessments, designing and executing monitoring and assessment frameworks, and designing and producing sets of sustainable management practices for agricultural partnership projects throughout the United States (Dlott et al., 2002; Haley & Dlott, 2001; Dlott & Lynch 2000; Dlott 1999; Dlott & Haley 1998; Dlott et al., 1997; Dlott, Chaney & Kozloff, 1996; Dlott 1995; Dlott, Altieri & Masumoto, 1994).

Mr. Gilmore will serve as contractual program manager for the remaining SAM project components including the Demonstration Component, Water Conservation Incentive Program (Assessment and Certification component), implementation of the IWM Toll-Free Hotline and Water Conservation Infrastructure Development. Mr. Gilmore's experience as Irrigation Lab Team Leader and innovator of the PRISM Irrigation Scheduling program qualifies him to assist in the selection and deployment of technologies to be adapted and transferred from the Temecula Wine Country to the avocado growing region. A 40-acre site for the demonstration area has already been selected which fulfills and exceeds committee-defined criteria. Siting and installation of demonstration area and telemetry infrastructure equipment will be conducted in cooperation with Western Farm Services and Computerized Irrigation, Inc., exclusive vendors for the range of Adcon, Motorola and Envirosan equipment selected for the program.

RCWD Planning Director Perry Louck will serve as overall SAM project manager on behalf of the applicant.

B.15g. Outreach, Community Involvement and Acceptance

Information about this project will be disseminated in a variety of ways including the following:

- Information regarding the development of the Sustainable Management Practices Workbook and the need for local participation will be disseminated primarily through the Temecula Winegrowers Association, local farm management firms, CALAVO, the Avocado Commission, UC Cooperative Extension and RCWD. During the development process, we will solicit participation by the local associations cited, individual growers, packers and external stakeholders. External review of the product will be conducted by local associations, state and federal agencies, environmental and social equity organizations and academia.
- A key touchstone for this project will be the Ag Technology Demonstration Center and Infrastructure Development Program. This demonstration component provides the opportunity for individuals and small groups to view, by appointment or special arrangement, a variety of irrigation water management technologies in place and in operation on a working orchard and vineyard. The Infrastructure Development component will stimulate technology transfer by making it more affordable for growers to utilize remote-sensing technologies. When completed, information about the Center will be disseminated through local associations, RCWD, the local press and state and federal agencies.
- Information regarding the Conservation Incentive Program will be disseminated primarily by RCWD, San Jacinto Basin RCD Irrigation Lab cooperators records, CALAVO and the Avocado Commission. This incentive program is being offered to growers within RCWD's service area.
- Information concerning the Irrigation Water Management Toll-Free Hotline has been disseminated in the past through the DWR CIMIS website, local associations and the regional press. RCWD and the San Jacinto Basin RCD Irrigation Lab will inform their customers of the availability of this service and of the opportunity for participation in the Conservation Incentive Program.
- Information concerning program components may also be highlighted during special events including the annual Grape Day Technical Conference and Trade Show and periodic technical meetings sponsored by the Viticulture and Enology Research Committee of the Temecula Winegrowers Association. CALAVO and the Avocado Commission similarly sponsor periodic grower conferences for educational purposes, which are appropriate venues for the dissemination of project related information.

- Upon project completion, we anticipate that there will be a need for local implementation of Workbook processes and considerable interest in statewide dissemination of the Sustainable Management Practices Workbook and in the Conservation Incentive Program. This will require local, regional and state level coordination with appropriate agencies and stakeholders who have been included in development of this project since its conception. The model suggested by the Sustainable Winegrowing Practices Workbook project includes the following steps:
 - Implementation
 - Workshops
 - Outreach
 - Analysis and Reporting
 - Analytical Software
 - Custom Participant Reports
 - Benchmark Information
 - Actions to Improve
 - Regional Benchmark Reports
 - Action Plan Workshops
 - Targeted Educational Materials

The purpose of this process is to implement, institutionalize and disseminate the Workbook product and to institutionalize and disseminate the Conservation Incentive Program for regional and statewide consideration. The Workshop/Outreach component would focus on regional grower groups, public water agencies, grower associations, UC Cooperative Extension and state and federal water management agencies such as DWR and the US Bureau of Reclamation.

B-15h. Innovation

The quest for improvement of agricultural water use efficiency is best achieved by the integration of demonstratively effective management practices with proven water management technologies. The result, when combined with the kind of voluntary self-assessment of agronomic practices which characterizes the SAM project, is an holistic, systematic approach to orchard and vineyard management. This approach offers the best opportunities to advance not just water use, but also preserve the agrarian ambience which is the essence of community identity for the Temecula Valley.

No single component of the SAM project may be described as “innovative” in the conventional sense. However, the comprehensive and integrated approach of the sustainable agricultural management program is innovative, particularly in southern California. The integration of best management practices with advanced technology includes the following elements:

- Voluntary self-assessment of practices
- Grower education focusing on effective technologies
 - Real time weather monitoring and ET computation
 - Remote sensing of soil moisture
 - Remote monitoring of irrigation system performance
- Infrastructure development to support adoption of technologies
- Assistance with the assessment and improvement of irrigation system performance
- Grower (water rate) incentives
- Education, support and assistance in the adoption of appropriate irrigation scheduling practices

B-15i. Benefits and Costs

The following budgets breakdown the project component costs that are summarized in Table C-1 [Appendix E]. Explanation of Labor Costs (including consultants), equipment, supplies and travel is included in the budgets.

Budget 1: Development of Avocado Sustainable Management Practices Workbook

Task 1. Conduct Needs Assessment	YEAR 1	YEAR 2	Total
A. Labor (Contractual)			
1. 15 Interviews (Prep, Execution & Write-up)	\$6,750		\$6,750
2. Focus Groups (Prep, Execution & Write-up)	\$4,800		\$4,800
3. Needs Assessment Report	\$2,400		\$2,400
Labor Total	\$13,950		\$13,950
B. Travel			
1. Airfare, parking, lodging and travel (San Jose to Temecula) @ 2 trips	\$800		\$800
Task 1. Subtotal	\$14,750		\$14,750
Task 2. Review Workbook Monitoring and Assessment Framework			
A. Labor (Contractual)			
1. 10 Interviews (Prep, Execution & Write-up)	\$4,500		\$4,500
2. Focus Groups (Prep, Execution & Write-up)	\$7,200		\$7,200
3. Monitoring and Assessment Report	\$3,600		\$3,600
Labor Total	\$15,300		\$15,300
B. Travel			
1. Airfare, parking, lodging and travel (San Jose to Temecula) @ 4 trips	\$1,600		\$1,600
Task 2. Subtotal	\$16,900		\$16,900
Task 3. Finalize Sustainable Management Practices			
A. Labor (Contractual)			
1. 15 Interviews (Prep, Execution & Write-up)	\$6,750		\$6,750
2. Focus Groups (Prep, Execution & Write-up)	\$16,800		\$16,800
3. Monitoring and Assessment Report	\$4,800		\$4,800
Labor Total	\$28,350		\$28,350
B. Travel			
1. Airfare, parking, lodging and travel (San Jose to Temecula) @ 4 trips	\$1,600		\$1,600
Task 3. Subtotal	\$29,950		\$29,950

Budget 1: Development of Avocado Sustainable Management Practices Workbook, continued

Task 4. Draft Workbook

A. Labor (Contractual)

1. Draft 10 Chapters	\$63,000	\$42,000	\$105,000
2. Hold 10 Chapter Review Meetings	\$43,200	\$28,800	\$72,000
3. Edit all Chapter		\$6,000	\$6,000
4. Produce First Full Draft of Workbook		\$20,000	\$20,000

Labor Total \$106,200 \$96,800 \$203,000

B. Travel

1. Airfare, parking, lodging and travel (San Jose to Temecula) @ 20 trips	\$4,800	\$3,200	\$8,000
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Task 4. Subtotal \$111,000 \$100,000 \$211,000

Task 5. Workbook External Review

A. Labor (Contractual)

1. 20 interviews (Prep, Execution & Write-up)		\$9,000	\$9,000
2. Focus Groups (Prep, Execution & Write-up)		\$9,600	\$9,600
3. External Review Report		\$4,800	\$4,800

Labor Total \$23,400 \$23,400

B. Travel

1. Airfare, parking, lodging and travel (San Jose to Temecula) @ 4 trips		\$1,600	\$1,600
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Task 5. Subtotal \$25,000 \$25,000

6. Complete Workbook

A. Labor (Contractual)

1. Incorporate External Review Comments		\$4,800	\$4,800
2. Proof Entire Workbook		\$6,000	\$6,000
3. Workbook Design, Layout and Printing		\$50,000	\$50,000

Labor Total \$60,800 \$60,800

B. Travel

1. Airfare, parking, lodging and travel (San Jose to Temecula) @ 4 trips		\$1,600	\$1,600
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Task 6. Subtotal \$ 62,400 \$62,400

		YEAR 1	YEAR 2	Project Total
Total		\$172,600	\$187,400	\$360,000

Budget 2: Agricultural Technology Demonstration Center

	Year 1	Year 2	Total
A. Labor (Contractual)			
1. System De-bugging	\$1,500		\$1,500
2. Staff Training	\$1,400		\$1,400
3. Baseline Irrigation System Evaluation	\$1,600		\$1,600
4. Prep. of Site Irrigation Schedules – 2 yrs	\$1,540		\$1,540
5. Public Outreach	\$2,040		\$2,040
6. Project data compilation and report preparation	\$1,000		\$1,000
7. Tissue sampling and analysis	\$500		\$500
Labor Total	\$9,580		\$9,580
B. Equipment/Installation and Maintenance Agreement			
(1) Adcon Weather Station (ETo capable)	\$5,000		\$5,000
(1) System Gateway Device (Datalogger)	\$3,300		\$3,300
REMOTE SENSORS			\$0
(3) Adcon Soil Moisture C-Probes	\$4,500		\$4,500
(2) Aquaflex sensors	\$1,840		\$1,840
(3) GroPoint Sensors	\$3,600		\$3,600
(2) Enviroscan Tri-Scan sensors (Temp, soil moisture, EC)	\$3,600		\$3,600
(1) Keller Pressure Sensor	\$935		\$935
(1) McCrometer Flow Meter/Totalizer	\$1,200		\$1,200
			\$0
REMOTELY OPERATED VALVES			\$0
(3) Remote (radio-operated) valves w/ interface, software and installation	\$15,160		\$15,160
OTHER			
(8) Adcon Add-It Telemetry Transmitters	\$8,161		\$8,161
(8) Site installation fees	\$2,100		\$2,100
(2) Maintenance Agreement – 2years	\$1,990		\$1,990
Equipment Total	\$51,386		\$51,386
Total Budget 2	\$60,966	\$0	\$60,966

Budget 3: Water Conservation Incentive Program

A. Labor (Contractual)

	Year 1	Year 2	Total
1. Supervision/Report Preparation	\$32,032	\$33,753	\$65,785
2. Field Assistants (2)	\$47,840	\$57,408	\$105,248
3. Staff Training and Certification	\$3,000		\$3,000
4. Quarterly Reports	\$500	\$400	\$900
5. Final Report	N/A	\$1,000	\$1,000
Labor Total	\$83,372	\$92,561	\$175,933

B. Equipment

1. Mobile Lab Vehicle replacement, tool box and signage	\$32,000		\$32,000
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C. Travel

1. Mileage	\$5,000	\$5,000	\$10,000
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D. Supplies

1. Gauges, collection beakers, updated software, office supplies	\$1,500	\$1,000	\$2,500
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E. Other

1. Vehicle Insurance	\$1,800	\$1,800	\$3,600
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Total Budget 3	\$123,672	\$100,361	\$224,033
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Budget 4: Irrigation Water Management Toll-Free Hotline

	Year 1	Year 2	Total
A. Labor (Contractual)			
1. Compute and Record Hotline, 5 days/wk, 2 yrs	\$8,008	\$8,288	\$16,296
B. Other			
1. Phone Charges at \$75/mo	\$900	\$900	\$1,800
Total Budget 4	\$8,908	\$9,188	\$18,096

Budget 5: Water Conservation Infrastructure Development Component

	Year 1	Year 2	Total
A. Labor (Contractual)			
1. Conduct telemetry surveys for area network	\$10,000		\$10,000
2. System de-bugging	\$5,000		\$5,000
Labor Total	\$15,000		\$15,000
B. Equipment, Installation, Programming (Estimate 8 solar-powered relays) Estimate 8 solar-powered relays	\$14,117		\$14,117
C. Maintenance Agreement – 2 yrs	\$500	\$500	\$1,000
Total Budget 5	\$29,617	\$500	\$30,117

Explanation of Cost Sharing for each Element as well as Direct and Indirect Costs Summary Table

Component	Direct Costs	Indirect Costs	Total Program	Local Cost Share
1. Sustainable Workbook	\$360,000		\$360,000	\$25,000
2. Ag Tech Demo Center	\$60,966	\$1,762	\$62,728	
3. Conservation Incentive	\$224,033	\$37,254	\$261,287	\$13,500
4. Toll-Free Hotline	\$18,096	\$3,510	\$21,606	
5. Infrastructure Dev.	\$30,117	\$2,910	\$33,027	\$25,000
6. Administration	\$147,730		147,730	\$50,000
Program Total	\$840,932	\$45,436	\$886,368	\$113,500

1. The indirect cost rate for components 2 through 5 is 19.4% chargeable by sub-contractor San Jacinto Basin RCD for all items exclusive of equipment, and labor by secondary contractors.

Potential Benefits and Information to be gained in terms of Water Use Efficiency

Collectively, the elements of the Sustainable Agricultural Management program will result in water savings through improvements in water use efficiency on the scale described above. In particular, the project will produce information regarding the role of each component intervention in contributing to WUE and an indication of the synergistic effects of this integrated program, including:

- The role of remote sensing technology (soil moisture, weather parameters and irrigation system performance) in improving WUE.
- The cumulative effects of the following in improving WUE:
 - Self-assessment of management practices
 - Irrigation system performance evaluations
 - Irrigation system improvements based on evaluation results
 - The adoption of appropriate (CIMIS-based irrigation scheduling strategies)
- The extent to which grower water rate incentives will stimulate the adoption of management practices and technologies affecting WUE.
- The extent to which RCWD support of telemetry infrastructure development will stimulate adoption of remote sensing technologies.
- The accumulation of baseline and “after improvements” information related to irrigation system application uniformity (AU), irrigation efficiency (IE) and water use trends.

Compare the potential benefits and information to be gained to the anticipated costs (Addresses cost/benefit in lieu of Table C-5)

This issue has been discussed at some length in sections above addressing “Water Demand and Savings” and “Estimates of Total Expected Water Savings.” To reiterate, historical records of the San Jacinto Basin RCD Irrigation Water Management Lab have documented savings in the range of 0.4 to 0.53 acre feet per acre as a function of irrigation system improvements implemented as a direct result of system evaluations conducted by the Lab since 1994. Water savings were attributed to improved application uniformity, better maintenance, better monitoring of seasonal rainfall and appropriate irrigation scheduling practices. Statistical evidence has also suggested that an additional 0.07 acre-feet per acre savings might be attributed to the adoption of remote sensing technology.

Accordingly, this project includes components that can be expected to generate water savings of 0.6 acre-feet for every acre included in the program. With 6,878 acres of avocados in the project area, potential savings are 4,127 acre-feet with a retail value of \$1.86 million. Measured against project costs of \$886,378, the potential return on our investment is encouraging. In addition, we believe this project has broad applicability for other growing regions in southern California where avocados are important including Santa Barbara and Ventura counties.

The Sustainable Practices Workbook will stimulate improvements in grower agronomic practices that will lead to improved water quality in the Santa Margarita Watershed (with the Santa Margarita River, the last river running wild in California) and improved water savings through more effective technology management. The Sustainable Management Practices

Workbook component will foster new investments in reclaimed water and desalination technologies and infrastructure because it lengthens the payback period for such investments as it ensures future agricultural water uses. Finally, we believe that the integration of strategies which characterize the SAM Program may have additional synergistic effects that we have not yet anticipated.

APPENDIX A

Press Release on GEELA Award for Sustainable Winegrowing Practices Program.



**Contact: Nancy Light or Gladys Horiuchi of
Wine Institute, 415/512-0151 or
Karen Ross of
California Association of Winegrape Growers,**

**December 2, 2004
916/924-5370**

GOVERNOR SCHWARZENEGGER GIVES TOP ENVIRONMENTAL AWARD TO CALIFORNIA SUSTAINABLE WINEGROWING ALLIANCE

SAN FRANCISCO -- Governor Schwarzenegger named the California Sustainable Winegrowing Alliance (CSWA) a recipient of the 2004 Governor's Environmental and Economic Leadership Awards (GEELA) during a ceremony at the California Environmental Protection Agency headquarters in Sacramento yesterday. The GEELA is California's highest and most prestigious environmental honor and recognizes individuals, organizations and businesses that have demonstrated leadership and made notable contributions in conserving the state's natural resources, protecting and enhancing the environment, and building public-private partnerships. CSWA is a 501(c)3 educational nonprofit organization established by Wine Institute and the California Association of Winegrape Growers to support widespread adoption of sustainable winegrowing practices.

The governor recognized CSWA in the award category of Environmental & Economic Partnerships. A prominent feature of the CSWA Sustainable Winegrowing Program is the active participation of vintners, growers, regional trade associations, regulators, academics, environmental and social equity groups and other stakeholders in its development and implementation of the program. The result of this collaborative effort by CSWA has been more than 90 sustainable winegrowing workshops in 24 counties covering all the major winegrowing regions of California. To date, more than 1000 growers and/or winemakers, representing 800 vineyard enterprises and 125 winery facilities, have attended the workshops. The participants contributed benchmark data measuring the level of adoption of sustainable practices in their vineyard and winery operations.

CSWA reported on the data in its first Sustainability Report in October of 2004. The report described California's sustainable winegrowing strengths and opportunities for improvement and set new goals to increase adoption of environmentally friendly practices. Based on the report findings, CSWA is planning new sustainable winegrowing workshops targeted at the most challenging areas and will issue follow-up reports tracking the California wine community's progress in the years to come.

"On behalf of the CSWA Board of Directors, we are honored to receive this special recognition from the State of California and the governor," said CSWA President Steve Quashnick of Quashnick Farms in Acampo. "We hope the recognition will help expand participation in our sustainable winegrowing program. Through this collaborative effort between vintners and growers, sustainability is a concept that has now entered the mainstream thinking and doing of the California wine community."

"The GEELA recognition continues the momentum of our sustainable program, which has received a positive response from vintners and growers around the state," said CSWA Vice President Jim Unti of Constellation USA. "However, our work is only beginning, and the California wine community has demonstrated its commitment in taking a leadership role in producing the finest quality wines in a socially responsible manner."

Nominated by Congressman David Dreier and Assembly Member Patricia Wiggins, CSWA was also endorsed for the award by California Senator Wesley Chesbro, CDFG Secretary A.G. Kawamura, Sustainable Conservation Executive Director Ashley Boren, California Environmental Dialogue Director Charles McGlashan, and California Council for Environmental and Economic Balance President Victor Weisser. A Selection Committee evaluated applications for strength in eight specific areas: results, transferability, environmental impact, resource conservation impact, economic progress, innovation/uniqueness, pollution prevention, and environmental justice.

The annual GEELA program is administered by the California Environmental Protection Agency and Resources Agency in partnership with the State and Consumer Services Agency.

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Appendix B

Press Release on Commissioner's Award from the US Bureau of Reclamation for the PRISM Program.

[See attached hard copy].

Appendix C

Sustainable Management Practices Workbook Tasks

Task 1: Conduct Needs Assessment

The project needs assessment will be conducted at the initiation of the project from August 2005 through October 2005. The assessment will consist of a series of three to four facilitated focus group sessions with project cooperators, local growers, and broader stakeholders along with 15 to 20 individual interviews.

The purposes of the needs assessment are to ensure project cooperators, local growers, and external stakeholders are aware of the project scope and scale, have an opportunity to provide input to refine the project scope and scale, and establish effective communication mechanisms at the very beginning of project.

Task 2. Review Workbook Monitoring and Assessment Framework

The monitoring and assessment framework used in the Sustainable Winegrowing Practices (SWP) workbook will be reviewed, and as appropriate, adapted by project cooperators, growers and external stakeholders to the specific needs of this project.

The framework employed in the SWP workbook includes a built-in measurement system (See **Table 2**). Participants assess their management practices according to a four-category system. Category one illustrates practices which are considered to be the minimum level of sustainability for that practice but within regulatory compliance, if regulations exist. Category four illustrates the highest level of sustainable management practices for each criterion.

This task will be accomplished through a series of two to three facilitated focus group sessions with project cooperators, local growers, and broader stakeholders along with 10 to 15 individual interviews.

The key purpose of reviewing and adapting the workbook monitoring and assessment framework is to ensure that the workbook framework for categorizing water quantity and water quality sustainable management practices will support the Water Conservation Incentive (Discount Water Rate) Program proposed in this grant application.

Table 2. Example criteria from the SWP workbook that presents the 4-category system of increasing performance for sustainable management practices moving from right to left.

WATER MANAGEMENT—OVERALL STRATEGY				
Criteria	Category 4	Category 3	Category 2	Category 1
<p>5-1 Water Management Strategy</p> <p>EXAMPLE – WILL BE ADAPTED FOR AVOCADOS</p>	<p>When defining a water management strategy for my vineyard, I determine my grape-growing objectives before the growing season begins.* They include yield, quality, canopy characteristics, floor management, and fertility requirements. The strategy also takes into account soil types, slope, water quality, and energy efficiency **</p> <p>And</p> <p>Tools are in place to accomplish these goals, e.g., soil monitoring devices, weather stations, etc. A minimum of 3 parameters are used to make water management decisions (e.g., <i>evapotranspiration</i> (ET), vine condition, <i>pressure bomb</i>, soil moisture)</p> <p>And</p> <p>A strategy is implemented and improved annually.</p>	<p>When defining a water management strategy for my vineyard, I determined my grape-growing objectives before the growing season begins.* They include yield, quality, canopy characteristics, floor management, and fertility requirements. The strategy also takes into account soil types, slope, water quality, and energy efficiency**</p> <p>And</p> <p>Tools are in place to accomplish these goals, e.g., soil monitoring devices, weather stations, etc. A minimum of 3 parameters are used to make water management decisions (e.g., ET, vine condition, pressure bomb, soil moisture).</p>	<p>When defining a water management strategy for my vineyard, I determine my grape-growing objectives before the growing season begins.* They include yield, quality, canopy characteristics, floor management, and fertility requirements. The strategy also takes into account soil types, slope, and water quality.</p>	<p>I have not developed a water management strategy for my vineyard.</p>

*Some examples of water management strategies are regulated deficit irrigation, partial root zone drying, and also considering any challenging pest problems, such as nematodes or phylloxera, that may affect vine water uptake.

**E.g., the ability to run the irrigation system at off-peak hours.

Task 3. Finalizing Sustainable Management Practices Chapters and Criteria

The chapters and the criteria within each chapter for the sustainable management practices assessment workbook for avocados will be adapted from the SWP workbook. The SWP workbook includes 13 self-assessment chapters that address vineyard management and winery operations (see **Table 3**).

Through a series of four to five facilitated focus group sessions with project cooperators, local growers, and broader stakeholders along with 15 to 20 individual interviews, the final chapter list and list of criteria per chapter will be determined. **Table 1** (in Section 1: Relevance and Importance) presents the proposed list of 10 integrated chapters for the sustainable management practices assessment workbook for avocados and their relevance to CALFED Goals and water use efficiency (WUE) objectives. **Table 4** presents a list of sustainable management practices criteria from the SWP workbook as and example of the scope and scale of management practices to be addressed in each chapter. Each chapter and the respective criteria for the avocado workbook will be reviewed and adapted for this task.

Table 3. List of 13 integrated sustainable management practices chapters and number of criteria per chapter in the 2002 SWP workbook

Sustainable Winegrowing Practices (SWP) Workbook Chapters	Number of Criteria per Chapter
Viticulture	20 Criteria
Soil Management	15 Criteria
Vineyard Water Management	13 Criteria
Pest Management	38 Criteria
Wine Quality	8 Criteria
Ecosystem Management	20 Criteria
Energy Efficiency	11 Criteria
Winery Water Conservation & Quality	16 Criteria
Material Handling	14 Criteria
Winery Solid Waste Reduction & Management	16 Criteria
Environmentally Preferred Purchasing	15 Criteria
Human Resources	16 Criteria
Neighbours and Community	14 Criteria

Table 4. List of sustainable management practices criteria from the SWP workbook as and example of the scope and scale of management practices to be addressed.

Criteria from SWP Chapter 5: Vineyard Water Management
Water Management Strategy
Monitoring and Amending Water Quality
Off-site Water Movement
Irrigation System
Distribution Uniformity for Micro-Irrigation Systems
Filters and Lines
Flow Meters
Soil Water-Holding Capacity
Soil Moisture and Plant Water Status Monitoring Methods
Evapotranspiration (ET)

Task 4. Draft Workbook

A workbook technical development team will be formed and include appropriate representatives from Rancho California Water District, San Jacinto Basin Resource Conservation District; California Avocado Commission, CalAvo Growers, The Nature Conservancy, University of California, U.S. Bureau of Reclamation, local growers, and other organizations.

Draft chapters will be produced and then distributed to members of the workbook development team. Team members will bring their comments to facilitated team meetings where each criterion will be reviewed and edited. This method was used to draft, review and edit all 13 chapters and 221 criteria in the SWP workbook over the course of 18 months. Workbook chapter development meetings will occur once per month for 9 months from February 2006 through November 2006. SureHarvest staff along with appropriate content expertise from the public and/or private sectors will draft chapters and criteria.

The purpose of reviewing and editing each chapter and criteria in a professional facilitated group meeting, the final chapter content reflects the best available knowledge from leading experts along with being practical in nature and feasible to implement due to input from growers during the team meetings.

Task 5. Facilitate Workbook External Review

A draft of the sustainable management practices assessment workbook for avocados will be sent to appropriate technical representatives for external review. Approximately 40-50 external reviewers will be identified by the workbook technical development team. These external reviewers will include representatives from relevant local, state and federal government agencies, environmental and social equity nonprofit organizations, and research and extension professionals.

In addition to seeking written comments, at least 20 interviews of external reviewers will be conducted along with one or two facilitated review meetings. The external review process will take place from December 2006 through March 2007.

The purpose of conducting an extensive external review is to ensure that the workbook content is technically sound, relevant, and feasible.

Task 6. Complete Workbook Writing, Design and Printing

The collection of external review comments will be incorporated into the final workbook. A professional print design and production firm will be subcontracted to design and produce the final workbook. 1000 workbooks will be printed.

APPENDIX D
Resumes of Project Managers and Key Project Participants

Jeff Dlott, Ph.D.

Dr. Jeff Dlott is president & CEO of SureHarvest, a California corporation that provides integrated farm management software and sustainability professional services. He is also the Acting Executive Director of the California Sustainable Winegrowing Alliance (CSWA), a San Francisco-based 501(c) 3 nonprofit organization incorporated in 2003 to conduct public outreach on the benefits of widespread adoption of sustainable winegrowing. For the last 15 years, he has focused on the development and adoption of sustainable agricultural practices in public-private partnerships.

He received his Ph.D. from UC Berkeley in the Department of Environmental Science, Policy and Management in 1993 where he combined ecological field research with social science program design and evaluation tools to understand and extend sustainable agriculture systems. He has worked with private companies, nonprofit organizations, private foundations, academic institutions, and state and federal government agencies throughout the US. Dr. Dlott has authored peer-reviewed academic journal articles and book chapters as well as trade articles, public and confidential client reports.

Since 2001, Dr. Dlott has managed a professional services team working with the Wine Institute, California Association of Winegrape Growers and many regional winegrowing associations in the design, execution and evaluation of the California Code of Sustainable Winegrowing Practices (SWP)—a comprehensive sustainable management practices assessment and educational program for winegrowers and winemakers. The SWP Program recently received one of the prestigious 2004 Governor’s Environmental and Economic Leadership Awards (GEELA).

Jim Gilmore

Jim Gilmore has served as Program Manager for the San Jacinto Basin RCD and as Team Leader for the district's Irrigation and Nutrient Management Lab for the last 10 years. He is a graduate of California State University at San Luis Obispo with a B.S. in Biological Sciences and minors in Agriculture and English. Prior to 1992, he was Managing Director of the National Coalition for Marine Conservation – Pacific Region and founding director of the United Anglers of Southern California. From 1974 through 1981, he was the Program Development Specialist (Grants Officer) for the Huntington Beach Union High School District and creator of the Community Environment Laboratory. Over the last 10 years he has managed the following grant programs for San Jacinto Basin RCD:

<u>Program</u>	<u>Period</u>	<u>Grantor*</u>
Agricultural Irrigation Water Management And System Assessment	July '92 – Present	Eastern Municipal Water District (EMWD)
AG IWM and System Assessment	Jan '94 – Dec '01	USBR
Powdery Mildew Management in Winegrapes: Adcon Wx Stn Network	1996	Dept. of Pesticide Regulation
PRISM Irrigation Scheduling Program	1999 to Present	USBR
USDA EQIP Education Program for Growers of Winegrapes, Citrus & Avocado	2000, 2001	USDA/NRCS
Nitrate Management in Winegrapes Conservation	2000, 2001	Dept. of
Expansion of PRISM Irrigation Scheduling Conservation Program	2001, 2002	Dept. of
Regulated Deficit Irrigation Program	2002	USBR
IWM and System Assessment for Large Commercial Landscapes	2002, 2003	USBR via EMWD
Irrigation Water Management Hotline (Toll-free scheduling information)	1995 – Present	EMWD

*Reference contacts provided upon request

Perry R. Louck

Perry is a Certified Public Accountant with twenty years of experience in the Water and wastewater industry. Perry's industry experience includes internal and external auditing, financial planning and rate modeling. In addition to his current position as Director of Planning for Rancho California Water District, He has also functioned as the District's Controller and Assistant to the General Manager. As the Director of Planning he implemented the District's current Targeted Conservation Program for municipal users and is leader of the District's Sustainable Agriculture team. Perry is currently also managing the District's Integrated Water Resource Plan.

Michele Barefoot, MBA

Michele Barefoot is President of Agraria Consulting, an agribusiness consulting firm based in Davis, California. Agraria Consulting provides business analysis, planning and development assistance to growers, commodity organizations, food processors, agricultural suppliers, nonprofit organizations, and technology developers in the food and agriculture industries.

Ms. Barefoot has over twenty years of experience as a strategic planning and marketing consultant to organizations involved in market development and the adoption of new technology and business strategies. Her professional experience includes business and startup planning, organization and management consulting, strategic planning and facilitation services, market development and communications planning, and international partnering.

Ms. Barefoot served as General Manager and Director of Consulting Services for agAccess Information Services in Davis for over ten years, where she gained extensive experience working with California specialty crop commodity organizations and agricultural technology firms. Her areas of industry expertise include consulting to the irrigation, seed and ag chemical industries and, more recently, the emerging field of sustainability and eco-label marketing.

Collaborative projects and feasibility studies coordinated by Ms. Barefoot include the Lodi-Woodbridge Winegrape Commission Sustainability Positioning and Outreach Strategy, the Yolo County Biotech Incubator Needs Assessment, the development of the AgriTech Connect resource organization for ag technology attraction to the Sacramento Region, and other market and industry development initiatives.

In 1999, Ms. Barefoot conducted a comprehensive global irrigation and fertigation technology assessment study for Kemira Agro of Finland. This study included international and in-field interviews of growers, research institutes, irrigation and fertilizer companies to determine current and developing technologies and practices for water conservation and nutrient applications in agriculture.

On an international level, Ms. Barefoot has also worked as a strategy consultant at Booz-Allen & Hamilton in the food distribution industry in Spain and Europe, devising marketing strategies to comply with the evolving regulatory climate following Spain's inclusion in the EEC in 1986. She has served as a business advisor to US and European companies on partnering and distribution strategies in the US, Mexico and emerging Latin American markets.

Ms. Barefoot holds a Masters in Business Administration from the Anderson School at UCLA and a Bachelor of Arts in Anthropology and Spanish from Colorado College. She is an instructor in food and agricultural business topics for the University of California Extension Program.

APPENDIX E

Table C-1
[See attached Excel file]

Applicant: Rancho California Water District, Year 1 of 2

THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY

Table C-1: Project Costs (Budget) in Dollars)

	Category (I)	Project Costs \$ (II)	Contingency % (ex. 5 or 10) (III)	Project Cost + Contingency \$ (IV)	Applicant Share \$ (V)	State Share Grant \$ (VI)	Life of investment (years) (VII)	Capital Recovery Factor (VIII)	Annualized Costs \$ (IX)
	Administration ¹								
	Salaries, wages	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Fringe benefits	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Supplies	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Equipment	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Consulting services	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Travel	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Other	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(a)	Total Administration Costs	\$73,865		\$0	\$25,000	-\$25,000			\$0
(b)	Planning/Design/Engineering	\$85,180	5	\$89,439	\$0	\$89,439	0	0.0000	\$0
(c)	Equipment Purchases/Rentals/Rebates/Vouchers	\$93,473	5	\$98,147	\$0	\$98,147	10	0.0000	\$0
(d)	Materials/Installation/Implementation	\$113,100	5	\$118,755	\$0	\$118,755	0	0.0000	\$0
(e)	Implementation Verification	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(f)	Project Legal/License Fees	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(g)	Structures	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(h)	Land Purchase/Easement	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(i)	Environmental Compliance/Mitigation/Enhancement	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(j)	Construction	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(k)	Other (Indirect Cost)		0	\$0	\$0	\$0	0	0.0000	\$0
(l)	Monitoring and Assessment	\$102,075	5	\$107,179	\$31,750	\$75,429	0	0.0000	\$0
(m)	Report Preparation	\$500	5	\$525	\$0	\$525	0	0.0000	\$0
(n)	TOTAL	\$468,193		\$414,044	\$56,750	\$357,294			\$0
(o)	Cost Share -Percentage				14	86			

1- excludes administration O&M.

Applicant: Rancho California Water District, Year 2 of 2

THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY

Table C-1: Project Costs (Budget) in Dollars)

	Category (I)	Project Costs \$ (II)	Contingency % (ex. 5 or 10) (III)	Project Cost + Contingency \$ (IV)	Applicant Share \$ (V)	State Share Grant \$ (VI)	Life of investment (years) (VII)	Capital Recovery Factor (VIII)	Annualized Costs \$ (IX)
	Administration ¹								
	Salaries, wages	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Fringe benefits	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Supplies	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Equipment	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Consulting services	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Travel	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Other	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(a)	Total Administration Costs	\$73,865		\$0	\$25,000	-\$25,000			\$0
(b)	Planning/Design/Engineering	\$500	5	\$525	\$0	\$525	0	0.0000	\$0
(c)	Equipment Purchases/Rentals/Rebates/Vouchers	\$0	0	\$0	\$0	\$0	10	0.0000	\$0
(d)	Materials/Installation/Implementation	\$187,400	5	\$196,770	\$0	\$196,770	0	0.0000	\$0
(e)	Implementation Verification	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(f)	Project Legal/License Fees	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(g)	Structures	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(h)	Land Purchase/Easement	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(i)	Environmental Compliance/Mitigation/Enhancement	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(j)	Construction	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(k)	Other (Specify)		0	\$0	\$0	\$0	0	0.0000	\$0
(l)	Monitoring and Assessment	\$108,584	5	\$114,013	\$31,750	\$82,263	0	0.0000	\$0
(m)	Report Preparation	\$2,400	5	\$2,520	\$0	\$2,520	0	0.0000	\$0
(n)	TOTAL	\$372,749		\$313,828	\$56,750	\$257,078			\$0
(o)	Cost Share -Percentage				18	82			

1- excludes administration O&M.

Applicant: Rancho California Water District, Total - Year 1 + Year 2

THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY

Table C-1: Project Costs (Budget) in Dollars)

	Category (I)	Project Costs \$ (II)	Contingency % (ex. 5 or 10) (III)	Project Cost + Contingency \$ (IV)	Applicant Share \$ (V)	State Share Grant \$ (VI)	Life of investment (years) (VII)	Capital Recovery Factor (VIII)	Annualized Costs \$ (IX)
	Administration ¹								
	Salaries, wages	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Fringe benefits	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Supplies	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Equipment	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Consulting services	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Travel	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Other	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(a)	Total Administration Costs	\$147,730		\$147,730	\$50,000	\$97,730			\$0
(b)	Planning/Design/Engineering	\$85,680	5	\$89,964	\$0	\$89,964	0	0.0000	\$0
(c)	Equipment Purchases/Rentals/Rebates/Vouchers	\$93,473	5	\$98,147	\$0	\$98,147	10	0.0000	\$0
(d)	Materials/Installation/Implementation	\$300,500	5	\$315,525	\$0	\$315,525	0	0.0000	\$0
(e)	Implementation Verification	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(f)	Project Legal/License Fees	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(g)	Structures	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(h)	Land Purchase/Easement	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(i)	Environmental Compliance/Mitigation/Enhancement	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(j)	Construction	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(k)	Other (Indirect Costs)	\$45,436	0	\$45,436	\$0	\$45,436	0	0.0000	\$0
(l)	Monitoring and Assessment	\$210,659	5	\$221,192	\$63,500	\$157,692	0	0.0000	\$0
(m)	Report Preparation	\$2,900	5	\$3,045	\$0	\$3,045	0	0.0000	\$0
(n)	TOTAL	\$886,378		\$921,039	\$113,500	\$807,539			\$0
(o)	Cost Share -Percentage				12	88			

1- excludes administration O&M.