Attachment 7
Technical Justification

This section outlines the physical benefits and technical justification of each project included in this application.

Note: The supporting materials for all Attachments for all of the projects in this application are attached as part of the Technical Justification Attachment (and are not attached in the other Attachments). We opted to attach all of the supporting materials just once in this Attachment, rather than in each of the Attachments wherever they are referenced, in order to avoid multiple uploads of the same documents. The following table lists the supporting materials attached for each project in this application, along with an explanation of which Attachments those materials support, and the file under which those materials can be found.

Project	Supporting Materials	In Support of Attachments:
Project 1. County of Monterey: San Lucas Water District Public Water Supply Project **Found in: Att7_IG2_TechJust_2of5**	*Draft Feasibility Study for Source Water Evaluation, San Lucas County Water District, San Lucas, California*, Springer & Associates, Inc., March 10, 2008	3
	Hydrologic Characterization and Test Well Feasibility Analysis for San Lucas County Water District, Monterey County, Pueblo Water Resources, Inc., September, 2010	3
	"Do Not Drink" Notification Order, County of Monterey Health Department, March 15, 2011	3, 7
	Compliance Order No. 11-006, County of Monterey Health Department, May 23, 2011	3, 7
	Technical Memorandum: *Nitrate Concentration in Groundwater near San Lucas*, Pueblo Water Resources, Inc., June 6, 2011	3
	Irrigated Agriculture Program: Notice of Violation and Water Code Section 13260 and 13267 Order For Information, Naraghi Farms Property – 56395 Cattlemen Road, San Lucas, Monterey County, California Regional Water Quality Control Board, Central Coast Region, May 15, 2012	3, 7
	Agricultural Order No. R3-2012-0011: Transmittal of Draft Cleanup and Abatement Order for Naraghi Farms Property; Las Colinas Ranches 1-4, 56395 Cattlemen Road, San Lucas, Monterey County, California Regional Water Quality Control Board, Central Coast Region, December 14, 2012	3, 7
	San Jerardo Water System Improvements contract prices	4
Project 2. Pajaro Sunny Mesa CSD: Springfield Water Project **Found in: Att7_IG2_TechJust_2of5**	Monterey County Health Department, Springfield Notice of Violation, pages 1-2	3
	California Department of Public Health: Violations by County 2011 ACR, pages 3-4	3
	Monterey County Environmental Health: Springfield Water System Inspection Report, pages 5-11	3
	PSMCSD Springfield Water Laboratory Analysis Summaries, pages 12-14	3
	Engineer's Report for Springfield Road and Struve Road Water Systems, page 16-33	3
	Well Driller's Well Completion Report Springfield Road Site, pages 34-35	3
	Conceptual Cost Estimate Springfield Road Site, pages 36-37	3
	Conceptual Cost Estimates Moss Landing and Added DAC Connections, pages 38-40	3
	Conceptual Design and Springfield Well Site Plans, pages 41-43	3

Project 3. City of Salinas/ Monterey Regional Water Pollution Control Agency: Dry Weather Run Off Diversion Program **Found in: Att7_IG2_TechJust_3of5**	Dry Weather Run Off Diversion Program Specifications (Draft)	3
	Urban Runoff Pollutants Removal of Three Engineered Soils	3, 7
	Biotic Degradation of Pollutants	3, 7
	MRWPCA Regular Meeting Notice/Consent Agenda/Waste Discharge Report	3, 7
	Monterey Wastewater Reclamation Study for Agriculture	3, 7
	Irrigated Lands Regulatory Program	3, 7
	Historic Seawater Intrusion Map – 180 ft. Aquifer	3, 7
	Historic Seawater Intrusion Map – 400 ft. Aquifer	3, 7
	Monterey Bay Sanctuary Citizen Watershed Monitoring Network: Monitoring Report for NPS Pollution	3, 7
	Salinas MS4 NPDES Permit – Appendix C	3, 7
	Central Coast Regional Water Quality Control Board: TMDL for Fecal Coliform in Lower Salinas River Watershed	3, 7
	Central Coast Regional Water Quality Control Board: TMDL for Chlorpyrifos and Diazinon in Lower Salinas River Watershed	3, 7
	Central Coast Regional Water Quality Control Board Nutrient Guideline (Developing a Nitrate Guideline Value for Aquatic Life)	3, 7
	CCA Salinas River	3, 7
	Salinas Lift Station Monitoring Results	3, 7
	UC Davis Study: Addressing Nitrate in California's Drinking Water	3, 7
	Engineer's Estimate	4
Project 4. RCD of Monterey County: Salinas River Watershed Invasive Non-native Plant Control and Restoration Program **Found in: Att7_IG2_TechJust_2of5**	California Invasive Plant Council, *Arundo donax Distribution and Impact Report (2011)* Filename: ArundoDistributionandImpactReport_Cal-IPC_March202011.pdf	3, 7
	Resource Conservation District of Monterey County, *Initial Study – Salinas Watershed Invasive Non-native Plant Control and Restoration Program* (2011) Filename: MND CEQA Salinas final 20dec2011.pdf	3
Project 5. RCD of Monterey County: Monterey County Farm Water Quality Assistance Program **Found in: Att7_IG2_TechJust_2of5**	Cahn, Michael, Husein Ajwa, and Richard Smith, UCCE, Monterey County, "Evaluation of Polyacrylamide (PAM) for Reducing Sediment and Nutrient Concentration in Tail Water from Central Coast Vegetable Fields." CDFA Fertilizer Research and Education Program. 2005. Filename: 02-0781Cahn 05 PAM study.pdf	3, 7
	Cahn, Michael, and Richard Smith, UCCE, Monterey County, "Summary of 2008-9 Large Scale Irrigation and Nitrogen Fertilizer Management Trials in Lettuce," *UCCE Monterey Crop Notes*, March -April 2010. Filename: Crop Notes March_-_April,_2010.pdf	3, 7
	Central Coast Regional Water Quality Control Board, "Water Quality Conditions in the Central Coast Region Related to Agricultural Discharges" (Appendix G), *Staff Recommendations to the for the "Updated Conditional Waiver of Waste Discharge Requirements for Irrigated Agricultural Waste Discharges."* March 2011.	7
	Mountjoy, Daniel, "Practice Effectiveness for Elkhorn Slough Watershed" (spreadsheet), USDA Natural Resources Conservation Service Salinas Service Center, 2002.	7
	Resource Conservation District of Santa Cruz County, *Desafios y Soluciones: A Snapshot of Needs and Challenges in the Spanish-speaking Grower Community of Santa Cruz County,* 2011.	7

	Smith, Richard, and Michael Cahn, UCCE, Monterey County; and Tim Hartz, University of California, Davis, "Evaluation and demonstration of best management irrigation and nutrient management practices (BMP) to safeguard water quality." California Lettuce Research Board. 2011. Filename: Smith_Irrigation_and_nutrient_mgmt_practices.pdf	3, 7
	Smith, Richard, and Michael Cahn, UCCE, Monterey County; and Tim Hartz, University of California, Davis, "Evaluation of best management irrigation and nutrient management practices (BMP) and treatment of nitrate in tile water to safeguard water quality," California Leafy Greens Research Board. 2012.	7
	Smith, Richard, UCCE, Monterey County, "Evaluation Low-residue Cover Crops to Reduce Nitrate Leaching, and Nitrogen and Phosphorous Losses from Winter Fallow Vegetable Production Fields in the Salinas Valley," CDFA Fertilizer Research and Education Program. 2008. Filename: Smith FREP cover crop study 08-0628.pdf	3, 7
	USDA Natural Resources Conservation Service, *Elkhorn Slough Watershed Project 1994 To 2005 Summary Report.* Filename: Elkhorn Slough Summary Report 1994-2005.pdf	3
Project 6. Ecology Action: Monterey Bay Green Gardener Training and Certification Program **Found in: Att7_IG2_TechJust_2of5**	Bilingual Green Gardener promotional flyer examples from previous classes, and pre and post-training evaluation forms	3
	Salinas Landscape Water Budget Calculator	7
	Residential Greywater Irrigation Systems in California: An Evaluation of Soil and Water Quality, User Satisfaction, and Installation Costs (Greywater Action, City of Santa Rosa, Ecology Action, Nov. 2012)	7
	EPA GHG calculator	7
Project 7. Elkhorn Slough Foundation: Ridgeline to Tideline - Water Resource Conservation in Elkhorn Slough **Found in: Att7_IG2_TechJust_4of5**	Allen, J.R.L. 2000. Morphodynamics of Holocene salt marshes: a review sketch from the Atlantic and Southern North Sea coasts of Europe. Quaternary Science Reviews 19:1155-1231.	7
	Byrd, K.B., and M. Kelly. 2006. Salt marsh vegetation response to edaphic and topographic changes from upland sedimentation in a Pacific estuary. Wetlands 26:813-829.	7
	Callaway, J.C., E.L. Borgnis, R.E. Turner, and C.S. Milan. 2012. Carbon sequestration and sediment accretion in San Francisco Bay tidal wetlands. Estuaries and Coasts 35:1163-1181.	7
	Center for Watershed Sciences. 2012. Addressing Nitrate in California's Drinking Water. Prepared for the California State Water Resources Control Board. University of California Davis, CA.	7
	Elkhorn Slough Tidal Wetland Project Team. 2007. Elkhorn Slough Tidal Wetland Strategic Plan. A report describing Elkhorn Slough's estuarine habitats, main impacts, and broad conservation and restoration recommendations. 100 pp.	3
	Environmental Protection Agency. 2010. Managing agricultural fertilizer application to prevent contamination of drinking water. Source Water Protection Practices Bulletin. Washington, DC.	7
	ESNERR. 2012. Request for Proposal: Elkhorn Slough Tidal Marsh Restoration Phase II: Site Assessment, Engineering Design and Regulatory Compliance. http://www.elkhornslough.org/tidalwetland/downloads/ESF_Marsh_Restoration_RFP.pdf	3, 4
	ESNERR and Moffatt & Nichol. 2010. Parsons Slough Complex Wetland Restoration Plan. Prepared for the California State Coastal Commission.	3, 4
	Friedrichs, C. T., and Perry, J. E. 2001. Tidal salt marsh morphodynamics: a	7

	synthesis. Journal of Coastal Research 27:7-37.	
	Gee, A. K., K. Wasson, S.L. Shaw, and J. Haskins. 2010. Signatures of restoration and management changes in the water quality of a central California estuary. Coasts and Estuaries 33:1004-124.	3, 7
	Hughes, Brent B., John C. Haskins, Kerstin Wasson, and Elizabeth Watson. 2011. Identifying factors that influence expression of eutrophication in a central California estuary. Marine Ecology Progress Series 439:31-43.	3, 7
	Monterey County Water Resources Agency. 2006. Monterey County Groundwater Management Plan. Monterey, CA.	7
	Nelson J.L. and E.S. Zavaleta. 2012. Salt marsh as a coastal filter for the oceans: changes in function with experimental increases in nitrogen loading and sea-level rise. PLoS ONE 7(8)	7
	Scharffenberger, T. 1999. Elkhorn Slough Watershed Conservation Plan. Elkhorn Slough Foundation and The Nature Conservancy.	3, 7
	Van Dyke, E., and K. Wasson. 2005. Historical ecology of a central California estuary: 150 years of habitat change. Estuaries 28:173-189.	7
	Wasson, K. and A. Woolfolk. 2011. Salt marsh-upland ecotones in central California: vulnerability to invasions and anthropogenic stressors. Wetlands 31:1-14.	3, 7
	Woolfolk, A, and Q. Labadie. 2012. The significance of pickleweed-dominated tidal salt marsh in Elkhorn Slough, California: a literature review. Elkhorn Slough Technical Report Series 2012:4.	7
	Woolfolk, Andrea, Kerstin Wasson, and Nina D'Amore. 2009. Making room for native grasses: physical control of coastal weeds. Proceedings: California Invasive Plant Council Symposium 13: 94-96. www.cal-ipc.org/symposia/archive/pdf/Proceedings_2009_small.pdf	3, 7
Project 8. Central Coast Wetlands Group: Greater Monterey County Regional Water Quality Monitoring Network **Found in: Att7_IG2_TechJust_5of5**	LOBO Results (slide show)	3
	Monterey Bay National Marine Sanctuary. 2008. *Strategic Plan for Central Coast Water Quality Monitoring Coordination and Data Synthesis.*	3
	Monterey Bay National Marine Sanctuary. 2012. *Greater Monterey County IRWM Assessment of Water Quality Monitoring Programs and Data Gaps.*	3
	Equipment Quotation: LOBO (January 18, 2013)	4
	Equipment Quotation: SUNA (January 24, 2013)	4
Project 9. Save Our Shores: Annual Coastal Cleanup Day in Monterey County **Found in: Att7_IG2_TechJust_5of5**	2012 ACC Results Press Release	3
	Monterey Weekly ad (9-13-12)	3
	Monterey Weekly ad Thank-You (9-20-2012)	3

Project 1. County of Monterey: San Lucas Water District Public Water Supply Project

The community of San Lucas is a small (pop. 400) rural economically disadvantaged farmworker community in southern Monterey County. In 2003, the County of Monterey was awarded a grant to help fund improvements to the existing municipal water system serving San Lucas. The project included replacement of the existing water tank and transmission lines. At that time, the quality of the water supply met all local and State standards. The funding was awarded based on the affordable housing that would be provided by a proposed 33-unit affordable housing project for farmworkers in the region. In 2005, the County was awarded another grant to make improvements to the wastewater system necessary to support the proposed affordable housing units. The improvements were completed in 2007 but the Regional Water Quality Control Board (RWQCB) discharge permit could not be issued for the treatment facility due to excessive amounts of total dissolved solids (TDS) found in the treated effluent. Preliminary investigation determined the cause of the problem was the source of the community's existing water well. The County Health Department notified the Water District that it would not be allowed to approve any new service connections until the TDS contamination was removed from the water supply. TDS levels are currently running about 2,000 ppm.

A few years later, based on routine sampling and testing required in State law for public water supplies, the Monterey County Health Department determined that concentrations of nitrates and TDS in the San Lucas Water District's public water supply exceed State-mandated maximum contaminant levels. In March 2011 the Health Department notified the District that its customers are not allowed to drink or cook with the water. This was followed in May 2011 by the issuance of Compliance Order No. 11-006, which prohibits the Water District from allowing their public water supply to be consumed.

In May 2012, the RWQCB issued a Notice of Violation to the landowner on which the Water District's existing well is located, stating the landowner's agricultural activities had contaminated the Water District's public water supply, and in December 2012 issued a Draft Cleanup and Abatement Order directing the landowner to remediate this contamination.

The proposed Project will retain professional consultants to analyze alternative solutions to restore the quality of the community public water supply, select a Preferred Option, perform preliminary engineering, CEQA review, final engineering, obtain permits and rights-of-way, and construct the project. The Project will result in the creation of a long-term affordable public water supply for the San Lucas Water District.

Project Physical Benefits

The San Lucas Water District provides public water supply and wastewater collection and disposal services to the San Lucas community through a total of 85 service connections. Average water demand for the community over the last ten years has been about 55 AFY (125 gpcd).

As discussed above, in May 2011 the County Health Department determined the community's public water supply is not potable due to nitrate and TDS contamination, and the residents of San Lucas have been prohibited from drinking or cooking with their water for two years. In addition, because of excessive amounts of TDS found in the treated effluent, the County Health Department has notified the Water District that it will not be allowed to approve any new service connections until the TDS contamination has been removed from the water supply. The proposed project will produce the following physical benefits:

- Provision of a potable public water supply for the San Lucas community, where one does not now exist.

- Opportunity to construct new, much-needed affordable housing units, which will be made possible by permission granted from the County Health Department to add new service connections to District's wastewater treatment system.

Supporting Materials

The following documents are being submitted electronically as supporting materials, and can be found in this Attachment as Att7_IG2_TechJust_2of5:

- "Do Not Drink" Notification Order, County of Monterey Health Department, March 15, 2011
- *Compliance Order No. 11-006*, County of Monterey Health Department, May 23, 2011
- *Irrigated Agriculture Program: Notice of Violation and Water Code Section 13260 and 13267 Order For Information, Naraghi Farms Property – 56395 Cattlemen Road, San Lucas, Monterey County,* California Regional Water Quality Control Board, Central Coast Region, May 15, 2012
- *Agricultural Order No. R3-2012-0011: Transmittal of Draft Cleanup and Abatement Order for Naraghi Farms Property; Las Colinas Ranches 1-4, 56395 Cattlemen Road, San Lucas, Monterey County*, California Regional Water Quality Control Board, Central Coast Region, December 14, 2012

Table 9
Project 1. County of Monterey: San Lucas Water District Public Water Supply Project

Table 9 – Annual Project Physical Benefits			
Project Name: San Lucas Water District Public Water Supply Replacement			
Type of Benefit Claimed: Provide potable public water supply to disadvantaged community			
Measure of Benefit Claimed: Acre Feet per Year			
(a)	**(b)**	**(c)**	**(d)**
Physical Benefits			
Year	**Without Project**	**With Project**	**Change Resulting from Project (b)-(c)**
Ongoing from date of completion	No potable water supply	Community has potable water supply: ~55 acre feet per year	~55 acre feet per year of potable water supply
Comments: The 55 acre feet/year estimate is based on current demand.			

Table 9 – Annual Project Physical Benefits			
Project Name: San Lucas Water District Public Water Supply Replacement			
Type of Benefit Claimed: Possibility for new farmworker housing units			
Measure of Benefit Claimed: Number of new connections			
(a)	**(b)**	**(c)**	**(d)**
Physical Benefits			
Year	**Without Project**	**With Project**	**Change Resulting from Project (b)-(c)**
Ongoing from date of completion	No new connections permitted to wastewater system	New connections permitted to wastewater system	New connections permitted (actual number unknown), allowing for construction of new affordable housing units
Comments: When the TDS contamination in the water supply is removed, the County Health Department will permit the Water District to approve new service connections to the wastewater treatment system, which will result in the opportunity to construct much-needed affordable housing units for this farmworker community.			

Project 2. Pajaro/Sunny Mesa Community Services District: Springfield Water Project

Residents of the Springfield area, a disadvantaged community (DAC) in rural north Monterey County, do not have access to a safe drinking water supply from the existing well for the Springfield water system. The project currently proposed by the Pajaro/Sunny Mesa Community Services District (PSMCSD) will provide the predevelopment technical studies, analysis, and engineering to choose an appropriate replacement water supply for this small community and proceed with design and permitting.

There are approximately 165 primarily lower income residents served by 34 operational connections in the Springfield community water system. Test results for the Springfield water system have exceeded acceptable nitrate levels since 1986, according to Nancy Martella from the Monterey County Health Department, Environmental Health Bureau. PSMCSD began operating the water system in 2004. A Notice of Violation for failure to comply with Section 116450 of the California Health Safety Code was issued and a Bottled Water Order remains in place for the community due to high nitrate levels. Recently, nitrate levels (as NO3) averaged 282 ppm over four consecutive quarters of 2012, exceeding the allowable amount under California drinking water health and safety standards by nearly 600%. Total dissolved solids (TDS) are also above acceptable standards (2900 ppm). The well is in an area at high risk of seawater intrusion due to its proximity to the coastline and low elevation. Water quality conditions are expected to continue to deteriorate over time.

PSMCSD has obtained an easement to develop a well and storage tank at a different site. However, financial constraints have prevented the project from moving forward. New information regarding hydrological conditions indicates the potential for seawater intrusion in the area proposed for the new well in the longer term. PSMCSD has determined that hydrology and geotechnical studies and additional water quality tests are needed to confirm the suitability of the site. A second option is for the system to consolidate with the Moss Landing Water System to the south. Other options include identification of another site for well development further inland and treatment of the water from the existing well. Expansion of the water connections to adjacent underserved DAC areas will be considered in the proposed studies.

The objective for this project is to ensure that the Springfield community will be able to develop a new supply of water that meets State and local drinking water standards for water quality and adequate production capacity for minimum health and safety requirements, including fire safety codes. Planning for a replacement water supply has been determined to be a priority for PSMCSD. However, current water rates are inadequate to support predevelopment costs and the economically disadvantaged residents are unable to afford rate increases commensurate with the development cost unless financial assistance is available for the project. Tasks included in the Work Plan are critical to selection of the best long-term solution to the DAC's long-term water problems and will move the project forward to completion.

Without IRWM funding, a clearly defined path to achieve the project goal does not exist at this time.

Project Physical Benefits

There are no physical benefits expected to directly result from the Springfield Water Project as the grant request is limited to predevelopment technical studies, planning, feasibility analysis and design in order to evaluate the optimal replacement water supply for the DAC. (See below for an explanation of benefits that will result from the replacement water supply after construction.)

Narrative Description of the Project's Expected Physical Benefits

The Springfield Water Project will not provide immediate physical or economic benefits (as defined by DWR) from the technical studies, planning, design and analysis activities proposed by PSMCSD. However, there are significant physical benefits once construction of the project is complete.

The primary physical benefits to be derived from the project upon completion of construction include improved water quality and water supply production for the Springfield disadvantaged community. The current water supply fails to meet State and local drinking water health and safety regulations and fire safety codes. The tasks included in the proposed Scope of Work for the project will result in the selection of an alternative that is recommended after consideration of hydrology, geotechnical, and water testing for quality and production adequacy.

The new water supply project will provide an amount of water production sufficient to meet the daily needs of Springfield residents, including potable water for drinking and cooking. The existing water usage for Springfield averages approximately 6 million gallons per annum. After completion of construction, projected for 2015, residents will be able to utilize an estimated 121,000 gallons of water per year for cooking and drinking from the new water source instead of bottled water. Over 6 million gallons of water with excessive nitrates produced by the existing Springfield well will be replaced by water that is in compliance with safe drinking water standards from the new water supply each year.

Other benefits: Fire safety and supply improvements will include construction of a 210,000 gallon water storage tank and generator to ensure ample water supply in the case of power outages or equipment failure. Relocation of the source of water supply further inland from the existing well near the coastline will reduce overdraft and seawater intrusion risks over a longer term for the Springfield Terrace region west of State Highway 1 by more than 6 million gallons per year.

This community is economically disadvantaged and unable to afford higher water rates that would be necessary for formation of an assessment district to fund improvements or to self-fund the cost to evaluate alternatives. Completion of technical studies, design work, and permitting to the point of bringing the project to "shovel readiness" will enhance the competiveness of future applications for financing and ensure that the project will achieve the overarching goal of supplying adequate water meeting drinking water quality standards for this disadvantaged community.

Quantifiable avoided costs after project completion currently are limited to the estimated cost of bottled water for residents because other avoided costs for the project cannot be determined at this time. Since 2004, Springfield community residents have been forced to bear the costs of purchasing water for drinking and cooking purposes and additional mileage costs to pick up water for their families. These costs are in addition to PSMCSD monthly water fees for Springfield system operations. PSMCSD estimates that 124,500 gallons of drinking/cooking water are used per person/day. Based on the average cost per gallon of water in the immediate vicinity, average miles to water facility, and IRS mileage rate of $0.565/mile, we estimate avoided costs of $177,800 per year upon project completion.

The only realistic option if funding is not made available at this time would be to halt planning and continue under the Bottled Water Order pending other funding opportunities for water remediation or system consolidation that are adequate to complete the requisite technical studies and planning for the project. Residents will not be able to use Springfield system water for drinking or cooking purposes until a future development is finished.

The uncertainties associated with this project are limited to the potential findings of technical studies and feasibility analysis. PSMCSD will evaluate potential risks and uncertainties. However, it is likely that the

project will be developed in a reasonable timeframe after the studies and design are completed. No new technologies, methods, or approaches are proposed and the project is not controversial in nature.

There are no known potential adverse physical effects of the project.

Project 3. City of Salinas and Monterey Regional Water Pollution Control Agency: Dry Weather Runoff Diversion Program

The lower Salinas River and the Reclamation Ditch are two of the most polluted water bodies within the state. Each has segments that have continually failed to meet established minimum beneficial use standards, and have therefore been federally listed on the 303d list for non-attainment. Urban water runoff from the City of Salinas currently flows to receiving waters untreated. Water from south Salinas flows into the Salinas River via a series of stormwater conveyance pipes. The remainder of the city drains into the Reclamation Ditch. Water carries with it pollutants from a number of point urban sources. Left untreated these pollutants can adversely affect downstream environments. The proposed project will help mitigate some urban contributions of contaminants to the Salinas River (south Salinas area) from the City of Salinas and, depending upon the scope, receiving waters of the Reclamation Ditch in north Salinas.

The proposed project will also help increase recycled water supplies used for agricultural production in the northern coastal region, an area severely impacted by seawater intrusion. The regional economy is tied to production agriculture, which represents a $4 billion industry for Monterey County. The growers in the northern coastal region of the County rely upon recycled water to reduce their groundwater pumping requirements. The Monterey Regional Water Pollution Control Agency's (MRWPCA) wastewater treatment plant in Marina has the capacity to generate approximately 21,600 AFY of recycled water. Of that amount, 13,300 AFY of tertiary treated recycled water is currently delivered to the Castroville area for agricultural irrigation during the irrigation season, irrigating approximately 12,000 acres of agricultural fields and substantially reducing the need to pump groundwater for irrigation (the Castroville Seawater Intrusion Project, or CSIP); the remaining 8,300 AFY of available capacity would be generated during the non-irrigation season, but cannot directly be delivered for irrigation purposes due to current lack of seasonal storage facilities (though plans exist to expand the current storage facilities).

The dry weather runoff diversion program would divert runoff from south Salinas into a detention basin that would utilize naturally occurring microbes in the soil to breakdown contaminants in the water, then send it for further treatment to the MRWPCA wastewater treatment plant, where it would be combined with raw sewage from the city and be treated to tertiary standards. The product would then be pumped through the existing CSIP recycled water distribution system in northern Monterey County during dry weather periods, contributing to the source wastewater supply that is reclaimed and used for agricultural irrigation in Castroville.

Note that as several urban water suppliers' areas have embraced water conservation strategies, the amount of water that is being treated at the regional treatment plant and ultimately being sent to the growers during the dry season has been reduced. Finding additional water supplies that can be easily integrated into the existing infrastructure is very desirable. The dry weather runoff diversion program represents a potential source of additional water supply for growers in the region. The benefits of treating water for a higher, more beneficial use as well as reducing the amount of pollutants reaching various water bodies is a very strategic and integrated approach to water management planning.

In the future, the City and MRWPCA plans to study north Salinas, to determine if acceptable water quality and stormwater flows could be diverted into the sanitary sewer system, also a tributary to MRWPCA's wastewater treatment plant. This would further add to the recycled water production for agricultural irrigation in the seawater-intruded northern coastal region.

Project Physical Benefits

The following physical benefits are being claimed for this project:

- Reduced contaminant load in Salinas River and other downstream receiving waters from diverting dry weather urban runoff from south Salinas.
- Reduced contaminant load entering underlying aquifers.
- Increased reclaimed water supply for agricultural production.

Narrative Description of the Project's Expected Physical Benefits

Estimating physical benefits: There currently does not exist the baseline data that would allow us to quantify the amount of contamination in the diverted runoff from south Salinas. The estimate of 40 AF of additional recycled water per year was derived by taking a measurement from the Salinas Outfall during a typical dry weather point in time (cubic feet per second) and adjusting the data point down by 30% to account for any inflow and infiltration (I&I) that maybe occurring in the pipe. It is not uncommon for a pipe like the outfall pipe to have some weak areas which would allow for additional inflow and infiltration amounts. One component of the project includes installing, operating, and maintaining one or more flow meters and automatic water quality samplers to determine the actual amount of water being diverted and the quantity/type of constituents in the diverted water (prior to treatment in the soil detention basin). This analysis will enable us to characterize and quantify the contaminant load prevented from entering the Salinas River (and possibly in the future, the Reclamation Ditch) due to implementation of the project. In addition, the water quality of the raw diverted runoff will be compared to the water quality results after the water has left the soil, and prior to being delivered to the regional wastewater treatment. The soil basin's ability to treat the water as a treatment option will be evaluated during various times in the dry weather period.

Since the Salinas River and Reclamation Ditch water percolates to underlying aquifers, the quality of these surface waters will also affect the quality of the groundwater in the Salinas Valley Groundwater Basin; however, the amount of change due to this one project will be impossible to determine. Note that if additional wet season flows are captured in the future, benefits of this project in terms of improved surface water quality, and also improved groundwater quality, will increase. The assumed life of this project is at least 25 years.

Determining the volume of concentration of the pollutants will help determine the total amount of flux entering the environment. Further calculations can be made to determine transport time down the Salinas River or down into the Salinas Valley aquifer. These estimates will take years to evaluate the total impact of this dry weather diversion program.

Without this project: The City of Salinas would have to embark on a very expensive solution for controlling dry weather runoff, if the proposed project were not implemented. Estimates for designing, building, and operating a facility to treat the pollutants from urban dry weather runoff will be in the multi-million dollar range. The City is already facing tough economic conditions, which are forcing city officials to reduce or scale back many of their core services. The proposed project is easily implementable, relatively economical, and can accomplish multiple benefits, including contributing to the region's recycled water supply for agricultural irrigation and thereby helping to reduce seawater intrusion in coastal aquifers.

Certainty of Benefits and Factors: The project team is confident of the methodology surrounding the soil treatment and degradation of pollutants in the runoff. The team is also fully satisfied with the facility

design and strategy. Any uncertainty will stem from the volume of the flows. Without any flow data to date, it is difficult to estimate the volume and subsequently the amount of pollutant load reduction reaching the various water bodies.

Adverse Physical Effects: The only adverse effect the project team could identify is in the soil detention basin. If there is a large volume of flow during the summer months, subjecting the detention basin to persistent saturated conditions could hinder the soil microbes in breaking down the pollutants. This anaerobic condition could benefit some parts of the soil microflora but could be detrimental to other parts of the soil microbiology. The project team has already developed a plan to alternate the flows to different portions of the basin during the dry weather period to counteract any potential saturated soil conditions.

Supporting Materials

The following documents are being submitted electronically as supporting materials, and can be found in this Attachment as Att7_IG2_TechJust_3of5:

- Urban Runoff Pollutants Removal of Three Engineered Soils
- Biotic Degradation of Pollutants
- MRWPCA Regular Meeting Notice/Consent Agenda/Waste Discharge Report
- Monterey Wastewater Reclamation Study for Agriculture
- Irrigated Lands Regulatory Program
- Historic Seawater Intrusion Map – 180 ft. Aquifer
- Historic Seawater Intrusion Map – 400 ft. Aquifer
- Monterey Bay Sanctuary Citizen Watershed Monitoring Network: Monitoring Report for NPS Pollution
- Salinas MS4 NPDES Permit – Appendix C
- Central Coast Regional Water Quality Control Board: TMDL for Fecal Coliform in Lower Salinas River Watershed
- Central Coast Regional Water Quality Control Board: TMDL for Chlorpyrifos and Diazinon in Lower Salinas River Watershed
- Central Coast Regional Water Quality Control Board Nutrient Guideline (Developing a Nitrate Guideline Value for Aquatic Life)
- CCA Salinas River
- Salinas Lift Station Monitoring Results
- UC Davis Study: Addressing Nitrate in California's Drinking Water

Table 9
Project 3. City of Salinas and Monterey Regional Water Pollution Control Agency: Dry Weather Runoff Diversion Program

Table 9 – Annual Project Physical Benefits			
Project Name: Dry Weather Runoff Diversion Program			
Type of Benefit Claimed: Reduced contaminant load in Salinas River and other downstream receiving waters			
Measure of Benefit Claimed: N/A			
(a)	**(b)**	**(c)**	**(d)**
Physical Benefits			
Year	**Without Project**	**With Project**	**Change Resulting from Project (b)-(c)**
2013 – 2038	Baseline amount (unknown)	Reduced amount	Reduced amount (see comments)
Comments: Baseline data that would allow us to quantify the amount of contamination in the diverted runoff does not exist. The project will include installing, operating, and maintaining one or more flow meters and automatic water quality samplers to determine the actual amount of water being diverted and the quantity/type of constituents in the diverted water (prior to treatment). This analysis will enable us to characterize and quantify the contaminant load removed from downstream receiving waters due to implementation of the project. Note that if additional wet season flows are captured in the future, benefits of this project in terms of improved surface water quality will increase significantly. The assumed life of this project is at least 25 years.			

Table 9 – Annual Project Physical Benefits			
Project Name: Dry Weather Runoff Diversion Program			
Type of Benefit Claimed: Reduced contaminant load entering underlying aquifers			
Measure of Benefit Claimed: N/A			
(a)	**(b)**	**(c)**	**(d)**
Physical Benefits			
Year	**Without Project**	**With Project**	**Change Resulting from Project (b)-(c)**
2013 – 2038	Baseline amount (unknown)	Reduced amount	Reduced amount (see comments)
Comments: Baseline data that would allow us to quantify the amount of contamination in the diverted runoff does not exist. The project will include installing, operating, and maintaining one or more flow meters and automatic water quality samplers to determine the actual amount of water being diverted and the quantity/type of constituents in the diverted water (prior to treatment). This analysis will enable us to characterize and quantify the contaminant load removed from downstream receiving waters due to implementation of the project. Since the Salinas River and Reclamation Ditch water percolates to underlying aquifers, the quality of these surface waters will affect the quality of the groundwater; however, the amount of change due to this one project will be impossible to determine. Note that if additional wet season flows are captured in the future, benefits of this project in terms of improved surface water quality, and therefore improved groundwater quality, will increase significantly. The assumed life of this project is at least 25 years.			

Table 9 – Annual Project Physical Benefits			
Project Name: Dry Weather Runoff Diversion Program			
Type of Benefit Claimed: Increased reclaimed water supply for agricultural production			
Measure of Benefit Claimed: Acre Feet per Year			
(a)	**(b)**	**(c)**	**(d)**
Physical Benefits			
Year	**Without Project**	**With Project**	**Change Resulting from Project (b)-(c)**
2013 – 2038	13,300	13,340 AFY	40 AFY
Comments: This water supply will be added to the existing recycled water supplies to help irrigate 12,000 acres of food crops. If additional wet season flows are captured in the future, the reclaimed water supply amount will increase significantly. The assumed life of this project is at least 25 years.			

Project 4. Resource Conservation District of Monterey County: Salinas River Watershed Invasive Non-native Plant Control and Restoration Program

Habitat, flood control and water availability in the Salinas Valley are compromised and threatened by the second-largest invasion of the noxious weed, *Arundo donax* in California. Arundo is a non-native aggressive perennial grass that has overtaken approximately 1,869 gross acres of the Salinas River, forming enormous monocultures with virtually no food or habitat value for native wildlife. Arundo is known to draw over three times as much water from the aquifer as native vegetation, increasing the likelihood of fire and flooding. Exacerbated flooding poses an additional food safety risk for riverside vegetable farms, for whom flooded fields mean crop loss and cannot be planted for months afterwards.

A secondary weed threat is the growing population of tamarisk (*Tamarix ramosissima*), which, like arundo, displaces native vegetation and quality habitat. Unlike native riparian plants, both weeds provide little shading for in-stream habitat, leading to increased water temperatures and reduced habitat quality for aquatic wildlife (SAWPA 2002). Wildlife at risk include the federally threatened California red-legged frog (*Rana aurora draytonii*), the federally endangered least Bell's vireo (*Vireo bellii pusillus*), the federally endangered arroyo toad (*Bufo microscaphus californicus*) and the federally threatened southern steelhead trout (*Oncorhynchus mykiss*). The Salinas River and its tributaries have been designated by the National Marine Fisheries Service as critical habitat for steelhead. Any control of these invasive plants will have a direct impact on the quality of this habitat and prevent their further proliferation downstream.

The goal of this project is to improve habitat quality, channel conveyance capacity, enhance recharge, and reduce unnatural bank erosion by treatment of 120 net acres of the noxious riparian weeds, arundo and tamarisk, and strategic revegetation with native plants in the channel of the Salinas River and nearby tributaries in the vicinity of King City and downstream towards Soledad.

Physical Benefits

The following physical benefits are being claimed for this project:

- Water conservation: Reduced water consumption, making more water available for fish, native vegetation, and groundwater recharge. The latter is a major function of the river for urban and agricultural use. *Arundo donax* is estimated to consume much more water than native vegetation.
- Reduced acreage of farmland flooded.
- Reduced flood damage to local high-value farmland and bridges.
- Wildlife habitat improvement: 120 acres of riparian habitat enhancement.

Narrative Description of the Project's Expected Physical Benefits

The project proposal is for the first 3-year stage of large scale, coordinated treatment and revegetation in and along the Salinas River and its tributaries. Treatment in this first stage will cover infestations in the San Lorenzo Creek watershed (which drains into the Salinas River at King City) and the channel, floodplain and terraces of the Salinas River between King City and Soledad. With arundo in the river corridor upstream of King City treated in San Luis Obispo County and Monterey County, we anticipate it will require an additional 10-12 years of focused treatment to manage the remaining 1,869 riparian acres infested by arundo and tamarisk from King City downstream to the river mouth at Monterey Bay.

The methods used to estimate physical benefits come from the *Arundo donax Distribution and Impact Report (2011)* prepared by the California Invasive Plant Council (Giessow, et al.). Estimated benefits are

based on averages, but actual benefits will be dependent on site-specific variables at each work site such as channel configuration, density of arundo population (hence localized degree of benefit of arundo removal), intensity of storms during years following treatment, effectiveness of monitoring for retreatment, adjacent vegetation in channel and out of channel, quality of revegetation work, etc. As no other similar projects are planned or likely to be permitted for several years, no other physical benefits will happen without this project.

Potentially adverse physical effects include unintentional harm to resident wildlife and native vegetation, soil disturbance by motor vehicles, and exhaust from vehicles. These are all mitigated by protection measures included in our environmental documentation and further formalized in our associated permit conditions.

Specific notes regarding calculations of physical benefits:

"Reduced acreage of farmland flooded": Under the Flood Study, the authors modeled the potential farmland flooded in 2-year storm events and 10-year storm events with and without channel maintenance (of which we estimated arundo removal might provide 33% of the total estimated benefit; channel maintenance also includes sand/gravel bar removal) for all the farmlands along the river, as follows:

- 2-year storm flooding: 381 acres (existing conditions), 323 acres (with full channel maintenance), estimated 15% reduction or $600,000 reduction in crop losses between the two scenarios.
- 10-year storm flooding: 26,577 acres (existing conditions), 24,869 acres (with full channel maintenance), estimated 6.5% reduction or $28 million reduction in potential crop losses between the two scenarios.

Those numbers are for the entire river (river miles 2 - 94). The proposed project runs roughly RM 68 - 50 so we are estimating 10-20% of the potential lands affected by flooding in the scenarios above. This is calculated then as follows:

- Years 2, 4, 6, 8: 19 acres farmland not flooded during two-year storms (381 - 323 = 59 acre difference, divided by 3 = 19 acres spared by project during 2-year storms).
- Year 10: 569 acres farmland not flooded during two-year storms (26,577 - 24,869 = 1,708 acre difference, divided by 3 = 569 acres spared by project during 10-year storms).

"Reduced flood damage to bridges": There are three highway bridges (Hwy 101 at Soledad, Hwy 68, and Hwy 1) and seven medium to small sized bridges most likely to be impacted by untreated arundo downstream of project starting point (Elm Avenue, Gonzales River Road, Chualar Road, South Davis Road, West Blanco Road, RR bridge adjacent to Monte Road, and Monte Road). These bridges are listed in order of proximity to the project start. We estimate a 20% increased potential for flood damage to these bridges (over 10 years assuming all control) without the project, resulting in costs of bridge replacement/repair along the Salinas River avoided. This estimate is based on the *Arundo donax Distribution and Impact Report* (2011, attached).

Supporting Materials

The following document is being submitted electronically as supporting material, and can be found in this Attachment as Att7_IG2_TechJust_2of5:

- California Invasive Plant Council*, Arundo donax Distribution and Impact Report (2011)*

Table 9
Project 4. Resource Conservation District of Monterey County: Salinas River Watershed Invasive Non-native Plant Control and Restoration Program

Table 9 – Annual Project Physical Benefits			
Project Name: Salinas River Watershed Invasive Non-native Plant Control and Restoration Program			
Type of Benefit Claimed: Water conservation			
Measure of Benefit Claimed (Name of Units): Acre-feet per year			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (b) – (c)**
2015	0	0.223	0.223
2016	0	0.445	0.445
2017	0	0.668	0.668
2018	0	0.668	0.668
2019	0	0.668	0.668
2020	0	0.668	0.668
2021	0	0.668	0.668
2022	0	0.668	0.668
2023	0	0.668	0.668
2024	0	0.668	0.668
Comments: 16.7 ac-mm/year water saved per acre treated according to *Arundo donax Distribution and Impact Report* (2011).			

Table 9 – Annual Project Physical Benefits			
Project Name: Salinas River Watershed Invasive Non-native Plant Control and Restoration Program			
Type of Benefit Claimed: Wildlife Habitat Improvement			
Measure of Benefit Claimed (Name of Units): Acres of improved habitat (arundo treated and native regrowth			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (b) – (c)**
2015	0	40	40
2016	0	40	40
2017	0	40	40
Comments: We can assume $2.5k per acre per year, per California Invasive Plant Council *Arundo Impacts* document (2012).			

Table 9 – Annual Project Physical Benefits			
Project Name: Salinas River Watershed Invasive Non-native Plant Control and Restoration Program			
Type of Benefit Claimed: Reduced flood damage to bridges			
Measure of Benefit Claimed (Name of Units): Bridges avoiding damage, thanks to removed arundo			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (b) – (c)**
2015			
2016			
2017			
2018			
2019			
2020			
2021			
2022			
2023			
Last Year of Project Life	0	2	2
Comments: There are three highway bridges downstream (Hwy 101 at Soledad, Hwy 68, and Hwy 1) and seven medium to small sized bridges most likely to be impacted by untreated arundo downstream of project starting point: Elm Avenue, Gonzales River Road, Chualar Road, South Davis Road, West Blanco Road, RR bridge adjacent to Monte Road, and Monte Road. Bridges listed in order of proximity to project start. Estimate is potential of 20% cost of bridge replacement/repair along the Salinas River avoided (over 10 years assuming all control) according to Arundo donax Distribution and Impact Report (2011).			

Table 9 – Annual Project Physical Benefits			
Project Name: Salinas River Watershed Invasive Non-native Plant Control and Restoration Program			
Type of Benefit Claimed: Reduced acreage of farmland flooded			
Measure of Benefit Claimed (Name of Units): acres			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (b) – (c)**
2015			0
2016			0
2017	381	362	19
2018			
2019	381	362	19
2020			
2021	381	362	19
2022			
2023	381	362	19
2024			
2025	26,577	26,008	569
2026			
Etc.			

Comments: Under the Flood Study, the authors modelled the potential farmland flooded in 2-year storm events and 10-year storm events with and without channel maintenance (of which we guessed arundo removal might provide 33% of the total estimated benefit; channel maintenance also includes sand/gravel bar removal) for all the farmlands along the river:
2 year storm flooding: 381 ac. (existing conditions); 323 ac. (with full channel maintenance), estimated 15% reduction or $600,000 reduction in crop losses between the two scenarios. 10 year storm flooding: 26,577 ac (existing conditions); 24,869 (w channel maintenance), estimated 6.5% reduction or $28Million reduction in potential crop losses between the two scenarios.
Those numbers are for the entire river (river miles 2-94). The proposed project runs roughly RM 68 - 50 so we are estimating 10-20% of the potential lands affected by flooding in the scenarios above. Math for the above is: Years 2,4,6,8: 19 ac. farmland not flooded during two-year storms (381-323=59 ac diff, divide by 3 = 19 ac spared by project during 2-year storms). Year 10: (26,577-24,869=1708 ac diff, divide by 3 = 569 ac spared by project during 10-year storm).

Project 5. Resource Conservation District of Monterey County: Monterey County Farm Water Quality Assistance Program

The Resource Conservation District of Monterey County (RCDMC), in close partnership with University of California Cooperative Extension (UCCE) Crop Advisors and USDA Natural Resources Conservation Service (NRCS), will provide a bilingual on-farm erosion, irrigation, and nutrient management evaluation program for Monterey County farmers. The service will 1) evaluate erosion potential, irrigation system and application efficiency, and nutrient budgeting; 2) develop recommendations as needed for field configuration, soil stabilization, and refined water and nutrient applications; 3) assist growers' voluntary implementation of those recommendations to help reduce excess soil, water and nutrient movement off area farms while optimizing farm productivity; and 4) monitor and verify the effectiveness of the implemented management changes and practices.

Physical Benefits

The following physical benefits are being claimed for this project:

- Reduced nitrogen fertilizer application, resulting in reduced nitrates in surface waters and groundwater
- Reduced soil loss from the field to downstream fields, ditches, roads and waterways, retaining with it any bound nutrients and agrichemicals (particularly pyrethroids)
- Reduced water pumping

Based on an estimated average 10 acres per project site over 10 sites, we anticipate as much as 4,400 lb in reduced nutrient loading to groundwater due to reduced nitrogen fertilizer applications and 10% reduction in water pumping. For the growers that implement our recommendation, we anticipate potential savings on average of 30-40% in fertilizer materials costs/acre and 10% reduction in water pumping or delivery costs. These anticipated benefits are based on multiple trials conducted with growers in the Salinas Valley (as noted below), with the nitrogen fertilizer use reductions saving five lettuce growers in one 2008 UC Cooperative Extension study on average $33/acre per crop (assuming $0.60/lb for N fertilizer), and water use reductions saving the same growers an additional $8/acre per crop, while reducing nitrogen lost/leached to groundwater (to be a potential pollutant). Depending on field slope and soil type, the soil conservation savings can amount to over 20 tons per acre per year, which is a significant annual expense for County of Monterey Public Works to remove from downslope structures such as roads and ditches.

Narrative Description of the Project's Expected Physical Benefits

Recent and historical conditions: In "Water Quality Conditions in the Central Coast Region Related to Agricultural Discharges," Appendix G of the March 2011 Staff Recommendations to the Central Coast Regional Water Quality Control Board for the "Updated Conditional Waiver of Waste Discharge Requirements for Irrigated Agricultural Waste Discharges" (Conditional Waiver), farm runoff and leached water is described as significantly impacting regional surface and ground water quality, with the lower Salinas River watershed in Monterey County showing up as one of the key areas of focused concern. Levels of nitrate exceeding water quality standards in both surface waters and groundwater is documented as a primary concern, along with pesticide toxicity, turbidity, water temperature and ammonia. Regional Board staff linked these water quality concerns to agricultural runoff based on land uses proximate to the sampling sites and seasonal water flow and quality variations. The resulting updated Conditional Waiver was approved by the Regional Board in 2012 with particular emphasis on compelling farmers to implement and record their on-farm nutrient and water management efforts with the intended

benefit of improving water quality in regional water ways and groundwater. Currently, in the Salinas River watershed, 12 water bodies are identified as impaired with excessive nitrate concentrations, and 18% of the public water supply wells contain nitrate levels in excess of the drinking water standard.

Methods for estimating benefits: Our estimation of physical benefits for the proposed work is based on outcomes of recommendations of similar work conducted by University of California Cooperative Extension (UCCE) personnel, Drs. Richard Smith and Michael Cahn, in field trials with growers in Monterey County during the past five years, referenced below. For each implementation site, RCDMC and UCCE personnel will evaluate the efficacy of system or management changes on cooperator farms either in the form of changes in inputs (reductions in recorded water or nutrient use) or changes in outputs (runoff flow or constituent reductions) through grower communications, flow measurements, water and soil sample analysis, and estimation tools. We will also track costs associated with the practice changes and aggregate results for estimated cumulative benefits where enough growers are located along the same drainage or waterway to elicit a significant cumulative impact.

Unquantifiable benefits: While the overarching goal of the project is to assist farmers in their efforts to improve regional water quality, on the scale of this project (10-20 farms out of hundreds), quantifying the actual improvements to ground and surface waters is not possible. Long-term benefits to groundwater cannot be quantified because the project timeframe is too short (water moving from surface to deep aquifers is a decades-long process), and projects are likely too small and geographically dispersed to show any measurable cumulative benefit. Likewise for downstream surface water, the projects' scale and location relative to the volume of water in local waterways render ambient water monitoring for chemicals or nutrients meaningless for the 10 sites we will evaluate. The best assessment of the benefits of the projects will be on the sites themselves.

Without-project conditions: This project effectively augments the ongoing, diffuse efforts already by motivated and skilled growers who are undertaking projects on their own to manage the quality of water moving off their lands. The need for this program is that there remain many growers, especially Hispanics, who lack technical information and resources to undertake the record-keeping and practice or management changes necessary to meet the new agricultural regulations, and for whom increased exposure and direct on-farm assistance will bridge that gap. *Desafíos y Soluciones: A Snapshot of Needs and Challenges in the Spanish-speaking Grower Community of Santa Cruz County* (RCD of Santa Cruz County, 2011) documented through interviews and surveys these important information and technical assistance gaps for Hispanic farmers (which is highly relevant in Monterey County). There currently exists no focused program to provide this assistance in Monterey County.

That said, we are unable to estimate the difference in regional conditions other than in terms of the absence of the benefits of the 10-20 projects that this program would facilitate, and beyond that, the absence of likely additional projects that newly informed growers will choose to conduct on their own.

Uncertainties: Each farmer, operation, and field that we will work with is unique and has its own variables of scale, soil, cropping history, slope, and operational constraints. Such variables along with the different degrees of improvement needed (from little to great) on a given farm will determine the potential benefits of the water quality improvements associated with changes implemented there.

Potential adverse effects: Potential adverse physical effects include: “no impact” due to improvement practices not being implemented correctly; slight reductions in crop yield associated with reduced fertilizer use; and temporarily increased traffic and soil impacts on project sites that involve soil movement for runoff management (ditches and furrow modifications and cultivation for grass-seeding).

Supporting Materials

The following documents are being submitted electronically as supporting materials, and can be found in this Attachment as Att7_IG2_TechJust_2of5:

- Cahn, Michael, Husein Ajwa, and Richard Smith, UCCE, Monterey County, "Evaluation of Polyacrylamide (PAM) for Reducing Sediment and Nutrient Concentration in Tail Water from Central Coast Vegetable Fields." CDFA Fertilizer Research and Education Program. 2005.

- Cahn, Michael and Richard Smith, UCCE, Monterey County, "Summary of 2008-9 Large Scale Irrigation and Nitrogen Fertilizer Management Trials in Lettuce," *UCCE Monterey Crop Notes*, March -April 2010 pp. 5-9.

- Central Coast Regional Water Quality Control Board, "Water Quality Conditions in the Central Coast Region Related to Agricultural Discharges" (Appendix G), *Staff Recommendations to the for the "Updated Conditional Waiver of Waste Discharge Requirements for Irrigated Agricultural Waste Discharges,"* March 2011.

- Mountjoy, Daniel, "Practice Effectiveness for Elkhorn Slough Watershed" (spreadsheet), USDA Natural Resources Conservation Service Salinas Service Center, 2002.

- Resource Conservation District of Santa Cruz County, *Desafios y Soluciones: A Snapshot of Needs and Challenges in the Spanish-speaking Grower Community of Santa Cruz County,* 2011.

- Smith, Richard, UCCE, Monterey County, "Evaluation Low-residue Cover Crops to Reduce Nitrate Leaching, and Nitrogen and Phosphorous Losses from Winter Fallow Vegetable Production Fields in the Salinas Valley," CDFA Fertilizer Research and Education Program. 2008.

- Smith, Richard and Michael Cahn, UCCE, Monterey County; and Tim Hartz, University of California, Davis, "Evaluation and demonstration of best management irrigation and nutrient management practices (BMP) to safeguard water quality." California Lettuce Research Board. 2011.

- Smith, Richard and Michael Cahn, UCCE, Monterey County; and Tim Hartz, University of California, Davis, "Evaluation of best management irrigation and nutrient management practices (BMP) and treatment of nitrate in tile water to safeguard water quality," California Leafy Greens Research Board. 2012.

Table 9
Project 5. Resource Conservation District of Monterey County: Monterey County Farm Water Quality Assistance Program

Table 9 – Annual Project Physical Benefits			
Project Name: Monterey County Farm Water Quality Assistance Program			
Type of Benefit Claimed: Nitrogen fertilizer conservation (i.e., not applied to crops)			
Measure of Benefit Claimed (Name of Units): Pounds per acre per crop			
Additional Information About this Measure: Over an average of ten 10-acre sites			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014			0
2015	0	275	275
2016	0	550	550
2017	0	550	550
2018	0	550	550
2019	0	550	550
2020	0	550	550
2021	0	550	550
2022	0	550	550
2023	0	550	550
Comments: Based on savings observed by Cahn and Smith, assuming 5 acres treated each year and continuing each year for the anticipated life of the project.			

Table 9 – Annual Project Physical Benefits			
Project Name: Monterey County Farm Water Quality Assistance Program			
Type of Benefit Claimed: Soil conservation			
Measure of Benefit Claimed (Name of Units): Tons per acre per year			
Additional Information About this Measure: Over an average of five 10-acre sites, two implemented in year 2 and three implemented in year 3			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014			0
2015	0	300	300
2016	0	1,050	1,050
2017	0	1,050	1,050
2018	0	1,050	1,050
2019	0	1,050	1,050
2020	0	1,050	1,050
2021	0	1,050	1,050
2022	0	1,050	1,050
2023	0	1,050	1,050
decade 2	0	10,500	10,500
decade 3	0	10,500	10,500
Comments: Based on lower-bound potential soil erosion reductions from hillside farms in the Elkhorn Watershed as observed by Mountjoy (2002), and continuing each year for the anticipated life of the project.			

Table 9 – Annual Project Physical Benefits			
Project Name: Monterey County Farm Water Quality Assistance Program			
Type of Benefit Claimed: Water conservation			
Measure of Benefit Claimed (Name of Units): Acre-feet per crop			
Additional Information About this Measure: Over an average of ten 10-acre sites			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (b) – (c)**
2014			
2015	0	10.4	10.4
2016	0	20.8	20.8
2017	0	20.8	20.8
2018	0	20.8	20.8
2019	0	20.8	20.8
2020	0	20.8	20.8
2021	0	20.8	20.8
2022	0	20.8	20.8
2023	0	20.8	20.8
Comments: Based on savings observed by Cahn and Smith, assuming 5 acres treated each year and continuing each year for the anticipated life of the project.			

Project 6. Ecology Action: Monterey Bay Green Gardener Training and Certification Program

The Green Gardener Certification Program teaches a comprehensive approach to watershed management in the landscape. Green Gardener training participants are either home gardeners, self-employed maintenance gardeners and/or employees of licensed landscape contractors, school districts or public agencies. Green Gardener 10-week certification-level course topics include efficient irrigation system design and management, applying mulches and compost to build the soil food web, improving water retention capacity of soil and preventing erosion, drought-tolerant plant selection and natural landscaping based on plant communties in a watershed, integrated pest and weed management strategies that reduce pesticide applications in the landscape, fertilization practices that protect water quality, and natural pruning and plant selection practices that reduce green waste and carbon emissions. In addition to the certification level course, the Monterey Bay Green Gardener program offers hands-on public workshops on water-wise landscaping, irrigation efficiency retrofits, laundry-to-landscape greywater irrigation, and low impact development (LID) practices.

The proposed project will:

- Provide one, 10-week Green Gardener Certification course.
- Provide four Green Gardener public workshop opportunities for residents of the Salinas Valley.
- Integrate into Green Gardener trainings and workshops the design and construction of four water-wise landscape sites on public and private properties that will provide hands-on learning experiences for training participants and raise community awareness about landscape water conservation methods.

The Central Coast Regional Water Quality Control Board has found that water quality of stormwater discharges within the City of Salinas are impaired by nitrate/nitrate, ammonia, and pesticides, among several other others.[1] The EPA has listed the middle Salinas River as impaired for warm, fresh water habitat by pesticides originating from non-point source pollution.[2] Ecological landscape maintenance practices implemented by certified Green Gardeners will reduce dry-weather flows and prevent non-point source pollution from fertilizers and pesticides used on turf and landscapes in the urbanized zones of the Gabilan watershed and tributaries of the lower and middle Salinas watersheds. Green Gardeners that install and/or retrofit water-wise landscapes during and after training help to meet multiple IRWM Plan objectives to reduce water demand through improved landscape water use efficiency, promote native drought-tolerant plantings in municipal and residential landscaping, improve water quality through pollution prevention, capture and manage storm water runoff with LID methods, diversify water supply sources in ways that match water quality to water use, and maximize water conservation incentive programs offered by local water utilities.

Physical Benefits

The following physical benefits are being claimed for this project:

[1] September 2011, Central Coast Water Board: Fact Sheet/Rationale Technical Report for Order No. R3-2012-00XX, Waste Discharge Requirements for the City of Salinas Municipal Storm Water Discharges.

[2] EPA, 2010, Watershed Assessment, Tracking & Environmental Results, 2010 Waterbody Report for Salinas River (Middle, Near Gonzales Rd Crossing To Confluence With Nacimiento River).

- 131.72 hundred cubic feet (HCF)/year (98,526 gallons) of water will be conserved at two Green Gardener public demonstration sites by replacing 2,000 ft^2 of turf irrigated by fixed spray heads with drought tolerant landscaping irrigated by low volume irrigation.
- 11.8 HCF/year (8,826 gallons) of greywater will be recycled for irrigation use during the irrigation season (April-October) at two residential greywater demonstration sites.
- Sediment, nutrient, and pesticide loads in stormwater and irrigation run-off from urban landscapes will be reduced from demonstration sites and Green Gardener client sites.
- 4,000 square feet of open space and habitat will be created for humans, beneficial insects, and pollinators.
- GHG emissions associated with water conservation, and with mowing, blowing, and hauling greenwaste to the Salinas Sun St. Transfer Station or Johnson Canyon Landfill will be reduced from demonstration sites and Green Gardener client sites.
- Impacts from irrigation run-off will be prevented at Green Gardener public demonstration site areas, and reduced or eliminated at Green Gardener client sites. [Not quantifiable – No Table 9 for this benefit.]
- Impacts of rainwater that falls on public demonstration sites or building roofs immediately adjacent to public demonstration sites will be reduced; rainwater will be treated with a site-specific Low Impact Development BMP. [Not quantifiable – No Table 9 for this benefit.]

Narrative Description of the Project's Expected Physical Benefits

Without the project, public demonstration sites would use approximately 164.67 HCF/year of water for irrigation, assuming existing landscapes are irrigating cool season turf. Homes that install greywater irrigation systems would continue to use 11.8 HCF of potable water annually for landscape irrigation.

The California Landscape Contractor's Water Budget Calculator was used to estimate water savings benefits for public demonstration sites (attached as an appendix). Historical ETo and precipitation data from CIMIS station 116 were used to calculate a water budget for 2,000 ft^2 of drought tolerant landscaping and turf (no project) scenarios. Distribution uniformity of 0.80 and 0.55 were assumed for low volume and fixed spray irrigation systems respectively.

Savings from laundry to landscape irrigation systems were calculated using single-family residence indoor water data from A. Vickers, 2001 and the California Urban Water Conservation Council.[3] Average water savings from clothes washer systems assume a four-person household washing 5 loads/week in an average efficiency clothes washer (30 gallons/load), and that greywater produced will replace the equivalent amount of potable water used for landscape irrigation. Estimated greywater savings for laundry to landscape systems using this method has been published in *Residential Greywater Irrigation Systems in California: An Evaluation of Soil and Water Quality, User Satisfaction, and Installation Costs* (Greywater Action, City of Santa Rosa, Ecology Action, November 2012, http://greywateraction.org/content/greywater-study-0).

Factors that may change the estimate of water saving benefits for the public demonstration sites include the selected location of the installation (Soledad and King City have higher ETo and landscape water demand than Salinas), the size of the landscape to be retrofitted, the irrigation efficiency of the system, and the current and future irrigation scheduling practices of the public agency landscape manager. Factors that may change the estimate of water recycling benefits for greywater irrigation system include

[3] Vickers, Amy. 2001. Handbook of Water Use and Conservation. WaterPlow Press, 2001, ISBN 1-931579-07-5.

family size (number of loads of laundry/week), future changes to household occupancy, and the water efficiency of the clothes washer at the demonstration site.

Quantification of a reduction in GHG emissions from water conservation has been estimated using the Environmental Protection Agency (EPA) GHG calculator (attached); however, we are unable to quantify the reduction in GHG emissions associated with mowing, blowing, and hauling greenwaste. Quantification of a reduction in pesticides entering waterways from Green Gardener pubic demonstration projects is not possible because a stormdrain (outfall) monitoring program is not in place to quantify baseline levels of pollutants from demonstration site locations. Green Gardener students graduating from the class of 2011 managed a total of 480 landscapes. Evaluation data for 2011 reveal that a Green Gardener student manages an average of 17 landscapes that vary significantly in terms of size, water requirements, and management needs. Tracking GHG emissions from landscaping equipment, fertilizer and pesticide applications, and actual landscape water use compared to real time ETo at 480 or more Green Gardener client landscapes is beyond the administrative scope and capacity of this grant or the Monterey Bay Green Gardener Program.

Supporting Materials

The following documents are being submitted electronically as supporting materials, and can be found in this Attachment as Att7_IG2_TechJust_2of5:

- Salinas Landscape Water Budget Calculator
- *Residential Greywater Irrigation Systems in California: An Evaluation of Soil and Water Quality, User Satisfaction, and Installation Costs* (Greywater Action, City of Santa Rosa, Ecology Action, Nov. 2012). Executive Summary is submitted electronically.
- Environmental Protection Agency GHG calculator

Table 9
Project 6. Ecology Action: Monterey Bay Green Gardener Training and Certification Program

Table 9 – Annual Project Physical Benefits			
Project Name: Monterey Bay Green Gardener Program			
Type of Benefit Claimed: Landscape Water Conservation - Demand Reduction			
Measure of Benefit Claimed (Name of Units): HCF/year			
(a)	**(b)**	**(c)**	**(d)**
Physical Benefits			
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2014 – 2044 +	176.47	31.96	144.51 reduction
Comments: Estimates based on: Each 2,000 ft^2 demonstration site location using 82.34 HCF/year to irrigate cool season turfgrass in Salinas. Each greywater installation site producing 5.9 HCF available to replace potable water for landscape irrigation from April-October. The project life on all demonstration projects is estimated at 30 years or more.			

Table 9 – Annual Project Physical Benefits			
Project Name: Monterey Bay Green Gardener Program			
Type of Benefit Claimed: Improved surface water quality			
Measure of Benefit Claimed (Name of Units): N/A			
(a)	**(b)**	**(c)**	**(d)**
Physical Benefits			
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2014 – 2044 +	Baseline amount of sediment, nutrients, and pesticides in surface waters (unknown)	A reduced amount of sediment, nutrient, and pesticides in surface waters (reduction in constituents is measurable, but unknown)	Improved surface waters (actual reduction in pollutants unknown)
Comments: Sediment, nutrient, and pesticide loads in stormwater and irrigation run-off from urban landscapes will be reduced from demonstration sites and Green Gardener client sites. This will result in improved water quality in receiving surface waters. These improvements cannot be quantified since baseline data does not exist, and it is not within the scope of the proposed project to conduct water quality testing. The project life on all demonstration projects is estimated at 30 years or more.			

Table 9 – Annual Project Physical Benefits			
Project Name: Monterey Bay Green Gardener Program			
Type of Benefit Claimed: Improved habitat			
Measure of Benefit Claimed (Name of Units): Square Feet			
(a)	**(b)**	**(c)**	**(d)**
Physical Benefits			
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2014 – 2044 +	0	4,000	4,000
Comments: 4,000 square feet of open space and habitat will be created for humans, beneficial insects, and pollinators. The project life on all demonstration projects is estimated at 30 years or more.			

Table 9 – Annual Project Physical Benefits			
Project Name: Monterey Bay Green Gardener Program			
Type of Benefit Claimed: Reduced GHG emissions from water conservation			
Measure of Benefit Claimed (Name of Units): $MTCO_2e$			
(a)	**(b)**	**(c)**	**(d)**
Physical Benefits			
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2014 – 2044 +	baseline amount (unknown)	Baseline amount – 0.16	0.16 reduction/year
Comments: GHG emissions associated with water conservation. Estimates based on: Each 2,000 ft^2 demonstration site location using 82.34 HCF/year to irrigate cool season turfgrass in Salinas. Each greywater installation site producing 5.9 HCF available to replace potable water for landscape irrigation from April-October. This equals conservation of 107,352 gallons of water/year. Using the EPA GHG conversion calculator, the project will result in GHG emissions reduction of 0.16 $MTCO_2e$/year. The project life on all demonstration projects is estimated at 30 years or more. NOTE: GHG emissions associated with mowing, blowing, and hauling greenwaste to the landfill will be reduced, but these amounts cannot be quantified.			

Project 7. Elkhorn Slough Foundation: Ridgeline to Tideline - Water Resource Conservation in Elkhorn Slough

Types of Physical Benefits being Claimed

- Water supply saved: This project is expected to decrease groundwater use by about 230 acre feet per year, through the retirement of 95 acres of farmland.
- Types (constituents) and amounts of water quality improvement provided, and the amount of water treated or improved: This project is expected to:
    - Reduce erosion on 95 acres of steep agricultural fields and thereby improve surface water quality in downhill estuarine habitat
    - Prevent seawater intrusion through reduced pumping of groundwater in an area adjacent to tidal saltwater
    - End fertilizer application on 95 acres of agricultural fields, reducing the risk of groundwater contamination by nitrates
    - Reduce nitrate and sediment in the water column in Elkhorn Slough tidal waters, where 7 acres of vegetated marsh will be restored
- Types and amounts of environmental benefits provided: This project is expected to:
    - Protect sensitive estuarine wetland from habitat conversion due to sedimentation (2.5 acres of historical salt marsh has been converted to other habitat due to sedimentation since 1980)
    - Restore 2.5 acres of salt marsh-to-upland ecotone/buffer currently dominated by exotic eucalyptus and iceplant
    - Restore 7 acres of historical salt marsh in the lower Slough. Salt marsh degradation in Elkhorn Slough is associated with the local extirpation of the federally endangered California clapper rail in the 1980s; this project is a first step to recovering habitat for this species. Nearby salt marsh has recently been documented to provide resting and foraging habitat for the federally threatened southern sea otter. Restoration of this habitat may benefit local populations of this species.
- Amount of land and types of land uses, structures and equipment protected from flooding: This project is expected to:
    - Protect a 500-foot section of Elkhorn Road from sedimentation/agricultural runoff during storm events
    - Provide some flood protection for 10 acres of adjacent upland
- Amount of energy produced or saved, and amount of greenhouse gases that can be avoided: This project, with its 7 acres of salt marsh restoration will help sequester carbon (3,144,297 g C $year^{-1}$), and will therefore help prevent carbon dioxide, a greenhouse gas, from entering the atmosphere. Salt marshes sequester carbon at a higher rate than most ecosystems.

Narrative Description of the Project's Expected Physical Benefits

Water Supply Saved

Seawater intrusion, due to overdraft of groundwater, was first identified as a problem in the Salinas Valley Groundwater Basin in 1930, and today halting seawater intrusion is the Monterey County Water

Resource Agency's biggest challenge (MCWRA 2006). Without imported water and/or a willingness of landowners to voluntarily cut water use, overdraft may eventually result in a loss of productive farmlands and sensitive freshwater habitat in the Elkhorn Slough watershed (Scharffenberger 1999). This project includes voluntary reductions in water use, on both already-acquired farmland in the lower Slough, and on land proposed for acquisition. On the California Department of Fish and Wildlife's (CDFW) Minhoto parcel, purchased in 2008 and provided as project match, 40 acres of farmland have been retired since 2010. On the property proposed for acquisition with requested and other State funds, the Elkhorn Slough Foundation (ESF) proposes to retire another 55 acres of current farmland. According to Michael Cahn, Farm Advisor at the UC Cooperative Extension (personal communication), retiring agricultural crops can result in a groundwater savings of 2 - 2½ acre feet of water per acre of crop per year. Based on this estimate, we anticipate that when complete this project will result in a groundwater savings of approximately 230 acre feet per year.

Water Quality Improvement

Reduce erosion and improve surface water quality in downhill estuarine habitat
The estuarine habitat (CDFW's North Marsh), directly downhill from the farmland proposed for acquisition has been characterized as being hyper-eutrophic, due both to agricultural inputs and a highly muted tidal range (Hughes et al. 2011). Acquisition of the uphill farm and subsequent land use changes are anticipated to directly improve water quality in North Marsh. Research conducted in tidal wetlands adjacent to farmland acquired and managed by ESF has shown that ESF's land use practices can result in lower nutrients and improved water quality (Gee et al. 2010). These researchers, studying tidal wetlands immediately north of the proposed project site, documented average decreases of 50–70% in tidal water NO3, NH3, and PO4 concentrations, compared to conditions before ESF acquired and managed the uphill farms. Requested funds will also provide project planning and environmental compliance for North Marsh improvements, bringing us several steps closer to increasing tidal range and flushing in this degraded wetland, which will address the other major factor in low water quality at that site.

Prevent seawater intrusion through reduced pumping of groundwater
Over-extraction of Salinas Valley groundwater for irrigation and municipal water supply has resulted in the intrusion of seawater into local coastal aquifers (MCWRA 2006). In the 1999 Elkhorn Slough Watershed Plan, ESF and The Nature Conservancy identified strategies for helping to conserve aquifers, while protecting agriculture and natural habitat lands. A key strategy included purchasing marginal portions of farms, restoring natural habitat, and providing buffers. This project seeks to implement these strategies. In the lower Slough, these actions have been completed (removal of crops from slopes adjacent to Elkhorn wetlands, and the creation of a 40-acre buffer on CDFW's Minhoto parcel) or are in progress (native grass restoration in the buffer zone). Similar actions would follow after acquisition of farmlands uphill of North Marsh. At both sites, these actions reduce the need for groundwater pumping, helping to conserve local aquifers.

Reduce fertilizer application and the risk of groundwater contamination by nitrates
Locally elevated nitrate contamination has been documented throughout the Salinas Valley groundwater basin (MCWRA 2006) and agricultural fertilizers applied to croplands have been identified as a major contributor to groundwater nitrates (Center for Watershed Sciences 2012). Because fertilizer can be biologically transformed to nitrate that is soluble in water, it can be highly mobile and can move with percolating water out of the soil and into groundwater (EPA 2010). Reduction of nitrate loading to groundwater is required to improve long-term water quality (Center for Watershed Science 2012). Current typical annual fertilization rates in the lower Salinas Basin/Elkhorn Slough watershed are between 165 and 220 lbs N/ac/year (Center for Watershed Science 2012). This project will result in local reduction of fertilizer applications where ESF and CDFW reduce farmland footprints by 95 acres, leading to an estimated reduction of fertilizer application of 18,300 lbs/year.

Reduce nitrate and sediment in tidal waters through marsh restoration
Salt marsh above-ground structure has been shown to significantly reduce tidal flow speed and turbulence relative to unvegetated areas, promoting sediment deposition and preventing sediment resuspension (Friedrichs and Perry 2001). Feldspar marker horizons in Elkhorn Slough marshes demonstrate that pickleweed marsh accretes approximately 3-6 mm of sediment each year (Elkhorn Slough National Estuarine Research Reserve [ESNERR] unpublished data). The restoration of 7 acres of salt marsh in the lower Slough is therefore expected to contribute to reductions of sediment in Elkhorn Slough's water column. Recent research in Elkhorn Slough's salt marsh found that local salt marsh plants serve as a robust N trap and coastal filter; this function is not saturated by high background annual N inputs from upstream agriculture (Nelson and Zavaleta 2012). Therefore restoration of salt marsh in Elkhorn Slough is predicted to reduce nitrates in local tidal waters.

Environmental Benefits

Protect sensitive estuarine wetland from habitat conversion due to sedimentation
Sediment fans form in the Elkhorn Slough watershed as soil eroding from farms moves downslope, filling marshes, mudflats, and channels (Byrd and Kelly 2006). Since 1980, 2.5 acres of historical salt marsh in North Marsh have been buried in agricultural sediment from uphill farms, resulting in habitat conversion (Figures 1 and 2).

Figure 1. Agricultural sediment deposited on historical salt marsh in ESNERR's North Marsh. Note willow grove in background, where marsh once dominated.

Figure 2. Sediment from uphill farms deposited in North Marsh, burying salt marsh vegetation.

Acquisition and retirement of farmland will significantly reduce erosion and the agricultural stormwater runoff responsible for this deposition and loss of salt marsh.

Restore 2.5 acres of salt marsh-to-upland ecotone/buffer

Requested funds will be used to remove ~2.5 acres of non-native eucalyptus and iceplant from the transition zone and upland adjacent to North Marsh. Exotic plants are a significant stressor in Elkhorn Slough's marsh-to-upland ecotone (Wasson and Woolfolk 2011), but research completed by ESNERR staff has demonstrated that the removal of iceplant can result in the recolonization of native high marsh plants and native grasses (Woolfolk et al. 2009). ESNERR also has a track record of successful eucalyptus removal. Over 13 acres were removed from the Reserve in 1992, and today the removal site is a mosaic of native oaks, shrubs, and includes patches of native grassland (ESNERR unpublished data). This project is expected to lead to significant improvements in native plant assemblages at the site.

Restore 7 acres of salt marsh

Historical ecology analyses reveal approximately 50% of Elkhorn Slough's salt marsh has been lost over the past 150 years (Van Dyke and Wasson 2005). The most significant cause of marsh loss has been artificial tidal restriction: diking and draining of wetlands. Even after tidal exchange was returned to some of these areas, such as the Minhoto parcel on ESNERR, marsh did not return, because elevations were too low as a result of subsidence during the diked period. This project will use imported sediment from a Pajaro River flood control project to raise wetland elevations and restore 7 acres of lost marsh. The physical and ecological benefits of West Coast salt marshes are summarized in Woolfolk and Labadie 2012, and include providing wildlife habitat for estuarine invertebrates, fish, birds, and mammals such as the federally threatened southern sea otter (Figure 3). Videos of sea otter mothers and pups resting and foraging in Elkhorn Slough existing salt marsh adjacent to the project site can be viewed at http://www.elkhornslough.org/tidalwetland/tidal_marsh_restoration.htm.

Figure 3. Southern sea otter grooming in ESNERR salt marsh adjacent to project site.

Protection from Flooding

Protect a 500-foot section of Elkhorn Road from sedimentation
During large storm events, erosion from the farmland uphill from North Marsh results in deposition of sediment on Elkhorn Road. Acquisition and reduction in the farm footprint will prevent sedimentation of Elkhorn Road below the farm in the future.

Provide flood protection for 10 acres of upland
Water flows are significantly dampened as they pass through salt marsh plants, and as a result marsh plains can provide adjacent uplands with protection against coastal flooding and wave erosion (Allen 2000). The proposed salt marsh restoration project will abut 0.75 miles of shoreline, and will offer flood protection to approximately 10 acres of upland habitat, as determined using LiDAR data.

Amount of Greenhouse Gases that can be Avoided

Central California salt marshes have been documented to sequester carbon at a rate of approximately 111 g C $^{m-2}$/year^{-1} (Callaway et al. 2012). Because this project proposes to restore 7 acres of salt marsh, we estimate that it will sequester 3,144,297 g C /year^{-1}.

Supporting Materials

The following documents are being submitted electronically as supporting materials, and can be found in this Attachment as Att7_IG2_TechJust_4of5:

- Allen, J.R.L. 2000. Morphodynamics of Holocene salt marshes: A review sketch from the Atlantic and Southern North Sea coasts of Europe. *Quaternary Science Reviews* 19:1155-1231.
- Byrd, K.B., and M. Kelly. 2006. Salt marsh vegetation response to edaphic and topographic changes from upland sedimentation in a Pacific estuary. *Wetlands* 26:813-829.
- Callaway, J.C., E.L. Borgnis, R.E. Turner, and C.S. Milan. 2012. Carbon sequestration and

sediment accretion in San Francisco Bay tidal wetlands. *Estuaries and Coasts* 35:1163-1181.

- Center for Watershed Sciences, University of California, Davis. 2012. Groundwater Nitrate Project, Implementation of Senate Bill X2 1, Prepared for California State Water Resources Control Board. http://groundwaternitrate.ucdavis.edu
- Environmental Protection Agency (EPA). 2010. Source Water Protection Practices Bulletin: Managing Agricultural Fertilizer Application to Prevent Contamination of Drinking Water. Washington, DC.
- Friedrichs, C.T., and J.E. Perry. 2001. Tidal salt marsh morphodynamics: A synthesis. *Journal of Coastal Research* SI 27:7-37.
- Gee, A.K., K. Wasson, S.L. Shaw, and J. Haskins. 2010. Signatures of restoration and management changes in the water quality of a central California estuary. *Coasts and Estuaries* 33:1004-124.
- Hughes, B.B., J.C. Haskins, K. Wasson, and E. Watson. 2011. Identifying factors that influence expression of eutrophication in a central California estuary. *Marine Ecology Progress Series* 439:31-43.
- Monterey County Water Resources Agency (MCWRA). 2006. Monterey County Groundwater Management Plan.
- Nelson J.L. and E.S. Zavaleta. 2012. Salt marsh as a coastal filter for the oceans: Changes in function with experimental increases in nitrogen loading and sea-level rise. *PLoS ONE* 7(8).
- Scharffenberger, T. 1999. Elkhorn Slough Watershed Conservation Plan. Elkhorn Slough Foundation and The Nature Conservancy. Moss Landing, CA.
- Van Dyke, E., and K. Wasson. 2005. Historical ecology of a central California estuary: 150 years of habitat change. *Estuaries* 28:173-189.
- Wasson, K. and A. Woolfolk. 2011. Salt marsh-upland ecotones in central California: vulnerability to invasions and anthropogenic stressors. *Wetlands* 31:1-14.
- Woolfolk, A., K. Wasson, and N. D'Amore. 2009. Making room for native grasses: physical control of coastal weeds. Proceedings: California Invasive Plant Council Symposium 13: 94-96. www.cal-ipc.org/symposia/archive/pdf/Proceedings_2009_small.pdf
- Woolfolk, A. and Q. Labadie. 2012. The significance of pickleweed-dominated tidal salt marsh in Elkhorn Slough, California: a literature review. *Elkhorn Slough Technical Report Series* 2012:4. http://www.elkhornslough.org/research/bibliography_tr.htm

Table 9
Project 7. Elkhorn Slough Foundation: Ridgeline to Tideline

Table 9 – Annual Project Physical Benefits			
Project Name: Ridgeline to Tideline: Water Resource Conservation in Elkhorn Slough			
Type of Benefit Claimed: Water supply saved			
Measure of Benefit Claimed (Name of Units): Acre Feet/Year			
Additional Information About this Measure: Please see narrative for details			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014-2064	0	230 ac ft/yr	230 ac ft/yr
Comments: Based on estimated groundwater savings of 2-2.5 ac ft/yr per 1 acre of crops retired. Estimate from Michael Cahn, Farm Advisor at the UC Cooperative Extension (pers. comm.). Forty acres have already been retired at CDFW's Minhoto parcel, but are included here because they are project match. An additional 55 acres will be retired if grant funds are awarded, for a total of 95 acres of retired agricultural lands.			

Table 9 – Annual Project Physical Benefits			
Project Name: Ridgeline to Tideline: Water Resource Conservation in Elkhorn Slough			
Type of Benefit Claimed: Water quality improvements			
Measure of Benefit Claimed (Name of Units): Percent decrease in NO3, NH3, and PO4 concentrations			
Additional Information About this Measure: Please see narrative for details			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014-2064	0	50-70% reduction	50-70% reduction in NO3, NH3, and PO4 concentrations in tidal waters immediately downhill from farmland
Comments: Based on published data (Gee et al. 2010) from tidal wetlands and farmlands immediately north of proposed project site.			

Table 9 – Annual Project Physical Benefits			
Project Name: Ridgeline to Tideline: Water Resource Conservation in Elkhorn Slough			
Type of Benefit Claimed: Prevention of seawater intrusion through reduced groundwater pumping			
Measure of Benefit Claimed (Name of Units): Acre Feet/Year of groundwater reduction			
Additional Information About this Measure: Please see narrative for details			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014-2064	0	230 ac ft/yr	230 ac ft/yr
Comments: Based on estimated groundwater savings of 2-2.5 ac ft/yr per 1 acre of crops retired. Estimate from Michael Cahn, Farm Advisor at the UC Cooperative Extension (pers. comm.) Forty acres have already been retired at CDFW's Minhoto parcel, but are included here because they are project match. An additional 55 acres will be retired if grant funds are awarded, for a total of 95 acres of retired agricultural lands.			

Table 9 – Annual Project Physical Benefits			
Project Name: Ridgeline to Tideline: Water Resource Conservation in Elkhorn Slough			
Type of Benefit Claimed: Reduced risk of groundwater contamination through decreased fertilizer application			
Measure of Benefit Claimed (Name of Units): Reduction of fertilizer application: pounds N/year			
Additional Information About this Measure: Please see narrative for details			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014-2064	0	18,300 lbs/yr	18,300 lbs/yr
Comments: Based on current typical annual fertilization rates in the lower Salinas Basin/Elkhorn Slough watershed (165 - 220 lbs N/ac/year). Estimate from Center for Watershed Science 2012, page 20. Forty acres have already been retired at CDFW's Minhoto parcel, but are included here because they are project match. An additional 55 acres will be retired if grant funds are awarded, for a total of 95 acres of retired agricultural lands.			

Table 9 – Annual Project Physical Benefits			
Project Name: Ridgeline to Tideline: Water Resource Conservation in Elkhorn Slough			
Type of Benefit Claimed: Reduction of nitrates and sediment in Elkhorn Slough's water column			
Measure of Benefit Claimed (Name of Units): N/A			
Additional Information About this Measure: Please see narrative for details			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014-2064	0	N/A	N/A
Comments: Elkhorn Slough's marshes accrete between 3-6 mm of sediment per year (ESNERR unpublished data), but these measurements are of vertical accretion only, and do not include an estimate of deposition by area. Therefore we cannot use the data to estimate the effects of 7 acres of salt marsh restoration on the volume of sediment that might be trapped by marsh plants. Nelson and Zavaleta (2012) documented Elkhorn Slough's salt marshes' ability to sequester nitrogen, but this was a comparative study analyzing different sea level rise and nitrogen addition scenarios, making simple extrapolations difficult.			

Table 9 – Annual Project Physical Benefits			
Project Name: Ridgeline to Tideline: Water Resource Conservation in Elkhorn Slough			
Type of Benefit Claimed: Protection of marsh habitat from farm sedimentation			
Measure of Benefit Claimed (Name of Units): sq m/year			
Additional Information About this Measure: Please see narrative for details			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014-2064	0	335 m^2 /year	335 m^2 /year
Comments: Two and a half acres of historical salt marsh at North Marsh have been buried under agricultural sediments since 1980 (Byrd and Kelly 2006, ESNERR unpublished data). That equates to a loss of approximately 335 m^2 /year of salt marsh. Acquisition of the uphill farmland and retirement of the crops on highly erosive steep slopes is predicted to prevent this sedimentation in the future.			

Table 9 – Annual Project Physical Benefits			
Project Name: Ridgeline to Tideline: Water Resource Conservation in Elkhorn Slough			
Type of Benefit Claimed: Removal of exotic plants and restoration of native plant assemblages			
Measure of Benefit Claimed (Name of Units): acres			
Additional Information About this Measure: Please see narrative for details			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014-2064	0	2.5 acres	2.5 acres
Comments: Acres in North Marsh buffer currently dominated by exotic eucalyptus trees and iceplant estimated from 2010 aerial photos and ground surveys (ESNERR unpublished data).			

Table 9 – Annual Project Physical Benefits			
Project Name: Ridgeline to Tideline: Water Resource Conservation in Elkhorn Slough			
Type of Benefit Claimed: Restoration of salt marsh			
Measure of Benefit Claimed (Name of Units): acres			
Additional Information About this Measure: Please see narrative for details			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014-2064	0	7 acres	7 acres
Comments: Please see ESNERR and Moffatt & Nichol 2010 for preliminary analysis and restoration plans for salt marsh restoration in Elkhorn Slough. The multiple benefits of salt marsh in Elkhorn Slough are reviewed in Woolfolk and Labidie 2012.			

Table 9 – Annual Project Physical Benefits			
Project Name: Ridgeline to Tideline: Water Resource Conservation in Elkhorn Slough			
Type of Benefit Claimed: Protection of public road from agricultural runoff			
Measure of Benefit Claimed (Name of Units): feet of road			
Additional Information About this Measure: Please see narrative for details			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014-2064	0	500 feet of road	500 feet of road
Comments: During storm events, agricultural sediment from the farm targeted for acquisition covers a portion of Elkhorn Road (personal observation). Acquisition of the uphill farmland and retirement of the crops on highly erosive steep slopes is predicted to prevent this sedimentation in the future.			

Table 9 – Annual Project Physical Benefits			
Project Name: Ridgeline to Tideline: Water Resource Conservation in Elkhorn Slough			
Type of Benefit Claimed: Flood protection for uplands			
Measure of Benefit Claimed (Name of Units): acres			
Additional Information About this Measure: Please see narrative for details			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014-2064	0	10 acres	10 acres
Comments: Water flows are significantly dampened as they pass through salt marsh plants, and as a result marsh plains can provide adjacent uplands with protection against coast flooding and wave erosion (Allen 2000). The proposed salt marsh restoration project at CDFW's Minhoto property will abut 0.75 miles of shoreline, and will offer flood protection to approximately 10 acres of upland habitat, as determined using LiDAR data.			

Table 9 – Annual Project Physical Benefits			
Project Name: Ridgeline to Tideline: Water Resource Conservation in Elkhorn Slough			
Type of Benefit Claimed: Greenhouse gases avoided			
Measure of Benefit Claimed (Name of Units): g C m−2 year−1			
Additional Information About this Measure: Please see narrative for details			
(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014-2064	0	3,144,297 g C $year^{-1}$	3,144,297 g C $year^{-1}$
Comments: Central California salt marshes have been documented to sequester carbon at a rate of approximately 111 g C m−2 year−1 (Callaway et al. 2012). Because this project proposes to restore 7 acres of salt marsh, we estimate that it will sequester 3,144,297 g C year−1.			

Project 8. Central Coast Wetlands Group: Deployment of the Greater Monterey County Regional Water Quality Monitoring Network

The watersheds of the Lower Salinas Valley (Old Salinas, Tembladero, Moro Cojo and Elkhorn) have been prioritized for action to improve water quality by many stakeholders, including the Regional Water Quality Control Board and the members of the Greater Monterey IRWM planning region. The cumulative results of water quality projects implemented through the Greater Monterey County IRWM Plan and through other State grant funds are expected to lead to improvements in water quality. However, we currently do not have the robust monitoring system in place needed to successfully document these improvements. This project will provide the necessary data to quantify the effectiveness of the various water quality management efforts within these priority regions.

This project proposes to expand and maintain an existing real time monitoring matrix. Dr. Ken Johnson at the Monterey Bay Aquarium Research Institute (MBARI) has developed and deployed the LOBO (Land/Ocean Biogeochemical Observatory) monitoring system, remotely sampling water quality of the Old Salinas River Channel and Elkhorn Slough. The LOBO system array continuously monitors water quality at hourly intervals, which enables the region to document the interactions between watershed processes and coastal impacts to receiving waters. The proposed project will expand the coverage of the LOBO monitoring array to two additional priority coastal confluence locations that drain significant portions of the Salinas Valley. The LOBO technology is highly advanced with the ability to test and record water quality every hour. Additional nutrient monitoring equipment will be installed at the confluence of multiple sub-drainages in order to further document the cumulative effects of nutrient management strategies. The project will also provide synthesis and analysis of existing data to correlate to on-the-ground work.

Project Physical Benefits

The following physical benefit is being claimed for this project:

- Installation of expanded LOBO monitoring array and nutrient monitoring equipment for collection of much-needed data regarding the effects of water quality enhancement management practices

Narrative Description of the Project's Expected Physical Benefits

We recognize that the installation of monitoring equipment is not typically considered a "physical benefit" per se. However, we are claiming it as a physical benefit because of its pivotal function in bringing about other physical benefits for the region. The data that will be collected through the installation of the LOBO monitoring array and nutrient monitoring equipment includes high quality baseline data necessary for the State to track success towards meeting beneficial uses described in the Basin Plan and report on regional success of State regulatory and non-regulatory programs, and ongoing data to track physical changes in water quality associated with on-the-ground implementation of management practices in priority watersheds. The data will allow regional scientists and decision-makers to gain a physical understanding of what is actually happening in terms of water quality in the lower Salinas Valley, and to understand how various management practices being implemented in the upper watersheds affects water quality in receiving waters. Understanding this data will provide important feedback to landowners, growers, regulators, scientists, funding agencies, and other decision-makers for adaptive management in selecting and implementing future management practices, leading ultimately to greater improvements in water quality for the region.

Recent and historical conditions that provide background for benefits to be claimed: This project implements a much needed water quality monitoring system that can provide extremely valuable baseline and project effectiveness data for a wide audience. Waterbodies in the lower Salinas Valley are known to be heavily polluted (for example, Tembladero Slough is listed for 14 TMDLs (see http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml). Without the proposed coastal confluence and watershed system array in these priority watersheds, individual projects (over 30 IRWM Plan projects defined within these watersheds) will need to establish site-specific monitoring programs that will provide less robust data and be more costly to implement than the data derived from the monitoring array strategy. Further, without the array system, the region will have absolutely no information quantifying the cumulative effects of the various efforts.

Estimates of without-project conditions: Standard "grab sample" monitoring programs that sample water monthly or weekly only provide a snapshot of water quality that has been demonstrated to fluctuate significantly throughout the day and month (SAM 2006). This is not nearly enough data to understand the impacts that time of day can have on water quality on a regional scale. It is also not enough information to establish an accurate baseline of pollutant loading, which requires precise estimates of daily, weekly, and yearly fluctuations. Without a well-established pollutant load baseline, it is nearly impossible to track if any on-the-ground work is having an impact on site-specific water quality or improving water quality flowing to receiving waters.

Further, without the prescribed array, we will not be able to understand the complexities of how individual projects or suites of activities within these priority watersheds contribute to changes in loading. The 2008 Monterey Bay National Marine Sanctuary's *Strategic Plan for Central Coast Water Quality Monitoring Coordination and Data Synthesis* (SAM report, attached) specifically demonstrates that without such a monitoring strategy for this region, State funding that supports implementation will fail to fully document the success of those expenditures or be able to prescribe the best strategies to meet water quality objectives for the region.

A description of the project and its relationship to other projects in the proposal: This project directly relates to all the other projects in the Greater Monterey County region. The LOBOs are being strategically located at the end of particularly impaired drainages that are the focus of work being done in the region. The mobile nutrient probe will be deployed throughout the watersheds to track project-specific changes in water quality and integrate project effects with watershed trend data.

Uncertainty of the benefits and factors that lead to uncertainty: There are no uncertainties about this project or the benefits of this project.

Description of any potential adverse physical effects: Minimal disturbance will occur when the LOBO and nutrient probe are installed.

Table 9
Project 8. Central Coast Wetlands Group: Deployment of the Greater Monterey County Regional Water Quality Monitoring Network

Table 9 – Annual Project Physical Benefits			
Project Name: Deployment of the Greater Monterey County Regional Water Quality Monitoring Network			
Type of Benefit Claimed: Installation of expanded LOBO monitoring array and nutrient monitoring equipment, which will provide much-needed water quality data for the region			
Measure of Benefit Claimed (Name of Units):			
(a)	**(b)**	**(c)**	**(d)**
Physical Benefits			
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2013 – 2015	Existing LOBO monitoring array	Expanded LOBO monitoring array, plus nutrient monitoring probe	Addition of LOBO monitoring in two new locations plus nutrient monitoring probe, leading to significantly increased data and knowledge for implementing more effective management practices for improving water quality
Comments: The life span of the new LOBO buoys and nutrient monitoring probe is expected to be 10-15 years. The equipment will be available to continue producing information over this time period; however, without guarantee of staff support after the IRWM grant period ends, we cannot claim benefits for the remaining life span of the equipment.			

Project 9. Save Our Shores: Watershed Protection Program - Annual Coastal Cleanup Day in Monterey County

The problems of trash and plastic pollution in Monterey County Rivers and in the Monterey Bay National Marine Sanctuary are a result of trash littered through storm drains, directly into waterways, and/or from the beach. This trash impairs movement of fish populations through rivers and causes harm to wildlife that ingests or becomes entangled in the trash. For the past five years, Save Our Shores has coordinated the largest cleanup day of the year, Annual Coastal Cleanup Day (ACC), in Santa Cruz County, and more recently in Monterey County. SOS coordinates up to 4,000 volunteers to clean up over 50 beach and river sites and has collected up to 12,000 pounds of trash on ACC day. ACC is hosted internationally by the Ocean Conservancy, state-wide by the California Coastal Commission, and locally by SOS and is the largest volunteer event in the state. During the 2012 Annual Coastal Cleanup (ACC) Day at 23 Monterey County sites, SOS volunteers collected 5,963 pounds of trash and 787 pounds of recyclables of which were 490 plastic bottles, 1,240 plastic bags, 1,275 bottle caps/lids, 3,648 food wrappers, and 13,261 cigarette butts. Of these 23 sites, four were inland sites on rivers and lakes where volunteers collected 4,545 pounds of trash and 419 pounds of recyclables.

This world-wide one-day cleanup event is important because it helps to remove trash from local waterways and beaches before it ends up as ocean pollution. The ACC is a highly publicized event that raises the public's awareness of marine debris and the connection of marine debrid to land-based sources such as rivers and streams, neighborhood streets, and beaches.

Project Physical Benefits

The following physical benefit is being claimed for this project:

- Reduction in quantity of trash in Monterey County waterways, on beaches, and in the Monterey Bay National Marine Sanctuary, which will result in improved fish and wildlife habitat and improved recreational experiences.

Narrative Description of the Project's Expected Physical Benefits

The proposed project addresses the Monterey Bay National Marine Sanctuary and the waterways that drain into it including Upper Carr Lake, Arroyo Seco River, Elkhorn Slough, Carmel River, and the Salinas River.

The trash found in local waterways and in the Sanctuary is primarily composed of plastic. It has been documented that 80-90% of all trash in the ocean is plastic. Plastic poses a special threat to marine animals. Birds and fish often ingest small plastic pieces because they mistake them for food; their stomachs get filled with the plastic and they starve because they think they are full, or they can choke and die from ingesting the plastic. Endangered sea turtles, such as the Leatherback which was recently designated California's State Marine Reptile, migrate to the Monterey Bay and often mistake plastic bags for their favorite food—jellyfish—and die from suffocation or starvation. Marine species can also die from the toxins that are present in plastics.

The problem of marine debris from land-based sources is a major threat to the health of marine species in the coastal environment. For example, in every cleanup SOS conducts and for every ACC Day world-wide, cigarette butts are the number one item collected.[4] On ACC Day 2012, SOS picked up 37,389 total

[4] "Picking up 52.9 Million Plastic Cigarette Butts off Beaches," NOAA Office of Response and Restoration, April 26, 2012. Website. February 19, 2013.

cigarette butts in Santa Cruz and Monterey Counties with 13,261 from Monterey sites alone. The filters in cigarettes contain plastic along with hundreds of toxins. A study conducted in 2009 by San Diego State University professor Tom Novotny and other members of the Cigarette Butt Advisory Group states that one cigarette butt will kill half the fish living in one liter of water in 96 hours.[5] ACC Day is conducted along with regular monthly cleanups throughout the year as a way to educate the public and to remove significant levels of trash from local watersheds in order to protect and enhance the coastal and marine environment of the Central Coast region.

While it is part of SOS normal procedure to monitor and quantify the amount and types of debris removed as part of every ACC event, it is difficult to quantify the benefits to wildlife that will result from each one-day ACC event. We are unaware of any study that might provide this information. However, we can state with certainty that without the Annual Coastal Cleanup Day event, much of the debris that exists in coastal waterways and on beaches will end up in coastal waters, and that the harmful impacts on wildlife and local communities resulting from this debris will be significantly greater than if the ACC Day event were conducted.

Table 9
Project 9. Save Our Shores:
Watershed Protection Program - Annual Coastal Cleanup Day in Monterey County

Table 9 – Annual Project Physical Benefits

Project Name: Annual Coastal Cleanup Day in Monterey County

Type of Benefit Claimed: Debris removed from coastal waterways and beaches

Measure of Benefit Claimed (Name of Units): Pounds of trash and recyclables

(a)	(b)	(c)	(d)
Physical Benefits			
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2014	0	6,000 pounds of trash and 800 pounds of recyclables	6,000 pounds of trash and 800 pounds of recyclables removed
2015	0	6,500 pounds of trash and 850 pounds of recyclables	6,500 pounds of trash and 850 pounds of recyclables
2016	0	7,000 pounds of trash and 900 pounds of recyclables	7,000 pounds of trash and 900 pounds of recyclables

Comments: We expect an increase in the amount of trash and recyclables collected each year as we continue to grow the ACC program.

[5] Toxicity Studies, Cigarette Butt Pollution Project. www.cigwaste.org. May 2009. Website. February 19, 2013.