APPENDIX E: SUMMARY OF FARM WATER QUALITY MANAGEMENT PLAN

INTRODUCTION

The University of California Cooperative Extension (UCCE) Farm Water Quality Management Plan template has been completed by a farmer in the Carpinteria Creek Watershed. A summary of that farm plan is shown in this appendix. A farm plan map is attached, and practices that the farmer is already implementing and/or will be implementing during the next five years are listed below. An electronic version of the farm plan template completed by the farmer for this project is available on the UCCE/ANR website at http://anrcatalog.ucdavis.edu, or by calling (800)994-8849; request Publication 9002.

IRRIGATION SYSTEM EVALUATION (NRCS #449)

An irrigation evaluation was conducted on the farm. The evaluators measured pressures and flow rates from sprinklers over the entire farm. The values obtained were statistically manipulated to determine how uniform the application of irrigation water is. Recommendations were delivered to the farm manager for system improvements that will eliminate irrigation runoff and conserve irrigation water.

Convert to a More Efficient Irrigation System: This irrigation system is a combination of several different sprinkler types and should be converted to a new system that consists of one micro-sprinkler per tree. Micro-sprinkler irrigation allows water to be placed directly above the plant root zone, in small amounts and causes less runoff than sprinklers.

Irrigation System Maintenance: Regular system maintenance is needed for this system. Frequent checking of sprinklers for clogs and blocked rotors can increase water conservation, decrease runoff and increase distribution uniformity.

Monitor Soil Moisture Content: Soil moisture monitoring is extremely important in avocados. Avocado roots are concentrated in the top foot of soil and are very susceptible to root-rot fungi that thrive in wet soil conditions. The farm manager monitors soil moisture content by probing the soil and by using tensiometers.

Know Irrigation Application Rate: The farm manager knows the application rate of the irrigation system in gallons per minute and schedules irrigation around the capability of the system.

Keep Water Application Records: The farm manager keeps track of when each field is watered and how many hours the system is run to water each field.

FIELD EROSION

Grassed Waterways (NRCS #412): Field gullies formed by concentrated runoff, should be planted with grass to reduce sediment delivery to the creek.

Vegetative Filter Strip (NRCS #393)
A strip of vegetation is placed at the bottom of a slope and parallel to the creek. Runoff leaving the field will pass through this vegetative strip before entering the creek.

A combination of a grassed waterway and a vegetative filter strip was recommended for two locations on this farm. Both locations have field gullies that are forming. The gullies can be reshaped and planted with grass, and then the filter strip would be a grass strip planted perpendicular to the waterway to slow down and filter any runoff coming from the waterway, before it entered the creek.

TREE REPLACEMENT
The orchard on this farm is at least 30 years old and the trees will need to be replaced in the near future, to maintain productivity. Any orchard replacement should include a drainage plan that addresses slopes and topography of the property. For the first three years the newly planted orchard areas should be mulched or planted with ground cover vegetation. New tree rows that are placed next to the creek should have a vegetative buffer strip planted between the trees and the top of the creek bank, running parallel to the creek. Alternative weed and pest control methods are recommended for areas that are 24 feet from the top of the creek bank.

Contour Orchard and Other Fruit Area (NRCS #331)
Rows are placed on slopes and grades that minimize erosion.

Mulching (NRCS #484)
Plant residues or other materials such as chipped landscaping trimmings are applied to the field soil surface. Rainfall impact is reduced and infiltration potential increases. Avocado resistance to root rot fungi can be increased with the addition of coarse woody mulches.

Critical Area Planting (#NRCS342)
Erosive portions of non-paved access roads are planted with non-crop vegetation in the winter.

Contour Buffer Strip (NRCS #332)
Strips of vegetation are placed along rows and in the middle areas between tree rows that are farmed on the contour.

BARE SOIL AREAS IN THE ORCHARD
Three portions of this property had bare soil exposed. Surface mulch should be added to these areas until the tree canopy is established. Planting of ground cover vegetation is another option.

Mulching (NRCS #484)
Plant residues or other materials such as chipped landscaping trimmings are applied to the field soil surface. Rainfall impact is reduced and infiltration potential increases.

Avocado resistance to root rot fungi can be increased with the addition of coarse woody mulches.

Critical Area Planting (#NRCS342)
Erosive portions of non-paved access roads are planted with non-crop vegetation in the winter.

NON-PAVED ROADS
There is an entrance road that leads down to a stream crossing and then an access road that leads to a water district outlet facility that need to be restored and protected. Both of these roads should be surveyed and graded to reduce erosion. After grading the roads will need to be mulched and planted with grass. Spreading barley seed on the freshly graded soil and then crimping in straw as a surface mulch is one method of protecting roads for the winter.

Access Road (NRCS#560): Road placement, grade, and surface conditions are assessed for proper drainage. Roads are graded to reduce erosion.

Critical Area Planting (#NRCS342)
Erosive portions of non-paved access roads are planted with non-crop vegetation in the winter.

CHEMICAL MANAGEMENT
Pesticide Management (NRCS #595A): Pesticide and herbicide applications are made using Integrated Pest Management (IPM) techniques. Spot spraying is used in order to reduce the amount of spray applied. Pest control decisions are based on the presence of pests and tolerable pest densities, rather than calendar schedules. The farm manager is a State licensed Pest Control Advisor (PCA), and he makes all chemical application decisions.

Assess Pest Populations: UC IPM Pest Management Guidelines are consulted for crop specific assessment techniques. Disease resistant varieties are planted. Blocks are scouted regularly for early detection of pests and diseases. "Hot spots" are treated separately when possible. Records of pests and beneficial insects are maintained.

Adopt Cultural Practices for Pest Management: Sanitation is practiced when handling plant material and equipment. Pest-ridden and diseased plants are removed or "rogued" out. Dust from roads onto fields is reduced through mulching and wetting. Mechanical weeding such as mowing, disking and hand weeding is used whenever practical.

Adopt Biological Control Practices for Pest Management: Biological controls are used to control pest populations where possible. Populations of beneficial insects are considered when making pesticide selection.

Make Efficient Pest Control Decisions: UC IPM Pest Management Guidelines are consulted for alternatives to chemical pest control or for reduced-risk pesticide selections. Compatible pesticides, such as selective pesticides, are used when beneficial insects are present. Application decisions are based on scouting data, pest thresholds and/or risk-assessment models. Pesticides are selected for lower risk of runoff or leaching based upon site conditions, pesticide label warnings, or transport models.

Handle Pesticide and Fertilizer Materials Safely: Pesticide handlers and applicators receive yearly training that includes: how to follow pesticide label instructions and environmental hazard warnings, how to calibrate and check application equipment and/or injectors and methods of environmentally safe disposal. Applicators determine the size of the areas to be treated and soil types being treated. Pesticide and fertilizer sprayers are turned off when equipment is turning outside of rows. Pesticides and or fertilizers are not sprayed when winds could move chemicals off-target as "drift" or when rain events are forecast.

Nutrient Management (NRCS #590): Management of fertilizer application systems, including soil and plant tissue sampling, fertilizer formulation, fertilizer application methods, and monitoring nutrients in the irrigation water make up the practice of Nutrient Management. Making sure that the fertilizer being applied relates to what the plant needs and can utilize will drastically reduce over-application of fertilizers, which is wasteful and potentially polluting. Nutrient management does not directly affect sediment reduction.

Base Fertilizer Use on Crop Needs: The farmer consults UC guidelines for fertilizer rates and types.

Sampling the soil before planting allows the farmer to better manage any pre-plant fertilizers. These samples are analyzed for multiple parameters and the current year fertilizer programs are based on the lab results.

Sample Plant Tissue: The farmer samples leaf tissue once each year before fertilizers are applied to compare with the soil analysis report, and adjust the fertilizer application amounts further.

Measure N in irrigation water & adjust application: The farmer samples and analyzes water from the well annually and the portion of nitrogen in the water is included in the fertilizer application budget. Analysis also includes electroconductivity (EC), phosphorus (P), sodium (Na), chlorides (Cl), and the sodium adsorption ration (SAR).

Reduce Nutrient Pollution from Human Waste
Septic systems are inspected and maintained regularly, by the property owner. Any portable toilets are regularly maintained to avoid spills.

CREEK BANK AND CHANNEL PROTECTION

Channel Bank Vegetation (NRCS #322) Vegetative cover is established on the banks to reduce erosion and enhance habitat.

Streambank Protection (NRCS#580) A 300 foot section of stream bank was destabilized in 1998 and before. The landowner and farm manager are involved in discussion about how to stabilize this stream bank portion with vegetation and/or structural measures to reduce erosion.

Clearing and Snagging (NRCS #326) Obstructions in the waterway are removed, prior to winter rains, to improve water flow and prevent bank erosion. This includes trimming of willows that reduce flow.

Fish Passage (NRCS #396) A low water creek crossing exists on this property that reportedly restricts fish migration. The landowner and farm manager are involved in discussion about removing or retrofitting this creek crossing.

RECORD KEEPING

The farm manager and the landowner have agreed to keep records of weather conditions such as air temperature, precipitation , and evapotranspiration. Extreme weather events such as severe storms, floods, and droughts will be documented as will destructive events such as fires and vandalism.

Photo Point Self-Evaluation

The farm manager and landowner agree to photograph the creek channel bank that appears unstable, and the creek crossing. Photo points will be established and photographs will be taken once each year and following any significant changes to the sites. They will also establish and monitor erosion pins along the creek channel bank that appears unstable, and the banks downstream of the creek crossing. The farm manager will walk over the farm when it rains to identify erosion concerns.