PUBLICATION 8332

The Farm Water Quality Plan

Plan components compiled by **MARY BIANCHI,** UC Cooperative Extension Farm Advisor, San Luis Obispo County; **DANIEL MOUNTJOY,** Area Resource Conservationist, USDA–NRCS; and **ALISON JONES,** Watershed Management Initiative Coordinator, Central Coast Regional Quality Control Board.

Use these sections to formalize a Farm Water Quality Plan for your farm.

This is the Farm Water Quality Plan for _____

Prepared by: _____

Date: _____

CONTENTS

UNIVERSITY OF CALIFORNIA
Division of Agriculture and Natural Resources
http://anrcatalog.ucdavis.edu

In partnership with
NRCS Natural Resources Conservation Service
http://www.nrcs.usda.gov

Farm Water Quality Planning

A Water Quality and Technical Assistance Program for California Agriculture
http://waterquality.ucanr.org

This PLAN is part of the **Farm Water Quality Planning (FWQP)** series, developed for a short course that provides training for growers of irrigated crops who are interested in implementing water quality protection practices. The short course teaches the basic concepts of watersheds, nonpoint source pollution (NPS), site-assessment techniques, and evaluation techniques. Management goals and practices are presented for a variety of cropping systems.

UC PEER REVIEWED

PROPERTY INFORMATION

Farm/Ranch

Farm/Ranch Name:	
Mailing Address or P.O. Box:	
City, State and Zip Code:	
Phone:	Size (acres):

Owner

Name(s):	
Mailing Address or P.O. Box: ☐Same as Farm/Ranch Address	
City, State and Zip Code:	
Phone:	E-mail:

Lessee/Manager

Name(s):	
Mailing Address or P.O. Box: ☐Same as Farm/Ranch Address	
City, State and Zip Code:	
Phone:	E-mail:

Location

County:
Legal Description (Township, Range, Sections):

OPERATIONS AND LAND USE

Current farm/ranch enterprises or activities and the area devoted to each

Land use activity	Area in acres/sq. ft.
☐ farming (field production)	
☐ greenhouse	
☐ shade and other temporary structures	
☐ grazing livestock	
☐ dairy	
☐ feedlot	
☐ soil mixing/handling, compost areas	
☐ processing (winery, cold storage, etc.)	
☐ public facilities (winery tasting rooms, etc.)	
☐ forestry (timber)	
☐ wildlife preserve	
☐ camping	
☐ hunt club	
☐	
☐	
☐	
☐	

Operations and Land use, cont'd.

Farming Enterprises

Number of production blocks for farming _____

☐Alfalfa/other hay	☐Cotton	☐Strawberries
☐Caneberries	☐Field crops	☐Tree/fruit/nut crops
☐Corn (grain)	☐Irrigated pasture	☐Vegetable crops
☐Corn (silage)	☐Oil crops	☐Vineyard
☐Other silage	☐Rice	☐Wheat, barley, oats
☐Greenhouse ☐Container ☐Ground	☐Shade & temporary ☐Container ☐Ground	☐Outdoor flowers ☐Container ☐Ground
☐	☐	☐
☐	☐	☐

Schedule for rotated crops:

Water sources for farming enterprises:
☐Surface water ☐Ground water ☐Municipal ☐Reclaimed/Recycled

Livestock Enterprises

Number of pastures for grazing _____

Types of livestock	Livestock access to water
☐cow/calf–spring calving	☐troughs and tanks
☐cow/calf–fall calving	☐springs
☐cow/calf–year-round calving	☐streams or creeks
☐stocker production	☐stock ponds
☐goat production	☐water gaps
☐llama production	☐wells
☐horses	☐river
☐ratite (ostrich, emu, etc) production	☐
☐	☐
☐	☐

STATEMENT OF GOALS

Production Goals
☐to pass the farm/ranch on to the next generation
☐to reduce family/farm debt so that only minor borrowing for operating capital is necessary in a typical year
☐to expand existing enterprises
☐to increase income by developing new enterprises
☐to increase profitability
☐to purchase or lease more property
☐to reduce short-term production costs
☐to achieve long-term reduced production costs
☐to increase the value of the land
☐
☐
☐

Quality of Life Goals
☐to reduce energy consumption in our home and in the farm/ranch operation
☐to reduce family debt
☐to provide support for our children's college education
☐to provide financial or other support to community organizations
☐to reduce household operating expenses
☐to build an emergency fund
☐to be involved in at least one significant community activity that is important to our family's goals, health, values, or well-being
☐to build a retirement fund
☐to grow crops or raise livestock during my retirement
☐to enhance relationships with neighbors and the community
☐to enhance health and well-being on the farm
☐
☐

Statement of Goals, cont'd.

Natural Resource/Water Quality Goals
☐to protect cropland, nursery area, rangeland, pastureland, and/or forestland from erosion
☐to manage farm or ranch roads to reduce movement of sediment into streams, and other water bodies
☐to reduce human-caused erosion of stream banks
☐to increase canopy and/or ground cover in riparian areas or along streams and other water bodies
☐to protect and enhance fish populations and other aquatic resources.
☐to reduce concentration of livestock in or near riparian areas, streams or other water bodies
☐to reduce the opportunity for nutrients, pesticides, and pathogens to enter streams or other water bodies.
☐to maintain and enhance riparian plant communities
☐to reduce wildfire hazard
☐to maintain and protect oak woodland and other upland native plant communities
☐to maintain or improve wildlife habitat
☐to reduce/manage invasive weeds
☐
☐
☐

REGIONAL AND LOCAL WATER QUALITY INFORMATION

Water Quality Information is Available on the Following Websites:

California Coastal Commission (CCC)

Critical Coastal Areas (CCAs) program:
http://www.coastal.ca.gov/nps/cca-nps.html

California Department of Pesticide Regulation (DPR)

Ground Water Protection Area (GWPA) maps:
http://www.cdpr.ca.gov/docs/gwp/gwpamaps.htm

National Oceanic and Atmospheric Administration (NOAA) — National Marine Fisheries Service (NMFS) Protected Resources Division

Environmentally Significant Unit (ESU) maps and information:
http://swr.ucsd.edu/psd/ps1inf.htm#Salmon

State Water Resources Control Board (SWRCB) — Regional Water Quality Control Board (RWQCB)

Beneficial Uses: Basin Plan
http://www.swrcb.ca.gov/rwqcb3/BasinPlan/BP_text/chapter_2/figs_n_tables/table_2-1.doc

Beneficial Use Support: California Water Quality Assessment Report 1998 Staff Report, Part A
http://www.swrcb.ca.gov/general/publications/index.html#Cc

Clean Water Act Section 303(d) list
http://www.swrcb.ca.gov/tmdl/docs/303dlists2006/approved/r3_06_303d_reqtmdls.pdf

Central Coast Ambient Monitoring Program (CCAMP) monitoring data
http://www.ccamp.org/ca/3/3.htm

Regional and Local Water Quality Information, cont'd.

Location of the Operation — "Watershed Address"	
Water Quality Control Board Region ☐ Region 1: North Coast ☐ Region 2: San Francisco Bay ☐ Region 3: Central Coast ☐ Region 4: Los Angeles ☐ Region 5: Central Valley	☐ Region 6: Lahontan ☐ Region 7: Colorado River Basin ☐ Region 8: Santa Ana ☐ Region 9: San Diego
Name of the Hydrologic Unit (HU):	
Name of the Hydrologic Area (HA):	

Downstream Waterbodies

Type(s) of streams on and adjacent to the farm/ranch:

☐ Perennial – flow all year
☐ Intermittent – flow during and for a period following rainfall
☐ Ephemeral – only flow in direct response to rainfall
☐ None

List names of all downstream waterbodies, beginning at the property and ending at the ocean:

Pollutants identified in downstream waterbodies:

☐ Sediment/Silt Waterbody: _____ Source: ☐ 303(d)*
☐ Cooperative Monitoring ☐ Other _____

☐ Nutrients/Nitrate Waterbody: _____ Source: ☐ 303(d)*
☐ Cooperative Monitoring ☐ Other _____

☐ Pesticides Waterbody: _____ Source: ☐ 303(d)*
☐ Cooperative Monitoring ☐ Other _____

☐ Other(s) Waterbody: _____ Source: ☐ 303(d)*
☐ Cooperative Monitoring ☐ Other _____

*Waterbodies on Federal 303(d) list are subject to Total Maximum Daily Loads.

Is the watershed you are in designated by the Department of Fish and Game as being within a known range of an Evolutionary Significant Unit (ESU) for Coho or Steelhead?

Coho ESU? ☐ Yes ☐ No
If yes, are the Coho Threatened or Endangered? ☐ T ☐ E

Steelhead ESU? ☐ Yes ☐ No
If yes, are the Steelhead Threatened or Endangered? ☐ T ☐ E

Regional and Local Water Quality Information, cont'd.

Is a coastal zone downstream of the operation designated by the California Coastal Commission as a proposed Critical Coastal Area (CCA)? ☐ Yes ☐ No
Groundwater Basin
Name and Number of the Groundwater Basin:
Is the farm/ranch within an area designated by the California Department of Pesticide Regulation as a Ground Water Protection Area (GWPA)? ☐ Yes ☐ No
Include maps that indicate your watershed, groundwater basin, and flow of water from your operation to the ocean.

FARM/RANCH MAP

Facilities and Resources
Keep maps and photographs with Plan for reference

Indicate the acres within the boundary, number of each facility and hydrologic feature, and miles of road and fencing. Rough estimates are adequate for miles.

Shown on map	Boundaries	Total Acres
☐	Farm or ranch boundary	
☐	Field boundaries	
☐		
	Buildings	**Total Number**
☐	Residence, offices (label)	
☐	Barns/shops/outbuildings (label)	
☐	Pesticide storage (label)	
☐	Fertilizer storage (label)	
☐	Petroleum storage (label)	
☐	Dairy or other animal handling facilities	
☐	Livestock waste management facilities (label)	
☐	Greenhouses (label)	
☐	Shade houses, other temporary structures (label)	
☐	Soil handling/mixing, compost areas (label)	
☐	Boiler rooms (label)	
☐	Cold storage, postharvest handling (label)	
☐		
	Structures	**Total Number**
☐	Equipment yards	
☐	Corrals	
☐	Feedlots (label)	
☐	Septic tanks, other bathroom facilities	
☐	Stockwater storage tanks	
☐	Stockwater troughs	
☐	Erosion control structures (label)	
☐		

Farm/Ranch Map, cont'd.

	Fences and Roads	Total Miles
☐	Fences	
☐	Dirt road	
☐	Gravel road (label) gravel	
☐	Paved road	
☐		
	Hydrologic Features	**Total Number**
☐	Irrigation ditches	
☐	Irrigation ditches, lined (label) lined	
☐	Streams and creeks	
☐	Springs	
☐	Irrigation reservoirs R	
☐	Recycling reservoirs (label) R recycling	
☐	Irrigation settling ponds (label) settling pond	
☐	Stockwater ponds	
☐	Tailwater recovery systems (label) tailwater recovery system	
☐	Bridges	
☐	Stream crossings FORD	
☐	Domestic wells (label) domestic well	
☐	Irrigation wells	
☐	Stockwater wells (label) well	
☐		

SITE ASSESSMENT AND PRACTICES PLANNING

You have completed the basin water quality information that lists important water bodies in your area and the water quality problems that have been identified for these water bodies. You have also created a map of your farm or ranch that lists land uses, facilities, and resources.

The following section can help identify areas of your farm or ranch where you've already implemented management practices to protect water quality. It can also help determine what areas of your farm or ranch can receive the most benefit from the implementation of new management practices. These items can be added to your map.

A trip around the property in a vehicle or on foot may be necessary to complete this assessment. Some of the assessment may involve accessing your pesticide use reports, or operations budget for nutrients applied to specific fields. Keep this section and the following self-evaluation section as a working document to record your decisions and your progress. You should keep records or take photographs before and after implementation to document changes that occur as a result of practices or groups of practices.

If you conclude that you need to make some changes, it may take you a while to decide how to proceed. You may want to compare practices that can accomplish the same thing. Not all practices listed may be applicable or available for your situation. Discuss these options with other farmers, consultants, or technical advisors from UCCE, NRCS, RCDs or other organizations. You should estimate costs of implementation. You may want to seek cost share funding with NRCS or other sources.

How to complete this section:
If you answer "yes" to any of the questions, look at the following table(s) for Management Practices. Select Practices that you are currently using or that you think might be useful. Update annually and keep notes that help with record keeping. If you would like to be more specific, you can record block designations, square footage, or acres of each selected Practice in the "location(s)" column. NRCS Conservation Practice Standards that you might want to use are listed where applicable. (e.g., Sediment Basin #350).

Site Assessment and Practices Planning–Sediment, cont'd.

Managing Sediment

Soil erosion and sediment deposition are primary contributors to lowered surface water quality from farmlands. In areas where there are steep slopes, erodible soils, and intense storm characteristics, sediment delivery from farmlands can be relatively high. Roads and other areas of disturbed ground where bare soils are susceptible to the erosive action of water and wind can also be major contributors of sediment to waterbodies.

Upstream/Upslope Land Use

S1. Is your property affected by sediment from upstream/upslope land uses?

☐Yes ☐No

Notes:

Practices to Manage Sediment from Upstream/Upslope									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
A structure to collect the sediment is installed and maintained.									
Sediment Basin #350									
Water and Sediment Control Basin #638									
A structure to divert the sediment is installed and maintained									
Diversion #362									
Grassed Waterway #412									
Lined Waterway #468									
Open Channel #582									
Structure for Water Control #587									
Surface Drainage Ditch #607 & #608									
Underground Outlet #620									
Vegetation is established to filter the sediment									
Conservation Cover #327									
Filter Strip #393									
Tree/Shrub Establishment #612									

Site Assessment and Practices Planning–Sediment, cont'd.

Fields and Other Growing Areas

S2. Do you notice soil erosion from fields and other growing areas with steep slopes or long lengths of run?

☐Yes ☐No

Notes:

Develop a Field Layout to Minimize Erosion Potential									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Rows are placed on slopes and grades that minimize erosion.									
Contour Farming #330									
Contour Orchard and Other Fruit Area #331									
Row Arrangement #557									
Long runs are broken up.									
Access Road #560									
Contour Buffer Strip #332									
Diversion #362									
Irregularities that cause concentrated runoff on slopes are removed.									
Land Smoothing #466									

Site Assessment and Practices Planning–Sediment, cont'd.

S3. During rain events, do you notice soil erosion from fields with bare soil or sparse ground cover?

☐Yes ☐No

Notes:

Cover Bare Fields to Reduce Rainfall Runoff Potential									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Bare soil is covered with vegetation.									
Conservation Crop Rotation #328									
Cover Crop #340									
Alternate rows are cultivated and cover cropped.									
Cover Crop #340									
Plant residues or other materials are applied to or managed on the field soil surface.									
Mulching #484									
Residue Management #329									
Strips of vegetation are placed along rows that are farmed on the contour.									
Contour Buffer Strip #332									
Critical Area Planting #342									

Site Assessment and Practices Planning–Sediment, cont'd.

S4. During irrigation, do you notice soil erosion from fields?
☐Yes ☐No

Notes:

Manage Irrigation Water to Minimize Erosion Potential									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Irrigations are managed to eliminate runoff.									
Irrigation Water Management #449									
Amendments are used to improve infiltration: PAM, gypsum, organic amendments.									
Anionic Polyacrylamide (PAM) #450									
Deep tillage is performed to fracture restrictive soil layers and increase deep percolation where leaching of pollutants to ground water is not a significant risk.									
Deep Tillage #324									
Soil or substrate moisture status is monitored using tensiometers or other sensors.									
The application rate of the irrigation system (in/hr) is known.									
Irrigation system is redesigned or converted to another type.									
Fields are graded for uniform application of irrigation water.									
Irrigation Land Leveling #464									

Site Assessment and Practices Planning–Sediment, cont'd.

S5. During high winds, do you notice dust blowing from fields with bare soil or sparse ground cover or from field roads?

☐Yes ☐No

Notes:

Reduce Wind Erosion Potential									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Vegetation is established along the field edges to shield the field from wind.									
Hedgerow #422									
Herbaceous Wind Barrier #603									
Windbreak / Shelterbelt Establishment #380 & #650									
The bare soil is covered with vegetation.									
Conservation Crop Rotation #328									
Cover Crop #340									
Residue Management #329									
The soil surface is roughened.									
Cross Wind Ridges #589A									
Surface Roughening #609									
Road surfaces are protected with mulch, gravel, water, or an environmentally-safe dust suppressant.									
Access Road #560									
Mulching #484									

Site Assessment and Practices Planning–Sediment, cont'd.

Container-Grown Plants, Including Hydroponics

S6. Do you grow plants in containers in a system that doesn't recover all applied water? ☐Yes ☐No

Notes:

Reduce Erosion and Runoff in Container-Grown Plants									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Plants are grouped to increase water and nutrient use efficiency by container size, container design, age, canopy architecture, water and nutrient requirements and/or salt tolerance.									
Plants are consolidated and irrigation is shut off in unused portions.									
Containers are filled and packed uniformly.									
Growing media and/or substrate is selected for high water-holding capacity and adequate drainage and aeration.									
Growing media and/or substrate is stored and mixed in a location sheltered from wind and away from drainage channels.									
Mulch is used to prevent soil mix from splashing out of containers.									
Mulch is used to protect ground surface below containers from erosion.									

Site Assessment and Practices Planning–Sediment, cont'd.

Roads and Roadside Ditches

S7. Do you notice rills, gullies, or headcuts running down the road?
☐Yes ☐No

Notes:

S8. Do you notice water-loving vegetation present on the roadbed?
☐Yes ☐No

Notes:

S9. Is an outboard berm channeling water down the road?
☐Yes ☐No

Notes:

S10. Do you notice tension cracks on the road surface or outboard fill?
☐Yes ☐No

Notes:

Protect Roads from Concentrated Flow of Runoff									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Road placement, grade, and surface conditions are assessed for proper drainage.									
Roads are graded to reduce erosion.									
Access Road #560									
Roadbeds and/or banks are covered in the winter or during minimal use.									
Cover Crop #340									
Critical Area Planting #342									
Erodible soil on the roadbeds is permanently protected with mulch, road oil, gravel or paving.									
Access Road #560									
Mulching #484									
Outboard berms are removed.									
Access Road #560									

Site Assessment and Practices Planning–Sediment, cont'd.

S11. Is the road or ditch runoff causing erosion on land below the roadway?

☐Yes ☐No

Notes:

S12. Are ditch banks being eroded by water flow from greenhouses and other structures, fields, or roads?

☐Yes ☐No

Notes:

S13. Do you notice that the inboard ditch channel is being downcut?

☐Yes ☐No

Notes:

S14. Is the inboard ditch channel obstructed, causing water to flow onto the road?

☐Yes ☐No

Notes:

S15. Is overflow from a plugged culvert diverting water down the road surface?

☐Yes ☐No

Notes:

S16. Do you see rockfall or slumping due to instability of the cutbank or hillslope above the roadway?

Protect Ditches and Banks from Concentrated Flow									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Road placement, grade, and surface conditions are assessed for proper drainage.									
Vegetation is established in eroding roadside ditches.									
Grassed Waterway #412									
Eroding channels are protected with geotextiles or rock.									
Lined Channel #468									
Ditches and culverts provide adequate drainage.									
Grade Stabilization Structure #410									
Open Channel #582									
Structure for Water Control #587									
Ditches and culverts are kept clean of debris.									
Water is diverted away from unstable slopes.									
Diversion #362									
Unstable slopes are treated.									
Cut bank stabilization #742									

Site Assessment and Practices Planning–Sediment, cont'd.

Non-Cropped and Non-Road Areas

S17. Do you notice erosion or sediment loss from areas of bare soil such as cut banks, field margins, between field blocks or greenhouses, on abandoned slopes, soil mixing/handling or compost areas, equipment yards, parking areas, and postharvest or cold storage facilities?

☐Yes ☐No

Notes:

S18. Do you see signs of or the potential for sheet erosion, rill erosion, gullies, headcuts, mudslides, or landslides in steep non-cropped areas?

☐Yes ☐No

Notes:

Reduce Erosion from Non-Cropped Areas	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Protect Soil									
Bare soil is covered with vegetation or mulch.									
Mulching #484									
Conservation Cover #327									
Critical Area Planting #342									
Filter Strip #393									
Hedgerow Planting #422									
Range Planting #550									
Tree/Shrub Establishment #612									
Vegetation is allowed to reestablish by excluding animals, people, or vehicles.									
Use Exclusion #472									
Regrade Potential Problem Areas									
Potential landslide areas are stabilized by reducing and/or supporting the slope.									
Cut Bank Stabilization #742									
Landslide Treatment #453									
Gullies are stabilized or reshaped.									
Critical Area Planting #342									
Grade Stabilization Structure #410									
Structure for Water Control #587									
Divert Water to a Stable Outlet									
Channels or conduits to divert water to a stable outlet are installed or improved.									
Diversion #362									
Grassed Waterway #412									
Lined Waterway #468									
Open Channel #582									
Structure for Water Control #587									
Subsurface Drain #606									
Surface Drainage Ditch #607 & #608									
Underground Outlet #620									
Facilities roof runoff is collected and diverted to a stable outlet.									
Roof Runoff Management #558									

Site Assessment and Practices Planning–Sediment, cont'd.

Sediment Leaving the Operation

S19. Do you notice sediment moving off the farm after irrigation and/or storm events?

☐Yes ☐No

Notes:

S20. Do you notice sediment accumulating in ditches, channels, ponds, or other waterways downstream of the farm?

☐Yes ☐No

Notes:

Detain or Filter Eroded Sediment Leaving the Operation									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Structures to divert sediment to settling areas are installed and maintained.									
Diversion #362									
Lined Waterway #468									
Open Channel #582									
Structure for Water Control #587									
Surface Drainage Ditch #607 & #608									
Underground Outlet #620									
Structures to collect sediment are appropriately sized, installed and maintained.									
Irrigation System Tailwater Recovery #447									
Sediment Basin #350									
Water and Sediment Control Basin #638									
Vegetation is established to filter sediment.									
Conservation Cover #327									
Filter Strip #393									
Grassed Waterway #412									

Site Assessment and Practices Planning–Irrigation, cont'd.

Managing Irrigation

Efficient irrigation management maximizes water use for crop production and minimizes water losses caused by runoff, evaporation, and deep percolation. A portion of the water applied during an irrigation benefits crop growth by providing moisture for transpiration, preventing the build up of salts in the root zone, and moderating the air temperature around the crop. The remainder of the applied water that is lost through run-off and deep percolation not only wastes water, energy, and fertilizer, but can also transport nutrients and pesticides into ground and surface water supplies.

I1. Does tailwater or runoff water leave the operation during irrigation events?

☐Yes ☐No

Notes:

I2. Could you irrigate more efficiently to reduce the amount of water that leaches out of the root zone to eventually reach the ground water?

☐Yes ☐No

Notes:

Manage Irrigation Water for Maximum Efficiency									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Maximize Irrigation System Efficiency									
Irrigation efficiency is evaluated by an irrigation mobile lab, UCCE, or a consultant.									
Irrigation Water Management #449									
Regular system maintenance is performed.									
Irrigators are trained in practices that promote efficient irrigation.									
Amendments are used to improve infiltration—PAM, gypsum, organic amendments.									
Anionic Polyacrylamide (PAM) #450									
Deep tillage is performed to fracture restrictive soil layers and increase deep percolation where leaching of pollutants to ground water is not a significant risk.									
Deep Tillage #324									
Optimize Irrigation Scheduling									
Daily water use is estimated using resources such as CIMIS data, evapotransporation (ET) atmometers and/or irrigation records.									
Soil or substrate moisture status is monitored using tensiometers or other sensors.									
Irrigations are scheduled during times that minimize ET losses.									
The application rate of the irrigation system (in/hr) is known.									
Plant rooting depths are known.									
The irrigation schedule is adjusted to account for the leaching fraction and distribution uniformity of the system.									

Site Assessment and Practices Planning–Irrigation, cont'd.

	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Timers automatically shut off irrigation after a prescribed time.									
Records are kept of the irrigation schedule and water applied during each irrigation.									
Optimize Irrigation System Design									
Irrigation system is properly designed and maintained or is converted to another type.									
Irrigation System, Microirrigation #441									
Irrigation System, Sprinkler #442									
Irrigation Water Management #449									
Fields are graded for uniform application of irrigation water.									
Irrigation Land Leveling #464									
Irrigation water conveyance system (main, canals, etc.) is properly designed, maintained, or upgraded.									
Irrigation Water Conveyance Pipeline #430									
Tailwater is recirculated.									
Irrigation Regulation Reservoir #552B									
Irrigation System Tailwater Recovery #447									
Subsurface drainage is installed and used in combination with other practices to reduce the potential for NPS pollution.									
Subsurface Drain #606									
Water wells no longer in use are sealed off.									
Well Decommissioning #351									

Site Assessment and Practices Planning–Irrigation, cont'd.

13. Are some areas furrow or flood irrigated?

☐Yes ☐No

Notes:

Improve Furrow or Flood Irrigation Uniformity									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
A surge valve (surge irrigation) is used to reduce deep percolation losses.									
Irrigation ditches are properly designed.									
Irrigation Field Ditch #388									
Short furrow lengths or split fields are used.									
Furrows are smoothed prior to irrigating (torpedo).									
Alternate furrows are irrigated to avoid over irrigating in sandy or loamy soils.									
Inflow rates are adjusted to match field infiltration rate.									
Advance and recession times in furrows are recorded.									
Ditches are lined or converted to pipe.									
Irrigation Canal or Lateral #320									
Irrigation Water Conveyance Pipeline #430									
Cover crops are used to enhance soil aggregate structure and improve infiltration.									
Cover Crop #340									

Site Assessment and Practices Planning–Irrigation, cont'd.

I4. Are some areas irrigated with sprinklers or microsprinklers?
☐Yes ☐No

Notes:

Improve Sprinkler and Microsprinkler Irrigation Uniformity									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Appropriate system pressure is maintained.									
System flow rate and pressures (head and tail) are recorded.									
Leaks on mains and laterals are repaired.									
Sprinkler heads are maintained.									
Sprinkler heads with a high uniformity rating are used.									
Appropriate nozzle sizes are selected for lateral spacing and head pattern.									
Uniform nozzle sizes are used.									
Flow control nozzles are used when pressure is too high or variable.									
Consistent riser heights are used and risers are maintained to remain perpendicular to the ground.									
Microsprinklers with low pressure shutoff valves are used to improve uniformity on sloping runs.									
In greenhouses, traveling sprinkler booms are used to increase distribution uniformity.									
Starting locations of hand-move lines are offset between irrigations to increase uniformity throughout the growing season.									
System is operated in low-wind conditions.									
Vegetation is established along field edges to shield from wind.									
Herbaceous Wind Barrier #603									
Windbreak / Shelterbelt #380 & #650									
Irrigations are ended if significant runoff occurs.									
Cover crops are used to enhance soil aggregate structure and improve infiltration.									
Cover Crop #340									

Site Assessment and Practices Planning–Irrigation, cont'd.

15. Are some areas drip irrigated? ☐Yes ☐No

Notes:

Improve Drip Irrigation Uniformity									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Drip tape and emitters are used with an application rate that matches system design, soil or substrate type, and crop needs.									
The water supply is evaluated for high bicarbonates that can cause clogging.									
A filter is selected that filters the mineral and sand particles in the water supply.									
Filters are regularly flushed/cleaned.									
Lateral lines are flushed regularly.									
Lateral lines are periodically chlorinated to prevent bacterial and algal build-up and root intrusion into emitters.									
Emitters are regularly checked to ensure they are delivering water to plants.									
Leaks on mains and laterals are repaired.									
Emitters with shut-off valves to isolate unused containers or benches are used.									
Drip tape with a small emitter discharge exponent is used.									
Pulse irrigation is used.									
A pressure regulator is used for each submain.									
Pressures of submains are regularly adjusted.									
Pressure-compensating emitters are used.									
Cover crops are used to enhance soil aggregate structure and improve infiltration.									
Cover Crop #340									

Site Assessment and Practices Planning–Pesticides, cont'd.

Managing Pesticides

Pesticides that move from their site of application into surface or groundwater can affect the beneficial uses of water through their potential impact on human and animal health and on non-target organisms. Wind and water erosion of soil or drift from pesticide applications may contribute to pesticide movement away from the target area. Pesticides may enter surface waters in irrigation return flows and tile drainage either as water-soluble residuals or adsorbed to sediments. Ground waters in agricultural areas may also be subject to pollution from pesticides when deep percolation from irrigated land carries water-soluble pesticides to the ground water. Many practices in this section fall under NRCS Conservation Practice Standard #595. Consult other sources such as the UC Integrated Pest Management (IPM) Pest Management Guidelines for crop-specific IPM practices and alternatives to pesticide use (www.ipm.ucdavis.edu).

Pesticide Management Program

P1. Does your pest management program have the potential to impact water quality?

☐Yes ☐No

Notes:

Use IPM to Make Informed Pesticide Application Decisions (www.ipm.ucdavis.edu)									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Prepare Site and Use Plant Materials to Promote Crop Health									
Fields are designed or managed to reduce water related stress.									
Bedding #310									
Irrigation Land Leveling #464									
Irrigation Water Management #449									
Container media is selected to reduce water-related stress.									
Resistant varieties are planted.									
Crop rotations are used to break pest population cycles.									
Conservation Crop Rotation #328									
Cover crops are used to promote soil health and reduce weeds, insects, and pathogens.									
Cover Crops #340									
Non-cropped areas are managed (planted, paved, or mulched) to discourage weeds.									

Site Assessment and Practices Planning–Pesticides, cont'd.

	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Assess Pest Populations									
UC IPM Pest Management Guidelines are consulted for crop-specific assessment techniques (www.ipm.ucdavis.edu).									
Blocks are scouted regularly for early detection of pests and diseases.									
"Hot spots" are identified.									
Records of pests and beneficial insects are maintained.									
Adopt Cultural Practices for Pest Management									
Sanitation – Plant material is certified and inspected for vigor, sanitation is practiced when handling plant material and equipment.									
Pest-ridden and diseased plants are removed or "rogued" out.									
Alternate host plants that are non-native and/or not harboring beneficial insects are replaced.									
Dust from roads onto fields is reduced through mulching, graveling, wetting, or treating with an environmentally safe dust suppressant.									
Access Road #560									
Mulching #484									
Mechanical weeding such as mowing, tilling, disking, and hand weeding is used whenever practical.									
Physical or environmental controls are used (changing humidity or temperature in greenhouses, switching to drip irrigation in row crops, etc.).									
Pest exclusion is performed in greenhouses.									
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 (www.ipm.ucdavis.edu).									
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. (www.wcc.nrcs.usda.gov/pestmgt/winpst.html)									
"Hot spots" are treated independently.									
Pesticides are applied at the lowest effective labeled rate.									

Site Assessment and Practices Planning–Pesticides, cont'd.

Pesticide Handling

P2. Are pesticides stored on site?

☐Yes ☐No

Notes:

P3. Are pesticides mixed and loaded on site?

☐Yes ☐No

Notes:

P4. Are pesticides (organic and/or synthetic) applied to crops, including ground-applied, foliar-applied, and chemigation?

☐Yes ☐No

Notes:

Implement Responsible Storage, Application, and Disposal Practices	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Handle Materials Safely									
Pesticide handlers and applicators receive yearly training.									
Pesticide label instructions and environmental hazard warnings are followed.									
Application equipment and/or injectors are checked and calibrated regularly.									
Acreage to be treated and soil types are known.									
Pesticide sprayers are turned off when equipment is making turns outside of rows.									
Pesticides are not sprayed when winds could move pesticides off-target as "drift."									
Greenhouse exhaust fans are turned off during applications.									
Rain events are considered: pesticides are not applied prior to projected rain events.									
Pesticide applications in ditches occur when water quality impacts are minimal and the materials used are approved for use near aquatic habitat.									
Disposal methods are environmentally safe.									
Design Facilities Appropriately									
The pesticide storage facility includes a concrete pad and curb to contain spills and leaks.									
Production wells are located on elevated, impervious bases and are upslope of pesticide storage and handling facilities.									
Wellhead protection consists of an impermeable pad, sump, or buffer area of 100' around the wellhead that excludes pesticide handling and pesticide-laden drainage.									
Containment basins are lined to prevent leaching of pesticides.									
Mixing is performed on low runoff hazard sites: over 100' downslope of wells on an impermeable surface.									
Agrichemical Handling Facility #702									

Site Assessment and Practices Planning–Pesticides, cont'd.

Reducing Pesticide Movement

P5. Do the pesticides applied to your crops have the potential to move offsite adsorbed to sediment, in runoff water, and/or by leaching?

☐Yes ☐No

Notes:

P6. Are you aware of pesticides in the soil from historic applications?

☐Yes ☐No

Notes:

Reduce Pesticide Movement in Water and Eroding Soil									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Design Field Layout to Minimize Pesticide Movement									
The field is shaped to planned grades.									
Irrigation Land Leveling #464									
Land Smoothing #466									
Rows are placed on slopes, grades, widths, or on the contour to minimize erosion and runoff.									
Contour Farming #330									
Contour Orchard and Other Fruit Area #331									
Row Arrangement #557									
Manage Field to Reduce Pesticide Movement									
Bare soil in the field has been covered with vegetation to reduce soil erosion, increase infiltration, and build soil organic matter.									
Conservation Cover #327									
Cover Crop #340									
Vegetative Barrier #601									
Plant residues are retained or other materials are applied to the soil or substrate surface.									
Mulching #484									
Residue Management #329									

Site Assessment and Practices Planning–Pesticides, cont'd.

	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Deep tillage is performed to fracture restrictive soil layers and increase deep percolation where leaching of pollutants to ground water is not a significant risk.									
Deep Tillage #324									
Irrigations are managed to minimize leaching and runoff.									
Irrigation Water Management #449									
Strips of perennial vegetation are placed along rows farmed on the contour.									
Contour Buffer Strip #332									
A structure to collect sediments that contain pesticides is installed and maintained.									
Sediment Basin #350									
Water and Sediment Control Basin #638									
Irrigation System, Tailwater Recovery #447									
Vegetation is established along the downslope field edge to filter sediments containing pesticides.									
Conservation Cover #327									
Filter Strip #393									
A vegetated channel is placed downslope of the field.									
Grassed Waterway #412									

Site Assessment and Practices Planning–Nutrients, cont'd.

Managing Nutrients

Nutrient sources associated with agricultural production practices include fertilizers and other amendments, nutrients in ground water used in irrigation, biodegradation of crop residues, agricultural and municipal waste applied to land, and waste generated by animals directly. Nutrients from these sources become pollutants when they are transported offsite into nearby streams and lakes or percolate in excessive amounts to ground water. Nitrates and phosphates in surface water bodies contribute to eutrophication. Eutrophication leads to increases in aquatic plants and algal blooms that deplete dissolved oxygen, impacting aquatic organisms. Nitrate pollution of ground water is widespread and a serious problem statewide because of impacts to drinking water. Nitrates are water soluble and have the potential to leach or to run off in surface water. Phosphates attach to soil particles and have the potential to move offsite with eroding soil. In areas with high concentrations of accumulated soil phosphorus, it can also be carried off as dissolved phosphate in runoff water. Many practices in this section fall under NRCS Conservation Practice Standard Nutrient Management #590.

Nutrient Management Program

N1. Do you apply sources of nitrogen (N) and/or phosphorus (P) (fertilizer, compost, manure)? ☐Yes ☐No

Notes:

Make Informed Nutrient Management Decisions									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Base Fertilizer Use on Crop Needs									
N and P requirements are determined for each crop.									
N and P status of soil amendments or substrate is determined.									
Well/irrigation water is monitored for N and P levels.									
Pre-sidedress nitrogen testing is used where applicable.									
Tissue samples are taken for N and P status.									
All N and P sources (irrigation water, amendments, crop residue, etc.) are considered in a nutrient budget.									
A nutrient budget is used in determining fertilizer applications.									
Make Efficient Fertilizer Decisions									
Fertilizer application is timed according to crop requirements.									
Fertigation is used.									
Split applications are made.									
A controlled/slow-release fertilizer is used alone or with a liquid feed.									
Nitrogen-accumulating species are used for cover cropping.									
Cover Crop #340									
Irrigations are managed to avoid nutrient loss below the root zone.									
Irrigation Water Management #449									

Site Assessment and Practices Planning–Nutrients, cont'd.

Nutrient Handling

N2. Are fertilizers stored and/or mixed on site?
☐Yes ☐No

Notes:

N3. Are fertilizers (organic and/or synthetic) applied to crops, including pre-mixing with soil substrates, ground applied, foliar applied, and fertigation?
☐Yes ☐No

Notes:

Implement Responsible Storage, Application, and Disposal Practices									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Handle Materials Safely									
Application equipment and/or injectors are checked and calibrated regularly.									
Precision placement is used to apply fertilizer close to roots.									
Fertilizer handlers and applicators receive training.									
Rain and irrigation events are considered: Fertilizers are not applied prior to projected rain events or irrigations.									
Design Facilities Appropriately									
The fertilizer storage facility includes a concrete pad and curb to contain spills and leaks.									
Mixing is performed on low runoff hazard sites: Over 100 feet downslope of the well on an impermeable surface.									
Agrichemical Handling Facility #702									

Site Assessment and Practices Planning–Nutrients, cont'd.

Reducing Nutrient Movement

N4. Does the fertilizer applied to your crops have the potential to move offsite attached to sediment, in runoff water, and/or by leaching?

☐Yes ☐No

Notes:

Reduce Nutrient Movement with Water and Eroding Soil									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Field Layout									
The field is shaped to planned grades.									
Irrigation Land Leveling #464									
Land Smoothing #466									
Rows are placed on slopes, grades, widths, or on the contour to minimize erosion and runoff.									
Contour Farming #330									
Contour Orchard and other Fruit Area #331									
Row Arrangement #557									
Plants in poorly drained soil are placed on parallel ridges or "beds."									
Bedding #310									
Manage Field to Reduce Nutrient Movement									
Bare soil in the field has been covered with vegetation to reduce soil erosion, increase infiltration, and build soil organic matter.									
Conservation Cover #327									
Cover Crop #340									
Vegetative Barrier #601									
Plant residues or other materials are applied to the field soil surface.									
Mulching #484									
Residue Management #329									
Deep tillage is performed to fracture restrictive soil layers and increase deep percolation where leaching of pollutants to ground water is not a significant risk.									
Deep Tillage #324									
Irrigations are managed to minimize leaching and runoff.									
Irrigation Water Management #449									
Strips of perennial vegetation are placed along rows farmed on the contour.									
Contour Buffer Strip #332									
A structure to collect sediments containing nutrients is installed and maintained.									
Irrigation System Tailwater Recovery #447									
Sediment Basin #350									
Water and Sediment Control Basin #638									

Site Assessment and Practices Planning–Nutrients, cont'd.

	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Vegetation is established along the downslope field edge to filter sediment containing nutrients.									
Conservation Cover #327									
Filter Strip #393									
Vegetation is placed downslope of the field.									
Grassed Waterway #412									
Constructed Wetland #656									

Nutrient Waste

N5. Is there a septic system on the farm or operation?

☐Yes ☐No

Notes:

N6. Do livestock have access to a water body?

☐Yes ☐No

Notes:

N7. Is there a feedlot, loafing area, or concentration of livestock near a water body?

☐Yes ☐No

Notes:

Reduce Nutrient Pollution from Human and/or Livestock Waste

	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Septic systems are inspected and maintained.									
Portable toilets are regularly maintained to avoid spills.									
Livestock are fenced off from waterways.									
Fence #382									
Use Exclusion #472									
Livestock are directed away from water bodies with placement of troughs, salt licks, dusters and/or trails.									
Animal Trails or Walkways #575									
Prescribed Grazing #528									
Watering Facility #614									

Site Assessment and Practices Planning–Salinity, cont'd.

Managing Salinity

Irrigation water is essential for crop production in the arid and semiarid regions of California. Irrigation water naturally contains a certain amount of dissolved minerals (salts) depending on its source. Typical irrigation water contains a substantial amount of salt. For example a water source with an EC of 1.0 mmho/cm, a quality suitable for irrigation of most crops, contains nearly a ton of salt in every acre-foot of water applied. In some coastal areas, increased groundwater pumping has resulted in salt water intrusion from the ocean, threatening the overall groundwater quality. In areas such as the Salinas Basin, surface water quality degradation of ponds and sloughs has resulted from high salt levels in irrigation return flow.

Salinity Management Program

1. Is salt accumulation from irrigation, fertilizer, and/or amendments a potential problem?
☐Yes ☐No

Notes:

Manage Soil Salinity									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Manage Salinity from Irrigation Water									
The salinity of irrigation water is evaluated.									
The distribution uniformity of the irrigation system is improved or maintained.									
Appropriate leaching fractions are used.									
Fields are graded to improve irrigation uniformity.									
Irrigation Land Leveling #464									
Saline wells are decommissioned and alternative water supplies are used.									
Well Decommissioning #351									
Manage Salinity from Fertilizers and Amendments									
Fertilizers and amendments that have a low salt index are used.									

Site Assessment and Practices Planning–Salinity, cont'd.

	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Manage Saline Soils									
Soil salinity is evaluated.									
Gypsum and other calcium-containing amendments to reduce the build-up of exchangeable sodium (ESP) are used.									
Sulfur amendments are used to reduce soil pH.									
Where leaching of pollutants to ground water is not a significant risk, deep tillage is used to break up hardpan layers that prevent salts from leaching.									
Deep Tillage #324									
A tile drain system is used to improve drainage.									
Subsurface Drain #606									
Cover crops are used to improve water infiltration into soil.									
Cover Crop #340									
Amendments are used to improve infiltration (PAM, gypsum, organic amendments).									
Anionic Polyacrylamide (PAM) #450									

Site Assessment and Practices Planning–Waterways, cont'd.

Practices to Improve Water Quality in Waterways

Waterways, streams, and riparian areas are sensitive to damage from agricultural, forest and other land use activities and practices. Healthy riparian areas protect farmland from erosion and flooding. They also buffer waterways from the effects of potential nutrient and pesticide runoff.

Land Management Impacts on Waterways

W1. Is there the potential for soil to fall into the waterway or riparian area from cultural operations along the banks (disking, road grading, etc.)?

☐Yes ☐No

Notes:

W2. Are there cattle trails along the waterway and/or do cattle graze in the waterway?

☐Yes ☐No

Notes:

W3. Do you see mud or sediment filling the waterway?

☐Yes ☐No

Notes:

Protect Water Bodies and Riparian Areas									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Minimize Physical Impacts									
Setbacks are established between cultural operations and waterways.									
Riparian Forest Buffer #391									
Roads have been placed away from waterways.									
Access Road #560									
Livestock access to waterways is controlled with fencing and/or management.									
Fence #382									
Prescribed Grazing #528									
Use Exclusion #472									
Watering Facility #614									
Filter Pollutants									
A herbaceous vegetative strip is placed between the operation and waterway to filter out pollutants.									
Conservation Cover #327									
Filter Strip #393									
Riparian Herbaceous Cover #390									
Woody vegetation is planted near the natural waterway to filter out pollutants, reduce erosion, and provide wildlife habitat and shade.									
Riparian Forest Buffer #391									
Channels carrying water from farm operations to waterways are planted with vegetation to filter out pollutants.									
Grassed Waterway #412									

Site Assessment and Practices Planning–Waterways, cont'd.

W4. Is there bare soil along banks and/or are there bank sections that are unstable (i.e., vertical banks) due to inadequate vegetation?

☐Yes ☐No

Notes:

W5. Do you notice the waterway depth is eroding or downcutting?

☐Yes ☐No

Notes:

W6. Do you notice bank erosion caused by the impacts of bank armoring?

☐Yes ☐No

Notes:

W7. Does runoff entering the waterway result in bank erosion or gullies?

☐Yes ☐No

Notes:

Stabilize Banks and Channels									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Vegetative cover is established on the banks to reduce erosion and enhance habitat.									
Channel Bank Vegetation #322									
Critical Area Planting #342									
Streambank Protection #580									
Obstructions in the waterway are removed to improve water flow and prevent bank erosion.									
Clearing and Snagging #326									
The channel bed is stabilized to prevent erosion.									
Grade Stabilization Structure #410									
Stream Channel Stabilization #584									
Structures to convey field drainage water into waterways are installed and maintained.									
Diversion #362									
Grade Stabilization Structure #410									
Structure for Water Control #587									
Underground Outlet #620									

Site Assessment and Practices Planning–Waterways, cont'd.

Waterway Crossings

W8. Is the waterway crossing prone to washing out?

☐Yes ☐No

Notes:

W9. Do you notice bank erosion caused by the impacts of structures such as bridges or crossings?

☐Yes ☐No

Notes:

W10. Do you notice water collecting upstream from culvert inlets during storms?

☐Yes ☐No

Notes:

W11. Do you see sediment deposited from pooled water above the culvert inlet?

☐Yes ☐No

Notes:

W12. Do you see debris deposited upstream of the culvert inlet?

☐Yes ☐No

Notes:

W13. Are there high rust lines in any of the metal culvert pipes (this may indicate undersized pipe)?

☐Yes ☐No

Notes:

W14. Are any culvert inlets or outlets crushed, torn, jagged, or worn through at the base?

☐Yes ☐No

Notes:

W15. Is there the potential for water to run across the road when the culvert plugs?

☐Yes ☐No

Notes:

W16.Is the water that comes out of the culvert undercutting the road bank or scouring the channel downstream?

☐Yes ☐No

Notes:

Site Assessment and Practices Planning–Waterways, cont'd.

Protect Waterway Crossings									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Road crossings and culverts have been assessed for proper flows and channel grades.									
Access Road #560									
Structure for Water Control #587									
Stream banks are stabilized with vegetation and/or structural measures to reduce erosion.									
Channel Vegetation #322									
Critical Area Planting #342									
Streambank and Shoreline Protection #580									
Obstructions are removed to improve water flow and reduce bank erosion.									
Clearing and Snagging #326									
Channel crossings and culverts are sized, placed, and maintained to provide a stable channel grade.									
Stream Channel Stabilization #584									
Structure for Water Control #587									
Undersized, worn/compacted, or improperly placed culverts are replaced.									
Structure for Water Control #587									
Energy dissipaters are installed below culverts to prevent scouring.									

Site Assessment and Practices Planning–Waterways, cont'd.

Stream Habitat

W17. Are sections of streamflow exposed to sun for more than half the day?
☐Yes ☐No

Notes:

W18. Are there potential impediments to fish passage in the stream?
☐Yes ☐No

Notes:

W19. Do you notice the encroachment of non-native invasive plant species and/or loss of native riparian or wetland habitat?
☐Yes ☐No

Notes:

Maintain or Improve Stream Habitat									
	Used or could be helpful	Location(s)	Year(s) used						
			2002	2003	2004	2005	2006	2007	2008
Vegetative cover is established along banks to reduce erosion and enhance habitat.									
Channel Bank Vegetation #322									
Riparian Forest Buffer #391									
Riparian Herbaceous Cover #390									
Tree and Shrub Establishment #612									
Wetland Wildlife Habitat Management #644									
Invasive plant species are identified, removed, and replaced with native species.									
Restoration and Management of Declining Habitats #643									
Stream conditions are improved for aquatic species.									
Irrigation Storage Reservoir #436									
Obstruction Removal #500									
Barriers that restrict or prevent fish migration are removed.									
Fish Passage #396									

SELF-EVALUATION

An essential element of a water quality site-assessment is the tracking of land use and management activities on your agricultural operation. Self-evaluation data that you can provide can be important in explaining any water quality changes that may occur due to implementation of management practices. Self-evaluation techniques can help determine whether water quality changes can be attributed to implementing management practices and not to other confounding influences such as regional geology or a source upstream of the operation.
Simple field measurements are often undervalued and suspected of lacking scientific validity. When properly designed and carefully executed, however, they can provide sound data. Their strength lies in the possibility of taking large numbers of measurements inexpensively and with only semi-skilled assistance to obtain results that are more pertinent to your site than sophisticated measurements taking place at some distant monitoring station.

Record Keeping
Keep with Plan for reference

Do you keep a record of:
- ☐weather conditions such as air temperature, precipitation, and evapotranspiration
- ☐extreme weather events such as severe storms, floods, and droughts
- ☐natural vegetation and/or wildlife observations
- ☐grazing (animal numbers, in and out pasture dates)
- ☐destructive events such as fires and vandalism
- ☐

Photo Point Self-Evaluation
Keep photos and historic records with Plan for reference

Do you have any historic records and/or photographs that can help you document short- or long-term changes on the farm/ranch?
☐Yes ☐No

How many photo points are on your farm/ranch:

How many times per year will photographs be taken:

Other Self-Evaluation Techniques You Perform or Plan to Perform
Keep with Plan for reference

Technique	Location(s)	Dates or Schedule
Sediments		
☐Erosion Pins		
☐Erosion Pipes		
☐Estimating Streambank Loss		
☐Imhoff Cones		
☐Paint Collars		
☐Sediment Basin or Sand Trap (record amount of sediment removed)		
☐Staking Gullies or Streambanks		

Self-Evaluation, cont'd.

Technique	Location(s)	Dates or Schedule
☐Walking the Runoff		
☐		
Nutrients		
☐Drainage Water Analysis		
☐Irrigation Water Analysis		
☐Plant Tissue Analysis		
☐Record Fertilizer Use		
☐Soil Analysis		
☐Utilize Crop Budgets		
☐		
Pesticides		
☐Monitor for Pests and Beneficial Insects		
☐Review Use Reports		
☐Assess Risk of Pesticide Loss		
☐		
Riparian Habitat		
☐Percent Bare Soil Along Banks		
☐Percent Canopy Cover over Stream		
☐Staking Gullies or Streambanks		
☐Streambank Erosion Measurements		
☐Walking the Runoff		
☐		
Surface Water Quality		
☐Ammonia		
☐Conductivity		
☐Dissolved Oxygen (DO)		
☐Nitrate		
☐pH		
☐Phosphates		
☐Rapid Bioassessment Technique		
☐Stream Flow		
☐Stream Temperature		
☐Stream Turbidity		
☐		
Irrigation/groundwater Quality		
☐Electroconductivity (EC)		
☐Chlorides		
☐Nutrient Levels in Well Water (N, P, Na, Cl)		
☐pH		
☐Sodium Adsorption Ratio (SAR)		
☐Turbidity		
☐		
Drainage Water Quality		
☐Effluent flow		
☐Electroconductivity (EC)		
☐Nutrient Levels in Drainage Water (N, P, Na, Cl)		
☐pH		
☐Turbidity		
☐		

REFERENCES

Much of the information in the Farm Water Quality Plan has been adapted from the Ranch Water Quality Management Plan created by University of California Cooperative Extension and the USDA Natural Resources Conservation Service (unpublished).

Some practices in the Site Assessment and Practices Planning section were adapted from *Production guide: Nitrogen and water management for coastal cool-season vegetables.* 1998. G. S. Pettygrove, et al., Division of Agriculture and Natural Resources, University of California, Oakland CA; *Farm-A-Syst farmstead assessment system,* University of Wisconsin–Extension http://www.uwex.edu/farmasyst; and *The Positive Points System,* Central Coast Vineyard Team http://www.vineyardteam.org/pps/index.htm.

Numbered practices in the Site Assessment and Practices Planning section refer to USDA–NRCS *National handbook of conservation standards.* Individual practices can be found at http://www.ftw.nrcs.usda.gov/nhcp_2.html.

Site Assessment and Practices Planning questions E7 through E11 adapted from Downie, Scott, Dennis Halligan and Ross Taylor. 1998. *Watershed processes and erosion control: A workbook and compendium.* Fish, Farm, and Forest Communities Forum.

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Lisa McCann, Central Coast Regional Water Quality Control Board
Amanda Bern, Central Coast Regional Water Quality Control Board
Mark Angelo, Central Coast Regional Water Quality Control Board

Managing sediment

Giulio Ferruzzi, USDA–NRCS

Managing irrigation

Michael Cahn, UCCE Monterey County
Thomas Harter, UCCE Davis

Managing pesticides

Giulio Ferruzzi, USDA–NRCS
Jay Gan, UCCE Riverside
William Chaney, UCCE Monterey County

Managing nutrients

Giulio Ferruzzi, USDA–NRCS

Managing salinity

Michael Cahn, UCCE Monterey County
Giulio Ferruzzi, USDA–NRCS

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Giulio Ferruzzi, USDA–NRCS
John Warner, USDA–NRCS
Richard Casale, USDA–NRCS

Self-evaluation

Terry Hall, USDA–NRCS

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Cool-season vegetables

Richard Smith, UCCE Monterey County
Tim Hartz, UCCE Davis

Greenhouse/nursery

Ann King, UCCE San Mateo County
John Kabashima, UCCE South Coast Research and Extension Center
Darren Haver, UCCE Orange County
Richard Evans, UCCE Davis
Aziz Baameur, UCCE Santa Clara County
Julie Newman, UCCE Ventura County
Loren Oki, UCCE Davis
Steve Tjosvold, UCCE Santa Cruz County
J. Heinrich Lieth, UCCE Davis

Orchards and vineyards

Ben Faber, UCCE Ventura
Mark Battany, UCCE San Luis Obispo County

Strawberries and caneberries

Mark Bolda, UCCE Santa Cruz County

Reviewers

Special thanks for review of Farm Water Quality Plan sections –

Mel George, UCCE Davis
Michael Isensee, UCCE San Luis Obispo County
Royce Larson, UCCE San Luis Obispo County
Margy Lindquist, USDA–NRCS
Dan Johnson, USDA–NRCS
Rebecca Challender, USDA–NRCS
Robert Fry, USDA–NRCS
Albert Cerna, USDA–NRCS
David Robledo, USDA–NRCS
Tina Vander Hoek, USDA–NRCS
Marc Los Huertos, UC Santa Cruz
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FOR MORE INFORMATION

You'll find detailed information on many aspects of resource conservation in these titles and in other publications, slide sets, CD-ROMs, and videos from UC ANR:

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Nonpoint Sources of Pollution in Irrigated Agriculture, publication 8055

Practices for Reducing Nonpoint Source Pollution from Irrigated Agriculture, publication 8075

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