

**Napa County
Putah Creek Watershed Group**

Reduced Monitoring / Management Practices Verification Option

December, 2015



Pope Valley Area, Napa County Putah Creek Watershed

Napa County Putah Creek Watershed Group Steering Committee

INTRODUCTION

This Reduced Monitoring / Management Practices Verification Option application is being submitted by the Napa County Putah Creek Watershed Group Steering Committee on behalf of the Napa County Putah Creek Watershed Group. In compliance with ORDER R5-2014-0030-R1, WASTE DISCHARGE REQUIREMENTS GENERAL ORDER FOR GROWERS WITHIN THE SACRAMENTO RIVER WATERSHED THAT ARE MEMBERS OF A THIRD-PARTY GROUP.

Napa County Putah Creek Watershed Group Background

The Napa County Putah Creek Watershed Group (NCPCWG) was formed in response to the irrigated lands regulatory program and is a subgroup of the Sacramento Valley Water Quality Coalition (SVWQC). The NCPCWG has been implementing its group waiver program since 2004. Between 2004 and 2009, the program consisted of working with more than 90% of the landowner membership to maintain Best Management Practices (BMP's) coupled with collection and analysis of water quality monitoring samples collected between December and May. NCPCWG conducted water quality monitoring at 2 sites (Pope Creek & Capell Creek) from 2005 to 2008, but with consistent reports of no water quality impairment due to irrigated agriculture, one testing site was deemed sufficient for the 2008/09 year and thereafter with the 5 year core monitoring requirement.

Following a July 2009 field meeting with Region 5 Water Board and SVWQC representatives, and in recognition that water quality monitoring results did not indicate poor water quality conditions due to irrigated agriculture, the NCPCWG was encouraged to pursue a pilot watershed management practices plan (Pilot Plan) as an alternative to the monitoring program. In February 2010, the NCPCWG submitted a Pilot Plan consistent with Monitoring and Report Program Order No. R5-2009-0875, Attachment D (MRP Order). The Pilot Plan, Appendix A, received approval by the California Regional Water Quality Control Board Central Valley Region on April 22, 2010 (Appendix B). The Regional Board confirmed successful implementation of the Pilot Plan for several years and then approved an extension of the Pilot Plan on April 23, 2012. Each year, the NCPCWG completed site visits to farms and submitting annual reports to the Regional Board documenting and verifying adequate implementation of Best Practices to protect the watershed.

Putah Creek Watershed Setting

The Putah Creek watershed encompasses lands in three counties. Headwaters in Lake County pass through Napa County, primarily via Lake Berryessa, and enter Solano County at the Monticello Dam on the eastern boundary of Napa County. A total of 230,874 acres of land in Napa County drain into Lake Berryessa (see the map on the following page). Most of the lands in the Napa County Putah Creek drainage have low intensity uses: mixed woodlands, oak savanna, chaparral, and non-irrigated rangelands grazed by beef cattle.

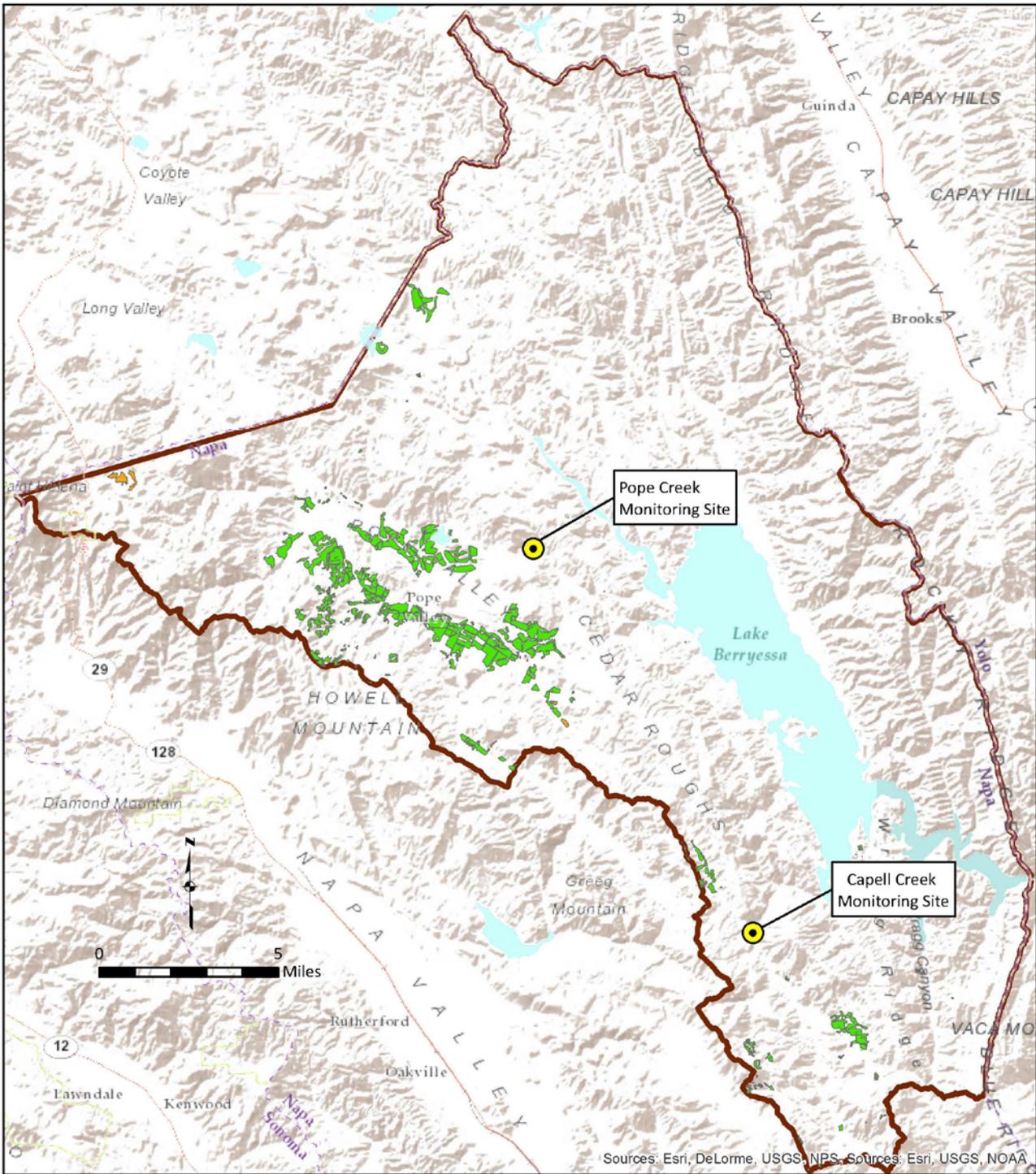
Required Application Elements

This application is structured to follow the six minimum elements requested and individually addresses each element:

- **Low Threat of Pesticide Discharge**
- **Low Intensity of Agricultural Land Use**
- **Monitoring Confirming Low Threat to Surface Water Quality from Irrigated Agriculture**
- **Best Management Practices Currently Being Employed to Prevent Impacts to Water Quality**
- **Education and Outreach Strategy to Implement Appropriate Management**
- **Strategy for Verifying Member Implementation of BMPs**

Additional Requirement

As required for the Reduced Monitoring / Management Practices Verification Option, parameters associated with existing management plans in the subwatershed do not include toxicity, pesticides, copper, or nutrients.



Putah Creek Watershed within Napa County

Irrigated Agriculture

-  Vineyard
-  Orchard
-  Putah Creek Watershed

Agriculture Data Source: 2014 - Napa County

Napa County



DESCRIBE THE LOW THREAT OF PESTICIDE DISCHARGE

Wine grape vineyards comprise approximately 99.7 percent of the irrigated agricultural lands in the Napa County Putah Creek Watershed, with orchards, predominantly olives, providing the remainder.

Low Impact Irrigation

In the Napa County Putah Creek Watershed, most of the annual precipitation falls during the period of November through April and the average annual precipitation ranges from 20 inches to 35 inches. The majority of land in wine grape and olive production is irrigated.

Almost all of these irrigated agricultural lands in the Napa County Putah Creek Watershed are drip-irrigated during the dry summer and early autumn growing season. Micro-irrigation systems are used almost exclusively for irrigation, although a small percentage of vineyards utilize overhead sprinklers for early spring frost protection of grapevines or occasional overhead sprinkling during extremely hot afternoons. Drip irrigation application rates are well below minimum soil permeability rates for all mapped soils in the Putah Creek drainage. Drip/micro-irrigation systems typically supply water to the vineyard with a single 1-gallon per hour or dual-mounted ½-gallon per hour emitters at each vine. This is equivalent to a rainfall rate of 0.02 to 0.03 inches per hour depending on vine and emitter spacing. According to the USDA Soil Survey of Napa County (1978), surface soils and subsurface soil horizons of mapped irrigated land soils in the Napa County Putah Creek Watershed exhibit a minimum permeability rate of 0.06 inches per hour. On average, only 2 to 8 inches of irrigation water are applied to irrigated agricultural lands/vineyards on an annual basis.

Because growers commonly monitor soil moisture, vine condition, and also irrigation system performance, it can be reasonably assumed that irrigation-induced runoff or soil erosion would be an extremely rare occurrence. Anecdotally, no runoff from functioning drip-irrigation systems is ever observed. Drip-irrigated lands therefore do not generate runoff during the growing season, when nearly all fertilizers, soil amendments, and pesticides are applied. Most vineyard fertilizer application is accomplished via “fertigation,” the application of fertilizer through the drip-irrigation water.

Runoff from these irrigated agriculture lands is therefore only a factor during the winter and spring rainy season. Cover crops of grasses and/or legumes are typically planted between vine rows and under the vines in the autumn before the winter rainfall begins. By the time sufficient rainfall to initiate soil runoff has occurred, usually in late November or December, cover crops have grown enough to provide good protection against raindrop impact and surface runoff soil erosion. Cover crops are considered to be the most effective water quality protection measure. This is well-documented by the USDA’s Universal Soil Loss Equation, which is a required analysis tool for all Napa County vineyard erosion control plan applications. Cover crops provide very effective control of rain drop impact and rill soil detachment and also increase soil infiltration rates, which also reduce off-farm runoff.

Irrigation-induced soil erosion is not a concern in drip-irrigated wine grape vineyards, including those in the Putah Creek Watershed. Likewise, since irrigation-related runoff does not occur, irrigation-related pesticide or fertilizer transport or runoff is highly unlikely to occur from Putah Creek irrigated agriculture.

Limited Pesticide Use

The Napa County Agricultural Commissioner's Office reports that the typically used irrigated agriculture pesticides in the Putah Creek Watershed are elemental sulfur, mineral oils/petroleum distillates, and glyphosate.

Sulfur fungicides are used for the control of powdery mildew on grapes and can be effective against most species of pest mites, brown rot, rust, and scab. Typically applied sulfur products include Dusting Sulfur (EPA Reg #2935-48) or Sulfur DF (EPA Reg #51036-352-2935).

Mineral oil pesticides are considered one of the safest methods in controlling pests, especially the scale insects and mealybugs infesting different plants, and plant diseases. They play a fundamental role in the IPM programs on many pests and can be used as an acaricide, fungicide, insecticide, and miticide. Examples of the most common mineral oil pesticides are Organic JMS Stylet Oil (EPA Reg # 65564-1-ZA) and Purespray Green (EPA Reg # 69526-9-AA). The most commonly used refined petroleum distillate is called JMS Stylet Oil (EPA Reg # 65564-1-AA). Mineral oils can also act as penetrants and will move other chemicals on the surface of the canopy into the plant tissues. These products are called adjuvants or spreader stickers. The most commonly used adjuvant spreader sticker is Miller Nu Film (EPA Reg # 72-50022-AA). Petroleum distillate oils are used to manage pests and diseases of plants and may be referred to many names, including horticultural oil, spray oil, dormant oil, summer oil, supreme oil, superior oil, Volck oil or white mineral oil. The most commonly used refined petroleum distillate is called JMS Stylet Oil (EPA Reg # 65564-1-AA). The "heavier" dormant oils are not typically used in this area.

Glyphosate (often Monsanto Roundup products) is a broad spectrum, systemic, contact herbicide used to control weeds or winter cover crop directly under the base of vines and in other specific locations. Roundup Pro Herbicide (EPA Reg #524-475) is a typically used product.

The same office reports that average Napa County annual application rates, when the pesticide is applied, is 6.25 lbs. of active ingredient per acre for elemental sulfur, 3.73 lbs. of active ingredient per acre for mineral oils, 4.03 lbs. of active ingredient per acre for petroleum distillates, and 1.40 lbs. of active ingredient per acre for glyphosate.

The typical application timing for sulfur and the mineral oils/petroleum distillates is between April and July, mostly during the dry season when there is little chance of water-borne pesticide discharge. Glyphosate products are typically used between November and February during the rainy season, but glyphosate is not applied ahead of forecast rainfall and the product readily adsorbs to soil particles.

Each of these typically used pesticides carries the low-threat Signal Word "Caution." The two sulfurs, the Organic JMS stylet oil, and Purespray Green are certified as organic by the Organic Materials Research Institute. The sulfurs are listed as environmentally non-toxic. Each of the mineral/petroleum products is listed as toxic to fish or aquatic organisms. Glyphosate is listed as moderately toxic to fish and is not to be applied where surface water is present.

The last three years of Napa County Agricultural Commissioner's Office pesticide use records for the Putah Creek watershed within Napa County are included as Appendix C. As an example of how to

correctly interpret these tables, if a 2-acre vineyard block is sprayed three times a year with sulfur, the total acres treated for that year will read 6 acres.

The low application rates and the low environmental toxicity of the irrigated agriculture pesticides commonly used in the Putah Creek Watershed combine to result in a low threat of pesticide discharge.

DESCRIBE THE LOW INTENSITY OF AGRICULTURAL LAND USE

Low Area Extent

A total of 230,874 acres of land in Napa County drain into Lake Berryessa, which is at the mid-point in Putah Creek's three-county watershed.

According to Putah Creek Watershed Group data, only 1.7 percent of these lands, or 3,999 acres, is devoted to irrigated agricultural production. Wine grape production encompasses 3,985 acres or 99.6 percent of the total, with orchards, predominantly olives, providing the balance.

This minor land coverage of irrigated agriculture translates to a relatively minor impact to the watershed.

Low Impact Agriculture

Vineyards and orchards are both forms of permaculture; the crop vines or trees are perennial. After the vineyard or orchard is established, soil disturbance is minimal for the life of the vine (greater than 25 years) or the tree (up to 30 years). Annual soil disturbance is limited to late spring disking-in of the cover crop in the areas between vines or trees. Almost all vineyards (97 percent in the Farm Evaluation results) plant a winter cover crop to protect the soil from rainfall related erosion and to increase soil organic matter, permeability, and health. Many vineyards cultivate or apply herbicides only under the vine rows, and just mow the cover crop in the alleys between rows. Nutrient/fertilizer applications to wine grape vineyards are minimal; excess nutrient application harms crop quality and can reduce crop size. Wine grape production also requires minimal pesticide inputs compared to many other crops. Most vineyard managers are university educated and have degrees in viticulture; they have been educated in the use of integrated pest management and other sustainable agriculture techniques. An increasing number of vineyards are certified by a sustainable agriculture program such as Napa Green Fish Friendly Farming and the California Sustainable Winegrowing Alliance, and the Napa County Resource Conservation District involvement with Landsmart, the regional collaborative program that helps land managers meet their natural resource management goals. Many vineyards are operated organically, with many of these certified by California Certified Organic Farmers.

Napa County agricultural producers also operate in a context of intense and strict local land regulations. Napa County strictly enforces one of the most intensive erosion control and water quality protection ordinances in the country. Enacted in 1991, the Napa County Conservation Regulations place strenuous requirements on all new vineyard lands and replanted lands on slopes 5 percent or steeper. These regulations require that growers develop an erosion control plan (ECP) and provide scientifically defensible environmental information to Napa County Department of Planning, Building and

Environmental Services to certify that there's no net increase in erosion and no net increase in runoff. Developments on land over 30 percent slope require a special use permit and are very seldom (if ever) applied for or granted. In addition, the Conservation Regulations require stream setbacks for all lands, regardless of slope, thereby further protecting water quality. Required setbacks from the top of bank vary from 35 feet on slopes of less than 1 percent to 150 feet on slopes of 60 – 70 percent. Slopes of 15 percent - 30 percent require a 65 foot setback. Vineyards that require an ECP under the Conservation Regulations are subject to environmental review under the California Environmental Quality Act (CEQA). Commonly required erosion control practices include cover crops, buffer areas along streams, runoff management devices, and sediment control measures.

The NCPCWG formally adopted a series of BMPs in 2007 which are based on USDA Natural Resource Conservation Service (NRCS) Field Office Technical Guide Conservation Practice Standards, and were developed with the local Napa Resource Conservation District (RCD). Favorable water quality monitoring results over the past five (5) years are presumed to be a result of successful BMPs implementation, coupled with the rather limited extent of irrigated lands in relation to total watershed size, as previously described.

These multiple factors combine to give the irrigated agriculture in the Napa County Putah Creek Watershed a relatively low potential impact on water quality.

SUMMARIZE MONITORING CONFIRMING LOW THREAT TO SURFACE WATER QUALITY FROM IRRIGATED AGRICULTURE

The Putah Creek watershed encompasses lands in three counties. Headwaters in Lake County pass through Napa County -- primarily via Lake Berryessa -- and enter Solano County at the Monticello Dam on the eastern boundary of Napa County.

Stream Monitoring

Water quality in the two creeks that drain the predominant irrigated agriculture areas within the Napa County Putah Creek Watershed has been extensively monitored; Capell Creek from 2005 through 2008 and Pope Creek during a ten year period from 2005 to date (see the map for creek sampling locations). A summary and the individual results of this water quality monitoring are attached in Appendix D. Note that the results format differs slightly between different monitoring periods, primarily because different parameters were tested at different times.

The few water quality parameter exceedances, which are noted below, show no evidence of being related to irrigated agriculture. The monitoring results have shown no evidence of irrigated agriculture generated water impairment.

Location and test period results:

Pope Creek 2005-2008	pH exceedance 1 of 12 samples E. Coli exceedance 1 of 12 samples
Capell Creek 2005-2008	DO exceedance 1 of 12 samples pH exceedances 2 of 12 samples E. Coli exceedances 2 of 12 samples
Pope Creek 2008-2009	TDS exceedance 1 of 12 samples E. Coli exceedance 1 of 12 samples
Pope Creek 2009-2010	pH exceedances 2 of 6 samples
Pope Creek 2014-2015	E. Coli exceedances 4 of 6 samples

Receiving Water Monitoring

According to the Drinking Water Source Assessment for Lake Berryessa, prepared in 2001 by the California Department of Health Services, the above-the-dam uses of the reservoir are most vulnerable to impacts from boats and personal watercraft, leaking underground storage tanks, active and historic gas stations, and known contaminant plumes. The lake is impaired by mercury content originating from the soil and from mining operations in the watershed, and there is a warning regarding eating fish from the lake.

DESCRIBE BEST MANAGEMENT PRACTICES CURRENTLY BEING EMPLOYED TO PREVENT IMPACTS TO WATER QUALITY

The NCPCWG has utilized a list of NRCS Practice Standards as Best Management Practices (BMPs) since its inception. These practices have been taught at past NCPCWG member workshops and will continue to be promoted to members. Past annual surveys of NCPCWG members have documented high utilization of these BMP practices, as applicable to specific locations, at member vineyard and orchard operations. The NCPCWG has a 10-year record of successful implementation of these BMPs.

The seventeen NRCS Practice Standard BMPs currently being utilized by the NCPCWG and its members are:

- Access Road (NRCS Practice 560)
- Conservation Cover (327)
- Cover Crop (340)
- Critical Area Planting (342)
- Diversion (362)
- Filter Strip (393)
- Grassed Waterway (412)
- Integrated Pest Management (595)
- Irrigation Water Management (449)
- Mulching (484)
- Nutrient Management (590)
- Riparian Forest Buffer (391)
- Riparian Herbaceous Cover (390)
- Sediment Basin (350)
- Streambank and Shoreline Protection (580)
- Underground Outlet (620)

One-page descriptive summaries of these BMPs utilized by the NCPCWG are attached as Appendix E.

In addition, NCPCWG members have to comply with Napa County Conservation Regulations, which have been in effect since 1990, and which dictate BMPs such as erosion control measures and agricultural setbacks from streams. Many Putah Creek Watershed vineyards have site-specific Erosion Control Plans documenting compliance with the regulations.

The NCPCWG will continue to promote use of these BMPs by its members.

DESCRIBE EDUCATION AND OUTREACH STRATEGY TO IMPLEMENT APPROPRIATE MANAGEMENT

The NCPCWG will continue its past practice of holding annual business and educational meetings plus additional educational meetings as recommended by the NCPCWG steering committee.

Member growers or a designated representative will be encouraged to attend the annual NCPCWG meetings, which will include technical discussions on Best Management Practice implementation. Annual meeting and educational meeting attendance will be cross-checked against the membership list by the steering committee to assure membership participation.

DISCUSS STRATEGY FOR VERIFYING MEMBER IMPLEMENTATION OF BMPS

The NCPCWG has a 10-year record of successful documentation of BMP implementation through two member questionnaire surveys and annual on-site inspections. Because the new Sacramento Valley RWQCB Waste Discharge Requirements for growers within the Sacramento River Watershed required “Farm Evaluations” generally duplicate much of the information that would have been gathered by NCPCWG member BMP surveys, the member surveys will no longer be conducted. The NCPCWG will continue the annual on-site inspections as detailed below.

A summary of the agricultural practices utilized by Napa County Putah Creek Watershed Group members through their Farm Evaluations submitted to the Sacramento Valley Water Quality Coalition in 2015 shows high utilization of the appropriate agricultural practices queried. This summary is attached as **Appendix F**.

Annual Representative Site Inspections

NCPCWG steering committee members will conduct annual on-site BMP verification visits consistent with the pilot program that was implemented by NCPCWG. Steering committee members affiliated with agencies including the Agricultural Commissioner’s Office, the NRCS, the RCD, and the UC Cooperative Extension may serve in an advisory capacity to the steering committee, and will only engage in on-site verification visits when the landowner has requested or agreed to their presence and services. Steering committee members will reserve the right to seek additional qualified technical advice as they deem necessary and appropriate to fulfill their charge. On-site inspection field visit times and dates may vary, but the steering committee will endeavor to visit member farms during the late fall or winter season, to allow for a better observation of active BMP implementation.

Individual Farm Evaluation BMP use data will be used to help validate BMP observations during the inspections. Farms inspected will be asked to produce records that provide evidence of NCPCWG BMPs. These records may include Pest Control Advisor monitoring reports, records of pesticide use, soil or crop petiole analysis reports, records of plant nutrient application, county agricultural commissioner pesticide application permits, and County-approved erosion control plans and associated winterization site-inspection memos.

Steering committee members will be required to abstain from participating in annual on-site inspections of lands they own or manage and to abstain from participating in annual on-site inspections of lands adjacent to land that they own or manage.

Selection of Lands for Annual On-site Inspections

The NCPCWG steering committee will select three member farms for each yearly inspection, and these three farms will total at least 5% of the total NCPCWG member acreage, amounting to approximately 175 total acres of land. Effort will be made to select one relatively larger, one medium-sized, and one smaller-sized farm for each year's annual on-site inspection.

Farm selection for annual on-site inspections will be evaluated based largely on GIS mapping data available to the steering committee and their advisory members. Data layers will include information on irrigated lands adjacent to USGS blue line streams, farms with irrigated lands greater than 5% slope, and irrigated lands subject to active Napa County Erosion Control Plan applications, including winterization inspections or county spot checks within the calendar year. Other selection criteria used may include pesticide application permits issued by the Napa County Agricultural Commissioner's Office and data supplied on the Farm Evaluations.

An additional category of lands subject to certification will be member farms where NCPCWG membership status has lagged in at least one of the past 3 years.

Farms visited by an annual on-site inspection will not be selected for re-inspection for a period of at least 5 years.

On-Site Inspection Documentation

The NCPCWG steering committee has developed a standard form for recording in-field observations related to visual indicators of management practices, including the presence of cover crops, active soil erosion control techniques, and irrigation system type. This form also includes a checklist of grower-utilization of NCPCWG employed BMPs. The 2015 version of this On-site Certification form is attached as Appendix G.

The NCPCWG has a strong record of successful documentation of BMP implementation.

CONCLUSION

The Napa County Putah Creek Watershed Group believes that the responses presented in this application demonstrate 1) that there is a low threat of pesticide discharge from irrigated lands causing or contributing to surface water quality exceedance and 2) that there is a low intensity of agricultural land use in this subwatershed. This application should successfully justify Napa County Putah Creek Watershed Group meeting of the Reduced Monitoring / Management Practices Verification Option requirements.

List of Appendices

Appendix A – Napa County Putah Creek Watershed Group Pilot Plan Proposal, Feb. 2010

Appendix B – Central Valley Regional Water Quality Control Board approval of Pilot Plan, April 2010

Appendix C – Napa County Agricultural Commissioner’s Office Pesticide Use Reports, 2013-2015

Appendix D – Napa County Putah Creek Watershed Group Water Quality Testing Results, 2005-2015

Appendix E - Best Management Practices for Napa County Putah Creek Watershed Group

Appendix F – Farm Evaluation Summary Results for Napa County Putah Creek Watershed Group

Appendix G – 2015 Onsite Inspection form for Napa County Putah Creek Watershed Group

Appendix A

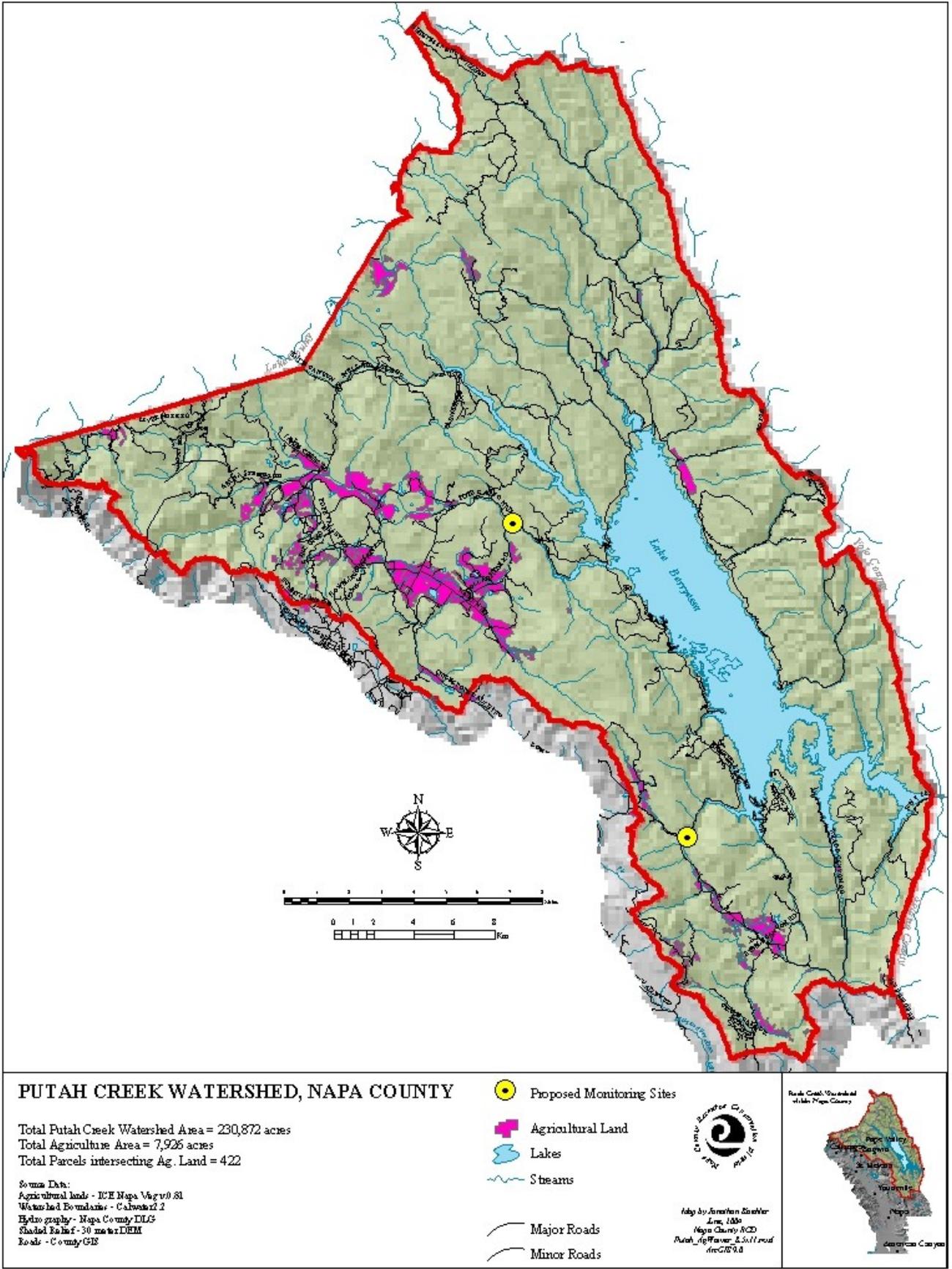
Napa County Putah Creek Watershed Group Pilot Plan Proposal, Feb. 2010

**Napa County
Putah Creek Watershed Group
Pilot Watershed Program Proposal
February, 2010**



Pope Valley Area, Napa County Putah Creek Watershed

Napa County Putah Creek Watershed Group Steering Committee



**Napa County Putah Creek Watershed Irrigated Lands Group
Pilot Watershed Management Practices Plan (Pilot Plan)
December 2009**

Background

The Napa County Putah Creek Watershed Group (NCPCWG) was formed in response to the irrigated lands regulatory program and is a subgroup of the Sacramento Valley Water Quality Coalition (SVWQC). The NCPCWG has been implementing its group waiver program since 2004. The current program consists of working with the more than 90% landowner membership to maintain Best Management Practices (BMP's) coupled with 3 water quality monitoring samples, (collected between December and May on Pope Creek) each year.

Following a July 2009 field meeting with Region V Water Board and SVWQC representatives, the NCPCWG was encouraged to consider pursuing a pilot watershed management practices plan as an alternative to the existing program. The pilot plan approach would focus on working to insure that owners and managers of irrigated lands continue to implement and manage long-used BMPs needed to protect water quality.

Napa County agricultural producers operate in a context of intense and strict land regulations, where many voluntary programs have proven hugely successful in terms of sediment reduction and water quality protection. The NCPCWG formally adopted a series of BMPs in 2007 which are based on USDA Natural Resource Conservation Service (NRCS) Field Office Technical Guide Conservation Practice Standards, and were developed with the local Napa Resource Conservation District (RCD). Favorable water quality monitoring results over the past five (5) years are presumed to be a result of successful BMPs implementation, coupled with the rather limited extent of irrigated lands in relation to total watershed size, as is described below.

Watershed Setting

The Putah Creek watershed encompasses lands in three counties. Headwaters in Lake County pass through Napa County -- primarily via Lake Berryessa -- and enter Solano County at the Monticello Dam on the eastern boundary of Napa County.

A total of 230,872 acres of land in Napa County drain into Lake Berryessa, which is at the mid-point in the three-county watershed. Most of the lands in the Napa County Putah Creek drainage have low intensity uses; they are brushlands, rangelands, and include lands used in the past for quicksilver and gold mining. According to the Napa County Agricultural Commissioner's Office, only 1.5% of these lands, or 3,461 acres, is devoted to more intensive agricultural production. Wine grape production encompasses 98.5% of that acreage, with olive production providing the balance. The majority of land in wine grape and olive production is irrigated. Micro-irrigation systems are used almost exclusively for irrigation, although a small percentage of vineyards utilize overhead sprinklers for early spring frost protection of grapevines. Most of the annual precipitation falls during the period of November through April. The average annual precipitation ranges from 20 inches to 35 inches in the Putah drainage.

Over 80% of the wine grape lands in the Napa County portion of the watershed drain to Lake Berryessa via Pope Creek from the northwest or Capell Creek from the southwest portion of the drainage. Other lands noted in purple on the attached I.C.E. map (attached) as “agricultural lands” are primarily non-irrigated, non-intensively farmed lands. These lands feed runoff to the lake from the north and east. A small area of irrigated lands north of the lake bordering the County line are part of wine grape farming operations in Lake County, and part of drainage systems in that County.

Irrigated Lands

Sources for irrigation water in the Putah Creek drainage of Napa County are generally limited. No organized purveyors of water such as irrigation districts exist, leaving growers to develop their own sources. Typical sources of irrigation water are private wells and surface diversion impoundment reservoirs. Water rights are difficult to acquire from the State of California, and intensive County conservation regulations severely limit lands available for agricultural development, even if water was readily available.

Average annual application of irrigation waters varies from about 2 inches to 8 inches. Nearly all wine grape producers practice “deficit irrigation” following the recommendations of UC California researchers. This management scheme accounts for the relatively minimal irrigation applications, which are intended to boost wine grape quality.

Irrigation-induced soil erosion is not a concern in drip-irrigated wine grape vineyards. Application rates are well below minimum soil permeability rates for all mapped soils in the Putah Creek drainage. Micro-irrigation systems typically supply water to the crop with 1 gallon-per-hour, or dual-mounted ½ gallon per hour emitters. This is equivalent to 0.02 inches per hour. According to the NRCS Napa Area Soil Survey, published in 1978, surface soils and subsurface soil horizons of mapped irrigated lands in the Napa County Putah creek drainage exhibit a minimum permeability rate of 0.06 inches per hour. Because growers commonly monitor soil moisture, vine condition, and also monitor irrigation system performance, it can be reasonably assumed that irrigation-induced runoff or soil erosion would be an extremely rare occurrence.

Runoff from farmlands is only a factor during the winter and spring rainy seasons. By the time initial runoff begins, usually in November or December, cover crops are providing ample control of runoff and erosion. Cover crops are also considered to be the most effective water quality protection measure. This is well-documented by the USDA’s Universal Soil Loss Equation, which is a required analysis tool for all Napa County vineyard erosion control plan applications, (ECPA’s). Cover crops provide very effective control of soil detachment and also enhance soil infiltration rates, which also reduce off-farm runoff.

Lake Berryessa

The most notable aquatic resource in the Putah Creek drainage of Napa County is Lake Berryessa. Developed by the US Bureau of Reclamation in the early 1950s, it is the largest federally managed lake in California, storing over 1.6 million acre feet of water when at capacity. The lake is primarily a water supply source for Solano County farmers and over

500,000 urban users. Solano County water agencies have management of these water delivery systems. The lake's secondary use is as a recreational site.

The Solano County Water Agency prepares a Sanitary Survey for Lake Berryessa every five years. The survey contains information about the health of the watershed, potentially contaminating activities, source water assessments (a more direct look at where the water comes from and what levels of protection are provided to protect it from potentially contaminating activities) and lists current water quality testing activities and results.

According to the Drinking Water Source Assessment for Lake Berryessa, prepared in 2001 by the California Department of Health Services, the above-the-dam uses of the reservoir are most vulnerable to impacts from boats and personal watercraft, leaking underground storage tanks, active and historic gas stations, and known contaminant plumes. The lake is impaired by mercury content originating from the soil and from mining operations in the watershed, and there is a warning regarding eating fish from the lake.

The cities of Fairfield, Vacaville, and Benicia post annual water quality health-related standards for drinking water supplied from Lake Berryessa. A copy of the City of Benicia report has been consulted, and no detected pesticides or other specific agricultural chemical materials or constituent materials were noted.

In essence, no study or assessment to date appears to have found agricultural operations to be of any importance in terms of Lake Berryessa water quality issues.

Rationale for Pilot Watershed Program Consideration

Due to the foregoing, the NCPCWG believes that irrigated agricultural lands in the Napa County Putah Creek watershed area should be considered a low potential water quality impairment source.

Our findings and recommendations are based on the following:

- Irrigated agricultural lands are sparsely spread over a rather large area, comprising only 1.5% of the watershed lands.
- Drip irrigated lands do not generate runoff during the growing season, when nearly all fertilizers, soil amendments, and pesticides are applied. On average, only 2 to 8 inches of supplemental irrigation water are applied to the land on an annual basis.
- As reported by the Napa County Agricultural Commissioner's Office, a very limited palette of pesticide materials is applied in very low quantities on an annual basis in the watershed. Elemental sulphur is by far and away the most heavily applied material. Growers conduct intensive monitoring of pest and nutrient needs before applying materials to the land and crop.

- Regular studies conducted by the California Department of Health Service on waters of Lake Berryessa have not shown evidence of pesticide or nutrient materials of concern that would be generated from Napa County agricultural lands. All agricultural lands in the Napa County Putah Creek watershed drain to Lake Berryessa, and runoff to the lake is exclusively from winter/ early-spring season storm runoff. Copies of recent Napa County water samples taken at the lake are attached to this report.
- Napa County rigidly enforces one of the most intensive erosion control and water quality protection ordinances in the country, (see attachment 1). Enacted in 1991, the Napa County Conservation Regulations place strenuous requirements on all new vineyard lands and replanted lands on slopes 5% and steeper. These regulations routinely require that growers provide scientifically defensible environmental information to the Napa County Conservation Development and Planning Department to certify that runoff from the land does not carry significant amounts of sediment to streams and downstream lands. Commonly required erosion control practices include cover crops, buffer areas along streams, runoff management devices, and sediment control measures. Since enactment of the regulations, the RCD and NRCS estimate that erosion rates have fallen more than 80%, as compared to pre-ordinance studies conducted in 1985 and 1990, (published materials attached).
- Napa County grape growers regularly attend intensive training sessions on water quality protection requirements and technology transfer training on the latest Integrated Pest Management practices and environmental restoration technology. Groups such as the Napa Sustainable Winegrowing Group and efforts such as the newly-enacted Green Certification Program draw large numbers of interested growers for seminars and training sessions that focus on sustainable farming technology, including water quality protection and pollution control.
- Water quality monitoring conducted by the Napa County RCD for the NCPCWG since 2005 have consistently demonstrated that irrigated agricultural lands are not a source of water quality impairment to those constituents for whom the Water Board has ordered testing. The NCPCWG is therefore convinced that BMPs have been consistently working well for the intended purpose.

The Proposed Pilot Plan

The July 15, 2009 draft Monitoring and Reporting Program (MRP) Order No. R5-2009-0875 (CVRWQCB, December 2009 for the Sacramento Valley Water Quality Coalition set forth general guidance for a “Pilot Watershed Management Practices Plan”. This program alternative would provide, among other things, an alternative approach to standard water quality monitoring requirements. The MRP Order states:

A Pilot Watershed Management Practices Plan must contain all of the following elements:

- *A set of management objectives (by crop type or type of agricultural operation),*
- *A set of management practices that will be effective in addressing agricultural discharge-related impacts to water quality and achieving the objectives,*
- *The approach that will be used by the Coalition to promote implementation of the management objectives and practices, and*
- *The mechanism(s) that will be used to track the watershed-wide level of management practice implementation and identification of performance goals for implementation.*

The NCPCWG will implement the required elements as follows:

I. Management Objectives

Management of irrigated wine grape vineyards and irrigated olive orchards will be based on resource concerns and quality criterion outlined in the USDA NRCS Field Office Technical Guide (FOTG), 2009, http://efotg.nrcs.usda.gov/efotg_locator.aspx?map=CA. This NRCS conservation planning guidance document indicates that excess soil erosion, excess irrigation system runoff, and suspended sediments, nutrients, and pesticides should be prevented from entering waterways adjacent to irrigated farm lands. The following table summarizes management objectives, organized according to NRCS Quality Criterion:

**NRCS Napa County Field Office Technical Guide
Resource Concerns and Quality Criterion**

1. Soil

Resource Concern	NRCS Quality criterion
Sheet and rill erosion (Includes potential for soil-borne nutrients and pesticides)	Erosion does not exceed “2T+1” *, based on USDA Universal Soil Loss Equation, (USLE)
Farm road erosion	Adequate storm runoff control in place to prevent visible rills or washes.

2. Water Quality

Resource Concern	NRCS Quality criterion
Excess irrigation runoff	Irrigation water is uniformly applied according to crop needs, avoiding runoff.
Suspended sediments (Sourced from farmed lands and farm roads)	Conservation practices are in place to control excessive amounts of sediment transport from farmed fields.
Excessive nutrients in surface waters (Crop-applied)	Crop nutrients are applied in a manner that prevents drift or runoff of materials. Any applied manures or other potential sources of the E-coli bacterium are composted prior to application, or are applied to the soil only during non-storm runoff periods of the growing season.
Pesticides in surface waters (Crop-applied)	Pesticides are applied in a manner that prevents drift or runoff of materials.

*"T" refers to the USDA rating for soil loss tolerance, based on the soil map unit in question

II. Management Practices to Address Potential Agricultural Discharge Impacts

Using FOTG resource concerns and quality criterion, the NCPCWG adapted a series of 13 best management practices (BMPs) in 2007, based on the NRCS Field Office Technical Guide, (see attachment). These management practices have become common technology in Napa County within the last twenty years, partially as a result of the Napa County Conservation Regulations ordinance.

The ordinance was originally adopted by the county board of supervisors in 1990 (interim ordinance) and 1991 (permanent ordinance) to address soil erosion problems and water quality protection. The Soil Conservation Service (SCS, now known as the NRCS) provided consultation to the County on both the need for the ordinance, as well as on technical aspects of erosion control and water quality protection. As background to the ordinance, in 1985 and 1990, the SCS and the Napa County RCD published a collaborative study that showed soil erosion on Napa County farmlands exceeded the USDA erosion tolerance, or “T” factor for erosion on lands steeper than 5%, where erosion control BMPs were not being followed. It was also determined at that time that sediment runoff from these lands was more likely to mobilize and enter downstream waters on the same lands.

Because pesticides and crop nutrients are applied to the land during the non-rainy season, the main opportunity for these constituents to enter downstream waters comes via storm runoff and via sediment bound transport. The NRCS determined that if practices are therefore in place to control soil erosion and sediment transport, i.e., the County conservation ordinance, the corresponding critical conservation practices that must be in place to limit the potential for pesticides and nutrients to leave the farmed area are Pest Management (NRCS FOTG Practice 595) and Nutrient Management (NRCS FOTG Practice 590).

Practices 590 and 595 are included in a suite of conservation practices that are offered through the USDA’s Environmental Quality Incentives Program (EQIP). Farmer applicants are eligible for funding assistance to implement conservation practices if their farming program is not already addressing the NRCS benchmark treatment needs. The good news is that, in the 12 years that NRCS has been offering EQIP in Napa County, few farmlands have qualified for Practices 590 and 595 cost-sharing, due to the fact that most farms are already meeting the minimum conservation treatment standard. Because crop nutrients are applied in small quantities, and precisely targeted to each vine or tree during the growing season, there is little to no potential of runoff. Also, many nutrients are applied via fertigation with drip irrigation systems, which do not generate runoff unless the system is damaged. Vine and tree crops in Napa County are not typically fertilized with animal manures, and the various forms of organic source nutrients applied are not considered to be a potential source of E-coli bacteria. Where manures are applied to irrigated farmland, a grower certification questionnaire has been developed for members to provide further details on use.

As a part of the EQIP program eligibility analysis for Pest Management (Practice 595), growers supply information to determine if the UC Integrated Pest Management (IPM) guidance is being followed for their cropped land. The IPM standard incorporates grower usage of pest monitoring, scouting, and application of precisely-applied materials or organic alternative materials to address pest control. This kind of precise pest management program -- as compared

to applying a standard series of pesticide material on a calendar basis -- provides a high degree of certainty that materials are being applied according to need and proper timing.

More particular to this pilot program, in the 12 years since EQIP funding became available for growers in the Putah Creek watershed area of Napa County, the NRCS has not been able to identify program any eligible growers; program applicants to date appear to be applying pesticides, nutrients, and irrigation water to an acceptable conservation standard.

III. Promotion of Management Objectives and Practices

It is anticipated that the current NCPCWG steering committee, comprised of representatives from Napa County Farm Bureau, NRCS, Napa County RCD, Napa County Agricultural Commissioner's Office, irrigating growers, and also Napa County Supervisor Diane Dillon, will continue to work together on promotion of management objectives. To date, the Napa County Farm Bureau (FB) has played a critical coordination role with growers and partnering agencies. FB has also supported tracking and management of grower participation and communications with the Sacramento Valley Water Coalition and State Water Board staff. Napa County RCD has performed water quality monitoring tasks, and the other partners have assisted with program development and management, including NRCS's role in developing BMPs and educating growers on proper use of BMPs.

Annual workshop meetings have been held for growers, providing an educational forum for management practice training and for informing growers of the requirements and responsibilities associated with participation in the group watershed process. Members of the steering committee have also worked with Napa County's Watershed Information Center and Conservancy (WICC) to post watershed group reports and information on management practices. All of these activities would continue in the proposed pilot program.

Promotional work and outreach to growers has been very effective in keeping participation levels high (typically more than 80% by grower number) and attendance at grower meetings has also been good. The NCPCWG is confident that it can continue to achieve effective participation in a Pilot Watershed Program, using similar outreach coordination techniques. It should be noted that at their February 5, 2010 meeting, the steering committee presented recommendations for participation in an optional Pilot Watershed Management Program. Grower members in attendance voted unanimously to submit a pilot program proposal to the Region V Water Board. Also, annual water quality monitoring reports have consistently demonstrated that irrigated agricultural lands are not a significant source of water quality impairment, supporting the premise that a pilot program focused on continuing implementation of best management practices is therefore appropriate.

The NCPCWG would continue to utilize the same communication and education processes and agency partner roles, as described above. We will also look to state and/or local government for more financial resources via grants or a joint powers agreement.

IV. Mechanisms to Track Practice Implementation

Grower documentation requirements would be addressed by having grower/ landowners fill out the attached “Annual BMP Implementation” questionnaire and submit it to the Napa County Farm Bureau with the grower’s annual dues check. The questionnaire has been developed based on NCPCWG’s determination that grower/owners routinely utilize farm management measures that reduce the likelihood of water quality impairment. For instance:

- a) Nearly all farms utilize high efficiency drip irrigation systems, which rarely produce any runoff at all.
- b) Farms commonly follow general UC IPM programs, including field scouting and reduced pesticides.
- c) Virtually all pesticide materials are applied in small increments during months of the year when no storm runoff occurs.
- d) Most farms utilize soil and/or petiole analysis on a regular basis, applying low amounts of precisely-targeted crop nutrients. Nutrients applied are typically either “dripped-in” with micro-irrigation systems, or are foliar-applied during dry spring or summer months. Potential loss of nutrients to surface waters is therefore very minimal.
- e) Growers with active Erosion Control Plan Applications, (ECPA’s) will be a source of valuable information and documentation of implemented water quality protection measures.

The NRCS Napa County office offers a variety of USDA conservation funding assistance programs to farms and ranches. All applications are screened and ranked to determine if conservation targets for key issues such as water quality protection are being met on the farm. Through that process, NRCS has determined that most farmers already meet standards for pesticide and nutrient application, and also already utilize state-of-the-art irrigation practices. For example, since the inception of the EQIP in 1997, no applicant irrigated lands have needed additional treatment to meet nutrient or pest management targets aimed at protecting water quality. The same finding has been found for EQIP cost share offerings for irrigation water conservation, as vineyards and orchards were already utilizing high efficiency drip irrigation systems and system management.

Using the NRCS Field Office Technical Guide, the tables below note resource concerns (shown as “Potential Water Quality Impairment Source”) with a listing of management practice and sources of documentation for those practices. The tables were originally used to identify the full suite of BMP’s adopted by the NCPCWG. Depending on terrain factors, soil type, and management inputs, not all BMP’s apply to all farms. Further evaluation is needed for any given farm field.

**-Performance Goals-
Management Practices & Appropriate Documentation Sources**

1. Soil

Potential Water Quality Impairment Source	<u>Mngmt Practices</u> (That Address NRCS Quality Criterion Needs)	<u>Source of Documentation</u>
Sheet and rill erosion (Includes potential for soil-borne nutrients and pesticides)	Cover crops Diversion Underground outlets Grassed waterways Mulching	N.C. Conservation Regulations NRCS/ RCD conservation assistance http://efotg.nrcs.usda.gov/treemenuFS.aspx
Farm road erosion	Access road Critical area treatment Mulching	N.C. Conservation Regulations NRCS/ RCD conservation assistance http://efotg.nrcs.usda.gov/treemenuFS.aspx

2. Water Quality

Potential Water Quality Impairment Source	<u>Mngmt Practices</u> (That Address NRCS Quality Criterion Needs)	<u>Source of Documentation</u>
Excess irrigation runoff	Irrigation water management Micro-irrigation system	Engineered drip irrigation syst. NRCS conservation assistance http://cesanjoaquin.ucdavis.edu/files/13563.pdf http://efotg.nrcs.usda.gov/treemenuFS.aspx
Suspended sediments (Sourced from farmed lands and farm roads)	Sediment basin Herbaceous buffers Streambank stabilization Riparian forest buffer	N.C. Conservation Regulations NRCS/ RCD conservation assistance http://efotg.nrcs.usda.gov/treemenuFS.aspx http://efotg.nrcs.usda.gov/treemenuFS.aspx
Excessive nutrients in surface waters (Crop-applied)	Nutrient management	Regular soil/ petiole analysis http://efotg.nrcs.usda.gov/treemenuFS.aspx
Pesticides in surface waters (Crop-applied)	Pesticide management	UC IPM Program- Grapes http://www.ipm.ucdavis.edu/PMG/C302/m302yi01.html http://efotg.nrcs.usda.gov/treemenuFS.aspx

Through its ongoing, existing free technical assistance program, NRCS would also be available to assist growers with on-farm management practice evaluations and planning assistance on a continuous basis as a part of its ongoing conservation program. Growers needing to improve their existing conservation systems or needing to implement management practices could also apply for incentive funding grants through NRCS's farm bill programs, such as the EQIP.

The attached grower questionnaire documents compliance with the Napa County Conservation Regulations and grower participation in existing programs like that of California Certified Organic Farmers (CCOF). The Napa County Farm Bureau would annually tabulate grower questionnaire results and provide summary reports to the Sacramento Valley Water Coalition, much as is done with the current monitoring program. Members of the NCPCWG steering

committee would then review questionnaires to track active participants and help determine field certification needs.

As discussed at our July 2009 field meeting, with NCPCWG members, Region V staff, and Sacramento Valley Water Coalition staff, all irrigated agricultural growers participating in the Pilot Watershed Plan group process would be subject to inspection of their lands. The “Annual Inspections” section on pages 15 and 16 propose a process for conducting certification that BMP’s have been implemented on member grower’s lands.

Attachments

- Description of the Napa County Conservation Regulations
- RCD Water Quality Monitoring Reports 2005-2008
- NCPCWG Best Management Practices- Adopted 2007
- 1985 and 1990 RCD/NRCS Napa County Erosion Studies and follow-up-
(These 2 reports will be mailed as they are not in an electronic format)

Proposed Annual Questionnaire for Growers (follows)

**Napa County Putah Creek Watershed Group
2009 Grower's Management Practices Questionnaire***

Name: _____

Assessor Parcel Number/s: _____

Total Acres Farmed: _____

Acres Under Irrigation in the most recent crop year: _____

Crops Grown, (By acreage) : _____

1 Yes <input type="checkbox"/> No <input type="checkbox"/>	I have attended the most current NCP CWG BMP workshop which was held on _____ .
2 Yes <input type="checkbox"/> No <input type="checkbox"/>	Irrigated farmlands I own or farm were planted or re-planted under requirements of the Napa County Conservation Regulations. (If "Yes", answer next row).
3 Yes <input type="checkbox"/> No <input type="checkbox"/>	The RCD continues to provide winterization inspection of my Putah Creek watershed farm. (Include a copy of the latest inspection memo from RCD and/or Napa County. My ECPA # is listed by Napa County planning documents as:
4 Yes <input type="checkbox"/> No <input type="checkbox"/>	I maintain erosion control practices, including a cover crop program, (maintaining cover throughout the vineyard from October through March), and inspect my farmland and farm roads for erosion conditions after each storm event.
5 Yes <input type="checkbox"/> No <input type="checkbox"/>	I am currently CCOF certified, or am in transition to organic certification on lands I farm in the watershed. (Please attach CCOF Organic Certification Plan, OSP, or CCOF Application materials as documentation).
6 Yes <input type="checkbox"/> No <input type="checkbox"/>	I understand and follow the UC-IPM program for my crop, or I utilize the services of a PSA who manages my farm pest management program. (UC-IPM reference = http://www.ipm.ucdavis.edu/PMG/C302/m302yi01.html)
7 Yes <input type="checkbox"/> No <input type="checkbox"/>	I apply pesticides in a manner that avoids drift and rainfall runoff.
8 Yes <input type="checkbox"/> No <input type="checkbox"/>	My primary irrigation system is drip (micro-irrigation), and it was designed by a competent agricultural engineer or irrigation designer.
9 Yes <input type="checkbox"/> No <input type="checkbox"/>	I utilize overhead sprinklers for frost protection.
10 Yes <input type="checkbox"/> No <input type="checkbox"/>	I utilize irrigation water management techniques, monitoring soil moisture and crop needs, and only apply water necessary to meet crop needs.
11 Yes <input type="checkbox"/> No <input type="checkbox"/>	I maintain my irrigation system and inspect fields during each irrigation to insure that there are no damages or leaks in the system. (QUESTIONS CONTINUE ON THE NEXT PAGE)

Page 2 of 2 Grower Questionnaire, (Continued)	
12 Yes <input type="checkbox"/> No <input type="checkbox"/>	I perform annual soil or petiole analysis, and apply crop nutrients based on crop needs. I also time sprayings to avoid drift and runoff of any aerosol crop nutrient materials applied.
13 Yes <input type="checkbox"/> No <input type="checkbox"/>	I do not apply crop nutrients during the months of November through March. If "Yes", list nutrients applied:
14 Yes <input type="checkbox"/> No <input type="checkbox"/>	I apply manure on my irrigated acreage. (If you answered "Yes", list when you apply manures, and whether the manure is pre-composted prior to application: Date of application: _____ Manure is composted? Y N
15 Yes <input type="checkbox"/> No <input type="checkbox"/>	I do not apply pesticide spray materials, (includes herbicides and insecticides) during the months of November through March. If "Yes", list pesticides applied during this or the last crop year:
16 Yes <input type="checkbox"/> No <input type="checkbox"/>	Riparian areas adjacent to farmed lands are left undisturbed, or have been managed for, natural ground cover and control of streambank erosion in consultation with qualified professionals such as the NRCS.
17 Yes <input type="checkbox"/> No <input type="checkbox"/>	I have a copy of the Napa County Putah Creek Watershed Best Management Practices and utilize them on my irrigated farmland.
18 Yes <input type="checkbox"/> No <input type="checkbox"/>	I would like to request consultation with the NRCS, RCD, or other professional consultants, to better understand BMPs and ensure that I am applying them appropriately to the land.

Signature

Date

**This questionnaire must be submitted annually to the Napa County Putah Creek Watershed Group Steering Committee, upon payment of yearly dues. The series of Best Management Practices, adopted in 2007 represent the basis for determining technical adequacy of farming measures evaluated in questions 1 through 15. If you have any questions or need technical clarification for your responses, you can call the Napa County office of the Natural Resources Conservation Service, (NRCS) at 707.252.4189.*

Annual Inspections:

Proposed Criterion and Procedures for Selecting Sites for Field Confirmation of Grower Data

The following criterion has been established by the steering committee, in response to comments received from the Region V staff in January, 2010. The Pilot Watershed Program concept requires that local groups establish an annual certification/ verification program that provides reasonable assurance that growers are actively applying best practices on irrigated lands to protect water quality.

Napa County is actively implementing the Napa County Conservation Regulations Program. Under these local regulations, irrigated lands in the watershed are already subject to regular inspections and spot inspections by the County of Napa and by the Napa County Resource Conservation District, (RCD). Because the regulations require adherence to management practices that control soil erosion, manage runoff to minimize water quality impairment, and also require protection of riparian areas through farming setbacks, the NCPCWG will utilize documentation from this program as a first line of verification with its grower members.

Annual Grower Questionnaire data will be further used to verify grower self-certified information that will be subject to spot checks by the NCPCWG steering committee. Farms selected for inspection will be asked to produce records that provide evidence of NCPCWG Best Management Practices. These records may include Pest Control Advisor monitoring reports, records of pesticide use, soil or crop petiole analysis reports, and records of plant nutrient application, and county agricultural commissioner pesticide application permits.

Member growers will also be required to attend, or send a designated representative to attend annual NCPCWG meetings, which will include technical discussions on Best Management Practice implementation. Attendance records will be cross-checked with the questionnaire by the steering committee.

The NCPCWG steering committee will select farmland parcels for their yearly inspection, totaling at least 5% of its member total acreage. Based on 2009 data, this will amount to at least 175 acres of land, owned by at least 3 watershed group members. Lands subject to certification will not require recertification for a period of at least 5 years, and steering committee members will be required to abstain from participating in certification of lands they own or manage. They will also be required to abstain from participating in certification of lands adjacent to land that they own or manage.

Selection of Lands Requiring Certification

Lands selected for annual BMP certification will be evaluated based largely on GIS mapping data available to the steering committee and their advisory members. Data layers will include information on irrigated lands adjacent to USGS blue line streams, irrigated land parcels

comprised of lands greater than 5% slope, and irrigated lands subject to active Napa County ECP applications, including winterization inspections or county spot checks within the calendar year. Other data used may include pesticide application permits issued by the Napa County

Agricultural Commissioner's Office, and data supplied on the Grower's Management Practices Questionnaire.

A second category of lands subject to certification will be member lands where membership status has lagged in at least one of the past 3 years.

On-Site Certification Documentation

The NCPCWG steering committee will develop a standard form for recording in-field observations related to visual indicators of features including the presence of cover crops, active soil erosion processes, and irrigation system type. The standard form will also include a checklist of grower-submitted BMP implementation records as referenced on the Grower's Management Practices Questionnaire. Steering committee members affiliated with agencies including the Agricultural Commissioner's Office, the NRCS, the RCD, and the UC Cooperative Extension will only serve in an advisory capacity to the steering committee, and will only engage in certifications where the landowner has requested their presence and services. Steering committee members will reserve the right to seek to qualified technical advice as they deem necessary and appropriate to fulfill their charge.

Certification field visit times and dates may vary, but the steering committee will endeavor to visit properties during the late fall or winter season, to allow for a better visual gauge of BMP implementation.

Appendix I

Napa County Putah Creek Watershed Group Best Management Practices

Napa County Putah Creek Watershed Group

Best Management Farming Practices for Water Quality Protection

January, 2007



Best Management Practices: Strategies and Implementation

The Napa County Putah Creek Watershed Group (NCPCWG), was formed in 2004 to address water quality issues related to the state's irrigated agriculture waivers program mandate. The centerpiece of the NCPCWG's efforts has been to assess the potential for water quality impairment sourcing from irrigated agriculture, and to put in place an ongoing water quality monitoring program to insure that clean water goals are achieved.

Progressive conservation programs and sustainable farming efforts already in place in Napa County have allowed the NCPCWG to demonstrate that threats to water quality impairment due to agriculture discharges are not expected to be likely or common.

As an adjunct to its water quality monitoring program being carried out by the Napa County RCD, the NCPCWG has developed a list of 14 Best Management farming practices (BMP's). The BMP's are intended for growers to use as guidance for documenting farming and land management practices that protect water quality by managing potential runoff of soil, pesticides, and nutrients from their irrigated farmland.

The BMP's are based on USDA Natural Resources Conservation Service, (NRCS) conservation practice standards that have been further adapted for use in Napa County. Because each farm has its own set of unique soil, climatic, and terrain features, as well as unique farming and natural resources components, the degree to which various BMP's should be applied to the land will vary. On some lands, for instance, soil erosion control needs and storm runoff management issues will require more intensive attention.

The *Irrigation Water Management*, *Nutrient Management*, and *Pesticide Management* BMP's will be fully implemented on all enrolled lands, with appropriate farm-specific planning to achieve water quality protection goals.

Growers are encouraged to work with professional advisors, including the NRCS, licensed Pest Control Advisors, the University of California, licensed engineers, and other qualified professionals, to assess their land and farming practices and determine the effectiveness of their current conservation farming program.

The following pages include a simple, single-page description of the following BMP's, as well as appropriate sources of additional guidance to tailor appropriate applications.

BMP Practice List

- **Access Road**
- **Cover crops**
- **Critical Area Planting**
- **Diversion**
- **Grassed Waterway**
- **Irrigation Water Management**
- **Mulching**
- **Nutrient Management**
- **Pest Management**
- **Riparian Forest Buffer**
- **Sediment Basin**
- **Streambank & Shoreline Protection**
- **Underground Outlet**

Best Management Farming Practices for Water Quality Protection

Access Road (NRCS Conservation Practice Code 560)



DEFINITION

Vehicular and farm equipment travelways constructed and maintained to provide access to farms, fields, structures, and other non-farmed destination points.

PURPOSES

- To provide stable, reliable travel surfaces.
- Maintain access, while reducing runoff and soil erosion potential.
- Protect water quality.
- Maintain efficient transport, while avoiding disturbance or blockage to riparian areas and sensitive habitats.

CONDITIONS

Roads will be constructed and maintained to facilitate and control the disposal of runoff water, reduce soil erosion, and make the most efficient use of topographic features. Roads should generally follow natural contours and sloped/graded to minimize disturbance of natural drainage patterns. Where possible, roads will be located away from watercourses, and where watercourses are traversed, blockage or alteration of stream flow patterns will be avoided. Associated practices such as relief culverts, rolling dips, waterbars, cut/ fill grades, mulching, sediment basins, and riparian herbaceous cover, and critical area plantings will be used to stabilize the landscape and prevent excess sediment from entering aquatic areas and downstream lands.

TECHNICAL RESOURCES:

- **USDA Natural Resources Conservation Service, Napa County.**
- **Consulting engineers and Certified Prof Erosion and Sediment Control specialists.**
- **NRCS Field Office Technical Guide & various rural roads design/ maintenance guides.**
- **CA Dept of Fish and Game Salmonid Restoration Handbook.**

Best Management Farming Practices for Water Quality Protection

Cover Crops (NRCS Conservation Practice Code 340) 



DEFINITION

Grasses, legumes, forbs, or other herbaceous plants established in vineyards and orchards to provide seasonal, or year round groundcover for conservation purposes.

PURPOSES

- Reduce soil erosion from storm runoff
- Increase soil organic matter
- Cycle excess nutrients before reaching waterways
- Increase bio-diversity
- Suppress unwanted weeds
- Manage soil moisture
- Reduce dust
- Manage crop vigor

CONDITIONS

Cover crops will be established and managed to provide ground protection when runoff from the land may pose potential for soil erosion. The Universal Soil Loss Equation will provide guidance on the type and degree of groundcover necessary to reduce soil erosion potential to standards established in the Napa County Conservation Regulations. Soil type, terrain factors, rainfall intensity, and farm management factors will be evaluated to determine whether a cover crop management program will meet conservation needs for water quality protection and soil quality enhancement.

TECHNICAL RESOURCES:

- NRCS Napa County Field Office Technical Guide
- Universal Soil Loss Equation: Special Applications for Napa County, USDA-NRCS, 1994.

Best Management Farming Practices for Water Quality Protection

Critical Area Planting (NRCS Conservation Practice Code 342)



DEFINITION

Critical Area Planting is planting vegetation such as trees, shrubs, grasses, and other plants to stabilize critically eroding land.

PURPOSES

- Stabilize soil.
- Protect water quality in downstream areas.
- Improve wildlife habitat and improve landscape esthetics.

CONDITIONS

Plant materials are established to provide effective ground cover and rooting to hold steep or erodable non-farmed land. Appropriate plants and planting methods are selected to provide stabilization and reduce storm water runoff. Where appropriate and necessary, mulches, fertilizer, and weed control are utilized to provide rapid vegetation establishment. Where possible and practical, irrigation water will be applied to plantings ahead of fall rains. Applied mulches will consist of grain straw, erosion control fabrics, and coarse organic materials. Prior to planting, land surfaces will be smoothed to prevent channeling of storm runoff. Other conservation practices such as diversions, grassed waterways, and sediment basins may be necessary to stabilize soil erosion and prevent sediment from reaching downstream areas.

TECHNICAL RESOURCES:

- **USDA Natural Resources Conservation Service (NRCS) Field Office Technical Guide.**
- **Riparian Vegetation Management for Pierce's Disease in North Coast Vineyards Information Manual.**
- **Certified Professionals in Erosion and Sediment Control.**

Best Management Farming Practices for Water Quality Protection

Diversion (NRCS Conservation Practice Code 362)



DEFINITION

A diversion is a small channel conveyance constructed across the slope to convey storm water runoff to a protected outlet or down slope conveyance device.

PURPOSES

- Control soil erosion and protect water quality.
- Spread storm water runoff to multiple low-discharge locations.
- Provide temporary or long-term erosion protection on newly-developed or redeveloped farmland.

CONDITIONS

Diversions will be designed to capture storm water runoff and prevent it from channeling down slope through farmland. Diversion placement will be predicated on the need to break up long-running slopes into smaller, non-erodible increments. Running across the slope, diversions generally do not have a run exceeding five percent. For mid-slope diversions in farmed fields, the Universal Soil Loss Equation will be used to determine the maximum allowable distance between diversions. Where temporary diversion are warranted (two year life or less), the design capacity will at least equal the 2-year, 24-hour storm event. Permanent diversion will carry up to a 10-year, 24-hour storm, and will be protected with no-till cover or appropriate armoring to control scour erosion.

TECHNICAL RESOURCES:

- **USDA Natural Resources Conservation Service and Napa County Resource Conservation District consultation.**
- **NRCS Field Office Technical Guide and NRCS Engineering Field Handbook.**
- **Qualified consulting engineers and Certified Professionals in Erosion and Sediment Control.**

Best Management Farming Practices for Water Quality Protection

Grassed Waterway (NRCS Conservation Practice Code 412)



DEFINITION

Grassed waterways are natural or constructed channels, typically broad and shallow in shape, that are planted and continuously maintained with low-growing grassy cover to convey storm water runoff.

PURPOSES

- Convey storm water runoff non-erosively to a protected outlet or natural waterway.
- Protect water quality.
- Provide a more natural, lower velocity alternative to other means of storm water conveyance.

CONDITIONS

Grassed waterways will be used to control soil erosion from concentrated water flow or gullying where storm water runoff can be conveyed at velocities less than five feet per second. Where grading is used to construct waterways, an effective sod, preferably comprised of permanent grasses, will be established with mulch and irrigation prior to the beginning of the fall rainy season. Where conditions warrant additional erosion protection, stone-lined channel bottoms, or periodic rock checks finished at channel-bottom grade may be used. Associated conservation practices include Critical Area Planting (342) and Rock-lined Waterway (468).

TECHNICAL RESOURCES:

- **NRCS Napa Field Office Technical Guide and NRCS Engineering Field Handbook.**
- **Qualified consulting engineers.**

Best Management Farming Practices for Water Quality Protection

Irrigation Water Management (NRCS Conservation Practice Code 490)



DEFINITION

Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.

PURPOSES

- To manage soil moisture to promote desired crop quality.
- Minimize potential for irrigation induced soil erosion.
- Decrease or eliminate potential for non-point source pollution of surface and groundwater resources.

CONDITIONS

Irrigation systems will be designed and maintained to apply water to meet the basic evapotranspirative needs of the crop, minimizing the potential for excess runoff. In most cases, drip or micro-irrigation systems will be used to supply irrigation, but similar standards will be applied to overhead sprinkler systems supplying water for frost protection. Irrigation systems will be set up with appropriate flow and pressure controls to apply water uniformly across the field. Soil moisture, climatic conditions, and crop condition will be closely monitored to determine appropriate application timing and amount. Where irrigation water is used to mobilize soil-applied fertilizer and soil amendments, care will be taken to insure that applied materials do not move below the crop root zone, or off the field. Associated conservation practices include 590 Nutrient Management.

TECHNICAL RESOURCES:

- UC Cooperative Extension Service and USDA Natural Resources Conservation Service publications.
- Consulting irrigation engineers and Certified crop management specialists.
- California Irrigation Management Information System, (CIMIS), data and farm weather data systems.

Best Management Farming Practices for Water Quality Protection

Mulching (NRCS Conservation Practice Code 484)



DEFINITION

Applying plant residues or other suitable materials to the soil surface.

PURPOSES

- To conserve soil moisture
- Reduce runoff and soil erosion potential.
- Prevent surface compaction or soil crusting.
- Control weeds and aid in establishment of desirable plant cover.

CONDITIONS

Bare, exposed soil surfaces that are deemed to be potential critical erosion areas. In most cases, mulch will consist of grain straw residue. Straw mulches will generally be applied at a rate of 4,000 lbs. per acre. Key areas for mulch application will be field perimeters, vineyard avenues, and steep slope lands requiring quick erosion control cover. Mulches, including wood fiber materials and manufactured erosion control blankets may also be used. Where feasible, late summer irrigation will be utilized to help bind mulch and establish vegetative cover before fall rains commence. Straw bales, straw wattles, and other similar materials may also be installed in critical locations to provide sediment retention and storm runoff control. Mulched surfaces will be maintained throughout the rainy season.

TECHNICAL RESOURCES:

- **Napa Co RCD and USDA Natural Resources Conservation Service, Napa County.**
- **NRCS Field Office Technical Guide.**
- **Qualified Professional Engineers and Certified Soil Erosion & Sediment Control Specialists.**

Best Management Farming Practices for Water Quality Protection

Nutrient Management (NRCS Conservation Practice Code 590) 



DEFINITION

Managing the amount, form, placement, and timing of applications of plant nutrients.

PURPOSES

- Supply nutrients for optimum crop quality.
- Minimize potential entry of nutrients to surface waters and groundwater.
- Maintain or improve the chemical and biological condition of the soil.

CONDITIONS

Soil and petiole analysis will be conducted during key crop growth periods to determine appropriate kinds and rates of nutrient applications, avoiding excessive nutrient application. Farming operations that maintain soil tilth and reduce potential soil compaction will be practiced, to reduce potential nutrient runoff and optimize efficient uptake of applied nutrients. Soil erosion control practices will be planned to minimize soil loss and runoff that may pose the potential to carry dissolved and attached nutrients to surface waters. Organic materials such as compost and soil organic building green manure crops will be utilized to maintain optimum soil organic matter and soil nutrient retention. Application of nutrients will be timed to maximize optimum uptake and utilization of nutrients.

TECHNICAL RESOURCES:

- UC Cooperative Extension Service
- NRCS Field Office Technical Guide
- Licensed, qualified soil and crop laboratories and crop management advisors.

Best Management Farming Practices for Water Quality Protection

Pest Management (NRCS Conservation Practice Code 595A)



DEFINITION

Management of agricultural pests, (including weeds, insects, rodents, and diseases), considering both the needs of the crop as well as the surrounding aquatic and terrestrial environment.

PURPOSES

- Minimize farm chemical inputs necessary to manage agricultural pests.
- Reduce or eliminate the potential for applied pesticide materials to reach surface or groundwater
- Manage farm cultural operations to reduce loss of materials by runoff and airborne drift.

CONDITIONS

Pesticides and pest control practices will be carried out through consultation with licensed Pest Control Advisors, (PCA). Planning emphasis will identify the use of integrated pest management systems that utilize the most appropriate means of control, including cultural, mechanical, chemical, and biological alternatives. Pest control models will be utilized in conjunction with regular field scouting to target appropriate timing and application methods and amounts of material. Applicator equipment will be kept in good working condition to maintain accurate calibration. Loading, mixing, and rinsing operations will be conducted away from sensitive environmental areas and aquatic habitats.

TECHNICAL RESOURCES:

- Napa County Agricultural Commissioners Office
- UC pest management publications and Napa County Farm Advisor's Office
- Licensed Pest Control Advisors

Best Management Farming Practices for Water Quality Protection

Riparian Forest Buffer (NRCS Conservation Practice Code 391A) 



DEFINITION

A zone of trees and shrubs between farmland, up-gradient from streams and other water bodies.

PURPOSES

- Reduce excess amounts of sediment, nutrients, pesticides and other potential pollutants in runoff
- Provide a source of detritus and large woody debris for fish and other aquatic organisms
- Create shade to lower water temperatures to improve habitat for fish and other aquatic organisms

CONDITIONS

Riparian forest buffers will be maintained or established to provide native, non-farmed habitat and conservation cover. Buffers will be established or maintained to provide a transition zone of reasonable width between the farmed area and average riparian water surface area. Native plant materials that are non-systemic hosts for the Pierce's Disease bacterium will comprise the preferred vegetation type. Establishment and management of forest buffers will be carried out in accordance with all required permits and agreements.

TECHNICAL RESOURCES:

- NRCS Napa County Field Office Technical Guide
- Riparian Vegetation Management for Pierce's Disease in North Coast CA Vineyards manual.

Best Management Farming Practices for Water Quality Protection

Riparian Herbaceous Cover (NRCS Conservation Practice Code 390)



DEFINITION

Grasses, grass-like plants and forbs that are established or managed in the transitional zone between farmland and aquatic habitats.

PURPOSES

- Improve and protect water quality by reducing the amount of sediment, and other potential pollutants such as pesticides and nutrients in storm runoff.
- Help stabilize stream banks and shorelines.
- Provide food, cover, and shading for wildlife and amphibians.

CONDITIONS

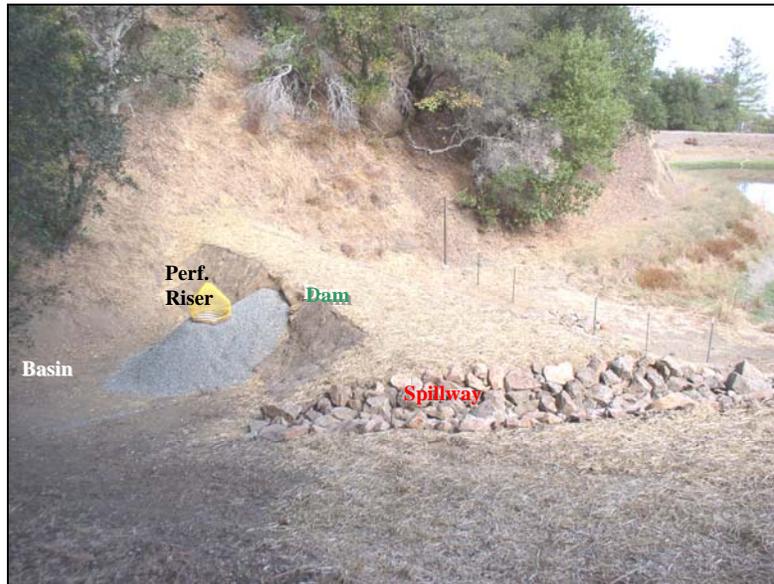
Growers will develop or manage zones of buffer vegetation between farmed and non-farmed seasonal or perennial aquatic areas. Where possible, herbaceous buffers will provide a transition between woody riparian vegetation areas and the farmed ground. Buffer widths will vary, but minimum width per side will include the 1st bench of the floodplain, and will be at least 1.5 times bank-full stream width, or 15 feet for other water bodies. If mowing is necessary to maintain cover, it will occur after July 15 to protect nesting areas, and will leave at least 5 to 6 inches of surface residue to provide erosion protection prior to fall rains. Plant species that may be alternate hosts for diseases such as Pierce's Disease will be avoided, and native plants will be utilized as much as possible. The location, layout, and vegetative composition of the buffer should complement natural features.

TECHNICAL RESOURCES:

- NRCS Napa Field Office Technical Guide
- Licensed, qualified agronomists and crop management advisors.
- North Coast Pierce's Disease Riparian Management Manual.

Best Management Farming Practices for Water Quality Protection

Sediment Basin (NRCS Conservation Practice Code 350)



DEFINITION

A basin constructed to collect and store soil sediment and prevent excessive sediment runoff into receiving surface waters.

PURPOSES

- Capture significant excess sediment originating on farmed lands.
- Minimize potential entry of sediment and attached nutrients to surface waters.
- Optimize the efficacy of erosion control practices on newly developed or replanted vineyards and orchards.

CONDITIONS

Temporary or permanent sediment basin installations will be constructed, as appropriate to augment erosion control practices on lands where recently disturbed soils pose a potential to exceed acceptable soil loss standards. Sediment basins will be designed and sited in appropriate terrains to optimize sediment trapping efficiency where eroded soils pose potential to leave the site and enter surface waters or neighboring lands. Applications will related mostly to lands over 5% slopes, or situations where excessive sediments may concentrate. The Napa County Conservation Regulations guidelines, as prescribed by the NRCS and Napa Co RCD will be followed in the design and siting of basins.

TECHNICAL RESOURCES:

- Napa Co RCD and USDA Natural Resources Conservation Service, Napa County.
- NRCS Field Office Technical Guide and NRCS Engineering Handbook.
- Qualified Professional Engineers and Certified Soil Erosion & Sediment Control Specialists.

Best Management Farming Practices for Water Quality Protection

Streambank & Shoreline Protection (NRCS Conservation Practice Code 580)



DEFINITION

Treatments used to stabilize and protect banks of natural streams, constructed waterways, and shorelines of lakes and reservoirs.

PURPOSES

- To control excessive erosion scour and stabilize failing banks.
- Reduce runoff and soil erosion potential.
- Protect water quality.
- Restore critical habitat, shade, and riparian cover for wildlife and fisheries benefit.

CONDITIONS

Critically eroding banks that are retreating into the land, are leading to loss of valuable riparian or aquatic habitat, and are discharging excessive amounts of sediment will be treated to control erosion. Erosion control treatments will emphasize use of natural stream energy training methods and use of suitable native plants to stabilize banks with minimal use of hardscape materials. Design treatments will be planned with respect to natural, stable stream planform and will avoid usage of man-made materials that may pose potential for water quality impairment, or disturbance of habitats. The CA Dept. of Fish and Game will be consulted for potential need for a stream alteration agreement, prior to commencement of any work in riparian or wetland areas.

TECHNICAL RESOURCES:

- USDA Natural Resources Conservation Service, Napa County.
- NRCS Field Office Technical Guide and NRCS Engineering Field Handbook.
- CA Dept of Fish and Game Salmonid Restoration Handbook.

Best Management Farming Practices for Water Quality Protection

Underground Outlet (NRCS Conservation Practice Code 620)



DEFINITION

A conduit installed below ground to collect concentrated discharge of surface water and convey it to a protected, managed outlet.

PURPOSES

- To collect excess surface runoff before it can concentrate and produce gullies and other serious forms of erosion.
- Minimize potential entry of sediment and attached nutrients to surface waters.
- Protect vineyard avenues, swales and other terrain where runoff may begin to concentrate.
- Spread discharged waters to the maximum extent possible.

CONDITIONS

Runoff waters will be collected from avenues, swales, and constructed erosion control diversions to be piped to appropriate protected discharge locations or water spreading devices. Care will be taken to minimize installation of conduits that may deliver high volumes of runoff to single-discharge locations. Runoff control designs will be geared to spread discharge of waters to multiple locations in smaller incremental amounts, or guide discharge to protected outlets or sediment basins. The Napa County Conservation Regulations guidelines, as prescribed by the NRCS and Napa Co RCD will be followed in the design and siting of basins.

TECHNICAL RESOURCES:

- Napa Co RCD and USDA Natural Resources Conservation Service, Napa County.
- NRCS Field Office Technical Guide and NRCS Engineering Handbook.
- Qualified Professional Engineers and Certified Soil Erosion & Sediment Control Specialists.

Appendix II

Napa County Putah Creek Watershed Group Background Data

- Napa County Conservation Regulations
- Napa Co RCD Water Quality Monitoring Reports 2005 to 2009
- Napa Co Agricultural Commissioner's Pesticide Use Report, 2008
- Napa County Markeley Cove Coliform Water Quality Report

ORDINANCE NO. 1219

**AN ORDINANCE OF THE BOARD OF SUPERVISORS OF THE
COUNTY OF NAPA, STATE OF CALIFORNIA, AMENDING SECTIONS
18.108.010, 18.108.027, 18.108.030, AND 18.108.140 OF AND ADDING A
NEW SECTION 18.108.135 TO THE NAPA COUNTY CODE,
SPECIFYING ADDITIONAL PURPOSES, PROVIDING NEW
STANDARDS IN AND EXPANDING THE NUMBER OF DOMESTIC
WATER SUPPLY WATERSHEDS, SPECIFYING GENERAL
OPERATIONAL PROCEDURES, MONITORING AND INSPECTION
REQUIREMENTS, AND AMENDING CURRENT BONDING
PROVISIONS OF THE CONSERVATION REGULATIONS**

The Board of Supervisors of the County of Napa, State of California, ordains as follows:

SECTION 1. Section 18.108.010 (Purpose) of Chapter 18.108 (Conservation

Regulations) of the County Code is amended to read in full as follows:

18.108.010 Purpose.

A. The purpose and intent of these regulations is to protect the public health, safety and community welfare, and to otherwise preserve the natural resources of the county of Napa. Further, these regulations are intended to ensure the continued long-term viability of county agricultural resources by protecting county lands from excessive soil loss which if unprotected could threaten local water quality and quantity and lead ultimately to loss of economic productivity. These regulations have been developed in general accord with the policies and principles of the general plan, as specified in the land use element and the open space and conservation element.

B. It is furthermore intended that these regulations accomplish the following:

1. Minimize cut, fill, earthmoving, grading operations and other such man-made effects in the natural terrain;
2. Minimize soil erosion caused by human modifications to the natural terrain;
3. Maintain and improve, to the extent feasible, existing water quality by regulating the quantity and quality of runoff entering local watercourses;
4. Preserve riparian areas and other natural habitat by controlling development near streams and rivers;
5. Encourage development which minimizes impacts on existing land forms, avoids steep slopes, and preserves existing vegetation and unique geologic features; and
6. Protect drinking water supply reservoirs in sensitive domestic water supply drainages from sediment, turbidity, and pollution.

C. It is not the intent of these regulations to provide that compliance with these regulations shall provide a defense to a charge of violating Section 5650 of the California Fish and Game Code.

D. It is also the intent of these regulations to further the intent and purpose of Section 1600 of the California Fish and Game Code.

SECTION 2. Section 18.108.027 (General Provisions-Vegetation Preservation

In Municipal Water Supply Areas) of Chapter 18.108 (Conservation Regulations) of the County

Code is amended to read in full as follows:

18.108.027 Sensitive Domestic Water Supply Drainages.

A. Applicability. The provisions of this section shall apply in sensitive domestic water supply drainages.

B. Vegetation clearing. A minimum of sixty percent of the tree canopy cover on the parcel existing on June 16, 1993 along with any understory vegetation, or when vegetation consists of shrub and brush without tree canopy, a minimum of forty percent of the shrub, brush and associated annual and perennial herbaceous vegetation shall be maintained as part of any use involving earth-disturbing activity.

C. Winter shut-down. All earth-disturbing activities shall be limited to the period of April 1st through September 1st of each year. No earth-disturbing activities other than installation of winterization measures shall take place during other times of the year. All winterization measures shall be in place by September 15th of any given year.

D. Drainage facilities. Concentration of runoff shall, wherever feasible, be avoided. Runoff shall instead be spread in small incremental doses into relatively flat buffer areas. Those drainage facilities and outfalls that unavoidably have to be installed shall be sized and designed to handle the runoff from a one hundred-year storm event without failure or unintentional bypassing. Outlets shall be protected against erosion in the one hundred-year storm event.

E. Notice required. The Director shall provide notice to the owner/operator(s) of a public-serving water supply system(s) located in a sensitive domestic water supply drainage of each erosion control plan filed in their drainage. Said notice shall include a copy of the plan submitted and shall provide twenty-one days for a response. If the owner/operator(s) submits credible evidence within this time period that the delivery of sediment or other pollutants into their reservoir(s) from the drainage will be increased by more than one percent on an individual project basis or by more than ten percent on a cumulative basis, the subject erosion control plan shall not be approved until a public hearing on the matter has been held before the commission and a use permit has been issued.

F. Geotechnical report required. A report prepared by a qualified professional specifying the depth and nature of the soils and bedrock present and the stability, both current and projected, of the area potentially effected shall be submitted by the property owner at the time of application for any project located in a sensitive domestic water supply drainage.

SECTION 3.

Section 18.108.030 (Definitions) of Chapter 18.108 (Conservation

Regulations) of the County Code is amended to read in full as follows:

18.108.030 Definitions.

“**Drainage ditch**” means a channel constructed solely for the purpose of providing drainage for agricultural use. A drainage ditch is not a stream as that term is defined in this section.

“**Earthmoving or earth-disturbing activity**” means any activity that involves vegetation clearing, grading, excavation, compaction of the soil, or the creation of fills and embankments to prepare a site for the construction of roads, structures, landscaping, new planting, and other improvements. It also means excavations; fills or grading which of themselves constitute engineered works or improvements.

“**Erosion**” means the wearing away of the ground surface as a result of the movement of wind or water.

“**Erosion hazard area**” means those portions of parcels of land having slopes over five percent.

“**Failure**” or “**failed**” with respect to an erosion control measure means that the measure has operated in the past or is expected to operate in the future in such a manner that erosion and/or resultant sedimentation have or will be increased above design rates or that flows exceed the capacity of the measure and bypassing has or will occur.

“**Grading**” shall mean any stripping, cutting, filling, contouring, recontouring or stockpiling of earth or land, including the land in its cut or fill condition.

“**Hydrophilic vegetation**” means vegetation that grows in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content (i.e., plants typically found in wet habitats).

“**Improvement**” means any man-made, immovable item which becomes part of, placed on, or affixed to, a parcel of land.

“**Land clearing**” means the removal of tree canopy, understory or herbaceous vegetation down to bare soil, by any method.

“**Landscape structure**” means a structure, object and/or feature for human use and enjoyment of the land associated with decorative landscaping in relationship to a residential structure, which does not require issuance of a ministerial or discretionary permit by the county.

“**Major storm event**” means a two year or larger storm (i.e., a storm with a fifty percent or less probability of occurring in any given year).

“**One hundred-year storm**” means a storm with a one percent probability of occurring in any given year.

“**Resolution**” means any resolution duly adopted by the Napa County board of supervisors.

“**Riparian vegetation**” means vegetation commonly occurring adjacent to or within streams and watercourses or along their banks including, but not limited to, such plants as willows, cottonwoods and their associated understory vegetation.

“**Sensitive domestic water supply drainage**” means any of the following drainages as depicted on the Sensitive Domestic Water Supply Drainages Map(s) maintained and hereafter modified from time to time as necessary by the Director:

1. Kimball Reservoir Drainage

2. Rector Reservoir Drainage
3. Milliken Reservoir Drainage
4. Bell Canyon Reservoir Drainage
5. Lake Hennessey Drainage including Friesen Lakes
6. Lake Curry Drainage
7. Lake Madigan Drainage

“**Slope**” means the inclination of the terrain calculated in accordance with the methodology set forth in Resolution No. 91-61, which is incorporated herein by reference.

“**Stream**” means any of the following:

1. A watercourse designated by a solid line or dash and three dots symbol on the largest scale of the United State Geological Survey maps most recently published, or any replacement to that symbol;
2. Any watercourse which has a well-defined channel with a depth greater than four feet and banks steeper than 3:1 and contains hydrophilic vegetation, riparian vegetation or woody vegetation including tree species greater than ten feet in height;
3. Those watercourses listed in Resolution No. 91-61 and incorporated herein by reference.

“**Structure**” means anything which is built or constructed, or any piece of work artificially built up or composed of parts joined in some definite manner whether installed on, above, or below the surface of the land.

“**Vegetation canopy cover**” means the crown area of a stand of trees (i.e., upper-story vegetation) in a natural stand of vegetation. For the purposes of this chapter, canopy cover is the collective cover of a grouping of trees viewed from an aerial photograph of the latest edition on file with the department, where the tree stand is continuous. Single trees are not considered canopy cover.

“**Vegetation outboard dripline**” means the furthestmost edge of riparian vegetation, including the dripline of the canopy cover of woody vegetation of a stream visible on the latest edition of aerial photographs on file with the department or as determined by a field inspection conducted by the director or his/her designee.

“**Vegetation understory**” means shrub or brush vegetation within a natural stand of vegetation that commonly grows to a height below established tree levels, and also includes associated annual and perennial herbaceous vegetation.

“**Vineyard replanting**” shall mean vine removal, ripping, recontouring or grading or any installation of erosion control measures and replanting of vines where the removal of vines began no more than six years prior to submittal of vineyard replanting program or erosion control plan to the department.

SECTION 4. A new Section 18.108.135 entitled “Oversight and Inspection” of

Chapter 18.108 (Conservation Regulations) of the County Code is added to read in full as follows:

18.108.135 Oversight and Operation.

- A. Installation oversight.** The qualified professional preparing an erosion control

plan shall oversee its implementation. Prior to the first winter rains after construction begins and each year thereafter until the project has received a final inspection from the County or its agent and been found complete, the qualified professional shall inspect the site and certify in writing to the Director that all of the erosion control measures required at that stage of development have been installed in conformance with the plan and related specifications.

B. Maintenance. The property owner is responsible for insuring that the erosion control measures installed operate properly and are effective in reducing to a minimum erosion and related sedimentation. The property owner shall either personally or have personnel inspect and repair/clean as necessary the erosion control measures installed at least weekly during the period between October 1st and April 1st of each year. Moreover, the property owner shall either be onsite him/herself or have personnel on site as required when it is raining to inspect the erosion control measures present and take those actions necessary to keep them functioning properly.

C. Monitoring. For projects disturbing more than one acre of land or with an average slope greater than fifteen percent, the property owner shall implement, prior to the first winter rains after installation of the planned facilities is commenced, a permanent, on-going program of self-monitoring of groundcover condition, and erosion control facility operation. The groundcover monitoring shall follow the procedures promulgated by the National Resource Conservation Service (NRCS, formerly the SCS) for determining rangeland condition for hydrologic assessment.

For projects involving disturbance of more than forty acres of land or containing areas with slopes greater than thirty percent totaling a quarter acre or more, an *Annual Erosion Control Plan Operation Status Report* specifying ground cover condition and how the erosion control measures involved are operating shall be provided to the Director and, if in a sensitive domestic water supply drainage, the owner/operator(s) of any public-serving drinking water supply reservoir present by September 1st of each year. This report shall specify the proposed management and cultural measures to be used the following year to return or maintain the ground cover in good condition in all parts of the area disturbed including vineyard avenues and any remedial actions that will be taken to get the other erosion control measures present to operate in such a manner as to minimize erosion and resultant sedimentation.

D. Failures. The following provisions shall apply where erosion control measures have failed or are in imminent danger of failing.

1. **Property owner duties-Temporary measures.** The property owner shall:
 - a. notify the Director in writing of the failure or pending failure of any erosion control measures within twenty four hours of discovery and indicate the temporary measures taken to stabilize the situation;
 - b. modify, within twenty four hours of the time that they receive comments from the independent engineer hired by the County to review the adequacy of these temporary measures, the temporary measures in the manner deemed necessary by the property owner's engineer so as to make them adequate to prevent further damage and problems;
2. **Property owner duties-Permanent remedial measures.** The property owner shall:
 - a. submit within ninety six hours after the discovery of a failure or pending failure
 - i. an engineered plan for the remedial measures necessary to permanently correct the problem and an engineer's estimate of the cost thereof, and
 - ii. a plan for cleanup of the damage done with an engineer's estimate for the cost of

this work;

b. re-submit to the County, within 48 hours of the time comments are received from the independent engineer hired by the County to review the temporary measures installed, the plan, and engineer's cost estimates revised plans and estimates;

c. pay the County the costs of this review within 48 hours of demand;

d. post a security in one of the forms specified by subsection (A)(1)-(4) of Section 17.38.030 in the amount equal to one hundred percent of the accepted estimated total cost to do the work required to correct the situation and cleanup the damage done within forty eight hours of demand; and

e. insure that the revised plan prepared is fully implemented within ninety six hours of its approval.

The time frames specified in this sub-section are maximums. The Director may in the case of an immediate threat to public health and/or safety require performance in shorter time periods.

3. **Plan preparer duties.** The plan preparer shall provide a notice to the County within twenty four-hours of full implementation of the plan prepared to permanently correct the problem certifying that the measures shown have been installed in conformance with said plan and related specifications.

4. **Non-compliance.** Failure to adhere to the provisions of subsections D(1) and (2) above may be considered a threat to public health and safety. The Director may in such instances take immediate action without further notice or hearing to remedy the situation and bill the property owner for the remedial work done. The Director shall keep an itemized account of the costs incurred in remedying the situation. The Board shall conduct a hearing on the costs in accordance with Sections 1.20.090-1.20.130 of this code and shall give the property owner an opportunity to object to the costs prior to recording a lien against the property or pursuing other cost-recovery actions.

E. Inspection.

1. Each project requiring an erosion control plan that has not received a final inspection and been found complete by the Director or his/her agent shall be inspected by the County or its agent after the first major storm event of each winter until the project has been completed and stable for three years. If it is found that the erosion control program implemented is not functioning properly or is ineffective the property owner shall take such remedial measures as the Director deems necessary to reduce erosion and related sedimentation to minimal levels. The full costs of said measures and the related inspections shall be borne by the property owner.

2. Five percent of projects that have received a final inspection and been found complete by the Director or his/her agent shall be spot checked by the Director or his/her agent each year to confirm groundcover condition and the proper operation of other erosion control measures. The Director, in cooperation with the Napa County Resource Conservation District (RCD) and other County departments and agencies, will develop a remedial program to address any deficiencies that may be identified as the result of these spot checks. The property owner shall implement this program, which may include re-seeding all or some portions of the site or changing agricultural or management practices. He/she shall pay all costs associated with these spot-checks.

F. Right of entry. With the property owner's consent, with a warrant, or in an emergency, the property owner shall give the Director and his/her agents full and complete

access to and throughout the project area so as to allow:

1. inspection of the erosion control and any remedial measures installed there to insure that they are functioning properly,
2. the making of necessary repairs or corrections to alleviate an erosion control problem or potential erosion control problem, or
3. the performance of needed maintenance.

SECTION 5. Section 18.108.140 (Violation-Penalty) of Chapter 18.108

(Conservation Regulations) of the County Code is amended to read in full as follows:

18.108.140 Security, Violations, and Penalties.

A. Security.

1. No earthmoving activity, grading, improvement, or construction of a structure for which an erosion control plan is required by this chapter shall commence until the property owner has filed security in the form, specified in subsection (A)(2) of this section if any of the proposed earth moving activities

- a. may pose a significant safety or public health risk,
- b. may result in a potential water quality impairment,
- c. is located in an area determined to have a severe soil erosion hazard as determined by the Director in consultation with the Napa County Resource Conservation District based on the Napa County Soil Survey prepared by the federal Resource Conservation Service, incorporated herein by reference,

- d. is located in a sensitive domestic water supply drainage,
- e. involves a failure or potential failure of existing erosion control measures, or
- f. is otherwise deemed warranted by the Director.

2. The security required by subsection (A)(1) of this section shall be comprised of both of the following:

- a. Security in the amount of the estimated cost of original installation of the required erosion control measures, which shall be posted with the Director in one or more of the forms specified by subsections (A)(1) through (4) of Section 17.38.030.

- b. Security in the amount of ten percent of the estimated costs of original installation of the required erosion control measures, which shall be in the form of recorded lien as specified in subsection (A)(5) of Section 17.38.030 against the parcel on which the measures are installed for the purpose of ensuring ongoing maintenance of the required erosion control measures in the manner specified in the erosion control plan.

3. The security required under subsection (A)(2)(a) of this section shall not be released by the Director until:

- a. all required measures have been installed/implemented,
- b. in the case of a failure any cleanup needed has been completed,
- c. three winters after (a) and (b) have been completed have passed without any substantial problem, and
- d. the Director has made a final inspection and approved the installation

B. Violations. Whenever the Director determines that a violation of this chapter has occurred, the Director may notify the violator in writing of the violation and require that certain

conditions be implemented or adhered to in a reasonable amount of time to correct the erosion problem. Each failure to comply with the director's notice or meet the deadlines specified therein shall constitute a separate and distinct violation, punishable as set forth in subsection (C) of this section. Moreover, the County and its agents may with the property owner's consent, with a warrant, or in an emergency enter the property and make necessary repairs or corrections, or perform needed maintenance. The property owner shall fully and completely reimburse the County for the costs associated with this remedial work.

C. Penalties. It is unlawful and a public nuisance for any person to violate any of the provisions of this chapter for any purpose or to cause any other person to do so. Such a violation shall be enforceable as a misdemeanor pursuant to Napa County Code Sections 1.20.150 and 1.20.160. Such a violation may also be abated as a public nuisance by judicial action or by administrative enforcement in accordance with the procedures set forth in Chapter 1.20, commencing with Section 1.20.010, including those pertaining to treble damages for multiple judgments. In addition administrative penalties may be imposed in the manner specified in Chapter 1.28 (Administrative Penalty) of the Napa County Code.

SECTION 6. If any section, subsection, sentence, clause, phrase or word of this chapter is for any reason held to be invalid by a court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this ordinance. The Board of Supervisors of the County of Napa hereby declares it would have passed and adopted this ordinance and each and all provisions hereof irrespective of the fact that any one or more of said provisions be declared invalid.

SECTION 7. This ordinance shall be effective thirty (30) days from and after the date of its passage.

SECTION 8. A summary of this ordinance shall be published at least once 5 days before adoption and at least once before the expiration of 15 days after its passage in the Napa Valley Register, a newspaper of general circulation published in the County of Napa, together with the names of members voting for and against the same.

The foregoing ordinance was first introduced and read at a regular meeting of the Conservation Development and Planning Commission, held on the 5th day of March, 2003, and passed at a regular meeting of the Board of Supervisors of the County of Napa, State of

California, held on the 18th day of March, 2003, by the following vote:

AYES:	SUPERVISORS	<u>DODD, DILLON, LUCE, RIPPEY and</u> <u>WAGENKNECHT</u>
NOES:	SUPERVISORS	<u>NONE</u>
ABSTAIN:	SUPERVISORS	<u>NONE</u>
ABSENT:	SUPERVISORS	<u>NONE</u>

BRAD WAGENKNECHT, CHAIRMAN
Napa County Board of Supervisors

ATTEST:

Clerk of the Board

By: _____
Deputy

Putah Creek Ag Waiver Monitoring Project

Results Summaries: Years 2005 to 2008

Putah Creek Ag Waiver Monitoring Project
 Napa County Resource Conservation District

Site Name: **Pope Creek**
 Site Code: **POP1 (PCULB)**

Sample Date	12/1/2008	1/5/2009	2/3/2009	3/2/2009	4/1/2009	5/1/2009
Sample Time	11:30	12:10	11:30	10:45	12:29	10:30
Physical Parameters:						
Flow (cfs)	0.09	0.5	1.4	1000	10.6	5.8
Air Temp (°C)	9.0	6.0	10.0	12.0	22.0	14.0
Water Temp (°C)	8.4	5.4	7.4	11.4	16.4	16.4
DO (mg/L)	9.45	12.26	11.4	10.3	10.33	8.78
DO (% saturation)	80.8	97.3	94.9	94.4	105.7	89.9
Specific Cond. (µS/cm)	665	432.5	555	131.5	431.6	555
pH	7.0	7.0	8.2	7.5	8.3	8.3
Color (CU)	32	18	not sampled			
TOC (mg/L)	8.3	3.5	2.4	6.1	4.2	3.9
TSS (mg/L)	ND	ND	ND	130	ND	ND
TDS (mg/L)	480	290	360	100	270	340
Hardness (mg/L)	not sampled	220	290	70	220	290
Turbidity (NTU)	0.31	0.14	0.13	92	0.49	1
Pathogens:						
Fecal Coliform	not sampled	not sampled	not sampled	not sampled	50	220
E. Coli (MPN/100 mL)	18	24	8.5	820	40	160
Pesticides:						
Glyphosate (µg/L)	ND	ND	ND	ND	ND	ND

WATER QUALITY LIMITS	
Low Trigger	High Trigger

-	-
-	-
-	-
5.0	-
-	-
-	700
6.5	8.5
-	-
-	-
-	-
-	450 (narrative)
-	-
-	variable

-	400
-	235

-	700
---	-----

Simazine (µg/L)	ND	ND	ND	ND	not sampled	
Metals:						
Arsenic (µg/L)	not sampled	0.7	1.2	1.5	not sampled	
Boron (µg/L)		320	420	94		
Cadmium (µg/L)		ND	ND	ND		
Copper (µg/L)		2.1	1.8	10	1.1	1.2
Lead (µg/L)		ND	ND	1.9	not sampled	
Nickel (µg/L)		3.6	3.1	54		
Molybdenum (µg/L)		0.77	1.0	ND		
Selenium (µg/L)		ND	ND	ND		
Zinc (µg/L)		ND	ND	19		
Nutrients:						
Total Kjeldahl Nitrogen (µg/L)	not sampled	0.18	0.24	0.58	ND	ND
Nitrate plus Nitrite (µg/L)		0.25	ND	0.13	0.25	ND
Total Ammonia (µg/L)		ND	ND	ND	ND	ND
Un-ionized Ammonia (µg/L)		ND	0.0028	ND	ND	ND
Total Phosphorous (µg/L)		ND	ND	0.31	ND	ND
Soluble Orthophosphate (µg/L)		ND	ND	ND	ND	ND

Result within limits

Result exceeded limits (min or max)

-	4.0
---	-----

-	10
-	700
-	variable (3.0-15 based on hardness range of 70-290)
-	variable (10-38 based on hardness range of 70-290)
-	variable (52-320 based on hardness range of 70-290)
-	variable (350-1200 based on hardness range of 70-290)
-	10
-	50
-	variable (89-300 based on hardness range of 70-290)

-	-
-	45,000 NO ₃ , 10,000 NO ₂
-	variable use worksheet
-	-
-	-
-	-

Putah Creek Ag Waiver Monitoring Project
 Napa County Resource Conservation District

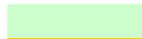
Site Name: **Capell Creek**
 Site Code: **CAPI**

Sample Date	1/13/2005	3/7/2005	5/3/2005	1/24/2006	3/9/2006	5/1/2006	1/2/2007	2/27/2007	5/1/2007	1/2/2008	3/3/2008	5/1/2008
Sample Time	12:50	13:15	10:47	13:15	13:20	12:47	12:29	13:23	12:53	13:05	13:50	13:35
Flow (cfs)	77.9	57.0	9.6	52.8	115.9	42.0	2.2	48.9	1.6	< 1	19.4	2.1
Air Temp (°C)	9.0	23.5	24.0	14.0	11.5	27.0	15.0	6.0	19.0	11.0	18.0	22.5
Water Temp (°C)	8.7	13.2	16.3	10	12.2	17.1	8.7	7.8	16	10.2	11.7	15.6
DO (mg/L)	10.55	11.86	9.38	10.22	10.31	10.52	8.9	10.9	7.48	3.49	11.1	6.53
DO (% saturation)	90.6	113.2	95.7	90.6	96.1	109.1	76.5	91.8	75.8	31.4	102.3	65.7
Specific Cond. (µS/cm)	327.7	399.3	513	385	316.1	370.4	465.5	274.7	498.1	663	387.5	493.4
pH	6.6	6.5	7	6	6.5	6.5	6.5	6	6.5	7.1	7.4	7.6
Color (CU)	20	13	6	13	25	8	7	60	8	4	10	6
TOC (mg/L)	3.2	2.8	5	6.8	4.7	9.2	1.9	4.9	1.6	1.3	2.5	1.6
TSS (mg/L)	3	ND	ND	ND	8	ND	ND	ND	ND	ND	ND	ND
TDS (mg/L)	190	230	270	220	190	260	280	180	300	410	230	290
Turbidity (NTU)	3.9	1.7	0.57	3.7	13	1.5	0.47	34	0.54	0.23	1.8	0.26
E. Coli (MPN/100 mL)	77	26	>2419.6	15	11	120	52	820	46	6.2	25	28

Site Name: **Pope Creek**

Site Code: **POP1**

Sample Date	1/13/2005	3/7/2005	5/3/2005	1/24/2006	3/9/2006	5/1/2006	1/2/2007	2/27/2007	5/1/2007	1/2/2008	3/3/2008	5/1/2008
Sample Time	12:50	11:10	12:31	11:07	11:15	10:50	10:55	11:45	11:28	11:30	11:45	12:00
Flow (cfs)	192.6	84.2	23.3	59.5	235.6	56.9	13.6	246.9	1.05	4.5	32.8	4.5
Air Temp (°C)	6.0	17.5	27.0	10.5	13.0	21.5	10.5	9.5	21.5	5.0	15.0	19.0
Water Temp (°C)	7.9	13	17.8	8.8	11	18.3	6.5	8.3	20.4	4.6	10.7	16
DO (mg/L)	10.94	12.15	9.01	10.71	10.94	11.18	11.57	12.21	7.7	12.61	11.8	9.88
DO (% saturation)	92.2	115.5	95	92.3	99.2	118.9	94.4	103.9	85.6	97.8	106.4	100.4
Specific Cond. (µS/cm)	245.1	335.9	564	354.8	267.9	484.3	355.6	183.7	514	329	350.1	667
pH	6.9	6.5	7.5	6.5	7	7.5	6.5	6	7	7.3	8	7.3
Color (CU)	25	20	8	17	20	17	20	35	12	20	13	20
TOC (mg/L)	3.8	3.3	5.5	3.6	3.5	7.7	3.3	3.8	2.1	3.5	3.1	3
TSS (mg/L)	ND	ND	ND	ND	1.5	ND	ND	ND	ND	ND	ND	5
TDS (mg/L)	160	170	310	290	150	280	240	120	330	220	220	420
Turbidity (NTU)	3.7	1.6	0.54	2.1	6.1	2	0.7	9.2	1.3	0.4	0.9	0.68
E. Coli (MPN/100 mL)	31	47	2400	15	56	120	50	39	30	96	44	44

 within limits
 min or max exceedance

Water Quality Objectives

PARAMETER	MIN	MAX	UNITS
DO	5		mg/L
pH	6.5	8.5	units
E. Coli		235	MPN/100ml
TDS		500	mg/L
Conductivity		900	µS/cm

null value = 0.001

Source: Table 15. Adopted Basin Plan and California Toxics Rule Objectives for Analytes Monitored for the 2006 Storm Season

Pesticide Use in the Putah Creek Drainage

The vast majority of pesticides applied to lands in the Napa County Putah Creek drainage are applied to wine grapes. The following table summarizes pesticide use data compiled by the Napa County Agricultural Commissioner's office in the area. A total of 34 growers in the Putah Creek drainage (30 wine grape, 1 pasture, and 3 oat hay) reported pesticide use in calendar year 2008.

Irrigated Agriculture , Year 2008 *: (Source: Napa County Agricultural Commissioner)

CHEMICAL	PESTICIDE TYPE	AMOUNT
2,4-D	Herbicide	43.75 GAL
Acetochlor	Herbicide	1.25 GAL
Adjuvant	Adjuvant	178 LB
Adjuvant	Adjuvant	630.1625875 GAL
Azoxystrobin	Fungicide	37.130625 GAL
Bacillus pumilis	Insecticide	1153.5625 GAL
Bacillus subtilis	Insecticide	3642.06 LB
Bacillus thuringiensis	Insecticide	4.2 LB
Bifenzamate	Insecticide	145.19 LB
Buprofezin	Insecticide	105.5 GAL
Carfentrazone-ethyl	Herbicide	0.42453125 GAL
Copper Hydroxide	Fungicide	30.62 LB
Copper Hydroxide	Fungicide	113.0540625 GAL
Cuprous Oxide	Fungicide	1060.3 LB
Cyprodinil	Fungicide	34.87 LB
Cyprodinil	Fungicide	2.4375 GAL
Dinotefuran	Insecticide	1.13 LB
Dinotefuran	Insecticide	1.696796875 GAL
Diphacinone	Rodenticide	98.5 LB
Diuron	Herbicide	189.56 LB
Diuron	Herbicide	1.953125 GAL
Etoxazole	Miticide	0.016640625 GAL
Fenarimol	Fungicide	5.25 GAL
Fenhexamid	Fungicide	58 LB
Flumioxazin	Herbicide	13.05 LB
Flumioxazin	Herbicide	56.4903125 GAL
Glufosinate ammonium	Herbicide	5.955 GAL
Glyphosate	Herbicide	1086.0858375 GAL
Imidacloprid	Insecticide	20.2020125 LB
Imidacloprid	Insecticide	17.423046875 GAL
Kaolin	Barrier	714.2 LB
Kresoxim methyl	Fungicide	13.75 LB
Lime Sulphur	Fungicide	635.78 GAL
Myclobutanil	Fungicide	202.030625 LB
Myrothecium verucarria	Nematicide	182.6 LB
Oryzalin	Herbicide	107.2875 GAL
Oxyfluorfen	Herbicide	210.94515625 GAL
Potassium Bicarbonate	Fungicide	165.59 LB
Pyraclostrobin	Fungicide	725.858125 LB

Pyrethrins	Insecticide	345.4975 GAL
Pyridaben	Insecticide	3.5 LB
Pyrimethanil	Fungicide	3 GAL
Quinoxifen	Fungicide	34.90845625 GAL
Simazine	Herbicide	40.5 GAL
Spinosad	Insecticide	199.26 GAL
Strychnine	Rodenticide	3 LB
Sulphur	Fungicide	102839.17191875 LB
Sulphur	Fungicide	3.34 GAL
Tebuconazole	Fungicide	309.6125 LB
Thiophanate-Methyl	Fungicide	25.5 LB
Trifloxystrobin	Fungicide	129.615625 LB
Triflumizole	Fungicide	10.7 LB
Triflumizole	Fungicide	28.676875 GAL
White Oil	Fungicide	1762.1075 GAL
CHEMICAL	PESTICIDE TYPE	AMOUNT
2,4-D	Herbicide	43.75 GAL

* Data reflects amount of manufactured product used, not active ingredient. Most manufactured products include inert ingredients, some at a very high percentage of the total product.

In pounds of active ingredient, elemental sulfur is by far the greatest pesticide usage in the Putah Creek watershed, distantly followed by glyphosate herbicide. Research results from an evaluation of pesticide use data from Napa County by UC Davis (Napa County Agricultural Commissioner personal communication with Minghua Zhang [mhzhang@ucdavis.edu] and Jennifer Campos [jycampos@ucdavis.edu]; 530-754-9292) indicate a significant decline in FQPA I & II pesticide use in Napa County between 1993 and 2001 and substantiate that a high number of growers only use sulfur and glyphosate in their vineyards.

It is important to note that insecticide applications are not typically applied in the winter rainy season, when storm runoff from the land would be generated.

County Of Napa- Water Quality Sample Summary- Total Coliform- Markeley Cove, Lake Berryessa

Name of System: Markley Cove- Lake Berryessa SN 2800585 Source Type Lake/Reservoir

	Sample Day	Sample Date (per LT2 Plan)	Sample Day	Sample Date (Actual)	Date Flag	E-coli Result (MPN/100 ml)	Detection Limit (if result "0"/ND)	Comments (please note reason for missing result/sample if available)
1	Wednesday	10/08/08	Monday	10/06/08		0		Total coliform = 248.1
2	Wednesday	10/22/08	Monday	10/20/08		1		Total coliform = 387.3
3	Wednesday	11/05/08	Monday	11/03/08		3.1		Tot coliform = 1203.3
4	Wednesday	11/19/08	Monday	11/17/08		0	1	Tot coliform = 153.9
5	Wednesday	12/03/08	Monday	12/01/08		1		Total coliform = >2419.2
6	Wednesday	12/17/08	Monday	12/15/08		2		Total coliform = 1299.7
7	Wednesday	12/31/08	Monday	12/29/08		0		Total coliform = >2419.2
8	Wednesday	01/14/09	Monday	01/12/09		0	1	1299.7
9	Wednesday	01/28/09	Monday	01/26/09		0	1	396.8
10	Wednesday	02/11/09	Monday	02/09/09		0	1	135.4
11	Wednesday	02/25/09	Monday	02/23/09		9.7		648.8
12	Wednesday	03/11/09	Monday	03/09/09		0	1	613.1
13	Wednesday	03/25/09	Monday	03/23/09		0	1	>2419.2
14	Wednesday	04/08/09	Monday	04/06/09		0	1	47.2
15	Wednesday	04/22/09	Monday	04/20/09		0	1	6.3
16	Wednesday	05/06/09	Monday	05/04/09		0	1	40.4
17	Wednesday	05/20/09	Monday	05/18/09		3.1	1	77.6
18	Wednesday	06/03/09	Monday	06/01/09		0	1	135.4
19	Wednesday	06/17/09	Monday	06/15/09		0	1	total coliform: 387.3
20	Wednesday	07/01/09	Monday	06/29/09		0	1	268.2
21	Wednesday	07/15/09	Monday	07/13/09		0	1	214.3
22	Wednesday	07/29/09	Monday	07/27/09		1	1	165.8
23	Wednesday	08/12/09	Monday	08/10/09		0	1	435.2
24	Wednesday	08/26/09	Monday	08/24/09		0	1	206.3
25	Wednesday	09/09/09	Tuesday	09/08/09		0	1	2419.2
26	Wednesday	09/23/09	Monday	09/21/09		0	1	131.3

Appendix B

Central Valley Regional Water Quality Control Board approval of Pilot Plan, April 2010



Linda S. Adams
Secretary for
Environmental
Protection

California Regional Water Quality Control Board Central Valley Region

Katherine Hart, Chair



Arnold
Schwarzenegger
Governor

11020 Sun Center Drive #200, Rancho Cordova, California 95670-6114
Phone (916) 464-3291 • FAX (916) 464-4645
<http://www.waterboards.ca.gov/centralvalley>

22 April 2010

Mr. Bruce Houdesheldt, Director of
Regulatory Affairs, NCWA
Sacramento Valley Water Quality Coalition
455 Capitol Mall, Suite 335
Sacramento, CA 95814

Ms. Sandy Elles, Executive Director, Napa
County Putah Creek Watershed Group
Napa County Farm Bureau
811 Jefferson Street
Napa, CA 94559

NAPA COUNTY PUTAH CREEK SUBWATERSHED GROUP PILOT WATERSHED MANAGEMENT PRACTICES PLAN

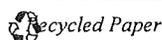
Thank you for submittal of the Napa County Putah Creek Watershed Group's (NCPCWG) *Pilot Watershed Management Practices Plan* (Pilot Plan) proposal on 22 February 2010. The Pilot Plan proposal was submitted jointly by the Sacramento Valley Water Quality Coalition (Coalition) and the NCPCWG Subwatershed.

Per the Coalition's Monitoring and Report Program Order No. R5-2009-0875 (MRP Order), the Coalition has the option of demonstrating that management practices have been implemented in lieu of conducting water quality monitoring for up to three subwatersheds. To receive full approval for this alternative approach, the Coalition must submit a management practices plan for the subwatershed *and* demonstrate that 75% of their member growers are implementing practices identified in that plan. This letter serves as approval of the Pilot Plan submitted by the Coalition and NCPCWG. Reduced monitoring requirements will apply once the necessary documentation of member grower implementation of management practices has been provided.

As stated in the MRP Order, Special Project monitoring activities must continue, where applicable. At the end of the first full year of the Pilot Plan, the Coalition must submit evidence that management practice implementation has been attained by 95% of member growers enrolled in the ILRP within the NCPCWG.

I am extending the deadline for submitting the documentation of management practices implementation from 1 May to 15 June 2010. This extension will allow NCPCWG the time needed to distribute and receive surveys back from its members. In addition, time will be needed for the Subwatershed Group to respond to questions from members and to follow-up on any questionnaires that were not fully completed by its members.

California Environmental Protection Agency



I would like to thank the Coalition and NCPCWG representatives for the extra efforts they have made for their members and this Program. If there are any questions regarding this letter, please contact Susan Fregien at 916-464-4813 or by email at sfregien@waterboards.ca.gov.

A handwritten signature in black ink that reads "Pamela C. Creedon". The signature is written in a cursive style with a large initial "P".

Pamela C. Creedon
Executive Officer

Appendix C

Napa County Agricultural Commissioner's Office Pesticide Use Reports, 2013-2015

Napa County Putah Creek Watershed Agricultural Pesticide Use 2013

Active Ingredient (AI)	Pounds AI	Treated Acres
TOTAL POUNDS ACTIVE INGREDIENT APPLIED IN YEAR 2013	133,487.57	-
SULFUR	73,486.32	11,729.58
INERT INGREDIENTS	36,653.24	39,515.01
MINERAL OIL	5,866.87	1,246.16
GLYPHOSATE, POTASSIUM SALT	4,925.77	3,529.80
PETROLEUM DISTILLATES, REFINED	2,568.45	538.50
POTASSIUM BICARBONATE	1,791.65	639.03
LIME-SULFUR	1,269.56	58.49
GLYPHOSATE, ISOPROPYLAMINE SALT	1,097.87	964.05
MYROTHECIUM VERRUCARIA, DRIED FERMENTATION SOLIDS & SOLUBLES, STRAIN AARC-0255	1,077.57	119.73
OXYFLUORFEN	420.32	1,208.91
COPPER OXIDE (OUS)	288.37	241.88
QST 713 STRAIN OF DRIED BACILLUS SUBTILIS	263.20	642.92
BOSCALID	248.98	1,164.93
CYPRODINIL	233.88	1,039.53
MYCLOBUTANIL	229.66	2,319.25
THIOPHANATE-METHYL	220.02	342.87
COPPER OXYCHLORIDE	213.81	787.13
FLUMIOXAZIN	210.40	1,233.87
COPPER HYDROXIDE	194.10	787.13
BIFENAZATE	183.36	402.67
ORYZALIN	177.96	53.25
PENDIMETHALIN	171.60	98.18
TRIFLUMIZOLE	160.49	804.84
SIMAZINE	148.99	89.50
QUINOXYFEN	145.90	1,722.86
IMIDACLOPRID	137.33	735.07
BACILLUS PUMILUS, STRAIN QST 2808	128.83	1,219.29
PYRACLOSTROBIN	126.47	1,164.93
REYNOUTRIA SACHALINENSIS	117.79	640.22
POTASSIUM SILICATE	85.24	59.79
FENHEXAMID	75.13	155.81
HYDROGEN PEROXIDE	70.31	39.15
DIFENOCONAZOLE	69.76	901.66
TETRACONAZOLE	62.10	1,616.50
TRIFLOXYSTROBIN	57.88	679.83
CHROMOBACTERIUM SUBTUSGAE STRAIN PRAA4-1	39.49	83.04
METRAFENONE	37.35	166.95
KRESOXIM-METHYL	31.48	221.98
PYRIMETHANIL	31.02	103.84
METHOXYFENOZIDE	29.66	113.00
ACETAMIPRID	23.23	665.84
BACILLUS THURINGIENSIS, SUBSP. KURSTAKI, STRAIN ABTS-351, FERMENTATION SOLIDS AND SOLUBLES	22.95	87.00
DINOTEFURAN	22.91	393.88
AZOXYSTROBIN	15.99	88.37
ISOXABEN	8.44	10.00
INDAZIFLAM	5.98	137.63
RIMSULFURON	4.78	91.50
POLYOXIN D, ZINC SALT	4.05	93.04
CARFENTRAZONE-ETHYL	3.73	218.29
PETROLEUM HYDROCARBONS	3.58	17.00
CAPSIUM OLEORESIN	3.30	303.46
CLOPYRALID, MONOETHANOLAMINE SALT	3.28	10.00
ABAMECTIN	3.16	190.98
CHLORANTRANILIPROLE	2.63	30.00
PYRETHRINS	2.04	85.34
ETOXAZOLE	1.98	18.94
SULFUR DIOXIDE	1.98	20.00
CHLORSULFURON	1.22	10.00
TEBUCONAZOLE	1.13	12.39
MESOSULFURON-METHYL	0.96	72.00
FENPYROXIMATE	0.71	34.00
THIAMETHOXAM	0.69	18.76
SODIUM HYPOCHLORITE	0.25	2.00
FENPROPATHRIN	0.25	12.39
ALUMINUM PHOSPHIDE	0.09	18.56
PYRAFLUFEN-ETHYL	0.08	29.00
SPINOSAD	0.01	32.00
DIPHACINONE	0.00	0.24

Napa County Putah Creek Watershed Agricultural Pesticide Use 2014

Active Ingredient (AI)	Pounds AI	Treated Acres
TOTAL POUNDS ACTIVE INGREDIENT APPLIED IN YEAR 2014	141,487.40	-
SULFUR	85,779.20	14468.79
INERT INGREDIENTS	32,778.52	44756.60
MINERAL OIL	7,100.38	1391.25
GLYPHOSATE	4,959.71	3692.51
PETROLEUM DISTILLATES, REFINED	3,232.70	569.63
MYROTHECIUM VERRUCARIA, DRIED FERMENTATION SOLIDS & SOLUBLES, STRAIN AARC-0255	1,245.24	97.96
POTASSIUM BICARBONATE	1,043.72	398.69
LIME-SULFUR	523.70	29.01
BOSCALID	372.47	1887.87
COPPER OXYCHLORIDE	369.27	1068.82
COPPER HYDROXIDE	335.98	1068.82
COPPER OXIDE (OUS)	321.25	424.77
KAOLIN	270.75	11.35
PENDIMETHALIN	229.50	81.95
OXYFLUORFEN	218.14	645.99
IMIDACLOPRID	197.31	1097.92
PYRACLOSTROBIN	189.19	1887.87
QST 713 STRAIN OF DRIED BACILLUS SUBTILIS	185.86	677.88
HYDROGEN PEROXIDE	183.28	93.86
FLUMIOXAZIN	172.66	1532.31
QUINOXYFEN	163.69	1750.88
CHROMOBACTERIUM SUBSUGAE STRAIN PRAA4-1	153.00	163.13
THIOPHANATE-METHYL	128.98	627.33
AZOXYSTROBIN	114.38	578.63
REYNOUTRIA SACHALINENSIS	102.24	752.45
BACILLUS PUMILUS, STRAIN QST 2808	99.34	899.49
TETRACONAZOLE	98.73	2589.07
METRAFENONE	97.59	412.28
METHOXYFENOZIDE	94.32	421.00
MYCLOBUTANIL	92.91	1264.26
SIMAZINE	80.57	72.00
TRIFLOXYSTROBIN	71.30	912.93
TRIFLUMIZOLE	69.86	345.97
ORYZALIN	60.80	19.00
FENHEXAMID	44.82	89.17
CYPRODINIL	38.33	420.75
BIFENAZATE	36.83	76.48
COPPER ETHANOLAMINE COMPLEXES, MIXED	24.53	35.00
SPIROTETRAMAT	19.45	152.14
GLUFOSINATE-AMMONIUM	17.57	128.98
ACETAMIPRID	16.52	2252.91
FLUOPYRAM	15.23	177.71
TEBUCONAZOLE	15.23	177.71
KRESOXIM-METHYL	14.66	99.32
DINOTEFURAN	10.83	391.13
PYRETHRINS	9.40	322.04
QUILLAJA	9.27	189.22
DIFENOCONAZOLE	8.29	387.82
POLYOXIN D, ZINC SALT	7.46	172.14
RIMSULFURON	6.93	179.82
SPIRODICLOFEN	6.43	13.86
PYRIMETHANIL	5.93	15.84
BACILLUS THURINGIENSIS, SUBSP. KURSTAKI, STRAIN ABTS-351, FERMENTATION SOLIDS AND SOLUBLES	5.40	6.00
INDAZIFLAM	5.38	183.64
DIQUAT DIBROMIDE	4.95	5.30
ETOXAZOLE	4.60	35.17
THIAMETHOXAM	4.41	63.98
ABAMECTIN	3.49	240.00
CHLORANTRANILIPROLE	3.33	38.00
CAPSIUM OLEORESIN	2.23	61.95
DIURON	2.00	6.00
CYFLUFENAMID	1.91	86.96
PETROLEUM HYDROCARBONS	1.89	10.30
CARFENTHAZONE-ETHYL	0.98	80.02
FENPROPATHRIN	0.59	20.00
CHLOROTHALONIL	0.56	0.50
FENPYROXIMATE	0.55	5.23
(E,Z)-7,9-DODECADIEN-1-YL ACETATE	0.38	38.00
SPINOSAD	0.17	126.39
SPINETORAM	0.14	3.00
TRIADIMEFON	0.09	0.50
PYRAFLUFEN-ETHYL	0.07	53.16
TRITICONAZOLE	0.01	0.05

Napa County Putah Creek Watershed Agricultural Pesticide Use 2015

Active Ingredient (AI)	Pounds AI	Treated Acres
TOTAL POUNDS ACTIVE INGREDIENT APPLIED IN YEAR 2015	134,779.93	-
SULFUR	75,219.00	13,004.56
INERT INGREDIENTS	36,134.78	42,408.73
MINERAL OIL	6,113.14	1,543.11
GLYPHOSATE, POTASSIUM SALT	3,946.05	3,164.72
PETROLEUM DISTILLATES, REFINED	3,498.91	882.97
GLYPHOSATE, ISOPROPYLAMINE SALT	2,204.41	1,215.88
LIME-SULFUR	1,925.03	134.64
PENDIMETHALIN	479.73	378.83
COPPER ETHANOLAMINE COMPLEXES, MIXED	448.53	103.80
OXYFLUORFEN	388.73	1,100.34
ORYZALIN	309.31	176.75
POTASSIUM BICARBONATE	302.42	107.03
COPPER OXIDE (OUS)	293.76	342.42
GLUFOSINATE-AMMONIUM	249.96	376.12
FLUMIOXAZIN	232.46	1,535.97
KAOLIN	228.00	9.56
BOSCALID	207.13	812.90
MYCLOBUTANIL	172.70	2,165.71
IMIDACLOPRID	153.27	1,357.39
TRIFLUMIZOLE	150.45	826.25
REYNOUTRIA SACHALINENSIS	145.84	917.78
MYROTHECIUM VERRUCARIA, DRIED FERMENTATION SOLIDS & SOLUBLES, STRAIN AARC-0255	136.31	11.69
QST 713 STRAIN OF DRIED BACILLUS SUBTILIS	135.92	681.26
THIOPHANATE-METHYL	133.34	664.25
TRIFLOXYSTROBIN	126.90	1,677.58
DIFENOCONAZOLE	117.36	1,031.87
AZOXYSTROBIN	111.02	507.79
PYRACLOSTROBIN	105.21	812.90
CYPRODINIL	84.12	340.50
QUINOXYFEN	81.35	860.62
FLUOPYRAM	79.91	714.79
TETRACONAZOLE	75.45	1,896.42
CAPRYLIC ACID	68.82	60.22
TEBUCONAZOLE	67.56	646.96
METRAFENONE	61.43	220.64
BIFENAZATE	57.19	111.88
HYDROGEN PEROXIDE	55.84	22.66
PYRIMETHANIL	49.77	119.44
BACILLUS PUMILUS, STRAIN QST 2808	47.36	444.52
CAPRIC ACID	46.86	60.22
COPPER HYDROXIDE	44.04	142.54
ISOXABEN	36.85	141.42
FENHEXAMID	36.75	81.23
COPPER OXYCHLORIDE	36.50	116.16
PYRETHRINS	22.80	792.98
KRESOXIM-METHYL	22.17	163.05
METHOXYFENOZIDE	20.47	84.10
DIFENOCONAZOLE	16.06	235.18
SULFUR	12.59	5.23
SPIROTETRAMAT	11.31	90.13
INDAZIFLAM	11.16	219.37
DINOTEFURAN	7.67	162.56
SETHOXYDIM	7.15	120.33
ETOXAZOLE	6.95	47.04
ACETAMIPRID	6.82	180.04
THIAMETHOXAM	5.34	63.88
CLOTHIANIDIN	4.28	41.29
DIQUAT DIBROMIDE	3.90	8.56
FLUDIOXONIL	3.73	18.09
CHLORANTRANILIPROLE	3.26	38.00
POLYOXIN D, ZINC SALT	2.62	60.70
SODIUM CYANIDE	2.39	13.00
CAPSIUM OLEORESIN	2.12	215.76
FENPYROXIMATE	1.89	17.86
CARFENTRAZONE-ETHYL	1.39	27.77
SODIUM HYPOCHLORITE	0.98	16.00
MYCLOBUTANIL	0.98	13.00
ABAMECTIN	0.94	59.52
FLUBENDIAMIDE	0.50	12.39
3,7-DIMETHYL-6-OCTEN-1-OL	0.30	18.08
GERANIOL	0.30	18.08
BACILLUS THURINGIENSIS, SUBSP. KURSTAKI, STRAIN HD-1	0.21	1.00
PYRAFLUFEN-ETHYL	0.18	92.87
SPINOSAD	0.01	34.00
SILVER NITRATE	0.00	3.00

Appendix D

Napa County Putah Creek Watershed Group Water Quality Testing Results, 2005-2015

Napa County Putah Creek Watershed Group Subwatershed Monitoring Data: January 2005 - May 2015

PARAMETERS	Unit	Pope Creek		Capell Creek		Total # Analyses	Total # Exceedances	Minimum Result	Maximum Result
		Dry	Wet	Dry	Wet				
GENERAL⁽¹⁾									
Electrical Conductivity	µS/cm	14	23	3	6	46		131.2	667
Dissolved Oxygen	mg/L	14	23	3	6	46	1	6.53	16.2
Hardness as CaCO3	mg/L	4	2			6		70	290
pH	-log[H+]	14	26	3	6	49	4	6	8.61
Total Dissolved Solids	mg/L	7	9	3	6	25	1	100	480
Total Organic Carbon	mg/L	9	16	3	6	34		1.6	9.2
Total Suspended Solids	mg/L	9	17	3	6	35		<3	130
Turbidity	NTU	9	17	3	6	35		0.08	92

PATHOGENS

E. coli	MPN/100mL	9	17	3	6	35	7	<1	>2400
Fecal Coliforms	MPN/100mL	2				2		50	220
Total Coliforms	MPN/100mL	2	1			3		>2400	>2419.6

PESTICIDES

Alachlor	µg/L		2			2		<0.04	<0.04
Atrazine	µg/L		2			2		<0.06	<0.06
Bromacil	µg/L		2			2		<0.05	<0.05
Butachlor	µg/L		2			2		<0.05	<0.05
Diazinon	µg/L		2			2		<0.05	<0.05
Dimethoate	µg/L		2			2		<0.06	<0.06
Metolachlor	µg/L		2			2		<0.05	<0.05
Metribuzin	µg/L		2			2		<0.05	<0.05
Molinate	µg/L		2			2		<0.04	<0.04
Oxyfluorfen	µg/L		4			4		<0.008	<0.008
Prometryn	µg/L		2			2		<0.05	<0.05
Propachlor	µg/L		2			2		<0.04	<0.04
Simazine	µg/L		3			3		<0.04	<0.047
Thiobencarb	µg/L		2			2		<0.04	<0.04
Trifluralin	µg/L		2			2		<0.03	<0.03

METALS

Arsenic - Total	µg/L		3			3		0.7	1.5
Boron - Total	µg/L		3			3		94	420
Cadmium - Dissolved	µg/L		2			2		<0.06	<0.06
Cadmium - Total	µg/L		3			3		<0.011	<0.06
Copper - Dissolved	µg/L	2	2			4		1.6	1.7
Copper - Total	µg/L	4	3			7		1.1	10
Lead - Dissolved	µg/L		2			2		<0.1	<0.1
Lead - Total	µg/L		3			3		<0.1	1.9
Molybdenum - Total	µg/L		3			3		<0.016	1
Nickel - Dissolved	µg/L		2			2		2.9	3.6
Nickel - Total	µg/L		3			3		3.1	54
Selenium - Total	µg/L		3			3		<0.11	<0.11
Zinc - Dissolved	µg/L		2			2		<0.2	<0.2
Zinc - Total	µg/L		3			3		<0.2	19

NUTRIENTS

Ammonia, Total as N	mg/L	4	6			10		<0.006	0.099
Nitrate+Nitrite, as N	mg/L	4	6			10		<0.02	0.25
Orthophosphate, as P - Dissolved	mg/L	2	5			7		<0.006	0.24
Phosphorus as P, Total	mg/L	4	3			7		<0.01	0.31
Total Kjeldahl Nitrogen	mg/L	2	3			5		<0.07	0.58

Notes:

1. Counts of general analyses for Pope Creek also include follow-up monitoring.

Putah Creek Ag Waiver Monitoring Project
Napa County Resource Conservation District

Site Name: **Capell Creek**
 Site Desc: **Capell Valley Road Bridge 38.483429° , -122.241066°**
 Site Code: **CAP1**

Sample Date	1/13/2005	3/7/2005	5/3/2005	1/24/2006	3/9/2006	5/1/2006	1/2/2007	2/27/2007	5/1/2007	1/2/2008	3/3/2008	5/1/2008
Sample Time	12:50	13:15	10:47	13:15	13:20	12:47	12:29	13:23	12:53	13:05	13:50	13:35
Flow (cfs)	77.9	57.0	9.6	52.8	115.9	42.0	2.2	48.9	1.6	< 1	19.4	2.1
Air Temp (°C)	9.0	23.5	24.0	14.0	11.5	27.0	15.0	6.0	19.0	11.0	18.0	22.5
Water Temp (°C)	8.7	13.2	16.3	10	12.2	17.1	8.7	7.8	16	10.2	11.7	15.6
DO (mg/L)	10.55	11.86	9.38	10.22	10.31	10.52	8.9	10.9	7.48	3.49	11.1	6.53
DO (% saturation)	90.6	113.2	95.7	90.6	96.1	109.1	76.5	91.8	75.8	31.4	102.3	65.7
Specific Cond. (µS/cm)	327.7	399.3	513	385	316.1	370.4	465.5	274.7	498.1	663	387.5	493.4
pH	6.6	6.5	7	6	6.5	6.5	6.5	6	6.5	7.1	7.4	7.6
Color (CU)	20	13	6	13	25	8	7	60	8	4	10	6
TOC (mg/L)	3.2	2.8	5	6.8	4.7	9.2	1.9	4.9	1.6	1.3	2.5	1.6
TSS (mg/L)	3	ND	ND	ND	8	ND	ND	ND	ND	ND	ND	ND
TDS (mg/L)	190	230	270	220	190	260	280	180	300	410	230	290
Turbidity (NTU)	3.9	1.7	0.57	3.7	13	1.5	0.47	34	0.54	0.23	1.8	0.26
E. Coli (MPN/100 mL)	77	26	>2419.6	15	11	120	52	820	46	6.2	25	28

Site Name: **Pope Creek**
 Site Desc: **Pope Valley Road Bridge 38.646398° , -122.241066°**
 Site Code: **POP1**

Sample Date	1/13/2005	3/7/2005	5/3/2005	1/24/2006	3/9/2006	5/1/2006	1/2/2007	2/27/2007	5/1/2007	1/2/2008	3/3/2008	5/1/2008
Sample Time	12:50	11:10	12:31	11:07	11:15	10:50	10:55	11:45	11:28	11:30	11:45	12:00
Flow (cfs)	192.6	84.2	23.3	59.5	235.6	56.9	13.6	246.9	1.05	4.5	32.8	4.5
Air Temp (°C)	6.0	17.5	27.0	10.5	13.0	21.5	10.5	9.5	21.5	5.0	15.0	19.0
Water Temp (°C)	7.9	13	17.8	8.8	11	18.3	6.5	8.3	20.4	4.6	10.7	16
DO (mg/L)	10.94	12.15	9.01	10.71	10.94	11.18	11.57	12.21	7.7	12.61	11.8	9.88
DO (% saturation)	92.2	115.5	95	92.3	99.2	118.9	94.4	103.9	85.6	97.8	106.4	100.4
Specific Cond. (µS/cm)	245.1	335.9	564	354.8	267.9	484.3	355.6	183.7	514	329	350.1	667
pH	6.9	6.5	7.5	6.5	7	7.5	6.5	6	7	7.3	8	7.3
Color (CU)	25	20	8	17	20	17	20	35	12	20	13	20
TOC (mg/L)	3.8	3.3	5.5	3.6	3.5	7.7	3.3	3.8	2.1	3.5	3.1	3
TSS (mg/L)	ND	ND	ND	ND	1.5	ND	ND	ND	ND	ND	ND	5
TDS (mg/L)	160	170	310	290	150	280	240	120	330	220	220	420
Turbidity (NTU)	3.7	1.6	0.54	2.1	6.1	2	0.7	9.2	1.3	0.4	0.9	0.68
E. Coli (MPN/100 mL)	31	47	2400	15	56	120	50	39	30	96	44	44

within limits
 min or max exceedance

Water Quality Objectives

PARAMETER	MIN	MAX	UNITS
DO	5		mg/L
pH	6.5	8.5	units
E. Coli		235	MPN/100ml
TDS		500	mg/L
Conductivity		900	µS/cm

null value = 0.001

Putah Creek Ag Waiver Monitoring Project
 Napa County Resource Conservation District

Site Name: **Pope Creek**
 Site Desc: **Pope Valley Road Bridge 38.646398°, -122.364596°**
 Site Code: **POP1 (PCULB)**

Sample Date	12/1/2008	1/5/2009	2/3/2009	3/2/2009	4/1/2009	5/1/2009
Sample Time	11:30	12:10	11:30	10:45	12:29	10:30
Physical Parameters:						
Flow (cfs)	0.09	0.5	1.4	1000	10.6	5.8
Air Temp (°C)	9.0	6.0	10.0	12.0	22.0	14.0
Water Temp (°C)	8.4	5.4	7.4	11.4	16.4	16.4
DO (mg/L)	9.45	12.26	11.4	10.3	10.33	8.78
DO (% saturation)	80.8	97.3	94.9	94.4	105.7	89.9
Specific Cond. (µS/cm)	665	432.5	555	131.5	431.6	555
pH	7.0	7.0	8.2	7.5	8.3	8.3
Color (CU)	32	18	not sampled			
TOC (mg/L)	8.3	3.5	2.4	6.1	4.2	3.9
TSS (mg/L)	ND	ND	ND	130	ND	ND
TDS (mg/L)	480	290	360	100	270	340
Hardness (mg/L)	not sampled	220	290	70	220	290
Turbidity (NTU)	0.31	0.14	0.13	92	0.49	1
Pathogens:						
Fecal Coliform	not sampled	not sampled	not sampled	not sampled	50	220
E. Coli (MPN/100 mL)	18	24	8.5	820	40	160
Pesticides:						
Glyphosate (µg/L)	ND	ND	ND	ND	ND	ND
Simazine (µg/L)	ND	ND	ND	ND	not sampled	
Metals:						
Arsenic (µg/L)	not sampled	0.7	1.2	1.5	not sampled	
Boron (µg/L)		320	420	94		
Cadmium (µg/L)		ND	ND	ND		
Copper (µg/L)		2.1	1.8	10	1.1	1.2
Lead (µg/L)		ND	ND	1.9	not sampled	
Nickel (µg/L)		3.6	3.1	54		
Molybdenum (µg/L)		0.77	1.0	ND		
Selenium (µg/L)		ND	ND	ND		
Zinc (µg/L)		ND	ND	19		
Nutrients:						
Total Kjeldahl Nitrogen (µg/L)	not sampled	0.18	0.24	0.58	ND	ND
Nitrate plus Nitrite (µg/L)		0.25	ND	0.13	0.25	ND
Total Ammonia (µg/L)		ND	ND	ND	ND	ND
Un-ionized Ammonia (µg/L)		ND	0.0028	ND	ND	ND
Total Phosphorous (µg/L)		ND	ND	0.31	ND	ND
Soluble Orthophosphate (µg/L)		ND	ND	ND	ND	ND

WATER QUALITY LIMITS	
Low Trigger	High Trigger

-	-
-	-
-	-
5.0	-
-	-
-	700
6.5	8.5
-	-
-	-
-	-
-	450 (narrative)
-	-
-	variable

-	400
-	235

-	700
-	4.0

-	10
-	700

-	variable (3.0-15 based on hardness range of 70-290)
-	variable (10-38 based on hardness range of 70-290)
-	variable (52-320 based on hardness range of 70-290)
-	variable (350-1200 based on hardness range of 70-290)
-	10
-	50
-	variable (89-300 based on hardness range of 70-290)

-	-
-	45,000 NO ₃ , 10,000 NO ₂
-	variable use worksheet
-	-
-	-
-	-

Result within limits
Result exceeded limits (min or max)

Putah Creek Ag Waiver Monitoring Project
 Napa County Resource Conservation District



Site Name: **Pope Creek**

Site Desc: **Pope Valley Road Bridge 38.646398°, -122.241066°**

Site Code: **POP1**

Sample Date	12/1/2009	1/4/2009	2/1/2010	3/1/2010	4/1/2010	5/3/2010
Sample Time	10:20	11:00	11:30	11:00	11:30	12:00
Flow (cfs)	1.5	12.5	37.1	121	86.3	23.0
Air Temp (°C)	7.5	5.5	10.5	13.0	10.0	24.0
Water Temp (°C)	6.9	7.1	10.3	11.8	11.5	18.9
DO (mg/L)	14.06	13.35	11.69	12.37	11.60	11.87
DO (% saturation)	115.6	110.4	104.3	114.3	106.6	128.2
Specific Cond. (µS/cm)	566	240.8	326.5	271.8	253.3	447.9
pH	8.61	8.12	8.13	8.55	8.23	8.41
TOC (mg/L)	2.5	4.2	2.7	3.2	3.7	1.9
TSS (mg/L)	ND	ND	ND	ND	ND	ND
Turbidity (NTU)	0.08	0.42	1.8	3.6	3.4	0.80
E. Coli (MPN/100 mL)	23	35	110	47	130	ND

WATER QUALITY LIMITS	
Low Trigger	High Trigger
-	-
-	-
-	-
7.0	-
-	-
-	700
6.5	8.5
-	-
-	-
-	variable
-	235

Putah Creek Watershed Group
Sacramento Valley Water Quality Coalition



Site Name: Pope Creek upstream of Lake Berryessa

Site Desc: Pope Canyon Road Bridge

Site Code: PCULB

Lat/Long: 38.64637°, -122.36424°

FIELD OBSERVATIONS AND MEASUREMENTS

Sample Date	12/2/2014	1/20/2015	2/9/2015	3/18/2015	4/21/2015	5/20/2015	WQO
Sample Time	10:31	10:34	10:20	11:25	10:45	12:15	
Crew	J.Koehler, P. Blank	J.Koehler, P. Blank	J.Koehler, P. Blank	P. Blank	P. Blank	P. Blank	
Sampling Event	106	107	108	109	110	111	
Dominant substrate	gravel	gravel	not seen	gravel	gravel	gravel	
Site odor	none	none	none	none	none	none	
Other presences	none	none	none	none	none	none	
Water odor	none	none	none	none	none	none	
Water clarity	clear	clear	cloudy	clear	clear	clear	
Water color	brown	clear	brown	clear	clear	clear	
Sky code	overcast	clear	p. cloudy	clear	p. cloudy	clear	
Precipitation	rain	none	none	none	none	none	
Precipitation (last 24hrs)	unknown	none	> 1"	none	none	none	
Flow (cfs)	12.6	9.12	not measured	7.37	2.54	0.812	
Water Temp (°C)	12.5	9.4	12.8	14.0	18.9	21.4	
Turbidity (NTU)	1.10	0.17	28.60	0.86	0.89	0.40	
DO (mg/L)	9.54	10.4	10.02	10.43	8.09	8.76	≥ 7
DO (% saturation)	89.7	90.9	94.7	101.2	87.2	99.1	
Conductivity (µS/cm)	175.4	353.7	131.2	436.6	568.0	657.0	≤ 700
pH	6.97	8.11	7.98	8.16	8.11	8.48	6.5 - 8.5

LAB ANALYSES

TOC (mg/L) ¹	8.2	2.4	5.5	2.1	2.5	2.3	
TSS (mg/L) ¹	ND	ND	31	6	ND	ND	
Total Ammonia as N (mg/L) ¹	≤ 0.1	ND	≤ 0.1	ND	0.12	ND	
Nitrate+Nitrite as N (mg/L) ¹	0.12	0.23	0.2	0.17	ND	ND	
Dissolved Ortho-P (mg/L) ¹	0.010	<0.01	0.24	ND	ND	ND	
E. Coli (MPN/100 mL) ¹	> 2419.6	236.7	> 2419.6	44.1	791.5	30.1	≤ 235
Copper (µg/L) ¹					1.2	0.81	
Hardness as CaCO ₃ (mg/L) ^{1,2}					330	390.00	
<i>Selenastrum</i> (algae) toxicity 96hr. ²	Pass	Pass	Pass	Pass			
Oxyflourfen (µg/L) ³	ND	ND	ND	ND			

¹ Caltest Laboratory, 1885 N. Kelly Road, Napa CA 94558, (707) 258 - 4000

² Pacific EcoRisk, 2250 Cordelia Road, Fairfield CA 94534, (707) 207 - 7766

³ APPL Inc., 908 N. Temperance Ave, Clovis CA 93611, (559) 275 - 2175

Appendix E

Best Management Practices for Napa County Putah Creek Watershed Group

Best Management Farming Practices for Water Quality Protection

Access Road (560) Fact Sheet

BMP: Reduce surface runoff, erosion and sediment from access roads to water bodies

NRCS Practice Standard: Access Road (560)

Roads will provide a fixed route for vehicular travel for proper management of the farming operation and maintenance of conservation practices. Roads will be constructed and maintained to manage the dispersal of runoff water, reduce soil erosion, and minimize disturbance of natural drainage patterns.



Access Road (NRCS Conservation Practice Code 560)

Definition: To provide a fixed route for vehicular travel for resource activities involving the management of timber, livestock, agriculture, wildlife habitat and other conservation enterprises while protecting soil, water, air, fish, wildlife, and other adjacent natural resources.

Purposes:

- Control and disposal of water
- Erosion control
- Reduce fine sediments eroding from roads
- Reduce surface runoff
- Reduce concentrated runoff
- Provide access for management activities
- Improve water infiltration

CONSIDER THIS:

Follow sound engineering practices to insure road meets requirements of intended use.

Design road drainage to minimize concentration of runoff.

Release concentrated runoff to stable areas or protected drop inlets.

Out-slope roads where safe, and where adequate provisions are made to disperse the runoff onto stable or protected areas.

Manage road runoff using such practices as ditch relief culverts, rolling dips, waterbars, mulching, sediment basins, etc.

Design stream crossings for large storm events.

Excavate and/or structurally stabilize unstable road fills.

Monitor and maintain roads to ensure that continued proper drainage.

Seek assistance from a licensed engineer or qualified professional.

For more information contact your local NRCS office or visit our website at <http://efotq.sc.ea.gov.usda.gov/treemenuFS.aspx>

USDA is an equal opportunity provider and employer.

Best Management Farming Practices for Water Quality Protection

Conservation Cover (327) Fact Sheet

BMP: Bare soil is covered with vegetation. Ditches and banks are protected from concentrated flow, gullies and ditches are stabilized, and erosion is reduced on cropped and non-cropped areas. Crop and air quality are protected from dust.

NRCS Practice Standard: Conservation Cover (327)

Planting, establishing and maintaining vegetation on land needing permanent vegetative cover and protection.



Conservation Cover (NRCS Conservation Practice Code 327)

Definition: Establishing and maintaining permanent vegetative cover.

Purposes:

- Reduce soil erosion and sedimentation
- Improve water quality
- Enhance wildlife habitat
- Improve soil quality
- Manage plant pests
- Provide beneficial insect habitat

For more information contact your local NRCS office or visit our website at <http://efotg.sc.egov.usda.gov/treemenuFS.aspx>

CONSIDER THIS:

This practice involves establishing and maintaining a protective cover of perennial vegetation.

In perennial crop systems such as vineyards, vegetation established needs to provide full year- round coverage in vineyard middles.

Permanent plant mixes may consist of grasses, legumes and/or other forbs adapted to soils and micro-climates of Napa County.

Select species for planting that are suited to current site conditions and intended uses.

Avoid invasive plant species.

Prepare a seedbed sufficient to suppress weeds and provide for germination and growth of selected species.

Establish vegetation by October 15.

When applying straw mulch, apply certified weed free mulch at 1500 lbs/acre at planting, distribute uniformly over seeded area within 48 hours after seeding. Anchor straw using hand tools, rollers, crimpers, disks or similar equipment.

Use hydro-mulch planting on steep, inaccessible sites not suitable for straw mulch planting and on other sites when rain is expected 60 days following planting.

Do not use fertilizer when using this practice for water quality purposes.

Best Management Farming Practices for Water Quality Protection

Cover Crop (340) Fact Sheet

BMP: Soil is covered with vegetation

NRCS Practice Standard: Cover Crop (340)

Planting cover crops is the most cost effective method to reduce erosion and sediment deposition from your property. Cover crops prevent sheet and rill erosion and provide many other benefits on your farm. Benefits include improved water infiltration, nitrogen fixation in the soil, and habitat for beneficial insects. Crop and air quality are protected from dust.



Cover Crops (NRCS Conservation Practice Code 340)

Definition: Grasses, legumes, forbs or other herbaceous plants established in vineyards and orchards to provide seasonal or year round ground cover for conservation purposes.

Purposes:

- Reduce soil erosion from storm runoff
- Increase soil organic matter
- Cycle excess nutrients before reaching waterways
- Increase bio-diversity
- Suppress unwanted weeds
- Manage soil moisture
- Reduce dust
- Manage crop vigor
- Provide habitat for beneficial insects
- Improve water infiltration

CONSIDER THIS:

Establish cover crops by October 15 and maintain throughout rainy season.

Drill or broadcast seed and incorporate into soil.

Choose species compatible with crop.

Avoid using species that are on local weed lists or are hosts to Pierce's Disease.

Use certified weed free straw mulch at 1500 lbs/acre where cover crops are planted late or if rain is likely before cover crop is established.

Avoid tilling early in the spring or late in the fall.

Minimize tillage practices if slopes are greater than 5%.

Use filter strips to filter sediment before it reaches a water body.

Keep on-site erosion control materials such as straw bales or wattles, gravel or geotextile fabrics. Protect stockpiles from rain. Train crews in proper installation techniques.

Check site after each rainfall.

For more information contact your local NRCS office or visit our website at <http://efotq.sc.egov.usda.gov/treemenuFS.aspx>

Best Management Farming Practices for Water Quality Protection

Critical Area Planting (342) Fact Sheet

BMP: Bare soil is covered with vegetation, ditches and banks are protected from concentrated flow, gullies and ditches are stabilized, and erosion is reduced on non-cropped areas. Crop, water and air quality protected from dust and sediment.

NRCS Practice Standard: Critical Area Planting (342)

Use on areas with existing or expected high rates of erosion or degraded sites that usually cannot be stabilized by ordinary conservation treatment and/or management. If left untreated, these areas could be severely damaged by erosion or sedimentation, or could cause significant off-site damage.



Critical Area Planting (NRCS Conservation Practice Code 342)

Definition: Planting vegetation on critically eroding areas that require extraordinary treatment.

Purposes:

- Stabilize areas with existing or expected high rates of soil erosion by water
- Stabilize areas with existing or expected high rates of soil erosion by wind
- Restore degraded sites that cannot be stabilized through normal methods

CONSIDER THIS:

This practice may be used on cuts, fills and disturbed areas, and waterline stabilization for small streams and ponds.

Select species for planting that are suited to current site conditions and intended uses.

Select species that will have the capacity to achieve adequate density and vigor within an appropriate time frame to stabilize the site sufficiently.

When applying straw mulch apply at least 1500 lbs/acre at planting, distribute uniformly over seeded area within 48 hours after seeding. Anchor straw using hand tools, rollers, crimpers, disks or similar equipment.

Use certified weed-free straw.

Straw may be anchored by jute, erosion control blankets, plastic or excelsior matting.

Use hydro-mulch planting on steep, inaccessible sites not suitable for straw mulch planting and on other sites when rain is expected 60 days following planting.

Do not use fertilizer when using this practice for water quality purposes.

For more information contact your local NRCS office or visit our website at <http://efotg.sc.egov.usda.gov/treemenuFS.aspx>

Best Management Farming Practices for Water Quality Protection

Diversion (362) Fact Sheet

BMP: Structures to divert sediment to settling areas are installed and maintained.

NRCS Practice Standard: Diversion (362)

Constructed erosion control diversions will collect runoff from vineyard facilities and discharge runoff to a safe and stable outlet.



Diversions (NRCS Conservation Practice Code 362)

Definition: A channel generally constructed across the slope with a supporting ridge on the lower side

Purposes:

- Break up concentrations of water on long slopes
- Collect or direct water
- Intercept surface flow
- Control erosion and protect water quality
- Minimize potential entry of sediment to surface waters
- Spread storm water runoff to multiple low-discharge locations
- Provide temporary or long-term erosion protection on newly-developed or redeveloped farmland

For more information contact your local NRCS office or visit our website at <http://efotq.sc.egov.usda.gov/treemenuFS.aspx>

CONSIDER THIS:

Diversions that protect agricultural land shall have a minimum capacity for the peak discharge from a 10-year frequency, 24-hour duration storm.

The outlet conditions, topography, land use, cultural operations and soil type shall determine the location of the diversion.

A combination of practices may be needed to prevent damaging accumulations of sediment in the diversion channel.

Each diversion must have a safe and stable outlet with adequate capacity. The outlet could be a grassed waterway, a lined waterway, a vegetated or paved area, a grade stabilization structure, an underground outlet, a stable watercourse, a sediment basin, rock energy dissipator, level spreader or a combination of these practices.

The outlet must convey runoff to a point where outflow will not cause damage.

Seek assistance from a licensed engineer or other qualified professional.

Best Management Farming Practices for Water Quality Protection

Filter Strip (393) Fact Sheet

BMP: Vegetation is established to filter sediment

NRCS Practice Standard: Filter Strip (393)

Use filter strips to filter suspended sediment before it reaches a water body. Planting a filter strip is an effective method to prevent sediment from leaving your property and preventing sediment delivery into sensitive areas such as streams and other water bodies. A filter strip will also prevent transport and delivery of nutrients, pesticides and adsorbed contaminants into water bodies. A filter strip should be installed only below areas where sheet and rill erosion have been reduced to an acceptable level and where other practices are in place that slow runoff and contaminant delivery.



Filter Strip (NRCS Conservation Practice Code 393)

Definition: An area of vegetation established for the purpose of removing sediment, organic materials, and other pollutants from runoff.

Purposes:

- To reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in runoff
- To reduce dissolved contaminant loadings in runoff
- To serve as Zone 3 of a Riparian Forest Buffer, Practice Standard 391
- To restore, create or enhance herbaceous habitat for wildlife and beneficial insects
- To maintain or enhance watershed function and value

CONSIDER THIS:

Filter strips are typically positioned down-slope of a field or disturbed area and, to the extent possible, placed on the approximate contour.

Plant grass and legume seed uniformly over area.

Mulch newly seeded filter strips at 1500 lbs of straw/acre.

Use certified weed-free straw.

Consider sowing small grains or other annual grasses as a companion (nurse) crop until establishment.

After establishment, maintain dense vegetation, reseeding when necessary.

Mow filter strips as necessary to encourage dense vegetative growth.

Control undesirable weed species, mow after rainy season.

Inspect and repair after storm events, reseed disturbed areas.

Restore or replant the filter strip if it accumulates so much sediment that it no longer functions effectively.

For more information contact your local NRCS office or visit our website at <http://efotg.sc.egov.usda.gov/treemenuFS.aspx>

Best Management Farming Practices for Water Quality Protection

Grassed Waterway (412) Fact Sheet

BMP: Protect ditches and banks from concentrated flow from runoff; divert water to a stable outlet; and/or establish vegetation to filter sediment from a slope.

NRCS Practice Standard: Grassed Waterway (412)

Grassed waterways are natural or constructed channels, typically broad and shallow in shape, that are planted and continuously maintained with low-growing grassy cover to convey storm water runoff.



Grassed Waterway (NRCS Conservation Practice Code 412)

Definition: A shaped or graded channel that is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Grassed waterways are used to control gullying or soil erosion from concentrated water flow, where storm water runoff can be conveyed at velocities less than five feet per second.

Purpose

- Provide a more natural, lower velocity alternative to other means of storm water conveyance.
- To convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding.
- To reduce gully erosion.
- To protect/improve water quality.
- To maintain or enhance watershed function and value.
- May enhance wildlife habitat.

For more information contact your local NRCS office or visit our website at <http://efotg.sc.egov.usda.gov/treemenuFS.aspx>

CONSIDER THIS:

Where grading is used to construct waterways, establish an effective sod, preferably comprised of permanent grasses, applying mulch and irrigation prior to the beginning of the fall rainy season. Establish vegetation before allowing water to flow in the waterway.

Use mulch, anchoring, a nurse crop, rock, hay-bale dikes, filter fences, or runoff diversions as necessary to protect the vegetation until established.

Where conditions warrant additional erosion protection, stone-lined channel bottoms, or periodic rock checks finished at channel-bottom grade may be used.

Select species that have the capacity to achieve adequate density, stiffness and vigor within an appropriate time frame to stabilize the site sufficiently.

When applying straw mulch apply at 1500 lbs/acre at planting, distributed uniformly over seeded area within 48 hours after seeding. Anchor straw using hand tools, rollers, crimpers, disks or similar equipment.

After establishment maintain dense vegetation, reseeding and irrigating when necessary.

Control undesirable weed species; mow after rainy season.

Inspect and repair after storm events, reseed disturbed areas.

Do not use fertilizer when using for water quality.

Best Management Farming Practices for Water Quality Protection

Integrated Pest Management (595) Fact Sheet

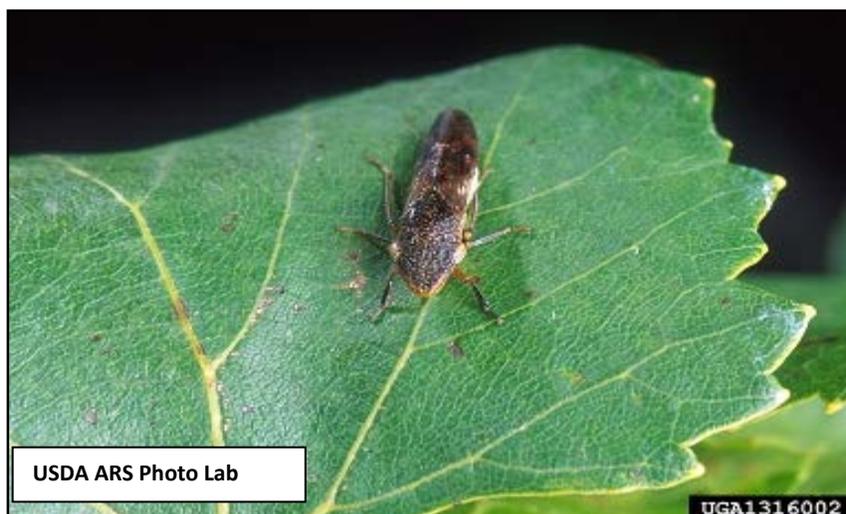
BMP: Reduce off-site pesticide risk to soil, water and air

NRCS Practice Standard: Integrated Pest Management 595

IPM is the management of agricultural pests, including weeds, insects, rodents and diseases, considering both the needs of the crop as well as the surrounding aquatic and terrestrial environment. IPM will be carried out by consulting and following UC IPM Pest Management Guidelines for crop-specific assessment techniques.

<http://www.ipm.ucdavis.edu/> Pesticides shall be applied at lowest effective labeled rate possible.

<http://www.wcc.nrcs.usda.gov/pestmgt/winpst.html>



Integrated Pest Management (NRCS Conservation Practice Code 595)

Definition: A site-specific combination of pest prevention, pest avoidance, pest monitoring, and pest suppression strategies.

Purposes:

- Prevent or mitigate off-site pesticide risks to water quality from leaching, solution runoff and adsorbed runoff losses.
- Prevent or mitigate off-site pesticide risks to soil, water, air, plants, animals and humans from drift and volatilization.
- Prevent or mitigate on-site pesticide risks to pollinators and other beneficial species through direct contact.
- Prevent or mitigate cultural, mechanical and biological pest suppression risks to soil, water, air, plants, animals and humans.

CONSIDER THIS:

Scout blocks regularly.

Maintain detailed records.

Use good sanitation practices.

Remove alternate hosts plants.

Control dust.

Use plant varieties and rootstock resistant to phylloxera and nematodes when planting and replanting.

Base pesticide application decisions on scouting data, pest thresholds and/or risk assessment models.

Select pesticides for lower risk of runoff or leaching based on site conditions, pesticide label warnings or transport models.

Apply at lowest effective labeled rate.

For more information contact your local NRCS office or visit our website at <http://efotg.sc.egov.usda.gov/treemenuFS.aspx>

Best Management Farming Practices for Water Quality Protection

Irrigation Water Management (449) Fact Sheet

BMP: Managing Irrigation Water

NRCS Practice Standard: Irrigation Water Management (449)

The process of determining and controlling the volume, frequency and application rate of irrigation water in a planned, efficient manner.



IWM (NRCS Conservation Practice Code 449)

Definition: Site specific irrigation water management plan to develop proper irrigation scheduling (timing, amount) to control runoff, minimize deep percolation and uniform application of water.

Purposes:

- Manage soil moisture to promote desired crop response
- Optimize use of available water supplies
- Minimize irrigation induced soil erosion
- Decrease non-point source pollution of surface and groundwater resources
- Manage air, soil, or plant micro-climate
- Proper and safe chemigation or fertigation
- Improve air, soil, or plant micro-climate
- Improve air quality by managing soil moisture to reduce particulate matter movement
- Reduce energy use
- Improve water infiltration

CONSIDER THIS:

Water shall not be applied in excess of the needs to meet the intended purpose

Measurement and determination of flow rate is a critical component of irrigation water management

An irrigation water management plan will be developed

Irrigation frequency shall be based on the volume of irrigation water needed and/or available to the crop, rate of crop evapotranspiration and effective precipitation

Water application shall be at rates that minimize transport of sediment, nutrients, and chemicals to surface waters and that minimize transport of nutrients and chemicals to groundwater.

Consider improving the irrigation system to increase distribution uniformity or application efficiency of irrigation water applications

Identify and manage for weather conditions

For more information contact your local NRCS office or visit our website at <http://efotq.sc.egov.usda.gov/treemenuFS.aspx>

Best Management Farming Practices for Water Quality Protection

Mulching (484) Fact Sheet

BMP: Bare soil is covered with vegetation, reduction of erosion from non-cropped areas, protect newly planted areas.

NRCS Practice Standard: Mulching (484)

Applying plant residues or other suitable materials produced off site to the land surface. Mulching is used on bare, exposed soil surfaces that are deemed to be potential critical erosion areas. In most cases, mulch will consist of grain straw residue, but may include wood chips, leaves, composted yard waste, etc.



Mulching (NRCS Conservation Practice Code 484)

Definition: Applying plant residues or other suitable materials produced off site to the land surface.

Purposes:

- Conserve soil moisture
- Moderate soil temperature
- Provide erosion control
- Suppress weed growth
- Facilitate the establishment of vegetative cover
- Improve soil condition
- Reduce airborne particulates

For more information contact your local NRCS office or visit our website at <http://efotg.sc.egov.usda.gov/treemenuFS.aspx>

CONSIDER THIS:

Straw mulches will generally be applied at a rate of at least 2,000 lbs. per acre. Anchor straw using hand tools, rollers, crimpers, disks or similar equipment.

When using straw use certified weed-free straw.

Key areas for mulch application will be field perimeters, vineyard avenues, and steep slope lands requiring quick erosion control cover.

Mulches, including wood fiber materials and manufactured erosion control blankets may also be used.

Where feasible, use late summer irrigation to help bind mulch and establish vegetative cover before fall rains commence.

Straw bales, straw wattles, and other similar materials may also be installed in critical locations to provide sediment retention and storm runoff control.

Maintain mulched surfaces throughout the rainy season.

Stockpile and tarp erosion control materials such as straw bales or wattles, gravel or geotextile fabrics in locations with wet-weather access. Train crews in proper installation techniques.

Check site after each rainfall.

Best Management Farming Practices for Water Quality Protection

Nutrient Management (590) Fact Sheet

BMP: Minimize nonpoint source pollution to surface and groundwater resources

NRCS Practice Standard: Nutrient Management (590)

Managing the amount (rate), source, placement, method of application, and timing of plant nutrients and soil amendments.



Nutrient Management (NRCS Conservation Practice Code 590)

Definition: Development of nutrient budget for nitrogen, phosphorus and potassium that considers all potential sources of nutrients including, but not limited to, green manures, legumes, crop residues, compost, animal manure, organic by-products, organic matter, commercial fertilizer and irrigation water.

Purposes:

- To budget, supply, and conserve nutrients for plant production
- Minimize agricultural nonpoint source pollution of surface and groundwater resources
- Properly utilize manure or organic by-products as a plant nutrient source
- Protect air quality by reducing odors, nitrogen emissions and the formation of atmospheric particulates
- Maintain or improved the physical, chemical, and biological condition of soil.

CONSIDER THIS:

Soil and tissue tests must include analyses pertinent to monitoring or amending the annual nutrient budget

Nutrient sources utilized must be compatible with application timing, tillage, soil properties, crop, soil organic content and local climate to minimize risk to the environment

Nutrients must be applied with the right placement, right amount, right time and from the right source to minimize nutrient losses to surface and groundwater

Coordinate nutrient applications with optimum crop nutrient uptake

Utilize injection methods of application through drip system

When there is a high risk of nutrient transport, practices must utilized to prevent loss of nutrients from the field by surface or subsurface flow.

On organic operations, nutrient sources and management must be consistent with USDA's National Organic Program

For more information contact your local NRCS office or visit our website at <http://efotq.sc.egov.usda.gov/treemenuFS.aspx>

Best Management Farming Practices for Water Quality Protection

Riparian Forest Buffer (391)

BMP: Protect ditches and banks from concentrated flow and runoff. Detain or filter eroded sediment leaving the operation. Protect creeks, streams and rivers from sediment.

NRCS Practice Standard: Riparian Forest Buffer (391)

A riparian forest buffer is an area of trees and shrubs located adjacent to streams, lakes, ponds, or wetlands. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.



Riparian Forest Buffer (NRCS Conservation Practice Code 391)

Definition: An area predominantly trees and/or shrubs located adjacent to watercourses or water bodies.

Purposes:

- Create shade to lower or maintain water temperatures to improve habitat for aquatic organisms.
- Create or improve riparian habitat
- Reduce excess amounts of sediment, organic materials, nutrients and pesticides in surface runoff.
- Reduce pesticide drift entering the water body.
- Enhance stream bank protection as part of stream bank soil bioengineering practices.
- Restore riparian plant communities.
- Increase carbon storage in plant biomass and soils.

Consider this:

Head cuts and stream bank erosion should be assessed and treated appropriately before establishing the riparian forest buffer.

Make certain channel and stream bank stability is adequate to support this practice.

Select trees and shrubs that are adapted to site and hydrologic conditions and provide diversity preferred by fish and wildlife.

Select native species adapted to area.

Tree and shrub species which may be alternate host to undesirable pests should be avoided.

Specification for each installation shall be based on a thorough field investigation of each site.

Minimum width shall be at least 35 feet measured horizontally on a line perpendicular to the water body beginning at the normal water line, bank-full elevation, or the top of the bank as determined locally.

For more information contact your local NRCS office or visit our website at <http://efota.sc.ea.gov.usda.gov/treemenuFS.asp>

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Best Management Farming Practices for Water Quality Protection

Riparian Herbaceous Cover (390)

BMP: Protect ditches and banks from concentrated flow and runoff. Detain or filter eroded sediment leaving the operation. Protect creeks, streams and rivers from sediment.

NRCS Practice Standard: Riparian Herbaceous Cover (390)

Developing and managing zones of buffer vegetation between farmed and non-farmed seasonal or perennial aquatic areas (streams, creeks, rivers, ponds or lakes). Herbaceous buffers consists of grasses and grass-like plants and forbs that can tolerate intermittent inundation. Helps stabilize stream banks and shorelines.



Riparian Herbaceous Cover (NRCS Conservation Practice Code 390)

Definition: Grasses, sedges, rushes, ferns, legumes and forbs tolerant of intermittent flooding or saturated soils, established or managed as the dominant vegetation in the transitional zone between upland and aquatic habitats.

Purposes:

- Provide or improve food and cover for fish and wildlife
- Improve and maintain water quality
- Reduce erosion and improve stability to stream banks and shorelines
- Dissipate stream energy and trap sediment
- Enhance stream bank protection as part of stream bank soil bioengineering practices.

Consider this:

Establish riparian buffers by October 15 and maintain.

Make certain channel and stream bank stability is adequate to support this practice.

Select plants that are adapted to site and hydrologic conditions and provide diversity preferred by fish and wildlife. Plants must be able to endure saturation and inundation.

Select native species that provide a deep binding root mass to strengthen stream bank and shoreline.

Select species that have stiff stems and high stem density near the ground surface.

If mowing is necessary it should occur outside of the nesting season.

Control concentrated flow erosion in the up gradient area prior to establishment of the riparian herbaceous cover.

For more information contact your local NRCS office or visit our website at <http://efotq.sc.ea.gov.usda.gov/treemenuFS.aspx>

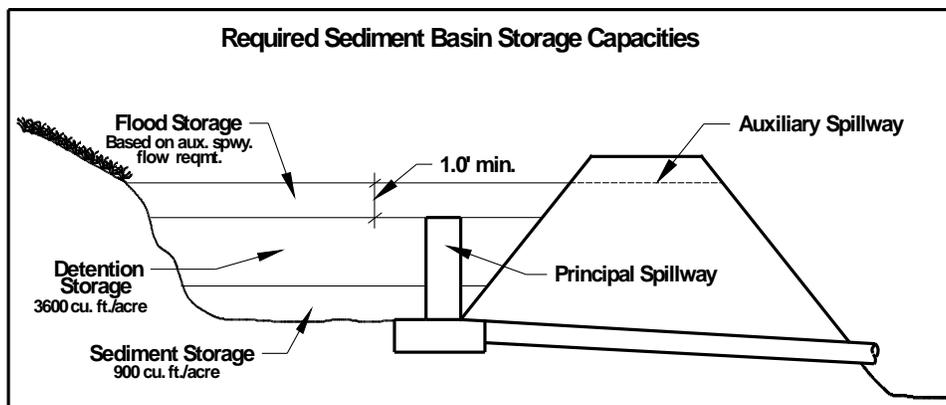
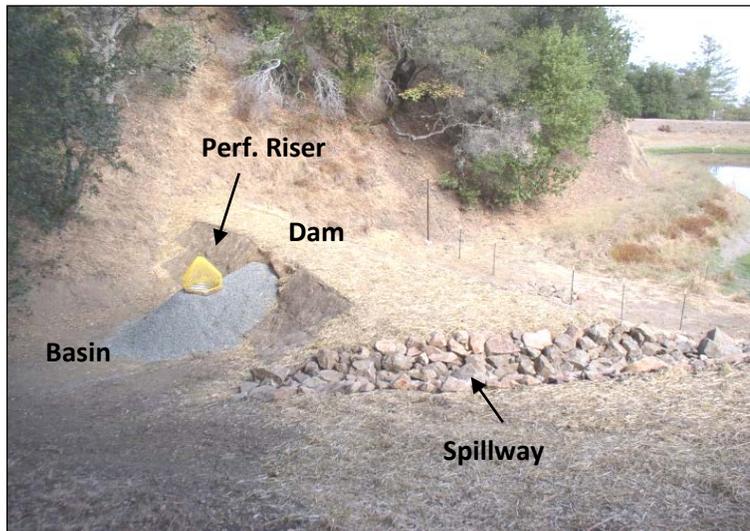
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Best Management Farming Practices for Water Quality Protection

Sediment Basin (350) Fact Sheet

BMP: Structures to collect sediment appropriately sized, installed and maintained.

NRCS Practice Standard: Sediment Basin (350)



Sediment Basin (NRCS Conservation Practice Code 350)

A basin constructed with an engineered outlet, formed by an embankment or excavation or a combination of the two.

Purposes:

- Capture and detain sediment laden runoff, or other debris for a sufficient length of time to allow it to settle out in the basin
- Protect water quality

For more information contact your local NRCS office or visit our website at <http://efotg.sc.eqov.usda.gov/treemenuFS.aspx>

Consider this:

Sediment basin design and construction must comply with all applicable federal, state and local laws and regulations.

For maximum sediment retention, design basin so that detention storage remains full of water between storm events. To maximize peak flow attenuation, basin should de-water between storms.

Choose location so that it intercepts as much runoff as possible from disturbed area of watershed.

Choose location that minimizes the number of entry points for runoff into basin and interference with farming activities. Do not locate sediment basins in perennial streams.

Establish vegetation on embankment and side slopes of basin following construction.

Contact a licensed engineer or other qualified professional for design and construction assistance.

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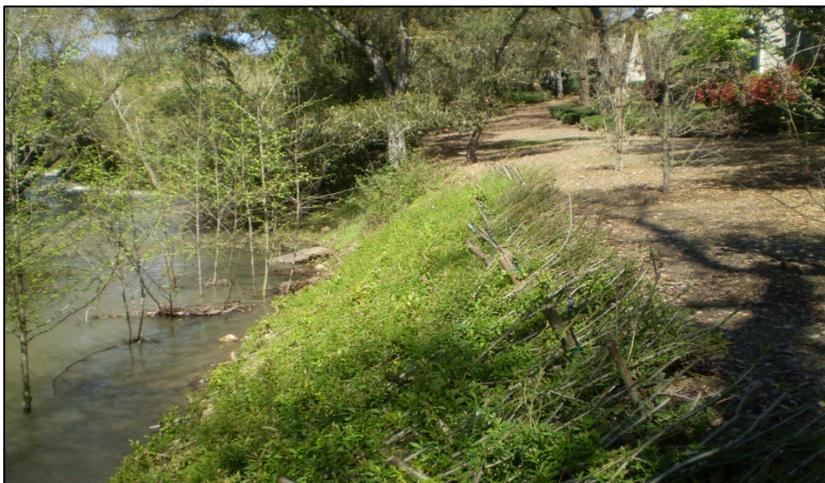
Best Management Farming Practices for Water Quality Protection

Streambank and Shoreline Protection (580)

BMP: Protect ditches and banks from concentrated flow and runoff. Detain or filter eroded sediment leaving the operation. Protect creeks, streams and rivers from sediment.

NRCS Practice Standard: Streambank and Shoreline Protection (580)

Treatment used to stabilize and protect banks of natural streams and other waterways. Used on critically eroding banks that are retreating into the land and are leading to loss of valuable riparian or aquatic habitat, and are discharging excessive amounts of sediment. Erosion control methods will emphasize use of natural stream energy and suitable native plants with minimal use of hardscape materials. Treatments will be planned with respect to natural, stable stream form and will avoid use of man-made materials.



Streambank and Shoreline Protection (580)

Definition: Treatment(s) used to stabilize and protect banks of streams or constructed channels, and shorelines of lakes, reservoirs, or estuaries.

Purposes:

- Prevent loss of land or damage to land uses, or facilities adjacent to the banks of stream, constructed channels, shoreline of lakes, reservoirs, or estuaries.
- Maintain flow capacity of streams or channels.
- Reduce the offsite or downstream effects of sediment resulting from bank erosion.
- Improve or enhance the stream corridor for fish and wildlife habitat, aesthetics, recreation

Consider this:

Conduct an assessment of unstable streambank or shoreline sites in sufficient detail to identify the causes contributing to the instability.

Implement treatments that are compatible with the bank or shoreline materials, water chemistry, channel or lake hydraulics, and slope characteristics above and below the water line.

Select vegetation that is best suited for site conditions and achieves the intended purpose(s).

Classify stream segments to be protected according to a system deemed appropriate by the state.

Do not change channel alignment without a fluvial geomorphic assessment of the effects of the proposed alignment on both upstream and downstream reaches.

Check with your local NRCS engineer on recommended processes.

Prior to commencement of any work in riparian or wetland areas, consult the California Dept. of Fish and Game for potential requirements for a Streambed Alteration Agreement,

For more information contact your local NRCS office or visit our website at <http://efota.sc.eaov.usda.gov/treemenuF>

Best Management Farming Practices for Water Quality Protection

Underground Outlet (620) Fact Sheet

BMP: Divert water to a stable outlet.

NRCS Practice Standard: Underground Outlet 620

Runoff waters will be collected from avenues, swales and constructed erosion control diversions to be piped to appropriate protected discharge locations or water spreading devices.



Underground Outlet (NRCS Conservation Practice Code 620)

Definition: A conduit or system of conduits installed beneath the surface of the ground to convey surface water to a suitable outlet.

Purposes:

- To prevent damage from erosion or flooding by conveying to protected discharge points concentrated runoff from diversions, terraces, detention or sediment basins, waterways, surface drains or other similar structures
- To collect excess surface runoff before it can concentrate and produce gullies
- To minimize potential entry of sediment and attached nutrients to surface waters
- To protect vineyard avenues, swales and other terrain where runoff may begin to concentrate
- To spread discharged waters to the maximum extent possible

For more information contact your local NRCS office or visit our website at <http://efotq.sc.egov.usda.gov/treemenuFS.aspx>

CONSIDER THIS:

Minimize installation of conduits that may deliver high volumes of runoff to single-discharge locations.

Design underground outlets with adequate capacity to handle design storm peak flows.

Design runoff control structures to spread discharge to multiple locations in smaller increments to the extent feasible. Convey discharges to protected outlets.

Provide inlets with appropriate trash guards to ensure that trash or other debris entering the inlet passes through the conduit without plugging.

Design and locate basins following the guidelines of Napa County Conservation Regulations, as specified by NRCS and Napa County RCD.

Seek assistance from a licensed engineer or other qualified professional.

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Appendix F

Farm Evaluation Summary Results for Napa County Putah Creek Watershed Group

Baseline Summary of Agricultural Practices Implemented in Napa County

<i>PRACTICE CATEGORY</i>	Acres Reported	Percent of Total Acres Reported (3,458 acres)
Individual Practice		
<i>PESTICIDE APPLICATION PRACTICES</i>		
Follow Label Restrictions	3392.27	98.1
County Permit Followed	3387.65	98.0
Monitor Rain Forecasts	3372.77	97.5
Monitor Wind Conditions	3323.27	96.1
Use PCA Recommendations	3151.29	96.1
Use Appropriate Buffer Zones	3117.64	90.1
Avoid Surface Water When Spraying	3018.42	87.3
End of Row Shutoff When Spraying	2915.88	84.3
Attend Trainings	2828.22	81.8
Use Drift Control Agents	2279.69	65.9
Use Vegetated Drain Ditches	1402.54	40.6
Sensitive Areas Mapped	1100.58	31.8
Chemigation	935.33	27.0
Reapply Rinsate to Treated Field	827.43	23.9
Target Sensing Sprayer used	622.03	18.0
Other1	527.06	15.2
Other2	508.06	14.7
No Pesticide Applied	13.7	0.4
No Selection	7	0.2
<i>WHO DO YOU HAVE HELP DEVELOP YOUR CROP FERTILITY PLAN?</i>		
Pest Control Advisor (PCA)	2704.09	78.2
Independently Prepared by Member	1940.48	56.1
Professional Agronomist	935.95	27.1
Professional Soil Scientist	764.26	22.1
Certified Crop Advisor (CCA)	453.44	13.1
Certified Technical Service Providers by NRCS	28	0.8
None of the above	23	0.7
UC Farm Advisor	2.5	0.1
<i>DOES YOUR FARM HAVE THE POTENTIAL TO DISCHARGE SEDIMENT TO OFF-FARM SURFACE WATERS?</i>		
No	1874.41	54.2
Yes	1583.94	45.8
<i>IRRIGATION PRACTICES</i>		
Drip	3448.35	99.7
Sprinkler	113	3.3

PRACTICE CATEGORY	Acres Reported	Percent of Total Acres Reported (3,458 acres)
Individual Practice		
SECONDARY IRRIGATION		
Sprinkler	2801.09	81.0
No Selection	645.26	18.7
Drip	6.5	0.2
Micro Sprinkler	5.5	0.2
IRRIGATION EFFICIENCY PRACTICES		
Water application scheduled to need	3407.19	98.5
Pressure Bomb	2322.57	67.2
Use of ET in scheduling irrigations	1706.71	49.4
Soil Moisture Neutron Probe	1600.68	46.3
Use of moisture probe	448.2	13.0
Other	375.04	10.8
Other2	118.32	3.4
Laser Leveling	21.5	0.6
NITROGEN MANGEMENT METHODS TO MINIMIZE LEACHING PAST THE ROOT ZONE		
Tissue/Petiole Testing	3296.77	95.3
Fertigation	2662.34	77.0
Cover Crops	2576.74	74.5
Soil Testing	1727.33	49.9
Split Fertilizer Applications	1277.19	36.9
Foliar N Application	734.07	21.2
Variable Rate Applications using GPS	697.85	20.2
Irrigation Water N Testing	367.4	10.6
Do Not Apply Nitrogen	138.2	4.0
Other	101.78	2.9
DO YOU HAVE ANY IRRIGATION WELLS ON PARCELS ASSOCIATED WITH THIS SURVEY?		
No	3017.81	87.3
Yes	402.54	11.6
No Selection	38	1.1
ARE YOU AWARE OF ANY KNOWN ABANDONED WELLS ASSOCIATED WITH THIS SURVEY?		
No	3377.04	97.6
No Selection	48	1.4
Yes	33.31	1.0
WELLHEAD PROTECTION PRACTICES		
N/A (Has No Irrigation Wells)	3017.81	87.3

PRACTICE CATEGORY	Acres Reported	Percent of Total Acres Reported (3,458 acres)
Individual Practice		
Standing water avoided around wellhead	394.54	11.4
Good "Housekeeping" Practices	389.48	11.3
Ground Sloped Away from Wellhead	361.23	10.4
Backflow Preventive / Check Valve	333.23	9.6
Cement Pad	326.39	9.4
Air Gap (for non-pressurized systems)	142.87	4.1
No Data Entered	38	1.1
ABANDONED WELL PRACTICES		
N/A (Has No Abandoned Wells)	3377.04	97.6
No Data Entered	48	1.4
Destroyed - Unknown method	33.31	1.0
IRRIGATION PRACTICES FOR MANAGING SEDIMENT AND EROSION		
Use drip or micro-irrigation to eliminate irrigation drainage.	3380.49	97.7
The time between pesticide applications and the next irrigation is lengthened as much as possible to mitigate runoff of pesticide residue.	1190.45	34.4
No irrigation drainage due to field or soil conditions.	912.44	26.4
Shorter irrigation runs are used with checks to manage and capture flows.	650.14	18.8
Other	210.44	6.1
In-furrow dams are used to increase infiltration and settling out of sediment prior to entering the tail ditch.	208	6.0
Catchment Basin.	184.41	5.3
No Selection	74.16	2.1
Use of flow dissipaters to minimize erosion at discharge point.	25.45	0.7
CULTURAL PRACTICES TO MANAGE SEDIMENT AND EROSION		
Cover crops or native vegetation are used to reduce erosion.	3349.99	96.9
Soil water penetration has been increased through the use of amendments, deep ripping and/or aeration.	2618.77	75.7
Hedgerows or trees are used to help stabilize soils and trap sediment movement.	1529.29	44.2
Minimum tillage incorporated to minimize erosion.	1425.19	41.2
Creek banks and stream banks have been stabilized.	1235	35.7
Vegetated ditches are used to remove sediment as well as water soluble pesticides, phosphate fertilizers and some forms of nitrogen.	962.77	27.8
Subsurface pipelines are used to channel runoff water.	508.23	14.7

<i>PRACTICE CATEGORY</i>		
Individual Practice	Acres Reported	Percent of Total Acres Reported (3,458 acres)
Sediment basins / holding ponds are used to settle out sediment and hydrophobic pesticides such as pyrethroids from irrigation and storm runoff.	487.76	14.1
Crop rows are graded, directed and at a length that will optimize the use of rain and irrigation water.	480.2	13.9
Field is lower than surrounding terrain.	449.77	13.0
Berms are constructed at low ends of fields to capture runoff and trap sediment.	418.43	12.1
Vegetative filter strips and buffers are used to capture flows.	406.83	11.8
Storm water is captured using field borders.	373.37	10.8
No Selection	76.66	2.2
Other	46.51	1.3
No storm drainage due to field or soil conditions.	3.7	0.1

Appendix G

2015 Onsite Inspection form for Napa County Putah Creek Watershed Group

**Napa County Putah Creek Watershed Group
2015 On-Site Certification Form**

Member Name: _____
Site Address: _____
Assessor's Parcel Numbers: _____
Irrigated Acres Farmed (by crop): _____
Acres Irrigated in most recent crop year: _____

BACKGROUND INFORMATION

GIS Info

Is the Irrigated Land Adjacent to USGS Blue-line Stream? No: ___ Yes: ___
Does the Irrigated Land Include Land >5% Slope? No: ___ Yes: ___

Documents and Records

Does the irrigated land have an Active Napa County Erosion Control Plan? No: ___ Yes: ___
Was an ECP winterization or spot inspection conducted in 2015? N/A: ___ No: ___ Yes: ___
Is the irrigated land certified under a green certification program? No: ___ Yes: ___
Which program(s)? _____
Pest Control Advisor (or other qualification) Monitoring Reports? No: ___ Yes: ___
Records of Pesticide Use? No: ___ Yes: ___
NC Ag Commissioner Pesticide Application Permits? No: ___ Yes: ___
Soil or Plant Tissue Analysis Reports? No: ___ Yes: ___
Plant Nutrient Application Records? No: ___ Yes: ___
Organic Certification for Irrigated Cropland? No: ___ Yes: ___

BEST MANAGEMENT PRACTICES

(Site Visit Team: Please take some pictures of installed practices to provide photo documentation of BMP implementation.)

Are the Following BMPs Being Utilized?

Access Road (560) No: ___ Yes, Describe: _____

Conservation Cover (327) No: ___ Yes, Describe: _____

Cover Crop (340)

No: ___ Yes, Describe: _____

Critical Area Planting (342)

No: ___ Yes, Describe: _____

Diversion (362)

No: ___ Yes, Describe: _____

Filter Strip (393)

No: ___ Yes, Describe: _____

Grassed Waterway (412)

No: ___ Yes, Describe: _____

Integrated Pest Management (595A)

No: ___ Yes, Describe: _____

_____ Documentation: No: ___ Yes: ___

Irrigation Water Management (490)
(Include Frost Protection)

No: ___ Yes, Describe: _____

_____ Documentation: No: ___ Yes: ___

Mulching (484) No: ___ Yes, Describe: _____

Nutrient Management (590) No: ___ Yes, Describe: _____

_____ Documentation: No: ___ Yes: ___

Riparian Forest Buffer (391A) No: ___ Yes, Describe: _____

Riparian Herbaceous Cover (390) No: ___ Yes, Describe: _____

Sediment Basin (350) No: ___ Yes, Describe: _____

Streambank and Shoreline Protection (580) No: ___ Yes, Describe: _____

Underground Outlet (620) No: ___ Yes, Describe: _____

Are there any observed water quality improvements or controls which are not recorded in the above practices questions? _____

Are there any observed water quality impairment issues not being addressed by BMPs? _____
