

STATE OF CALIFORNIA  
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
CENTRAL COAST REGION

STAFF REPORT FOR REGULAR MEETING OF DECEMBER 1-2, 2005

Prepared on October 22, 2005

ITEM NUMBER: 8

SUBJECT: On-Farm Management Practice Implementation: The Key to Water Quality Improvement

### SUMMARY

This staff report provides information to the Central Coast Water Board about on-farm management practices. The Conditional Irrigated Agricultural Waiver requires growers to implement management measures and practices. Ultimately, water quality improves when the majority of growers implement management practices. In this staff report, we will describe what constitutes on-farm management practices, what it takes to implement these practices, the importance of the technical-assistance agency staff, and the challenges involved in the management practice implementation process.

### DISCUSSION

#### Description of on-farm management practices

On-farm management practices refer to any practice that reduces pollution to surface or ground waters. There are hundreds of practices that can be used in innumerable combinations, but they can be divided into two main groups: source control and pollution control.

Source control reduces pollution by limiting the amount of chemicals applied, and/or controls the rate of run-off. Source control examples include calculating the amount of fertilizer necessary based on crop needs vs. available nutrients in soil and water (nutrient efficiency), or calculating water needs based on crop and soil/weather factors (irrigation efficiency). Source control, as an on-farm management practice, tends to rely heavily on educational and training components. We don't actually "see" the practice (like a

sediment basin or a grassed waterway). Once a grower learns nutrient and irrigation efficiency, that knowledge is carried on to each piece of land that is farmed, and each time the farmer grows that crop in the future. This is why Water Board staff has been, and continues to be, supportive of educational and technical guidance activities. Educational activities train growers to change their behavior, which is ultimately necessary to positively impact water quality on a watershed scale.

The second type of on-farm management practice is pollution control. Pollution control is designed to capture and or treat pollution before it reaches surface or ground waters. Pollution control practices aid where source control activities cannot fully prevent the pollution. Examples of pollution control are sediment basins (which capture sediment after erosion has taken place), or vegetated treatment systems (which break down pesticides into less toxic substances and reduces nutrient run-off). Although there is an education component involved, the practice itself must be designed and supervised and/or implemented by someone other than the grower.

Given the scale of water application and chemical application rates, most growers will need to implement both source and pollution control practices. Under the Agricultural Waiver, we are able to track the total numbers of growers that are implementing source control and pollution control activities. There are also several projects underway to test the

effectiveness of these management practices. This will be discussed later in the staff report.

#### **Who are the technical assistance providers?**

For the purposes of this report, the term "technical assistance staff" refers to those individuals, working for non-profit or governmental organizations, who aid growers in implementing on-farm management practices. These individuals have varying technical backgrounds (engineering, hydrology, biology, soil science, agronomy, irrigation management, pest management etc), but are all focused on conservation practices on farms.

The primary governmental organizations are the federal Natural Resources Conservation Service and the county-specific Resource Conservation Districts. They primarily aid growers with specific on-farm practices, and in obtaining funding to help implement those practices. The University of California Cooperative Extension is also county specific. Their primary roles are education and research. These roles sometimes entail on-farm implementation, but more from the standpoint of testing new practices. There are also non-profit organizations like the Community Alliance for Family Farms (CAFF) and the Agricultural and Land-Based training Association (ALBA). As part of CAFF's larger mission of aiding family farms, they help growers implement management practices. ALBA focus's primarily on Latino growers. They offer a six-month "school" on sustainable farming. They primarily provide land and education. ALBA owns several pieces of land, where on-farm management practices are implemented.

#### **Steps necessary in on-farm implementation**

(Bryan Largay, a hydrologist with the Resource Conservation District of Monterey County, assisted staff in writing this section.)

In order for a management practice to be implemented, there are six steps that must occur, with the entire process taking approximately three months to one year, depending on the complexity of the practice.

**Education** - Attendance at the UCCE Farm Water Quality Short Course (Short Course) and development of the Farm Water Quality Plan (Farm Plan) set the stage for final practice

selection and implementation. Most farmers are unfamiliar with basic concepts in water quality improvement and soil conservation. The Short Course and Farm Plan cover basic concepts for preventing pollution from farming operations. Without education, latter stages of management practice implementation can be inefficient, as misunderstandings bog down the process.

**Outreach** -The Outreach phase is the key link between education and implementation because it informs growers about the resources available to their specific farming operations. Based on knowledge taught during the Short Course, growers are given more detailed information on management practice implementation as it specifically applies to their farm(s). This step requires time, as individuals with little resource conservation training are exposed to new subject matter and asked to apply that knowledge to their complex farming operations.

**Conservation Planning** - Technical assistance staff trained in areas of relevant expertise work with the cooperating farmer to identify solutions to specific problems. The planning process identifies barriers to implementing practices such as cost, conflicts with production, permits, etc. This is an essential process where the cooperator takes ownership of the ultimate practices.

**Design, Permitting, Funding** - Solutions are further developed in an iterative process with the cooperating farmer to address site-specific issues. The final product is a buildable, permitted, funded design. This is often the most time consuming phase.

**Implementation/Construction** - The practice is installed with supervision and guidance from technical assistance staff with relevant expertise.

**Monitoring/Maintenance/Support** - Technical assistance staff inspects the implemented practice and collect performance data (e.g. is the sediment basin adequately meeting its design standards? Or, is the crop row alignment adequately reducing erosion?) Technical assistance staff further educates the cooperating grower in the ongoing operations and maintenance of practices. Finally, staff continues to identify opportunities for further conservation planning.

Typically, technical assistance personnel will cycle through this process multiple times with a particular grower, adding practices each year.

#### **Importance of Technical Assistance Staff**

A lack of technical assistance personnel creates a lack of practice implementation, and therefore, diminishes water quality improvement. As mentioned previously, the majority of growers have little to no training in conservation practice concepts. Aside from some simple straightforward practices (e.g. backflow valves on irrigation systems, safely storing chemicals etc.), growers are unable to implement practices without technical assistance.

Pollution prevention on a farm is complex and difficult to control. There are over 120 crop types, and many soil types and terrains, within the Central Coast region. In order for a project to be effective at preventing pollution, it must take into account the ever-changing landscape of the farm. Factors such as crop type, scheduling of chemical applications and irrigation events, rainfall, and soil characteristics must be included when choosing and designing practices that prevent pollution.

The Monterey County UC Cooperative Extension office prepares studies that describe the work performed on farming operations, based on known economic and agronomic factors. We have summarized information taken from two of these studies (Attachment 1). The first study represents a hypothetical broccoli crop. The second study represents an actual strawberry crop. The Table in Attachment 1 summarizes chemical and water application rates in the broccoli and strawberry studies. Staff chose strawberries and broccoli because they are common in our region. For a 400-acre crop of broccoli, discing and other significant soil disturbance activities occur seven times during one crop cycle. This one crop would require approximately 824,000 lbs of various fertilizers and compost, 1,100 lbs and 212.5 gallons of insecticides, and 800 lbs of herbicides. Over 325 million gallons of irrigation water would also be required. In addition, it is common to produce at least two crops of broccoli per year. The amount of chemicals applied and irrigation water used are significant.

For strawberries, one crop is produced per year. The amount of fertilizer over the course of one year is slightly less than a third that of broccoli, but the amount of pesticides applied is four-fold higher. All of these activities take place in the open environment, and different farm staff frequently performs the chemical applications and irrigation activities. It is common for growers to contract out many services (e.g. irrigation, fumigation, harvesting), meaning that personnel not associated with the larger farming operation or the property owner performs work.

Under this scenario, controlling pollution from a farm is challenging and therefore requires personnel trained in technical fields (i.e. agronomy, hydrology, soil science, and engineering) and personnel trained in outreach and education (i.e. ability to convey complex technical information to someone not familiar with such terms, ability to speak languages other than English, etc). Due to the infinite combinations of crops, soils, and chemical applications, designing specific projects to reduce pollution must be highly customized to individual farms and crops.

Unlike other industry groups, Regional Board staff and technical assistance staff are aware of only a few private consultants available to aid the growers with on-farm practice implementation (and it is still common for them to rely on technical assistance staff for advice). We believe a private consultant market is likely to develop, but that demand for technical assistance is likely to grower faster than the market of technical service providers. Many growers do not have the knowledge and training required to implement practices on their own. Therefore, technical assistance staff plays an important role in solving farm pollution problems.

Our office has worked closely with the technical assistance agencies for the past seven years. Under the next section, we will discuss staff's concerns about the future of these technical assistance efforts.

## **Challenges in Management Practice Implementation**

### **Limited availability of technical assistance providers**

The number of technical assistance staff in relation to the number of growers is low, and the future availability of staff is uncertain. For certain areas of expertise (e.g. irrigation efficiency), there are only three or four specialists in our region. Aside from some positions at UCCE and the NRCS, there are no permanent, budgeted funds to pay for staff positions or operating costs.

The majority of technical assistance staff rely solely on grant funds. In addition, there are very few grant funding sources that pay for these kinds of activities outside of the State and Regional Board systems. We are concerned about the future availability of trained staff after all the Propositions dollars have been spent (i.e. in about three years). As the available funds decrease, the number of growers needing assistance in Region 3 will increase. This makes it imperative that the technical assistance agencies have adequate staff. Technical assistance agencies continue to actively pursue funds to support their efforts, but their future is uncertain.

### **Lack of scientific data regarding the efficacy of management practices**

Our knowledge of on-farm management practice effectiveness is limited. We do not know the degree to which implemented practices will be effective at reducing water pollution without evaluating those practices on a local level. Many agricultural management practices were designed and tested for pollution prevention in other regions, but the site-specific conditions in other regions are different from those on the Central Coast. The dominant factors influencing run-off on farms have to do with the properties of soil and rainfall. Within the Central Coast, soil infiltration varies over six orders of magnitude and erodability over two orders of magnitude.

Although we know that certain management practices clearly reduce polluted run-off, we cannot predict within any meaningful confidence intervals the expected amount of pollution prevention or load reduction from any management practice. The question of whether

these projects are 20% effective or 80% effective at improving water quality is unknown. Technical assistance personnel believe that much of project implementation, at this time, is an educated guess, followed by monitoring the project over a period of time, and making adjustments. This process may take several reiterations, over a period of a year or two, depending on project complexity. Certain management practices that appear to inherently reduce pollution, such as nutrient efficiency, can still be highly variable in their effectiveness at reducing pollution.

To address this issue, Water Board staff is overseeing several projects that evaluate management practice effectiveness on local farms. This should aid technical assistance staff in helping growers choose effective management practices for the farms in Region 3.

### **New State Water Board grant requirements**

New State Water Board grant agreements require all grantees to report site locations using GPS coordinates to within 50 feet. This includes projects that monitor management practice implementation effectiveness. Our concern about requiring this degree of site-specific resolution (within 50 feet) is that it will greatly limit grower participation in practice effectiveness studies. Our office had one project, which was designed to answer important questions, refuse funds because of this new requirement. Another project will likely not be conducted within the Central Coast for the same reason. In addition, UC Davis, the largest institution in California addressing research issues associated with agriculture and water quality, will not accept any more new grant funds from State Board due to this requirement.

Ironically, all agriculture waiver requirements, here and in other regions, allow for water quality monitoring on a watershed scale. However, under the new grant requirements, individual property water quality monitoring would be required. This creates a situation where the most cooperative growers are under greater scrutiny from grant requirements than from the regulations. Most growers are worried that data collected from their property will be used for private litigation or enforcement. As a result, growers are reluctant to allow research projects on their lands. This creates a major obstacle for our grant recipients, since they must rely on the growers' voluntary

participation in these studies. We also lose the opportunity to gain scientifically defensible data about the effectiveness of on-farm implementation practices, the very practices that we recommend to growers in our non-point source and agricultural waiver programs.

Staff submitted a letter to the State Water Board regarding these concerns (Attachment 2). At this time, State Board has not changed their new requirement. They have agreed to hold workshops and continue to meet with technical assistance providers to discuss this issue.

#### **Opposition to use of non-crop vegetation**

For certain kinds of pollution control practices, non-crop vegetation is perhaps the best method for reducing pesticide and nutrients. Vegetated Treatment Systems show promise for addressing both pesticides and nutrients simultaneously. Also, riparian buffer zones are known to be essential in maintaining stream channel health and improving water quality.

There is currently a major roadblock to implementing vegetated practices. Farmers perceive the presence of vegetation on or near their farm fields as a food safety issue. In some cases, produce grown near vegetation cannot be sold. Also, industry auditors, who regulate grower contracts, perceive non-crop vegetation as a risk for increased crop contamination. Their rationale is that wildlife using non-crop vegetation could introduce bacteria to the crop or be entrained in the harvesting process. These perceptions are a disincentive to installing one of the most effective and practicable pollution treatment practices.

In addition to the concern by industry auditors, the local Mosquito Abatement Districts and the California Department of Food and Agriculture also discourage non-crop vegetation. The local Mosquito Abatement Districts believe that vegetation in waterways, especially wetland type environments, encourage the growth of mosquito larvae, which may transmit West Nile Virus. The California Department of Food and Agriculture is not only concerned with food safety issues, but also that non-crop vegetation may spread diseases to crops.

The Monterey County Resource Conservation District is currently organizing an effort to bring all parties together to discuss this issue, and perform a scientific literature search to determine whether non-crop vegetation actually increases the risks of pests.

#### **Multiple Permitting Requirements:**

Staff will go into greater detail on issues of permit streamlining in the staff report titled "Guadalupe Fund: Permit Streamlining San Luis Obispo County and Santa Barbara County, Request for Funding as Part of the Blueprint for Expenditure of the Guadalupe Settlement Fund," on this agenda. In brief, certain kinds of practices, especially those that involve repairing stream banks, are subject to numerous permits, which can total thousands of dollars and increase implementation schedules by months to years. In the Elkhorn Slough area, the current waiting period for obtaining permits can be up to one year. In the following staff report, permit streamlining is presented as a way to resolve this problem.

#### **CONCLUSION**

Implementing management practices is the single most important activity that growers can engage in to improve water quality. The complexity and amount of chemical and water applications make technical assistance staff a necessity for implementing management practices. In addition, there are numerous other obstacles that make implementing these practices challenging.

Implementing on-farm management practices is as much an art as it is a science. During the first five-year cycle of the Agricultural Waiver, Water Board staff will be closely tracking management practice implementation, along with tracking trends in watershed water quality. In order for water quality to improve from its current conditions, we must affect cultural change at the watershed scale. This requires a lot of individual attention, covering a large number of growers.

Water Board staff will continue to work with and support technical assistance providers in their critical water quality protection role.

**ATTACHMENTS**

1. Water and chemical applications for one broccoli crop and one strawberry crop in Monterey County
2. Memo to the State Water Board regarding concerns over new grant requirements

This item sent to an electronic Interested Parties List

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