CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

A REVIEW OF OPTIONS FOR CONTROLLING DISCHARGES FROM IRRIGATED LANDS:

- Irrigation Return Water
- Storm Water Runoff

July 2001

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EXECUTIVE SUMMARY

INTRODUCTION AND BACKGROUND

California Water Code Section 13260 requires persons discharging waste to submit a Report of Waste Discharge (ROWD). This report is used by the Regional Boards to prepare waste discharge requirements (WDRs) that limit the discharges to the extent necessary to comply with applicable laws and regulations. The purpose of this regulatory program is to protect the beneficial uses of the waters receiving wastes.

If the Board finds that it is not against the public interest, WDRs can be waived for individual dischargers or categories of dischargers (Water Code §13269). In 1982, the Board adopted Resolution No. 82-036 waiving waste discharge requirements (WDRs) for 23 categories of discharges. Irrigated lands generate discharges in two of these categories – irrigation return waters and storm water.

Specific conditions must be met to receive a waiver of WDRs. Discharges of irrigation return waters must be "*Operating to minimize sediment to meet Basin Plan turbidity objectives and to prevent concentrations of materials toxic to fish or wildlife.*" WDRs are waived for storm water "*Where no water quality problems are contemplated and no federal National Pollutant Discharge Elimination System (NPDES) permit is required.*"

The staff report developed at the time Resolution No. 82-036 went to the Board indicates that the Executive Officer would determine whether discharges pose a threat to water quality. If there is no potential to impact water quality, the Board has no jurisdiction and there is no requirement to submit a ROWD except in cases where it is determined that additional information is needed.

Irrigation return waters and storm water have been discharged from irrigated lands in the Central Valley for over a century before the adoption of the Porter-Cologne Water Quality Control Act in 1969. Rather than call for submittal of ROWDs, the Board's program has focused on promotion of voluntary compliance with management practices that minimize discharges of pollutants. Where the Board determines that a threat to water quality exists, other regulatory actions have been used, including discharge prohibitions and regulation under WDRs. In the irrigation return water category, WDRs have been used to regulate evaporation basins in the Tulare Lake Basin and to regulate return flows from the Grassland Bypass Project. A conditional discharge prohibition has also been utilized in regulating discharges from some

irrigated rice acreage in the Sacramento Valley. No WDRs or other regulatory mechanisms have been issued for storm water discharges from agricultural lands.

As a result of recent changes to Water Code§13269, all the waiver categories in Resolution 82-036 will sunset at the end of the year 2002 if the Board takes no action to renew them. Any new waivers adopted by the Board after 1 January 2000 must be reviewed at least every five years and the Board must require compliance with any conditions placed on a waiver. If a new waiver is adopted, the new law requires that the Board must also indicate whether the discharge would be subject to general or individual WDRs if the waiver conditions are not met. If no action were taken, the default approach for regulating discharges that pose a threat to water quality would be issuance of individual WDRs.

On 28 November 2000, Earthjustice Legal Defense Fund (ELDF) submitted a petition (Petition) requesting that the Board immediately rescind the irrigation return water waiver and proceed with adoption of WDRs to control discharges containing pesticide residues. The Petition was submitted with a letter of support signed by representatives of 66 organizations. Accompanying the Petition were several reports addressing pesticides in surface waters of the Central Valley. The accompanying documentation provided evidence of past pesticide discharges from irrigated lands, including those from irrigation return flows and from storm water runoff. At its January 2001 meeting, the Board directed staff to prepare a report on the issues raised by the Petition and to schedule a workshop to receive pertinent information.

This accompanying staff report reviews issues related to regulation of discharges from irrigated lands, including:

- A description of the extent of irrigated agriculture and pesticide use in the Central Valley,
- Potential water quality impacts from irrigation return waters and storm water runoff from irrigated lands,
- A review of existing policies and programs as they relate to irrigation practices and storm water management,
- Options the Board has for controlling the water quality impacts, and
- Estimated costs of conducting various programs

IRRIGATED AGRICULTURE AND PESTICIDE USE IN THE CENTRAL VALLEY

There are seven million acres of irrigated agriculture in the Central Valley Region. It is the dominant land use on the valley floor and often irrigation activities dominate flow and quality of valley floor water bodies. A survey conducted by Board staff in the early 1990's identified over 20,000 miles of waterways dominated by flows related to activities on irrigated lands.

Pesticides, the focus of the ELDF petition, are products commonly used to control insects, weeds and other pests. These pests can adversely impact the quality and quantity of crops grown under

irrigation. In 1999, over 113 million pounds of active ingredients were applied within the counties in the Central Valley.

Surface water discharges that can carry pesticides from irrigated lands fall into two categories:

- *Storm water* runoff generally occurs during the winter and spring months and consists of rainfall that does not infiltrate into the soil. In the drainage courses, it is often commingled with runoff from other land uses besides agricultural lands.

- *Irrigation return waters* are defined as "*surface and subsurface water which leaves the field following application of irrigation water*" (USEPA, 1997). Irrigation water is applied to cropland during the dryer months of the year to meet crop water requirements and the return waters are often the only waters in some drainage courses during the summer and early fall months.

WATER QUALITY IMPACTS FROM IRRIGATION ACTIVITIES

The type and amount of pollutants carried to surface waters by discharges from irrigated lands will vary by location as a result of irrigation method, rainfall amounts, crops grown, soil type, pesticides and fertilizers used, management practices and several other factors. It is important to note that pesticides are not the only constituents of concern. For example, relative to irrigation water supplies, irrigation return waters commonly carry higher levels of one or more of the following constituents:

- sediment
- pesticides
- nutrients
- salt
- trace elements (such as selenium)
- temperature

Discharges from an individual field have the potential to contain high enough levels of a pollutant to cause violations of water quality objectives in smaller water bodies. Cumulative impacts from numerous such discharges can adversely impact larger water bodies, such as the Sacramento-San Joaquin Delta or its tributary rivers. The recent survey conducted by Board staff of agriculturally dominated water bodies, both constructed and natural, shows that there are over 20,000 miles of these water bodies in the Central Valley Region.

The Board has documented the impact to water quality from irrigation return flow and storm water through their listing of impaired water bodies in conformance with the requirements of section 303(d) of the Clean Water Act (CWA). **Table 7** in the staff report lists the water bodies that the Board has determined are impaired due to pesticides. Many of these pesticide impairments are related to either irrigation return waters or storm water runoff that contains organophosphate pesticides, primarily diazinon and chlorpyrifos.

EXISTING LAWS AND POLICIES

There are several laws and policies that apply to the two categories of discharges from irrigated lands. A brief summary is provided below, and more detail is contained in the staff report.

Federal Clean Water Act (CWA) - This law provides a specific exclusion from the NPDES permitting program for irrigation return waters. Storm water from irrigated lands is also not included in the NPDES storm water permitting program. Under the CWA, water quality impacts caused by discharges from irrigated lands are addressed by promoting the use of best management practices. The CWA requires the preparation of Total Maximum Daily Loads+ (TMDLs) for impaired water bodies, including those impaired by nonpoint sources such as irrigation return flows and storm water flows from irrigated lands. The TMDL process sets load allocations for nonpoint sources of pollution but there are no implementation mechanisms under the CWA.

California Porter-Cologne Water Quality Control Act - Provides the Regional Board with the authority to regulate discharges from both point and nonpoint source (NPS) discharges through WDRs, the state equivalent to an NPDES Permit. The statutory mandate that WDRs be adopted however can be waived by a Regional Board "where such waiver is not against the public interest" (Water Code §13269). The SWRCB and the RWQCBs can also make their own investigations or may require dischargers to carry out water quality investigations and report on water quality issues (Water Code §13267).

Water Quality Control Plans (Basin Plans) – Adopted by the Regional Board pursuant to requirements in both the State and Federal water quality control programs. The Porter-Cologne Act requires the adoption of a water quality control plan (Basin Plan) that contains the guiding policies of water pollution management in each region. A Basin Plan identifies the existing and potential beneficial uses of waters of the State and establishes water quality objectives to protect these uses. The Basin Plan also contains implementation, surveillance, and monitoring plans. The Basin Plans form the basis for water quality protection in the Region. The Basin Plan is implemented primarily through issuance of WDRs or a NPDES permit. The Basin Plan for the Sacramento River and San Joaquin River Basins contains a specific control program for pesticides in irrigation return flows. Under this program, the Board would hold hearings every two years to review the control effort and initiate appropriate regulatory response. This Basin Plan also contains specific water quality control programs for selenium and five pesticides used on rice fields. The Tulare Lake Basin Plan has sections specific to the construction and operation of evaporation basins.

Plan for California Nonpoint Source Pollution Control Program - This is the State's policy for controlling nonpoint source pollution including discharges from irrigated land. This Plan was adopted to satisfy the requirements of the federal CWA and the Coastal Zone Reauthorization Amendments of 1990 (CZARA). While giving the Regional Boards the discretion to use the most appropriate approach for any specific case, it recommends the use of a three-tier process:

Tier 1: Self-determined implementation of Best Management Practices

Tier 2: Regulatory-based encouragement of management practices
Tier 3: Effluent limits and enforcement

The plan also identified management measures for irrigation water management, pesticide management, erosion and sediment control and nutrient management, all of which will impact the quality of discharges from irrigated lands. These management measures are broad policy directives that are to be implemented statewide. An example of a management measure for irrigation water management states that (the State) promotes effective irrigation while reducing pollutant delivery to surface and ground waters. The broad policy directive, however, does not come with specific implementation measures. These must be crafted within the three-tier structure.

Management Agency Agreement between the State Board and Department of Pesticide Regulation (DPR) – The California Department of Pesticide Regulation is the state agency with primary authority over registration and use of pesticides. This Agreement spells out how the State Board, DPR, Regional Boards and the County Agricultural Commissioners will deal with issues involving pesticides and water quality. In most cases, DPR and the County Agricultural Commissioners are given lead role in correcting any problems using the pesticide regulatory process before the Regional Board uses its authority under the Porter-Cologne Water Quality Control Act.

Technical Advisory Committees – In the mid-1990's, the SWRCB established technical committees to provide advice on controlling various categories of nonpoint source pollution. Recommendations were received regarding both irrigation return flows and pesticides. In addition to the work related to the nonpoint source program, the SWRCB also formed a Technical Advisory Committee on how to implement the Inland Surface Waters Plan for agriculturally dominated water bodies. Reports from these groups have been used to craft the state's nonpoint source implementation strategy.

California Environmental Quality Act (CEQA)- CEQA applies to discretionary activities proposed to be carried out by government agencies, including approval of WDRs and waivers of WDRs. Compliance is commonly achieved through the preparation of Environmental Impact Reports (EIR) or Negative Declarations. The Board's Basin Planning process has been determined to be functionally equivalent to completing an EIR.

Summary of Key Regional Board Responsibilities Relative to Discharges from Irrigated Lands

- When a discharge is not a threat to water quality, the Board has no jurisdiction and no action is needed.

- If a party submits a Report of Waste Discharge, the Board must determine if the discharge poses a threat to water quality. If it does, the Board must determine whether it should be regulated under WDRs or a conditional waiver of WDRs.

- Adoption of WDRs or a conditional waiver of WDRs requires compliance with CEQA. This could mean the preparation of a Negative Declaration, an EIR or an exemption from CEQA (since most of these discharges existed prior to enactment of CEQA).

- Regional Board Resolution No. 82-036 sets waiver conditions for irrigation return waters and storm water generated from irrigated land. For both storm water and irrigation return waters, the waiver can only be applied if the discharge does not pose a threat to water quality. The Executive Officer is delegated the responsibility to determine whether a threat to water quality exists for an individual discharger in these categories.

- As a result of recent changes in Water Code §13269, the waiver of WDRs for irrigation return flows and storm waters will sunset on 1 January 2003. If the Board wants to continue to regulate these categories of dischargers through a waiver program, it will have to take action to renew or update the waiver requirements.

- The Basin Plan for the Sacramento River and San Joaquin River Basins contains a program for controlling pesticides in surface waters. Under this program, the Board would hold hearings every two years to review the control effort and initiate appropriate regulatory efforts.

- The Basin Plans contain specific water quality control programs for selenium, evaporation basins and five pesticides used on rice fields.

- The federal Clean Water Act requires development of TMDLs for all impaired water bodies. Under the TMDL program, the Board must set waste load allocations for nonpoint source dischargers and develop an implementation program that will meet these allocations. Irrigated return flows and storm water from irrigated land is a major source of several of the constituents being addressed by the TMDL program.

- The State Board's Plan for California's Nonpoint Source Pollution Control Program (NPS Program Plan) identifies three tiers of regulatory effort to achieve compliance with water quality objectives and encourages the Regional Boards to work with other organizations to achieve program goals. The Regional Boards must develop the most appropriate approach for specific problems following these guidelines.

- Pursuant to the NPS Program Plan, the Regional Boards must implement programs to ensure that dischargers are following specific management measures. There are management measures that apply to discharges from irrigated agriculture, including specific steps for erosion and sediment control, nutrient management, pesticide management, and irrigation water management. Under this program, the manager of an irrigated field is expected to follow appropriate management practices designed to control potential releases of multiple pollutants.

- The Management Agency Agreement (MAA) between the State Board and DPR specifies how pesticide-related water quality issues are addressed. The Regional Boards continue to be primarily responsible for the protection of water quality, but in general DPR uses its regulatory authority over pesticide use in an effort to correct problems before the water quality regulatory process is employed. A four-tier process similar to the State Board's three-tier NPS Program Plan is used in most situations. The Regional Boards can take regulatory action at any time they feel it is necessary.

- The Regional Board administers grants and participates in watershed efforts that in some cases develop local plans for control of discharges from irrigated lands. In order to formally incorporate the plans into the regulatory program, the Board must adopt Basin Plan amendments or make compliance with the plan a condition of a WDR waiver.

OPTIONS

The Board has the option of using various approaches to achieve compliance with water quality objectives. The approaches can vary by region, crop or even by discharger. For example some dischargers in a specific category may be regulated by WDRs while others may qualify for waivers. This staff report discusses the following options, which are also shown in the **Table 11** in the staff report:

- Watershed approach
- Memorandum of Understanding (MOU)/MAA
- Waivers of WDRs
- WDRs
    - Individual
    - General
    - Areawide
- Prohibition of Discharge

Regardless of the regulatory program in place, the goal remains the same – consistent implementation of management practices that result in compliance with water quality objectives. From the standpoint of the discharger, the greatest cost should relate to the implementation of the control efforts. As regulatory programs become more structured, monitoring and reporting will increase costs, but this increase is generally minor compared to the overall effort expected of the discharger. A more structured regulatory program will only add significant costs for those dischargers who are not implementing appropriate management practices.

EXISTING PROGRAMS

In 1975, NPDES Permits were placed on 24 agricultural water supply and drainage entities. Based on recommendations from a State Board Technical Advisory Committee, these permits

focused on monitoring irrigation return waters. This monitoring ceased in 1977 when the 95th Congress excluded irrigation return waters from the NPDES permit program.

The monitoring conducted showed no distinct problem except for sediment levels. No pesticide monitoring was conducted. The Board focused efforts on sediment during the 1977-81 period using primarily federal 208 planning grants. The 208 planning program recommended that the Board use best management practices to regulate low threat sediment discharges. In 1982, the Board adopted Resolution No. 82-036 waiving WDRs for irrigation return waters and several other categories of low threat discharges. Even though storm water was included in the waiver policy and this waiver would apply to runoff from irrigated lands, there was little available data and therefore probably no Board consideration of runoff from agricultural areas at the time the Resolution was adopted.

Since that time, the majority of parties discharging from irrigated lands have never been contacted directly by the Regional Board. There have been no inspections to evaluate compliance with WDR waiver conditions but monitoring has continued to determine threats to water quality. When water quality impacts have been demonstrated to occur due to irrigation return flow discharges, the Board has used its regulatory options to correct these problems. The Board has established four major programs addressing specific water quality issues related to irrigation return waters:

Rice Pesticide Control Program - During the early 1980's pesticides discharged from Sacramento Valley rice fields caused fish kills in drains and taste complaints regarding the City of Sacramento drinking water supply. The Board has worked with the state's pesticide regulatory agency (formerly Department of Food and Agriculture, currently Department of Pesticide Regulation), the rice industry and numerous other organizations to develop methods to control these discharges. In 1990, the Board adopted a conditional prohibition of discharge for irrigation return flows containing five specific pesticides commonly used on rice fields. This prohibition is waived if the discharger is following management practices approved by the Board.

Selenium Control Program - In the mid-1980's, selenium levels in subsurface agricultural drainage from the Grassland watershed were determined to be a threat to waterfowl in the wetland areas. A control program adopted in 1988 stressed the use of improved irrigation efficiency to reduce selenium discharges. The program was updated in 1996 to require WDRs for the control of selenium. WDRs for the Grassland Bypass Project, which serves approximately 97,000 acres of irrigated agricultural land, were adopted in 1998.

Evaporation Basins - Agricultural evaporation basins are utilized for the disposal of saline drainwater where there are no opportunities for discharge into the San Joaquin River. Between 1972 and 1985, 28 evaporation ponds were constructed covering a surface area of about 7,100 acres, mainly in the environs of the Tulare Lake Basin. Presently only 10 ponds with a surface area of about 4,900 acres are active and managed by seven operators. The remainder have been voluntarily deactivated due to the high costs of meeting the waste discharge requirements and mitigation

measures, or closed by order of the State and Regional Boards due to toxic effects to waterbirds from selenium present in the impounded waters.

Development of TMDLs for Nonpoint Sources - Total Maximum Daily Loads (TMDLs) are required under section 303(d) of the Federal Clean Water Act for all impaired water bodies. The Board has listed several water bodies as impaired due to pesticide runoff. A TMDL report will be prepared to quantify the impact and the options available to the Board. These reports will form the basis of a proposed Basin Plan Amendment report covering the regulatory options and recommended mechanisms for controlling these pollutants. The Regional Boards have the responsibility to complete and implement TMDLs.

DISCUSSION AND RECOMMENDATIONS

Due to the extent of irrigated agriculture in the Central Valley and limitations on staff resources, the Board has historically had to prioritize efforts to address water quality impacts associated with this land use. For the past two decades, the Board has focused its efforts on the most serious water quality problems associated with irrigation return waters. The Board continues to waive WDRs for low priority discharges from irrigated lands while focusing its limited resources for regulatory control efforts on selenium discharges, disposal to evaporation basins, rice pesticide return flows and discharges from confined animal facilities.

Recently the Board has been directed to develop a regulatory program for salinity and boron discharges on the San Joaquin River which may eventually require increased regulation of irrigation return flows. In addition, the Association of California Urban Water Agencies is requesting the Board take a closer look at drinking water issues, including trihalomethane precursors which may be caused in part by irrigation return flows from Delta Islands.

There are few alternative approaches because of the limited funding that is available for the Board's NPS control activities. Most of the NPS implementation money comes from federal grant resources and are directed at the successful implementation of the federal 319(h) grant program and have specific deliverables as described in a federally-approved statewide workplan. Because the federal Clean Water Act specifically excludes irrigation return flows from permitting or regulation, the use of federal 319(h) NPS grant monies for a state permitting program would probably be rejected.

The Board is also constrained by the workplans for the resources it receives from the State Board. One alternative would be to redirect resources from the Non-15 Core Regulatory program resources. The reason the focus would be on Non-15 or the 'discharge to land' program rather than NPDES permitting money is that it would be very difficult for the Board to redirect NPDES or surface water discharge permitting monies since the federal CWA specifically excludes irrigation return waters from being regulated under the NPDES permitting provisions of the Act. Redirecting from Non-15 resources would mean that the existing backlog of WDRs, inspections and enforcement activities would increase. Eliminating this backlog has been a high

priority in discussions with the legislature, the California Environmental Protection Agency (Cal EPA) and the State Board.

The recent adoption of the NPS Program Plan by the State Board as well as the additional work associated with the TMDLs under development will further strain limited resources available to the Board for implementation of NPS control efforts. Based on the rice pesticide and the TMDL programs, it takes a significant staff effort to conduct a credible program, even with support from DPR and other interested parties.

The same analogy is true for storm water runoff from irrigated lands. The present storm water regulatory program under the federal CWA does not list agricultural lands as a category for regulation. The only option for redirection of resources would be to use state storm water monies but the storm water program has been under close review by the legislature for failure to regulate the storm water categories already targeted by the program. Diversion of monies to regulate individual agricultural dischargers, who may or may not be part of the runoff problem, would be criticized for lack of focused regulation and the Board would be subject to review by the legislature for failure to regulate those sites for which they provided resources.

Under the circumstances, staff recommends that the Board:

a) Notify the State Board of the results of the Petition review, the options that the Board considered and the conclusion that additional funds will be required to even partially address these discharges, and
b) Seek additional resources and consider redirection of existing resources to address the issues raised by this review of the WDR waiver programs associated with irrigation return water and storm water runoff from irrigated lands, and
c) Based on the rice pesticide, selenium and evaporation basin projects, a significant amount of staff time must be devoted to developing and implementing control efforts. Estimated costs of conducting programs addressing discharges from irrigated lands are presented below. These costs are strictly for implementation. Program development costs, such as adoption of the Basin Plan amendment containing a prohibition of discharge, would be in addition to the figures provided.

Control Option	Resources Required (Personnel Years (PYs)/Year)
Watershed approach	5
MOU/MAA	2
Waivers of WDRs	20
Individual WDRs	500
General WDRs	15
Areawide WDRs	6
Prohibition of Discharge	4
Phased approach (see Recommendations Section)	4

If staff can be redirected into this effort, it is recommended that they work with water agencies or groups of agencies to establish local monitoring efforts. Information developed through this monitoring would be used to prioritize Board efforts and to track progress toward improving water quality. Since the Board and other agencies are already monitoring storm water under the TMDL program, any new monitoring would initially focus on irrigation return water. In addition to evaluating the levels of individual constituents such as boron, toxicity testing would serve as the initial screening tool to determine if pesticides or other acutely toxic materials are present.

Redirection of existing resources would not provide the staffing needed to regulate all discharges from irrigated lands with individual WDRs. Realistically, the Board must work with waivers, general orders or areawide orders to address water quality problems associated with this category of dischargers. These types of policies and orders would be more effective if they are tailored to address local water quality issues and would best be developed after obtaining the initial round of results from local monitoring efforts.

Rescinding the existing waiver programs would leave the Board with an overwhelming task of preparing WDRs without sufficient information to properly prioritize the effort. Because of this, staff recommends that the short-term focus be placed on developing the local monitoring, the results of which can be used to establish appropriate control programs at a local level. If the monitoring is initiated immediately, the Board would have the initial results in time to consider before the existing waivers sunset in January 2003.

Specific steps the Board should follow are:

- For irrigation return waters, make no changes in existing programs until additional resources are provided. If at least four PYs of additional staff become available, the recommended approach is to have staff meet with water agencies to determine if a similar grouping of water interests to that used in the 1975 –77 period could be reestablished. The goal of reestablishing these watershed groupings would be to renew the water quality monitoring to evaluate the potential water quality threats posed by discharges from the previously identified valley floor watersheds. The emphasis of this monitoring would be to evaluate the existence of toxicity associated with return flows from these watershed areas. Staff, in consultation with the watershed groups, would use the water quality data to formulate future policies and priorities with respect to the need to regulate this category of discharge. This information will be used to form the basis of a recommendation to the Board on the appropriateness of renewing the waiver of WDRs as required by Water Code §13269. Since water quality issues related to irrigated agriculture vary throughout the Region, it is anticipated that recommended policies, waiver conditions or permit conditions will differ by location. (This is referred to as the Phased Approach in the table showing the resources required for various control options.)

- For storm water runoff from irrigated lands, staff does not recommend that we ask for additional monitoring of storm flows. Staff is working with the United States Geological Survey (USGS), University of California Davis and DPR to evaluate the extent of pollution from these flows. But these agencies, especially DPR, must continue to focus

their resources on the ongoing monitoring and control efforts. If funding does not remain adequate in the future staff will report back to the Board for reconsideration of this recommendation.

- The Board has also listed the waterbodies presented by the petitioners, as impaired under Section 303(d) of the CWA. The emphasis needs to be on finding a correction mechanism. Therefore staff does not recommend diverting from the present program of developing federally required TMDLs. It is projected that the TMDL report, including the loading allocation and implementation plan will be completed by June 2002. These reports will form the basis of a proposed Basin Plan Amendment report covering the regulatory options and recommended mechanisms for controlling these storm water pollutants on the mainstem Feather, Sacramento and San Joaquin Rivers and the Delta.

INTRODUCTION

In 1982, the Central Valley Regional Board adopted a Resolution that conditionally waived the filing of a Report of Waste Discharge (ROWD) for 23 categories of discharge that presented a low threat to water quality. Two of these categories were irrigation return waters and storm water flows, including those from irrigated lands. In January 2000, SB 390 was enacted which eliminates that waiver on January 1, 2003, unless the Regional Board terminates or renews the waiver prior to that date (SWRCB. 1999). On 28 November 2000, Earthjustice Legal Defense Fund on behalf of Water Keepers Northern California and the California Public Interest Research Group submitted a petition to immediately revoke this waiver. This staff report reviews issues related to the waiver and the need for regulation of surface water discharges from irrigated agriculture.

The "*Background*" section of the staff report presents an overview of irrigated agriculture in the Central Valley. It shows that over seven million acres of the Central Valley are used for irrigated agriculture, with potentially thousands of individual discharges to surface water. These irrigation return waters often dominate flow and quality of many waterways in the Central Valley. (see *Irrigation in the Central Valley of California).*

A review is made of the possible effects of irrigation return waters and storm water runoff from agricultural lands on receiving waters. Most of the information is based on a 1994 Irrigated Agriculture Technical Advisory Committee (TAC) Report to the State Water Resources Control Board that identified several constituents of concern in irrigation return waters: sedimentation, salinity, trace elements, elevated temperature, bacteria, nutrients and pesticides. The petitioners have provided extensive data showing pesticide impacts to surface waters. The petitioners and the TAC findings support the conclusion that pesticides pose a significant concern due to the level of toxicity of today's pesticides and the intensity of irrigated agriculture in the Central Valley. Chemigation practices, the application of a chemical through irrigation, is also identified as being of concern due to the high water solubility and thus ease of offsite transport of the chemicals. (see *Water Quality Concerns*)

A review of some of the applicable laws and policies for regulation of irrigation return flows are provided in the staff report. The 1972 enactment of the Clean Water Act (CWA) was pivotal in that it established that irrigation return waters were considered a point source of pollutant discharge and an National Pollutant Discharge Elimination System (NPDES) Permit was required. Irrigation return flows were defined by United States Environmental Protection Agency (USEPA) as "*surface and subsurface water which leaves the field following application of irrigation water*" (USEPA, 1997). When Congress amended the federal CWA in 1977, it specifically excluded irrigation return flows from regulation under the NPDES Permitting system. That exclusion continues today. (see *Federal Water Pollution Control Act*)

The Federal Insecticide Fungicide and Rodenticide Act (FIFRA) is used to regulate the manufacture, distribution and sale of pesticides (see *FIFRA*). Even though the information supplied by the petitioners is directed at pesticides, FIFRA does not specifically mention compliance with the federal CWA even though USEPA administers both FIFRA and the CWA. In a recent court decision known as the Talent Decision (2000), the US Court of Appeals for the

Ninth Circuit concluded that a FIFRA approved label's failure to indicate the need for a NPDES Permit does not exempt the user of the product(s) from the requirements of the Clean Water Act. This court decision again opens up the question of the differences between FIFRA and the CWA. It does not however bring into question the specific exclusion of irrigation return waters from regulation under the CWA (see *Talent Decision*).

The staff report reviews the applicable portions of the Porter-Cologne Water Quality Control Act of 1969, the principal law governing water quality regulation in California. Porter-Cologne regulates discharges primarily through the use of waste discharge requirements (WDRs), which are issued by Regional Water Quality Control Boards (RWQCB) after the receipt of a report of waste discharge (ROWD). A ROWD is required of anyone discharging or proposing to discharge materials that could affect water quality and this includes return flows from irrigated agriculture (see *Porter-Cologne)*. Porter-Cologne Act also requires the development of a Basin Plan, which contains the Board's policies for regulating the discharge of pollutants, including those from irrigated agriculture. Also discussed is the State's Antidegradation Policy that is designed to protect water bodies that have high quality water from unnecessary degradation. (see *Basin Plans* and *Antidegradation Policy*)

The Central Valley Board has historically acted in regards to regulating irrigation return flows when a water quality problem is noted. Initially the Central Valley Board had adopted 24 NPDES permits to regulate irrigation return flows from various locations in the Central Valley. To be in conformance with the recommendation of the State Board's Irrigated Agriculture Technical Advisory Committee report, the permits focused on surface water monitoring programs in 1976 and part of 1977 to expand the limited knowledge on the quality of irrigation return flows.

The limited monitoring conducted during 1976-77 did not indicate a significant problem and thus the Regional Board took no further action under the state's WDR process, the only option available for the regulation of irrigation return flows (see *Federal Water Pollution Control Act).* Since irrigation return flows had been excluded from the NPDES Permit process and the Regional Board had no additional evidence that these discharges posed a threat to water quality, no further action was taken on these discharges.

In 1982, the Regional Board adopted Resolution No.82-036, which conditionally waived the filing of a ROWD for 23 categories of discharge including irrigation return waters and storm water flows from irrigated lands (*Appendix 1*). The statutory mandated adoption of WDRs can be waived by a Regional Board "where such waiver is not against the public interest" (Water Code §13269). The conditions of the irrigation return flow waiver include *"operating to minimize sediment to meet Basin Plan turbidity objectives and to prevent concentrations of materials toxic to fish and wildlife*". The conditions of the storm water runoff waiver include "*where no water quality problems are contemplated and no federal NPDES permit is required*".

The staff report also presents summaries of other laws and policies applicable to irrigation return flows. The California Environmental Quality Act, which requires review of the environmental impacts of discretionary activities proposed to be carried out by government agencies, would be needed if the waiver is to be renewed as part of SB 390. The Nonpoint Source (NPS)

Management Plan, including the Irrigated Agriculture Technical Advisory Committee (TAC) and the Pesticide TAC, identify water quality issues related to irrigation return flows and propose best management practices. The staff report also explores ongoing Regional Board efforts to successfully regulate irrigation related discharges including the Rice Pesticide Program, the Grasslands Bypass, agricultural evaporation basins and the Total Maximum Daily Load (TMDL) process for nonpoint source wastes. (see *Other Laws and Policies*)

The staff report provides a summary of the decision-making framework provided in the State Board's Plan for California's Nonpoint Source Pollution Control Program (SWRCB, 2000) including its three tier regulatory system (see *Options*). Tier 1 is self-determined implementation of management practices and includes actions such as watershed management plans. Tier 2 includes regulatory-based encouragement of management practices such waivers and memorandums of understanding. Irrigation return flows are currently managed under a Tier 2 approach with the use of a conditional waiver. Tier 3 includes effluent limitations, such as WDRs, and enforcement including cease and desist orders, cleanup and abatement orders, administrative civil liability orders, civil court actions, and criminal prosecutions.

Appendix 1 contains Resolution No. 82-036 "*Waiving Waste Discharge Requirements For Specific Types Of Discharge*" including irrigation return flows. Appendix 2 includes Water Code Sections 13260 and 132269. Appendix 3 contains the Petition from Earthjustice Legal Defense Fund. Appendix 4 includes a review of the language in the Basin Plans, including irrigated agriculture polices in the Sacramento River and San Joaquin River Basin Plan and the Tulare Lake Basin Plan. Appendix 5 provides a summary of pesticide regulation, including California Department of Pesticide Regulation policy on the water quality impacts of pesticides. Appendix 6 contains abbreviations and definitions.

IRRIGATION IN THE CENTRAL VALLEY

California's Mediterranean type climate provides rain during the winter when most crops are not in production. These winter rains also create a significant snow pack in the Sierra Mountains. This snow pack melts in the warmer season and flows into the valley floor through a series of rivers and streams. For over a century, farmers and other water managers have utilized this snowmelt flow through an elaborate system of storage, diversion and transport facilities to enhance crop production in the Central Valley. Farmers rely on this source of water to irrigate and produce crops during the dry summer growing season. Through this water supply system, the Central Valley of California is one of the most productive irrigated areas in the world.

Irrigation, as practiced in the Central Valley since the mid 19th Century is simply to supply soil water that plants need to grow, at the times the plants need it (CFWC, 1999). Irrigation methods used in the Valley include both gravity flow and pressurized systems. The type of system used varies depending upon historical practices, the crop grown, terrain, water price and available water supply.

Gravity flow systems distribute water across the field by simply utilizing a drop in elevation. Typical fields irrigated by gravity flow systems have minimal slopes, are rectangular in shape and consist of medium- or fine-textured soils. Borders and furrows can be used to control lateral water movement. Types of gravity flow systems include furrow, border/basin and uncontrolled flood application systems. Traditional gravity flow systems have comparatively high water losses (irrigation return flows) that include end of field runoff and percolation below the root zone. (USDA, 2001).

Pressurized systems distribute water with pressure, typically by pumping which requires energy. Sprinkler systems, where water is sprayed over the surface of the field, are often used on moderately sloping terrain and for soils with coarser textures where gravity flows systems would result in large water losses. Sprinkler systems generally have efficiencies of 60 to 85% as they can be designed to provide the water at a rate closely matching the soil intake rate. Examples of sprinkler systems include center-pivot systems including linear move and low-energy precision application systems, hand move, sideroll/wheel move, big gun and solid set. Another type of pressurized system is low-flow irrigation, in which water is placed at or below the soil surface in small controlled quantities. Low-flow irrigation is most commonly used for orchard, vineyard and vegetable production. With proper design, application efficiencies above 95% can be achieved. (USDA, 2001) Both the sprinkler and low-flow systems can significantly reduce the amount of irrigation return flow, especially surface runoff. In many instances, these systems can be operated without surface runoff.

Whether gravity or pressurized irrigation systems are used, neither system is 100% efficient. Irrigation return flows are an integral part of that system. For example, if no leaching of salt from the rootzone (deep percolation to groundwater) took place, within a short period of time, salinity would build up to a level that crop production would not be possible (Ayers and Westcot, 1985). Where surface runoff occurs, the potential exists that these irrigation return flows can carry pollutants from the irrigated fields to waterways in the Central Valley and beyond.

Because irrigation is so extensive in the Central Valley, these return flows must be managed to avoid adverse impacts.

Extent Of Irrigation In The Central Valley

Irrigated agriculture is practiced on over 7 million acres (11,000 square miles) in the Central Valley. Estimates of the irrigated acres by crop type are shown in **Table 1**[1] for the three hydrologic basins in the Central Valley: Sacramento River Basin, San Joaquin River Basin and Tulare Lake Basin.

Table 1.
Crop and Irrigated Acreage by Hydrologic Region, 1995
Level in Thousands of Acres (DWR, 1998)

IRRIGATED CROP	SACRAMENTO RIVER	SAN JOAQUIN RIVER	TULARE LAKE	CENTRAL VALLEY TOTAL
Grain	270	180	260	710
Rice	494	22	0	516
Cotton	9	185	1,026	1,223
Sugar beets	54	47	30	131
Corn	92	212	116	420
Other field	155	120	97	372
Alfalfa	149	231	296	676
Pasture	352	199	49	600
Tomatoes	138	82	111	331
Other truck	56	130	194	380
Almond/pistachios	106	251	177	534
Other deciduous	219	154	191	564
Subtropical	28	8	202	238
Grapes	17	184	378	579
Total Crop Area	2,139	2,005	3,127	7,271
Multiple Crop	52	56	63	171
Irrigated Land Area	2,087	1,949	3,064	**7,100**

[1]The three hydrologic regions are defined as follows. The Sacramento River includes basins draining into the Sacramento River system in the Central Valley (including the Pit River drainage), from the Oregon border south through the American River drainage basin. The San Joaquin River includes basins draining into the San Joaquin River system, from the Cosumnes River basin on the north through the southern boundary of the San Joaquin River watershed. The Tulare Lake is the closed drainage basin at the south end of the San Joaquin Valley, south of the San Joaquin River watershed, encompassing basins draining to Kern Lakebed, Tulare Lakebed, and Buena Vista Lakebed. (DWR, 1998)

DWR, 1998 also provides an estimate of agricultural water use, during both average and drought conditions, which is summarized in **Table 2**. A 2020 estimate is also projected in DWR, 1998. This projection assumes a reduction in farm usage and greater use of water by urban areas.

Table 2.
Applied Agricultural Water Use by Hydrologic Basin in Acre Feet (DWR, 1998)

REGION	1995		2020 ESTIMATE	
	Average	Drought	Average	Drought
Sacramento River	8,065	9,054	7,939	8,822
San Joaquin River	7,027	7,244	6,450	6,719
Tulare Lake	10,736	10,026	10,123	9,532
Central Valley Total	25,828	26,324	24,512	25,073

The use of water for irrigation is not uniform throughout the year. Greatest use is associated with the hot dry summer season. **Figure 1** shows the average volume of water released for irrigation for a five year period from Turlock Lake. The releases shown in **Figure 1** are typical of a water supply district in the San Joaquin Valley. A similar use pattern can be seen in the Sacramento River Valley (**Figure 2**).

Figure 1. Average MonthlyTurlock Lake Releases for the Period 1993-1997 (TID, 1999)

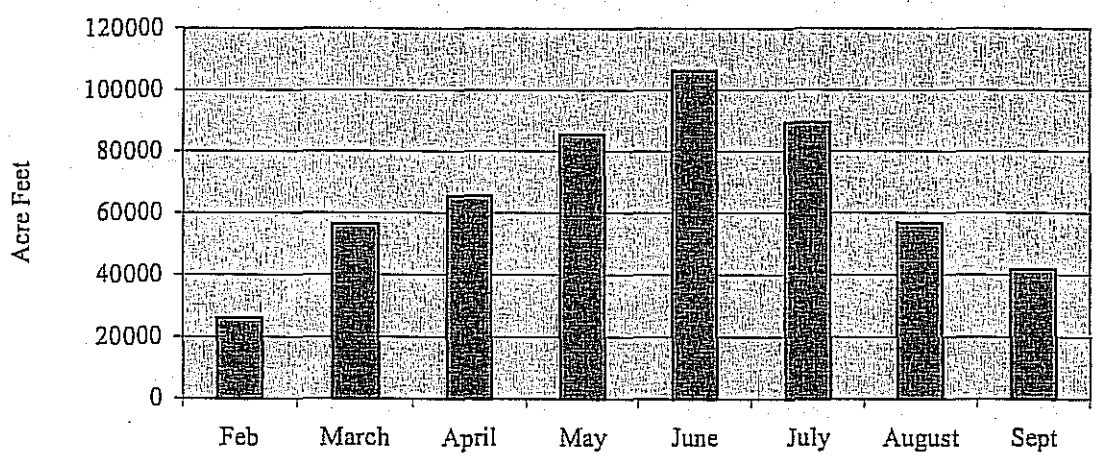
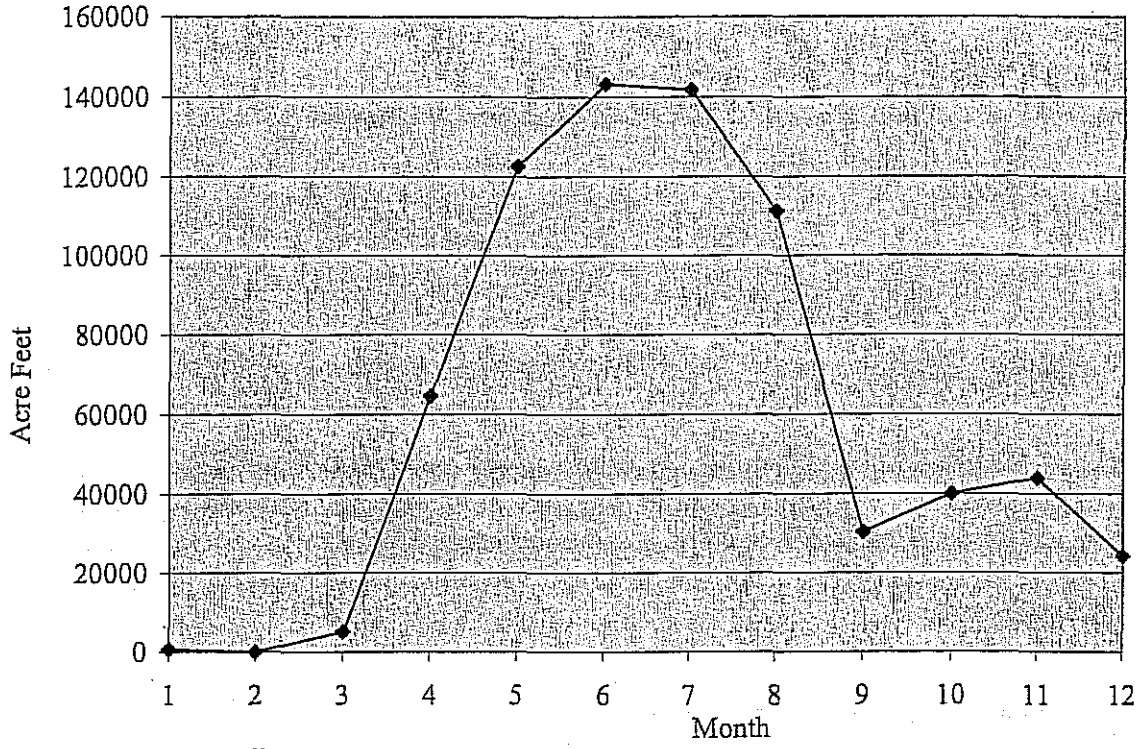


Figure 2.
Monthly Diversions to Glenn-Colusa Irrigation District Lands in 2000 (GCID, 2000)



The extensive use of water for irrigation in the Central Valley demonstrates that return flows have a significant potential to adversely impact water quality if pollutants are not managed at the farm level. Although there are no estimates for the Central Valley of the percentage of water that is diverted for irrigation use that ends up as return flows, the volume is likely to be large. For the United States as a whole, the United States Geological Survey (USGS, 1998) estimates that 61% of irrigation water goes towards consumptive use, 19% is lost during conveyance and 20% becomes return flow.

An extensive system of use and reuse has developed throughout the valley as water moves downstream. This extensive use and reuse takes place in a variety of waterways, from natural streams and rivers to small drainage canals on farm. As a result, use and reuse dominates flow and quality of many waterways on the valley floor of the Central Valley.

Water Supply And Drainage Infrastructure To Support Irrigated Agriculture In The Central Valley

Irrigated agriculture is the major land use in the valley floor portions of the Sacramento, San Joaquin and Tulare Lake Basins where an extensive water supply and drainage network has developed to serve this industry. The system was constructed and is operated by hundreds of individuals as well as local, state and federal agencies.

The supply canals and drains make up a complex maze of constructed water bodies overlaying a natural drainage network. In many locations, the natural drainage courses have been integrated into the man-made system. Designed with the intent of delivering water and providing for drainage of irrigation return flows and storm water, these facilities have significantly altered the aquatic system. Dams reduce peak river flows and flooding and allow for increased flows during the summer months. Areas that received water only during the wet winter months now have water deliveries throughout the year thus altering the ecosystem in these water bodies.

Many of these water bodies remained undefined until a few years ago. There was a requirement to prepare a listing of Water Body Designations to Comply with Provisions of the Water Quality Control Plan for Inland SurfaceWaters of California (ISWP) (CRWQCB, 1992). Though the ISWP itself was eventually set-aside in 1994, a survey of water bodies in the Central Valley was conducted. A summary of information provided by over 340 water, drainage and reclamation agencies on agriculture-impacted waters was prepared. This survey was conducted using the guidance of the ISWP, which defined two special water body categories. Category (b) water bodies included natural water bodies, or segments thereof, that are dominated by agricultural drainage (irrigation return flows) and/or agricultural supply water. The second, Category (c) included water bodies, or segments that have been constructed for the primary purpose of conveying or holding agricultural drainage and/or agricultural water supply and were not natural water bodies that supported aquatic habitat beneficial uses. Category (c) water bodies also included drains constructed in normally dry washes and low-lying areas.

In the three hydrologic basins in the Central Valley, 160 Category (b) natural water bodies, comprising a total of 1,512 miles, were dominated by agricultural drainage and/or agricultural supply water. There were shown to be 6,291 Category (c) constructed agricultural channels with a total length of 19,812 miles. A summary of the ISWP review is shown in **Table 3.**

Table 3.
Summary of Channels Dominated by Agricultural Activities (CRWQCB, 1992)

Drainage Area	# of Agency Reports	Water Bodies Dominated by Agricultural Drainage (b)		Constructed Agricultural Drains (c)	
		# Water Bodies	Length (miles)	# Water Bodies	Length (miles)
Sacramento	93	68	541	2,485	5,160
San Joaquin	63	46	538	1,715	4,689
Delta	70	13	126	789	1,548
Tulare Lake	109	28	268	1,068	6,460
Foothills	24	5	39	234	661
Area Subtotal:	359	160	1,512	6,291	18,519
Major Waterways	5	0	0	28	1293
Total:	364	160	1,512	6,319	19,812

Tables 4 and **5** provide further details on the two water body categories summarized in **Table 3** for the five hydrologic units used in presenting the ISWP data. These differ slightly from the three water quality basins defined by the Basin Plan in that the Delta is separated out for illustration purposes. In addition, those water bodies in the foothills are reported separately as they were not Valley floor water bodies.

Table 4 presents Category (b) channels that include natural water bodies dominated by agricultural activities including irrigation return flows and agricultural water supply. **Table 4** shows that there are 148 water bodies reported with a total length of 1,231 miles. The greatest number and length of natural water bodies dominated by agricultural return flows occurs in the Sacramento River Basin.

Table 5 presents a summary of category (c) channels, which includes constructed facilities that carry agricultural return flows or drainage, constructed facilities designed primarily to carry irrigation water that may carry return flows and altered natural dry washes that carry supply or return flows. As shown in **Table 5**, there are approximately 6,500 miles of constructed channels that carry predominately agricultural return flows and over 12,000 miles of other constructed channels that carry agricultural supply water but at times can carry a mixture of supply water and agricultural return flows. The latter is becoming more predominant as efforts are made to conserve water and concerns for water quality protection increase.

Table 4.
Summary of Category (b) Channels (CRWQCB, 1992)

Drainage Area	Natural water bodies dominated by agricultural drainage water (b1)		Natural water bodies dominated by agricultural supply water (b2)	
	# Water Bodies	Length (miles)	# Water Bodies	Length (miles)
Sacramento	55	371	27	203
San Joaquin	28	241	24	290
Delta	4	21	10	105
Tulare Lake	8	29	10	144
Foothills	4	32	1	7
Area Subtotal:	87	633	61	598
Major Waterways	0	0	0	0
Total:	87	633	61	598

*Some water bodies may be included in more than one category at different times of the year due to water recycling.

Table 5.
Summary of Category (c) Channels (CRWQCB, 1992)

Drainage Area	Constructed facilities designed to carry agricultural flows or drainage (c1)		Constructed facilities designed to carry irrigation water and may, at times, carry recycled return flows (c2)		Natural dry washes that have been altered and now carry agricultural supply water or return flows during time periods (c3)	
	# Water Bodies	Length (miles)	# Water Bodies	Length (miles)	# Water Bodies	Length (miles)
Sacramento	1,302	2,160	1,123	2,516	60	484
San Joaquin	510	1,296	1,191	3,307	14	86
Delta	508	908	281	641	0	0
Tulare Lake	43	1,792	998	4,484	27	184
Foothills	8	47	226	614	0	0
Area Subtotal:	2,371	6,203	3,819	11,562	101	753
Major Waterways	8	269	20	1,025	0	0
Total:	2,379	6,472	3,839	12,587	101	753

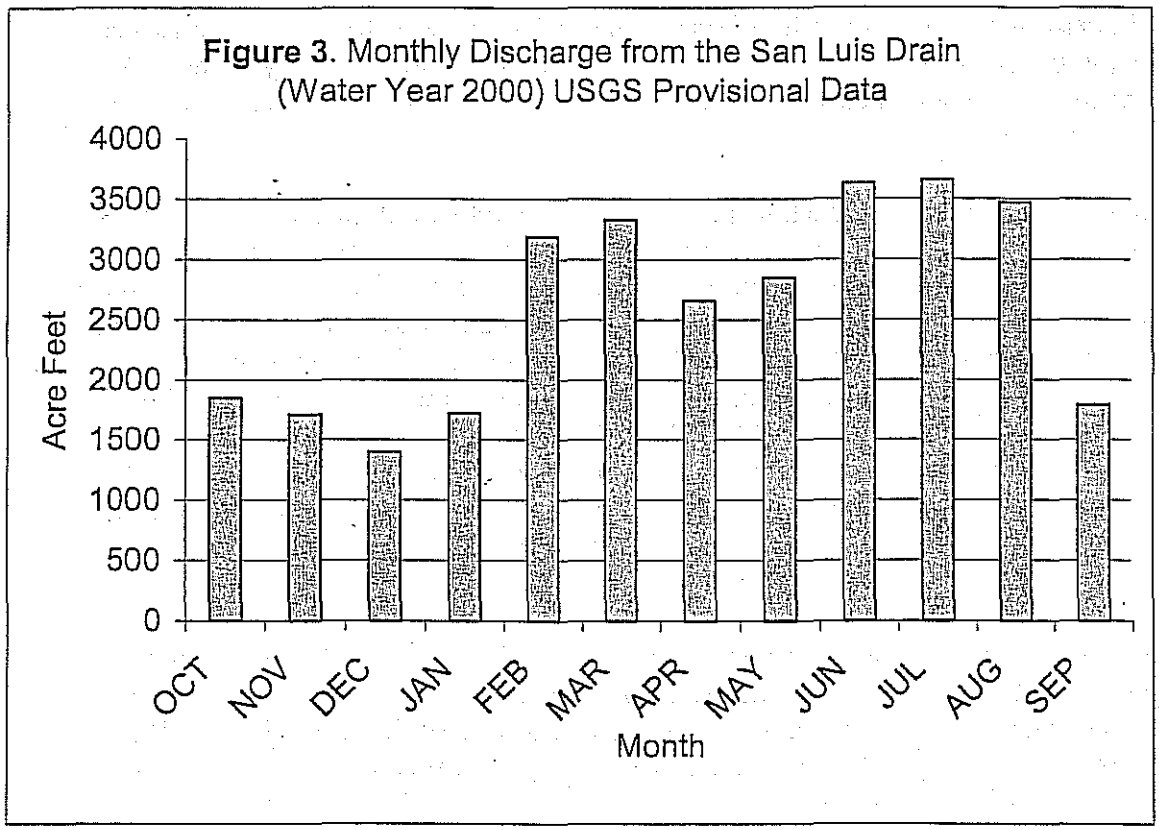
*Some water bodies may be included in more than one category at different times of the year due to water recycling.

WATER QUALITY CONCERNS

Constituents In Irrigation Return Flows

Irrigation return flows can potentially carry an array of constituents to surface waters. These could include sediment, trace elements, pesticides and nutrients. Constituents present in runoff from two adjacent fields may differ dramatically due to differences in crop type, soil properties, farming practices, irrigation techniques, as well as pesticide/fertilizer selection and application rate.

The timing of return flows to surface water often matches the irrigation water use period. Surface runoff from irrigation practices immediately follows water applications, however subsurface return flows may be delayed due to travel time. **Figure 3** depicts the monthly discharge for water year 2000 for the San Luis Drain which carries predominately subsurface return flow (USGS, 2000). The actual water applications may however have beem similar to those shown in **Figures 1** and **2**.



In 1994, the State Water Resources Control Board organized an Irrigated Agriculture Technical Advisory Committee (TAC, 1994a) to evaluate nonpoint source pollution control from irrigated agriculture in California. In its review of available data on water quality problems associated

with irrigated agriculture, the Irrigated Agriculture TAC defined that problems could be related to one or more of three mechanisms:

- Pollutants that are imported in or introduced into the irrigation water,
- Pollutants that are mobilized by the practice of irrigation, and
- Pollutants that are concentrated as a result of irrigation practices.

Likely constituents of concern in most irrigation return waters, as identified by the Irrigated Agriculture TAC (1994a), include:

Sedimentation. Sediments may carry certain pesticides that could contaminate the food chain and affect other beneficial uses of water. Excess sedimentation may degrade the natural environment, diminish the health and diversity of wildlife, and add to the costs of resource management. Erosion and sedimentation may be a result of irrigation by direct application of irrigation water or indirectly through sub-optimal land management. An example of pesticide movement is the continued elevated levels of DDT and its breakdown products being found in the San Joaquin River and Delta waterways. These are presently listed on the State 303(d) listing of impaired water bodies.

Salinity. Increased salinity restricts both urban and agricultural uses. Irrigation practices can mobilize naturally occurring salts, and can concentrate those already in supply water. Salt also moves with deep percolation below root zone and is either captured with drainage systems or moves to groundwater.

Trace Elements. Reported impacts thus far have been to wildlife but human health impacts are possible in severely contaminated areas. Trace elements can be mobilized by the same mechanisms as salts. Trace elements may occur in imported waters. Trace elements of concern are selenium, boron and molybdenum. Water bodies showing elevated selenium concentrations are located principally in the west side of the San Joaquin Valley. Those showing elevated boron are all located in boron-enriched areas that extend the entire length of the Westside of the San Joaquin and Sacramento Valleys and Delta. Elevated boron and total dissolved solids concentrations are common in many water bodies dominated by agriculture drainage and in natural and constructed facilities that carry ground water or recycled agricultural drainage water. Boron is very common in many groundwater-irrigated areas as it frequently occurs naturally in groundwater.

Elevated Temperature. Elevated temperature in irrigated fields, wetlands and tailwater can cause a rise in stream temperature. These elevated temperatures directly impact aquatic life especially in certain cold-water streams or those with anadromous fisheries. This problem occurs primarily in the Upper Sacramento and Feather River Basins but may be more extensive than originally thought when a more detailed analysis is conducted as part of California Federal Bay-Delta Program (CALFED) in their efforts to restore anadromous fisheries.

Bacteria. A potential pollutant present in irrigated-induced return flows from land that has received human or animal waste. Bacteria may also originate from wetland discharges.

Nutrients. Nitrates and phosphates in surface return flows can contribute to eutrophication in surface waters. Nutrients can also be transported to groundwater by deep percolation of irrigation and rainfall.

Pesticides. Pesticides may enter surface water in irrigation return flows from agricultural land that has received recent application of pesticides. Tailwater flows and tile drainage from fields may transport water-soluble pesticide residues and chemicals adsorbed to sediment into larger surface waters. Groundwater may also be subject to pesticide pollution via deep percolation.

Pesticides may be detected in water bodies that are dominated by agricultural drainage and at times in agricultural supply canals as a result of recycling of drainage water, pumped ground water or maintenance operations that are conducted on constructed canals and drains. Maintenance operations in constructed canals and drains may cause water quality objective violations. The mechanisms for movement of pesticides from the farm to surface water are varied but can generally be described as follows:

- Improper mixing or washing of pesticide and pesticide container at the field level;
- Residues from canal and other type of waterway maintenance, especially for algae and weed control;
- Pesticide residues that were present in the irrigation supply water;
- Direct injection of pesticide into the irrigation water supply such as done with pressurized irrigation systems or injection into on-farm surface water supply ditches (see discussion of chemigation under pesticide use);
- Application of pesticides during or immediately before an irrigation event that results in surface water runoff;
- Application of irrigation water immediately or to quickly following a pesticide application;
- Field erosion carrying pesticide-laden sediment into surface waters.

Pesticide Use in the Central Valley

Pesticide runoff into surface water presents a significant risk to water quality from irrigated agriculture. Because of the intensity of irrigated agriculture in the Central Valley, pesticide use presents a significant concern. In addition, the high toxicity level of pesticides in use today, makes aquatic toxicity a significant concern for water quality and ecosystem protection. Toxicity can have an impact on aquatic biota if releases of pesticide occur as a result of irrigation return flow water coming directly from the farm field. Under this scenario, no treatment or detoxification would be possible prior to discharge.

Since the 1950's, agricultural pesticides have been at least partially reported in California. Beginning in the 1970's, users of restricted material have been required to file pesticide use reports with county agricultural commissioners (CACs). Restricted materials are those that pose a hazard to *"public health, farm workers, domestic animals, honeybees, the environment, wildlife, or other crops. Home and garden use as well as most industrial and institutional uses are exempt from use reporting requirements."* (DPR, 1999a). In general, restricted materials

"may be possessed or used only by, or under the supervision of, licensed or certified persons and only in accordance with an annual permit issued by the county agricultural commissioner". (DPR, 1999a)

The State also requires commercial pest control operators to report all restricted and non-restricted pesticide use, including information on the pesticide, application time and place, and crop, if used for agriculture. Pesticide use in the Central Valley, by county, is summarized in **Table 6** for 1999, the latest year that data was available.

Table 6.
Total Pounds of Pesticide Active Ingredients Reported by Counties Within the Central Valley Regional Board Jurisdiction During 1999 (DPR, 1999a) [1]

COUNTY	POUNDS APPLIED	STATEWIDE RANKING AMONG 58 COUNTIES	COUNTY	POUNDS APPLIED	STATEWIDE RANKING AMONG 58 COUNTIES
Fresno	36,978,444	1	Sutter	3,018,889	18
Tulare	16,671,512	3	Yuba	1,413,231	28
San Joaquin	12,173,393	4	Colusa	1,260,553	29
Madera	9,649,641	6	Tehama	590,744	34
Merced	8,611,230	8	Shasta	260,747	41
Stanislaus	6,792,709	9	Tuolumne	52,187	48
Kings	5,259,491	11	Calaveras	40,752	50
Sacramento	3,701,448	15	Mariposa	22,985	52
Butte	3,622,043	16	Plumas	16,129	54
Yolo	3,437,121	17			
Total Pounds Reported in Region 5: 113,573,249					
*Only counties with boundaries located entirely in Region 5 are included.					

[1] The following uses of pesticides are included in the Table:

- The production of any agricultural commodity, except livestock.
- The treatment of post harvest agricultural commodities.
- Landscape maintenance in parks, golf courses, and cemeteries.
- Roadside and railroad rights-of-way
- Poultry and fish production
- Any application of a restricted material
- Any application of a pesticide with the potential to pollute ground water [listed in the California Code of Regulations, Title 3, Division 6, Chapter 4, Subchapter 1, Article 1, §6800 (b)] when used outdoors in industrial and institutional settings.
- Any application by a licensed pest control operator.

Chemigation

Chemigation is the application of chemicals through irrigation systems. Chemicals applied through irrigation systems are highly soluble and will move off of fields with any irrigation tailwater. Chemigation offers environmental benefits, such as the use of nitrogen chemigation to decrease nitrate-leaching losses. Other benefits of chemigation include the increased ability to uniformly apply the material (dependent on the uniformity of the irrigation system), flexible application time which is not dependent on weather conditions, potential reduction in application costs, increased precision management, reduced soil compaction and potential for reduced exposure to chemicals such as lack of aerial drift (Granberry et al., 1996). Chemigation must also be specified as a potential application method on the chemical label.

The general use of chemigation for pesticides is rare. In general, most constituents commonly applied in irrigation water are nutrients. Products commonly applied through chemigation are:

- Liquid urea-ammonium nitrate (fertilizer)
- Ammonium nitrate/ammonium sulfate, calcium nitrate, potassium nitrate (fertilizers)
- Potassium chloride (fertilizer)
- Gypsum (soil amendment)
  Zoldoske et al (1997), showed an increased yield in table grapes that received gypsum via drip chemigation when compared to other gypsum application methods. Experiments were conducted at CSU Fresno.
- Polyacrylamide (erosion control).

APPLICABLE LAWS AND POLICIES RELATED TO PESTICIDES, IRRIGATION RETURN FLOWS, STORM WATER AND WATER QUALITY PROTECTION

Federal Water Pollution Control Act

Public Law 92-500 enacted by the 92nd Congress was the most significant revision to existing water pollution laws in the history of the country. PL 92-500, enacted as the Federal Water Pollution Control Act Amendments of 1972 (commonly known as the Federal Clean Water Act (CWA), set in motion a major effort to clean up the nations waterways. The objective of the act was to restore and maintain the chemical, physical and biological integrity of the Nation's waters. The act established the National Pollutant Discharge Elimination System (NPDES) for permitting the discharge of pollutant into the nation's surface waters from point sources. Under the CWA, a NPDES permit is required for all point discharges of pollutants to surface waters. A point source is a discernible, confined, and discrete conveyances, such as a pipe, ditch or channel.

The CWA also provided that if the federal Environmental Protection Agency determined that a state had adequate laws to carry out the purposes of the Act, the state may apply for authority to issue permits or other appropriate documents that will suffice for purposes of federal law. In 1973, the State of California received Environmental Protection Agency approval to issue waste discharge requirements under Division 7 of the California Water Code, which will suffice as the permit required under the federal NPDES permitting requirements. Ever since that date, the State of California through its own water quality protection laws has enacted the NPDES provisions of the federal CWA.

At the time of the enactment of the CWA in 1972, irrigation return flows were considered point source discharges under the NPDES Permitting requirements of the CWA. However in 1977, Public Law 95-217 amended the Clean Water Act to prohibit the application of the NPDES Permit process to discharges from irrigated agriculture. Section 402(l) states "*The Administrator shall not require a permit under this section for discharges composed entirely of return flows from irrigated agriculture, nor shall the Administrator directly or indirectly, require any State to require such a permit*". The present United States Environmental Protection Agency (USEPA) definition of return flows from irrigated agriculture is *"surface and subsurface water which leaves the field following application of irrigation water"* (USEPA, 1997).

Total Maximum Daily Loads (TMDLs)

TMDLs are required under section 303(d) of the Federal Clean Water Act. A TMDL is the amount of a specific pollutant that a water body can receive and still maintain a water quality standard. Under section 303(d) of the Federal Clean Water Act, States are required to develop TMDLs for all water bodies that are not expected to meet water quality standards even if point sources are regulated to comply with the current level of treatment technology required by law. TMDLs must be developed for pollutants and water bodies that have been identified on the

303(d) list of impaired water bodies. In the State of California, the Regional Water Quality Control Boards have the responsibility for identifying impaired water bodies and completing TMDLs.

Table 7 lists the water bodies on the current 303(d) list that are impaired due to pesticides. Many of these pesticide impairments are related to either irrigation return waters or storm water runoff that contains organophosphorus pesticides, primarily diazinon and chlorpyrifos. The Regional Board has ranked as high priority the listings for the Delta and the largest rivers. High priority TMDLs on the Board's 303(d) list have the earliest completion dates, by which date a technical TMDL must be completed and a TMDL report sent to USEPA.

These TMDL reports provide a useful tool to quantify the impact of both point and nonpoint source pollution in a water body. There is currently no Federal Clean Water Act requirement to develop implementation plans for the TMDLs that need approval from USEPA. Regional Board staff, however, intends to incorporate elements of the TMDLs into the Water Quality Control Plans (Basin Plans) for the Sacramento River and San Joaquin River Basins and the Tulare Lake Basin, as required by California's Porter Cologne Water Quality Control Act. Putting TMDLs into the Basin Plans will require the development of an implementation plan. (see Discussion under Porter-Cologne Water Quality Control Act)

The implementation plan can consist of a range of options. Issuance of new or revised waste discharge requirements for the control of point and nonpoint sources may be part of the TMDL implementation plan for reducing or eliminating pesticide discharges. NPDES permits will not be considered an option in the implementation plan as neither irrigation return waters nor storm water runoff from irrigated lands are considered under the NPDES permit system. TMDL implementation may also include a prohibition of discharge. The Regional Board will hold a public hearing prior to adopting any amendments to the Basin Plan to incorporate TMDLs. Consideration of amended or new waste discharge requirements will also be done in a public meeting or a public hearing.

Federal Insecticide Fungicide and Rodenticide Act (FIFRA)

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) was passed on June 25, 1947 primarily as a consumer protection statute to regulate the manufacture, sale, distribution, and use of pesticides. It required that pesticides be registered with the U.S. Department of Agriculture (USDA) before they could be marketed in interstate commerce. In addition, a label, with manufacturers name and address, name, brand and trademark of the product, net contents, ingredient list, and warning statement to prevent injury, and directions for use was required to ensure safe use. (USEPA, 1999)

FIFRA was amended in 1959 to include nematicides, plant regulators, defoliants, and desiccants. An amendment requiring that all pesticide labels contain a Federal Registration Number and caution words such as, "*warning*", "*danger*", "*caution*", and "*keep out of reach of children*" was added in 1964. Manufacturers also had to remove all safety claims from the labels. In 1970, authority for FIFRA was transferred from USDA to the newly designated agency, Environmental Protection Agency (USEPA). In 1972 FIFRA was again amended and a series of changes were

Table 7.
Pesticide Impairments From 303(d) List of Impaired Water Bodies

Water Body	Pollutant	Size	Priority	TMDL Completion Date
American River, Lower	Group A Pesticides	23 Miles	Low	2011
Arcade Creek	Chlorpyrifos	10 Miles	Medium	2011
Arcade Creek	Diazinon	10 Miles	Medium	2011
Chicken Ranch Slough	Chlorpyrifos	5 Miles	Medium	2011
Chicken Ranch Slough	Diazinon	5 Miles	Medium	2011
Colusa Drain	Carbofuran/Furadan	70 Miles	Medium	2011
Colusa Drain	Group A Pesticides	70 Miles	Medium	2011
Colusa Drain	Malathion	70 Miles	Medium	2011
Colusa Drain	Methyl Parathion	70 Miles	Medium	2011
Delta Waterways	Chlorpyrifos	480000 Acres	High	2011
Delta Waterways	DDT	480000 Acres	Low	2011
Delta Waterways	Diazinon	480000 Acres	High	2011
Delta Waterways	Group A Pesticides	480000 Acres	Low	2011
Elder Creek	Chlorpyrifos	10 Miles	Medium	2011
Elder Creek	Diazinon	10 Miles	Medium	2011
Elk Grove Creek	Diazinon	5 Miles	Medium	2011
Feather River, Lower	Diazinon	60 Miles	High	2005
Feather River, Lower	Group A Pesticides	60 Miles	Low	2011
Five Mile Slough	Chlorpyrifos	1 Miles	Medium	2011
Five Mile Slough	Diazinon	1 Miles	Medium	2011
Harding Drain (Turlock Irr Dist Lateral #5)	Chlorpyrifos	7 Miles	Medium	2005
Harding Drain (Turlock Irr Dist Lateral #5)	Diazinon	7 Miles	Medium	2011
Kings River (Lower)	Toxaphene	30 Miles	Low	2011
Merced River, Lower	Chlorpyrifos	60 Miles	High	2005
Merced River, Lower	Diazinon	60 Miles	High	2005
Merced River, Lower	Group A Pesticides	60 Miles	Low	2011
Morrison Creek	Diazinon	20 Miles	Medium	2011
Mosher Slough	Chlorpyrifos	2 Miles	Medium	2011
Mosher Slough	Diazinon	2 Miles	Medium	2011
Mud Slough	Pesticides	16 Miles	Low	2011
Natomas East Main Drain	Diazinon	5 Miles	Medium	2011
Orestimba Creek	Chlorpyrifos	10 Miles	Medium	2011
Orestimba Creek	Diazinon	10 Miles	Medium	2005
Sacramento River (Red Bluff To Delta)	Diazinon	30 Miles	High	2011
Sacramento Slough	Diazinon	1 Miles	Medium	2011
Salt Slough	Chlorpyrifos	15 Miles	Low	2011
Salt Slough	Diazinon	15 Miles	Low	2005
San Joaquin River	Chlorpyrifos	130 Miles	High	2011
San Joaquin River	DDT	130 Miles	Low	2011
San Joaquin River	Diazinon	130 Miles	High	2011
San Joaquin River	Group A Pesticides	130 Miles	Low	2011
Stanislaus River (Lower)	Diazinon	48 Miles	High	2011
Stanislaus River (Lower)	Group A Pesticides	48 Miles	Low	2011
Stockton Deep Water Channel	Furans	2 Miles	Medium	NA
Strong Ranch Slough	Chlorpyrifos	5 Miles	Medium	2011
Strong Ranch Slough	Diazinon	5 Miles	Medium	2011
Tuolumne River (Lower)	Diazinon	32 Miles	High	2005
Tuolumne River (Lower)	Group A Pesticides	32 Miles	Low	2005

Group A Pesticides consist of: aldrin, dieldrin, endrin, heptachlor, heptachlor epoxide, chlordane (total), lindane, hexachlorocyclohexane (total), endosulfan (total), and toxaphene; NA = date not available since this listing was made by U.S.EPA

made to provide the USEPA with the authority to regulate pesticides to prevent unreasonable adverse effects on the environment. The 1972 amendments added the following changes:

- Required that you must follow the label;
- Violations can result in heavy fines and/or imprisonment;
- All pesticides will be classified as either "*Restricted Use Pesticides*" (RUP) or "*General Use Pesticides*" (Note: the "*General Use Pesticides*" classification was later changed to "*Unclassified Pesticides*";
- Anyone applying or supervising the use of RUP's must be certified by the State;
- Pesticide manufacturing plants must be registered and inspected by USEPA;
- States may register pesticide products on a limited basis for local special needs;
- All pesticide products must be registered by USEPA;
- When registering a product, the manufacturer is required to provide scientific evidence that the product will effectively control the pests listed on the label, not injure humans, crops, livestock, wildlife, or the environment, and not result in illegal residues in food or feed. (USEPA, 1999)

FIFRA §136w-1 (USC, 1972) gives the States primary enforcement responsibility if the State has pesticide use laws that are as stringent as those in FIFRA, the State enforces those laws and keeps records of pesticide use in compliance with FIFRA. California has received authority to implement FIFRA in the state through the Cal EPA Department of Pesticide Registration.

FIFRA does not specifically refer to compliance with the CWA or compliance with State water quality protection laws. FIFRA §136w-1, however provides guidance on environmental monitoring that includes mention of water monitoring but is not specific on the extent of water quality monitoring for compliance with water quality law, policies and regulations. § 136w-1 reads as follows:

> §136r. Research and monitoring
> (b) National monitoring plan. The Administrator shall formulate and periodically revise, in cooperation with other Federal, State, or local agencies, national plan for monitoring pesticides.
>
> (c) Monitoring. The Administrator shall undertake such monitoring activities, including, but not limited to monitoring in air, soil, water, man, plants, and animals, as may be necessary for the implementation of this subchapter and of the national pesticide monitoring plan. The Administrator shall establish procedures for the monitoring of man and animals and their environment for incidental [1] pesticide exposure, including, but not limited to, the quantification of incidental human and environmental pesticide pollution and the secular trends thereof, and identification of the sources of contamination and their relationship to human and environmental effects. Such activities shall be carried out in cooperation with other Federal, State, and local agencies. (USC, 1972)

In 1988, FIFRA was amended to require USEPA to reregister existing pesticides that were originally registered before current scientific and regulatory standards were formally established. Under this program and the Endangered Species Act, federal agencies must ensure that any action they carry out or authorize is not likely to jeopardize the continued existence of any

species listed on the Endangered Species List, or to destroy any or adversely modify its critical habitat. FIFRA is therefore required to ensure that the registration of pesticides and their use are not likely to jeopardize endangered species. (USEPA, 1999) As the state is the lead agency for pesticide enforcement and water quality regulation, it could be assumed that this portion of the FIFRA Act applies to any state regulatory program as well.

Although FIFRA does not specifically state that compliance with the CWA is needed, a recent court decision known as the Talent Irrigation District Decision has opened this up to question (Talent Decision, 2000). In May 1996, Talent Irrigation District (TID) in Jackson County, Oregon applied Magnacide H (active ingredient acrolein) to their canals in order to control the growth of aquatic weeds and vegetation. Magnacide H is an acutely toxic chemical that kills fish and wildlife. The Oregon Department of Fish and Wildlife found 92,000 dead juvenile steelhead downstream from TID's leaking waste gate from the canal. In 2000, Headwaters, Inc. and Oregon Natural Resources Council Action (Headwaters) filed a lawsuit against TID for violation of the Clean Water Act due to the discharge of a herbicide into its canals without a National Pollution Discharge Elimination System (NPDES) Permit. TID claimed that it did not need a permit because Magnacide H's label does not mention a permit is required and the label was approved by USEPA's Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

The United States Court of Appeals for the Ninth Circuit concluded that a label's failure to indicate the need for a NPDES Permit does not exempt the user of the product(s) from the requirements of the Clean Water Act. The FIFRA-approved label does not eliminate TID's obligation to obtain a NPDES permit. USEPA approves pesticides under FIFRA with the knowledge that pesticides containing pollutants may be discharged from point sources into the water only pursuant to a properly issued Clean Water Act permit.

In a similar case, the League of Wilderness Defenders, et al., filed a complaint against the U.S. Forest Service for violating the Clean Water Act by the aerial spraying of a pesticide over navigable waters without an NPDES permit. They claimed an NPDES permit as necessary if a pollutant is discharged into navigable waters by a point source such as pesticide spraying.

On 7 May 2001, the U.S. District Court for the District of Oregon concluded in favor of the U.S. Forest Service stating that USEPA has exempted silviculture activity from USEPA regulations and that USEPA regulations have identified silviculture pest control as a nonpoint source activity. Therefore, the U.S. Forest service is not subject to apply for an NPDES Permit. It is unclear whether the USEPA exemption of irrigated agriculture from NPDES Permits would also be concluded in a similar matter.

The League of Wilderness Defenders will appeal the case to the Ninth Circuit Court of Appeals to argue the fact that Congress and a past Supreme Court ruling show that an airplane is a point source and that USEPA does not have the authority to exempt point source activities. (Interview w/ Brent Foster, attorney for League of Wilderness Defenders)

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) is the principal law governing water quality regulation in California (Porter-Cologne, 1969). Enacted in 1969, it establishes a comprehensive program to protect water quality and the beneficial uses of water. The Porter-Cologne Act applies to surface waters, wetlands, and ground water and to both point and nonpoint sources of pollution. Pursuant to the Porter-Cologne Act (CWC § 13000), it is the policy of the State:

- that the quality of all the waters of the State shall be protected,
- that all activities and factors affecting the quality of water shall be regulated to attain the highest water quality within reason, and
- that the State must be prepared to exercise its full power and jurisdiction to protect the quality of water in the State from degradation. (SWRCB, 2000)

The Porter-Cologne Act established nine Regional Water Quality Control Boards (RWQCBs) and the State Water Resources Control Board (SWRCB) which are charged with implementing its provisions and which have primary responsibility for protecting water quality in California. The SWRCB provides program guidance and oversight, allocates funds, and reviews RWQCB decisions. In addition, the SWRCB has sole responsibility for allocating rights to the use of surface water. The RWQCBs have responsibility for water quality protection, including individual permitting, inspection, and enforcement actions within each of nine hydrologic regions. This permitting program also allows the SWRCB and nine RWQCBs to implement the permitting provisions of the federal CWA including issuance and enforcement of NPDES Permits. The SWRCB and RWQCBs have numerous nonpoint source (NPS)-related activities, including problem monitoring and assessment, planning, financial assistance, and regulatory and non-regulatory management.

The Porter-Cologne Act requires the adoption of a water quality control plan (Basin Plan) that contains the guiding policies of water pollution management in each of the nine regions. A Basin Plan identifies the existing and potential beneficial uses of waters of the State and establishes water quality objectives to protect these uses. The Basin Plan also contains implementation, surveillance, and monitoring plans. Basin Plans have been adopted for each of the nine RWQCBs. The Basin Plans form the basis for water quality protection in the nine Regions.

There are two Basin Plans for the Central Valley, one for the Sacramento River and San Joaquin River Basins and one for the Tulare Lake Basin. Relevant excerpts from these documents are provided in Appendix 4. The Plans contain sections addressing both irrigation return flows and storm water. Pesticides and other constituents are also addressed. For example, the Basin Plan for Sacramento River and San Joaquin River Basins provides details on how the Board will address pesticides in surface waters and site-specific details on the rice pesticide control program.

The RWQCBs implement the Basin Plan by regulating discharges primarily through issuance of Waste Discharge Requirements (WDRs) or a NPDES permit. Anyone discharging or proposing to discharge materials that could affect water quality, including return flows from irrigated agriculture must file a report of waste discharge (ROWD) (Water Code §13260) This is

consistent with the legislative history of the Porter-Cologne Act, in which the term "waste" was used as determined by the Attorney General under the Dickey Act to include irrigation return flows and drainage water from agricultural operations (Cal.Ops.Atty.Gen., 1956; 1964; 1966). Porter-Cologne was also intended to continue the Regional Board authority to regulate agricultural waste discharges to the waters of the state. The Report of the Assembly Committee on Water concerning Assembly Bill (AB) 413, states:

> "A condition precedent to jurisdiction of the regional boards to set discharge requirements is the existence of a discharge of waste, other than into a community sewer system. See Section 13054 of the existing law and Sections 13260 and 13263 of AB No. 413. The discharge of waste does not take place while water is still being used to irrigate crops in the fields. Of course, after the irrigation has taken place and after a subsequent discharge into a watercourse or other waters of the state of runoff is not intended to limit the existing authority of requirements that are needed to protect the quality of the waters of the state. In this respect Section 13263 does not change the existing law found in Section 13054." (RAC on AB 413, 1969)

After receipt of a ROWD, the RWQCB has a statutory obligation to prescribe WDRs or a NPDES Permit Order. The Porter-Cologne Act also provides several options for enforcing these orders, including cease and desist orders, cleanup and abatement orders, administrative civil liability orders, civil court actions, and criminal prosecutions.

In 1975, in response to the need to adopt NPDES permits in conformance with the federal CWA, the Central Valley Regional Board adopted 24 NPDES permits on various groups and water agencies for regulation of irrigation return flows. Because little was known about the quality of irrigation return flows, these NPDES Permits consisted primarily of surface water monitoring programs designed to characterize these types of discharges. The decision to structure these NPDES Permits as monitoring programs was based primarily on the final recommendations of a Technical Advisory Committee to the SWRCB. The Technical Advisory Committee concluded that because of the present inability to define practicable technology for control of discharges of irrigation return flows, the initial waste discharge requirement should seek to gain a data base upon which more informed judgments may be made.

The irrigation return flow monitoring was conducted throughout the 1976 and part of the 1977 water years. The monitoring activities were ceased when the 95th Congress amended the federal CWA in 1977 to specifically exclude irrigation return flows from regulation under the NPDES permit program. By Order No. 81-032, the Central Valley Regional Board rescinded all 24 NPDES Permits dealing with irrigation return flows.

The SWRCB and the RWQCBs can also make their own investigations or may require dischargers to carry out water quality investigations and report on water quality issues (Water Code §13267). Regarding the discharge of irrigation return flows, no such action was taken as there was not a demonstrated need recognized at the time the NPDES Permits were rescinded in 1977.

The statutory mandate that WDRs be adopted can be waived by a Regional Board "*where such waiver is not against the public interest*" (Water Code §13269). On 26 March 1982, the Central Valley Regional Water Quality Control Board (CVRWQCB) adopted Resolution No. 82-036 "*Waiving Waste Discharge Requirements For Specific Types Of Discharge.*" The resolution lists the 23 categories of waste discharges and the conditions to meet the waiver policy. The action of waiving WDRs is conditional and may be terminated at any time. Irrigation return water was one of the categories listed in the Waiver Policy. The conditions listed for the irrigation return water waiver were that the discharges be "*operating to minimize sediment to meet Basin Plan turbidity objectives and to prevent concentrations of materials toxic to fish or wildlife*". Storm water runoff, which could include that from irrigated lands, was also a listed category. The conditions for the waiver for storm water runoff were that the discharges be done "*where no water quality problems are contemplated and no federal NPDES permit is required*". (CRWQCB, 1982)

Antidegradation Policy

A key policy of California's water quality program is the SWRCB's Antidegradation Policy. This policy, formally known as the *Statement of Policy with Respect to Maintaining High Quality Waters in California* (SWRCB Resolution No. 68-16), restricts degradation of surface and ground waters. In particular, this policy protects water bodies where existing quality is higher than necessary for the protection of beneficial uses. (SWRCB, 2000)

Under the Antidegradation Policy, any actions that can adversely affect water quality in all surface and ground waters must: (1) be consistent with maximum benefit to the people of the State; (2) not unreasonably affect present and anticipated beneficial use of the water; and (3) not result in water quality less than that prescribed in water quality plans and policies. Furthermore, any actions that can adversely affect surface waters are also subject to the Federal Antidegradation Policy (40 Code of Federal Regulations [CFR], § 131.12) developed under the CWA. (SWRCB, 2000)

The Central Valley RWQCB Basin Plan (1998) includes the following statement regarding pesticide discharges and the antidegradation policy:

> "Since the discharge of pesticides into surface waters will be allowed under certain conditions, the Board will take steps to ensure that this control program is conducted in compliance with the federal and state antidegradation policies. This will primarily be done as pesticide discharges are evaluated on a case-by-case basis."

California Environmental Quality Act (CEQA)

California is one of 20 states with an environmental impact assessment law modeled after the National Environmental Policy Act (NEPA). The SWRCB, RWQCBs, and all State and local government agencies must comply with CEQA. CEQA applies to discretionary activities

proposed to be carried out by government agencies, including approval of permits and other entitlements. CEQA has six objectives: (1) to disclose to decision-makers and the public the significant environmental effects of proposed activities; (2) to identify ways to avoid or reduce environmental damage; (3) to prevent environmental damage by requiring implementation of feasible alternatives or mitigation measures; (4) to disclose to the public reasons for agency approvals of projects with significant environmental effects; (5) to foster interagency coordination; and 6) to enhance public participation. (SWRCB, 2000)

CEQA sets forth procedural requirements to ensure that the objectives are accomplished and also contains substantive provisions requiring agencies to avoid or mitigate, when feasible, impacts disclosed in an Environmental Impact Report (EIR). In addition, CEQA sets forth a series of sweeping policy statements encouraging environmental protection. These policies have led the courts to interpret CEQA "*so as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language.*" (*Friends of Mammoth v. Board of Supervisors [1972] 8 Cal 3d 247, 259, 104 Cal. Rptr. 761.*) (SWRCB, 2000)

NPS Management Plan

The *Plan for California's Nonpoint Source Pollution Control Program* (Program Plan) is the first significant upgrade of California's NPS Pollution Control Program (NPS Program) since its inception in 1988. California is required to have its Program conform to the Clean Water Act (CWA) and section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA). The lead State agencies for upgrading the Program were the State Water Resources Control Board (SWRCB) (designated lead water quality agency), the nine Regional Water Quality Control Boards (RWQCBs), and the California Coastal Commission (CCC) (designated lead coastal zone management agency). (SWRCB, 2000)

Although the SWRCB and CCC have lead roles in developing and coordinating the implementation of the Program, they are not solely responsible for solving the problem. Over 20 other State agencies have authorities, programs, or responsibilities relating to the control of NPS pollution. Coordinating and focusing such a large number of entities to produce an effective NPS program posed a difficult challenge. While use of regulatory authorities such as Porter-Cologne can help to address certain categories of NPS pollution (such as the relatively recent effort to issue permits for the most significant municipal storm water discharges), the Program Plan stresses the need to use a wide range of tools, activities, and authorities to address NPS pollution. Initially, implementation will focus on management measures (MMs). (SWRCB, 2000)

The State is committed to implementing the NPS MMs by 2013 consistent with Federal Administrative Guidance (USEPA and NOAA, 1998), the Three-Tiered Approach adopted in the Nonpoint Source Management Plan, November 1988 (1988 Plan), and priorities identified in each region's Watershed Management Initiative (WMI) Chapter. These MMs serve as general goals for the control and prevention of polluted runoff. Site-specific management practices (MPs) are then used to achieve the goals of each management measure. .

An important component of the Program Plan is that it relies on the use of existing authorities and regulatory processes to achieve implementation and continues use of the Three-Tiered Approach for addressing NPS pollution problems (Tier 1: Self-Determined Implementation of Management Practices [formerly referred to as "*voluntary*" implementation]; Tier 2: Regulatory Based Encouragement of Management Practices; and Tier 3: Effluent Limitations and Enforcement Actions). Senate Bill 227 (California Water Code [CWC] section 13369) required the SWRCB to develop by February 1, 2001, guidance for describing the process by which the SWRCB and RWQCBs will enforce the Program Plan. A draft of that guidance is now available (SWRCB, 2000).

Two of the seven management measures (MMs) identified by the SWRCB, CCC, and other State agencies address irrigation practices and pesticide management practices. These are:

Pesticide Management. Implementation of MM 1D is intended to reduce contamination of surface water and ground water from pesticides. Implementation of this measure will primarily occur through cooperation with the Department of Pesticide Regulation as provided in a Management Agency Agreement with the SWRCB. Elements of this measure include development and adoption of reduced risk pest management strategies (including reductions in pesticide use); evaluation of pest, crop, and field factors; use of Integrated Pest Management (IPM); consideration of environmental impacts in choice of pesticides; calibration of equipment; and use of anti-backflow devices. IPM is a key component of this MM. (SWRCB, 2000)

Irrigation Water Management. MM 1F promotes effective irrigation while reducing pollutant delivery to surface and ground waters. Pursuant to this measure, irrigation water would be applied uniformly based on an accurate measurement of cropwater needs and the volume of irrigation water applied, considering limitations raised by such issues as water rights, pollutant concentrations, water delivery restrictions, salt control, wetland, water supply and frost/freeze temperature management. Additional precautions would apply when chemicals are applied through irrigation. (SWRCB, 2000)

Technical Advisory Committees to the SWRCB

In the mid-1990's, the SWRCB established technical committees to provide advise on controlling various categories of nonpoint source pollution. Recommendations were received regarding both irrigation return flows and pesticides. The Technical Committees presented their recommendations to the SWRCB in 1995.

Irrigation Technical Committee Report

The Irrigated Agriculture Technical Advisory Committee (TAC) was one of several committees organized to evaluate nonpoint source pollution control in California. The TAC spent several months writing the report of its findings, and worked within the framework set forth by the SWRCB to provide a uniform consensus building approach. What follows, describes the TAC's recommendations to the SWRCB for dealing with nonpoint source pollution from irrigated agriculture in California. (TAC, 1994a)

The TAC felt that the SWRCB has the resources and the responsibility to assess and define where NPS pollution exists and where it presents risks to beneficial uses of water. The roles of the state and regional boards in this process are to ensure that the capabilities exist for education, communication, resources, planning and other support mechanisms for problem resolution. The SWRCB needs to facilitate formation and effectiveness of the watershed groups whose primary function is the identification of methods and alternative practices to correct problems, inform and garner the support of local land users, and to develop watershed plans.

The process presented by the TAC engages local watershed groups to lead efforts to organize, plan, and implement NPS pollution prevention practices. The TAC recognizes the need by the SWRCB and RWQCBs to retain current responsibility to see that adequate steps are being taken. Limited time and resources did not allow the development of regulatory guidelines if the process is inadequate or does not meet federal mandates or time lines.

The Irrigated Agriculture TAC commended the SWRCB for its effort in organizing stakeholders throughout the state in order to fairly and equitably manage nonpoint source pollution problems. The Irrigated Agriculture TAC hoped that their effort is looked on as a continuation of the SWRCB's desire to provide solutions, which are well founded and sensitive to the diverse interests who affect and that are affected by nonpoint source pollution. (TAC, 1994a)

The Irrigated Agriculture TAC report recognized that irrigated agriculture utilizes the bulk of the state's developed water supplies and contributes to nonpoint source (NPS) pollution from the expanse of production acreage and water usage. The Irrigated Agriculture TAC felt that agriculture's contribution to NPS pollution is characterized by large volumes of water containing low levels of pollutants, compared to industrial and municipal discharges that contain more concentrated levels of pollutants in smaller volumes of water. They also felt that NPS impacts associated with irrigation are most often regional or site specific in nature.

The TAC also felt that the efficacy of adopting uniform statewide standards for NPS pollution control is questionable because the causes, effects, and solutions are difficult to evaluate and are specific to individual watersheds. The Irrigated Agriculture TAC concluded that:

- Impacts are best addressed regionally or site specific and managed locally
- Data collection is a first step in a process to define extent and characterize irrigated agricultures role in NPS pollution
- There is a need to focus on management practices emphasizing public choice and select the most workable practices for individual operations
- It is important to obtain knowledge of the effect of on-farm practices on the watershed and the quality of drainage waters as they affect downstream water needs
- There should be an emphasis on both grower and public education in establishing a network to communicate with and educate growers in California will need to be developed.
- There should be an emphasis to promote partnerships forged between government, public interest groups, and the private sector to establish parallel efforts with other forums and programs.

To be effective, the TAC recommendations must be implemented at the local and state levels. At each level, there are different concerns that must be addressed for effective implementation. The TAC recognized the SWRCB's adopted a "*three tier*" process to solve NPS water quality problems. The first tier is voluntary, followed by two more regulatory based steps. The latter two are well established in regulations, and therefore the TAC concentrated on the steps needed to make the voluntary tier work. To promote voluntary action, the TAC developed a six-step process to assess NPS pollution, develop and implement strategies and review the effectiveness of those strategies. The process includes the following steps.

- Step 1: Define/Assess Pollution

The SWRCB and RWQCBs should coordinate a statewide assessment. Local advisors and land users such as Resource Conservation Districts, County Agricultural Commissioners, Farm Bureau, U.C. Cooperative Extension, Natural Resource Conservation Service (formerly the Soil Conservation Service), and local irrigation and water districts should be active participants.

- Step 2: Prioritize

With local advisors, the SWRCB should prioritize NPS pollution problems. Two levels of priorities are necessary, the state level and the watershed level. At the state level establish which watersheds have the most severe problems and set statewide priorities based on resource allocation and potential health and environmental risks. On the local level, pollutants need to be ranked and local stakeholders identified.

- Step 3: Watershed Groups

In each prioritized watershed, a "*watershed group*" will assemble. Members include land users, environmental and other public interest groups, and other stakeholders, Regional Water Quality Control Board representatives, technical assistance agencies, and industry groups. These watershed groups provide a forum for goal setting and solution development.

- Step 4: Watershed Plan

Watershed groups develop watershed plans which describe alternative practices and methods of implementation. Examples of practices and methods for solving NPS pollution problems can be found by specific pollutants in Appendix D of the report. The watershed plan is then submitted to the RWQCB for incorporation into its basin plans.

- Step 5: Implement Practices

The Regional Board adopts the watershed plan as part of its basin plan. Local water users implement needed practices with the leadership and technical assistance of the watershed group.

- Step 6: Evaluate/Modify

After initial implementation, groups involved in Step 1 join with the watershed group to assess how the plan is working. The program is evaluated and modifications that may improve its effectiveness are made if warranted.

Pesticide Technical Committee Report

The Pesticide Technical Advisory Committee developed a report and recommendations for minimizing surface water quality degradation due to agricultural use of pesticides. The three-tier process, as developed in the State Water Resources Control Board Nonpoint Source Management Plan, was integrated into this effort. Voluntary management practices to prevent off-site transport of pesticides were developed and are presented in this report. Off-site transport through leaching, volatilization, and wind action as well as surface runoff are addressed, since all can contribute to surface water contamination either directly or indirectly.

Implementation will require close coordination between a number of state and local agencies, especially the Department of Pesticide Regulation and the State Water Resources Control Board. This coordination is critical to prevent duplication or overlap of efforts and to insure that the appropriate qualifications and authority are available to address issues. Local agencies are crucial to help develop and implement local plans to define problems and assist growers and grower groups in conducting management practices.

Also crucial to the success of this program is funding of monitoring programs for problem identification/verification, management practice evaluation and results confirmation. Funding availability for state and local programs as well as agency staffing means priorities must be determined and other programs re-evaluated, trimmed, or combined. In the absence of this approach new funding sources are needed.

The ultimate goal of the recommendations developed by the TAC is: "*To reduce existing impacts and prevent future adverse impacts from pesticides found in surface water through their use on agricultural lands in ways that are safe, effective, environmentally sensitive, and reduce off-site transport.*" (TAC, 1994b)

Management Agency Agreement /Pesticide Implementation

The California Pesticide Management Plan for Water Quality (1997) establishes a Management Agency Agreement (MAA) between the California Department of Pesticide Regulation and the State Water Resources Control Board. (Cal EPA, 1997)

The California Pesticide Management Plan for Water Quality (Plan) is a joint effort by the Department of Pesticide Regulation (DPR) and the State Water Resources Control Board (State Board) to protect water quality from the potential adverse effects of pesticides. It describes how DPR and the County Agricultural Commissioners (Commissioners) will work in cooperation with the State Board and the Regional Water Quality Control Boards (Regional Boards) to protect water quality from the use of pesticides. The Plan is part of an effort to make state programs addressing pesticides and water quality more understandable, consistent, and efficient.

The Plan contains provisions for outreach programs, compliance with water quality standards, ground and surface water protection programs, self-regulatory and regulatory compliance, interagency communication, and dispute and conflict resolution. The appendices contain a copy

of the Management Agency Agreement (MAA) between DPR and the State Board, a list of reduced-risk practices for minimizing the potential for offsite pesticide movement and transport of residues to ground or surface water, information on procedures to protect proprietary information, applicable state and federal laws and regulations, a glossary of terms, and a list of abbreviations used in the Plan. The Plan recognizes both the importance of water quality in the state and the role pesticides play in maintaining a strong economy and protecting public health and safety.

DPR and the State Board have adopted a four-stage approach to minimize the potential for pesticide movement to ground and surface waters. This is consistent with the State Board's Nonpoint Source Management Plan approach. These four stages will be implemented, not necessarily in sequential order, as necessary to protect water quality.

- Stage 1, prevention of pesticide contamination of ground and surface water is promoted through educational outreach.
- Stage 2 is initiated following detections of pesticides that require response. This stage relies on self-regulating or cooperative efforts to identify and implement the most appropriate site-specific, reduced-risk practices. Stages 1 or 2 may include self-regulating label changes and implementation of registrant stewardship programs that address water quality issues on a statewide or regional basis.
- Stage 3 will be implemented by DPR and the Agricultural Commissioners, if adequate protection cannot be achieved by Stage 2. In this stage, reduced-risk practices will be implemented by restricted material use permit requirements, regulations, and other regulatory authority used by DPR and the Commissioners.
- Stage 4, the State and Regional Boards will use water quality control planning programs or other appropriate regulatory measures to protect water quality.

The following responses are also outlined in the plan:

Detections Resulting from Illegal Use. DPR will refer detections determined to be from illegal uses to Commissioners and may provide technical and legal assistance to properly penalize responsible parties. The State and Regional Boards will be notified of these detections.

Detections Resulting from Legal Use. After secondary evaluations conclude that detections of pesticides are the result of legal use of the pesticide, DPR may solicit participation of local interested parties in an advisory group. Advisory groups help identify issues, goals, mitigation options, and monitoring requirements. If the pesticides are detected in more than one region, more than one advisory group may be appropriate. Membership in advisory groups will include DPR and appropriate Regional Boards and Commissioners; other members will represent industry interests and public agencies as appropriate.

EXISTING PROGRAMS

In 1975, in response to the need to adopt National Pollutant Discharge Elimination System (NPDES) permits in conformance with the federal Clean Water Act (CWA), the Central Valley Regional Board adopted 24 NPDES permits on various groups and water agencies for regulation of irrigation return flows. Because little was known about the quality of irrigation return flows, these NPDES Permits consisted primarily of surface water monitoring programs designed to characterize these types of discharges. The decision to structure these NPDES Permits as monitoring programs was based primarily on the final recommendations of a 1975 Technical Advisory Committee to the State Water Resources Control Board (SWRCB). The Technical Advisory Committee concluded that because of the present inability to define practicable technology for control of discharges of irrigation return flows, the initial waste discharge requirement should seek to gain a data base upon which more informed judgments may be made.

The irrigation return flow monitoring was conducted throughout the 1976 and part of the 1977 water years. This monitoring ceased when the 95th Congress amended the federal CWA in 1977 to specifically exclude irrigation return flows from regulation under the NPDES permit program. By Order No. 81-032, the Central Valley Regional Board rescinded all 24 NPDES Permits dealing with irrigation return flows.

The monitoring conducted under the NPDES Permits showed no distinct problem except for sediment levels. No pesticide monitoring was conducted. The question of the need for these water agencies to file a Report of Waste Discharge (ROWD) under Porter Cologne was further investigated during the 1977-81 period using primarily federal 208 planning grants to assess the extent of the sediment discharge problem. This investigation principally focused on the sediment discharges associated with irrigation return flows on the west side of the San Joaquin and Sacramento Valleys. These investigations showed that sediment loads were excessive from these areas but there was no information that a water quality problem was occurring from these discharges. The 208 Planning Program recommended that the Board use best management practices to regulate these low threat sediment discharges.

As a result of the recommendations of the 208 Planning Program and the monitoring data that showed these discharges did not pose a threat to water quality, the Board, in 1982, adopted Resolution No. 82-036 "*Waiving Waste Discharge Requirements (WDRs) For Specific Types Of Discharge.*" The resolution lists 23 categories of low-threat waste discharges and the conditions to meet the waiver policy. The action of waiving WDRs was conditional and could be terminated at any time. Irrigation return water was one of the categories listed in the Waiver Policy. The conditions listed for the irrigation return water waiver were that the discharges be "*operating to minimize sediment to meet Basin Plan turbidity objectives and to prevent concentrations of materials toxic to fish or wildlife*". Even though storm water was included in the waiver policy and this waiver would apply to runoff from irrigated lands, there was little available data and therefore probably no Board consideration of runoff from agricultural areas at the time the Resolution was adopted. The conditions for the waiver for storm water runoff were that the discharges be done "*where no water quality problems are contemplated and no federal NPDES permit is required*". (CRWQCB, 1982)

Since that time, the majority of parties discharging from irrigated lands have never been contacted directly by the Regional Board. There have been no inspections to evaluate compliance with WDR waiver conditions but monitoring has continued to determine threats to water quality. When water quality impacts have been demonstrated to occur due to irrigation return flow discharges, the Board has used its regulatory options to correct these problems. The Board has established four major programs addressing specific water quality issues related to irrigation return waters:

Rice Pesticide Control Program

During the early 1980's pesticides discharged from Sacramento Valley rice fields caused fish kills in drains and taste complaints regarding the City of Sacramento drinking water supply. The Board has worked with the state's pesticide regulatory agency (formerly Department of Food and Agriculture, currently Department of Pesticide Regulation (DPR)), the rice industry and numerous other organizations to develop methods to control these discharges. The Rice Pesticide Program was implemented by the DPR in 1983 in an attempt to reduce surface water discharges of two rice pesticides, molinate (Ordram®) and thiobencarb (Bolero® and Abolish®). With the adoption of amendments to the CVRWQCB Basin Plan in 1990, control effort expanded to include performance goals for molinate and thiobencarb. In 1991, performance goals were established for carbofuran, methyl parathion and malathion (DPR, 2000). The Rice Pesticide Program illustrates the successful use of a combination of Tier II and III regulation.

The Rice Pesticide Program requires farmers to hold water on their fields after application of specified rice pesticides to protect aquatic organisms from pesticide toxicity. This period allows for the degradation of the pesticide which lowers concentrations in field runoff that later enters adjacent waterways. DPR has also identified drift as a likely contributor of increased concentrations of rice pesticides in adjacent drains. In response, DPR has established strict regulations to limit agricultural practices that may cause drift. Additionally, the USEPA Office of Pesticide Programs is in the process of improving product labels to control off-target drift. Seepage is another possible source of pesticides that is currently under investigation. (DPR, 2000).

Enforcement of the Rice Pesticide Program is conducted by the County Agricultural Commissioners (CACs). The CAC staff advises growers, pest control advisors and pest control operators on proper use, issue restricted material permits, conduct pesticide use monitoring inspections, evaluate emergency release variances and report rice pesticide use to DPR. (DPR, 2000)

The Rice Pesticide Program includes extensive monitoring directly overseen by DPR. Each year, background sampling will begin prior to the first carbofuran applications, usually early to mid-April. Sample collection will be conducted by the California Rice Research Board consultant personnel in consultation with staff at DPR. For nine weeks after initial field flooding, twice-weekly surface water sampling and water quality measurements will be performed. (DPR, 2000)

Selenium Control Program (Grassland Bypass Project)

In the mid-1980's, selenium levels in subsurface agricultural drainage from the Grassland watershed were determined to be a threat to waterfowl in the wetland areas. A control program adopted in 1988 stressed the use of improved irrigation efficiency to reduce selenium discharges. The program was updated in 1996 to require WDRs for the control of selenium. WDRs for the Grassland Bypass Project, which serves approximately 97,000 acres of irrigated agricultural land, were adopted in 1998. This is an example of the progressive implementation of all three Tiers of the Nonpoint Source (NPS) Management Plan.

The Grassland Bypass Project (GBP) uses the Grassland Bypass Channel and the San Luis Drain to remove agricultural drain water from wetland water supply channels. Prior to 1996, agricultural subsurface (tile) drainage water from approximately 97,400 gross acres of irrigated farmland from the west side of San Joaquin Valley (also known as the Grassland Drainage Area), would enter the Grassland Water District (GWD) from the south, where it was mixed with variable quantities of surface return flows (tailwater) from the Central California Irrigation District (CCID) and other riparian diverters. The commingled water flowed northward through the GWD in ditches and canals leading to Mud Slough and Salt Slough and eventually to the San Joaquin River. The GBP intercepts this drainage water at a point between Dos Palos and Russell Avenue, south of the GWD, and convey it through the existing San Luis Drain for discharge into Mud Slough (north). This system allows agricultural drainage flows to bypass the GWD altogether (USBR, 1996).

The GBP removes contaminated agricultural drainage from approximately 93 miles of wetland water supply channels, but introduces all of the drainage waters into 6 miles of Mud Slough. Discharges from subsurface drainage from this area contain salt, selenium, and boron.

The 1995 Use Agreement that allowed the San Luis and Delta-Mendota Water Authority to use the Bureau of Reclamation's San Luis Drain for the GBP will expire on September 30, 2001. The Bureau of Reclamation and San Luis and Delta-Mendota Water Authority have released a Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) to continue the GBP through December 31, 2009. The Final EIS/EIR addresses the potential environmental impacts of continuing the GBP, as well as how it will progressively reduce selenium loads and other trace elements to meet the 2005 and 2010 water quality requirements for the San Joaquin River (USBR, 2001).

Evaporation Basins

Agricultural evaporation basins are utilized for the disposal of saline drain water where there are no opportunities for discharge into the San Joaquin River. Between 1972 and 1985, 28 evaporation ponds were constructed covering a surface area of about 7,100 acres, mainly in the environs of the Tulare Lake Basin. Prior to 1985, one evaporation basin was regulated by waste discharge requirements (WDRs) and the remaining 27 were regulated by conditional waivers of WDRs. But the Board stopped issuing waivers after Kesterson Reservoir, an evaporation basin in the San

Joaquin River Basin, was closed due to wildlife impacts. Similar to Kesterson Reservoir, there was concern that waterbirds may be impacted adversely by exposure and bioaccumulation of selenium in their food chain at other evaporation sites. These adverse impacts may range from impaired health and condition of adult water birds, reduced hatchability of eggs and embryonic deformity. (EPTC, 1999)

In 1989, studies conducted by the U.S. Fish and Wildlife Service (USFWS) revealed impacts to wildlife in Tulare Lake Basin evaporation basins similar to those found at Kesterson Reservoir. In 1989, after the CVRWQCB circulated the tentative update for the one evaporative basin WDRs, the California Department of Fish and Game (DFG) asked that the cumulative impacts to wildlife from all the basins be addressed. As an interim measure to protect wildlife, pond operators and DFG entered in Memorandums of Understanding (MOUs) regarding basin management. In 1993 the cumulative environmental impact report (EIR) and 14 site specific EIRs were certified by the CVRWQCB and WDRs were issued. (EPTC, 1999)

Presently only 10 basins with a surface area of about 4,900 acres are active and managed by seven operators. The remainder has been voluntarily deactivated due to the high costs of meeting the waste discharge requirements and mitigation measures or closed by order of the SWRCB or CVRWQCB due to toxic effects of selenium to waterbirds from selenium present in the impounded waters. (EPTC, 1999)

Development of TMDLs for Nonpoint Sources

There are currently 150 pollutant waterbody pairs on the 303(d) list of impaired water bodies in Region 5. Water bodies were placed on this list if they were not expected to meet water quality standards even if point sources are regulated to comply with the current level of treatment technology required by law. As a result, most of these listings have a significant nonpoint source component. Discharge from agricultural areas is the primary nonpoint source for many of these TMDLs.

Regional Board staff has considered the severity of the pollution to rank the priority of the listed pollutant / water bodies. This ranking considers:

- Risk to human health and aquatic life
- Degree of public interest and support
- Recreational, economic, and aesthetic importance of a particular water body
- Vulnerability or fragility of a particular water body as an aquatic habitat
- Immediate programmatic needs such as waste load allocations for new or expanding discharges

Considering the above criteria, major tributaries in the Region, including the lower Sacramento and Feather Rivers, lower San Joaquin River, and the Sacramento-San Joaquin River Delta have been ranked highly for a number of pollutants, including organophosphorus pesticides, salt, selenium, and dissolved oxygen. Discharge from agricultural areas is the primary nonpoint source for all these pollutants.

The current TMDL development program is funded through a combination of state and Federal resources. The Regional Board has committed to completing technical TMDLs for many of the highest ranked 303(d) listings. Following is the timeline for completion of technical TMDL reports for the highly ranked TMDLs that have a significant agricultural component:

Waterbody	Pollutant	Completion Date
Lower San Joaquin River	Selenium	July 2001
Lower San Joaquin River	Salt and boron	September 2001
Lower San Joaquin River	Diazinon and Chlorpyrifos	June 2002
Lower Sacramento and Feather River	Diazinon	June 2002
Sacramento-SJR Delta	Diazinon and Chlorpyrifos	June 2003
South Delta	Dissolved Oxygen	June 2003

An additional year or more will be required for Basin Planning and development of implementation plans.

The framework is in place in the existing TMDL program, to identify and list as impaired, waterbodies in which water quality objectives are not currently being met. The framework is in place to priority rank these impaired pollutant water body pairs and develop a timeline of technical TMDL report completion. The framework is also in place to develop implementation plans and adopt components of these technical TMDLs into the Basin Plan. TMDLs provide a comprehensive and fair tool upon which to base watershed-wide water quality control programs to address nonpoint source pollution. Much of the future water quality assessment and regulatory framework to address nonpoint source pollution will be based on these TMDL products. There have been very limited resources in the past to address nonpoint source pollution control. Resources available for TMDL development have increased from nothing in fiscal year 98/99 to $1,780,000 per year in fiscal year 00/01. This level of funding will support continued development, implementation planning, and the basin plan amendment work required for the TMDLs currently underway. Additional funding will be required to fully implement the TMDLs and to concurrently commence work on additional TMDLs. Identification of appropriate management measures and development of the regulatory framework for controlling nonpoint source pollution is most appropriately handled through the TMDL development and implementation program.

AVAILABLE OPTIONS

Future regulation of irrigation return waters could be built on the current guidance provided in nonpoint source publications and regulations, including the SWRCB (2000) *Plan for California's Nonpoint Source Pollution Control Program.* The question is whether water quality protection can be accomplished and what effort is needed to make this happen.

California's Nonpoint Source Pollution Control Program

The goal of the three-tier process outlined in the plan is to attempt to meet water quality objectives using the least intrusive approach. Each of the tiers uses a different level of policies and mechanisms under the Porter Cologne Water Quality Control Act to ensure implementation of the NPS Program Plan and that water quality objectives are achieved. The tiers are presented in order of increasing stringency. The NPS Program Plan recognizes that many NPS problems are best addressed through the self-determined cooperation of stakeholders (Tier 1). For irrigation return flows, there has been a lack of resources to monitor activities or results of Teir 1 efforts.

Where persistent NPS water quality problems are not effectively resolved through self-determined actions, there can be more formal regulatory programs and authorities (Tier 2 and Tier 3). In practice, the RWQCBs will need to determine which or what combination of the three options will be used to address any given NPS problem. Sequential movement through the tiers (e.g., Tier 1 to Tier 2 to Tier 3) is not required of the RWQCBs. Depending on the water quality impacts and severity of the NPS problem, the RWQCBs may move directly to the enforcement actions specified in Tier 3. The current regulation of irrigation return waters through the conditional waiver of WDRs, is considered a Tier 2 approach.

All three options implement BMPs (Best Management Practices). BMPs include, but are not limited to, structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during, and after pollution producing activities to reduce or eliminate the introduction of pollutants into receiving waters. BMPs are means of achieving certain Management Measures (MMs). For example, seeding and mulching of steep slopes at a construction site would be structural BMPs for achieving the MM of erosion control. (SWRCB, 2001)

Tier One (Self-Determined Implementation of Management Practices)

Since its inception in 1988, the "self-determined" or "voluntary approach" to the implementation of BMPs has been central to discussions of the NPS Program. The terms "voluntary" and the "voluntary approach" have been a popular concept grounded in the historic notions of autonomy and self-determination. The definition of "autonomy" also refers to the concept of "moral independence," implying that autonomy also carries with it responsibility and accountability. This is especially critical in situations where individual actions may conflict with the public good.

As a concept the term "voluntary approach" is as important for what it does not mean as for what it does. Compliance with the CWA, CZARA, and the Porter-Cologne Water Quality Control Act is not a voluntary choice. It is the responsibility of the SWRCB and the RWQCBs to see that these laws are enforced. The concept of "self-determined implementation" of NPS control measures was developed to acknowledge the potential capability of landowners and resource managers to develop and implement workable solutions to NPS pollution control and to afford them the opportunity to solve their own problems before more stringent regulatory actions are taken (SWRCB, 2001). For example, for pesticides a voluntary approach would be for a water, irrigation, drainage or reclamation district to recognize that pesticides used within their district boundaries may cause a water quality impact if these pesticides leave the district in irrigation return waters. To ensure that they do not, the district may impose a no tail water policy for individual farmers and enforce it as a district policy. Thus there would be no role for the Regional Board as there would be no threat to water quality.

Property owners and/or managers may implement BMPs through their own initiative or self-determination to meet a policy of no pesticide runoff. Implementation could occur for economic reasons and/or through awareness of environmental benefits. An example of an economic and environmental benefit would be to market the products as pesticide free or as being grown in an environmentally friendly process.

Self-determined implementation can be encouraged through education, training, financial assistance, technical assistance, and demonstration projects. A self-determined approach would take advantage of the expertise and incentives offered by a variety of existing local, State, and federal programs that are geared to promoting private actions which could have water quality benefits. Lead agencies for these programs include the Natural Resource Conservation Service (NRCS), Farm Services Agency, resource conservation districts (RCDs), irrigation, water, reclamation and drainage districts and the University of California Cooperative Extension (UCCE). The recent recommendations of the Irrigated Agriculture Technical Advisory Committee (Irrigated Ag TAC) are focused on the need to make the Tier I process work. A discussion of the specific considerations of the Irrigated Ag TAC is given in the Section entitled 'Technical Advisory Committees' under the major section entitled 'Other Laws and Policies'.

The Irrigated Ag TAC stressed the role of the State and Regional Boards in implementing the Tier I process but there are few if any resources available to allow that participation to take place. Because of resource issues, the Regional Board normally does not get directly involved in implementation of Tier I actions. When the Regional Board becomes involved, the water quality problem is normally at a severe enough level that Tier I actions have not succeeded.

The process described by the Irrigated Ag TAC included the following six steps (shown in italics) and are discussed here in relation to controlling pesticide runoff:

- *Step 1: Define/Assess Pollution*

The SWRCB and RWQCBs should coordinate a statewide assessment. Local advisors and land users such as Resource Conservation Districts, County Agricultural Commissioners, Farm Bureau, U.C. Cooperative Extension, Natural Resource Conservation Service (formerly the

Soil Conservation Service), and local irrigation and water districts should be active participants.

The Regional Board could coordinate such an effort but there are no resources available to fund that participation. A coordinated statewide effort would mean that irrigation, water supply, reclamation and drainage districts would need to be active participants in making this assessment. To date, none of these agencies have shown any interest in conducting such a program when it involves pesticides and it would likely only be done under a Board order. If a Board order were issued it would not be a Tier I approach as suggested by the Irrigated Ag TAC.

- *Step 2: Prioritize*

With local advisors, the SWRCB should prioritize NPS pollution problems. Two levels of priorities are necessary, the state level and the watershed level. At the state level establish which watersheds have the most severe problems and set statewide priorities based on resource allocation and potential health and environmental risks. On the local level, pollutants need to be ranked and local stakeholders identified.

The Watershed Management Initiative (WMI) was approved by the State Board in 1995 and is used to set State and Regional Board goals and priorities. This process is used to recognize the differences between regions and between watersheds within a region. The Central Valley Regional Board annually revises its WMI Chapter to reflect changing priorities and conditions in the region. Irrigated agriculture and the impacts from its return flows and storm water runoff from irrigated lands are noted in the chapter as high priority issues to be worked on. The priorities in these chapters are then used to set funding priorities within the region.

There are two constraints. The first is that, in reality, there are no resources for the Central Valley Region to accomplish a creditable WMI review much less an implementation program. When the Legislature provided resources to the regions for conducting the WMI process, they were not sufficient for a full program. Each of the nine regions in the state was then given an equal amount of resource to conduct this program. Thus the Central Valley Region, which covers 40% of the state, has 80% of the developed water supply and 90% of the state's irrigated agriculture, received 1/10th of the statewide resources allocated by the legislature to implement this program. They are totally inadequate to implement a watershed assessment program much less a watershed outreach program that is staff resource intensive.

The second constraint is that resources that the Region receives are closely tied to specific programs and to specific outputs. Therefore there is little, if any, flexibility in reallocating resources between programs. The majority of the funding has been directed at the Core Regulatory Programs of the Board that focus on point source dischargers. Irrigated agriculture is a nonpoint source of pollutants and therefore has not been considered eligible for that funding source. Diversion of moneys from the Core Regulatory Program would also make the present backlog of permitting issues worse than it is at present and would not be acceptable to the legislature.

- *Step 3: Watershed Groups*

In each prioritized watershed, a "watershed group" will assemble. Members include land users, environmental and other public interest groups, and other stakeholders, Regional Water Quality Control Board representatives, technical assistance agencies, and industry groups. These watershed groups provide a forum for goal setting and solution development.

Our experience is that unless the Regional Board plays an active role in planning, developing and implementing a 'watershed group', there is little likelihood that such a group would form and succeed. There is no evidence, at present, that such a group has successfully implemented a pesticide control program other than that caused by a regulatory action or a proposed action. Under those circumstances, it would not be considered a Tier I action. One of the primary reasons is that many local groups do not want to be involved in controlling or regulating pesticides, traditionally a role of the DPR.

The Sacramento River Watershed Program is one success story of a group forming to solve common problems. This group did not form, however, on its own. The funding for this program came from the USEPA. They are now into their sixth funding cycle for this program with over $10 million expended. The Regional Board does not have this level of funding to initiate such a program elsewhere. Another success story of a watershed group is the San Joaquin River Management Program. They laid out a series of actions that needed to be taken in the basin for water supply, habitat, flood protection and water quality. None of these actions, however, involved pesticides even though evidence was presented to the group on the water quality impacts from pesticides, especially organophosphorus pesticides (OPs). The recommended actions, which do not involve pesticides, are being implemented as resources are made available. Participation in this program was mandated by legislation although no funding was made available for participation. Other programs were used to support the Board's participation in this program. This flexibility does not exist under present funding arrangements.

- *Step 4: Watershed Plan*
  Watershed groups develop watershed plans, which describe alternative practices and methods of implementation. Examples of practices and methods for solving NPS pollution problems can be found by specific pollutants in Appendix D of the report. The watershed plan is then submitted to the RWQCB for incorporation into its basin plans.

The Regional Board is working with the Sacramento River Watershed Program to develop management practices for control of OP Pesticides. This process is staff intensive and if the Regional Board's participation were not funded directly from USEPA for participation is this program, we would not be able to allocate enough resources to play an effective role. This resource intensive effort is similar to the stakeholder process currently going on with the TMDL development process. Board staff is being criticized for not playing a more active role in forming a similar group in the San Joaquin River Basin but time and resources do not allow this. Forming such a group and getting them coordinated is a time consuming process that is under considerable criticism for the length of time taken in the process. The success of the Sacramento River Watershed Program has been the result of hiring of a full time watershed coordinator. No such funding source is available for efforts like that in other watersheds. On the flip side of the argument is that if this watershed group helps develop the plan and once a plan is agreed upon, it is assumed that the groups participating have buy-in on the need for implementation and will assist in implementation. It is unclear how this will be done for pesticide runoff since there are multiple levels of regulatory authority, including the State and Regional Boards, DPR, the County Agricultural Commissioners and the Pest Control Advisors who apply the products.

- *Step 5: Implement Practices*
  The Regional Board adopts the watershed plan as part of its basin plan. Local water users implement needed practices with the leadership and technical assistance of the watershed group.

The Regional Board does not receive sufficient resources to conduct this level of Basin Planning. The lack of an up-to-date Basin Plan has been identified as a major constraint to the implementation of most of the Core Regulatory Permitting program. It also impacts the effectiveness of the nonpoint source management plans developed by local watershed groups. There is little hope that a plan developed by one of these groups would be placed into the Basin Plan in the near future. An additional constraint is that putting a watershed plan into the Basin Plan does not excuse a discharger, including irrigated agriculture, from compliance with Water Code § 13260 that requires any person discharging waste to file a ROWD.

A benefit to having the watershed plan placed into the Basin Plan is that implementation is then part of the California Water Code and all agencies (local and state) are expected to pursue projects that meets these goals. In addition, the Basin Plan could describe the process the Board will use if implementation does not take place but this may not starve off the need to comply with Water Code § 13260. Even if a plan is formally adopted into the Basin Plan and the dischargers file a ROWD, there is no assurance that resources will become available to implement the program.

- *Step 6: Evaluate/Modify*
  After initial implementation, groups involved in Step 1 join with the watershed group to assess how the plan is working. The program is evaluated and modifications that may improve its effectiveness are made if warranted.

This would involve a strong coordinated effort by all parties in the watershed. Often groups do not want to carry the expense of monitoring outside their own project area, especially the expense of monitoring for pesticides. Recently the Board was provided resources to conduct an ambient surface-water monitoring program to detect changes in water quality. The program is just beginning and unfortunately the recommendations of the Advisory Group to the State Board on this monitoring program do not emphasize project monitoring. The Watershed groups will need to conduct the monitoring and there is no evidence that such a group can accomplish this monitoring, especially pesticide monitoring, without strong outside input.

Examples of the Tier I approach are given in **Table 8.**

Tier Two (Regulatory-Based Encouragement of Management Practices)

In general, the Porter Cologne Water Quality Control Act constrains the Board from specifying the manner of compliance with water quality standards. However, the Board has three ways to use it regulatory authorities to encourage implementation of BMPs; through issuance of a conditional waiver of waste discharge requirements, entering into Management Agency Agreements (MAAs) with other federal, State or local agencies with regulatory authority or using Water Code § 13267 to require monitoring for a management plan for water quality improvement.

Table 8.
Description and Use of the Tier One Approach (SWRCB, 2001)

TIER	DESCRIPTION OF APPROACH	EXAMPLES OF THE TIER ONE APPROACH
Tier One: Self-determined Implementation of Best Management Practices	Landowners and resource managers implement MMs/BMPs to achieve water quality standards. The Board may rely on implementation of MMs and BMPs to demonstrate compliance with, but cannot excuse violation of, water quality standards. Self-determined implementation is encouraged through incentives and technical assistance offered by State and federal programs that promote resource stewardship to achieve water quality benefits and to comply with statutory requirements. Agencies that provide such programs include the SWRCB, RWQCBs, DOC, NRCS, Farm Services Agency (FSA), RCDs, and UCCE. Self-determined implementation is encouraged through the recognition by landowners and resource managers that this tier allows the discharger "*self-determination*" in complying with statutory requirements than the more-stringent Tiers Two and Three.	• Financial support for local watershed stewardship projects (CWA §319) • Sacramento Watershed Program fostering stewardship • Urban pesticide committee education efforts

First, the Board may encourage the use of BMPs by waiving adoption of WDRs on condition that dischargers comply with certain BMPs. The statutory mandate that WDRs be adopted can be waived by a Regional Board "*where such waiver is not against the public interest*" (Water Code §13269). On 26 March 1982, the Central Valley Regional Water Quality Control Board (CVRWQCB) adopted Resolution No. 82-036 waiving Waste Discharge Requirements For 23 Types Of Discharge. Irrigation return water was one of the categories listed in that Waiver Policy. The conditions listed for the irrigation return water waiver were that the discharges be "*operating to minimize sediment to meet Basin Plan turbidity objectives and to prevent concentrations of materials toxic to fish or wildlife*". Storm water runoff, which could include that from irrigated lands, was also a listed category. The conditions for the waiver for storm water runoff were that the discharges be done "*where no water quality problems are contemplated and no federal NPDES permit is required*" (CRWQCB, 1982). The Board has been using this waiver since that time unless a specific discharge has been shown to be a problem (see discussion on "Existing Programs"). The current agricultural return flow and storm water waivers will expire on January 1, 2003 as stipulated in SB 390 (Water Code § 13269(b)). Evaluating the continuing applicability of this waiver may include a review of the original justification for the waiver:

- Is the waiver still in the public interest?
- Does the waste discharge have an adverse effect on the waters of the state?

- Have irrigation return water dischargers self-regulated their discharges and thereby protected the waters of the state?
- Do local government or other state agencies effectively regulate irrigation return water dischargers?
- Is the state-of-the-art able to make significant improvements in irrigation return waters?

Alternatively, the SWRCB and the RWQCBs may enforce BMPs indirectly by entering into MAAs with other agencies that have the authority to enforce BMPs. Such authority derives either from the agency's regulatory authority or its management responsibility for publicly owned or controlled land. MAAs will include (or reference) specific, acceptable BMPs and their means of implementation. Both the SWRCB and the RWQCBs can enter into MAAs. The SWRCB is developing or has existing MAAs and MOUs with several State and federal agencies having statewide jurisdiction. SWRCB MAAs should specify acceptable BMPs and how they will be implemented. Formal agreements between the SWRCB and other agencies pertaining to the prevention and abatement of NPS pollution could then be referenced in the Board's Basin Plan and then becomes the primary basis for determination of compliance with State requirements. The Board can also seek agreements, where appropriate, with local agencies, such as cities, counties and local water agencies. For example, the Board could seek an MAA with the counties over control of storm water runoff from irrigated lands or with local water agencies over control of return flows containing pesticides.

On 23 December 1991, the SWRCB signed a MOU with the California Department of Pesticide Regulation (DPR) to ensure that pesticides registered in California are used in a manner that protects water quality and the beneficial uses of water while recognizing the need for pest control. Under the MOU, the SWRCB and nine Regional Boards are responsible for protecting the beneficial use of water in California and for controlling all discharges of waste into waters of the state while DPR is the lead agency for pesticide regulation in California. While the MOU defined the roles of the two agencies, it was unclear how the MOU would be operated when a pesticide use was causing a water quality problem.

The MOU was to be implemented by both agencies by promoting the use of Best Management Practices (BMPs). Initially this was to be done using voluntary compliance to be followed by regulatory-based encouragement of BMPs as circumstances dictated. Mandatory compliance, however, would be based, whenever possible, on DPR's implementation of regulations and/or pesticide use permit requirements. However, the SWRCB and Regional Boards retain ultimate responsibility for compliance with water quality objectives. The agreement was revised on 19 January 1993 as an MAA to facilitate implementation of the original agreement. The Management Agency Agreement (MAA) between the SWRCB and DPR specifies how pesticide-related water quality issues are addressed. The Regional Boards continue to be primarily responsible for the protection of water quality, but in general DPR uses its regulatory authority over pesticide use in an effort to correct problems before the water quality regulatory process is employed. A four-tier process similar to the State Board's three-tier NPS Program Plan is used in most situations. The Regional Boards can take regulatory action at any time they feel it is necessary (CRWQCB, 1998).

The County Agricultural Commissioner is the local enforcement agent for DPR. The Ag Commissioners manage programs and agricultural enforcement activities at the county level as mandated by the California Food and Agricultural Code. Some of these laws and regulations include pest prevention and plant quarantine, insect, disease and vertebrate pest management, noxious weed control and pesticide use enforcement for DPR. There are agricultural commissioners in all of the Central Valley counties. There is nothing to prevent the Regional Board from entering into a MAA with the local Agricultural Commissioner through the County Board of Supervisors. This has not been done in the Central Valley.

The role of each agency in dealing with the water quality impacts outlined by the Petitioner is unclear. The pesticides in the irrigation return water could be interpreted as a waste discharge because the pesticide was used according to the label. It was the application of irrigation water and the release of that water that causes the water quality impact. The Water Code is fairly clear under such circumstances and even though this is defined as a nonpoint source, this could be regulated similar to a point source. If the Board chooses, it could move forward under the MAA to regulate these discharges.

The discharge that results from a storm water runoff from agricultural lands is less clear. The runoff of the pesticide is the result of the pesticide use and not the application of irrigation water. The runoff results from rainfall that may not be controllable by the discharger but there may be the need to modify the label on the pesticide to restrict its use during periods of impending rainfall. Changes in the labeling requirements would be within the authority of DPR and not the Board.

RWQCBs will generally refrain from imposing effluent requirements on dischargers who are implementing BMPs in accordance with a waiver of WDRs, an approved MAA, or other SWRCB or RWQCB formal action. Once the SWRCB or RWQCB has formally approved BMPs, they will become the primary mechanism for meeting water quality standards. While compliance with BMP requirements cannot excuse a violation of water quality standards, the RWQCBs may rely on the implementation of BMPs to demonstrate compliance with standards. The Board also has the discretion in deciding what BMPs to encourage through conditional waiver of WDRs or inclusion in an MAA. The Board does not need to adopt BMPs into basin plans for these purposes but may do so to facilitate region wide application (SWRCB, 2001).

The third mechanism that the Board has available is the use of Water Code § 13267 where the Board can require any person or entity within the region who is discharging or proposing to discharge waste to furnish the Board with technical or monitoring reports on the discharge. This type of report could be used to obtain verification that dischargers are following specific management practices and/or obtain monitoring that verifies that water quality objectives are being met. This was used to initially determine the extent of selenium discharges within the Central Valley in 1984-85. Sixty-eight water, drainage, irrigation and reclamation districts were asked under this section of the Water Code to monitor their discharges for selenium and boron to determine the load that they contributed to the San Joaquin River system. All the agencies complied and allowed the Board to focus resources on the actual problem area (a small percentage of those who discharged) and develop a TMDL for future regulation of selenium discharges. A similar effort could be used for the pesticide discharges however the agencies

previously used may not have the expertise to be immediately capable of conducting such monitoring nor would they be eager to imply acceptance of responsibility for such discharges. These agencies may participate in an irrigation return flow-monitoring program but would not readily accept responsibility to conduct storm water monitoring. This same approach is often used to require water quality protection plans from dairies that need to upgrade their facilities.

Examples of the Tier II approach are given in **Table 9.**

Table 9.
Description and Use of the Tier Two Approach (SWRCB, 2001)

TIER	DESCRIPTION OF APPROACH	EXAMPLES OF THE TIER TWO APPROACH
Tier Two: Regulatory- Based Encouragement of Management Practices	RWQCBs may work with landowners and resource managers to waive the adoption of WDRs or a waste discharge prohibition on the condition that MMs and BMPs will be implemented to correct or prevent NPS pollutant(s) of concern. The SWRCB and RWQCBs may enforce MMs and BMPs by entering into MAAs with other agencies that have authority to enforce the implementation of appropriate MMs and BMPs. RWQCBs may require monitoring and reporting under Water Code § 13267.	• MAAs with DPR • Required submittal of agricultural drainage operation plans (RWQCB-5) • Agricultural Nutrient Management Plans-Newport Bay (RWQCB-8) • Use of Water Code § 13267 to initiate water quality monitoring.

Tier Three (Effluent Limitations and Enforcement)

The current waiver of WDRs remains in place until it expires in 2003 unless the Board decides to revoke or review the present waiver. In absence of a waiver, the following options are available for regulation of discharges that pose a threat to water quality:

- Individual WDRs
- General WDRs
- Area wide WDRs
- Prohibition of Discharge

Waste Discharge Requirements (WDRs)

State law requires that any person discharging waste or proposing to discharge waste that could affect water quality (other than to a community sewer system) file a complete report of waste discharge (ROWD)(Water Code §§13260 and 13264). This requirement also includes NPS discharges. If an application is received, the Board must prescribe WDRs or adopt a waiver. Under some circumstances the Board can waive the filing of a ROWD.

If prescribed, WDRs have two main components: the waste discharge orders and a monitoring and reporting program. The waste discharge orders specify what is necessary to comply with the requirements themselves. Although the Board cannot specify the manner of compliance with waste discharge limitations (with certain exceptions), in appropriate cases the Board can set limitations at a level that, in practice, requires implementation of BMPs. The format of the monitoring and reporting portion of the WDRs identifies what the monitoring and reporting program requirements are. Once issued, compliance and water quality protection are legal responsibilities of the WDR holder. Violations would be grounds for enforcement measures (SWRCB, 2001).

WDRs could be one of three types; individual WDRs, General WDRs or Area wide WDRs. Each is used in various scenarios.

Individual WDRs: Individual permits are issued to dischargers allowing discharge of specified quantities and qualities of waste to land or surface waters. The limitations placed on the discharge are designed to ensure compliance with water quality objectives in the Basin Plans. To obtain a permit, the discharger must submit a ROWD and the requirements of CEQA must be met. All dischargers must submit monitoring reports and most dischargers pay an annual fee.

The Board can use this approach to regulate any discharge to surface waters containing pesticides. The discharger would be responsible for providing enough information regarding the chemicals and volumes to be discharged and receiving waters to allow preparation of a WDR. Annual fees would cover staff costs and the discharger would cover monitoring costs. If this were used, each farmer discharging wastewater, potentially tens of thousands, would be required to apply. Few, if any, of the farmers would be prepared or capable of conducting the water quality monitoring.

An option is to organize a public entity that is willing to take responsibility for the drainage water regulation and monitoring. This approach was used in the Grassland Bypass Project. Individual requirements have been issued to each of the evaporation basins in the Tulare Lake Basin.

General WDRs: The Board could adopt a general WDR setting limits that must be met by a specified type of discharger but the Board would likely carry the responsibility for conducting a CEQA evaluation, including preparing a CEQA document addressing the WDRs. Individual dischargers would submit a Notice of Intent to comply with the order in lieu of a ROWD. This type of Order could be used to regulate a category of dischargers or those dischargers that do not meet the conditions for a waiver of WDRs.

As with the individual WDRs, the Board could receive tens of thousands of Notices of Intent to comply resulting in a significant administrative burden. This approach has not been used in the Central Valley for nonpoint sources. It is used for the storm water program that is significantly under funded to conduct compliance inspections and reviews of monitoring that is presently conducted. Regional Board 8 has used a General NPDES Permit for regulation of 350 dairy facilities but this requires a staff of 7 to conduct the compliance monitoring and inspections along with follow-up enforcement actions.

Area wide WDRs: The Board may adopt an area wide strategy using either irrigation districts or return flow groups. Area wide WDRs would set limits that must be met by a specified type of discharge along with a CEQA document addressing the permit.

The Board issued area wide WDRs in the 1970's when the Clean Water Act required NPDES permits for irrigation return flows. The NPDES permits were rescinded when the law changed, but this approach could be used to address local water quality issues. The Board could rank the irrigation districts according to their impacts on water quality. The agencies that most degrade water quality would be issued WDRs first. The irrigation districts with lower list status, and thus less threat to water quality, would have a grace period to improve the quality of their irrigation return water and thus avoid WDRs. If irrigation districts issued WDRs demonstrated improvement of their irrigation return waters, their WDRs could eventually be withdrawn.

Prohibition of Discharge

The Board, in a water quality control plan or in WDRs, may specify certain conditions or areas where the discharge of waste, or certain types of waste, will not be permitted. (Water Code § 13243). This process would allow the Board to address a large number of discharges in any area. When adopted into the Basin Plan, other state and local agencies must operate in compliance with the prohibition (Water Code § 13247), and thus would directly or indirectly assist in obtaining compliance. A prohibition of discharge has been used to control the discharge of rice pesticides into the Sacramento River. In this case, the prohibition is conditional. In 1990, the Board adopted a conditional prohibition of discharge for irrigation return flows containing five specific pesticides commonly used on rice fields. This prohibition is waived if the discharger is following management practices approved by the Board. A prohibition of discharge in WDRs has been used to prohibit discharge at several evaporation basins in the Tulare Lake Basin.

Enforcement

The Board can enforce requirements on any proposed or existing waste discharge, including NPS discharges. While many of the NPS Program activities support and promote self-determined implementation, the SWRCB and the Regional Boards have a wide array of enforcement mechanisms at their disposal that can be utilized. Enforcement actions may be considered to address circumstances including, but not limited to, the following: (1) violation of an effluent limit, receiving water limit, or discharge prohibition contained in an order or basin plan adopted

by the Board; (2) an unauthorized spill, leak, fill, or other discharge; and (3) failure to perform an action required by the Board, such as submittal of a self-monitoring or technical report or completion of a clean-up task by a specified deadline.

It is important to note that enforcement of State water quality statutes is not solely the purview of the Boards. State law allows members of the public to petition the SWRCB to review permitting and enforcement actions or inactions by the Board. In addition, the Water Code provides for public participation in the issuance of orders, policies, and Basin Plans.

The Board has a variety of enforcement tools to use in response to noncompliance by dischargers. An enforcement action is any formal or informal action taken to address an incidence of actual or threatened noncompliance with existing regulations or provisions designed to protect water quality (SWRCB, 2001).

Informal Enforcement: For minor violations, the first step is usually informal enforcement action. The discharger is informed of the specific violations and is provided information as to how and why the violations occurred and how and when the discharge must come back into compliance. This step can be deleted for significant violations, such as repeated or intentional illegal discharges and falsified reports. The usual method of informal enforcement is using a Notice of Violation (NOV). NOV have been used with success for nonpoint sources, including the evaporation ponds, irrigation management areas, subsurface water discharges and dairy waste applications.

Formal Enforcement:. Formal enforcement actions fall into two basic categories: (1) those that direct future actions by dischargers and (2) those that address past violations. Actions that generally direct future action include notices to comply (NTCs), imposition of time schedule orders (TSOs), and issuance of cleanup and abatement orders (CAOs). Actions taken to address past violations, include CAOs, rescission of WDRs, administrative civil liabilities (ACLs), and referral to the attorney general (AG) or district attorney (DA). In some instances, both types are used concurrently to deal with a specific violation (e.g., discharger has had past violations but has not yet corrected the problem). Formal enforcement actions have been taken regarding discharges to the evaporation basins in the Tulare Lake Basin.

Examples of Tier Three approaches are given in **Table 10.**

A summary description of all the options that the Board can consider to regulate waste discharges or options under the three-tiered approach is presented in **Table 11**. It describes their potential use relative to discharges from irrigated agriculture. When dealing with a category of dischargers, it is common to use a combination of actions. For example, the Basin Plan may describe the regulatory program the Board will use to achieve compliance with a water quality objective. Under this program, most parties in a category of dischargers may operate under a waiver of WDRs, while individual WDRs may be adopted for those that do not meet waiver conditions.

Table 10.
Description and Use of the Tier Three Approach (SWRCB, 2001)

TIER	DESCRIPTION OF APPROACH	EXAMPLES OF THE TIER THREE APPROACH
Tier Three Effluent Limitations and Enforcement	RWQCBs can adopt and enforce requirements on any proposed or existing waste discharge, including discharges from NPS. Although RWQCBs are generally precluded from specifying the manner of compliance with waste discharge limitations, in appropriate cases limitations may be set at a level, which, in practice, requires implementation of MMs and BMPs. In addition, the SWRCB and RWQCBs have a variety of enforcement tools—such as cease and desist orders (CDOs) and ACLs—that can be used in response to noncompliance.	• WDRs for commercial nurseries – Newport Bay (RWQCB-8) • WDR for selenium for San Joaquin River (RWQCB-5) • WDRs for dairies" • Conditional Prohibition of discharge for rice pesticides

Table 11
REGIONAL BOARD REGULATORY AND ENFORCEMENT MECHANISMS

ACTION	DESCRIPTION OF ACTION	POTENTIAL USE
Tier One		
Watershed Management Plans	Stakeholders within a watershed, including representatives of the Regional Board, develop and implement a plan to protect water quality and achieve other goals such as enhancement of the fishery or flood protection.	Use of the watershed approach is part of the Regional Board's Strategic Plan. While it often involves coordinated cooperative efforts, it does not preclude the use of regulatory tools to control discharges. Plans developed through the watershed process can be incorporated into the Basin Plan or WDRs.
Tier Two		
Basin Plan Amendment	The Basin Plan specifies the beneficial uses and water quality objectives for waters in the Region. It contains an implementation program for meeting the objectives.	The Basin Plan describes how the Board will address various categories of discharges. It already contains detailed descriptions of control programs addressing rice pesticides, selenium and evaporation basins. The plan can set timetables and establish a prohibition of discharge.
Waivers	The requirement to submit a ROWD or obtain a waste discharge requirement may be waived by the Board for specific discharges where such waivers are not against the public interest. Such waivers must be conditional and may be terminated at any time by the Board. (Water Code Section 13269)	Waiver conditions can require actions by the discharger such as compliance with specified management practices and submittal of monitoring reports. If the ROWD is not waived, the discharger must provide sufficient information to verify that waiver conditions will be met. If the discharge qualifies for a waiver, all or a portion of the filing fees can be refunded (Water Code Section 13260 (e)). That portion of the fees retained would cover review of the proposed discharge.
Memorandum of Understanding/Management Agency Agreements	The Board enters into an MOU or MAA with another agency to formally specify the relationship between the two organizations. The MAA often provides more detail and entrusts the other agency with additional responsibilities with respect to water quality control efforts.	The State Board has already signed a MAA with California Department of Pesticide Regulation that addresses water quality issues related to pesticides. Additional MOUs/MAAs could be developed with other agencies.

ACTION	DESCRIPTION OF ACTION	POTENTIAL USE
Request for Technical Information	The Board may require any person discharging or proposing to discharge waste to furnish technical or monitoring reports.	This type of report could be used to obtain verification that dischargers are following specific management practices and/or obtain monitoring that verifies that water quality objectives are being met.
Tier Three		
Waste Discharge Requirements	Individual permits are issued to dischargers allowing discharge of specified quantities and qualities of waste to land or surface waters. The limitations placed on the discharge are designed to ensure compliance with water quality objectives in the Basin Plans. To obtain a permit, the discharger must submit a Report of Waste Discharge and the requirements of CEQA must be met. All dischargers must submit monitoring reports and most dischargers pay an annual fee.	The Board can use this approach to regulate any discharge to surface waters. The discharger would be responsible for providing enough information regarding the chemicals and volumes to be discharged and receiving waters to allow preparation of a permit. Annual fees would cover staff costs and the discharger would cover monitoring costs.
General Waste Discharge Requirements	The Board adopts a general permit setting limits that must be met by a specified type of discharger along with a CEQA document addressing the permit. Individual dischargers submit a Notice of Intent to comply with the order in lieu of a Report of Waste Discharge	This type of Order could be used to regulate a category of dischargers or those dischargers that do not meet the conditions for a waiver of WDRs.

ACTION	DESCRIPTION OF ACTION	POTENTIAL USE
Areawide Waste Discharge Requirements	The Board may adopt an areawide strategy using either irrigation districts or return flow groups. These permits set limits that must be met by a specified type of discharge along with a CEQA document addressing the permit.	Areawide WDRs were issued by the Board in the 1970's when the Clean Water Act required NPDES permits for irrigation return flows. The NPDES permits were rescinded when the law changed, but this approach could be used to address local water quality issues. The Board could rank the irrigation districts according to their impacts on water quality. The agencies that most degraded water quality would be issued WDRs first. The irrigation districts with lower list status, and thus less threat to water quality, would have a grace period to improve the quality of their irrigation return water and thus avoid WDRs. If irrigation districts issued WDRs demonstrated improvement of their irrigation return waters, their WDRs could eventually be withdrawn.
National Pollutant Discharge Elimination System (NPDES) Permits	NPDES permits are issued by the Board pursuant to the federal Clean Water Act. They are used to regulate discharges from point sources such as sewage treatment plants and storm water to surface waters. As a result of 1977 amendments to the law, these types of permits are not applicable to nonpoint sources such as agricultural return flows. In California, the NPDES permits are also WDRs and serve the same purpose - to restrict the volume and concentration of waste discharged in order to ensure compliance with Basin Plan objectives.	This type of permit is routinely issued to point source dischargers. Federal laws and regulations do not allow issuance of NPDES permits for irrigation return flows or storm water runoff from agricultural lands.
Cleanup and Abatement Orders	This is an enforcement order that directs a discharger to clean up waste, abate the effects of the waste, or to take other remedial action. It can be issued by the Board or the Executive Officer to parties that have caused or threaten to cause a condition of pollution of nuisance. No CEQA document must be prepared prior to issuance of such an order.	This type of enforcement action is best applied to individual parties that are conducting activities that require prompt attention. The legality of applying this type of order to a class of dischargers (such as those parties discharging a specific pesticide) is questionable.

ACTION	DESCRIPTION OF ACTION	POTENTIAL USE
Cease and Desist Orders	This is an enforcement order issued by the Board to dischargers that are in violation or threaten to violate WDRs or discharge prohibitions. The order can direct the discharger to comply forthwith, comply in accordance with a timetable or to take preventative action to avoid threatened violations.	Under the present circumstances, this type of order would have limited use in the control of pesticides from nonpoint sources. The Board would have to have WDRs or prohibitions in place for this type of order to apply.
Prohibition of Discharge	The Board, in a water quality control plan or in WDRs, may specify certain conditions or areas where the discharge of waste, or certain types of waste, will not be permitted. (Water Code Section 13243)	This process would allow the Board to address a large number of discharges in any area. When adopted into the Basin Plan, other state agencies must operate in compliance with the prohibition (Water Code Section 13247), and thus would directly or indirectly assist in obtaining compliance.

DISCUSSION

In 1975, National Pollutant Discharge Elimination System (NPDES) Permits were placed on 24 agricultural water supply and drainage entities. Based on recommendations from a State Board Technical Advisory Committee (TAC), these permits focused on monitoring irrigation return waters. This monitoring ceased in 1977 when the 95th Congress excluded irrigation return waters from the NPDES permit program.

The monitoring conducted showed no distinct problem except for sediment levels. No pesticide monitoring was conducted, however. The Board focused efforts on sediment during the 1977-81 period using primarily federal 208 planning grants. The 208-planning program recommended that the Board encourage the use of best management practices to regulate these low threat sediment discharges.

The recommendation of the Technical Advisory Committee (TAC) and the results of the sediment monitoring indicated that the Board needed to focus its resources on more important water quality problems. This did not remove the need for all of irrigated agriculture to file a report of waste discharge as required by Water Code § 13260. To avoid an administrative process that would not likely result in any significant water quality improvement, the Board needed to consider whether it would not be against the public interest to waive waste discharge requirements (WDRs) for irrigation return waters as permitted under Water Code §13269. In 1982, the Board adopted Resolution No. 82-036 waiving WDRs for 23 categories of low threat discharges (CRWQCB, 1982). Irrigated lands generate discharges in two of these categories – irrigation return waters and storm water.

Specific conditions must be met to receive a waiver of WDRs. Discharges of irrigation return waters must be "*Operating to minimize sediment to meet Basin Plan turbidity objectives and to prevent concentrations of materials toxic to fish or wildlife.*" WDRs are waived for storm water "*Where no water quality problems are contemplated and no federal NPDES permit is required.*"

The staff report developed at the time Resolution No. 82-036 (went to the Board indicates that the Executive Officer would determine whether discharges pose a threat to water quality. If there is no potential to impact water quality, the Board has no jurisdiction and there is no requirement to submit a Report of Waste Discharge (ROWD) except in cases where it is determined that additional information is needed.

As a result of recent changes to the Water Code (§13269(b)), all the waiver categories in Resolution 82-036 will sunset at the end of 2002 if the Board takes no action to renew them. Any new waivers adopted by the Board after 1 January 2000 must be reviewed at least every five years and the Board must require compliance with any conditions placed on a waiver. If a new waiver is adopted, the new law requires that the Board must also indicate whether the discharge would be subject to general or individual WDRs if the waiver conditions were not met. If no action were taken, the default approach for regulating discharges that pose a threat to water quality would be issuance of individual WDRs.

Due to the extent of irrigated agriculture in the Central Valley and limitations on staff resources, the Board has historically had to prioritize efforts to address water quality impacts associated with irrigation land use. For the past two decades, the Board has focused its efforts on the most serious water quality problems associated with irrigation return waters. The Board continues to waive WDRs for low priority discharges from irrigated lands while focusing its limited resources on specific regulatory control efforts.

Rather than call for submittal of ROWDs, the Board's program has focused on promotion of voluntary compliance with management practices that minimize discharges of pollutants. Where the Board determines that a threat to water quality exists, other regulatory actions have been used, including discharge prohibitions and regulation under WDRs. In the irrigation return water category, WDRs have been used to regulate evaporation basins in the Tulare Lake Basin and to regulate return flows from the Grassland Bypass Project (GBP). A conditional discharge prohibition has also been utilized in regulating discharges from some irrigated rice acreage in the Sacramento Valley. No WDRs or other regulatory mechanisms have been issued for storm water discharges from agricultural lands. Each of these documented problems was handled outside the waiver policy and specific regulatory actions were taken for each.

Recently the Board has been directed to develop a regulatory program for salinity and boron discharges on the San Joaquin River that may eventually require increased regulation of irrigation return flows. In addition, the Association of California Urban Water Agencies is requesting the Board take a closer look at drinking water issues, including trihalomethane precursors that may be caused in part by irrigation return flows from Delta Islands.

In the early 1990's the State Water Resources Control Board (SWRCB) adopted the Inland Surface Waters Plan under which the Board was asked to evaluate the extent of agriculturally dominated water bodies. This work was completed in 1992 and showed over 20,000 miles of these types of water bodies in the Central Valley. This evaluation was to follow with a monitoring program to evaluate the health of representative water bodies but with the loss of the Plan by Court decision, little emphasis was placed on the monitoring effort. Board staff, working with others, including the agricultural chemical industry and DPR conducted an in stream monitoring program that has noted aquatic life toxicity in the main streams, rivers and tributaries within the Valley Floor of the Central Valley. The toxicity, although not completely defined at times, points primarily toward pesticides. There were two pesticides, Diazinon and Chlorpyrifos, that were noted frequently. When toxicity was noted, that water body has been listed on the Section 303(d) list as impaired.

There are currently 150 pollutant water body pairs on the 303(d) list of impaired water bodies in Region 5, many as the result of toxicity due to pesticides or unknown toxicity. Most of these listings have a significant nonpoint source component. Discharge from agricultural areas is the primary nonpoint source for many of these listings.

Regional Board staff has considered the severity of the pollution to rank the priority of the listed pollutant or water body. This ranking shows that major tributaries in the Region, including the lower Sacramento and Feather Rivers, lower San Joaquin River, and the Sacramento-San Joaquin River Delta have been ranked highly for a number of pollutants, including organophosphorus

pesticides, salt, selenium, and dissolved oxygen. Discharge from irrigated areas is the primary nonpoint source for all these pollutants. Because most of these pollutants are from nonpoint sources, there is no waste loadings available upon which to implement a regulatory program nor a defined regulatory program procedure to deal with each specific type of problem. These are being developed under the Total Maximum Daily Load (TMDL) requirements of the federal CWA.

The current TMDL development program is funded through a combination of state and Federal resources. The Regional Board has committed to completing technical TMDLs for many of the highest ranked 303(d) listings. Following is the timeline for completion of technical TMDL reports for the highly ranked TMDLs that have a significant agricultural component:

Waterbody	Pollutant	Completion Date
Lower San Joaquin River	Selenium	July 2001
Lower San Joaquin River	Salt and boron	September 2001
Lower San Joaquin River	Diazinon and Chlorpyrifos	June 2002
Lower Sacramento and Feather River	Diazinon	June 2002
Sacramento-SJR Delta	Diazinon and Chlorpyrifos	June 2003
South Delta	Dissolved Oxygen	June 2003

An additional year or more will be required for Basin Planning and development of implementation plans.

The framework is in place in the existing TMDL program, to identify and list as impaired, waterbodies in which water quality objectives are not currently being met. The Board ranks these impaired pollutant waterbody pairs and develops a timeline of technical TMDL report completion. The framework is also in place to develop implementation plans and adopt components of these technical TMDLs into the Basin Plan. TMDLs provide a comprehensive and fair tool upon which to base watershed-wide water quality control programs to address nonpoint source pollution. Much of the future water quality assessment and regulatory framework to address nonpoint source pollution will be based on these TMDL products. There have been very limited resources in the past to address nonpoint source pollution control. Resources available for TMDL development have increased from nothing in fiscal year 98/99 to $1,780,000 per year in fiscal year 00/01. This level of funding will support continued development, implementation planning, and the basin plan amendment work required for the TMDLs currently underway. Additional funding will be required to fully implement the TMDLs and to concurrently commence work on additional TMDLs. Identification of appropriate management measures and development of the regulatory framework for controlling nonpoint source pollution is most appropriately handled through the TMDL development and implementation program.

The experience of developing the rice pesticide program and the selenium control effort shows that the money being expended on the TMDL approach to nonpoint sources will result in far less cost and a more rapidly implementable program. Based on the rice pesticide control program, it takes a significant staff effort to conduct a credible program, even with support from Department of Pesticide Regulation (DPR) and other interested parties. It is estimated that the selenium

control effort cost over $2 million per year to develop and took 5-8 years to complete. The TMDL effort is clearly faster and less costly to pursue.

In addition, the TMDL program can work within the State Board's Plan for California's Nonpoint Source Pollution Control Program (NPS Program Plan). The NPS Program Plan identifies three tiers of regulatory effort to achieve compliance with water quality objectives and encourages the Regional Boards to work with other organizations to achieve program goals. The Regional Boards must develop the most appropriate approach for specific problems following these guidelines. The TMDL development process is consistent with this requirement.

The Board must also recognize that there is a Management Agency Agreement (MAA) between the SWRCB and DPR that specifies how pesticide-related water quality issues are addressed. The Regional Boards continue to be primarily responsible for the protection of water quality, but in general DPR uses its regulatory authority over pesticide use in an effort to correct problems before the water quality regulatory process is employed. A four-tier process similar to the SWRCB's three-tier NPS Program Plan is used in most situations. The Regional Boards can take regulatory action at any time they feel it is necessary, but until the TMDL process is completed and implementation is decided upon, there would not be a basis for such action.

There are few other alternatives available to the Board because of the limited funding that is available for the Board's NPS control activities. Most of the NPS implementation money comes from federal grant resources and is directed at the successful implementation of the federal 319(h) grant program and have specific deliverables as described in a federally-approved statewide workplan. Because the federal Clean Water Act specifically excludes irrigation return flows from permitting or regulation, the use of federal 319(h) NPS grant monies for a State permitting program would probably be rejected.

The Board is also constrained by the workplans for the resources it receives from the State Board. One alternative would be to redirect resources from the Non-15 Core Regulatory program resources. The reason the focus would be on Non-15 or the 'discharge to land' program rather than NPDES permitting money is that it would be very difficult for the Board to redirect NPDES or surface water discharge permitting monies since the federal CWA specifically excludes irrigation return waters from being regulated under the NPDES permitting provisions of the Act. Redirecting from Non-15 resources would mean that the existing backlog of WDRs, inspections and enforcement activities would increase. Eliminating this backlog has been a high priority in discussions with the legislature, California Environmental Protection Agency (CalEPA) and the State Board.

The same analogy is true for storm water runoff from irrigated lands. The present storm water regulatory program under the federal CWA does not list agricultural lands as a category for regulation. The only option for redirection of resources would be to use state storm water monies but the storm water program has been under close review by the legislature for failure to regulate the storm water categories already targeted by the program. Diversion of monies to regulate individual agricultural dischargers, who may or may not be part of the runoff problem, would be criticized for lack of focused regulation and the Board may be subject to review by the legislature for failure to regulate those sites for which they provided resources.

Under the circumstances, staff recommends that the Board:

- Notify the State Board of the results of the Petition review, the options that the Board considered and the conclusion that additional funds will be required to even partially address these discharges, and
- Seek additional resources and if workplan commitments can be reduced or waived under other programs, consider redirection of existing resources to address the issues raised by this review of the WDR waiver programs associated with irrigation return water and storm water runoff from irrigated lands, and
- Based on the rice pesticide, selenium and evaporation basin projects, a significant amount of staff time must be devoted to developing and implementing control efforts. Estimated costs of conducting programs addressing discharges from irrigated lands are presented below. These costs are strictly for implementation. Program development costs, such as adoption of the Basin Plan amendment containing a prohibition of discharge, would be in addition to the figures provided.

Control Option	Resources Required (Personnel Years (PYs)/Year)
Watershed approach	5
MOU/MAA	2
Waivers of WDRs	20
Individual WDRs	500
General WDRs	15
Areawide WDRs	6
Prohibition of Discharge	4
Phased approach	4

If staff can be redirected into this effort, it is recommended that they work with water agencies or groups of agencies to establish local monitoring efforts. Information developed through this monitoring would be used to prioritize Board efforts and to track progress toward improving water quality. Since the Board and other agencies are already monitoring storm water under the TMDL program, any new monitoring would initially focus on irrigation return water. In addition to evaluating the levels of individual constituents such as boron, toxicity testing would serve as the initial screening tool to determine if pesticides or other acutely toxic materials are present.

Redirection of existing resources would not provide the staffing needed to regulate all discharges from irrigated lands with individual WDRs. Realistically, the Board must work with waivers, general orders or areawide orders to address water quality problems associated with this category of dischargers. These types of policies and orders would be more effective if they are tailored to address local water quality issues and would best be developed after obtaining the initial round of results from local monitoring efforts.

Rescinding the existing waiver programs would leave the Board with an overwhelming task of preparing WDRs without sufficient information to properly prioritize the effort. Because of this, staff recommends that the short-term focus be placed on developing the local monitoring, the results of which can be used to establish appropriate control programs at a local level. If the

monitoring were initiated immediately, the Board would have the initial results in time to consider before the existing waivers sunset in January 2003.

Specific steps the Board would need to follow are:

- For irrigation return waters, make no changes in existing programs until additional resources are provided. If at least four PYs of additional staff become available, the recommended approach is to have staff meet with water agencies to determine if a similar grouping of water interests to that used in the 1975 –77 period could be reestablished. The goal of reestablishing these watershed groupings would be to renew the water quality monitoring to evaluate the potential water quality threats posed by discharges from the previously identified valley floor watersheds. The emphasis of this monitoring would be to evaluate the existence of toxicity associated with return flows from these watershed areas. Staff, in consultation with the watershed groups, would use the water quality data to formulate future policies and priorities with respect to the need to regulate this category of discharge. This information will be used to form the basis of a recommendation to the Board on the appropriateness of renewing the waiver of WDRs as required by Water Code (WC) §13269. Since water quality issues related to irrigated agriculture vary throughout the Region, it is anticipated that recommended policies, waiver conditions or permit conditions will differ by location. (This is referred to as the Phased Approach in the above table showing the resources required for various control options.)

- For storm water runoff from irrigated lands, staff does not recommend that we ask for additional monitoring of storm flows. Staff is working with the United States Geological Survey (USGS), University of California Davis and DPR to evaluate the extent of pollution from these flows. But these agencies, especially DPR, must continue to focus their resources on the ongoing monitoring and control efforts. If funding does not remain adequate in the future staff will report back to the Board for reconsideration of this recommendation.

- The Board has already listed several of the water bodies presented by the petitioners, as impaired under Section 303(d) of the CWA. The information provided with the petition is under review to determine if it supports the listing of additional water body / pollutant pairs. The emphasis needs to be on finding a correction mechanism. Therefore staff does not recommend diverting from the present program of developing federally required TMDLs. It is projected that the TMDL report, including the loading allocation and implementation plan will be completed by June 2002. These reports will form the basis of a proposed Basin Plan Amendment report covering the regulatory options and recommended mechanisms for controlling both irrigation return water and storm water pollutants on the main stem Feather, Sacramento and San Joaquin Rivers and the Delta.

BIBLIOGRAPHY

Ayers, R.S. and D.W. Westcot. 1985. *Water Quality for Agriculture*. FAO Irrigation and Drainage Paper 29:1.

RAC on AB413. 1969. *Report of the Assembly Committee On Water concerning AB 413*, p.3.

Cal EPA. 1997. California Environmental Protection Agency. *California Pesticide Management Plan for Water Quality.*

Cal.Ops.Atty.Gen. 1956. 27 Cal.Ops.Atty. Gen. 182

Cal.Ops.Atty.Gen. 1964. 43 Cal.Ops.Atty.Gen.302, 304

Cal.Ops.Atty.Gen. 1966. 48 Cal.Ops.Atty.Gen.30, 34

CFWC. 1999. California Farm Water Coalition. *California Agriculture and Its Use of Water.*

CRWQCB. 1981. California Regional Water Quality Control Board, Central Valley Region. *Internal Memo: Subject Waiver of Waste Discharge Requirements.*

CRWQCB. 1982. California Regional Water Quality Control Board, Central Valley Region. *Resolution No. 82-036. Waiving Waste Discharge Requirements For Specific Types of Discharge*. Amended March 26, 1982.

CRWQCB.1992. California Regional Water Quality Control Board, Central Valley Region. *Staff Report: Considerations of Water Body Designations to Comply with the Provisions of the Water Quality Control Plan for ISWP.*

CRWQCB. 1995. California Regional Water Quality Control Board, Central Valley Region. *Water Quality Control Plan (Basin Plan). Central Valley Region. Tulare Lake Basin.*

CRWQCB. 1998. California Regional Water Quality Control Board, Central Valley Region. *Fourth Edition Water Quality Control Plan (Basin Plan). Central Valley Region. Sacramento River and San Joaquin River Basins.*

CWA. 1972. *Federal Water Pollution Control Act of 1972.*

DPR. 1999a. California Department of Pesticide Regulation. *Summary of Pesticide Use Data Report Data 1999.*

DPR. 1999b California Department of Pesticide Regulation. *Enforcement Initiative.*

DPR. 2000. California Department of Pesticide Regulation. *Information on Rice Pesticides December 31, 2000.* Submitted to the CVRWQCB.

DPR. 2001. California Department of Pesticide Regulation. Surface Water Program Website. http://www.cdpr.ca.gov/docs/surfwatr/programs.htm

DWR. 1971. Department of Water Resources, *"A General Survey of Electrical Conductivity in Ground Water, San Joaquin Valley", March through June 1971.*

DWR. 1998. California Department of Water Resources. *Bulletin 160-98 California Water Plan.*

EPTC. 1999. Evaporative Ponds Technical Committee. *Evaporation Ponds.*

GCID. 2000. Glenn-Colusa Irrigation District. *Report on Water Measurement Program for 2000.*

Granberry, D. M., K.A. Harrison and W.T. Kelley. 1996. *Bulletin 1130 Drip Chemigation: Injecting Fertilizer, Acid and Chlorine* The University of Georgia College of Agricultural and Environmental Sciences Cooperative Extension Service.

Grassland Basin Drainage Steering Committee 1999. *Rule Enforcing Selenium Load Allocation and Establishing a Tradable Loads Program for Water Year 2000.* Passed October 22, 1999.

Opinion No. 65-259. 1966. California State Attorney General's Opinion No.65-259, 48 Ops.Cal.Atty.Gen. 30 (July 21,1966).

Porter-Cologne. 1969. Porter-Cologne Water Quality Control Act of 1969. Assembly Bill 413.

SJVDP, 1990. San Joaquin Valley Drainage Program, *Fish and Wildlife Resources and Agricultural Drainage in the San Joaquin Valley, California, Volume I.*

SWRCB. 1999. State Water Resources Control Board. *SB 390 (Alpert) Water Quality, Permit Waivers. Chapter 686, Statutes of 1999.* 1999 California Legislation. Office of Legislative and Public Affairs.

SWRCB. 2000. State Water Resources Control Board *Plan for California's Nonpoint Source Pollution Control Program.* California Coastal Commission.

SWRCB. 2001. State Water Resources Control Board *Draft : Compliance Assistance Guidance (CAG) for Implementing the Plan For California's Nonpoint Source Pollution Control Program.*

TAC. 1994a. Technical Advisory Committee. *Irrigated Agriculture Report to The California State Water Resources Control Board.*

TAC. 1994b. Technical Advisory Committee. *Report of the Technical Advisory Committee for Pesticide Management.*

Talent Decision. 2000. Ninth Circuit U.S. Court of Appeals. *Motion to Reconsider (March 26, 2001) -- Headwaters, Inc. and Oregon Natural Resources Council Action v. Talent Irrigation District*

TID. 1999. Turlock Irrigation District. *AB3616 Water Management Plan.*

USBR. 1996. United States Bureau of Reclamation. *Compliance Monitoring Program For Use And Operation Of The Grassland Bypass Project.*

USBR. 2001.United States Bureau of Reclamation and San Luis & Delta-Mendota Water Authority *Grassland Bypass Project Final Environmental Impact Statement and Environmental Impact Report.*

USC. 1972. United States Code. *Federal Insecticide, Fungicide and Rodenticide Act. 7 U.S.C. s/s 136 et.seq.*

USDA. 2001. United States Department of Agriculture Economic Research Service. *Irrigation and Water Use: Questions and Answers.*

USEPA. 1997. United States Environmental Protection Agency. *Terms of Environment* Revised December 1997.

USEPA and NOAA. 1998. United States Environmental Protection Agency and United States Department of Commerce, National Oceanic and Atmospheric Administration. *Final Administrative Changes to the Coastal Nonpoint Pollution Control Program Guidance and Response to Comments.*

USEPA. 1999. United States Environmental Protection Agency. *EPA Major Environmental Laws: FIFRA.* Office of Public Affairs Region 5. http://www.epa.gov/region5/defs/

USGS. 1998. United States Geological Survey. *Estimated Use of Water in the United States in 1995.*

USGS. 2000. http://aqua.wr.usgs.gov/Data/Grasslands/Flow_B00.dat

Zoldoske D., R.K. Striegler, and G.T. Berg. 1997. *Gypsum Application Technology Study Year 1 - 1996.* California State University, Fresno, California Center for Irrigation Technology Irrigation Notes.

APPENDIX 1: RESOLUTION NO. 82-036 "WAIVING WASTE DISCHARGE REQUIREMENTS FOR SPECIFIC TYPES OF DISCHARGE"

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

RESOLUTION NO. 82-036

WAIVING WASTE DISCHARGE REQUIREMENTS
FOR SPECIFIC TYPES OF DISCHARGE

WHEREAS, Water Code Section 13260(a) requires that any person discharging wastes or proposing to discharge wastes within the region, other than to a community sewer system, that could affect the quality of the waters of the state, shall file a report of waste discharge; and

WHEREAS, the Regional Water Quality Control Board, Central Valley Region, (hereafter Board), has a statutory obligation to prescribe waste discharge requirements except where a waiver is not against the public interest; and

WHEREAS, waiving requirements for certain specific type of waste discharge is not against the public interest because it avoids unnecessary expenditures of Board resources; and

WHEREAS, many types of waste discharges have no adverse effect on the waters of the state; and

WHEREAS, many waste dischargers are willing to self-regulate their discharges and thereby protect the waters of the state; and

WHEREAS, many waste dischargers are effectively regulated by local government or other state agencies; and

WHEREAS, state-of-the-art makes significant improvements in specific types of discharges unreasonable; and

WHEREAS, staff has prepared a Negative Declaration in accordance with the California Environmental Quality Act and appropriate regulations and finds that there are no significant adverse water quality impacts; and

WHEREAS, the Board has reviewed the Negative Declaration and concurs with the staff findings; and

WHEREAS, the Board, on 26 March 1982, held a hearing in Bakersfield, California and considered all evidence concerning this matter: Therefore be it

RESOLVED, That the California Regional Water Quality Board, Central Valley Region, waives waste discharge requirements for the following specific types of waste discharges except for those dischargers for which waste discharge requirements have been adopted; and be it further

RESOLVED, That this action waiving waste discharge requirements is conditional and may be terminated for any type of discharge or any specific discharger at any time.

Type of Waste Discharge	Limitations
1. Air conditioner, cooling and elevated temperature waters	Small volumnes which will not change temperature of receiving water more than 1°C.
2. Drilling muds	Discharged to sump with two feet of freeboard. Sump must be dried by evaporation or pumping. Drill-mud may remain in sump only if discharger demonstrates that it is nontoxic. Sump area shall be restored to pre-construction state within 60 days of completion or abandonment of well.
3. Clean oil containing no toxic materials	Used for beneficial purposes such as dust control, weed control and mosquito abatement where it cannot reach state waters.
4. Minor dredger operations	When spoil is nontoxic and discharged to land.
5. Group 3 solid wastes	Good disposal practices.
6. Test pumpings of fresh water wells	When assurances are provided that pollutants are neither present nor added.
7. Storm water runoff	Where no water quality problems are contemplated and no federal NPDES permit is required.
8. Erosion from development	Where Best Manangement Practices (BMP) plans have been formulated and implemented.
9. Pesticide rinse waters from applicators	Where discharger complies with Board guidelines.
10. Confined animal wastes	Where discharger complies with Board guidelines.

	Type of Waste Discharge	Limitations
11.	Minor stream channel alterations and suction dredging	Where regulated by Department of Fish and Game agreements.
12.	Small, short-term sand and gravel operations	All operations and wash waters confined to land.
13.	Small metals mining operations	All operations confined to land, no toxic materials utilized in recovery operations.
14.	Swimming pool discharges	Where adequate dilution exists or where beneficial uses are not affected.
15.	Food processing wastes spread on land	Where an operating/maintenance plan has been approved.
16.	Construction	Where BMPs used.
17.	Agricultural commodity wastes	Small, seasonal and confined to land.
18.	Industrial wastes utilized for soil amendments	Where industry certifies its nontoxic content and BMP Ag applications used.
19.	Timber harvesting	Operating under approved plan.
20.	Minor hydro projects	Operating under water rights permit from State Water Resources Control Board or Fish and Game agreement and no water quality impacts anticipated.
21.	Irrigation return water	Operating to minimize sediment to meet Basin Plan turbidity objectives and to prevent concentrations of materials toxic to fish or wildlife.
22.	Projects where application for Water Quality Certification is required	Where project (normally minor construction) is not expected to have a significant water quality effect and project complies with Fish and Game agreements.

RESOLUTION NO. 82-036
WAIVING WASTE DISCHARGE REQUIREMENTS
FOR SPECIFIC TYPES OF DISCHARGE

	Type of Waste Discharge	Limitations
23.	Septic tank/leachfield systems	Where project has county permit and county uses Board Guidelines.

I, JAMES A. ROBERTSON, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, Central Valley Region, on 26 March 1982.

JAMES A. ROBERTSON, Executive Officer

Amended 26 March 1982

APPENDIX 2: WATER CODE SECTIONS 13260 AND 13269

Chapter 4. Regional Water Quality Control

Article 4. Waste discharge requirements

- 13260. Reports; fees; exemptions

(a) All of the following persons shall file with the appropriate regional board a report of the discharge, containing the information which may be required by the regional board:

(1) Any person discharging waste, or proposing to discharge waste, within any region that could affect the quality of the waters of the state, other than into a community sewer system.

(2) Any person who is a citizen, domiciliary, or political agency or entity of this state discharging waste, or proposing to discharge waste, outside the boundaries of the state in a manner that could affect the quality of the waters of the state within any region.

(3) Any person operating, or proposing to construct, an injection well.

(b) No report of waste discharge need be filed pursuant to subdivision (a) if the requirement is waived pursuant to Section 13269.

(c) Every person subject to subdivision (a) shall file with the appropriate regional board a report of waste discharge relative to any material change or proposed change in the character, location, or volume of the discharge.

(d) (1) Each person for whom waste discharge requirements have been prescribed pursuant to Section 13263 shall submit an annual fee not to exceed ten thousand dollars ($10,000) according to a reasonable fee schedule established by the state board. Fees shall be calculated on the basis of total flow, volume, number of animals, or area involved.

(2) (A) Subject to subparagraph (B), any fees collected pursuant to this section shall be deposited in the Waste Discharge Permit Fund which is hereby created. The money in the fund is available for expenditure by the state board, upon appropriation by the Legislature, for the purposes of carrying out this division.

(B) (i) Notwithstanding subparagraph (A), the fees collected pursuant to this section from storm water dischargers that are subject to a general industrial or construction storm water permit under the national pollutant discharge elimination system (NPDES) shall be separately accounted for in the Waste Discharge Permit Fund.

(ii) Not less than 50 percent of the money in the Waste Discharge Permit Fund that is separately accounted for pursuant to clause (i) is available, upon appropriation by the Legislature, for expenditure by the regional board with jurisdiction over the permitted industry or construction site that generated the fee to carry out storm water programs in the region.

(iii) Each regional board that receives money pursuant to clause (ii) shall spend not less than 50 percent of that money solely on storm water inspection and regulatory compliance issues associated with industrial and construction storm water programs.

(3) Any person who would be required to pay the annual fee prescribed by paragraph (1) for waste discharge requirements applicable to discharges of solid waste, as defined in Section 40191 of the Public Resources Code, at a waste management unit that is also regulated under Division 30 (commencing with Section 40000) of the Public Resources Code, and who is or will be subject to the fee imposed pursuant to Section 46801 of the Public Resources Code in the same fiscal year, shall be entitled to a waiver of the annual fee for the discharge of solid waste at the waste management unit imposed by paragraph (1) upon verification by the state board of payment of the fee imposed by Section 48000 of the Public Resources Code, and provided that the fee established pursuant to Section 48000 of the Public Resources Code generates revenues sufficient to fund the programs specified in Section 48004 of the Public Resources Code and the amount appropriated by the Legislature for those purposes is not reduced.

(e) Each report of waste discharge for a new discharge submitted under this section shall be accompanied by a fee equal in amount to the annual fee for the discharge. If waste discharge requirements are issued, the fee shall serve as the first annual fee. If waste discharge requirements are waived pursuant to Section 13269, all or part of the fee shall be refunded.

(f) (1) On or before January 1, 1990, the state board shall adopt, by emergency regulations, a schedule of fees authorized under subdivisions (d) and (j). The total revenue collected each year through annual and filing fees shall be set at an amount equal to the revenue levels set forth in the Budget Act for this activity. The state board shall automatically adjust the annual and filing fees each fiscal year to conform with the revenue levels set forth in the Budget Act for this activity. If the state board determines that the revenue collected during the preceding year was greater than, or less than, the revenue levels set forth in the Budget Act, the state board may further adjust the annual filing fees to compensate for the over and under collection of revenue.

(2) The emergency regulations adopted pursuant to this subdivision, or subsequent adjustments to the annual fees, shall be adopted by the state board in accordance with Chapter 3.5 (commencing with Section 11340) of Part 1 of Division 3 of Title 2 of the Government Code. The adoption of these regulations is an emergency and shall be considered by the Office of Administrative Law as necessary for the immediate preservation of the public peace, health, safety, and general welfare. Notwithstanding Chapter 3.5 (commencing with Section 11340) of Part 1 of Division 3 of Title 2 of the Government Code, any emergency regulations adopted by the state board, or adjustments to the annual fees made by the state board pursuant to this section, shall not be subject to review by the Office of Administrative Law and shall remain in effect until revised by the state board.

(g) The state board shall adopt regulations setting forth reasonable time limits within which the regional board shall determine the adequacy of a report of waste discharge submitted under this section.

(h) Each report submitted under this section shall be sworn to, or submitted under penalty of perjury.

(i) The regulations adopted by the state board pursuant to subdivision (f) shall include a provision that annual fees shall not be imposed on those who pay fees under the National Pollutant Discharge Elimination System until the time when those fees are again due, at which time the fees shall become due on an annual basis.

(j) Facilities for confined animal feeding or holding operations, including dairy farms, which have been issued waste discharge requirements or exempted from waste discharge requirements prior to January 1, 1989, are exempt from subdivision (d). If the facility is required to file a report under subdivision (c) after January 1, 1989, the report shall be accompanied by a filing fee, to be established by the state board in accordance with subdivision (f), not to exceed two thousand dollars ($2,000), and the facility shall be exempt from any annual fee.

(k) Any person operating or proposing to construct an oil, gas, or geothermal injection well subject to paragraph (3) of subdivision (a), shall not be required to pay a fee pursuant to subdivision (d), if the injection well is regulated by the Division of Oil and Gas of the Department of Conservation, in lieu of the appropriate California regional water quality control board, pursuant to the memorandum of understanding, entered into between the state board and the Department of Conservation on May 19, 1988. This subdivision shall remain operative until the memorandum of understanding is revoked by the state board or the Department of Conservation.

(l) In addition to the report required by subdivision (a), before any person discharges mining waste, the person shall first submit the following to the regional board:

(1) A report on the physical and chemical characteristics of the waste that could affect its potential to cause pollution or contamination. The report shall include the results of all tests required by regulations adopted by the board, any test adopted by the Department of Toxic Substances Control pursuant to Section 25141 of the Health and Safety Code for extractable, persistent, and bioaccumulative toxic substances in a waste or other material, and any other tests that the state board or regional board may require, including, but not limited to, tests needed to determine the acid-generating potential of the mining waste or the extent to which hazardous substances may persist in the waste after disposal.

(2) A report that evaluates the potential of the discharge of the mining waste to produce, over the long term, acid mine drainage, the discharge or leaching of heavy metals, or the release of other hazardous substances.

(m) Except upon the written request of the regional board, a report of waste discharge need not be filed pursuant to subdivision (a) or (c) by a user of recycled water that is being supplied by a supplier or distributor of recycled water for whom a master recycling permit has been issued pursuant to Section 13523.1.

- 13260.2. No exposure fee structure

(a) The state board shall reduce the annual storm water fee to two hundred fifty dollars ($250) in the 1999 calendar year, and to fifty dollars ($50) thereafter, for facilities described in Code 20XX of the Standard Industrial Classification (SIC) Manual published by the United States Office of Management and Budget that are subject to a general industrial storm water permit and that, in the previous year, submitted to the regional board a "no exposure certification" and qualified for a sampling and analyses exemption as described in the general permit.

(b) The state board shall notify the facilities described in subdivision (a) with regard to the adoption of new or modified storm water regulations affecting those facilities.

(c) The state board may submit to the Legislature, on or before January 1, 2002, as part of the five-year review of the general industrial storm water permit, a report evaluating the fee structure for facilities with "no exposure" certification or exemptions.

(d) This section shall remain in effect only until January 1, 2003, and as of that date is repealed, unless a later enacted statute, which is enacted on or before January 1, 2003, deletes or extends that date.

discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports.

(2) When requested by the person furnishing a report, the portions of a report which might disclose trade secrets or secret processes shall not be made available for inspection by the public but shall be made available to governmental agencies for use in making studies. However, these portions of a report shall be available for use by the state or any state agency in judicial review or enforcement proceedings involving the person furnishing the report.

(c) In conducting an investigation pursuant to subdivision (a), the regional board may inspect the facilities of any person to ascertain whether the purposes of this division are being met and waste discharge requirements are being complied with. The inspection shall be made with the consent of the owner or possessor of the facilities or, if the consent is withheld, with a warrant duly issued pursuant to the procedure set forth in Title 13 (commencing with Section 1822.50) of Part 3 of the Code of Civil Procedure. However, in the event of an emergency affecting the public health or safety, an inspection may be performed without consent or the issuance of a warrant.

(d) The state board or a regional board may require any person, including a person subject to a waste discharge requirement under Section 13263, who is discharging, or who proposes to discharge, wastes or fluid into an injection well, to furnish the state board or regional board with a complete report on the condition and operation of the facility or injection well, or any other information that may be reasonably required to determine whether the injection well could affect the quality of the waters of the state.

- 13269. Waiver

(a) On and after January 1, 2000, the provisions of subdivisions (a) and (b) of Section 13260, subdivision (a) of Section 13263, or subdivision (a) of Section 13264 may be waived by a regional board as to a specific discharge or a specific type of discharge if the waiver is not against the public interest. Waivers for specific types of discharges may not exceed five years in duration, but may be renewed by a regional board. The waiver shall be conditional and may be terminated at any time by the board.

(b) A waiver in effect on January 1, 2000, shall remain valid until January 1, 2003, unless the regional board terminates that waiver prior to that date. All waivers that were valid on January 1, 2000, and granted an extension until January 1, 2003, and not otherwise terminated, may be renewed by a regional board in five-year increments.

(c) Upon notification of the appropriate regional board of the discharge or proposed discharge, except as provided in subdivision (d), the provisions of subdivisions (a) and (b) of Section 13260, subdivision (a) of Section 13263, and subdivision (a) of Section

13264 shall not apply to discharge resulting from any of the following emergency activities:

(1) Immediate emergency work necessary to protect life or property or immediate emergency repairs to public service facilities necessary to maintain service as a result of a disaster in a disaster-stricken area in which a state of emergency has been proclaimed by the Governor pursuant to Chapter 7 (commencing with Section 8550) of Division 1 of Title 2 of the Government Code.

(2) Emergency projects undertaken, carried out, or approved by a public agency to maintain, repair, or restore an existing highway, as defined in Section 360 of the Vehicle Code, except for a highway designated as an official state scenic highway pursuant to Section 262 of the Streets and Highways Code, within the existing right-of-way of the highway, damaged as a result of fire, flood, storm, earthquake, land subsidence, gradual earth movement, or landslide within one year of the damage. This paragraph does not exempt from this section any project undertaken, carried out, or approved by a public agency to expand or widen a highway damaged by fire, flood, storm, earthquake, land subsidence, gradual earth movement, or landslide.

(d) Subdivision (c) is not a limitation of the authority of a regional board under subdivision (a) to determine that any provision of this division shall not be waived or to establish conditions of a waiver. Subdivision (c) shall not apply to the extent that it is inconsistent with any waiver or other order or prohibition issued under this division.

(e) The regional boards and the state board shall require compliance with the conditions pursuant to which waivers are granted under this section.

(f) Prior to renewing any waiver for a specific type of discharge established under this section, the regional boards shall review the terms of the waiver policy at a public hearing. At the hearing, a regional board shall determine whether the discharge for which the waiver policy was established should be subject to general or individual waste discharge requirements

APPENDIX 3:PETITION FROM EARTHJUSTICE LEGAL DEFENSE FUND

Alameda Creek Alliance, Albany Coalition for Environmental Health, Ballona Valley Preservation League, Beeline Associates, Beyond Pesticides Coalition for Alternatives to Pesticides, Biological Urban Gardening Services, Bluewater Network, Breast Cancer Action, Breast Cancer Fund, Butte Environmental Council, California Coalition for Alternatives to Pesticides, California Communities Against Toxics, California Indian Basketweavers Association, California League of Conservation Voters, California Nurses, California Public Interest Research Group, California Rural Legal Assistance Foundation, California Sportfishing Protection Alliance, California Trout, Center for Community Action and Environmental Justice, Center for Marine Conservation, Center for Urban Agriculture at Fairview Gardens, Children's Health Environmental Coalition, City Farms, Clean Water Action, Coast Action Group, Comite Para El Bienstar de Earlimart, Committee to Save the Mokelumne, Defend the Bay, Desert Citizens Against Pollution, Ecology Center, Environmental Action Committee of West Marin, Environmental Center of San Luis Obispo, Environmental Health Coalition, Environmental Working Group, Foothill Conservancy, Fresno Coalition Against the Misuse of Pesticides, Friends of Butte Creek, Friends of the Eel River, Friends of the Estuary, Heal the Bay, Health and Habitat, Marin Breast Cancer Watch, Mendocino Cancer Resource Center, Mexican American Legal Defense and Education Fund, Natural Resources Defense Council, Navarro Watershed Protection Association, North Coast Environmental Center, Northern California Council of the Federation of Flyfishers, Pacific Coast Federation of Fishermen's Associations, Pesticide Action Network North America, Pesticide Watch, Physicians for Social Responsibility, Los Angeles Chapter, Physicians for Social Responsibility, San Francisco-Bay Area Chapter, Planning and Conservation League, Political Ecology Group, Safe Air for Everyone (SAFE), San Diego BayKeeper, San Joaquin Audubon Society, Santa Monica BayKeeper, Sierra Club California, Surfers' Environmental Alliance, The Arts and Healing Network, The Bay Institute of San Francisco, WaterKeepers Northern California (DeltaKeeper), WaterKeepers Northern California (San Francisco BayKeeper), Women's Cancer Resource Center

November 28, 2000

Steven T. Butler, Chair
Gary M. Carlton, Executive Officer
Regional Water Quality Control Board
Central Valley Region
3443 Routier Road, Suite A
Sacramento, California 95827-3003

Re: Request to revoke agricultural return flow exemptions from the Porter-Cologne Water Quality Control Act

Dear Messrs. Butler and Carlton:

On behalf of our members, we respectfully request that the Central Valley Regional Water Quality Control Board rescind its 18 year old order exempting dischargers of pesticide-laden irrigation return waters from the permitting and monitoring requirements of the state's water quality control law - the Porter-Cologne Water Quality Control Act. As the Regional Board overseeing the bulk of pesticide use in our state, we hope you will set a model example for other Regional Boards to follow.

The Central Valley Regional Board has long recognized that pesticide-contaminated agricultural return flows pose a real and substantial risk to our waterways, fisheries and community health. The current exemption inappropriately isolates agriculture from necessary compliance with water quality controls, even while that industry contributes significantly to the degradation and contamination of vast stretches of surface waters in the Central Valley. Pesticide discharges are a major reason that the Regional Board, the State Water Resources Control Board and the federal Environmental Protection Agency ("EPA") have determined

that the Delta and its tributary rivers, in particular the Sacramento and San Joaquin Rivers, fail to meet water quality standards, imperiling ecosystem health and denying communities their right to clean and safe waterways. By revoking the waiver, the Regional Board can lead the way for the rest of the state in the long overdue task of regulating pesticide discharges to water and ensuring that our waterways are protected.

The waiver, adopted in 1982, is based on claims that are clearly no longer true. For example, the waiver states that many types of waste discharges, including irrigation return waters, have no adverse effect on the waters of the state; that many waste dischargers are willing to self-regulate their discharges and thereby protect the waters of the state; and that many waste dischargers are effectively regulated by local government or other state agencies. These claims all defy common knowledge today. As Regional Board staff themselves have documented, pesticide contamination is widespread in the Delta and its tributary waters. These waters are officially listed by the state and EPA as being impaired by pesticides. Numerous studies conducted by government agencies and published in the scientific literature have documented pesticide levels in these waterways above targets for protecting aquatic health, many over long stretches of water and for alarming periods of time. The widespread degradation caused by pesticides presents irrefutable evidence that any voluntary or local regulation of these chemicals has been absent or wholly inadequate.

In light of these findings, we request that Regional Board take swift action to:

1. Rescind the waiver exempting agricultural practitioners from regulation under the state's Porter-Cologne Water Quality Control Act.

2. Develop an agricultural permitting program that will effectively protect our waters from degradation by pesticides. The program should include phaseouts of pesticides known to contaminate surface waters; the establishment of best management practices to minimize pesticide use and discharge while promoting least-toxic alternatives; monitoring to identify and quantify pesticide discharges; and reporting and notification requirements to ensure accountability and enforceability. The program should be developed with the full participation of conventional growers, organic and other alternative agricultural practitioners, sustainable agriculture organizations and environmental organizations, among others.

For nearly twenty years, pesticides carried by agricultural run-off have contaminated our rivers, deltas, estuaries and other surface waters. Regulatory programs or volunteer efforts have failed to emerge or have been completely ineffective. Meanwhile we are all confronted by the unfortunate reality of pervasive and ongoing contamination of our waterways by pesticides. This reality can no longer be ignored.

Your consideration is appreciated.

Respectfully,

Jeff Miller
Alameda Creek Alliance

Dorothea Dorenz
Albany Coalition for Environmental Health

Bruce Robertson
Ballona Valley Preservation League

Rick Reed
Beeline Associates

Cynthia Torres
Beyond Pesticides Coalition for Alternatives to Pesticides

Steven M. Zien
Biological Urban Gardening Services

Russel Long
Bluewater Network

Barbara Brenner
Breast Cancer Action

Joan Reinhardt Reiss
Breast Cancer Fund

Barbara Vlamis
Butte Environmental Council

Lee Hudson
California Coalition for Alternatives to Pesticides

Jane Williams
California Communities Against Toxics

Steve Nicola
California Indian Basketweavers Association

Jon Rainwater
California League of Conservation Voters

Giuliana Milanese
California Nurses

Teresa Olle
California Public Interest Research Group

Anne Katten
California Rural Legal Assistance Foundation

Jim Crenshaw
California Sportfishing Protection Alliance

Nick Di Croce
California Trout

Penny Newman
Center for Community Action and Environmental Justice

Linda Sheehan
Center for Marine Conservation

Michael Ableman
Center for Urban Agriculture at Fairview Gardens

Nancy Chuda
Children's Health Environmental Coalition

Keith Lenz
City Farms

Marguerite Young
Clean Water Action

Alan Levine
Coast Action Group

Teresa DeAnda
Comite Para El Bienstar de Earlimart

Bill Jennings
Committee to Save the Mokelumne

Bob Caustin
Defend the Bay

Jane Williams
Desert Citizens Against Pollution

Kathy Hutton
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Sandra Sarrouf
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Laura Hunter
Environmental Health Coalition

Bill Walker
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Peter Bell
Foothill Conservancy

Jeremy Hofer
Fresno Coalition Against the Misuse of Pesticides

Michael Smith
Friends of Butte Creek

Nadananda
Friends of the Eel River

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Gina Solomon
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Hillary Adams
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Tim McKay
North Coast Environmental Center

Dan McDaniel
Northern California Council of the Federation of Flyfishers

Zeke Grader
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Doug Ardley
Surfers' Environmental Alliance

Marion Weber
The Arts and Healing Network

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REGIONAL WATER QUALITY CONTROL BOARD - CENTRAL VALLEY REGION

WaterKeepers Northern California (DeltaKeeper and San Francisco BayKeeper); and California Public Interest Research Group, Petitioners, and Regional Water Quality Control Board - Central Valley Region, Respondent	Petition to Terminate Resolution No. 82-036 for Irrigation Return Water

This petition is filed on behalf of WaterKeepers Northern California (including its two projects, DeltaKeeper and San Francisco BayKeeper) and California Public Interest Research Group (collectively referred to as "DeltaKeeper"). DeltaKeeper seeks the termination of the waiver of waste discharge reporting requirements for discharges of pesticide-laden irrigation return water, which was granted by the Central Valley Regional Water Quality Control Board ("Regional Board") eighteen years ago, on March 26, 1982. Resolution No. 82-036, California Regional Water Quality Control Board, Central Valley Region (Exhibit A).[1,2] The waiver must be vacated because its findings

[1] The waiver also addresses 22 other categories. A number of those categories already have been issued federal permits under the National Pollutant Discharge Elimination System program. It is likely that many of the categories for which no permits have been issued, like the irrigation return flow category, are causing or contributing to water quality problems in the Central Valley Region and also should be issued discharge permits. The Regional Board may want to consider vacating Resolution No.

are no longer supported by available scientific data and it is inconsistent with intervening decisions of the Regional Board, the State Water Resources Control Board ("State Board") and U.S. Environmental Protection Agency ("US EPA"). The only action by the Regional Board and the State Board that would be consistent with the public interest is to demand that dischargers of irrigation return waters comply with the requirements of the Porter-Cologne Water Quality Control Act ("Porter-Cologne"), Water Code § 13000 et seq.[3] Facilities and fields discharging irrigation return waters should submit the requisite waste discharge reports and the Boards should adopt waste discharge requirements ("WDRs") that mandate the necessary monitoring and control measures be carried out by the pesticide dischargers.

INTRODUCTION

Toxic pulses of pesticides are routine occurrences in California rivers.[4] In 1997, the Regional Board found toxic levels of diazinon in the San Joaquin River for eight days in a row despite the river's flow being swelled with storm waters.[5] Pesticide concentrations in California waters frequently exceed levels lethal to zooplankton, a critical component of the aquatic food chain, and often reach levels high enough to kill fish outright. In 1998, the Regional Board, the State Board, and the US EPA unanimously agreed that over 500 miles of rivers and creeks and over 480,000 acres of Delta waters in the Central Valley Region are impaired by toxic discharges of pesticides

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82-036 in its entirety. The appropriateness of waivers for specific categories could then be debated on the merits of reports of waste discharge from those dischargers.

[2] Petitioners incorporate by reference all documents included as exhibits to the "Administrative Record in Support of WaterKeepers Northern California et al.'s Petition to Vacate Waiver for Irrigation Return Waters, Resolution No. 82-036."

[3] Water Code § 13269(a) provides that:

(a) On and after January 1, 2000, the provisions of subdivisions (a) and (b) of Section 13260 [requiring reports of waste discharge], subdivision (a) of Section 13263 [providing for the issuance of waste discharges requirements], or subdivision (a) of Section 13264 [pertaining to new or modified discharges] may be waived by a regional board as to a specific discharge or a specific type of discharge if the waiver is not against the public interest. Waivers for specific types of discharges may not exceed five years in duration, but may be renewed by a regional board. The waiver shall be conditional and may be terminated at any time by the board.

(b) A waiver in effect on January 1, 2000, shall remain valid until January 1, 2003, unless the regional board terminates that waiver prior to that date.

[4] Susan Kegley, Lars Neumeister, Timothy Martin, Disrupting the Balance: Ecological Impacts of Pesticides in California, Pesticide Action Network, 1999, p. 2 (hereafter "Disrupting") (Exhibit B).

[5] Disrupting at p. 57, citing Christopher Foe, Linda Deanovic, and Dave Hinton, Toxicity Identification Evaluations of Orchard Dormant Spray Runoff (Draft), Central Valley Regional Water Quality Control Board, 1998 (Exhibit C).

from agriculture. Unfortunately, it is not surprising to observe rampant toxicity from pesticide discharges because those toxic releases have gone unregulated by Porter-Cologne's requirements. While significant progress has been made due to the Board's issuance of enforceable pollution control permits for municipal and industrial discharges, including permits addressing storm water pollution, no such permits have been issued for irrigation return waters. That omission, and the agricultural communities' ongoing pesticide discharges, has resulted in the gross contamination observed today.

In light of these facts, we petition for termination of the outdated waiver of waste discharge requirements for "irrigation return water" enacted eighteen years ago. See Exhibit A.

When the California Regional Water Quality Control Board, Central Valley Region, issued the waiver for irrigation return water, it stated the following findings or reasons for the waiver:

(1) Many types of waste discharges have no adverse effect on the waters of the state;

(2) Many waste dischargers are willing to self regulate their discharges and thereby protect the waters of the state;

(3) Many waste dischargers are effectively regulated by local government and other state agencies, and;

(4) Waiving requirements for certain specific type of waste discharge is not against the public interest because it avoids unnecessary expenditures of Board resources.

Studies of California waters, many of which were conducted by the Regional Board itself, have shown that, with regard to irrigation return water, each of these findings is blatantly false. Because the waiver is thus invalid by its own terms, it must be terminated.

Even if the original justifications for the waiver were valid, the waiver for irrigation return waters was granted on the condition that irrigators prevent concentrations of materials toxic to fish or wildlife. Waiver at 3, Para. 21 (Exhibit A). See Water Code § 13269 (all waivers shall be conditional). Because irrigators clearly have not met this condition, the Regional Board must terminate the waiver.

Termination of the waiver would mean that irrigators would, at a minimum, need to report the quantities and types of pesticides they plan to discharge. This would appropriately shift the burden of monitoring pesticide levels in the Central Valley waters from California taxpayers to the dischargers themselves. Currently, California taxpayers are both bearing the costs of pesticide impairment of the state's waters and paying to monitor the extent of that impairment. California taxpayers should not have to pay costs associated with the pollution irrigators' cause. The polluters themselves should be responsible for the costs of monitoring and controlling their polluting activities.

I. The Waiver for Pesticide Discharges in Irrigation Return Flows Must Be Vacated Because Its Finding That Such Discharges Have No Adverse Effect on the Waters of the State is Contrary to All Available Scientific and Technical Data

One of the reasons given by the Regional Board for the waiver of discharge requirements for irrigation return flow was that irrigation return waters have no adverse effect on the waters of the state. Waiver at 1 (Exhibit A). Numerous determinations and studies prepared by the Regional Board and others demonstrate that this eighteen year old assertion is, today, not supported by any evidence whatsoever.

The list of impaired waters prepared by the Regional Board in compliance with Clean Water Act Section 303(d) names twenty-four water bodies, totaling 565 miles of rivers and creeks and 488,224 acres of Delta and other waterways, in the Central Valley Region alone, that are polluted by agricultural pesticides at levels that do not protect beneficial uses and, in most cases, are acutely toxic to wildlife.[6] The Regional Board also identified agriculture as one of the main sources of those water quality problems.[7] The Regional Board's list of waters impaired by pesticides was reviewed and approved

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[6] 1998 California Section 303(d) List and TMDL Priority Schedule at 92-103 (hereafter "Impaired Waters List"), May 12, 1999 (Exhibit D). The Impaired Waters List prepared by the Regional Board was assembled pursuant to Section 303(d)(1)(A) of the Federal Water Pollution Control Act ("FWPCA"), 33 U.S.C. § 1313(d)(1)(A). The waters appearing on the list have been found by the Regional Board, as well as the State Board and US EPA, to be waters "for which [technology-based] effluent limitations required by [the FWPCA] are not stringent enough to implement any water quality standard applicable to such waters." Id.

[7] In addition to agriculture, discharges of pesticides from municipal storm water systems also are contributing to the degradation identified on the 1998 Section 303(d) list. It is worth noting that the larger municipal storm drain systems have been issued waste discharge permits under both Porter-Cologne and the FWPCA.

by both the State Board and US EPA. Id. Given this large number of impaired water bodies, and consensus over the fact that agricultural pesticides are to blame, it is impossible to justify the waiver of waste discharge requirements for irrigation return flows based on a "finding" that irrigation return flows have no adverse effect on the waters of the state.[8] The more recent findings made in the 1998 listing decision, in effect, supercede Resolution No. 82-036, overturning its incorrect conclusions regarding irrigation return waters.

The following are a few examples of the water bodies that the Regional Board, the State Board and the EPA agreed are impaired by pesticides from agricultural discharges. The Delta Waterways are impaired by chlorpyrifos, DDT, diazinon, and "Group A" pesticides, all from agriculture. The Colusa Drain is impaired by carbofuran/furadan, "Group A" pesticides, malathion, methyl parathion, and other substances of unknown toxicity, all from agriculture. The Lower Merced River is impaired by chlorpyrifos, diazinon, and "Group A" pesticides, all from agriculture. The San Joaquin River is impaired by chlorpyrifos, DDT, diazinon, and "Group A" pesticides, all from agriculture. The Lower Stanislaus River and the Lower Tuolomne River are both impaired with diazinon and "Group A" pesticides, again, from agriculture. The list goes on. See Exhibit D.[9]

Similarly, numerous studies have demonstrated that California waters are toxic to fish and/or wildlife on a regular basis as a result of pesticide contamination. Examples of some of these studies, which prove that irrigators have not prevented toxic accumulations from occurring, are as follows:

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[8] A study of the hydrology of San Joaquin River Basin has confirmed that "pesticides are transported to rivers by the drainage of irrigated fields." Joseph Domagalski, Results of a prototype surface water network design for pesticides developed for the San Joaquin River Basin, California; Journal of Hydrology 192, 1997, pp. 33-50, 35 (Exhibit E); *see also* Environmental Setting of the San Joaquin-Tulare Basins, California -- USGS Water-Resources Investigations Report 97-4205, 1997, p. 42 (Exhibit F); Joseph Domagalski, Pesticides in Surface and Ground Water of the San Joaquin-Tulare Basins, California: Analysis of Available Data, 1966 Through 1992, USGS Water-Supply Paper 2468, 1997, p. 1 (Exhibit G).

[9] This pesticide contamination also threatens the safety of drinking water in the San Joaquin-Tulare Basins. The USGS reported in 1988 that "DBCP concentrations exceed the U.S. EPA drinking-water standard of 0.2 micrograms/liter in 20 percent of the domestic water supply wells sampled" in the San Joaquin-Tulare Basin. Neil Dubrovsky, Charles Kratzer, Larry Brown, JoAnn Gronberg, and Karen Burow, Water Quality in the San Joaquin-Tulare Basins, California, 1992-95, USGS Circular 1159, 1998, p. 3 (Exhibit H).

- A USGS study in which 143 water samples were collected throughout 1993 from sites on the San Joaquin River and three of its tributaries, Orestimba Creek, Salt Slough, and the Merced River, reported that: "All but one sample contained at least one pesticide, and more than 50 percent of the samples contained seven or more pesticides.... The concentrations of seven pesticides exceeded criteria for the protection of freshwater aquatic life: azinphos-methyl, carbaryl, chlorpyrifos, diazinon, diuron, malathion, and trifluralin. Overall, some criteria for protection of aquatic life were exceeded in a total of 97 samples."[10]
- A State Board study reported that, "small invertebrates [that serve as primary food for many larval and juvenile fish] are killed when exposed for even short periods to organophosphate levels measured in the Sacramento and San Joaquin River watersheds during winter."[11] The State Board-funded report also identifies and analyzes a number of viable alternatives to organophosphate pesticides.
- Studies conducted by the Regional Board found that "Twenty-four percent of the samples collected in [a bioassay study of the San Joaquin watershed] resulted in statistically significant mortality to *C. dubia*. Average mortality in the toxic samples was 83 percent. A 69 kilometer reach of the main San Joaquin River, approximately between the confluences of the Merced and Stanislaus Rivers, elicited *C. dubia* mortality in 44 percent of the samples."[12]
- The Regional Board also found that "The Merced River, a major tributary [of the San Joaquin River], discharged toxic waters into the San Joaquin River. Orestimba Creek also discharged water with high-intensity toxicity (100 % mortality within 24

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[10] Sandra Panshin, Neil Dubrovsky, JoAnn Gronberg, and Joseph Domagalski, Occurrence and Distribution of Dissolved Pesticides in the San Joaquin River Basin, California, USGS Water-Resources Investigations Report 98-4032, 1998, p. 1 (Exhibit I).

[11] Frank G. Zalom, Michael N. Oliver, and David E. Hinton, Alternatives to Chlorpyrifos and Diazinon Dormant Sprays (funded through contract with State Board), 1999, p. 4 (Exhibit J).

[12] C. Foe and V. Connor 1991. The San Joaquin watershed bioassay results. Technical Report. Central Valley Regional Water Quality Control Board. Sacramento, California, *quoted in* Victor de Vlaming, Vallerie Connor, Carlo DiGiorgio, Howard C. Bailey, Linda A. Deanovic, and David E. Hinton, Application of WET Test Procedures to Ambient Water Quality Assessment (funded by US EPA and State Board), p. 9 (Exhibit K); *see also* C. Foe 1995 (Exhibit T). Insecticide concentrations and invertebrate bioassay mortality in agricultural return waters from the San Joaquin basin. Technical Report. Central Valley Regional Water Quality Control Board. Sacramento, California, *quoted in* Application of WET Test Procedures to Ambient Water Quality Assessment; Victor de Vlaming, Valerie Connor, Carlo DiGiorgio, Howard C. Bailey, Linda A. Deanovic, and David E. Hinton, p. 10 (Exhibit K).

hours) into the San Joaquin River.... Turlock Irrigation District, TID, No. 5 discharged high level toxic waters, causing 100% mortality within 24 hours, into the San Joaquin River. The inputs of TID No. 5, Orestimba Creek, and the Merced River resulted in notable toxicity (100% mortality within 48 hours) in the downstream San Joaquin River."[13]

- Another study found that after "the first rainfall of February, the San Joaquin River samples from Vernalis caused 100% *C. dubia* mortality (within 48 hours) for 12 consecutive days. For 21 consecutive days during February ... diazinon concentrations in the San Joaquin River at Vernalis were above the CDFG [California Department of Fish and Game] acute and chronic water quality criteria for the protection of aquatic life."[14] This study also found toxicity to sensitive invertebrates in the Sacramento River watershed.[15]
- In a monitoring study funded by DeltaKeeper conducted between August 1998 and September 1999, toxicity to *Ceriodaphnia* was detected on twenty occasions at five sites, and in most cases was caused by organophosphate pesticides.[16]
- In a 1990-92 study by the Sacramento Regional County Sanitation District, 44 percent of Sacramento River samples were toxic to fathead minnows.[17] This toxicity was attributed to the use of the pesticide ziram on almonds.[18]

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[13] C. Foe and V. Connor 1991.

[14] Kathryn Kuivila and Christopher Foe, Concentrations, Transport and Biological Effects of Dormant Spray Insecticide in the San Francisco Estuary, California, *Environ Toxicol Chem* 14:1141-1150, 1995 (Exhibit L), *quoted in* Application of WET Test Procedures to Ambient Water Quality Assessment; Victor de Vlaming, Valerie Connor, Carlo DiGiorgio, Howard C. Bailey, Linda A. Deanovic, and David E. Hinton, p. 11; *see also* Charles Kratzer, Transport of Diazinon in the San Joaquin River Basin, California, USGS Open-File Report 97-4111, 1997, p. 1 (Exhibit M) ("Some of the diazinon concentrations in the San Joaquin River during the January storm exceeded 0.35 micrograms per liter, a concentration shown to be acutely toxic to water fleas."); Neil Dubrovsky, Charles Kratzer, Larry Brown, JoAnn Gronberg, and Karen Burow, Water Quality in the San Joaquin-Tulare Basins, California, 1992-95, USGS Circular 1159, 1998, p. 1 (Exhibit H) ("Peak diazinon concentrations in Orestimba Creek, in the Merced and the Tuolumne Rivers, and in the main stem of the San Joaquin River frequently exceeded levels that can be acutely toxic to some aquatic life.").

[15] Kathryn Kuivila and Christopher Foe, Concentrations, Transport and Biological Effects of Dormant Spray Insecticide in the San Francisco Estuary, California, *Environ Toxicol Chem* 14:1141-1150, 1995 (Exhibit L), *quoted in* Application of WET Test Procedures to Ambient Water Quality Assessment; Victor de Vlaming, Valerie Connor, Carlo DiGiorgio, Howard C. Bailey, Linda A. Deanovic, and David E. Hinton, p. 12.

[16] Stephanie Fong, Emilie Reyes, Karen Larsen, Stephen Louie, Linda Deanovic, David Hinton, Sacramento-San Joaquin Delta Bioassay Monitoring Report: 1998-99, Draft Final Report for DeltaKeeper, 2000, p. 31 (Exhibit N).

- Data from a study of pesticide use in California orchards indicate that "during the winter season, toxic levels of diazinon can be present along most of the perennial reach of the San Joaquin River following storms that result in transport of pesticides from agricultural areas."[19]
- The Department of Pesticide Regulation ("DPR") reported that, in 1988, tests of water quality in the San Joaquin River watershed using bioassays detected pesticides including "diazinon, ethyl parathion, carbaryl, dimethoate, and carbofuran .... [at levels that] exceeded US EPA water quality criteria and/or LC_{50} concentrations."[20]
- A study conducted by the Regional Board between 1991 and 1992 found that 47 percent of the water samples collected from the west side of the San Joaquin Valley between April and June tested toxic. Most of the toxicity was attributed to chlorpyrifos, diazinon, fonofos, and carbaryl, all from agricultural sources.[21]
- A bioassay monitoring study conducted under the auspices of the Regional Board found serious enough toxicity that the study report recommended that the Regional Board consider classifying the San Joaquin River at Vernalis, the Paradise Cut, and the French Camp Slough as toxic hot spots as a result of contamination by pesticides.[22]

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[17] AQUA-Science, Phase II effluent variability study, summary report, April 12, 1993, cited in Disrupting, p. 59 (Exhibit B).

[18] Disrupting, p. 59 (Exhibit B).

[19] Joseph Domagalski, Neil Dubrovsky, and Charles Kratzer, Pesticides in the San Joaquin River, California: Inputs from Dormant Sprayed Orchards, Journal of Environmental Quality, Volume 26, 1997, p. 465 (Exhibit O); *see also* Charles Kratzer, Transport of Diazinon in the San Joaquin River Basin, California, USGS Open-File Report 97-411, 1997, p. 1 (Exhibit P); Christopher Foe, Linda Deanovic, and David Hinton, Toxicity Identification Evaluations of Orchard Dormant Spray Storm Runoff (Review of 1996-97 Orchard Dormant Spray Monitoring Results), California Regional Water Quality Control Board, Central Valley Region, November 1998 (Exhibit C).

[20] Lisa Ross, Department of Pesticide Regulation, Memo to John Sanders regarding "Preliminary Results of the San Joaquin River Study; March and April, 1991," November 4, 1991, p. 1 (Exhibit Q).

[21] Christopher Foe, Insecticide Concentrations and Invertebrates Bioassay Mortality in Agricultural Return Water from the San Joaquin Basin, California Regional Water Quality Control Board, Central Valley Region, December 1995, p. xv (Exhibit R).

[22] Linda Deanovic, Howard Bailey, T.W. Shed, and David Hinton, Sacramento-San Joaquin Delta Bioassay Monitoring Report 1993-1994 -- First Annual Report to the Central Valley Regional Water Quality Control Board, May 1996, p. 2 (Exhibit S); see also Linda Deanovic, Kristy Cortright, Karen Larsen, Emilie Reyes, Howard Bailey, David Hinton, Sacramento-San Joaquin Delta Bioassay Monitoring Report 1994-95 -- Second Annual Report to the Central Valley Regional Water Quality Control Board, 1997 (Exhibit T).

- A USGS study found that "concentrations [of several organochlorine compounds] in biota at several West-side and San Joaquin River sites exceeded the National Academy of Sciences and National Academy of Engineering recommended tissue concentrations for protection of fish-eating wildlife.... several sites exceeded EPA-draft sediment criteria for organic chlorine compounds."[23]
- A California Urban Water Agencies report announced that "Pesticides and aquatic toxicity are ubiquitous in surface waters of the Sacramento and San Joaquin basins and the Delta .... Bioassay and chemical testing demonstrate that surface waters are toxic to sensitive algae, invertebrates, and fish species."[24] This should be of great concern to the fishing industry, because "the larger rivers in the Central Valley such as the Sacramento, American, Feather, and lower San Joaquin provide major spawning and rearing habitat for fish such as salmon, steelhead trout, striped bass, shad, and sturgeon."[25] In fact, the study found that "fish from the Bay-Delta ecosystem have elevated concentrations of organochlorine pesticides and pesticide ingredients in their tissues. Adult striped bass from the Sacramento River have exhibited lesions, parasitism, and discolored fatty livers while eggs from these fish had high mortality rates and produced deformed embryos or larvae with skeletal deformities and other abnormalities." [26] Toxicity to Chinook salmon and striped bass has been shown in agricultural drainages, the major rivers, and sediments.[27]
- A study conducted by the Regional Board found that "one quarter (2/8) and one half (4/8) of all samples collected at Orestimba Creek and at Sacramento Slough exceeded the acute [recommended diazinon hazard assessment] criteria [to protect freshwater aquatic life] in 1997. These results demonstrate, like in previous years, that exceedances of the acute hazard criteria are common in the [Sacramento] basin

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[23] Larry Brown, Concentrations of Chlorinated Organic Compounds in Biota and Bed Sediment in Streams of the Lower San Joaquin River Drainage, California, USGS Open-File Report 98-171, 1998, p. 13 (Exhibit U).

[24] J. Phyllis Fox and Elaine Archibald, Aquatic Toxicity and Pesticides in Surface Waters of the Central Valley, prepared for California Urban Water Agencies, 1997, p. 227 (Exhibit V).

[25] Id. at 1.

[26] Id. at 227.

[27] Id.

after storms."[28] The study also confirmed that diazinon was present in toxic amounts to *Ceriodaphnia* in water samples collected from San Joaquin River and Sacramento River in 1996 and 1997.

- Another study by the Regional Board found that "as in February 1993, flow and diazinon concentrations increased in the Sacramento River at Sacramento after the three largest rain storms of [January/February 1994]."[29] The study also found that "diazinon concentrations in the Sacramento River at Sacramento during January/February 1994 exceeded the [Department of Fish and Game]'s acute and chronic water quality criteria [for protection of aquatic life] for nine and nineteen days, respectively."[30]
- Dow AgroSciences, the registrant of chlorpyrifos, admits that the surface water monitoring it conducted at three locations on the lower reach of Orestimba Creek, from May 1, 1996-April 30, 1997, demonstrated 14 chlorpyrifos "acute events," defined as concentration exceeding 100 ng/liter, within a six month period.[31] The mean duration of these acute events was three days."[32] Dow also found that chronic chlorpyrifos exposure periods, defined as concentrations exceeding 18 ng/liter, occurred 18 times, for average duration of eight days each. Two of these periods exceeded 21 days.[33]
- Novartis, the registrant of diazinon, has admitted that "14.3 % of the samples taken during February from secondary sites on the main stem and tributaries [of the San Joaquin River], and 41.9 % of the samples from the creeks and drains, exceeded the 10th percentile of arthropod sensitivity[34] [defined as the likelihood that a sample

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[28] Christopher Foe, Linda Deanovic, and Dave Hinton, Toxicity Identification Evaluations of Orchard Dormant Spray Runoff (Draft), Central Valley Regional Water Quality Control Board, 1998, p. 15 (Exhibit C).

[29] Robert Holmes, Victor de Vlaming, and Christopher Foe, Sources and Concentrations of Diazinon in the Sacramento Watershed during the 1994 Orchard Dormant Spray Season, Central Valley Regional Water Quality Control Board, 2000, p. 25 (Exhibit W).

[30] Id.

[31] N. N. Poletika and C. K. Robb, A Monitoring Study to Characterize Chlorpyrifos Concentration Patterns and Ecological Risk in an Agriculturally Dominated Tributary of the San Joaquin River, Dow AgroSciences, 1998, p. 12 (Exhibit X).

[32] Id.

[33] Id. at 13.

[34] Dennis Tierney, An Ecological Risk Assessment of Diazinon in the Sacramento and San Joaquin River Basins, Novartis Crop Protection, Inc., 1997, p. 63 (Exhibit Y).

taken at any time during the study period would exceed the acute toxicity concentration for 10 percent of the species under consideration[35]]."

Given study results such as these, it is impossible to assert that irrigation return flows have no adverse effect on the waters of the state. The primary finding on which the waiver was based is thus invalid, and the waiver must be terminated.

II. Numerous Studies Confirm That Dischargers of Irrigation Return Water Have Not Prevented Concentrations of Materials Toxic to Fish or Wildlife From Being Released in Violation of the Condition of Discharge Included in the 1982 Waiver

The same determinations and studies over the last decade also demonstrate that irrigators have not fulfilled the condition on which the waiver was based -- namely, that they prevent concentrations of materials toxic to fish and wildlife from accumulating in state waters. Waiver at 3, Para. 21 (Exhibit A). Even Novartis, the registrant of diazinon, and Dow AgroSciences, the registrant of chlorpyrifos, recognize that pesticides have caused toxicity to wildlife in Central Valley waters.[36] Moreover, the agencies' 1998 listing decision under Section 303(d) confirms that dischargers of irrigation return waters in the Central Valley have not complied with the waiver's condition to prevent toxicity. Exhibit D.

It is clear that pesticides adversely affect the waters of the state and that irrigators are not meeting the required condition for the waiver of discharge requirements to prevent toxic concentrations of pesticides to fish and wildlife. The waiver therefore must be terminated.

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[35] Id. at 61.

[36] Moreover, those studies only report violations of established safety levels. Additional risks of pesticides are not well enough understood to have been reported in the studies. According to a 1999 report by the U.S. Geological Survey:

> Many pesticides and their breakdown products do not have standards or guidelines, and current standards and guidelines do not yet account for exposure to mixtures and seasonal pulses of high concentrations. In addition, potential effects on reproductive, nervous, and immune systems, as well as on chemically sensitive individuals, are not yet well understood. For example, some of the most frequently detected pesticides are suspected endocrine descriptors that have potential to affect reproduction or development of aquatic organisms or wildlife by interfering with natural hormones.

The Quality of Our Nation's Waters: Nutrients and Pesticides, USGS Circular 1225, 1999, p. 2 (Exhibit Z).

III. Resolution No. 82-036's Finding That "Self-Regulation" Will Protect the State's Waters Has Been Proven False Over Time.

The Regional Board declared in 1982 that "many waste dischargers are willing to self regulate their discharges and thereby protect the waters of the state." This was one of its stated reasons for granting the waiver from waste discharge requirements for irrigation return waters. Waiver at 1, Para. 5 (Exhibit A).

No such willingness to self-regulate is apparent from the data collected from waters throughout the Central Valley. Even assuming that some self-regulation has occurred over the years, it clearly has not resulted in the protection of any waters in the Central Valley from the adverse impacts of pesticide-laden irrigation return flow discharges. In 1999, 480,000 acres of Delta waterways were identified by the Regional Board, the State Board and the US EPA as impaired by chlorpyrifos, DDT, diazinon, Group A Pesticides and "unknown toxicity." 1998 California Section 303(d) List and TMDL Priority Schedule, May 12, 1999 (Exhibit D). Another 565 miles of rivers, sloughs and creeks in the Central Valley also are identified as impaired by pesticide discharges from agricultural sources. Id. Those list of waters impaired by agricultural pesticide discharges have increased dramatically since 1982, when Resolution No. 82-036 was passed, demonstrating the misdirection of the Regional Board's hands off approach at the time.

Only a handful of voluntary programs exist whose goal is to reduce discharges of pesticides from agricultural operations. Letter from Douglas Y. Okumura, DPR, to Michael Lozeau, Apr. 17, 2000. Exhibit AA.[37] All of these programs rely on educational

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[37] On April 4, 2000, WaterKeepers Northern California requested the following from DPR:

1. All documents regarding any local government, California Department of Pesticide Regulation, or other state agency voluntary programs designed to reduce the discharge of pesticides in irrigation return water and agricultural runoff.

2. All documents regarding voluntary efforts by farmers to self-regulate their discharges of pesticides in irrigation return flow water and agricultural runoff.

Letter from Michael Lozeau to Doug Okumura, DPR (Apr. 4, 2000) (Exhibit BB). In response to that request, DPR identified a grand total of two "programs," the Rice Pesticides Program and the Community Alliance With Family Farmers "BIOS" program, that actually implemented any measures to reduce discharges of pesticides in irrigation return waters. The rest of the materials sent by DPR in response to the document request included educational publications, an overview of small grants given out to various

outreach, sometimes in conjunction with small-scale demonstration plots. See Almond Board of California, Dormant Spray News, Summer 1999, p. 1-4 (Exhibit CC); Community Alliance With Family Farmers, Program Fact Sheet, "Biologically Integrated Orchard Systems," Feb. 1998 (Exhibit DD). The Department of Pesticide Regulation maintains no data on how many farm operations in the Central Valley have actually implemented any controls described in those voluntary programs. In fact, only a modest number of demonstration projects covering a very small percentage of the acreage to which pesticides are applied throughout the Central Valley have been the subject of pesticide reduction "experiments." Most importantly, eighteen years after the Regional Board's optimistic assertion that self-regulation would protect water quality, there is no measurable improvement in water quality for most waterbodies throughout the Central Valley.

Even where gains have been made, the results still have not fully protected receiving waters from toxic pulses of pesticides, nor were they achieved through "self-regulation" and voluntarism. The highly praised Rice Pesticides Program is a case in point. Despite having been in place since 1983, the Program reported that discharges in 1999, though drastically improved, nevertheless did not achieve the performance goals established for a range of pesticides. K. Newhart and K. Bennett, DPR, "Information on Rice Pesticides Submitted to the California Regional Water Quality Control Board Central Valley Region," December 31, 1999, p. 5-6 (Exhibit EE). Hence, even the most successful effort to reduce pesticide discharges from agricultural lands has not yet protected the waters of the state. No other "voluntary" program identified by DPR can claim to have resulted in any measurable reductions on a regional basis in the discharge of pesticides to the Central Valley's waters.

The modest gains of the Rice Pesticides Program are notable because they are not, in fact, voluntary or the results of "self-regulation.' Indeed, the Rice Pesticides Program is the only example of a command and control regulatory program being applied to pesticide discharge in the State of California. In order to be granted

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small-scale projects, a list of research proposals, a workplan for future discussions about efforts on a portion of Stoney Creek - in short, an uncoordinated, hodgepodge of small-scale projects coupled with

permission to apply certain rice pesticides, the grower must obtain a permit from DPR which, in addition to conditioning the application methods, also requires that the treated irrigation waters be held within the flooded rice fields for specified lengths of time in order to allow the pesticides to degrade to some extent. Although failing to include self-monitoring or reporting and adequate fee provisions, instead subsidizing the dischargers through monitoring by DPR and an emphasis on inspections, the use of a "discharge permit" for rice pesticide discharges is the only example that DPR can offer where some reductions have occurred in historic pesticide discharges. By vacating Resolution No. 82-036, the Regional and State Boards can both improve upon the pollution discharge controls for the rice pesticide dischargers and extend appropriate and necessary monitoring and control requirements to all other dischargers of pesticides in the Central Valley.

IV. Local Government and Other State Agencies Have Not Provided Effective Regulation of Pesticide Discharges to Surface Waters

Another reason given by the Regional Board for the waiver was that "[m]any waste dischargers are effectively regulated by local government and other state agencies." Again, the 303(d) list, as well as the other studies of surface water quality in the Central Valley cited above, demonstrate that regulation of pesticide dischargers has been ineffective at protecting the waters of the state. In light of the pervasive toxicity of Central Valley waters caused by pesticide discharges in irrigation return waters, it is impossible to conclude that regulation by local government and other state agencies of pesticide discharges has been effective. No local government or DPR currently regulates effectively the discharge of pesticide residues into Central Valley waters. No local ordinance of which petitioners are aware establishes any controls or regulations applicable to the discharge of pesticides in irrigation return waters to the state's surface waters.

Likewise, as the State and Regional Boards are well aware, DPR continues to actively avoid any regulation of pesticide discharges, instead relying exclusively on "self-regulating and cooperative efforts" and largely ignoring even the modest

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further study which has not and is very unlikely to protect the Central Valley's surface waters in any serious way.

requirements of the Management Agency Agreement entered into with the State Board. The MAA was based on a tiered approach beginning with voluntary measures and proceeding through various stages of regulation. See Memorandum of Understanding Between the State Water Resources Control Board and the California Department of Pesticide Regulation for the Protection of Water Quality (Surface and Ground Water) From the Potential Adverse Effects of Pesticides (Dec. 23, 1991) (Exhibit FF). It obligated DPR to develop Quantitative Response Limits (QRLs) to help determine whether pesticide concentrations are in conformity with narrative water quality objectives. QRLs were never developed. The DPR agreed to secure voluntary sponsors to direct the self-regulating implementation of control options. Sponsors were mandated to submit a plan that includes, among other things: 1) targets for BMP development, 2) timetables for implementation not to exceed four years, 3) measures of success, 4) a monitoring program, and 5) sources of funding. The MAA explicitly states that if no sponsors are forthcoming to implement the self-regulation stage, other measures will be taken, such as regulation by DPR or the Regional Board. Unfortunately, no sponsors have come forth and DPR is still mired in the fourth year of voluntary measures.

The MAA provisions were also incorporated in a 1996 Settlement Agreement between the DPR, SWRCB, CVRWQCB and the Sacramento Valley Toxics Campaign and Environmental Council of Sacramento. In a 26 June 1997 letter from DPR's Paul H. Gosselin to the State Water Board's Chief of the Division of Water Quality, Jesse Diaz; Mr. Gosselin stated that "DPR has reevaluated its concept of voluntary programs and the role of sponsors in them." Mr. Gosselin conceded that there are "no sponsors" and observed that "DPR now regards some of the responsibilities of sponsors...as unnecessary and overly burdensome." The DPR is as cavalier in its obligation to honor legally binding settlement agreements as it is toward its commitment to implement the MAA provisions.

The DPR has employed the MAA as a device to delay implementation of effective control measures and to impede the Water Board's exercise of their statutory obligations to protect the waters of the state. Hence, the notion that other local or state

agencies are stepping in with regulations comparable to those mandated by the Porter-Cologne Water Quality Control Act is entirely unsubstantiated.

V. The 1982 Waiver Has Increased the Expenditures of the Regional Board and, If Not Vacated, Will Lead to Increased Expenditures Over Time

Resolution No. 82-036 asserts that waiving the requirements of Porter-Cologne for irrigation return waters should have resulted in fewer "unnecessary expenditures" by the Regional Board. Waiver at 1 (Exhibit A). In fact, because the thousands of dischargers of pesticide laden irrigation return flows have been granted leave to discharge whatever they pleased from their return flow discharges without even having to characterize the nature of their discharge, the burden of demonstrating the adverse impacts of pesticide discharges throughout the Central Valley has fallen squarely on the shoulders of the Regional Board. A quick review of the studies submitted in support of this petition shows that the Regional Board has expended thousands of hours of staff time applying for funds to conduct monitoring, carrying out monitoring efforts and drafting resulting reports. The pollution dischargers, meanwhile, have simply continued their discharges without expending any funds to assess their impact. Had pesticide dischargers had to apply for WDRs like every other industrial discharger in the State, then the Regional Board would have access to a voluminous amount of data from which to make its regulatory decisions.

The resource pressures on the Regional Board are destined to increase. Because such a large number of Central Valley waters are listed as impaired under Section 303(d), the Regional Board is obligated to prepare Total Maximum Daily Loads ("TMDLs") for those impaired waterbodies. Additional monitoring will likely be necessary to establish those TMDLs. Without a regulatory framework for passing some of those investigation and other costs onto the pollution dischargers, the Regional Board will continue to bear the brunt of those costs, as it has done in the past.

VI. Terminating the Waiver would free the Regional and State Board's to apply their discretion in issuing appropriate waste discharge requirements for dischargers of irrigation return waters

This petition does not seek to dictate the terms of any WDRs that the Regional or State Board issues either in response to a particular waste discharge report or on their

own initiative. Terminating the waiver would merely require pesticide dischargers to complete waste discharge reports like all other dischargers of industrial waste. Water Code § 13260. The Regional Board, in issuing WDRs to such dischargers, may apply its discretion in establishing conditions and requirements in discharge permits. Depending on the Boards' findings, permit requirements could range from monitoring pesticide levels in irrigation return flow up to and including implementing Best Available Technology ("BAT") measures to reduce or eliminate pesticide discharges in irrigation return waters. At this time, however, petitioners are only asking that the waiver, which is invalid by its own terms, be terminated.

By applying waste discharge requirements, the Regional Board also would create an effective tool to track discharges of newly formulated pesticides. The replacement of common pesticides with new formulations generally leads to the expenditure of many years of agency time and resources to determine the adverse impacts of the new chemicals. Waste discharge requirements would properly place the burden of reporting and sampling any such proposed new discharges on the discharger and would provide an efficient avenue for the Regional Board to assure that appropriate restrictions are applied to the new materials.

CONCLUSION

The available science shows, without exception, that pesticides being discharged through irrigation return waters have serious adverse impacts on Central Valley and downstream waterways. Efforts to control storm water pollution from industrial, construction and municipal areas throughout the state have shown that regulating pollutants mobilized by storm water is not only possible -- it is critical to protecting the health of our state's waters. Existing storm water permits deal with storm water pollution from thousands of different sources, sometimes, in the case of municipal storm water systems, all discharged through the same outfall(s). Any given city's storm water pollution discharges are much more complex than those from agricultural fields. There is no scientific or technical reason why a storm water permit would be any less effective in addressing pollutants discharged from irrigation return water channels then they are in addressing municipal and other storm water pollution.

This petition provides the Regional Board a pathway to lead the State towards a scientifically-based approach to controlling the toxicity now harming waters throughout the Central Valley. It is a pathway that will allow the Regional Board to procure the resources and cooperation of the agricultural community that it sorely needs in order to carry out its TMDL and water quality protection obligations under state and federal clean water laws. It is a pathway that the facts and the Porter-Cologne Water Quality Control Act mandate be taken. We look forward to the Regional Board's response, including the prompt scheduling of a hearing to consider the petition and recommending the termination of the irrigation return waters waiver. We request that such a hearing be held within the next 60 days, consistent with Water Code § 13320.

November 28, 2000

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TABLE OF EXHIBITS

VOLUME 1

VOLUME 2

Procedures to Ambient Water Quality Assessment (funded by US EPA and State Board).

Exhibit L Kathryn Kuivila and Christopher Foe, Concentrations, Transport, and Biological Effects of Dormant Spray Insecticide in the San Francisco Estuary, California, Environmental Toxicology and Chemistry, Volume 14, 1995.

Exhibit M Charles Kratzer, Transport of Diazinon in the San Joaquin River Basin, California, USGS Open-File Report 97-4111, 1997.

VOLUME 3

Exhibit N Stephanie Fong, Emilie Reyes, Karen Larsen, Stephen Louie, Linda Deanovic, David Hinton, Sacramento-San Joaquin Delta Bioassay Monitoring Report: 1998-99, Draft Final Report for DeltaKeeper, 2000.

Exhibit O Joseph Domagalski, Neil Dubrovsky, and Charles Kratzer, Pesticides in the San Joaquin River, California: Inputs from Dormant Sprayed Orchards, Journal of Environmental Quality, Volume 26, 1997.

Exhibit P Charles Kratzer, Transport of Diazinon in the San Joaquin River Basin, California, USGS Open-File Report 97-411, 1997.

Exhibit Q Lisa Ross, Department of Pesticide Regulation, Memo to John Sanders regarding "Preliminary Results of the San Joaquin River Study; March and April, 1991," November 4, 1991.

Exhibit R Christopher Foe, Insecticide Concentrations and Invertebrate Bioassay Mortality in Agricultural Return Water from the San Joaquin Basin, California Regional Water Quality Control Board, Central Valley Region, December 1995.

VOLUME 4

Exhibit S Linda Deanovic, Howard Bailey, T.W. Shed, and David Hinton, Sacramento-San Joaquin Delta Bioassay Monitoring Report 1993-1994 -- First Annual Report to the Central Valley Regional Water Quality Control Board, May 1996.

Exhibit T Linda Deanovic, Kristy Cortright, Karen Larsen, Emilie Reyes, Howard Bailey, David Hinton, Sacramento-San Joaquin Delta Bioassay Monitoring Report 1994-95 -- Second Annual Report to the Central Valley Regional Water Quality Control Board, 1997.

VOLUME 5

Exhibit U	Larry Brown, Concentrations of Chlorinated Organic Compounds in Biota and Bed Sediment in Streams of the Lower San Joaquin River Drainage, California, USGS Open-File Report 98-171, 1998.
Exhibit V	J. Phyllis Fox and Elaine Archibald, Aquatic Toxicity and Pesticides in Surface Waters of the Central Valley, prepared for California Urban Water Agencies, 1997.

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Exhibit W	Robert Holmes, Victor de Vlaming, and Christopher Foe, Sources and Concentrations of Diazinon in the Sacramento Watershed during the 1994 Orchard Dormant Spray Season, Central Valley Regional Water Quality Control Board, 2000.
Exhibit X	N. N. Poletika and C. K. Robb, A Monitoring Study to Characterize Chlorpyrifos Concentration Patterns and Ecological Risk in an Agriculturally Dominated Tributary of the San Joaquin River, Dow AgroSciences, 1998.

VOLUME 7

Exhibit Y	Dennis Tierney, An Ecological Risk Assessment of Diazinon in the Sacramento and San Joaquin River Basins, Novartis Crop Protection, Inc., 1997.
Exhibit Z	The Quality of Our Nation's Waters: Nutrients and Pesticides, USGS Circular 1225, 1999.
Exhibit AA	Letter from Douglas Y. Okumura, DPR, to Michael Lozeau, April 17, 2000.
Exhibit BB	Letter from Michael Lozeau to Doug Okumura, DPR, April 4, 2000.
Exhibit CC	Almond Board of California, Dormant Spray News, Summer 1999.
Exhibit DD	Community Alliance With Family Farmers, Program Fact Sheet, "Biologically Integrated Orchard Systems," Feb. 1998.
Exhibit EE	KayLynn Newhart and Kevin Bennett, Information on Rice Pesticides Submitted to the California Regional Water Quality Control Board, Central Valley Region, Dec. 31, 1999.

Exhibit FF Memorandum of Understanding Between the State Water Resources Control Board and the California Department of Pesticide Regulation for the Protection of Water Quality (Surface and Ground Water) from Potentially Adverse Effects of Pesticides, Dec. 23, 1991.

CERTIFICATE OF SERVICE

I hereby certify that on this 28th day of November, 2000, I caused an original and ten copies of the above Petition to Terminate Resolution No. 82-036 for Irrigation Return Water and one copy of Volumes One through Seven of Exhibits A through FF to be hand-delivered to:

Steven Butler, Chairman
Robert Schneider, Vice-Chairman
Charles Ahlem
Susan L. Azevedo
Karl E. Longley
Craig Pederson
Gary M. Carlton, Executive Officer
Central Valley Regional Water Quality Control Board
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Michael R. Lozeau

APPENDIX 4: DISCUSSION OF BASIN PLANS

Overview

In California, the Regional Water Quality Control Boards (RWQCBs) and State Water Resources Control Board (SWRCB) are responsible for the development of statewide and regional Water Quality Control Plans (WQCPs), respectively. Pursuant to section 13240 of the Porter-Cologne Act, each of the State's nine RWQCBs must formulate and adopt regional WQCPs (basin plans) for all surface and ground waters within their respective regions.

Section 13241 of the Porter-Cologne Act requires that each basin plan:

(1) designate beneficial uses;
(2) establish water quality objectives that protect the designated beneficial uses; and
(3) provide an implementation plan for achieving the water quality objectives.

The implementation plan for achieving water quality objectives must include, but is not limited to:

(1) a description of the nature of the actions which are necessary to achieve the water quality objectives;
(2) a time schedule for the actions to be taken; and
(3) a description of the monitoring and surveillance to be undertaken to determine compliance with objectives. (SWRCB, 2000)

Section 13240 of the Porter-Cologne Act directs the SWRCB and the RWQCBs to periodically review and update basin plans. Furthermore, Clean Water Act (CWA) section 303(c) directs states to review water quality standards every three years (triennial review). In the triennial review process, basin planning issues are formally identified and ranked during the public hearing process. In the ensuing three years, these issues are addressed as resources allow. If necessary the basin water quality standards will be modified or new ones developed. These and other modifications to the basin plan are implemented through basin plan amendments which must be reviewed by the RWQCB and the SWRCB in a public review process specified. Following adoption by the RWQCB, basin plan amendments and supporting documents are submitted to the SWRCB for review and approval. All basin plan amendments approved by the SWRCB after June 1, 1992 must also be reviewed by the State Office of Administrative Law (OAL). In addition, the United States Environmental Protection Agency (USEPA) must review and approve those basin plan amendments that involve changes in State standards for surface water quality to ensure such changes do not conflict with federal regulations. (SWRCB, 2000)

The Basin Plan spells out the approach used by the Board to conduct a control effort and sets water quality objectives and attainment timetables. However, details regarding specific threats to water quality are most often dealt with outside the basin planning process. For example, waste discharge requirements (WDRs) are issued to individual dischargers. These requirements limit discharges of waste to ensure compliance with Basin Plan objectives in receiving waters. Generally, however, there is no equivalent procedure where nonpoint source discharges (such as

those involving pesticides) are involved. Instead, work plans can be developed and incorporated into the Basin Plan as part of the triennial review process.

Exerpts From Central Valley Basin Plans

The Board has adopted two water quality control plans, one for the Sacramento River and San Joaquin River Basins and the second for the Tulare Lake Basin. These are regulatory documents. The remainder of this Appendix consists of portions of the Basin Plans addressing irrigation return flows, storm water and pesticides.

THIS MATERIAL IS PROVIDED FOR PARTIES INTERESTED IN THE DETAILS OF BOARD PROGRAMS. THESE EXERPTS ARE ORGANIZED BY TOPIC AND DO NOT CONTAIN THE ENTIRE WATER QUALITY CONTROL PROGRAM PRESENTED IN THE BASIN PLANS.

SACRAMENTO RIVER AND SAN JOAQUIN RIVER BASIN PLAN

Chapter III: WATER QUALITY OBJECTIVES

Water Quality Objectives for Inland Surface Waters

Pesticides

- No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses.
- Discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses.
- Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by the Environmental Protection Agency or the Executive Officer.
- Pesticide concentrations shall not exceed those allowable by applicable antidegradation policies (see State Water Resources Control Board Resolution No. 68-16 and 40 C.F.R. Section131.12.).
- Pesticide concentrations shall not exceed the lowest levels technically and economically achievable.
- Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of pesticides in excess of the Maximum Contaminant Levels set forth in California Code of Regulations, Title 22, Division 4, Chapter 15.
- Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of thiobencarb in excess of 1.0 μg/l.

Where more than one objective may be applicable, the most stringent objective applies. For the purposes of this objective, the term pesticide shall include: (1) any substance, or mixture of substances which is intended to be used for defoliating plants, regulating plant

growth, or for preventing, destroying, repelling, or mitigating any pest, which may infest or be detrimental to vegetation, man, animals, or households, or be present in any agricultural or nonagricultural environment whatsoever, or (2) any spray adjuvant, or (3) any breakdown products of these materials that threaten beneficial uses. Note that discharges of "*inert*" ingredients included in pesticide formulations must comply with all applicable water quality objectives. (CRWQCB, 1998)

Chapter IV: IMPLEMENTATION

Water Quality Concerns

Agriculture

Agricultural activities affect water quality in a number of ways. There are unique problems associated with irrigated agriculture, agricultural support activities, and animal confinement operations because of the volume of water used and the diffused nature of many of the discharges. (CRWQCB, 1998)

Irrigated Agriculture

Irrigated agriculture accounts for most water use in the two sub-basins. Both the San Joaquin and the Sacramento Rivers carry substantial amounts of agricultural return water or drainage. Agricultural drainage contributes salts, nutrients, pesticides, trace elements, sediments, and other by-products that affect the water quality of the rivers and the Delta.

There is a Memorandum of Understanding (MOU) between the State Water Board and Department of Pesticide Regulation (DPR) describing the role of each agency with regard to pesticide regulation.

Salt management is critical to agriculture in the Central Valley. Evaporation and crop transpiration remove water from soils, which can result in an accumulation of salts in the root zone of the soils at levels that retard or inhibit plant growth. Additional amounts of water often are applied to leach the salts below the root zones. The leached salts can reach ground or surface water. The movement of the salts to surface waters may be a natural occurrence of subsurface flows or it can result from the surface water discharge of subsurface collection systems (often called tile drains) which are routinely employed in areas of the Central Valley where farm lands have poor drainage capabilities. The tile drainage practice consists of installing collection systems below the root zone of the crops to drain soils that would otherwise stay saturated because of subsurface conditions that restrict drainage. Tile drain installation may result in TDS concentrations in drainage water many times greater than in the irrigation water that was applied to the crops. Tile drain water can also contain pesticides, trace elements, and nutrients.

Pesticides and nutrients are also major ingredients of surface agricultural drainage. They have found their way to ground and surface waters in many areas of the basins. Fish and aquatic wildlife deaths attributable to pesticide contamination of surface water occur periodically.

Nitrate and DBCP (1,2-Dibromo-3-chloropropane) levels exceeding the State drinking water standards occur extensively in ground water in the basins and public and domestic supply wells have been closed because of DBCP, EDB, nitrates, and other contaminants in several locations.

Discharge of sediment is another problem encountered with agriculture. Sedimentation impairs fisheries and, by virtue of the characteristics of many organic and inorganic compounds to bind to soil particles, it serves to distribute and circulate toxic substances through the riparian, estuarine, and marine systems. Sedimentation also increases the costs of pumping and treating water for municipal and industrial use. An additional significant impact of sediment in runoff is the sediment's direct smothering effect on bottom dwelling communities.

The Regional Water Board approaches problems related to irrigated agriculture as it does other categories of problems. Staff are assigned to identify and evaluate beneficial use impairments associated with agricultural discharges. Control actions are developed and implemented as appropriate per the schedules identified through the continuous planning process.

Animal Confinement Operations

Runoff from animal confinement facilities (e.g., stockyards, dairies, poultry ranches) can impair both surface and ground water beneficial uses. The animal wastes may produce significant amounts of coliform, ammonia, nitrate, and TDS contamination. The greatest potential for water quality problems has historically stemmed from the overloading of the facilities' waste containment and treatment ponds during the rainy season and inappropriate application of wastewater and manure. Most of these facilities are not operating under waste discharge requirements (WDRs). However, waste management at all confined animal facilities must comply with specific regulations and large facilities must obtain an NPDES storm water permit. (CRWQCB, 1998)

Storm Water

Runoff from residential and industrial areas also contributes to water quality degradation. Urban storm water runoff contains pesticides, oil, grease, heavy metals, polynuclear aromatic hydrocarbons, other organics, and nutrients. Because these pollutants accumulate during the dry summer months, the first major autumn storm can flush a highly concentrated load to receiving waters and catch basins. Combined storm and sanitary systems may result in some runoff to sewage treatment plants. In other cases,

storm water collection wells can produce direct discharges to ground water. Impacts of storm water contaminants on surface and ground waters are an important concern

The Nature of Control Actions Implemented by the Regional Water Board

Control Action Considerations of the Regional Water board

Prohibitions

Effective immediately for molinate and thiobencarb and on 1 January 1991 for carbofuran, malathion and methyl parathion, the discharge of irrigation return flows containing these pesticides is prohibited unless the discharger is following a management practice approved by the Board. Proposed management practices for these pesticides will not be approved unless they are expected to meet the performance goals contained in the following table. Also, the management practices must ensure that discharges of thiobencarb to waters designated as municipal or domestic water supplies will comply with the 1.0 μg/l water quality objective for this pesticide. It is important to note that the performance goals in this timetable are interim in nature and while they are based on the best available information, they are not to be equated with concentrations that meet the water quality objectives. The intent of the performance goals is to bring concentrations being found in surface waters down to levels that approach compliance with the objectives. Future performance goals and numerical objectives will be set using the results of ongoing evaluations of the risks posed by these pesticides. Future performance goals may also be site-specific to take into consideration the additive impacts of more than one pesticide being present in a water body at the same time. The Board will reexamine the progress of the control effort for these pesticides in 1993 and will set performance goals intended to bring concentrations of these five pesticides into full compliance with all objectives by 1995. (CRWQCB, 1998)

Table 4-2.

Performance Goals 1 for Management Practices in μg/l (CRWQCB, 1998)

	YEAR			
Pesticide	1990	1991	1992	1993
Carbofuran	D	0.4	0.4	R
Malathion	I	0.1	R	R
Molinate	30.0	20.0	10.0	R
Methyl parathion	D	0.26	0.13	R
Thiobencarb	3.0	1.5	R	R

Performance goals are daily maxima and apply to all waters designated as freshwater habitat.
D = No numerical goal control practices under development
I = No numerical goal sources of discharge to be identified by special study
R = The Regional Board will review the latest technical and economic information determine if the performance goal should be adjusted" (CRWQCB, 1998)

Actions and Schedule to Achieve Water Quality Objectives

Agricultural Drainage Discharges in the San Joaquin River Basin

Water quality in the San Joaquin River has degraded significantly since the late 1940s. During this period, salt concentrations in the River, near Vernalis, have doubled. Concentrations of boron, selenium, molybdenum and other trace elements have also increased. These increases are primarily due to reservoir development on the east side tributaries and upper basin for agricultural development, the use of poorer quality, higher salinity, Delta water in lieu of San Joaquin River water on west side agricultural lands and drainage from upslope saline soils on the west side of the San Joaquin Valley. The water quality degradation in the River was identified in the 1975 Basin Plan and the Lower San Joaquin River was classified as a Water Quality Limited Segment. At that time, it was envisioned that a Valley-wide Drain would be developed and these subsurface drainage water flows would then be discharged outside the Basin, thus improving River water quality. However, present day development is looking more toward a regional solution to the drainage water discharge problem rather than a valley-wide drain. (CRWQCB, 1998)

Because of the need to manage salt and other pollutants in the River, the Regional Water Board began developing a Regional Drainage Water Disposal Plan for the Basin. The development began in FY 87/88 when Basin Plan amendments were considered by the Water Board in FY 88/89. The amendment development process included review of beneficial uses, establishment of water quality objectives, and preparation of a regulatory plan, including a full implementation plan. The regulatory plan emphasized achieving objectives through reductions in drainage volumes and pollutant loads through best management practices and other on-farm methods. Additional regulatory steps will be considered based on achievements of water quality goals and securing of adequate resources. (CRWQCB, 1998)

The amendment emphasized toxic elements in subsurface drainage discharges. The Regional Water Board however still recognizes salt management as the most serious long-term issue on the San Joaquin River. The Regional Water Board will continue as an active participant in the San Joaquin River Management Program implementation phase, as authorized by AB 3048, to promote salinity management schemes including time discharge releases, real time monitoring and source control. (CRWQCB, 1998)

Per the amendment to the Basin Plan for San Joaquin River subsurface agricultural drainage, approved by the State Water Board in Resolution No. 96-078 and incorporated herein, the following actions will be implemented. (CRWQCB, 1998)

1. In developing control actions for selenium, the Regional Board will utilize a priority system, which focuses on a combination of sensitivity of the beneficial use to selenium and the environmental benefit expected from the action.

2. Control actions, which result in selenium load reduction, are most effective in meeting water quality objectives.

3. With the uncertainty in the effectiveness of each control action, the regulatory program will be conducted as a series of short-term actions that are designed to meet long-term water quality objectives.

4. Best management practices, such as water conservation measures, are applicable to the control of agricultural subsurface drainage.

5. Performance goals will be used to measure progress toward achievement of water quality objectives for selenium. Prohibitions of discharge and waste discharge requirements will be used to control agricultural subsurface drainage discharges containing selenium.

6. Waste discharge requirements will be used to control agricultural subsurface drainage discharges containing selenium and may be used to control discharges containing other toxic trace elements.

7. Selenium load reduction requirements will be incorporated into waste discharge requirements as effluent limits as necessary to ensure that the selenium water quality objectives in the San Joaquin River downstream of the Merced River inflow is achieved. The Board intends to implement a TMDL after public review.

8. Selenium effluent limits established in waste discharge requirements will be applied to the discharge of subsurface drainage water from the Grassland watershed. In the absence of a regional entity to coordinate actions on the discharge, the Regional Board will consider setting the effluent limits at each drainage water source (discharger) to ensure that beneficial uses are protected at all points downstream.

9. Upslope irrigations and water facility operators whose actions contribute to subsurface drainage flows will participate in the program to control discharges.

10. Public and private managed-wetlands will participate in the program to achieve water quality objectives.

11. Achieving reductions in the load of selenium discharged is highly dependent upon the effectiveness of individual actions or technology not currently available; therefore, the Regional Board will review the waste discharge requirements and compliance schedule at least every 5 years.

12. All those discharging or contributing to the generation of agricultural subsurface drainage will be required to submit for approval a short-term (5-year) drainage management plan designed to meet interim milestones and a long-term drainage management plan designed to meet final water quality objectives.

13. An annual review of the effectiveness of control actions taken will be conducted by those contributing to the generation of agricultural subsurface drainage.

14. Evaporation basins in the San Joaquin Basin will be required to meet minimum design standards, have waste discharge requirements and be part of a regional plan to control agricultural subsurface drainage.

15. The Regional Board staff will coordinate with USEPA and the dischargers on a study plan to support the development of a site-specific selenium water quality objective for the San Joaquin River and other effluent dominated water bodies in the Grassland watershed.

16. The Regional Board will establish water quality objectives for salinity for the San Joaquin River.

Table 4-1.
Compliance Time Schedule for Meeting the 4-day Average and Monthly Mean Water Quality Objective for Selenium. Selenium Water Quality Objectives (in bold) and Performance Goals (in italics)

Water Body/Water Year Type [1]	1 October 1996	1 October 2002	1 October 2005	1 October 2010
Salt Slough and Wetland Water Supply Channels listed in Appendix 40	**2 µg/L monthly mean**			
San Joaquin River below the Merced River; Above Normal and Wet Water Year types [1]		*5µg/L monthly mean*	**5 µg/L 4-day avg.**	
San Joaquin River below the Merced River; Critical, Dry, and Below Normal Water Year types		*8µg/L monthly mean*	*5 µg/L monthly mean*	**5 µg/L 4-day avg.**
Mud Slough (north) and the San Joaquin River from Sack Dam to the Merced River				**5 µg/L 4-day avg.**

[1] The water year classification will be established using the best available estimate of the 60-20-20 San Joaquin Valley water year hydrologic classification (as defined in Footnote 17 for Table 3 in the State Water Resources Control Board's *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary*, May 1995) at the 75% exceedance level using data from the Department of Water Resources Bulletin 120 series. The previous water year's classification will apply until an estimate is made of the current water year.

Pesticide Discharges from Nonpoint Sources

The control of pesticide discharges to surface waters from nonpoint sources will be achieved primarily by the development and implementation of management practices that minimize or eliminate the amount discharged. The Board will use water quality monitoring results to evaluate the effectiveness of control efforts and to help prioritize control efforts. Regional Board monitoring will consist primarily of chemical analysis and biotoxicity testing of major water bodies receiving irrigation return flows. The focus will be on pesticides with use patterns and chemical characteristics that indicate a high probability of entering surface waters at levels that may impact beneficial uses. Board staff will advise other agencies that conduct water quality and aquatic biota monitoring of high priority chemicals, and will review monitoring data developed by these agencies. Review of the impacts of "*inert*" ingredients contained in pesticide formulations will be integrated into the Board's pesticide monitoring program. (CRWQCB, 1998)

When a pesticide is detected more than once in surface waters, investigations will be conducted to identify sources. Priority for investigation will be determined through consideration of the following factors: toxicity of the compound, use patterns and the number of detections. These investigations may be limited to specific watersheds where the pesticide is heavily used or local practices result in unusually high discharges. Special studies will also be conducted to determine pesticide content of sediment and aquatic life when conditions warrant. Other agencies will be consulted regarding prioritization of monitoring projects, protocol, and interpretation of results. (CRWQCB, 1998)

To ensure that new pesticides do not create a threat to water quality, the Board, either directly or through the State Water Resources Control Board, will review the pesticides that are processed through the Department of Food and Agriculture's (DFA) registration program. Where use of the pesticide may result in a discharge to surface waters, the Board staff will make efforts to ensure that label instructions or use restrictions require management practices that will result in compliance with water quality objectives. When the Board determines that despite any actions taken by DFA, use of the pesticide may result in discharge to surface waters in violation of the objectives, the Board will take regulatory action, such as adoption of a prohibition of discharge or issuance of waste discharge requirements to control discharges of the pesticide. Monitoring may be required to verify that management practices are effective in protecting water quality. (CRWQCB, 1998)

The Board will notify pesticide dischargers through public notices, educational programs and the Department of Food and Agriculture's pesticide regulatory program of the water quality objectives related to pesticide discharges. Dischargers will be advised to implement management practices that result in full compliance with these objectives by 1 January 1993, unless required to do so earlier. (Dischargers of carbofuran, malathion, methyl parathion, molinate and thiobencarb must meet the requirements detailed in the Prohibitions section.) During this time period, dischargers will remain legally responsible for the impacts caused by their discharges. (CRWQCB, 1998)

The Board will conduct reviews of the management practices being followed to verify that they produce discharges that comply with water quality objectives. It is anticipated that practices associated with one or two pesticides can be reviewed each year. Since criteria, control methods and other factors are subject to change, it is also anticipated that allowable management practices will change over time, and control practices for individual pesticides will have to be reevaluated periodically. (CRWQCB, 1998)

Public hearings will be held at least once every two years to review the progress of the pesticide control program. At these hearings, the Board will

- review monitoring results and identify pesticides of greatest concern,
- review changes or trends in pesticide use that may impact water quality,
- consider approval of proposed management practices for the control of pesticide discharges,
- set the schedule for reviewing management practices for specific pesticides, and
- consider enforcement action. (CRWQCB, 1998)

After reviewing the testimony, the Board will place the pesticides into one of the following three classifications. When compliance with water quality objectives and performance goals is not obtained within the timeframes allowed, the Board will consider alternate control options, such as prohibition of discharge or issuance of waste discharge requirements. (CRWQCB, 1998)

1. Where the Board finds that pesticide discharges pose a significant threat to drinking water supplies or other beneficial uses, it will request DFA to act to prevent further impacts. If DFA does not proceed with such action(s) within six months of the Board's request, the Board will act within a reasonable time period to place restrictions on the discharges.

2. Where the Board finds that currently used discharge management practices are resulting in violations of water quality objectives, but the impacts of the discharge are not so severe as to require immediate changes, dischargers will be given three years, with a possibility of three one year time extensions depending on the circumstances involved, to develop and implement practices that will meet the objectives. During this period of time, dischargers may be required to take interim steps, such as meeting Board established performance goals to reduce impacts of the discharges. Monitoring will be required to show that the interim steps and proposed management practices are effective.

3. The Board may approve the management practices as adequate to meet water quality objectives. After the Board has approved specific management practices for the use and discharge of a pesticide, no other management practice may be used until it has been reviewed by the Board and found to be equivalent to or better than previously approved practices. Waste discharge requirements will be waived for irrigation return water per Resolution No. 82-036 if the Board determines that the management practices are adequate to meet water quality objectives and meet the conditions of the

waiver policy. Enforcement action may be taken against those who do not follow management practices approved by the Board. (CRWQCB, 1998)

Carbofuran, malathion, methyl parathion, molinate and thiobencarb have been detected in surface waters at levels that impact aquatic organisms. Review of management practices associated with these materials is under way and is expected to continue for at least another two years. A timetable of activities related to these pesticides is at the end of the Prohibitions section. A detailed assessment of the impacts of these pesticides on aquatic organisms is also being conducted and water quality objectives will be adopted for these materials by the State or Regional Board by the end of 1993. (CRWQCB, 1998)

In conducting a review of pesticide monitoring data, the Board will consider the cumulative impact if more than one pesticide is present in the water body. This will be done by initially assuming that the toxicities of pesticides are additive. This will be evaluated separately for each beneficial use using the following formula:

$$\frac{C_1}{O_1} + \frac{C_2}{O_2} + \ldots + \frac{C_i}{O_i} = S$$

Where: C = the concentration of each pesticide.

O = the water quality objective or criterion for the specific beneficial use for each pesticide present, based on the best available information. Note that the numbers must be acceptable to the Board and performance goals are not to be used in this equation.

S = the sum. A sum exceeding one (1.0) indicates that the beneficial use may be impacted. (CRWQCB, 1998)

The above formula will not be used if it is determined that it does not apply to the pesticides being evaluated. When more than one pesticide is present, the impacts may not be cumulative or they may be additive, synergistic or antagonistic. A detailed assessment of the pesticides involved must be conducted to determine the exact nature of the impacts. (CRWQCB, 1998)

For most pesticides, numerical water quality objectives have not been adopted. USEPA criteria and other guidance are also extremely limited. Since this situation is not likely to change in the near future, the Board will use the best available technical information to evaluate compliance with the narrative objectives. Where valid testing has developed 96 hour LC50 values for aquatic organisms (the concentration that kills one half of the test organisms in 96 hours), the Board will consider one tenth of this value for the most sensitive species tested as the upper limit (daily maximum) for the protection of aquatic life. Other available technical information on the pesticide (such as Lowest Observed Effect Concentrations and No Observed Effect Levels), the water bodies and the organisms involved will be evaluated to determine if lower concentrations are required to meet the narrative objectives. (CRWQCB, 1998)

To ensure the best possible program, the Board will coordinate its pesticide control efforts with other agencies and organizations. Wherever possible, the burdens on pesticide dischargers will be reduced by working through the DFA or other appropriate regulatory processes. The Board may also designate another agency or organization as the responsible party for the development and/or implementation of management practices, but it will retain overall review and control authority. The Board will work with water agencies and others whose activities may influence pesticide levels to minimize concentrations in surface waters. (CRWQCB, 1998)

Since the discharge of pesticides into surface waters will be allowed under certain conditions, the Board will take steps to ensure that this control program is conducted in compliance with the federal and state antidegradation policies. This will primarily be done as pesticide discharges are evaluated on a case by case basis. (CRWQCB, 1998)

Dairies

The majority of the 1600+ dairies in the region are not regulated by waste discharge requirements and there is insufficient staff to conduct inspections on a regular basis to determine if the facilities are operating in compliance with applicable regulations. Based on information obtained during complaint investigations and aerial surveillance flights, however, it is apparent that many of the facilities are following practices that may adversely impact water quality. Regional Water Board studies have shown that dairies have impacted ground water quality in some areas. As part of a project funded by basin planning update funds, staff has been evaluating alternative approaches to obtaining improved water quality protection at dairy sites. Upon completion of the staff report, workshops will be held and the Regional Water Board will consider changes in the regulatory program for dairies. One of the primary concerns is the impact of dairies on ground water quality. As part of the basin planning project, shallow monitoring wells have been installed at five facilities that are following what are currently the best management practices for protection of ground water quality. Data from these sites will be used to help determine if improved management practices must be developed. (CRWQCB, 1998)

Nutrient and Pesticide Discharges From Nurseries

The majority of the over 500 nurseries in the region are not regulated by waste discharge requirements. Staff experience with the few nurseries that are regulated has shown that tailwater discharges from nurseries have the potential to impact water quality. A typical nursery irrigates at least once per day, and applies fertilizer through the irrigation system. Pesticides are applied as needed. Excess tailwater usually flows off the property, either into a sewer system, a surface waterway, or an infiltration pond. As part of a project supported by basin planning update funds, staff conducted a nine-month sampling program at four typical nurseries. Upon completion of the report summarizing the sampling project, staff will work with industry representatives, the State Water Board,

and the Department of Pesticide Regulation (DPR) to develop any needed best management practices. (CRWQCB, 1998)

TULARE LAKE BASIN PLAN

Portions of the Tulare Lake Basin Plan related to Agriculture include the following exerpts. (CRWQCB, 1995):

Chapter IV – Implementation Plan

Water Quality Problems

Agriculture

In 1987, agriculturally induced employment in the Basin ranged from 20 percent to more than 50 percent ["A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley", September 1990]. Most of the agricultural activity occurs on the valley floor. However, the natural precipitation on the Valley portion of the Basin averages less than 10 inches per year. Most precipitation occurs in the Sierras and the Coast Ranges. In order to supply the water needs of agriculture, water from the mountain areas is held in reservoirs and released during irrigation periods. The released water is transported to crops through a complex distribution system crisscrossing the Valley. Irrigated agriculture, agricultural support activities, and animal confinement operations create their own unique problems.

Irrigated Agriculture

Irrigated agriculture accounts for most water used in the Tulare Lake Basin. Local surface water, mainly stored in foothill reservoirs, is controlled for agricultural use. Historically, ground water made up the rest of agricultural needs. However, heavy ground water extractions after the 1930s, when improvements in pump technology led to the development of large turbine pumps, caused severe overdraft and accompanying land subsidence. This led to development of water projects (i.e., the California Aqueduct, the Delta-Mendota Canal, the Friant-Kern Canal, and the Cross City Canal) in the 1950's, 1960's and 1970's to import additional water into the Basin to relieve the demands on ground water. Even with the imported water, municipal, agricultural, and industrial water users continue to pump ground water to meet demands. Ground water pumping continues to contribute to overdraft of ground water aquifers.

Another problem from irrigated agriculture is drainage, excess water not used by crops that runs off or percolates. Agricultural drainage,

depending on management and location, carries varying amounts of salts, nutrients, pesticides, trace elements, sediments, and other by-products to surface and ground waters.

The crucial problem in the Tulare Lake Basin is the salts brought in with irrigation water and leached out of soils. Evaporation and crop transpiration remove water from soils, which can result in an accumulation of salts in the root zone of the soils at levels that retard or inhibit plant growth. Additional amounts of water often are applied to leach the salts below the root zone. The leached salts eventually enter ground or surface water. The amount of salts, which are leached, depends on the amounts in the soil profile and the applied waters. In 1970, the Department of Water Resources estimated that 481 million tons of salt were stored in the top 20 feet of soil (or the root zone) in the San Joaquin Valley {Department of Water Resources, "Land and Water Use Aspects of San Joaquin Valley Drainage Investigations", June 1970}. In 1971, the Department of Water Resources estimated that the four major rivers of the Tulare Lake Basin bring in 145,000 tons of salt per year. Another 63,000 tons are brought in by the Friant-Kern Canal, annually. The Delta-Mendota Canal brings in 336,000 tons per year {Department of Water Resources, "A General Survey of Electrical Conductivity in Ground Water, San Joaquin Valley", March through June 1971}.

The movement of the salts to surface waters can occur as shallow subsurface ground water flows or it can result from the surface water discharge of agricultural subsurface collection systems (or tile drains) which are employed in areas where farm lands have naturally poor drainage. Tile drains consist of pipe systems below the root zone of crops that drain water from soils that would otherwise stay saturated. TDS concentrations in tile drained water is many times greater than in the irrigation water that was applied to the crops. Tile drain water can also contain trace elements and nutrients. Removal and export, through a valley wide drain, of perched waters will offset, in part, the Basin's adverse salt accumulation.

Subsurface drainage will be a constant threat to surface water and usable ground water quality unless the disposal method is adequate. Disposal must be in a manner that isolates the salts in the drainage from the usable ground water body. In some areas of the Basin, evaporation basins are used to concentrate drainage water and contain salts. However, evaporation basins cannot be considered permanent solutions due to wildlife impacts, and the cost of ultimate salt disposal and basin closure. The California Department of Water Resources and other federal, state and local agencies continue to study alternative approaches for reuse and disposal of agricultural drainage waters.

The Central Valley provides critically important wetland habitat for wintering waterfowl of the Pacific Flyway. The Pacific Flyway covers the western portion of the North American Continent. Most Pacific Flyway waterfowl are from the prairies and parklands of western Canada and the river valleys and deltas of Alaska. The Central Valley supports approximately 60% of the Pacific Flyway wintering waterfowl population. Hundreds of thousands of shorebirds and other water or marsh birds annually winter or pass through the Central Valley {San Joaquin Valley Drainage Program, "Fish and Wildlife Resources and Agricultural Drainage in the San Joaquin Valley, California", Volume I, October 1990}.

Evaporation ponds constitute attractive oases for many species of wildlife. Aquatic migratory birds of the Pacific Flyway are drawn to the ponds, in part, because almost all of the native aquatic and wetland habitats in the San Joaquin Valley (especially in the Tulare Lake Basin) have been lost and because the ponds hold surface water in a vast, relatively sterile, agricultural landscape. The ponds also produce abundant aquatic invertebrates which feed large numbers of water birds {San Joaquin Valley Drainage Program, "Fish and Wildlife Resources and Agricultural Drainage in the San Joaquin Valley, California", Volume I, October 1990}.

Evaporation basins have varying potentials to impact wildlife, specifically shorebirds. Various studies have been conducted on this impact. Technical reports addressing site-specific and cumulative impacts from the majority of operating basins were completed in 1993. These reports were certified as environmental impact reports (EIRs).

The EIRs focused on impacts to wildlife and found all basins pose a risk to birds due to salinity and avian disease. To prevent and mitigate these impacts, waste discharge requirements for evaporation basins, adopted in 1993, include the following:

- Removal of attractive habitat, such as vegetation.
- A program for avian and waterfowl disease prevention, surveillance and control.
- Closure and financial assurance plans.
- Drainage operation plan to reduce drainage.

Basins with concentrations of selenium greater than 2.7 μg/l in the drainage water have potential for reduced hatchability and teratogenic impacts on waterfowl. To prevent and mitigate these impacts, waste

discharge requirements for these basins, adopted in 1993, include those listed above and the following:

- Intensive hazing prior to the breeding season.
- Egg monitoring.
- Basin reconfiguration, if necessary, to minimize attractiveness to water birds.
- Wildlife enhancement program, alternative habitat and/or compensatory habitat.

Regional Water Board policy on agricultural subsurface drainage:

- A valley wide drain to carry salts out of the valley remains the best technical solution to the water quality problems of the Tulare Lake Basin.
- Evaporation basins are an acceptable interim disposal method for agricultural subsurface drainage and may be an acceptable permanent disposal method in the absence of a valley drain provided that water quality is protected and potential impacts to wildlife are adequately mitigated. For existing basins requiring substantial physical improvements and other mitigations, some of which are dependent upon empirically derived techniques, operators shall implement mitigations as early as feasible.
- Persons proposing new evaporation basins and expansion of evaporation basins shall submit technical reports that assure compliance with, or support exemption from, Title 23, California Code of Regulations, Section 2510, et seq., and that discuss alternatives to the basins and assess potential impacts of and identify appropriate mitigations for the proposed basins.
- Agricultural drainage may be discharged to surface waters provided it does not exceed 1,000 µmhos/cm EC, 175 mg/l chloride, nor 1 mg/l boron. Other requirements also apply.

LOWER KINGS RIVER

The Lower Kings River from Peoples Weir to Stinson Weir on the North Fork and Empire Weir #2 on the South Fork is a Water Quality Limited Segment (see discussion regarding water quality limited segments later in this chapter) because of high salinity. Studies indicate that the source of the salinity is either surface or subsurface agricultural drainage. Levels of boron, molybdenum, sulfates, and chlorides in the Lower Kings River are high enough to impact agricultural uses and aquatic resources. Additional information is necessary to further characterize discharges to this section of the Kings River. In the meantime, drainage should be reduced by the use of at least the following management practices:

- Maximize distribution uniformity of irrigation systems.
- Minimize or eliminate pre-irrigation.
- Control the amount of water applied to each crop so it does not exceed the evapotranspiration needs of the crop and a reasonable leaching factor.
- Minimize seepage losses from ditches and canals to the extent feasible by lining them or replacing them with pipe.
- During periods of extreme dry conditions when dilution flows in the River are very low, farmers in the area should temporarily remove poorly drained land from production.

Agricultural Chemicals

Pesticides and nutrients in agricultural drainage have found their way to ground waters in many areas of the basin. Nitrate and pesticide levels exceeding the State drinking water standards occur in some ground waters in the basin, and have caused closure of domestic supply wells in several locations. One of the biggest problems facing municipal water providers is the presence of the chemical dibromochloropropane (DBCP) in their wells. The fumigant was widely used in the 1960's to control nematodes in vineyards and can now be found in wells down gradient of the use areas. Providers sued the manufacturers to recover damages and, as of 1995, most providers within the Valley have settled. State and local agencies are searching for methods to mitigate this problem.

The Department of Pesticide Regulation investigates reported cases of pesticide residues in ground water. Where contamination is confirmed to be through legal use of a pesticide, the Department designates a pest management zone after holding a public hearing. Use of the pesticide of concern is modified within the management zone created for it. Responsibility for water quality, however, remains with the State and Regional Water Boards. There is a Memorandum of Understanding between the State Water Board and the Department of Pesticide Regulation describing the role of each agency with regard to pesticide regulation.

Agricultural chemical applicators have been a source of pollution from spills, and improper containment and disposal of waters used to clean equipment or work areas. The application facilities fall under Regional Water Board regulatory programs. When appropriate management practices are implemented, waste discharge requirements may be waived. Regional Water Board staff also inspect high risk sites to evaluate compliance. Enforcement strategies are implemented as warranted.

Salinity

Degradation of ground water in the Tulare Lake Basin by salts is unavoidable without a plan for removing salts from the Basin. A valley wide drain to carry salts out of the valley remains the best technical solution to the water quality problems of the Tulare Lake Basin. The drain would carry wastewater generated by municipal, industrial, and agricultural activities, high in salt and unfit for reuse. The only other solution is to manage the rate of degradation by minimizing the salt loads to the ground water body.

Some of the salt load to the ground water resource is primarily the result of natural processes within the Basin. This includes salt loads leached from the soils by precipitation, valley floor runoff, and native surface waters.

Salts that are not indigenous to the Basin water resources result from man's activity. Salts come from imported water, soil leached by irrigation, animal wastes, fertilizers and other soil amendments, municipal use, industrial wastewaters, and oil field wastewaters. These salt sources, all contributors to salinity increases, should be managed to the extent practicable to reduce the rate of ground water degradation.

The Regional Water Board supports construction of a valley wide drain to remove salt-laden wastewater from the Basin under the following conditions:

- All toxicants would be reduced to a level which would not harm beneficial uses of receiving water.
- The discharge would be governed by specific discharge and receiving water limits in an NPDES permit.
- Long-term continuous biological monitoring would be required.

The Regional Water Board also encourages proactive management of waste streams to control and manage salts that remain in the Basin. Application or disposal of consolidated treated effluents should be to the west, toward the drainage trough of the valley. If feasible, salts in waste streams should be processed for reuse to reduce the need to import salt. Salt import should be reduced by assuring that imported water is of the highest quality possible. Water conveyance systems used to import water into the Basin should not be used to transport inferior quality water.

Storm Water

Runoff from residential and industrial areas can contribute to water quality degradation. Urban storm water runoff contains organics, pesticides, oil, grease, and heavy metals. Because these pollutants accumulate during the dry summer months, the first major storm after summer can flush a highly concentrated load to receiving waters and catch basins. Combined storm and sanitary systems may result in some runoff to wastewater treatment plants. In other cases, storm water collection wells can produce direct discharges to

ground water. Impacts of storm water contaminants on surface and ground waters are an important concern.

USEPA has promulgated regulations for municipal and industrial storm water permits in 40 CFR 122. The State Water Board implemented these regulations by adopting a General Industrial Activities Storm water Permit (excluding construction activity) and a General Construction Activity Storm water Permit. Storm water dischargers indicate intention to follow the specifications in the appropriate permit by filing a Notice of Intent with the State Water Board.

The Regional Water Board will take all measures necessary to protect the quality of surface and ground waters from treatment or disposal of urban runoff.

- The Regional Water Board will issue waste discharge requirements on the discharge of urban runoff when a threat to water quality exists.

- The Regional Water Board will regulate large and medium municipal storm water dischargers and, at its discretion, specific industrial dischargers through the issuance of individual NPDES permits. Industrial dischargers may also be regulated with individual, site-specific NPDES permits. The Regional Water Board will issue waste discharge requirements on the discharge of urban runoff to land when a threat to water quality exists.

Combined sewer systems will not be allowed without satisfactory justification.

- The Regional Water Board will require source control programs by local agencies when water quality benefits will be realized.
- Governing agencies should provide facilities for the treatment (if necessary), storage and percolation of runoff.

The implementation chapter of the Tulare Lake Basin Plan also lists the discharges that were waived from requiring Waste Discharge Requirements as adopted by Resolution No. 82-036 .

ACTIONS RECOMMENDED FOR IMPLEMENTATION BY OTHER AGENCIES

Consistent with the Porter-Cologne Water Quality Control Act, the Basin Plan may identify control actions recommended for implementation by agencies other than the Regional Water Board {California Water Code, Section 13242(a)}.

Irrigated Agriculture

The water quality concerns from irrigated agriculture are great and the Regional Water Board cannot resolve these alone. The following actions should be taken by other agencies:

1. As a last resort and where the withholding of irrigation water is the only means of achieving significant improvements in water quality, the State Water Board should use its water rights authority to preclude the supplying of water to specific lands.

2. The State Water Board should require all water agencies in the Central Valley, regardless of size, to submit an "informational" report on water conservation.

3. The State Water Board should continue to declare the drainage problem in the Central Valley a priority nonpoint source problem in order to make USEPA nonpoint source control funding available to the area.

4. The Legislature should sponsor additional bond issues before the voters to provide low interest loans for agricultural water conservation and water quality projects. The bonds should incorporate provisions that would allow recipients to be private landowners, and that would allow irrigation efficiency improvement projects that reduce drainage discharges to be eligible for both water conservation funds and water quality facilities funds.

5. The US Bureau of Reclamation should give the districts and growers subject to this program first priority in their water conservation loan program.

6. The State Water Board should request legislation that will protect negotiated fish flow releases for instream uses in those critical reaches designated by the Department of Fish and Game from any new exercise of appropriative or riparian rights. These flow releases should recognize and protect existing contractual commitments for beneficial use.

APPENDIX 5: PESTICIDE REGULATORY ACTIVITIES

DEPARTMENT OF PESTICIDE REGULATION

Department of Pesticide Regulation (DPR), under Food and Agriculture Code (FAC) §11501, is obligated to protect the environment, including surface water, from "*...environmentally harmful pesticides by prohibiting, regulating or ensuring proper stewardship of pesticides*". State law, and delegation of authority by the USEPA under FIFRA, requires DPR to thoroughly evaluate and register pesticides before they are sold or used in California. DPR's evaluation of pesticides includes potential water quality problems associated with specific uses of pesticides, such as on sites where pesticides are likely to move with runoff or irrigation tailwater into surface waterways. DPR gives special attention to the potential for toxicity to the aquatic biota and to factors that may interfere with attaining water quality objectives. If DPR determines that such uses will likely result in significant adverse impacts that cannot be avoided or adequately mitigated, registration is not granted unless the Director indicates otherwise, as provided in 3 CCR §6158. (Cal EPA, 1997)

The DPR CEQA Equivalent Process

In 1976, the State Attorney General issued an opinion that CDFA (*now DPR*) had to comply with CEQA when registering a pesticide or granting a license, permit or certificate. Under the terms of CEQA, the Department was required to prepare an environmental impact report (EIR) before registering a pesticide or issuing a permit to use a restricted pesticide. After a specially convened Environmental Assessment Team determined that this was not feasible, legislation was passed (AB 3765) that provided for an abbreviated environmental review procedure as the functional equivalent to a full EIR. (DPR, 1999b)

As a practical matter, the legislation meant that the State pesticide regulatory agency and the CACs did not have to prepare an EIR on each activity approved. However, documentation of environmental impacts, mitigation measures, and alternatives was required. This necessitated a revision of Department regulations relating to pesticide registration and evaluation, public notice of proposed actions and decisions and requiring permits to use certain restricted pesticides. The regulations also set up advisory committees to allow interaction between the Department and other State agencies that have responsibility for resources that may be affected by pesticides. (DPR, 1999b).

Surface Water Programs

In the 1999-2000 and 2000-2001 State Budgets, the Legislature appropriated resources to DPR to establish a surface water protection program. The goal of DPR's surface water program is to characterize pesticide residues in surface water bodies (including rivers, streams, and agricultural drains), identify the sources of the contamination, determine the mechanisms of off-site movement of pesticides to surface water, and develop site-specific mitigation strategies. This is done primarily through surface water monitoring in consultation with other agencies (including

the SWRCB and the RWQCBs), and research to characterize the factors that lead to off-site movement and to develop use practices to prevent such movement. Research is facilitated by contracting with the University of California, California State Universities, and the private sector. DPR also maintains a comprehensive database of surface water monitoring results.

DPR's Basin Plan Compliance

DPR works in conjunction with other state and federal programs relating to water quality and watershed management. Under the terms of agreements between DPR and the SWRCB, DPR will investigate pesticides of concern and help develop recommended pesticide use practices designed to reduce or eliminate the impact of pesticides on surface water quality. Management practices designed to reduce contamination are implemented initially through voluntary and cooperative efforts. (DPR, 2001)

Depending on the source of the residue problems, mitigation may include outreach programs targeted at modifying use practices among agricultural pesticide users. If the revised use practices (which do not have the force of law but are voluntarily adopted by pesticide users) do not adequately mitigate the impacts, then DPR must use its wide-ranging regulatory authority to impose use restrictions. DPR may modify the use of pesticides by regulation or permit conditions to prevent excessive amounts of residues from reaching surface water. Evaluating the feasibility of these modifications and conditions and promulgating regulations is the role of Environmental Monitoring and Enforcement branches. If those restrictions are not adequate, then the SWRCB and the RWQCBs have the authority to mitigate the adverse effects of pesticides in water bodies. (DPR, 2001)

The DPR/SWRCB Management Agency Agreement (MAA) (Cal EPA, 1997) contains an implementation plan, which includes guidelines for minimizing potential pesticide off-site movement and transport of residues into surface water. Applicable sections focus on pesticide selection, water and soil conservation, and drainage and disposal of surface water runoff including:

Pesticide Selection: Pesticide selectivity will be optimized and persistence and biotoxicity minimized through the selection of active ingredient, product formulation, additives, placement, and rate. Pesticides will be selected that are not known or suspected to be ground or surface water contaminants, especially when applications are planned for the rainy season. Additionally, pesticides will be used that are most selective for the target pest species to enhance natural population control mechanisms and reduce pesticide use.

Water and Soil Conservation: The MAA advocates practices that minimize water, soil, and sediment losses from treated sites including:

- improve irrigation system uniformity, and manage irrigation timing and amount to minimize deep percolation and surface runoff losses;

- use crop rotations, crop residue management, cover crops, conservation tillage, vegetative filter strips, grade stabilization structures, or sediment basins to minimize soil erosion and runoff velocity from rainfall and irrigation and allow sediment deposition; and,
- install irrigation tail water return systems to reduce runoff, allowing more time for pesticide dissipation and degradation.

Drainage and Disposal of Surface Water Runoff: These guidelines are aimed at preventing the transport of runoff from treated areas to surface waters and wetlands and to sites that may serve as pathways for ground water contamination including:

- in situations where there is direct surface water runoff from treatment sites to surface water bodies or wetlands, apply only those chemicals formulated for aquatic or wetland use; and
- wherever possible, establish noncropland sites adjacent to surface water features as application exclusion zones to reduce the potential for surface water contamination by the transport of residues in storm water runoff.

Future work by DPR will include the validation of management practices for runoff reduction, demonstration and promotion of management practices, establishment of a surface water sampling network and a bioassessment program. DPR will continue contracts with other agencies such as sampling the San Joaquin and Sacramento Rivers in collaboration with the SWRCB and RWQCBs as they implement their Nonpoint Source Pollution Control Program and pesticide Total Maximum Daily Load process. (DPR, 2001)

COUNTY AGRICULTURAL COMMISSIONERS

Under the direction and supervision of DPR, the county agricultural commissioners (CACs) carry out pesticide enforcement activities at the local level. The restricted material permit is a key element of the local regulatory program. Restricted materials include those that are hazards to public health, farmworkers, domestic animals, honeybees, the environment, wildlife, or crops other than those being treated. Pesticides may be proposed for designation as restricted materials at any time, often based on a review of data submitted by registrants or information derived from field studies or incident investigations. When a pesticide is designated a restricted material, the Director or the CACs may adopt specific conditions which govern the possession and use of the pesticide. (DPR, 1999b)

Pesticides given a restricted designation cannot be legally purchased or used without a permit from the CAC. Restricted materials (with certain exceptions) may be possessed or used only by or under the supervision of licensed or certified persons, and only in accordance with an annual permit issued by the county agricultural commissioner. A commissioner may require that restricted material users employ specific use practices to mitigate potential adverse effects or may deny the permit with cause. Permits for the agricultural use of pesticides are the functional equivalent of environmental impact reports and as a result must be site- and time-specific. Permits for the agricultural use of these pesticides are usually issued for a season or year. (DPR, 1999b)

In addition, since permits are usually issued for a 12-month period, a notice of intent to apply the pesticide must be submitted to the CAC at least 24 hours before application. The notice must describe the site to be treated and the pesticides to be applied. It must also contain information on any changes in the environmental setting that may have occurred since the permit was issued. All notices of intent are reviewed by county staff who can halt the proposed application if conditions warrant it. A minimum of five percent of the use sites identified by the notices or sites on the permit are selected for pre-application inspections, which are primarily spot checks to ensure that information contained on the permit is accurate. (DPR, 1999b)

Besides administering the restricted materials permitting system, the CACs enforce other State laws and regulations relating to pesticide use at the local level including:

- inspect the operations and records of growers, pest control operators, pesticide dealers, and agricultural pest control advisers;
- register licensed pest control businesses, pest control aircraft pilots, and agricultural pest control advisers doing business in the county;
- conduct pesticide incident investigations;
- provide training to pesticide users; and,
- under contract with DPR, collect fresh produce samples for State pesticide residue monitoring programs.

DPR and CACs guidelines acknowledge the necessity of a uniform enforcement response policy while maintaining the ability to recognize local conditions in decision making. Violations of the State's pesticide regulations are categorized as "*general*", primarily paperwork oversights, or "*substantive*" violations. The stiffest penalties have been reserved for violations classified as "substantive". To obtain compliance when violations are found, CACs have a range of options, including administrative actions, civil and criminal actions, and crop quarantine and seizure. DPR may also consider action on the pesticide's registration, such as cancellation. (DPR, 1999b)

APPENDIX 6: ACRONYMS AND DEFINITIONS

LIST OF ACRONYMS

AB	Assembly Bill
ACL	Administrative Civil Liability
AG	Attorney General
BMP	Best Management Practice
CAC	County Agricultural Commissioner
Cal/EPA	California Environmental Protection Agency
CALFED	California Federal Bay-Delta Program
CAO	Cleanup and Abatement Order
CCC	California Coastal Commission
CCID	Central California Irrigation District
CCR	California Code of Regulations
CDF	California Department of Forestry and Fire Protection
CDFA	California Department of Food and Agriculture
CDO	Cease and Desist Order
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CRWQCB	California Regional Water Quality Control Board
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
CWC	California Water Code
CZARA	Coastal Zone Act Reauthorization Amendments of 1990
DA	District Attorney
DBCP	1,2-Dibromo-3-chloropropane
DDFA	California Department of Food and Agriculture
DFG	Department of Fish and Game
DOC	Department of Conservation
DPR	Department of Pesticide Regulation
DWR	Department of Water Resources
EDB	Ethylene Dibromide
EIR	Environmental Impact Report
EIS	Enviornmental Impact Statement
ELDF	Earthjustice Legal Defense Fund
ET	Evapotranspiration
FSA	Farm Services Agency
FAC	Food and Agriculture Code
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act

FY	Fiscal Year (1 July – 30 June)
GBP	Grasslands Bypass Project
GWD	Grasslands Water District
IPM	Integrated Pest Management
ISWP	Inland Surface Waters Plan
LC50	Limit Where 50% of the Population Dies
MAA	Management Agency Agreement
MM	Management Measure
MOU	Memorandum of Understanding
MP	Management practice
MUN	Municipal Drinking Water Beneficial Use
NEPA	National Environmental Policy Act
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
NRCS	National Resources Conservation Service
NTC	Notice to Comply
OAL	Office of Administrative Law
ODW	Office of Drinking Water
OP	Organophosphorus pesticide
PCWQCA	Porter Cologne Water Quality Control Act
Porter-Cologne	Porter-Cologne Water Quality Control Act of 1969
PY	Personnel Year
RCD	Resource Conservation District
RMS	Resource Management Systems
ROWD	Report of Waste Discharge
RUP	Restricted Use Pesticides
RWQCB	Regional Water Quality Control Board
RWQCB 1	North Coast Region
RWQCB 2	San Francisco Bay Region
RWQCB 3	Central Coast Region
RWQCB 4	Los Angeles Region
RWQCB 5	Central Valley Region
RWQCB 6	Lahontan Region
RWQCB 7	Colorado River Basin Region
RWQCB 8	Santa Ana Region

RWQCB 9	San Diego Region
SJR	San Joaquin River
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TDS	Total Dissolved Solids
TID	Talent Irrigation District
TMDL	Total Maximum Daily Load
TSO	Time Schedule Orders
UCCE	University of California Cooperative Extension
USBR	U. S. Bureau of Reclamation
USC	United States Code
USDA	U. S. Department of Agriculture
USEPA	U. S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U. S. Geological Survey
WC	Water Code
WDR	Waste Discharge Requirement
WMI	Watershed Management Initiative
WQCP	Water Quality Control Plans

DEFINITIONS

Agricultural Drainage. (1) The process of directing excess water away from root zones by natural or artificial means, such as by using a system of drains placed below ground surface level; also called subsurface drainage; (2) the water drained away from irrigated farmland (DWR, 1998).

Anadromous Fish. A fish that spend a part of their life cycle in the sea and return to freshwater streams to spawn (DWR, 1998).

Deep Percolation. Percolation of irrigation water through the ground and beyond the lower limit of the root zone of plants into groundwater (DWR, 1998).

Evapotranspiration (ET). The quantity of water transpired (given off), retained in plant tissues, and evaporated from plant tissues and surrounding soil surfaces (DWR, 1998).

Fungicide. Pesticides, which are used to control, deter, or destroy fungi (EPA, 1997).

Furrow Irrigation. Irrigation method in which water travels through the field by means of small channels between each groups of rows (EPA, 1997).

Half-Life. The time required for a pollutant to lose one-half of its original concentration (EPA, 1997).

Herbicide. A chemical pesticide designed to control or destroy plants, weeds, or grasses (EPA, 1997).

Insecticide. A pesticide compound specifically used to kill or prevent the growth of insects (EPA, 1997).

Irrigation Efficiency. The amount of water stored in the crop root zone compared to the amount of irrigation water applied (EPA, 1997).

Irrigation Return Flow. Surface and subsurface water which leaves the field following application of irrigation water (EPA, 1997).

Pesticide. (1) any substance, or mixture of substances which is intended to be used for defoliating plants, regulating plant growth, or for preventing, destroying, repelling, or mitigating any pest, which may infest or be detrimental to vegetation, man, animals, or households, or be present in any agricultural or nonagricultural environment whatsoever, or (2) any spray adjuvant, or (3) any breakdown products of these materials that threaten beneficial use. Note that discharges of "inert" ingredients included in pesticide formulations must comply with all applicable water quality objectives. (CRWQCB, 1998).

Runoff. The volume of surface flow from an area (DWR, 1998).

Tail Water. The runoff of irrigation water from the lower end of an irrigated field (EPA, 1997).

Tile Water. Subsurface irrigation drainage water that is discharged through a sump (Grassland, 1999).

Trickle Irrigation. Method in which water drips to the soil from perforated tubes or emitters (EPA, 1997).