CENTRAL VALLEY REGIONAL
WATER QUALITY CONTROL BOARD

Non-Regulatory Amendments to the Water Quality Control Plans for the Sacramento River and San Joaquin River Basins and the Tulare Lake Basin to Provide a Cost Estimate and Potential Sources of Funding for a Long-Term Irrigated Lands Program

Staff Report

September 2011

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

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Non- Regulatory Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins and the Tulare Lake Basin to Provide a Cost Estimate and Potential Sources of Funding for a Long-Term Irrigated Lands Regulatory Program

Staff Report

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Table of Contents

List of Appendices

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1 EXECUTIVE SUMMARY

Staff of the Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) proposes for Central Valley Water Board consideration non-regulatory amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, and the Water Quality Control Plan for the Tulare Lake Basin. The amendments will add an estimate of the total cost of a Long-Term Irrigated Lands Regulatory Program ("LTP" or "Long-term Program"), and identify potential sources of financing for the LTP.

The estimate of total cost ranges from $216 million to $1,321 million per year. Most of those costs are associated with implementation of improved management practices to protect water quality and represent the greatest source of uncertainty in the cost estimate. Although some management practice information has been provided as part of the current irrigated lands regulatory program, information on management practices currently implemented and how effectively they are being employed to protect water quality is limited. The improved practices are not mandated by the Central Valley Water Board, but represent the potential responses by growers to new regulatory requirements. Since the practices evaluated are often employed to provide other, non-water quality, farm related benefits, it is not possible to determine which practices would be put in place in response to a new water quality program or in response to other economic or market demands.

Given the available information, the cost estimates provide a reasonable indication of cost impacts due to the new regulatory program and the potential response of growers to those new requirements. Should growers successfully address water quality problems as part of a regional effort led by third parties, actual costs would be near the lower end of the range. If growers and third parties are not successful in their regional efforts, the costs will be at the higher end of the cost range.

2 INTRODUCTION

Basin Plans form the basis for regulatory actions by Regional Water Boards taken to protect waters of the state and to assure compliance with the California Water Code (CWC). The preparation and adoption of a Basin Plan is required by CWC section 13240. Pursuant to state law, Basin Plans must consist of all of the following (CWC § 13240-13244):

a) beneficial uses to be protected;
b) water quality objectives;
c) a program of implementation needed for achieving water quality objectives; and
d) surveillance and monitoring to evaluate the effectiveness of the program.

Basin Plans are adopted and amended by the Regional Water Boards using a structured process involving peer review, full public participation, state environmental review, and state and federal agency review and approval. Each of the nine Regional Water Boards in California has adopted Basin Plans for its geographic region. The Central Valley Water Board has adopted two Basin Plans, one for the Sacramento River and San Joaquin River Basins and one for the Tulare Lake Basin.

The authority for the Regional Water Boards to formulate and adopt Basin Plans and to periodically review these plans is derived from CWC section 13240. However, a Basin Plan does not become effective until approved by the State Water Board (CWC § 13245), and the Office of Administrative Law (OAL). If the amendment involves adopting or revising a standard which relates to surface water, it falls under federal CWA jurisdiction and must also be approved by the US Environmental Protection Agency (USEPA) (Title 40 Code of Federal Regulations Part 131.21) before it becomes effective. Because the proposed amendments do not affect surface water quality standards, USEPA approval will not be required.

2.1 Mandates for Basin Plan Amendments

Water Code section 13141 states, in part, that, "… prior to implementation of any agricultural water quality control program, an estimate of the total cost of such a program, together with an identification of potential sources of financing, shall be indicated in any regional water quality control plan." The proposed Basin Plan amendments have been prepared to be consistent with this provision of the Water Code[1]. Since the Long-term Program would affect the entire Central Valley, amendments are needed for both the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, and the Water Quality Control Plan for the Tulare Lake Basin.

The Regional Water Boards must comply with applicable requirements of the California Environmental Quality Act (CEQA) (Public Resources Code § 21000 et seq.) when amending Basin Plans. The Secretary of Resources has determined that the Central Valley Water Board's Basin Planning Process qualifies as a certified regulatory program pursuant to Public Resources Code section 21080.5 and California Code of Regulations, title 14, section 15251(g). For Basin Plan Amendments, staff ordinarily establishes compliance with CEQA by following the requirements of State Water Resources Control Board's Regulations for Implementation of CEQA, Exempt Regulatory Programs, which are found in the California Code of Regulations, title 23, section 3775 et seq. However, as described below, these non-regulatory amendments are not a "project" for the purposes of CEQA, and are not subject to the requirements of CEQA nor the State Water Board's certified regulatory program.

The proposed amendments, which estimate costs and identify pre-existing sources of financing, are non-regulatory in that no party is required to take action in response to the amendments. As described more fully in section 5.1, adding this information to the Basin Plan will not cause a direct physical change in the environment, or a reasonably foreseeable indirect

[1] Note that 13141, in whole, refers to the relationship between the California Water Plan and the water boards' water quality control plans. The context of the requirement to provide a cost estimate suggests that such an estimate may only be required when a program of implementation for agriculture is established as part of a Basin Plan Amendment. However, the Central Valley Water Board has developed cost estimates for the long-term regulation of irrigated agricultural discharges and believes it is appropriate to include those estimates in the Basin Plans.

physical change in the environment. Therefore, the proposed amendments are not a "project"[2] for purposes of CEQA compliance, and are therefore legally exempt from CEQA requirements.[3] Likewise, the proposed amendments are exempt from the State Water Board's certified regulatory program requirements because those requirements do not apply if the board determines that the activity is exempt from CEQA. Despite the exemption from certified regulatory program requirements, Board staff has implemented the remaining regulatory procedures used in the Basin Planning process.

2.2 Water Quality Control Plan for the Sacramento River & San Joaquin River Basins

The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins was first adopted in 1975. Triennial reviews were completed in 1984, 1988, 1999, 2002 and 2005. This Basin Plan was revised and updated in 1989 and 1994. The current edition (Fourth Edition, 2007) incorporates all new amendments adopted since 1994.

2.3 Water Quality Control Plan for the Tulare Lake Basin

The Water Quality Control Plan for the Tulare Lake Basin was first adopted in 1975. This Basin Plan was updated in 1995 and revised in 2002, with amendments becoming effective in 2004. The current edition (Second Edition, 2004) incorporates all new amendments adopted since 1995.

3 IRRIGATED LANDS LONG-TERM PROGRAM DEVELOPMENT

In June 2006, the Central Valley Water Board approved coalition and individual conditional waivers applicable to discharges from irrigated agriculture to surface waters. The individual conditional waiver expired on 30 June 2011. However, in June 2011 the Board renewed the coalition conditional waiver for an additional two years. When the Board approved the 2006 conditional waivers, it directed staff to begin developing a long-term irrigated lands regulatory program ("LTP" or "Long-term Program") to protect water quality in accordance with state law. The Board also directed staff, in developing the Long-term Program, to continue preparation of an Environmental Impact Report (EIR).

In fall 2008, the Central Valley Water Board convened the Long-Term Program Stakeholder Advisory Workgroup. The Workgroup included a range of stakeholder interests representing local, State, and federal government, industry, agricultural, and environmental/environmental justice groups throughout the Central Valley. In August 2009, the Workgroup approved long-term ILRP goals and objectives and a range of alternatives to be considered in the EIR.

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[2] "Project" is defined by CEQA as a governmental activity "which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment…." Pub. Resources Code § 21065.

[3] Pub. Resources Code § 21080, subd. (a) (defining CEQA to apply only to discretionary "projects"); see also, 14 C.C.R. § 15060, subd. (c)(3) (clarifying that an activity is not subject to CEQA if it is not a project.)

In July 2010, the Central Valley Water Board released the *Irrigated Lands Regulatory Program Draft Environmental Impact Report* (Draft PEIR; ICF International) for the Long-Term Irrigated Lands Regulatory Program (ILRP). The Draft PEIR provides programmatic analysis of impacts resulting from the implementation of six alternatives. Five of the alternatives were developed with the Long-Term ILRP Stakeholder Advisory Workgroup. The sixth alternative was developed by staff in an attempt to fulfill program goals and objectives, meet applicable state policy and law, and minimize potentially adverse environmental impacts and economic effects.

On 7 April 2011, the Central Valley Water Board adopted Resolution R5-2011-0017, which certified the *Irrigated Lands Regulatory Program Final Environmental Impact Report* (Final PEIR; ICF International 2011). This report evaluated six program alternatives for the long-term regulation of irrigated lands, including an Alternative 6 that was the Board staff-recommended alternative when the Draft PEIR was released to the public. The cost estimates provided by this Basin Plan Amendment include an upper-end and lower-end range estimate of costs encompassing the full range of alternatives described in the Final PEIR.

3.1 Final Program EIR Long-Term Program Alternatives

The six Long-Term Program alternatives are evaluated and presented in detail in the Final PEIR. The descriptions of the alternatives provided below are partially excerpted from the Final PEIR.

- Alternative 1 – Full Implementation of Current Program (No Program Alternative): Under Alternative 1, the Central Valley Water Board would renew the current program and continue to implement it into the future. This would be considered the "No Project Alternative" per California Environmental Quality Act (CEQA) guidelines (Title 14 California Code of Regulations (CCR) Section 15126.6(e)(3)(A)).

  Coalition groups would continue to function as lead entities representing growers (owners of irrigated lands, wetland managers, nursery owners, and water districts). This alternative is based on continuing watershed monitoring to determine whether operations are causing water quality problems. Where monitoring indicates a problem, third-party groups and growers would be required to implement management practices[4] to address the problem and work toward compliance with applicable water quality standards. This alternative would not establish any new Central Valley Water Board requirements for discharges to groundwater from irrigated agricultural lands.

  Under this alternative, the Central Valley Water Board would renew the current program through Waste Discharge Requirements (WDRs) or a waiver of the WDRs. Water quality coalition groups have formed throughout the Central Valley to function as representative or "lead" entities that administer the current ILRP. Coalitions represent

[4] In the context of this cost analysis, the term "management practices" means conservation or agricultural practices typically employed on farms that, among other benefits, result in reduction of the discharge of wastes from irrigated agricultural lands. "Management practices" do not include practices that would be atypical for a farming operation, such as wastewater treatment processes.

growers, provide education, organize monitoring, and work with the Central Valley Water Board to help ensure that the current program is effectively implemented. These third-party water quality coalition groups would continue to function as lead entities for their members to ensure that all Central Valley Water Board requirements are met.

Monitoring under this alternative would be the same as the watershed-based assessment and core monitoring required under the current ILRP. Under this monitoring scheme, coalition groups would work with the Central Valley Water Board to develop monitoring plans for Central Valley Water Board approval. These plans would specify monitoring parameters and site locations.

- Alternative 2 – Third Party Lead Entity: Under Alternative 2, the Central Valley Water Board would develop a single mechanism or a series of regulatory mechanisms for waste discharge from irrigated agricultural lands to groundwater and surface water. The series of regulatory mechanisms would be designed to provide flexibility in establishing requirements for growers considering the variety of environmental conditions and agricultural operations throughout the Central Valley. These could include WDRs, conditional waivers of WDRs, or conditional prohibitions of discharge.

  Under Alternative 2, third-party groups (e.g., water quality coalitions) would function as lead entities representing growers. Regulation of discharges to surface water would be similar to Alternative 1 (the current ILRP). However, this alternative allows for a reduction in monitoring under lower threat circumstances and where watershed or area management objective plans are being developed. This alternative also includes requirements for development of groundwater quality management plans (GQMPs) to minimize discharge of waste to groundwater from irrigated lands. However, GQMPs under this alternative would not involve monitoring of groundwater to determine the performance of these management plans. These GQMPs would be reviewed every five years by the Central Valley Water Board and the third-party groups to determine whether and how the GQMPs should be updated. This alternative also relies on coordination with the California Department of Pesticide Regulation (DPR) for regulating discharges of pesticides to groundwater.

  Under this alternative, water quality coalitions or other third-party groups would be responsible for general administration of the ILRP and would need to agree to assume greater responsibilities than under Alternative 1.

  Third-party groups would have the option of developing a watershed or area management objectives plan. The goal of this plan would be to meet source control management objectives that would reduce the threat to surface water quality from waste discharge associated with irrigated agriculture. In areas implementing a Central Valley Water Board-approved watershed or area management objectives plan, surface water monitoring would be reduced. Plans would specify optional water quality management practices that could be implemented to achieve plan objectives. Further, the plan would be developed consistent with the area or watershed commodity types, common agricultural practices, pesticides commonly used, and local land characteristics.

Optional practices would be provided to allow growers to adapt to their specific conditions for compliance with the ILRP. The plan also would consider the results of previous water quality sampling.

Growers would be required to track implemented management practices and submit the results to the third-party group. The third-party group would report summary results to the Central Valley Water Board. The third-party group would be required to summarize the results of groundwater and surface water monitoring and tracking in an annual monitoring report to the Central Valley Water Board.

- Alternative 3 – Individual Farm Water Quality Management Plan: Under Alternative 3, growers would have the option of working directly with the Central Valley Water Board or another implementing entity (e.g., county agricultural commissioners [CACs]) in development of a farm water quality management plan (FWQMP). Growers would individually apply for a conditional waiver or WDRs that would require Central Valley Water Board approval of their FWQMP.

  On-farm implementation of effective water quality management practices would be the mechanism to reduce or eliminate waste discharged to state waters. This alternative would provide incentive for individual growers to participate by providing growers with Central Valley Water Board certification that they are implementing farm management practices to protect state waters. This alternative relies on coordination with DPR for regulating discharges of pesticides to groundwater.

  Under Alternative 3, growers would be the lead entities working directly with the Central Valley Water Board and would be responsible for applying for coverage, developing FWQMPs, and conducting any required reporting.

  Unless specifically required in response to water quality problems, owners/operators would not be required to conduct water quality monitoring of adjacent receiving waters or underlying groundwater. Required monitoring would include evaluation of management practice effectiveness. The Central Valley Water Board, or a designated third-party entity, would conduct annual site inspections on a selected number of operations. They also would review available applicable water quality monitoring data as additional means of monitoring the implementation of management practices and program effectiveness.

- Alternative 4 – Direct Oversight with Regional Monitoring: Under this alternative, the Central Valley Water Board would develop WDRs and/or a conditional waiver of WDRs for waste discharge from irrigated agricultural lands to groundwater and surface water. As in Alternative 3, growers, or legal entities responsible for waste discharges by a group of growers, would apply directly to the Central Valley Water Board in order to obtain coverage (“direct oversight”). Also as in Alternative 3, growers would be required to develop and implement individual FWQMPs in order to minimize discharge of waste to groundwater and surface water from irrigated agricultural lands. However, Alternative

4 would include an option for regional monitoring run by a third party instead of monitoring conducted by individual growers.

Discharge of waste to groundwater and surface water would be regulated using a tiered approach. Fields would be placed in one of three tiers based on their threat to water quality. The tiers represent fields with minimal (Tier 1), low (Tier 2), and high (Tier 3) potential threat to water quality. Requirements to avoid or minimize discharge of waste would be the least stringent for Tier 1 fields and the most stringent for Tier 3 fields. This would allow for less regulatory oversight for low-threat operations while establishing necessary requirements to protect water quality from higher-threat discharges. This alternative relies on coordination with DPR for regulating discharges of pesticides to groundwater.

Growers would be lead entities working directly with the Central Valley Water Board; they would be responsible for applying for coverage, developing FWQMPs, and conducting any required monitoring and reporting. This alternative would allow for formation of responsible legal entities that could serve a group of growers who discharge to the same general location and thus could share monitoring locations. In such cases, the legal entity would be required to assume responsibility for the waste discharges of member growers, to be approved by the Central Valley Water Board, and ultimately to be responsible for compliance with ILRP requirements.

For monitoring, growers would have the option of enrolling in a third-party group regional monitoring program instead of conducting individual monitoring. In cases where responsible legal entities were formed, these entities would be responsible for conducting monitoring. All growers would be required to track nutrient, pesticide, and implemented management practices and submit the results to the Central Valley Water Board (or an approved third-party monitoring group) annually. Other monitoring requirements would depend on designation of the fields as Tier 1, Tier 2, or Tier 3.

- Alternative 5 – Direct Oversight with Farm Monitoring: Alternative 5 would consist of general WDRs designed to protect groundwater and surface water from discharges associated with irrigated agriculture.

  All growers would be required to apply for and obtain coverage under the general WDRs. This alternative would include requirements to (1) develop and implement a FWQMP; (2) monitor (a) discharges of tail water, drainage water, and storm water to surface water; (b) applications of irrigation water, nutrients, and pesticides; and (c) groundwater; (3) keep records of (a) irrigation water; (b) pesticide applications; and (c) the nutrients applied, harvested, and moved off the site; and (4) submit an annual monitoring report to the Central Valley Water Board.

  Alternative 5 relies on coordination with DPR for regulating discharges of pesticides to groundwater. The Central Valley Water Board would develop general WDRs for irrigated agriculture. Growers would be the lead entity in working with the Central Valley Water Board. The Central Valley Water Board would adopt the WDRs, enroll individual

growers under the program, provide regulatory oversight, and enforce the requirements of the program.

Each grower would be required to monitor tail water discharges, storm water discharges, and drainage system discharges. In addition, each grower would be required to conduct nutrient and pesticide tracking as well as groundwater monitoring.

- Alternative 6 – Staff Recommended Alternative in the Final PEIR: Per the Final PEIR, each of the above alternatives was found to achieve some of the program evaluation measures, but not others. Because no single alternative achieved complete consistency with all evaluation measures, Board staff constructed Alternative 6 by selecting from the best-performing elements of Alternatives 1 through 5.

  Under Alternative 6, eight to twelve general WDRs or conditional waivers of WDRs would be developed that would be geographic and/or commodity-based. The alternative would establish requirements for waste discharge from irrigated agricultural lands to groundwater and surface water. Similar to Alternatives 1 and 2, water quality coalitions or other third-party groups would be responsible for general administration of the ILRP. The alternative would establish prioritization factors for determining the type of requirements and monitoring that would be applied. The prioritization would be applied geographically as a two tier system, where Tier 1 areas would be "low priority", and Tier 2 would be "high priority".

  Program requirements, monitoring and management would be dependent on the priority (Tier 1 or 2). Generally, this alternative requires regional management plans to address water quality concerns and regional monitoring to provide feedback on whether the practices implemented are working to solve identified water quality concerns. In Tier 1 areas, irrigated agricultural operations and third-party groups would be required to describe management objectives to be achieved, report on management practices implemented, and make an assessment of ground and surface water quality every five years. In Tier 2 areas, irrigated agricultural operations and third-party groups would be required to develop and implement ground and/or surface water quality management plans, as appropriate to address water quality concerns, report on management practices, and provide annual regional ground and surface water quality monitoring. Similar to Alternative 2, Alternative 6 would allow local groundwater management plans or integrated regional water management plans to substitute, all, or in part for ILRP GQMPs, with Central Valley Water Board approval.

  Alternative 6 would establish a time schedule for compliance for addressing surface and groundwater quality problems. The schedule would require compliance with water quality objectives within five to ten years for surface water problems and demonstrated improvement within five to ten years for groundwater problems.

When the Central Valley Water Board certified the Final PEIR, it did not select a specific Long-Term Program alternative for implementation. Instead, it directed staff to begin developing

proposed orders and other regulatory actions that will establish the Long-Term Program. At a subsequent Board meeting, staff updated the Board on its progress in developing the orders. Staff indicated that it would develop an approach modeled after a *Recommended Irrigated Lands Regulatory Program Framework Staff Report* (ILRP Framework Report), *March 2011*. The approach would be composed of elements from the range of alternatives evaluated in the Final PEIR. While the staff's approach is subject to change, and is modeled after a staff report that was not adopted by the Board, it provides additional information upon which to estimate future costs of the Long-Term Program.

Under staff's current approach, the proposed orders and regulatory actions would likely include the following elements: regulation of discharges to surface water and groundwater; a three-tiered approach to ensure regulatory requirements are appropriately tailored to the water quality conditions in the area[5]; conditional authorization of third-party groups to represent growers and proxy with staff; requirements for regional surface water and groundwater management plans; requirements for regional surface water and groundwater monitoring; individual farm evaluation; and individual certified nutrient management plans in groundwater basins impacted by nitrates. Individual dischargers not represented by third-party groups would be governed by general WDRs.

3.2 Estimated Total Costs

The Final PEIR was supported by a *Draft Technical Memorandum Concerning the Economic Analysis of the Irrigated Lands Regulatory Program* (Economics Report; ICF International 2010). An extensive economic analysis was presented in this report to estimate the cost and broader economic impact on irrigated agricultural operations associated with the five alternatives developed by the Stakeholder Advisory Workgroup. Staff was also able to use that analysis to estimate costs of the recommended program alternative (Alternative 6), since the recommended program alternative fell within the range of the five alternatives. This cost estimate is found in Appendix A of the Draft PEIR.

The Final PEIR and Economics Report assume that the effective implementation of typical source control conservation farming practices (management practices) will reduce waste discharge to surface and groundwater sufficiently to protect applicable beneficial uses. Such an analytical approach is fully consistent with State nonpoint source policies and federal law that describe a management practice-based approach to addressing nonpoint sources of pollution. The Final PEIR and Economics Report did not evaluate atypical farming practices, such as technology used for wastewater treatment, since broad use of such technology is likely unnecessary and contrary to other goals of the program[6]. If atypical farming practices

[5] The three tiers can be summarized as: Tier 1 applies to parameters and waters for which there is no or a limited threat to water quality from irrigated agricultural discharges; Tier 2 applies when the threat to water quality from irrigated agricultural discharges is unknown; and Tier 3 applies when there is a high threat from irrigated agricultural discharges.

[6] For example, Goal 3 of the ILRP (maintain the economic viability of agriculture) would not be met if requirements were structured in a manner requiring the broad use of wastewater treatment technology.

are required under a future regulatory program, the costs of compliance will be greater than the costs described in the Economics Report.

As with all other nonpoint source programs, the Board anticipates that an iterative process will be used to improve management practices until water quality goals are reached. If the iterative process of improvement is not successful in some instances, then the ILRP will need to be re-evaluated to determine whether additional regulatory requirements are needed or whether the beneficial uses need to be re-evaluated. Should any additional water quality control measures or other program changes be proposed as part of this reevaluation, additional cost estimates and environmental analysis would be necessary. Alternatively, the Board may choose to regulate irrigated lands discharges not amenable to a management practice based approach through separate, individual WDRs, which would fall outside the scope of the ILRP.

An example of another Board program that will address irrigated lands issues to support meeting water quality goals is the CV-SALTS (Central Valley Salinity Alternatives for Long-Term Sustainability) effort to address salt and nitrates. As described in the Appendix A of the Final PEIR, the *"ILRP is relying on CV-SALTS to identify the actions that need to be taken by irrigated agriculture and others to provide a long-term solution for discharge of [salts and nitrates]…."*

For salts and nitrates, the CV-SALTS process will result in identification of those areas in which beneficial uses cannot be attained through current regulatory efforts and what the appropriate regulatory response will be – re-evaluation of uses or additional regulatory requirements. It would be speculative to try to anticipate the outcome of that process and associate a cost to irrigated lands discharges at this time. Consequently, the cost estimates given in this report do not include potential additional costs associated with achieving water quality objectives in all areas of the Central Valley for salts and nitrates. Additional cost estimates and environmental analysis will need to be conducted under the CV-SALTS program, should additional water quality control measures be necessary for these constituents.

Information on the extent of management practice implementation is limited, and much of the available data are approximately 10 years old. The estimated cost of management practice implementation represents the largest cost, with the greatest uncertainty. However, a number of comments received on the Draft PEIR from growers and agricultural representatives indicated that many of the improved practices are being implemented already, suggesting that the cost estimates are likely too high.

Cost estimates were drawn from a number of sources, described in the Economics Report. As described above, the largest components of the costs were associated with management practices undertaken by growers to comply with the program. In particular, the costs of irrigation system modifications and tailwater recycling dominated the estimates. These specific management practices are not required for compliance, but are representative of the kinds of practices that growers could implement in order to comply with the program alternatives. Correspondingly, the total annualized costs (Table 1) and associated initial capital costs (Table 2) displayed below are representative, and should not be viewed as required for compliance.

The largest single component of the estimated cost is tailwater recycling, a system whereby water flowing to the lower end of an irrigated field is collected and pumped back to the head of the same or an adjacent field for reuse.

Capital costs were converted to annual costs by amortizing the cost of each capital item of the system over its expected life at a real interest rate of 4 percent[7]. In the determination of annual costs, a program lifetime was not considered, rather it was assumed that when a management practice reaches the end of its expected life, it would be replaced or overhauled in order to continue the practice. Annual operation costs (primarily pumping energy and labor) and annual maintenance costs were also included and considered. Other components that had initial capital costs were: pressurized irrigation systems, hedgerows, and, for the high-end estimate, monitoring wells and farm plans. Calculations of capital costs for these other components were similar to that described for tailwater recycling.

Staff received many comments on the Draft PEIR from agricultural representatives suggesting that additional groundwater monitoring is not necessary because sufficient data are available to characterize groundwater quality conditions. Should this be the case, additional costs associated with groundwater quality monitoring should be minimal. If, in fact, data are limited and it is not possible to determine groundwater quality conditions or the effectiveness of irrigated agricultural efforts to reduce groundwater quality impacts, additional monitoring will be needed.

The estimated total annual costs presented in Table 1 below were estimated for administration of the Long-Term Program alternatives (e.g., Board oversight and third-party activities), monitoring (for groundwater and surface water quality), and implementation of management practices. Annualized cost is the constant annual equivalent payment needed to cover all program costs including interest. For individual program components, the annualized cost includes the amortized initial cost of each capital item, plus annual operation and maintenance (O&M) costs. The costs that dominated the estimates are associated with the category for which data are most sparse – management practice implementation. In addition, the management practices evaluated generally result in multiple benefits, not only protection of water quality (e.g., more efficient irrigation reduces water costs and generally increases yields).

[7] This interest rate has been estimated given current information. It is expected that this rate will vary by individual and over time. Estimated amortized costs will increase/decrease along with interest rates.

Table 1: Estimates of Total Annualized Costs[8] for the Long-Term Program Alternatives

	Low-End Estimate	High-End Estimate
Total administration	$6.5 million	$67 million
Monitoring	$10.6 million	$302 million
Management practices	$199 million	$952 million
Total	**$216 million**	**$1,321 million**

The estimates of total annualized costs for the Long-Term Program alternatives provided above are based on the cost estimates provided in the Economics Report and specific management practice estimates for the Long-Term Program alternatives provided by a member of the economics consulting team (Roberson 2011a & 2011b). The total estimated cost was found to range from $216 and $1,321 million per year as expressed in 2007 dollars.

The table below (Table 2) summarizes the initial capital cost corresponding to the total annualized costs displayed in Table 1 above (Hatchett & Roberson, 2011). (Note that the table below is **not** simply the capital component of the annualized cost, which would necessarily be less than the total annualized cost.)

Table 2: Estimated Initial Capital Costs for the Long-Term Program Alternatives

	Low-End Estimate	High-End Estimate
Total administration	$0	$59 million
Monitoring	$0	$12 million
Management practices*	$552 million	$1,929 million
Total	**$552 million**	**$2,000 million**

* Capital cost estimates are based on the assumed mix of management practices used for the Economics Report. Actual practices could be different, so capital costs would be different.

The need for capital expenditure could be spread over a period of time depending on Long-Term Program implementation. The estimate of capital cost for administration represents the initial cost of preparing individual farm plans; the estimate of capital cost for monitoring represents installation of monitoring wells. Other parts of those two Long-Term Program components may also include expenditures for capital items such as equipment, but these would be small relative to the capital cost estimates shown in the table above.

Costs at the low end of the range (similar to Alternative 2 of the PEIR in terms of the regulatory structure) assumed that (1) the third-party coalition structure will be successful in addressing identified water quality problems; (2) existing groundwater monitoring networks will be adequate; (3) irrigated pasture will not require "hardware" management practices (e.g., tail water recovery systems) to address any pasture-related issues; (4) the existing use of improved management practices on field crops in areas with constituents of concern is greater

[8] Total annualized cost is the constant annual equivalent payment needed to cover all Long-Term Program costs, including interest.

than assumed in the Final PEIR; and (5) for constituents identified as Tier 2, with an unknown contribution by irrigated lands, irrigated lands will be found not to cause or contribute to the identified water quality problem.

Costs at the high end of the range (similar to Alternative 5 of the PEIR in terms of the regulatory structure) assumed that (1) direct regulatory oversight by the Board will be required due to widespread failure of the third-party framework; (2) individual groundwater monitoring and surface water monitoring will be required; (3) irrigated pasture will require hardware management practices; (4) the estimates of management practice implementation reflect current conditions; and (5) for all constituents identified as Tier 2, with an unknown irrigated lands contribution, irrigated lands will be found to cause or contribute to the identified water quality problem (necessitating additional water quality management practices).

In terms of staff's current approach to developing the Long-Term Program, the approach would primarily rely on third-party groups (similar to the Program EIR's Alternative 2), but has a backstop of direct Board regulation (similar to the Program EIR's Alternative 5), if the third-party coalition structure is not successful. Staff cannot reliably predict whether growers will successfully address water quality issues within the third-party framework or whether more direct regulation will be required. The administrative and monitoring costs of the current approach would therefore fall within the range of those two analyzed alternatives. Accordingly, the range of costs for staff's current approach is included in Table 1's range of Long-Term Program alternatives.

In summary, the range of alternatives presented represents a reasonable assessment of potential costs based on available information and the management practice-based regulatory approach that will be used to implement the Long-term Irrigated Lands Regulatory Program. The actual costs could be lower if growers effectively address water quality problems with less expensive practices or fewer growers need to implement improved practices to protect water quality; or costs could be offset if improved practices result in yield increases or greater reductions in farm material or labor inputs. Costs could be higher if more expensive practices are required to address water quality problems or additional problems are identified that require more extensive implementation of practices. However, trying to estimate such potentially higher or lower costs at this time would be unduly speculative given the information available.

Distribution of Program Costs

Besides total costs, it is also important to understand how potential program costs might be distributed when reviewing the above estimates (i.e., entities that will bear program costs). In carrying out the economic modeling and analysis summarized in the Economics Report, the Board assumed that all additional program costs would be paid for by irrigated agricultural operations that enroll in the program. This is a reasonable assumption considering that State general fund support for the irrigated lands program were limited to begin with and has since been eliminated. Therefore, any costs associated with increased staffing would be born by enrolled growers through increased fees. Water quality coalition groups pass along program costs to member growers for monitoring and administration; and the major estimated costs are associated with implementation of management practices, which generally would be incurred

solely by growers. It is important to note, however, that grants and low interest loans are available to fund some of the program costs (see section 3.3 below).

3.3 Potential Sources of Financing

Below is a discussion of potential sources of financing for irrigated agricultural operations. Financing that is targeted toward lands, crops, or growers with the greatest potential for losses and economic hardship would be most effective at reducing economic impacts. Many of the financing mechanisms would help reduce and defray the costs associated with implementing water quality management practices, thereby reducing the economic impact of the Long-Term Program alternatives.

In general, the potential sources of financing for agricultural water quality programs do not change significantly by crop type. The sources of financing identified in the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the agricultural subsurface drainage program and rice pesticide program are also potential financing sources for this program. These sources include:

1. Private financing by individual sources.
2. Bonded indebtedness or loans from government institutions.
3. Surcharge on water deliveries to lands contributing to the water quality problem.
4. Ad Valorem tax on lands contributing to the water quality problem.
5. Taxes and fees levied by a district created for the purpose of drainage management.
6. State and federal grants or low-interest loan programs.
7. Single purpose appropriations from federal or State legislative bodies (including land retirement programs.

Specific state and federal grant and loan programs include:

1. Federal Farm Bill – Title II of the 2008 Farm Bill (the Food, Conservation, and Energy Act of 2008, in effect through 2012) authorizes funding for conservation programs such as the Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program.
2. The State Water Board, Division of Financial Assistance, currently administers two programs that improve water quality: the Agricultural Drainage Management Loan Program and the Agricultural Drainage Loan Program. Both of these programs were implemented to reduce the impacts of agricultural drainage on surface water. The State Water Board also administers Clean Water Act funds that can be used for agricultural water quality improvements.
3. The Agricultural Water Quality Grant Program provides funding to reduce or eliminate the discharge of nonpoint source pollution from agricultural lands into surface water and groundwater. It is funded through bonds authorized by Proposition 84.
4. The State Water Pollution Control State Revolving Fund Program also has funding authorized through Proposition 84. It provides loan funds to a wide variety of point source and nonpoint source water quality control activities.

5. Other funding programs exist, including Integrated Regional Water Management grants that were authorized and funded by Proposition 50 and now by Proposition 84.

4 PROPOSED AMENDMENTS

4.1 Amendments to the Water Quality Control Plan for the Sacramento and San Joaquin River Basins

The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins already has a section titled *Estimated Costs of Agricultural Water Quality Control Programs and Potential Sources of Financing*. This section begins on Page IV-38. The proposed amendments presented below will appear at the end of this section.

"**Long-Term Irrigated Lands Regulatory Program**

The Central Valley Water Board intends on establishing a long-term irrigated lands regulatory program (Long-Term Program) by adopting one or more general waste discharge requirements and/or conditional waivers of WDRs to regulate the discharge of waste to ground and surface waters from irrigated agricultural operations. The Long-Term Program will be based, in whole or in part, on six alternatives described in the *Irrigated Lands Regulatory Program Final Environmental Impact Report* (Final PEIR; ICF International 2011) certified by resolution R5-2011-0017. The cost estimate below is based upon and encompasses the full range of those alternatives.

The cost estimate for the Long-Term Program accounts for program administration (e.g., Board oversight and third-party activities), monitoring for groundwater and surface water quality, and implementation of management practices throughout the Central Valley. The estimated cost for the annual capital and operational costs to comply with the Long-Term Program range from $216 million to $1,321 million (2007 dollars). This cost estimate is a cumulative total that includes costs from the Sacramento River and San Joaquin River Basins, and the Tulare Lake Basin.

Potential financing sources include:

1. The Federal Farm Bill, which authorizes funding for conservation programs such as the Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program.

2. Grant and loan programs administered by the State Water Resources Control Board and Department of Water Resources, which are targeted for agricultural drainage management, water use efficiency, and water quality improvement. These programs include:
    a. Agricultural Drainage Management Program (State Water Resources Control Board)

b. Agricultural Drainage Loan Program (State Water Resources Control Board)
c. Clean Water Act funds (State Water Resources Control Board)
d. Agricultural Water Quality Grant Program (State Water Resources Control Board)
e. Clean Water State Revolving Fund (State Water Resources Control Board)
f. Integrated Regional Water Management grants (State Water Resources Control Board, Department of Water Resources)

3. Those identified in the San Joaquin River Subsurface Agricultural Drainage Control Program."

4.2 Amendments to the Water Quality Control Plan for the Tulare Lake Basin

The Water Quality Control Plan for the Tulare Lake Basin currently does not include a section titled *Estimated Costs of Agricultural Water Quality Control Programs and Potential Sources of Financing*. The proposed amendments will add this section on Page IV-30, after the section titled *Continuous Planning for Implementation of Water Quality Control*. The proposed amendments presented below will appear in this new section.

"**Estimated Costs of Agricultural Water Quality Control Programs**

Long-Term Irrigated Lands Regulatory Program

The Central Valley Water Board intends on establishing a long-term irrigated lands regulatory program (Long-Term Program) by adopting one or more general waste discharge requirements and/or conditional waivers of WDRs to regulate the discharge of waste to ground and surface waters from irrigated agricultural operations. While the Central Valley Water Board has not established the Long-Term Program yet, it will be based, in whole or in part, on six alternatives described in the *Irrigated Lands Regulatory Program Final Environmental Impact Report* (Final PEIR; ICF International 2011) certified by resolution R5-2011-0017. The cost estimate below is based upon and encompasses the full range of those alternatives.

The cost estimate for the Long-Term Program accounts for program administration (e.g., Board oversight and third-party activities), monitoring for groundwater and surface water quality, and implementation of management practices throughout the Central Valley. The estimated cost for the annual capital and operational costs to comply with the Long-Term Program range from $216 million to $1,321 million (2007 dollars). This cost estimate is a cumulative total that includes costs from the Sacramento River and San Joaquin River Basin, and the Tulare Lake Basin.

Potential financing sources include:

1. The Federal Farm Bill, which authorizes funding for conservation programs such as the Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program.

2. Grant and loan programs administered by the State Water Resources Control Board and Department of Water Resources, which are targeted for agricultural drainage management, water use efficiency, and water quality improvement. These programs include:
    a. Agricultural Drainage Management Program (State Water Resources Control Board)
    b. Agricultural Drainage Loan Program (State Water Resources Control Board)
    c. Clean Water Act funds (State Water Resources Control Board)
    d. Agricultural Water Quality Grant Program (State Water Resources Control Board)
    e. Clean Water State Revolving Fund (State Water Resources Control Board)
    f. Integrated Regional Water Management grants (State Water Resources Control Board, Department of Water Resources)

3. Those identified in the San Joaquin River Subsurface Agricultural Drainage Control Program (see Water Quality Control Plan for the Sacramento River and San Joaquin River Basins), which are listed below:
    a. Private financing by individual sources.
    b. Bonded indebtedness or loans from governmental institutions.
    c. Surcharge on water deliveries to lands contributing to the drainage problem.
    d. Ad Valorem tax on lands contributing to the drainage problem.
    e. Taxes and fees levied by a district created for the purpose of drainage management.
    f. State or federal grants or low-interest loan programs.
    g. Single-purpose appropriations from federal or State legislative bodies (including land retirement programs).

5 OTHER CONSIDERATIONS

5.1 Environmental Considerations

The proposed amendments amend the two Basin Plans to include a cost estimate and potential sources of funding for a new regulatory program affecting agriculture. Because these amendments are non-regulatory (i.e., they require no action by any party), there will be no

direct physical change in the environment, or reasonably foreseeable indirect physical change in the environment as a result of the amendments. Any direct or indirect physical changes will be a result of the Long-Term Program, not the cost estimates or identified pre-existing funding sources.

5.2 Economic Considerations

The proposed amendments amend the two Basin Plans to include a cost estimate and potential sources of funding for a new regulatory program affecting agriculture. Because these amendments are non-regulatory, there are no anticipated economic costs associated with these amendments.

5.3 Necessity

The proposed Basin Plan amendments are necessary to update the existing description of potential costs and sources of financing already in the Basin Plan for agricultural water quality control programs created by Basin Plan Amendments. Inclusion of these estimates will provide a more complete and updated description of potential costs and sources of financing. Because the LTP affects the entire Central Valley, amendments are needed for both the Basin Plan for the Sacramento River and San Joaquin River Basins, and the Basin Plan for the Tulare Lake Basin.

5.4 Consistency with Federal and other State laws and regulations

The proposed amendments are intended to be consistent with Water Code section 13141. There are no other applicable Federal or State laws or regulations that apply to developing estimates of costs and potential sources of financing for agricultural water quality control programs. Therefore, these proposed amendments are consistent with Federal and other State laws and regulations.

6 REFERENCES

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