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February 7, 2011

Ms. Kari Kyler
State Water Resources Control Board
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Sacramento, CA 95812-2000

Re: Nov 2010 SJR flow and S. Delta salinity Response

Dear Ms. Kyler:

The San Luis & Delta-Mendota Water Authority and State Water Contractors submit to the State Water Resources Control Board (State Water Board) the following comments on its process to amend the southern Delta salinity and San Joaquin River flow objectives that have been established for the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary.

A. Scope of Inquire For Review of San Joaquin River Flow And South Delta Salinity Objectives

As noticed, the State Water Board's review of the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (2006 Bay-Delta Plan) is limited to the southern Delta salinity and San Joaquin River flow objectives. (Feb. 13, 2009, Notice.) The State Water Board frames its review by presenting four questions:

1. What should the salinity objectives be to protect agricultural beneficial uses in the southern Delta and where and when should those objectives apply?
2. What should the program of implementation be for the southern Delta salinity objectives?

3. What should the San Joaquin River flow objectives be to protect fish and wildlife beneficial uses and where and when should those objectives apply?

4. What should the program of implementation be for the San Joaquin River flow objectives?

Underlying those questions is a clear but limited geographical scope for this proceeding. The State Water Board explained that all of the objectives established in its Bay-Delta Plans have been imposed to protect beneficial uses of "the waters of the San Francisco Bay system and the legal Sacramento-San Joaquin Delta." 2006 Bay-Delta Plan, p. 10, 1995 Bay-Delta Plan, p. 14.

Consistent with that limited scope, in its 1995 Bay-Delta Plan and when establishing water quality objectives, the State Water Board looks to factors within the Bay-Delta that might stress beneficial uses. As an example, the State Water Board explained: "San Joaquin river flow objectives are included to provide attraction and transport flows and suitable habitat for various life stages of aquatic organisms." (1995 Bay Delta Plan, at 15. *See also* Environmental Report for the 1995 WQCP, at II-5.) The State Water Board expanded upon this explanation in Decision 1641. The State Water Board wrote:

> The April-May pulse flow under the SJRA coincides with the spawning season of a number of estuarine species. . . . Higher spring flows may improve spawning conditions for these species in the central and southern Delta and provide transport flows out of the central Delta. (SWRCB 7e.)

(D-1641 at 45.)

The State Water Board's focus on protecting beneficial uses of waters of the San Francisco Bay system and the legal Sacramento-San Joaquin Delta is also reflected in the draft "Technical Report On The Scientific Basis For Alternative San Joaquin River Flow And Southern Delta Salinity Objectives" (Draft Technical Report). There, the State Water Board recognized: "the focus of this water quality control planning effort is on the Bay-Delta." (*Id.* at p. 34.) The State Water Board must maintain that focus.

B. <u>When Considering The San Joaquin Flow Objectives, The State Water Board Should Present And Employ A Scientifically Sound Process To Analyze Data</u>[1]

The Draft Technical Report, and its focus on flow, is one piece of a much larger inquiry. To the extent the State Water Board has the legal authority to establish flow-based water quality objectives; the State Water Board must develop them through a process by which it analyzes flow needs within the full breath of factors that may affect species abundance.

1. The State Water Board Must Employ A Life Cycle Based Analytical Approach

To determine a balanced flow prescription for the San Joaquin River, a more sophisticated analysis than what has been completed to date will be necessary. The Board has begun by exploring one element of what should be a multi-part approach by conducting the hydrological modeling needed to determine flow variability within the system. The State Water Board's approach has used the available hydrologic analysis to estimate the "unimpaired" flow within the San Joaquin system. The next step is to determine how this unimpaired calculation should be used to develop an overall program that would reasonably support fishery needs. It is necessary to scientifically justify the flow prescriptions, and to do this the State Water Board should consider additional critical components to complete a reasonable analysis, such as temperature and life cycle modeling. There are at least three legs to the 'stool': hydrology, biological functions (such as temperature), and life cycle modeling.

The addition of dams and diversions, as well as the re-contouring and armoring of many river miles of channels with riprap for flood control and other purposes has greatly altered the San Joaquin basin from its historical physical configuration. The primary habitat for spring-run Chinook salmon and steelhead trout is now predominately located above existing reservoirs. Fall-Run Chinook salmon, now the primary anadromous species in the San Joaquin River, inhabits a small portion of the historical habitat available for salmonids in the San Joaquin watershed. The flow and habitat needs for fall-run Chinook salmon and steelhead trout in this limited habitat area are fundamentally different than that the flow and habitat needs of the spring-run Chinook salmon that originally predominated in the San Joaquin watershed. When setting objectives, the State Water Board needs to clearly articulate its fisheries goals with these facts in mind. It is not realistic to re-create pre-dam flow conditions below the dams and, even if it were realistic, the re-created pre-dam flow conditions would likely

[1] *See* attachment for references cited in this section of the comment letter.

have major adverse impacts on the fisheries currently in the San Joaquin watershed. Accordingly, the strategy should be to (1) identify a realistic goal for fisheries within the heavily altered San Joaquin River system considering the characteristics of habitat currently available, and (2) create conditions within the San Joaquin system that will achieve the goal, including those dynamic processes which, given the highly altered state of the water ways and watershed, are attainable and support habitat characteristics that benefit salmon and steelhead.

Useful approaches to determining appropriate flow prescriptions have been utilized in other watersheds, including the Lower Yuba River (Yuba Accord 2007). The approach adopted in these cases was to convene an expert panel which applied a functional, mechanistic, and process-based view of the flow needs of the fisheries (see Fleenor et al. 2010), in conjunction with the competing human uses in the managed system.

The Authority and SWC recommend that a collaborative technical team be assembled, composed of experts in the fields of hydrology, temperature, and life cycle modeling, which would be guided by the following principles: (1) focus on ecological processes and mechanisms for fish abundance;[2] and (2) keep the modeling as simple as possible. The processes and factors the technical team should take into consideration would include: (1) identifying physical conditions (such as water depth, velocity, turbidity and physical conditions) that support fishery life stages by species, spatially and temporally, through the articulation of life cycle models; (2) evaluating habitat availability in the San Joaquin and channel processes at restoration sites within the San Joaquin basin; (3) evaluating water and sediment interactions with river channel shape (i.e. fluvial geomorphology); (4) evaluating water temperature needs of salmon and steelhead, and the capability of dam releases to meet those needs at various downstream locations; and (5) developing a flow schedule, which emerges from the above information, and is informed by hydrologic, temperature, and life cycle modeling.

a. Temperature Modeling

Development in the San Joaquin basin has removed much of the historical spawning habitat for salmonids and, at present, the lower reaches of San Joaquin River tributaries must serve as spawning and cold water rearing habitat for these fishes. Proposals for additional flow to provide cooler temperatures where the San Joaquin River enters the Sacramento-San Joaquin Delta have been presented, which have not been accompanied by analysis of the quantities of flow necessary to provide optimal

[2] Water Quality Objectives that to do address the underlying stressors may violate the Clean Water Act and Porter-Cologne Water Quality Control Act.

temperatures and the effects those flows may have on temperatures at other times of the year. Understanding the relationship between water temperatures and water operations, and the extent to which meeting an objective at Vernalis would affect cold water pool management, is critical to the process of setting a water quality objective. Key questions include: "What is the relative effect of flow vs. ambient air temperature on water temperature at different times of the year and in different stretches of the San Joaquin River and its tributaries?"; and "Are there adverse effects of meeting San Joaquin River flow objectives to cold water pools?" Temperature modeling is available for the San Joaquin River (see SJRRP 2008, Deas and Lowney 2000), and information from temperature models will need to be integrated into management prescriptions. This is especially important when carryover and cold water storage concerns are added to the flow prescription balance.

b. <u>Life Cycle Modeling</u>

To ensure water quality objectives are established that protect beneficial uses of the Bay-Delta by fish, the State Water Board must identify factors most greatly influencing salmon and other important fish through each life stage. The State Water Board should use a life cycle approach for determining habitat functions necessary for fisheries survival. This can be accomplished by using a limiting factors constraints analysis, whereby the most important factors/processes that affect abundance are determined, and then the most reasonable management actions are applied to those factors (e.g. Stillwater Sciences 2004). For example, survival of juvenile Chinook salmon may be a function of flows, water temperatures, and predation. A limiting factors constraints analysis will provide the State Water Board with information that will allow it to better appreciate if, for example, managing flows is the best management action for migration cues and temperature regulation upstream of the Delta, or if a harvest program (a non-flow action) is the most reasonable approach for predation (*see* Marks et al 2010). Additionally, water quality parameters such as dissolved oxygen, nutrient loading, and suspended sediments are important for various stages of the species' life cycles, spatially and temporally, and will be important to identify as potentially constraining factors within a limiting factors analysis.

The goal should be to manage the system within the system's constraints to meet the functional requirements of the species, and to identify those areas where restoration actions would improve functions, including physical habitat restoration. For example, many functions are provided through the interactions between flow and floodplain inundation; but in areas where there is little connection between the channel and floodplain, providing flow within those areas may not improve conditions for fisheries. Physical habitat availability is significant limiting component of the carrying capacity of the system, and needs to be analyzed within the San Joaquin basin.

Opportunities and constraints should be identified and appropriate physical habitat restoration activities should be balanced with flow requirements.

The Draft Technical Report listed functions that flow provides for salmonids, but did not tie these into the needs of the salmonids by life stage (nor was tailored to the scope of this proceeding, the Bay-Delta). Simply choosing a percentage of unimpaired flow would be arbitrary without further explaining the reasoning behind a certain percentage. Tying the flow prescription to salmon life stage needs and the needs within the Bay-Delta is a critical step for determining a reasonable and justifiable way forward.

Several salmon life cycle models have been developed for the Sacramento-San Joaquin Delta. Some approaches use a correlative statistical relationship between salmon abundance and flow (e.g., the California Department of Fish and Game (CDFG) San Joaquin River fall-run Chinook salmon computer simulation population model); however, this approach is problematic because the correlative relationships do not provide satisfying exploration of the mechanisms underlying the relationships. Models that use a functional approach, seeking to quantify specific functions and their effects on life stages show more promise; but are not without their own pitfalls. Functional models can become very complex, and in some cases, where there is insufficient data, the assumptions the modeler is required to make result in model output with high uncertainty. That is why we recommend building a framework starting with the major drivers of population ecology.

There is already a good deal of work on salmonid life cycle modeling that the State Water Board can use as a starting point for this life cycle modeling effort. Two winter-run salmon models, the Interactive Object-oriented Simulation (IOS) Winter Run Chinook Life Cycle Model (Cavallo et al 2008), and the Oncorhynchus Bayesian Analysis (OBAN) (Hendrix 2008) models could be used as a platform for making San Joaquin-specific fall-run, and steelhead life cycle models. IOS is a model that analyzes functional relationships between life cycle processes and environmental variables, which were determined from the best available research. OBAN is a statistical modeling approach that incorporates mortality in all phases of salmon life history, and includes the effects of uncertainty in assessing population status. In addition, a life cycle model developed for Delta smelt by Maunder and Deriso (in press) analyzes factors such as food availability, predation, and temperature using correlations to quantify the relationship between those factors and Delta smelt abundance. This functional approach could be applied to fall-run Chinook and steelhead. Newman and Brandes (2009) developed a statistical approach that incorporates coded wire tag experiments with Sacramento River salmon, and explores uncertainties in the model with simulations. These approaches could serve as foundations to be applied to San Joaquin River fall-run Chinook and steelhead.

While, for the reasons set out above, a life cycle modeling approach is ultimately needed for the State Water Board to identify the relative benefits to downstream fisheries for varying levels of flows, the Authority and SWC recognize that such models are not currently functional, and their development may not be realizable within the time frame of this process. Therefore, the State Water Board may want to consider an adaptive process such as was applied through the Yuba Accord. The proposed technical team could use a life cycle analytical framework that clearly links flow requirements to fish species needs. Ultimately, the questions that the State Water Board needs consider are not "Do Fish Need Flow" but the more difficult question of "How much flow provides how much benefit to fisheries?" The Authority and SWC believe that the approaches outlined above provide the tools needed to address this issue. These tools also have the potential to identify the potential adverse impacts that could occur to fisheries, especially salmonids, that currently have access only to limited habitat that may result in different flow needs than those provided by unimpaired flow patterns.

Thus, the final essential piece to developing a reasonable flow prescription is to develop a responsive monitoring and adaptive management program. A carefully designed data collection and monitoring program should be part-in-parcel to the flow prescriptions. This should include hypothesis testing with regard to the management actions in a rigorous monitoring program. Feedback from focused studies on the fish responses to management actions will provide guidance for specific changes to the management regime and/or highlight areas of concern. As the Life Cycle Models become functional, this monitoring data will be essential as input to a process which is based on the best available science.

C. When Reviewing Water Quality Objectives, The State Water Board Is Required To Consider Information Beyond Flow

The State Water Board must develop water quality objectives to address water quality constituents or characteristics, the purpose of which is to provide reasonable protection of beneficial uses or the the prevention of nuisance in the specific area. As such, the law demands the State Water Board identify the mechanism(s) impairing the beneficial use(s) and develop an objective that provides a reasonable level of protection given all of the competing demands.

1. Clean Water Act

The Clean Water Act requires the State Water Board review its water quality control plan every three years. (33 USC § 1313(c)(1).) When undertaking such review, the State Water Board must consider the "use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes, and also taking into consideration their use and value for navigation. (33 USC § 1313(c)(2).) The CWA sets forth these considerations to ensure the objectives protect all the public uses. (*Id.*)

2. <u>Porter Cologne Act</u>

The Porter Cologne Act requires water quality objectives ensure the "reasonable protection of beneficial uses and prevention of nuisance." (Water Code, § 13241.) Water quality objectives, as defined by the Porter Cologne Act, are standards that limit the levels of water quality constituents or characteristics. (Wat. Code, § 13050, subd. (h).) "A water quality objective sets the limits for levels of water quality constituents or characteristics for reasonable protection of beneficial uses of water or the the prevention of nuisance in the specific area." (*County of Sacramento v. State Water Resources Control Board* (2007) 153 Cal.App.4th 1579, 1583.) In setting any objective, the determination of "reasonableness" requires consideration of:

> [A]ll demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible

(Water Code, § 13000.) Factors the State Water Board must consider when establishing water quality objectives are:

> (a) Past, present, and probable future beneficial uses of water;
> (b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto;
> (c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area;
> (d) Economic considerations;
> (e) The need for developing housing within the region;
> (f) The need to develop and use recycled water.

(Water Code, § 13241.)

3. <u>Constitutional Requirement of Reasonableness</u>

Article X, Section 2 of the California Constitution requires all water use be reasonable, including the use of water to protect beneficial uses. (Cal. Const. art. X, § 2.) Determination of reasonable use requires the State Water Board to consider the totality of the existing circumstances:

> The scope and technical complexity of issues concerning water resource management are unequalled by virtually any other type of activity presented to the courts. What constitutes reasonable water use is dependent upon not only the entire circumstances presented but varies as the current situation changes . . . what is reasonable use of water depends on the circumstances of each case, such an inquiry cannot be resolved *in vacuo* from statewide considerations of transcendent importance.

(*Environmental Defense Fund v. East Bay Mu. Utility Dist.* (1980) 26 Cal.3d 183, 194.)

4. <u>Scope Of Inquiry When Setting Water Quality Objectives</u>

As the State Water Board recognized in its August 2010 report "Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem":

> When setting flow objectives with regulatory effect, the State Water Board reviews and considers all the effects of the flow objectives through a broad inquiry into all public trust and public interest concerns. For example, the State Water Board would consider other public trust resources potentially affected by Delta outflow requirements and impose measures for the protection of those resources, such as requiring sufficient water for cold water pool in reservoirs to maintain temperatures in Delta tributaries. The State Water Board would also consider a broad range of public interest matters, including economics, power production, human health and welfare requirements, and the effects of flow measures on non-aquatic resources (such as habitat for terrestrial species).

Unlike the process for development of the Delta Flow Criteria, the State Water Board must develop water quality objectives, and ultimately terms for water rights permits, after considering not just downstream fisheries benefits, but also the effects on other beneficial uses. Ultimately, the State Water Board must have information that can allow the balancing of benefits to downstream fisheries against impacts to all other uses. While the spreadsheet water supply impact analysis contained in the Draft Technical Report provides an initial estimate of water supply impacts for assumed levels of unimpaired flow, it makes numerous simplifying assumptions and does not represent an actual "operation" to provide for current water uses.

As discussed at the January 6-7 workshop, the Authority and the SWC believe that additional analytical tools are needed to address other beneficial uses in the San Joaquin Basin. A modification to CALSIM or the use of available general application operations modeling tools for the San Joaquin Basin are two alternatives that should be considered. This operations analysis should also:

(1) [P]rovide for interaction with and feedback from groundwater,

(2) [B]e coupled with an economic analysis to identify the potential reductions in water use, the impacts that those reductions have on cropping patterns and the economic impacts from any reductions, either directly or indirectly,

(3) [R]ecognize the relative water rights seniority of various users, for example, the water rights of downstream users may be junior to many upstream water rights,

(4) [P]rovide for computation of impacts to streamflow temperatures and power generation through any alternative flow objectives. The streamflow temperature impacts can be determined through application of existing temperature models in the San Joaquin Watershed. Power impacts will need to rely on analysis through the new operations tool to determine the magnitude and timing of changes in power generation. Additionally, these impacts should be analyzed for system-wide effects on the California Power market, especially considering potential adverse impacts from reduced generation during peak power use periods on ancillary services and load regulation.

Ultimately, a combined operations-life cycle modeling approach should be applied to specific identified potential alternatives to provide a balanced comparison on the benefits to and adverse impacts on all beneficial uses. That is what state and federal water quality laws require.

D. <u>Proposed Schedule To Obtain Required Information</u>

The Authority and SWC respectfully request that the State Water Board establish a definitive schedule for submittal of any additional information the State Water Board needs to conduct the level of inquiry and balancing discussed above and required under the law. If the State Water Board is inclined to accept that request, the Authority and SWC welcome an opportunity to work with State Water Board staff and other stakeholders on the development of a list of informational needs and a submission schedule.

5. The Administrative Record Must Include All Information Submitted To Date

The State Water Board's process to review the San Joaquin River flow and south Delta salinity water quality objectives began with the State Board's adoption of the 2006 Bay Delta Plan. Due to the state of the science, the State Board adopted the 2006 Plan without changing the 1995 water quality objectives for San Joaquin River flows and south Delta salinity, but committed the State Water Board to review these two objectives in the future.

After the adoption of the 2006 Bay Delta Plan, the State Water Board began the process to review San Joaquin River flows and south Delta salinity objectives. Since 2006, the State Water Board has held numerous workshops and meetings and received substantial information. The information provided to the State Board in this time must all be included in and part of the record in support of any change to the San Joaquin River flows and south Delta salinity objectives. The Authority and SWC highlight some of that information.

On October 13, 2006, the State Water Board noticed the first workshop to review south Delta salinity objectives. In preparation for this workshop, the Authority and one of the members of the SWC, Kern County Water Agency, submitted letters on January 5, 2007. (Attached as Exhibit 1.) Representatives for the Authority and SWC attended and participated in the January workshop. In addition, the Authority and SWC representatives participated in the salinity workshops held on May 16, 2007, November 4, 2008, and March 18, 2009.

On September 17, 2008, the State Water Board held an information-gathering workshop on both San Joaquin River flow and south Delta salinity objectives. In preparation for the September workshop, the Authority submitted comments. (Attached as Exhibit 2.)[3] In the notice for the September workshop, the State Water Board set forth a process for review, which included hold a series of workshops to receive information on various topics. (August 11, 2008 Notice of Workshop.)

Representatives of the Authority and SWC participated in the first of these workshops on April 22, 2009. In preparation for the April workshop, the Authority and the SWC submitted comments. (Attached as Exhibit 3.) Representative of the Authority and SWC were prepared to participate in the remaining workshops, however, the State Water Board cancelled the remaining workshops it scheduled. (May 29, 2009 Notice.)

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[3] As part of the Authority's comments, it attached annual reports on the Vernalis Adaptive Management Program. The reports are available at http://www.sjrg.org/technicalreport/default.htm. The Authority and SWC incorporate herein by this reference each of the annual reports available at the referenced website, as of February 8, 2011.

The State Water Board took up review of San Joaquin River flow and south Delta salinity objectives again recently, by issuing the Draft Technical Report and holding a workshop in January 2011. The Authority and SWC submitted comments on and participated in the workshop for the Draft Technical Report. (Attached as Exhibit 4.)

The Authority and SWC expect to submit additional material in the coming months, and look forward to continuing to work with the State Water Board and its staff, as the State Water Board considers changes to the south Delta salinity objectives and San Joaquin River flow objectives.

Daniel G. Nelson, Executive Director
San Luis Delta-Mendota Water Authority

Terry Erlewine, General Manager
State Water Contractors

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EXHIBIT 1

diepenbrock•harrison
A PROFESSIONAL CORPORATION

January 5, 2007

Ms. Gita Kapahi, Chief
Bay Delta/Special Projects Unit
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812-2000

Re: Southern Delta Salinity Workshop

Dear Ms. Kapahi:

On October 13, 2006, the State Water Resources Control Board ("State Water Board") issued a notice for a public workshop. The notice provides that, at a workshop, the State Water Board would consider the appropriateness of the southern Delta water quality objectives for salinity ("southern Delta salinity objectives"), which are currently set forth in the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary ("2006 Plan").

The notice for the workshop explains that in 2004 the State Water Board conducted a periodic review of the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary adopted in 1995 ("1995 Plan"), and subsequently conducted a multi-day workshop to receive additional information on selected issues. Although the State Water Board approved the 2006 Plan in December 2006, the notice nevertheless invites interested parties to submit and discuss in January 2007 information regarding the southern Delta salinity objectives, including the corresponding elements of the program of implementation, presumable to assist the State Water Board with an additional review of those objectives. Pursuant to that invitation and goal, the San Luis & Delta-Mendota Water Authority ("Authority"), on behalf of its member agencies, submits this letter.

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The Authority, formed in 1992, consists of 32 member agencies,[1] each of which contracts with the United States Department of the Interior, Bureau of Reclamation ("Reclamation"), for a supply of Central Valley Project ("CVP") water. The Authority's member agencies are entitled to approximately 2,500,000 acre-feet of water for agricultural lands within the western San Joaquin Valley, San Benito County, and Santa Clara County, California. Authority members also supply water for municipal and industrial uses, including the delivery of approximately 150,000 and 200,000 acre-feet of water primarily to the Silicon Valley, and approximately 250,000 to 300,000 acre-feet of water for waterfowl and wildlife habitat in the San Joaquin Valley.

Two questions will be before the State Water Board in the workshop on southern Delta salinity objectives: (1) what are the appropriate water quality objectives to protect agricultural uses in the southern Delta, and (2) how should those objectives be implemented. The answers to those questions cannot be developed in a vacuum.

The Legislature provided general guidance to the State Water Board on how those questions should be answered. The Legislature found and declared:

> [A]ctivities and factors which may affect the quality of the waters of the state shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible.

(Water Code, § 13000 (emphasis added)). The Legislature provided the State Water Board with a more direct mandate when it adopts water quality objectives. The Legislature requires the State Water Board to "establish such water quality objectives . . . as in its judgment will ensure the reasonable protection of beneficial uses and the prevention of nuisance." (Water Code, § 13241). To achieve that mandate, the State Water Board must consider all of the following:

[1] The member agencies of the Authority are: Banta-Carbona Irrigation District; Broadview Water District; Central California Irrigation District; Centinella Water District; City of Tracy; Columbia Canal Company; Del Puerto Water District; Eagle Field Water District; Firebaugh Canal Water District; Fresno Slough Water District; Grassland Water District; James Irrigation District; Laguna Water District; Mercy Springs Water District; Oro Loma Water District; Pacheco Water District; Pajaro Valley Water Management Agency; Panoche Water District; Patterson Water District; Plain View Water District; Pleasant Valley Water District; Reclamation District 1606; San Benito County Water District; San Luis Canal Company; San Luis Water District; Santa Clara Valley Water District; Tranquility Irrigation District; Turner Island Water District; West Side Irrigation District; West Stanislaus Irrigation District; Westlands Water District; and Widren Water District.

(a) Past, present, and probable future beneficial uses of water.

(b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.

(c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.

(d) Economic considerations.

(e) The need for developing housing within the region.

(f) The need to develop and use recycled water.

(Water Code § 13241).

This letter focuses only on two, all be them critical, factors: (1) the extent of the beneficial uses, and (2) the factors which affect water quality in the southern Delta. (Water Code §13241(a), (c)). The letter will explain why the State Water Board must evaluate the water rights of those protected by the water quality objectives – agricultural water users in the southern Delta, and why the State Water Board should focus its inquiry on factors that affect the quality of water below Vernalis on the San Joaquin River. The Authority believes defining the water rights of those who the State Water Board seeks to protect and the scope of the area to be protected are critical, threshold steps. Only after that process is complete the State Water Board could conduct the necessary balancing and determine what might be the reasonable water quality conditions "considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible." (Water Code, § 13000). Notwithstanding, in the event that the State Water Board considers factors outside of the Delta, this letter also presents information on the significant actions by the Authority and its member agencies that, although not immediately relevant, improve water quality in the San Joaquin River, upstream of Vernalis.

Past, Present, And Probable Future Beneficial Uses Of Water

When considering what water quality objectives will provide a reasonable level of protection for agricultural uses in the southern Delta, the starting point must be a definition of water rights held by agricultural users in that area. (Water Code, § 13241(a)). If the State Water Board were to establish water quality objectives without such a threshold consideration, its action would likely be unreasonable and could be in direct conflict with well established law. Indeed, it could lead to the State Water Board imposing water quality objectives intended to protect agriculture that are not consistent with the past, present, and probable future water rights exercised for that beneficial use.

As an example, if the State Water Board were to establish a water quality objective for the southern Delta to protect agricultural beneficial uses at a time when no water user in the southern Delta maintains a right to divert water, the State Water Board could, when it implements the objective, require reductions in discharges and/or diversions to be taken that serve no lawful use of water, a result contrary to the California Constitution. (Cal. Const. art. X, §2). Alternatively, the State Water Board might require releases of stored water. In that case, that water would either be wasted, again as it would serve no beneficial use and thus unlawful, (*id.*), or it would be illegally diverted. (*State Water Resources Control Board Cases* (2006) 136 Cal.App.4th 674). Agricultural water users in the southern Delta do not have the right to water previously stored by another. (*Id.*)

The Court of Appeal in the *State Water Resources Control Board Cases* explained:

> In *Lindblom v. Round Valley Water Co. (1918) 178 Cal. 450*, our Supreme Court explained that a downstream riparian user may not claim any benefit from the storage of water by an upstream appropriator. "[The riparian user] is not in a position to demand that the [upstream appropriator] shall, by its artificial works, furnish a constant flow of water in [the watercourse] throughout the year. His only rights are those which he would have had under the natural conditions existing before the dam was erected, subject to the deduction of so much of the water as [the upstream appropriator] has continuously applied to a beneficial use. In other words, he cannot require the [upstream appropriator] to discharge any water into the stream during those months in which there would be no flow if no dam had ever been built. He may merely insist that, during the months of natural flow, the [upstream appropriator] shall permit the escape into the [watercourse] of the surplus of the natural flow over and above what is required to enable the [upstream appropriator] to meet its reasonable needs ... ." (*Id. at p. 457.*)

(*State Water Resources Control Board Cases*, *supra*, 136 Cal.App.4^{th} at 738).

An inquiry into the extent of rights held by agricultural water users in the southern Delta is particularly important given the findings by the State Water Board, which are reflected in State Water Board Decision 1641 ("D-1641"). There, the State Water Board summarized its findings as to riparian water users in the southern Delta as follows:

> 1. On average, insufficient water is available to supply the southern Delta in Below Normal, Dry and Critical Dry years in August, September and October.
>
> 2. On average, sufficient water is available in September only in Wet Years.
>
> 3. Insufficient water is available in July during 16 percent of years, in August during 56 percent of years, in September during 78 percent of years, and in October during 70 percent of years.
>
> To the extent that other instream water users are making riparian use of water, and to the extent that all southern Delta lands are not riparian, water is available to southern Delta water users less often than assumed herein.
>
> Based on this analysis, riparian rights to the waters of the San Joaquin River are inadequate to meet the agricultural demands in the southern Delta in some months of many years. Because a riparian right holder's water right cannot exceed the natural flow, it follows that whenever there is inadequate natural flow to meet their demands, southern Delta riparian right holders cannot be injured if they are deprived of water that exceeds the natural flow.

(D-1641, p. 33).

Although the State Water Board did not make similar, specific findings for agricultural water users in the southern Delta that hold rights to appropriate water, it did recognize the limitations imposed on such water users: a limitation, as recognized above, the Court of Appeal accepted in *State Water Resources Control Board Cases, supra,* 136 Cal.App.4th 674. In D-1641, the State Water Board stated:

> Appropriative rights have limits, however, that are relevant in this decision. If the amount of unappropriated water in the source is inadequate to satisfy senior appropriative rights, a junior appropriator may not be able to divert any water. Even if there is enough water for senior water right holders, a junior appropriator may not be able to divert the maximum amount available under the permit or license if there is not enough water left after the needs of senior water right holders are taken into account. Like riparians, downstream appropriators cannot require that the owner of an upstream reservoir release water appropriated during another season. (*Lindblom*, *supra*.)
>
> Further, a senior downstream appropriator can only demand that the reservoir operator bypass water during the season when the water is present in the stream and is being diverted. (*Lindblom*, *supra*.) Finally, an upstream appropriator is not required to continue to abandon stored water it has abandoned in the past, causing an artificial flow of water. (*Stevens v. Oakdale Irrigation District* (1939) 13 Cal.2d 343 [90 P.2d 58].)

(*Id.* at p. 33).[2]

Tailoring water quality objectives to periods when a particular quality of water would arguably benefit a lawful, beneficial use is not a concept foreign to water quality control plans. Indeed, the 1995 Plan and the 2006 Plan reflect many examples of such refined objectives. For example, in the 1995 Plan and 2006 Plan, the State Water Board established a minimum level of dissolved oxygen for the San Joaquin River between Turner Cut and Stockton to protect fish and wildlife beneficial uses. (1995 Plan, Table 3; 2006 Plan, Table 3). That objective applies only from September through November. (*Id.*). The State Water Board limited the time the objective is in effect because the September through November was the period the fish and wildlife beneficial use of concern arguable required protection. September through November is the period during which fall-run salmon migrate in the lower San Joaquin River. (1995 Plan, p. 15; 2006 Plan, Appendix 1, pp. 74-76).

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[2] The need for a review and definition of the rights held by agricultural water users in the southern Delta is also highlighted by the findings and conclusions rendered in Order WRO 2004-0004 - In the Matter of Administrative Civil Liability Complaints for Violations of Licenses 13222 and 13274 et al.

For these reasons, the State Water Board should evaluate the water right applications that seek authorization for and the permits and licenses that authorize the diversion of water for agricultural purposes in the southern Delta. The State Water Board should also require riparian and pre-1914 water rights holders, if they want the protections afforded by water quality objectives, to submit to the State Water Board evidence showing the nature and extent of their rights. The State Water Board should then create an inventory of all of those water rights to determine the period when agricultural water users in the Delta may lawfully divert water. The State Water Board should use those periods to establish the time when the southern Delta salinity objectives apply.

Water Quality Conditions That Could Reasonably Be Achieved Through The Coordinated Control Of All Factors Which Affect Water Quality In The Area

The State Water Board must consider the water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area. (Water Code, § 13241(c)). To satisfy that required consideration, the State Water Board must first define the area, and then identify the factors which affect water quality within that area.[3] Only after that occurs should the State Water Board assess how the factors within the area could be affected to achieve the desired water quality conditions.

In this case, the area of concern should be narrowly defined to include only those areas in the southern Delta, downstream of Vernalis – the area for which the State Water Board has established compliance measurement points at Interagency Station Nos. C-6, C-8, and P-12 (respectively San Joaquin River at Brandt Bridge, Old River near Middle River, and Old River at Tracy Road Bridge). It should not include the San Joaquin River at or upstream of Vernalis. (*See* Notice of Workshop on Southern Delta Salinity Objectives, Background (only discussing the area of the compliance measurement points referenced above)).

Although the State Water Board did not draw such a distinction in the 1995 Plan or the 2006 Plan when it discussed factors affecting salinity, it should have, and indeed drew the appropriate distinction in D-1641. The distinction between the southern Delta,

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[3] The importance of identifying the factors that affect water quality within the area of concern has recently been recognized by the State Water Board in the 2006 Plan. (*See* 2006 Plan, p. 3 (stating "This plan establishes water quality objectives for which implementation can be fully accomplished only if the State Water Board assigns some measure of responsibility to water right holders and water users to mitigate for the effects on the designated beneficial uses of their diversions and use of water" (emphasis added)).

downstream of Vernalis, and the lower San Joaquin River (Vernalis) is significant, as the factors which affect water quality in those areas are different.

As the State Water Board found in D-1641:

> Salinity at Vernalis is affected by the salt load and quantity of flow in the lower San Joaquin River. High salt loads and low flows at Vernalis result from a combination of upstream water diversions, discharges of saline drainage water to the San Joaquin River and subsurface accretions to the river from groundwater.

(D-1641, p. 80). At that time, the State Water Board determined:

> [T]he actions of the CVP are the principal cause of the salinity concentrations exceeding the objectives at Vernalis. The salinity problem at Vernalis is the result of saline discharges to the river, principally from irrigated agriculture, combined with low flows in the river due to upstream water development. The source of much of the saline discharge to the San Joaquin River is from lands on the west side of the San Joaquin Valley which are irrigated with water provided from the Delta by the CVP, primarily through the Delta-Mendota Canal and the San Luis Unit. The capacity of the lower San Joaquin River to assimilate the agricultural drainage has been significantly reduced through the diversion of high quality flows from the upper San Joaquin River by the CVP at Friant.
>
> * * *
>
> The Vernalis salinity objectives can be achieved either by providing sufficient fresh water to dilute upstream discharges of saline water above Vernalis or by using measures to control the discharge of saline water to the river upstream of Vernalis.

(D-1641, p. 83).

In contrast to that finding and determination related to water quality at Vernalis, the State Water Board found:

> Water quality in the southern Delta downstream of Vernalis is influenced by San Joaquin River inflow; tidal action; diversions of water by the SWP, CVP, and local water users; agricultural return flows; and channel capacity. . . .

(D-1641, p. 86). As a result, for water quality in the southern Delta, the State Water Board rendered conclusions very different then those rendered for water quality conditions at Vernalis. The State Water Board concluded the factors that could be controlled to achieve water quality conditions in the southern Delta were "dilution flows, controlling in-Delta discharges of salts, or by using measures that affect circulation in the Delta". (D-1641, pp. 86-87).

For the area downstream of Vernalis, the State Water Board identified a single adverse impact, albeit partially, attributable to operations of the CVP and State Water Project ("SWP"): an impact attributable to the effect on circulation. The State Water Board stated:

> [E]xport pumping by the SWP and the CVP and in-Delta diversions in the southern Delta . . . cause null zones, areas with little or no circulation. These zones have little assimilative capacity for locally discharged salts. The lack of circulation prevents better quality water that is otherwise available from the main channels from freshening the water in these channels.

(D-1641, p. 87).[4] Thus, even for that impact, the State Water Board also found that in-Delta diversions contributed to the alleged adverse affect.

The Court of Appeal in the *State Water Resources Control Board Cases* recognized the distinction drawn by the State Water Board in D-1641, and the limited adverse affect of the CVP and SWP on water quality in the southern Delta. The Court stated:

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[4] The State Water Board also acknowledged the benefit of export pumping on water quality. It stated:

> Diversions in the Delta can cause hydrodynamic changes that affect water quality. During periods of high exports and peak irrigation, <u>higher quality water is drawn into the southern Delta</u> from the Delta cross-channel, the Mokelumne River, and Georgiana Slough. <u>These waters mix with and improve the quality of San Joaquin flow</u>.

(D-1641, p. 87 (emphasis added)).

> In Decision 1641, the Board determined that salinity concentrations at Vernalis are caused by "a combination of upstream water diversions, discharges of saline drain-age water to the San Joaquin River and subsurface accretions to the river from groundwater." The Board further determined "that the actions of the CVP are the principal cause of the salinity concentrations exceeding the objectives at Vernalis."
>
> * * *
>
> With respect to the three other agricultural salinity objectives for the southern Delta downstream of Vernalis, the Board determined the Department and the Bureau were <u>partially responsible for the salinity problems at those locations because of export pumping</u>. Decision 1641 noted that "[m]easures that affect circulation in the Delta, such as barriers, can help improve the[se] salinity concentrations" (Decision 1641, p. 89) and that the Department and the Bureau were working together on a barrier program.

(*State Water Resources Control Board Cases, supra,* 136 Cal.App.4th at 710-11 (emphasis added)).

Thus, as the State Water Board reconsiders the southern Delta salinity objectives, the starting point for the factors it might affect, or seek to have other affect, to achieve reasonable water quality conditions in the southern Delta is the factors identified in D-1641 – San Joaquin River inflow; tidal action; diversions of water by the SWP, CVP, and local water users; agricultural return flows; and channel capacity." (D-1641, p. 86). The State Water Board should also consider updating the existing inventory of southern Delta diversions and discharges and, if necessary, expand that inventory to include municipal and industrial diversions and discharges.[5] Once that is completed, the State Water Board could begin to consider the water quality conditions that could reasonably be achieved through the coordinated control of each of those factors.

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[5] The importance of that update becomes evident when considering the extent of diversions and discharges in the southern Delta, and recent actions authorizing municipalities to discharge in the southern Delta. (*See, e.g.,* Delta Atlas at pp. 32, 34, copies of which are attached hereto as Exhibit 1; Order WQO 2005-0005 (authorizing the City of Manteca to discharge at levels in excess of the southern Delta Salinity objectives)).

Actions By The San Luis & Delta-Mendota Water Authority and Its Member Agencies To Address (1) Salinity in Discharges to the San Joaquin River At Or Above Vernalis And (2) Drainage Within Their Service Areas

As noted above, in D-1641, the State Water Board determined that actions of the CVP are the principal cause of the salinity concentrations exceeding the objectives in the San Joaquin River at Vernalis. Specifically, the State Water Board identified (1) low flows in the San Joaquin River due to upstream diversions, and (2) saline discharges to the San Joaquin River "from lands on the west side of the San Joaquin Valley which are irrigated with water provided from the Delta by the CVP, primarily through the Delta-Mendota Canal and the San Luis Unit." (D-1641, p. 83).

The Authority and its member agencies own no dams and do not control upstream diversions. Their primary water supply is the Delta-Mendota Canal, with its burden of imported salt. Those member agencies that have discharged water into the San Joaquin River have undertaken significant activities to address their discharges while those same member agencies and/or other member agencies have undertaken significant activities to address drainage issues within their service areas.

The Authority and its member agencies have successfully pursued federal grants, state grants, federal appropriations, and/or State Water Board low-interest loans for programs to improve infrastructure; acquire and develop reuse areas; and encourage installation of high-efficiency irrigation systems. Some member agencies have also funded their own revolving loan programs to assist growers with return systems, drip irrigation, and other irrigation improvements. Member agencies (1) have engaged their landowners and water users to achieve broad participation in the Regional Board's Irrigated Lands Program through the Westside San Joaquin River Water Quality Coalition, (2) comply with waste discharge requirements for the Grassland Bypass Project, including significant load reductions for both selenium and salt, and/or (3) developed a long-term program for drainage management, known as the Westside Regional Drainage Plan that builds on the Grassland Bypass Project and continues as a permanent drainage solution, with the goal of ultimate in-valley management of drainage from irrigation.

By the Authority and its member agencies undertaking those activities, they have improved drainage conditions within their service area, and, for those that discharged into the San Joaquin River, substantially reduced their discharges. All of those activities promise dramatic, further reductions in the future.

Westside San Joaquin River Watershed Coalition: The Westside San Joaquin River Watershed Coalition ("Westside Coalition") was formed by many of the Authority's member agencies under the umbrella of the San Joaquin Valley Drainage Authority ("SJVDA"). In June, 2003, the SJVDA submitted a Conditional Waiver Report for the Westside Coalition, was accepted into the program, and has assumed a leadership role ever since. The Westside Coalition watershed generally lies on the westside of the San Joaquin River from approximately the Stanislaus River on the north to 10 miles south of Mendota and encompasses an area of approximately 460,500 acres. There are approximately 4,000 landowners and 1,500 operators within the watershed. Most of the watershed receives water supplies from the CVP and is within the boundaries of the Authority. The Coalition also includes certain areas that receive water from the SWP, some areas that receive supplies from the San Joaquin River and local water sources, one area that receives a Kings River supply, and some areas receive water from groundwater wells. The Delta-Mendota Canal and San Luis Canal run through the center of the watershed. Water deliveries are made to CVP contractors and to the San Joaquin River Exchange Contractors from these facilities.

The Grassland Drainage Area encompasses 97,400 acres that are geographically within the watershed. The Grassland Drainage Area is not part of the Irrigated Lands Program because it is covered under its own waste discharge requirements for the Grassland Bypass Project (No. 5-01-234), discussed in more detail below. Nonetheless, the Grassland Drainage Area coordinates its separate monitoring and reporting program under the above waste discharge requirements.

The Westside Coalition area also includes federal, state and private managed wetlands. These areas share water delivery and drainage conveyance systems with the surrounding agricultural areas. Due to the integrated nature of the water facilities the managed wetlands have joined the Westside Coalition as a wetland sub-watershed participant to comply with the Conditional Waiver and effectively and efficiently address water quality issues.

Principal activities of the Westside Coalition to meet obligations under the Irrigated Lands Program consist of Monitoring, Reporting and Outreach, and BMP Development, briefly described below.

<u>Monitoring Program</u>: A key concept of the Irrigated Lands Program is that carefully controlled monitoring programs are required to develop reliable information on the quality of water discharged from irrigated lands. On July 30, 2004, the Westside Coalition received approval for its irrigated agricultural monitoring plan and quality

assurance program and plan from the Central Valley Regional Water Quality Control Board ("Regional Board"). The Monitoring and Reporting Plan for the Westside Coalition includes a monthly sampling plan for 19 monitoring sites within the coalition area, and plans for sampling for two rain events during each year. The first sampling event took place on July 6, 2004, and has continued ever since. The objectives of the monitoring program are as follows:

- To assess the existing water quality characteristics of major agricultural drains within the watershed area.
- To determine the location and magnitude of water quality problems.
- To determine the cause of water quality problems and develop solutions.

Two sampling crews have been trained by the analytical laboratories to collect samples according to the Westside Coalition's QAPP and Field Sampling Manual. These crews are responsible for collecting samples at each of the 19 sites. The sampling responsibilities include completion of the field data sheets, collection of water and sediment samples, completion of labels and chain of custody sheets, and coordination with the labs for sample pickup. The parameters analyzed at each site are shown in the table below.

Map Designation	Site Description	General Physical	Irrigation Season Aquatic Toxicity	Winter Aquatic Toxicity	Sediment Toxicity	Drinking Water Constituents	Pesticide Sampling
	1	3	4	5	6	7	8
1	Hospital Creek at River Road	x	x		x	x	x
2	Ingram Creek at River Road	x	x		x	x	x
3	Westley Wasteway nr Cox Road	x	x		x	x	x
4	Del Puerto Creek nr Cox Road	x	x		x	x	x
5	Del Puerto Creek at Hwy 33	x	x		x	x	x
6	Salado Creek nr Olive Ave	x	x		x	x	x
7	Ramona Lake nr Fig Avenue	x	x		x	x	x
8	Marshall Road Drain nr River Road	x	x			x	x
9	Orestimba Creek at River Road	x	x		x	x	x
10	Orestimba Creek at Highway 33	x	x		x	x	x
11	Newman Wasteway nr Hills Ferry Rd	x	x		x	x	x
12	SJR at Sack Dam	x					
13	SJR at Lander Ave	x	x	x	x	x	x
14	Mud Sl upstream of San Luis Drain	x	x	x	x	x	x
15	Salt Sl at Lander Ave	x	x	x	x	x	x
16	Salt Sl at Sand Dam	x	x		x	x	x
17	Los Banos Cr at Hwy 140	x	x	x	x	x	x
18	Los Banos Cr at China Camp Road	x	x		x	x	x
19	Turner Slough nr Edminster Road	x	x		x	x	x
	Number of sites	19	18	4	17	18	18
	Times per year	13	8	4	2	13	8
	Total	247	144	16	34	234	144

In addition to these constituents, aquatic and sediment toxicity samples were collected and analyzed. These samples were analyzed by Pacific Ecorisk, Inc. using the methods described below:

- *Ceriodaphnia dubia*: "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (USEPA 2002a).
- *Pimephales promelas*: "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (USEPA 2002a).
- *Selenastrum capricornutum*: "Short-term Methods for Estimated the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms" (USEPA 2002b).

Hyalella azteca: "Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Organisms" (USEPA 2000).

<u>Reporting and Outreach</u>: The Westside Coalition has submitted numerous reports to the Regional Board as required by the Irrigated Lands Program, including a Watershed Report, six semi-annual monitoring reports, reports communicating water quality exceedances, and others.[6] Since the inception of monitoring in July of 2004, the Westside Coalition has held 43 meetings with presentations to over 2,500 people. These outreach meetings have included coalition and district meetings to inform growers, landowners and other interested parties about the Westside Coalition and to discuss issues that have been identified as a result of the monitoring program. Specific water quality issues encountered within the Westside Coalition monitoring program have also resulted in meetings with the affected parties focusing on solutions. Other types of outreach meetings have included West Stanislaus Resource Conservation District ("WSRCD") meetings, county ag commissioner meetings, pest control advisor and grower meetings organized by the Westside Coalition, Coalition for Urban/Rural Environmental Stewardship ("CURES"), the WSRCD and others. Outreach has also included regular meetings with Regional Board Ag Waiver staff, and preparation and distribution of newsletters.

The Steering Committee for the Westside Coalition meets monthly to receive updates on and discuss both policy issues and technical information. Regular water district board meetings of participants in the Westside Coalition also include discussion of the Waiver and implementation measures.

[6] A copy of the most recent semi-annual monitoring report (without figure 1 and appendices) is attached hereto as Exhibit 2.

Pesticide manufacturers are also supporting the Westside Coalition's grower and PCA outreach through sponsorship and participation in some of the landowner meetings. They have also provided technical and BMP information for use in publications and presentations developed by CURES Information on how to implement these label changes as well as other best management practices were presented at each of the landowner meetings described above.

Recent editions of the *Water Coalition Newsletter*, a publication covering waiver activities and BMP development for irrigated agriculture that is published by CURES through support from the Almond Board of California, have been distributed to growers by districts within the Westside Coalition. Newsletters distributed by individual water districts have also included articles that update landowners on the conditional waiver program.

BMP Implementation: Several specific projects have already been implemented within the Westside Coalition. These efforts on the ground to improve water quality include:

- Tailwater return systems have been installed in Tranquility ID, the Grassland Drainage Area, Columbia Canal Company, Central California ID and Stevinson Water District. These projects and proposed future projects should yield immediate benefits to water quality in the affected streams and in the San Joaquin River.

- Construction of a regional tailwater return project to prevent surface runoff from entering the San Joaquin River and to improve water supplies within Patterson ID is complete and the project is operational, resulting in water quality improvements to the San Joaquin River. This return system intercepts water from the Marshall Road Drain and diverts it into a 65± acre foot reservoir, where it is returned to the irrigation system. The reservoir collects approximately 2000 cubic yards of sediment that settles out of the diverted water each year. This project was supported by a Department of Water Resources Water Use Efficiency grant.

- Construction of a second tailwater return project in Patterson Irrigation District is currently underway and is expected to be completed by 2008. The project includes a 50± acre foot reservoir will collect tail water and operational spills from five canal laterals that would otherwise discharge into Del Puerto Creek.

The project could potentially affects up to 4,500 acres by intercepting tail water and settling out suspended solids. This project is supported by a State Water Board Ag Water Quality grant.

- A project to identify and design BMP's for reduction of discharge from the Orestimba Creek watershed is completed; project BMP recommendations were developed in binder format and distributed to landowners/operators. Funding was made available by the CALFED Drinking Water Program, Prop 13.

- Landowners are continuing to install drip and micro spray irrigation systems. These systems reduce tailwater generation and subsequent discharge. Some of the systems are privately funded, some are funded through revolving loan-interest loan programs funded by member agencies, and others have been funded through State Revolving Fund Loans or Agricultural Water Quality program low-interest loans to participating districts.

The Westside Coalition is also in the process of developing additional best management practices through several projects. These projects include:

- Demonstration of an achievable reduction of chlorpyrifos in drainage water discharging from the tributary watershed of Orestimba Creek into the San Joaquin River from alfalfa, vegetable and other row crop farms. Vegetated ditch BMPs have been constructed and will be tested this summer. PAM calcium applications and constructed wetlands will also be evaluated this summer. Work will include field site assessments, grower publications and BMP outreach. Support includes a Department of Pesticide Regulation PRISM Grant.

- Examination and evaluation of four BMP strategies currently being used in the region for the control of sediments and pesticides: drainage retention ponds (reservoirs), constructed wetlands, vegetated ditches, PAM applications, and use of pesticide-degrading enzymes. Vegetated ditches have been constructed and will be tested this summer. Data has been compiled from previous studies. The project includes development of guidelines for BMP selection and grower outreach and education and is supported by a CALFED Drinking Water Program-Prop 13 grant.

- A project in the Grassland Water District, an area of private wetland habitat, supported by a State Water Board Agricultural Water Quality Grant Program, to study adaptive, coordinated real-time management of wetland drainage.

Grassland Bypass Project: The first regional effort to manage drainage and reduce discharges that reach the San Joaquin River was the Grassland Bypass Project, organized under the umbrella of the San Luis & Delta-Mendota Water Authority. Participants include Panoche Drainage District, Firebaugh Canal Water District, Camp 13 Drainage District, Charleston Drainage District, Pacheco Water District and several other small districts outside the San Luis Unit comprising approximately 97,000 acres. In 1996, and again in 2001, the Water Authority, entered into a Use Agreement with Reclamation to utilize a portion of the San Luis Drain to convey subsurface drainage water containing selenium around sensitive wetlands and wildlife habitat. The subsurface drainage is discharged into Mud Slough, a tributary of the San Joaquin. The project removed selenium from some 90 miles of wetland delivery channels, while causing significant worsening of water quality in approximately 6 miles of Mud Slough North between the end of the Drain and the River. Each Use Agreement was negotiated through a stakeholder process involving Reclamation, US Fish and Wildlife Service, USEPA, the Regional Board, Contra Costa Water District, Environmental Defense, and others.

The Use Agreement provides for a series of load reduction commitments, fee incentives and credits, and under highly unusual circumstances allows for some exemptions, all administered by a multi-agency Oversight Committee. The current agreement includes a selenium and biological monitoring program, supported by funding from the local agencies and Reclamation. Compliance with selenium objectives at monitoring points downsteam in the San Joaquin River is also required. Paralleling the Use Agreement, the Regional Board has issued waste discharge requirements to the Water Authority and Reclamation for the Project under the Porter-Cologne Act, the first such regulation of non-point source discharges from irrigated lands. The process included approval of a selenium TMDL, drastic reductions in both salt and selenium loading, and a glide path to achieving water quality objectives for selenium.

The Grassland Bypass Project is widely regarded as a model for addressing non point source discharges from irrigated land. Participants have been highly successful, reducing the selenium load discharged 70% since the beginning of the Project. There have been no annual load exceedances, although there have been some monthly load exceedances during periods of heavy rain or flooding when there has been little or no ongoing irrigation. The load reductions have been attained largely through improved irrigation efficiencies, some recycling of drainage into the irrigation supply, load trading among participants, and collection and application of subsurface drainage on regional reuse areas that grow salt-tolerant grasses and other crops. A regional reuse area of 4,000 acres has been acquired with the support of a $17.5M State grant, and developed with a combination of federal appropriation support and local contributions.[7] The Grassland Bypass Project deals with subsurface drainage water, and project participants are required to eliminate tailwater from their systems. This ordinarily occurs through the installation of on-farm recirculation systems, funded by farmers or supported by district revolving loan programs.

The project continues until December 2009, when the existing waste discharge requirements expire and the Basin Plan requires compliance with stringent selenium objectives in the compromised portion of Mud Slough. Due to delays in anticipated funding and development of treatment and disposal processes, Project participants have begun exploring with the Regional Board and others the possibility of an additional term for the Bypass Project and to consider longer-term use of the San Luis Drain as a conveyance to separate flood flows containing selenium from wetland channels.

Westside Regional Drainage Plan: The next anticipated phase of regional drainage management is implementation of the Westside Regional Drainage Plan ("WRDP"), which will cover the same lands as the Grassland Bypass Project with some expanded benefit to Westlands Water District and other San Joaquin River Exchange Contractor lands. The WRDP continues the Grassland Bypass Project model of implementing a proactive, regionally driven response to water quality regulations. It will continue and expand reuse facilities, provide investment in system improvements to reduce seepage to groundwater, and will ultimately add treatment and disposal facilities. It will also incorporate such additional features as groundwater pumping and transfers. The suite of actions is a proposed long term drainage solution for the region and contemplates the elimination of discharges of subsurface or surface flows arising from irrigation in the project area to the San Joaquin River.[8]

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[7] *See* photos that depict the regional reuse area, attached hereto as Exhibit 3. Also, attached as Exhibit 4 is a December 29, 2006 letter to Rudy Schnagl of the Central Valley Regional Water Quality Control Board providing, pursuant to the Waste Discharge Requirements, an update of the long-0term drainage management plan for the Grassland Bypass Project.

[8] In the event the State Water Board expands the scope of the workshop beyond the southern Delta, the Authority requests the opportunity to submit additional reports and information further documenting the facts presented in this letter.

Conclusion

This letter demonstrates two over-arcing points. It show that there are a number of factors the State Water Board must consider before undertaking the balancing necessary to determine what might be reasonable water quality conditions in the southern Delta for the protection of agricultural beneficial uses. Specifically, as threshold actions, the State Water Board should define the extent of the beneficial uses protected by the southern Delta salinity objectives, and identify the factors in that area, the control of which could reasonably achieve a desired water quality condition.

Second, this letter reflects the fact that the Authority and its member agencies are fully engaged in and committed to actions to reduce salinity in the San Joaquin River that results from irrigation within the Authority member agencies' service areas. Given those efforts, it is not appropriate to develop water quality objectives or a program of implementation that might cause actions that will further reduce the already restricted water supplies of the Authority's member agencies or to demand more from them in order to solve downstream water quality issues, at least until all contributors to those quality issues are addressing their own effects at a similar level.

The Authority and its member agencies are willing to meet with the State Water Board and its staff to answer questions or address concerns.

Thank you for your consideration of these comments.

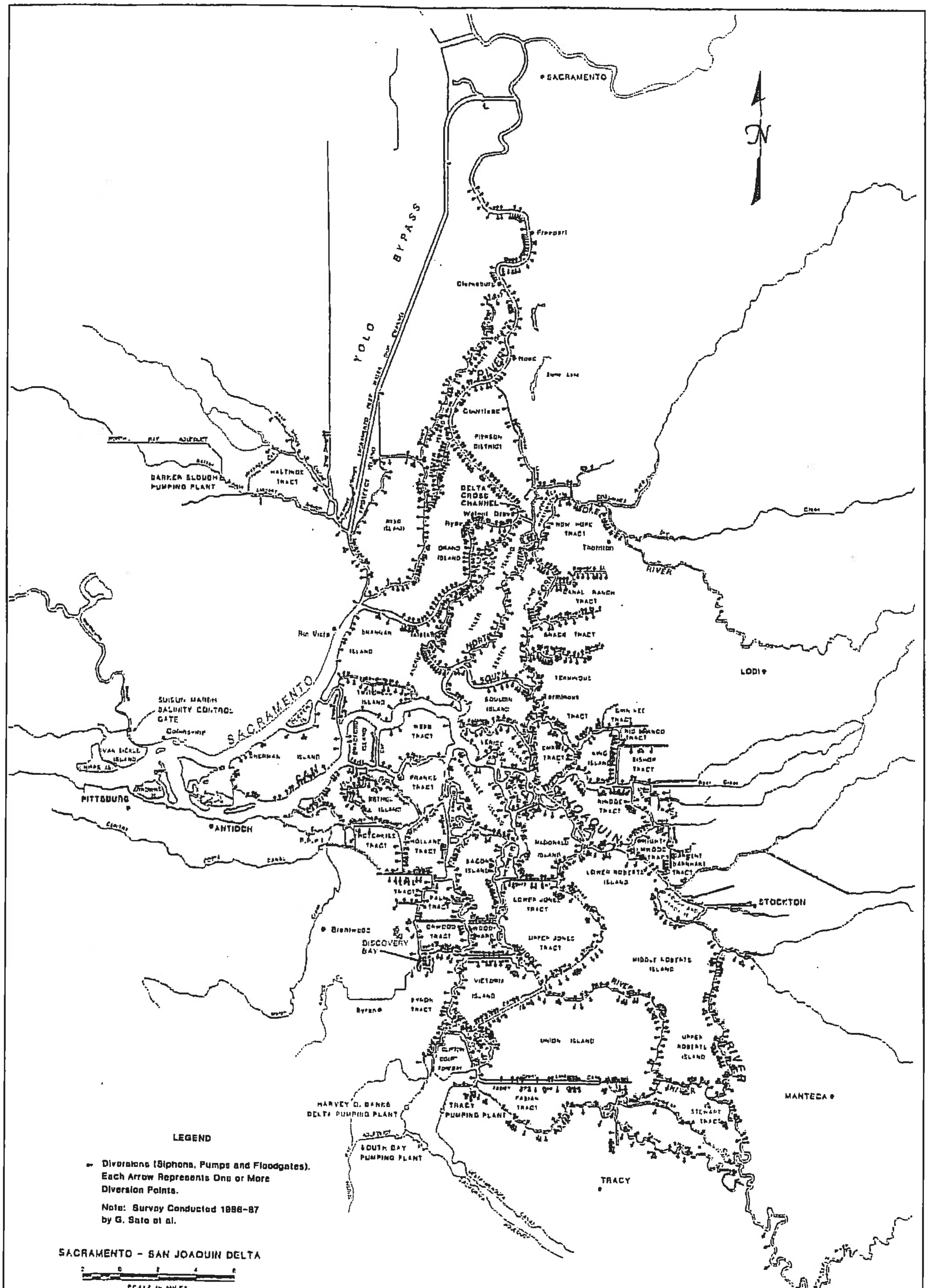
Very truly yours,

DIEPENBROCK HARRISON
A Professional Corporation

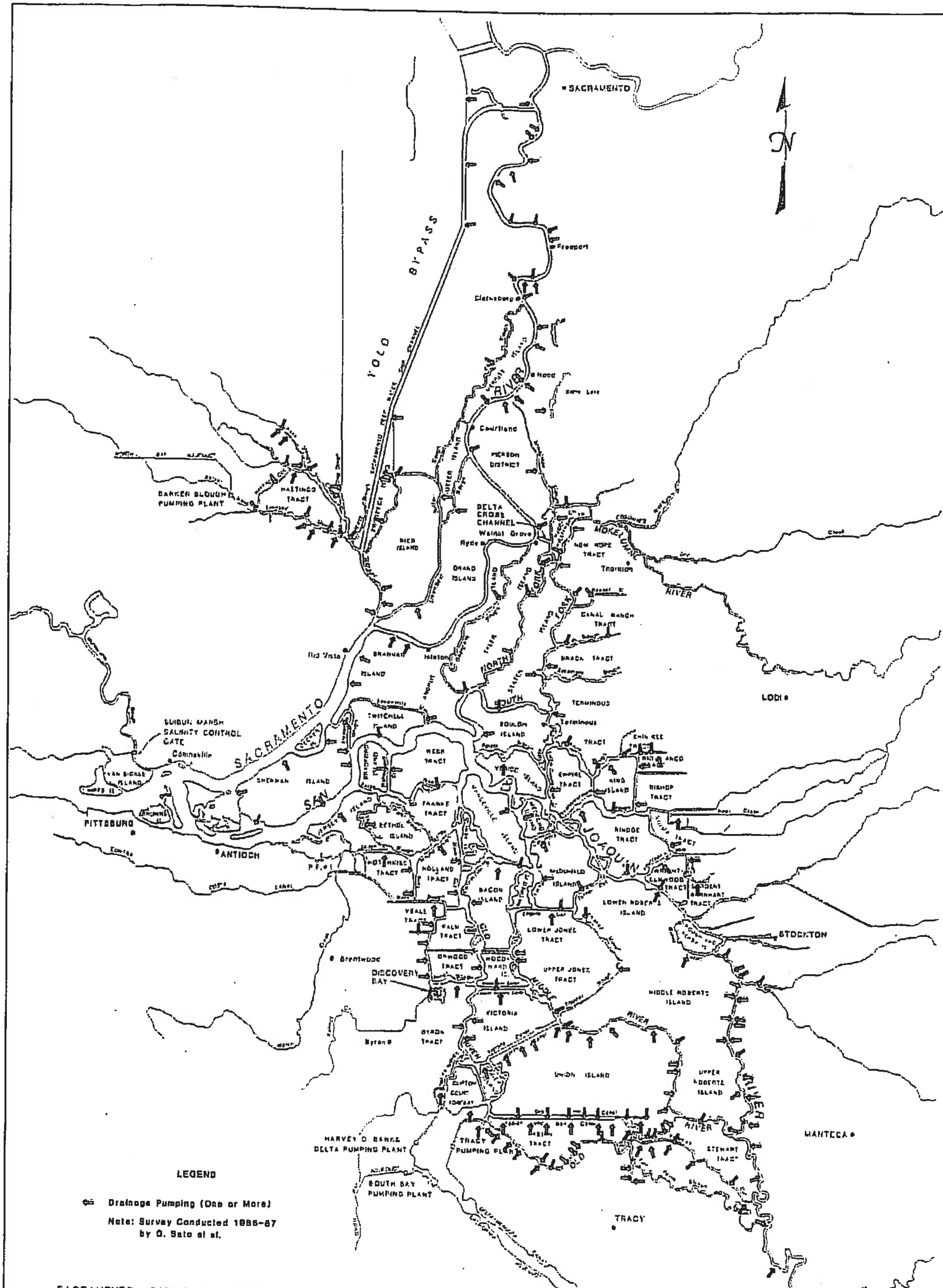
By
Jon D. Rubin
Attorneys for the San Luis & Delta-Mendota Water Authority

cc: Daniel Nelson

EXHIBIT 1



Irrigation Diversions



Agricultural Drainage Returns

EXHIBIT 2

SAN JOAQUIN VALLEY DRAINAGE AUTHORITY

P O Box 2157 Los Banos, CA 93635
209 826 9696 Phone 209 826 9698 Fax

December 31, 2006

Pamela Creedon, Executive Officer
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive #200
Rancho Cordova, CA. 95670-6114

Subject: Westside San Joaquin River Watershed Coalition
Submittal of December 31, 2006 semi-annual monitoring report

Dear Pamela,

Attached is the December 31, 2006 semi-annual monitoring report as required under the Monitoring and Reporting Program No. R5-2005-0833. This report covers the irrigation season monitoring from May 2006 through October 2006.

We have made significant steps during this period to identify water quality problems and follow up. We began Phase II monitoring in July and submitted a Water Quality Strategy on July 31, 2006. We are beginning to develop a management plan per your request of November 30, 2006 and have a meeting planned with your staff on January 8, 2007 to begin the process.

I certify under penalty of law that his document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment for violations.

If you should have any questions on the information submitted in this report, please give me a call at 559-582-9237.

Joseph C. McGahan
Watershed Coordinator
Westside San Joaquin River Watershed Coalition

San Joaquin Valley Drainage Authority

Westside San Joaquin River Watershed Coalition

Semi-Annual Monitoring Report

Covering the period: May 2006 through October 2006
(Sampling Events 22 through 27)

December 31, 2006

Prepared by:
Summers Engineering, Inc.
Consulting Engineers
Hanford California

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SECTION 1: EXECUTIVE SUMMARY

In June, 2003, the San Joaquin Valley Drainage Authority (SJVDA) submitted a Conditional Waiver Report for the Westside San Joaquin River Watershed Coalition (Westside Coalition). The Westside Coalition watershed generally lies on the westside of the San Joaquin River from approximately the Stanislaus River on the north to 10 miles south of Mendota and encompasses an area of approximately 460,500 acres. There are approximately 4,000 landowners and 1,500 operators within the watershed. Most of the watershed receives water supplies from the Central Valley Project, while certain areas receive water from the State Water Project. In addition, some areas receive supplies from the San Joaquin River and local water sources, one area receives a Kings River supply, and some areas receive water from groundwater wells. The Delta-Mendota Canal and San Luis Canal run through the center of the watershed. Water deliveries are made to Federal Central Valley Project Contractors and to San Joaquin River Exchange Contractors from these facilities. State water deliveries are also made to one area.

The Grassland Drainage Area encompasses 97,400 acres that are geographically within the watershed. The Grassland Drainage Area is covered under waste discharge requirements (No. 5-01-234), which regulates the discharge of subsurface drainage water through the San Luis Drain to the San Joaquin River. The area coordinates its separate monitoring and reporting program under the above waste discharge requirements.

The described Westside Coalition area also includes federal, state and private managed wetlands. These areas share water delivery and drainage conveyance systems with the surrounding agricultural areas. Due to the integrated nature of the water facilities the managed wetlands have joined the Westside Coalition as a wetland sub-watershed participant to comply with the Conditional Waiver and effectively and efficiently address water quality issues. The effects of discharges form the wetland areas are covered in this monitoring program. Grassland Water District has provided supplemental data from their monitoring efforts in **Appendix G**. The U.S. Fish and Wildlife Service has performed similar monitoring, however, this data is not yet available.

The communities of Grayson, Westley, Vernalis, Crows Landing, Patterson, Newman, Gustine, Stevinson, Los Banos, Dos Palos, South Dos Palos, Firebaugh, Mendota and Tranquillity lie within the geographic area of the Westside Coalition. These communities do not have discharges from irrigated lands and are not included in the Westside Coalition, but contribute storm waters and municipal waste waters to the watershed and may impact discharges from irrigated lands.

Interstate Highway 5 and State Highways 33, 140, 165 and 152 and many county roads run through the geographic area of the Westside Watershed. Storm water discharges from these roads and highways could contribute contaminants to the same water bodies that carry agricultural return water.

The San Joaquin Valley Drainage Authority, a joint powers agency, is the umbrella organization for the Westside Coalition for purposes of the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands within the Central Valley Region (Resolution

No.R5-2003-0105). On July 30, 2004, the Westside Coalition received approval for its irrigated agricultural monitoring plan from the Central Valley Regional Water Quality Control Board. The first sampling event took place on July 6, 2004, with subsequent event samples collected monthly. This report covers sampling events beginning May 2006 through October 2006.

The Monitoring and Reporting Plan for the Westside Coalition includes a monthly sampling plan for 19 monitoring sites within the coalition area as well as plans for sampling for two rain events during each year. During any given sampling event, each accessible site is visited, visually assessed, and samples are collected in accordance with the field sampling manual. **Table 1,** below, shows the monitoring events summary by site for the reporting period.

Table 1: May 2006 through October 2006 Sampling Event Summary

Site Designation	Site	Event 22	Event 23	Event 24	Event 25	Event 26		Event 27
		May	June	July	August	September		Oct.
1	Hospital Cr at River Road	S	S	S	S	S	SS	S
2	Ingram Cr at River Road	S	S	S	S	S	SS	S
3	Westley Wasteway near Cox Road	S	S	NF	S	S	SS	S
4	Del Puerto Cr near Cox Road	S	S	S	S	S	SS	S
5	Del Puerto Cr at Hwy 33	S	S	S	S	NF	SS	S
6	Salado Cr near Olive Ave.	BW	BW	BW	BW	BW	NP	BW
7	Ramona Lake near Fig Avenue	BW	BW	S	S	S	NP	S
8	Marshall Road Drain near River Road	BW	S	S	S	S	NP	S
9	Orestimba Cr at River Road	S	S	S	S	S	SS	S
10	Orestimba Cr at Hwy 33	S	S	S	S	S	SS	S
11	Newman Wasteway near Hills Ferry Road	S	S	S	S	S	SS	S
12	San Joaquin River at Sack Dam	S	S	S	S	S	NP	S
13	San Joaquin River at Lander Avenue	S	S	S	S	S	SS	S
14	Mud Slough u/s San Luis Drain	S	S	S	S	S	SS	S
15	Salt Slough at Lander Avenue	S	S	S	S	S	SS	S
16	Salt Slough at Sand Dam	S	S	S	S	S	SS	S
17	Los Banos Creek at Highway 140	S	S	S	S	S	SS	S
18	Los Banos Creek at China Camp Road	NF	NF	NF	NF	NF	SS	NF
19	Turner Slough near Edminster Road	S	S	S	S	S	SS	S

Notes: S = Water sampled according to the MRP.
SS = Sediment sampled according to the MRP.
NF = Not sampled due to lack of flow.
NS = No sediment to collect.
NP = Not included in sampling plan.
BW = Not sampled due to SJR backwater into monitoring site.

The objectives of the monitoring program are:

- To assess the existing water quality characteristics of major agricultural drains within the watershed area.
- To determine the location and magnitude of water quality problems.
- To determine the cause of water quality problems and develop solutions.

Two sampling crews have been trained by the analytical laboratories to collect samples according to the Westside Coalition's QAPP and Field Sampling Manual. These crews are responsible for collecting samples at each of the 19 sites; the field coordinator for the northerly region is responsible for collecting samples from sites 1 through 10. The field coordinator for the southerly region and is responsible for collecting samples from sites 11 through 19. The sampling crew for the northerly region is comprised of staff from Del Puerto Water District and Patterson Irrigation District. The southerly sampling crew is staffed by Central California Irrigation District. The sampling responsibilities include completion of the field data sheets, collection of water and sediment samples, completion of labels and chain of custody sheets, and coordination with the labs for sample pickup. The parameters analyzed at each site are shown in **Table 2**. The laboratory, method, and constituents analyzed are shown in **Table 3.**

Table 2: Monitoring Stations and Samples

Map Designation	Site Description	General Physical	Irrigation Season Aquatic Toxicity	Winter Aquatic Toxicity	Sediment Toxicity	Drinking Water Constituents	Pesticide Sampling
	1	3	4	5	6	7	8
1	Hospital Creek at River Road	x	x		x	x	x
2	Ingram Creek at River Road	x	x		x	x	x
3	Westley Wasteway nr Cox Road	x	x		x	x	x
4	Del Puerto Creek nr Cox Road	x	x		x	x	x
5	Del Puerto Creek at Hwy 33	x	x		x	x	x
6	Salado Creek nr Olive Ave	x	x		x	x	x
7	Ramona Lake nr Fig Avenue	x	x		x	x	x
8	Marshall Road Drain nr River Road	x	x			x	x
9	Orestimba Creek at River Road	x	x		x	x	x
10	Orestimba Creek at Highway 33	x	x		x	x	x
11	Newman Wasteway nr Hills Ferry Rd	x	x		x	x	x
12	SJR at Sack Dam	x					
13	SJR at Lander Ave	x	x	x	x	x	x
14	Mud Sl upstream of San Luis Drain	x	x	x	x	x	x
15	Salt Sl at Lander Ave	x	x	x	x	x	x
16	Salt Sl at Sand Dam	x	x		x	x	x
17	Los Banos Cr at Hwy 140	x	x	x	x	x	x
18	Los Banos Cr at China Camp Road	x	x		x	x	x
19	Turner Slough nr Edminster Road	x	x		x	x	x
	Number of sites	19	18	4	17	18	18
	Times per year	13	8	4	2	13	8
	Total	247	144	16	34	234	144

In addition to the constituents presented in **Table 3**, aquatic and sediment toxicity samples were collected and analyzed. These samples were analyzed by Pacific Ecorisk, Inc. using the methods described below:

- *Ceriodaphnia dubia*: "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (USEPA 2002a).
- *Pimephales promelas*: "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (USEPA 2002a).
- *Selenastrum capricornutum*: "Short-term Methods for Estimated the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms" (USEPA 2002b).
- *Hyalella azteca*: "Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Organisms" (USEPA 2000).

Fifteen of the 19 monitoring sites are located on streams that dominated by summer agricultural drainage runoff. The irrigation season within the Westside Coalition typically starts in March, with pre-irrigation and typically ends in August, just before harvest of the late season crops (such as cotton and fall corn). Because the irrigation period is also when pesticides are applied, and most likely to be carried off by tailwater drainage, the Westside Coalition has targeted this period for pesticide and toxicity analysis. See the Monitoring and Reporting Plan, page 8 (April 1, 2004). Four of the monitoring sites received agricultural drainage during the irrigation season and wetland drainage during the fall and winter (SJR at Lander Ave., Mud Sl. u/s San Luis Drain, Salt Sl. at Lander Ave. and Los Banos Creek at Hwy 140). Because of this, these 4 sites are tested for pesticides and toxicity year-round.

Attachment 1 details the samples collected at each site during each sampling event. A summary of the monitoring results is presented in **Appendix A**. Significant aquatic toxicity was measured at 7 sites during the reporting period. These results, along with associated water quality and flow data, are summarized in **Attachment 2**. Details of the aquatic and sediment toxicity analysis are shown in **Appendix F**.

Table 3: Analytes, Laboratories, and Methods.

	Constituent	Laboratory	Method	Units	Laboratory SOP No.
Field Data	pH	Field Crew	YSI meter	-	Field Manual
	Temperature	Field Crew	YSI meter	°C	Field Manual
	Conductivity	Field Crew	YSI meter	µmhos/cm	Field Manual
	Dissolved Oxygen	Field Crew	YSI meter	mg/L	Field Manual
	Flow	Field Crew	Estimate	cfs	Field Manual
Gen. Phy. / D.W.	Color (A.P.H.A.)	BSK/Caltest	SM 2120B	-	COLOR-rev4E
	pH	BSK/Caltest	SM 4500-H+B	-	PH-rev4
	TDS	BSK/Caltest	SM 2540C	mg/L	TDS-rev4E
	TSS	BSK/Caltest	SM 2540D	mg/L	TSS-rev4
	Turbidity	BSK/Caltest	SM 2130B	NTU	TURB-rev4E
	Hardness	Caltest	EPA 130.2	mg/L	HARD-rev5E
	Metals	Caltest	EPA 200.7, 200.8	mg/L	M-ICP-rev10E & 2008rev5Ea
	Bromide/Nitrate	BSK/Caltest	EPA 300.0	mg/L	DIONEX-rev5E
	Nitrogen, Nitrite	Caltest	EPA 354.1	mg/L	NO2-rev6
	TKN	Caltest	EPA 351.3	mg/L	NH3-TKN-rev6E
	Phosphate	Caltest	EPA 365.2	mg/L	PHOS-rev4
	Ammonia (as N)	Caltest	EPA 350.2	mg/L	NH3-TKN-rev6E
	DOC	BSK/Caltest	SM 5310-B/C	mg/L	TOC-D0C-rev7E
	TOC	BSK/Caltest	SM 5310-B/C	mg/L	TOC-D0C-rev7E
	E. Coli	BSK/Caltest	SM 9221BF/9223-B	MPN	MMOMUG-rev8E
Pesticides	Organophosphates	APPL	EPA 8141A	µg/L	ANA8141A
	Organochlorines	APPL	8081A/8082	µg/L	ANA8081A
	Carbamates	APPL	EPA 8321A LL	µg/L	HPL8321A
	Pyrethroids	APPL	EPA 8081A-P	µg/L	ANA8081A
	Herbicides	APPL	EPA 619	µg/L	ANA8151A
Toxicity	*Ceriodaphnia d.*	PER	EPA-821-R-02-012	% survival	Acute Cerio SOP
	Selenastrum c.	PER	EPA-821-R-02-013 & EPA-600-4-91-002	cell growth	Chronic Selenastrum SOP
	Pimephales p.	PER	EPA-821-R-02-012	% survival	Acute FHM SOP
	Hyalella a.	PER	EPA-600-R-99-064	% survival	10-D HyatellaAcuteSedTest

BSK Labs in Fresno, California
APPL labs in Fresno, California
Pacific Ecorisk (PER) in Martinez, California

Quality control samples were collected in addition to the event analysis sample. The quality control samples included field blanks, field duplicates, and matrix spike/matrix spike duplicate samples (MS/MSD). No significant quality control events were encountered, although there were a number of minor quality control issues, including exceedance of the field duplicate RPD value, hold time violation, or control sample failure. E. Coli samples for three sites (Mud Slough upstream of the San Luis Drain, and Salt Slough at both Lander Avenue and Sand Dam) during the June sampling event were spilled at the laboratory and were not analyzed. Results of the Quality Control samples are discussed in Section 4.

Monitoring Event Summaries.

High rainfall and snowfall in the Sierra Nevada mountain range resulted in significant, and fairly long-term water releases into the San Joaquin River. The higher flows in the river created a back-water condition at a number of the Westside Coaltion's monitoring sites during the reporting period and thwarted efforts to collect some samples.

Event 22; May 9, 2006

Irrigation season water samples were collected at all sites except Los Banos Creek at China Camp Road (no flow), Marshall Road Drain (SJR high water conditions cause a backwater into the site), Ramona Lake (SJR backwater) and Salado Creek (SJR backwater). Aquatic toxicity was measured at Newman Wasteway and Turner Slough for Fathead Minnow. Prior to toxicity testing, the toxicity laboratory notified us that the Fathead samples looked less healthy than normal, and the toxicity at both sites was consistent with pathogen interference. Resample at both sites (5/17/06) indicated no toxicity.

Event 23; June 13, 2006

Irrigation season water samples were collected at all sites except Los Banos Creek at China Camp Road (no flow), Ramona Lake (SJR backwater), and Salado Creek (SJR backwater). Aquatic toxicity was measured for Fathead Minnow at Hospital Creek. A resample was collected on June 19 and no toxicity was measured. E. Coli sample containers for Salt Slough at Lander Ave., Salt Slough at Sand Dam, and Mud Slough were spilled at the laboratory and no E. Coli data is reported for those sites.

Event 24; July 11, 2006

Irrigation season water samples were collected at all sites except Los Banos Creek at China Camp Road (no flow), Westley Wasteway (no flow), and Salado Creek (SJR backwater). The wet winter and high water conditions cause the local landowner at Ramona Lake to install a pump for the Ramona Lake discharge, which was not running at the time of sample collection. A discharge sample for Ramona Lake was later collected on July 17th. Complete mortality to Ceriodaphnia was measured at Orestimba Creek at River Road, Orestimba Creek at Highway 33, and Ramona Lake. Resamples were collect for all three sites (7/17/06 for Orestimba Creek at River Road and Orestimba Creek at Highway 33; 7/25/06 for Ramona Lake) and indicated persistent toxicity at all sites. Dilution series testing measured 5.5 toxic units (TU) for Orestimba Creek at River Road, >16TU for Orestimba Creek at Highway 33, and 3.6TU for Ramona Lake. TIE analyses had similar results for all three sites, indicating a non-polar organic material was the cause. Chlorpyrifos and Diazinon, among other materials, were detected at Orestimba Creek at Highway 33 and Orestimba Creek at River Road. Chlorpyrifos and dimethoate were detected at Ramona Lake.

Event 25; August 8 and 9, 2006
Irrigation season water samples were collected at all sites except Salado Creek (SJR backwater) and Los Banos Creek at China Camp Road (no flow). Due to time limitations, samples at Orestimba Creek at River Road and at Highway 33 were collected on August 9th. Complete mortality for Ceriodaphnia was measured at Salt Slough at Sand Dam. A resample was collected on 8/15, however 0% survival was measured in both the site water and the control. A retest of the resample measured 10% survival, indicating toxicity was persistent. A dilution series analysis measured 2.8 toxic units, and a TIE indicated a non-polar organic material (at least partially metabolically activated) as the probable cause. Chlorpyrifos, dicofol, and methomyl were detected in the site water.

Event 26; Water samples on September 12, sediment samples on September 11
On Tuesday, September 12, non-irrigation samples were collected at all sites except Los Banos Creek at China Camp Road (no flow), Salado Creek (SJR backwater), and Del Puerto Creek at Highway 33 (no flow). In accordance with the Westside Coalition's MRP, four sites are sampled for aquatic toxicity and pesticides during the non-irrigation season (Salt Slough at Lander Ave., San Joaquin River at Lander Ave., Los Banos Creek at Highway 140, and Mud Slough) and no toxicity was measured in any of those samples. On Monday, September 11, sediment samples were collected at accessible sites and analyzed for toxicity to Hyella azteca. Marshall road Drain, Salado Creek, and Ramona Lake are piped discharges and are not sampled for sediment. Sediment toxicity was measured at Hospital Creek, Ingram Creek, Westley Wasteway, Del Puerto Creek near Cox Road, Del Puerto Creek at Highway 33, and Orestimba Creek at Highway 33. Sediment sample from Orestimba Creek at Highway 33 and Ingram Creek were analyzed for pyrethroids, organophosphate pesticides, organochlorine pesticides, and various physical parameters. DDT, DDD, DDE, and cyhalothrin were detected in both creeks. Bifenthrin and permethrin were also detected in the Orestimba Creek sample.

Event 27; October 10, 2006.
Non-irrigation season water samples were collected at all sites except Salado Creek (SJR backwater) and Los Banos Creek at China Camp Road (no flow). Toxicity and pesticide samples were collected at Salt Slough at Lander Ave., San Joaquin River at Lander Ave., Los Banos Creek at Highway 140, and Mud Slough. No toxicity was measured, however the sample collection staff noted 2 people in a boat with spray containers and suits, headed upstream in Mud Slough. They appeared to be Mosquito Abatement, but that was not confirmed.

SECTION 2: SAMPLING SITES DESCRIPTION

Figure 1 shows the Westside Coalition area and the location of the monitoring sites. Following is a description and rationale for the monitoring sites.

- Hospital and Ingram Creek (Designation 1 & 2, Table 2 of MRP). The confluence of Hospital and Ingram creeks is on the 303(d) list for pesticides. The sites are each located on the individual creeks, upstream of the confluence. Both of these creeks are significant drainages for the Patterson subarea. Ingram Creek site water is analyzed for Group A pesticides.

- Westley Wasteway (Designation 3). Westley Wasteway is a significant drainage for the Patterson Subarea for both tailwater and storm runoff. Land use upstream of this monitoring station is similar to that of Del Puerto Creek. Westley Wasteway site water is analyzed for Group A pesticides.
- Del Puerto Creek (Designation 4). Del Puerto Creek is on the 303(d) list for pesticides and is a major drainage for the Patterson subarea and major storm runoff collector. Two stations are identified on this waterbody; one near the discharge to the San Joaquin River, and one at Highway 33, near the middle of the Patterson subarea. Biological assessments are performed on Del Puerto creek to assess its overall health, which will be useful in relating to collected water quality data. Del Puerto Creek site water is analyzed for Group A pesticides.
- Salado Creek, Ramona Lake, and Marshall Road Drain (Designations 6, 7 & 8). All three of these are significant drainages for the Patterson subarea. All three carry tail water from similar landuse areas, as well as operational spills. Salado Creek also collects storm water runoff from the City of Patterson. The outlet of Salado Creek is a pipe discharge into the San Joaquin River, and access for sampling is subject to the water level and flow conditions of the River, which frequently prevent sample collection. As of March, 2007, the Westside Coalition is proposing to discontinue monitoring at this location. Water from all three of these sites is analyzed for Group A pesticides.
- Orestimba Creek (Designation 9). There are two monitoring locations on Orestimba Creek; one near the discharge point to the San Joaquin River; and one upstream at Highway 33. The importance of Orestimba Creek is similar to that of Del Puerto: it is on the 303(d) list for pesticides, is a major drainage for the Patterson subarea, and is included in the biological assessment portion of the monitoring program. Subsequently, the importance of these sites to the monitoring program is the same as for Del Puerto Creek. Orestimba Creek site water is analyzed for Group A pesticides.
- Newman Wasteway (Designation 11). The Newman Wasteway is a significant drainage for the Patterson subarea and is on the 303(d) list for salt and pesticides. This measures drainage that originates from the southerly region of the Patterson subarea. Newman Wasteway site water is analyzed for Group A pesticides.
- The San Joaquin River at Sack Dam and Lander Avenue (Designations 12 & 13). These are baseline sites to establish the water quality backdrop in the San Joaquin River. The Sack Dam site is a water supply site that delivers water to agricultural areas within the Dos Palos Subarea as well as wetland water supplies. It can also receive ag return waters from the Tranquillity subarea. It is included to determine supply side water quality that may be affected by upstream discharge. San Joaquin River at Lander Avenue site water is analyzed for Group A pesticides.
- Mud Slough and Salt Slough (Designations 14, 15 & 16). These sites measure both drainage originating from the Los Banos and Dos Palos subareas that flow through the wetlands, as well as discharge from the wetlands themselves. Both Mud and Salt Sloughs are on the 303(d) list for a variety of constituents. In addition to the Westside Coalition's monitoring program, the Central Valley Regional Water Quality Control Board, Surface Water Ambient Monitoring Program (SWAMP) collects and analyzes samples from these sites throughout the year. These samples are analyzed for selenium, boron, and EC, along with other constituents. The SWAMP Data is available via the internet at:

http://www.waterboards.ca.gov/centralvalley/programs/agunit/swamp/index.html. Mud Slough and Salt Slough at Lander Avenue site water is analyzed for Group A pesticides.

- Los Banos Creek (Designations 17 & 18). Los Banos Creek carries storm water runoff from the Coastal Mountain Range, the City of Los Banos, and from the adjacent agricultural lands and wetlands. It also receives tail water from the Los Banos subarea. Two stations have been established on this waterbody, one upstream of the wetland area within the Los Banos subarea, and one within the wetlands.
- Turner Slough (Designation 19). This station is located on the eastside of the San Joaquin River and measures drainage from a portion of the Patterson subarea. Site water from Turner Slough is analyzed for Group A pesticides.

More than 56 different varieties of crops are grown within the Westside Coalition watershed area, ranging from fruit and nut trees to melons and cotton. **Table 4** shows the top twenty crops within the watershed area.

These crops are dispersed approximately evenly throughout the watershed area, with the exceptions of cotton (mostly in the Los Banos, Dos Palos and Tranquillity subareas), rice (Dos Palos subarea only), and fruit trees (mostly in the Patterson subarea). The planting practices are typical for conventional agriculture within the Central Valley. A complete crop list and detailed crop calendar was presented in the "Watershed Evaluation Report", submitted in April, 2004.

In general, annual field crops (cotton, tomatoes, melons, etc.) are planted in the spring between March and May, and harvested in the late summer and early fall, depending on the crop.

Table 4: Top 20 Crops Grown

Crop	Planted Acreage
Alfalfa	77,186
Cotton	67,906
Corn	22,189
Almonds	20,794
Cannery Tomatoes	17,673
Oats	12,944
Wheat	12,611
Green Beans	12,568
Fresh Market Tomatoes	11,349
Walnuts	8,852
Pasture	8,761
Native	8,260
Apricots	7,480
Dry Beans	7,240
Melons	6,565
Sugar Beets	6,280
Rice	4,131
Barley	3,226
Grapes	2,649
Broccoli	2,058

Orchard crops come out of dormancy between March and April, and are harvested in the late summer and fall.

Annual field crops are typically planted as seed or transplants after the field has been pre-irrigated to provide salt leaching and soil moisture for germination. These crops are usually furrow irrigated using either a plowed head ditch or gated pipe, but may also be sprinkler or sub-surface drip irrigated. Permanent field crops such as pasture or alfalfa are usually flood or sprinkler irrigated. The younger fruit and nut trees are almost universally irrigated with drip or micro-sprinkler systems, though many of the older orchards are still flood irrigated.

Table 5 shows the types of pesticides used in 2004 reported from the California Department of Pesticide Regulation, by sub-watershed and crop type. This area includes 10 of the 19 monitoring sites within the Westside Coalition, 3 of which are on the 303d list for pesticides. Pesticide use data for 2005 is not yet available.

Table 5: Stanislaus County 2004 Pesticide Use by Subwatershed

	Pesticide Type	Fallow / Native	Field Crops	Pasture	Orchard Crops	Vineyards	Nursery
Del Puerto Cr. Subwatershed	Carbamates		x				
	Herbicides	x	x	x	x	x	
	Organochlorine		x				
	Organophosphorus		x		x		
	Pyrethroid		x		x	x	
Hospital/Ingram Cr. Subwatershed	Carbamates		x		x		
	Herbicides	x	x		x	x	
	Organochlorine		x				
	Organophosphorus		x		x		
	Pyrethroid		x		x	x	
Orestimba Cr. Subwatershed	Carbamates		x		x		
	Herbicides	x	x		x		x
	Organochlorine		x		x		
	Organophosphorus		x		x		
	Pyrethroid		x		x		
Salado Creek Subwatershed	Carbamates		x	x			
	Herbicides	x	x	x	x		
	Organochlorine		x				
	Organophosphorus		x		x		
	Pyrethroid		x		x		
Westley Wasteway Subwatershed	Carbamates		x		x		
	Herbicides	x	x		x	x	
	Organochlorine		x				
	Organophosphorus		x		x		
	Pyrethroid		x		x	x	

Note: Shaded regions indicate no recorded pesticide application on that crop type in that subwatershed.

FIGURE 1: WATERSHED MAP W/ MONITORING SITES.

Table 6 shows the 10 most commonly applied pesticides (by acreage) for the three major counties occupied by the Westside Coalition.

Table 6: Most Commonly Applied Pesticides by County.

Fresno		Merced		Stanislaus	
Pesticide	Class	Pesticide	Class	Pesticide	Class
Ethephon	OP	Ethephon	OP	Lambda-cyhalothrin	Pyrethroid
Chlorpyrifos	OP	Lambda-cyhalothrin	Pyrethroid	Chlorpyrifos	OP
Methomyl	Carbamate	Chlorpyrifos	OP	Dimethoate	OP
Esfenvalerate	Pyrethroid	Cyfluthrin	Pyrethroid	Esfenvalerate	Pyrethroid
Permethrin	Pyrethroid	Permethrin	Pyrethroid	Permethrin	Pyrethroid
Cyfluthrin	Pyrethroid	Dimethoate	OP	Bifenthrin	Pyrethroid
Aldicarb	Carbamate	Methomyl	Carbamate	Diazinon	OP
Dimethoate	OP	Esfenvalerate	Pyrethroid	Dicofol	OC
Endosulfan	OC	Aldicarb	Carbamate	Ziram	Carbamate
Diazinon	OP	Dicofol	OC	Methyl Parathion	OP

SECTION 3: FIELD SAMPLING PROCEEDURE

Field water quality data and sample collections were collected as outlined in the Westside Coalition's Quality Assurance Project Plan (QAPP) and Field Sampling Manual. Two sampling crews are responsible for collecting samples at each of the 19 sites; the field coordinator for the northerly region is responsible for collecting samples from sites 1 through 10. The field coordinator for the southerly region and is responsible for collecting samples from sites 11 through 19. The sampling crew for the northerly region is comprised of staff from Del Puerto Water District and Patterson Irrigation District. The southerly sampling crew is staffed by Central California Irrigation District. These responsibilities include completion of the field data sheets, collection of water and sediment samples, completion of labels and chain of custody sheets, and coordination with the labs for sample pickup. Samples are collected either as a direct grab from the waterbody or as a bucket grab, where a large volume of water is collected in a stainless steel bucket and transferred to the sample bottles. Details of these collection methods are explained in Field Sampling manual.

Since the implementation of the monitoring program in July 2004, two minor changes have been made to the sampling procedure:

1. In accordance with a request from the Central Valley Regional Water Quality Control board, the five gallon fluorocarbon-lined polyethylene (FLPE) jerrycans have been replaced with five 1 gallon glass amber bottles.
2. Sediment sampling in the northerly region is performed with a stainless steel scoop instead of the mechanical Eckman sampler.

Additionally, in July 2006, the Westside Coalition transitioned to Phase II constituents at all of the 19 monitoring sites and have added the Group A pesticides analyses to nine monitoring stations. This revised list of constituents is listed in **Table 7**, below.

Table 7: Current Monitoring Constituents

Pesticides Material	Class
Aldicarb	Carbamate
Carbaryl	Carbamate
Carbofuran	Carbamate
Diuron	Carbamate
Linuron	Carbamate
Methiocarb	Carbamate
Methomyl	Carbamate
Oxamyl	Carbamate
4,4'-DDE	Organochlorine
4,4'-DDT	Organochlorine
4,4'-TDE/DDD	Organochlorine
Dicofol	Organochlorine
Dieldrin	Organochlorine
Endrin	Organochlorine
Methoxychlor	Organochlorine
Methamidophos	Organophosphate
Azinphosmethyl	Organophosphate
Chlorpyrifos	Organophosphate
Diazinon	Organophosphate
Dimethoate	Organophosphate
Disulfoton	Organophosphate
Malathion	Organophosphate
Methidathion	Organophosphate
Parathion, methyl	Organophosphate
Phorate	Organophosphate
Phosmet	Organophosphate
Bifenthrin	Pyrethroid
Cyfluthrin	Pyrethroid
Cypermethrin	Pyrethroid
Esfenvalerate/Fenvalerate	Pyrethroid
Lambda cyhalothrin	Pyrethroid
Permethrin	Pyrethroid
Atrazine	Triazine
Cyanazine	Triazine
Diuron	Triazine
Linuron	Triazine
Molinate	Triazine
Simazine	Triazine
Thiobencarb	Triazine

General Chemistry Constituents Material	Class
Bromide	Drinking Water
E. Coli	Drinking Water
Color	General Physical
Dissolved Organic Carbon	General Physical
Hardness (as CACO3)	General Physical
Total Dissolved Solids	General Physical
Total Organic Carbon	General Physical
Total Suspended Solids	General Physical
Turbidity	General Physical
Arsenic	Metal
Boron	Metal
Cadmium	Metal
Copper	Metal
Lead	Metal
Nickel	Metal
Selenium	Metal
Zinc	Metal
Ammonia (as N)	Nutrient
Nitrogen, Nitrate (as N)	Nutrient
Nitrogen, Nitrite	Nutrient
Phosphate as P,Ortho dissolved	Nutrient
Total Kjeldahl Nitrogen	Nutrient
Total Phosphate as P	Nutrient

Field Measurements Material
DO
EC
Est Depth
pH
Flow
Staff Gage
Temp

Toxicity Analyses Material	Class
Hyalella azteca	Sediment Toxicity
Pimephales promelas	Fathead Minnow
Selenastrum capricornutum	Algae
Ceriodaphnia dubia	Water Flea

SECTION 4: FIELD QUALITY CONTROL SAMPLES

Field quality control samples included the collection of field duplicate samples for aquatic and sediment toxicity analysis, and the collection of both field duplicate and field blank samples for pesticides, drinking water, and general physical constituent analysis.

- **Water Chemistry Analyses.** Six field duplicate and field blank sample sets were collected during the reporting period and analyzed for general chemistry and drinking water constituents. A comparison of the event samples, duplicate samples, and blank samples is tabulated in **Attachment 3.** A total of 123 duplicate analyses were completed and compared to the event sample results. Fourteen duplicate samples exceeded the 25% relative percent difference (RPD) established in the QAPP for:

color	total dissolved solids	total suspended solids	turbidity
nitrite	bromide	total organic carbon	dissolved organic carbon
zinc	selenium		

In four cases, the results for both the event results and the field duplicate were near or below the reporting limit and should be considered estimated values. The cause of the remaining RPD violations is not known but assumed to be caused by a general lack of homogeneity in the stream. It is important to note that the duplicate samples are collected as "Field Duplicates", where the duplicate sample water is collected directly from the stream simultaneously with the event water. Site conditions, such as variations in in-stream water quality, can significantly affect the RPD.

Six field blank sample sets were analyzed during the report period. Of these, two resulted in values greater than 20% of the event sample result, both during the June sampling event (Event 23). The dissolved organic carbon and total organic carbon measurements for the field blank at Del Puerto Creek near Cox Road were 27% and 20% (respectively) of the event result. The cause of these exceedances is unknown. Additionally, the total dissolved solids measurement in the field blank during the July sampling event measured 7,700 mg/L. A re-analysis of this sample measured non-detect.

There were a number of samples that were analyzed or re-analyzed outside of the designated hold-time. It is not expected that these hold-time violations will significantly affect the data usability.

- **Pesticide Analyses.** Field duplicate and field blank samples were collected and analyzed for pesticides. Triflurlan was detected in the May (Event 22, 0.21 µg/L) and June (Event 23, 0.051 µg/L) field blank, with corresponding event sample concentrations of 0.97 µg/L and 0.15 µg/L, respectively. Methyl parathion was detected in the July (Event 24, 0.11 µg/L) field blank, with a corresponding event sample concentration of 0.098 µg/L (RPD = 112%). Both the Event 24 field blank and event sample methyl parathion concentrations were below the detection limit and are considered estimated. The cause of the blank contamination is not known. There were no other pesticides detected in any of the field blank samples for the reporting period. Field duplicate samples were compared to their corresponding event samples, and there were seven violations of the RPD criteria. Five of these RPD criteria violations resulted from measurements that were at or below the detection limit, and are considered estimated values. During the July sampling event (Event 24), dimethoate was detected in the event sample (0.43 µg/L) and not detected in the field duplicate sample. During the September sampling event (Event 26), methomyl was detected at a concentration of 0.17 µg/L in the event sample and 0.22 µg/L in the field duplicate (RPD = 29%). The cause of these differences are not known, but the impact on the monitoring program is considered negligible. The results of the field duplicate and event sample comparisons are tabulated in **Attachment 3.**

- **Aquatic Toxicity Analyses.** Field duplicate samples were collected and analyzed for toxicity to all three species for five of the aquatic toxicity events tested during the reporting period. Field duplicate results were acceptable for all of the tests except for the Event 25 and 26 algae test, where the RPD was calculated to be 40% and 26% respectively. The cause of this exceedance is unknown but expected to be related to the inherent variability of the algae test. In both cases, the sample cell growth was measured to be above the control sample cell growth, indicating no toxicity. During the testing of the Event 25 resample of Salt Slough at Sand Dam, 0% survival of *Ceriodaphnia dubia* was measured in the control sample. A re-test of that sample set yielded acceptable results.

- **Sediment Toxicity Analysis.** Field duplicate samples were collected and analyzed for toxicity to *Hyalella azteca* in sediment. All field duplicate samples satisfied the RPD criteria.

SECTION 5: ANALYTICAL METHODS

Table 3 indicates the laboratories responsible for the analytical results of this monitoring program, the analytical method used, and the standard operating procedure (SOP) document number. This table includes the additional Phase II constituents.

Chain of Custody (COC) sheets were maintained from the time of sample collection to receipt at the laboratories. Copies of the COC sheets are included in **Appendix A**, along with a summary of the data results. The data summary includes all of the field readings, analytical chemistry results, pesticide scan results, and toxicity test results (including results from the initial bioassays, dilution series, and TIE's). The original laboratory reports are included in **Appendix F**. These reports also include all of the field and internal quality control results.

The laboratory original data sheets (raw data) for the toxicity results are included in **Appendix F**, as part of the laboratory reports. Raw data for general physical results, drinking water results, and pesticide results are kept by the laboratories for a minimum of five years and are available upon request.

SECTION 6: DATA INTERPRETATION

The primary objective of the monitoring program is to identify streams and drainages that are adversely affected by agricultural discharges. The monitoring program has used a combination of toxicity tests and pesticide analyses, along with close coordination among districts and growers to not only identify problem areas but also to determine the magnitude and cause of the problems.

The Westside Coalition's monitoring program includes 19 stations on the Westside of the San Joaquin Valley (see **Table 1** and **Figure 1**). These stations were selected to provide a representative snapshot of all of the various regions of the watershed. A summary of this data is presented in **Appendix A**, and the laboratory data reports are provided in **Appendix F**.

All of the analyzed parameters were reviewed regularly to evaluate the overall health of the streams within the coalition area. However, toxicity results were used as the primary indicator of problem areas. During the May to October, 2006 period, seven toxic results were measured at seven monitoring stations. Three samples were toxic to *Pimephales promelas*, and four were toxic to *Ceriodaphnia dubia*. The details of these results are summarized in **Attachment 2.**

Follow up samples were collected for all seven toxic samples. The follow-up samples for those toxic to *Pimephales promelas* indicated no toxicity. The toxicity laboratory determined that pathogen interference (rather than site water contaminants) is the cause of the reduced survival observed during the initial toxicity tests. The four samples that were toxic to *Ceriodaphnia dubia* required dilution series and TIE evaluations. In all four cases, the TIE suggested that non-polar organic materials were at least partially responsible.

A variety of pesticide analyses were conducted in tandem with the toxicity screening. During the reporting period, 19 different pesticides were detected:

- Bifenthrin (2 detections): Bifenthrin is a pyrethroid insecticide that is registered for use on a variety of field crops such as cotton, beans, melons, and corn.
- Chlorpyrifos (16 detections): Chlorpyrifos is an organophosphate pesticide used to control a wide range of insects in orchards, pasture, and field crops. It can be used as a dormant spray for fruit and nut trees.
- Cyanazine (2 detection): Cyanazine is a triazine pre- and post- emergent herbicide to control annual grasses and broadleaf weeds.
- DDT/DDE/DDD (27 detections): DDT is an organochlorine pesticide that was banned for agricultural use in 1972. However it had significant use in the region prior to that period and is still detected in the watershed a relatively low levels. DDE and DDD have no commercial value but are compounds normally associated with the degradation of DDT.
- Diazinon (6 detections): Diazinon is an organophosphate pesticide used to control a wide range of insects and is frequently applied to nut trees, melons, and tomatoes, and is often used as a dormant spray for trees.
- Dicofol (10 detections): Dicofol is an orgaochlorine insecticide that is registered for use on a variety of field crops such as cotton, tomatoes, beans, and melons.
- Dieldrin (3 detections): Dieldrin is an orgaonchlorine insecticide that is used on a variety of field and orchard crops including cotton, corn, and citrus.
- Dimethoate (18 detections): Dimethoate is an organophosphate pesticide used to control a wide range of insects. It is used on a variety of field crops including alfalfa, beans, tomatoes, and cotton.
- Diuron (1 detections): Diuron is a substitute urea herbicide used to control weeds in a variety of field crops including cotton, alfalfa, and wheat. It is also effective in controlling algae.
- EPTC (7 detections): EPTC is a selective thiocarbamate herbicide used to control grassy and broadleaf weeds in a variety of field crops including beans and corn.

- Esfenvalerate/Fenvalerate (1 detections): Esfenvalerate/Fenvalerate is a pyrethroid insecticide used on a variety of field and orchard crops including almonds, peaches, and tomatoes.
- Lambda Cyhalothrin (3 detections): Lambda Cyhalothrin is a pyrethroid insecticide used on a variety of crops including cotton, almonds, apricots, tomatoes, and beans.
- Malathion (1 detections): Malathion is an organophosphate insecticide used on a variety of crops including alfalfa, walnuts, lettuce, grapes, and cotton.
- Methomyl (5 detections): Methomyl is a carbamate insecticide used on a variety of crops including corn, tomatoes, grapes, beans, and cotton.
- Methyl parathion (3 detection): Methyl parathion is an organophosphate pesticide used to control a wide range of insects. It is approved for a variety of non-food crops including alfalfa, cotton, and silage corn.
- Prowl (3 detections): Prowl is a herbicide used to control broadleaf and grassy weeds and is approved for a variety of crops including cotton, field corn, beans, rice, and vineyards.
- Trifluralin (20 detections): Trifluralin is a pre-emergent herbicide used to control broadleaf and grassy weeds and is approved for a variety of crops including fruit and nut trees, cotton, beans, and tomatoes.

Sediment samples were collected in accordance with the MRP in September 2006. Sixteen samples were collected, of which six exhibited significant toxicity to *Hyalella azteca*. **Table 8** shows the results of the sediment toxicity survival analysis for sediment sampling events since the beginning of the Westside Coalition's monitoring program.

Table 8: Sediment Toxicity Analysis Comparison

Site	Sep 06 % Survival	Sep 06 Toxicity (Y/N)	Mar 06 % Survival	Mar 06 Toxicity (Y/N)	Oct 05 % Survival	Oct 05 Toxicity (Y/N)	Mar 05 % Survival	Mar 05 Toxicity (Y/N)	Sep 04 % Survival	Sep 04 Toxicity (Y/N)
Hospital Creek	1.25	Y	82.5	Y	0	Y	16.2	Y	85	N
Ingram Creek	0	Y	23.8	Y	0	Y	32.5	Y	0	Y
Westley Wasteway	1.25	Y	0	Y	0	Y	0	Y	95.7	N
Del Puerto Creek (Cox Rd)	55	Y	0	Y	1.3	Y	N/A	N/A	93.75	N
Del Puerto Creek (Hwy 33)	1.25	Y	68.8	Y	0	Y	0	Y	N/A	N/A
Turner Slough	98.75	N	91.3	N	95	N	85	N	93.75	N
SJR at Lander	95	N	N/A	N/A	97.5	N	91.2	N	88.75	N
Salt Slough at Sand Dam	98.75	N	95	N	91.3	N	87.5	N	95	N
Orestimba Creek at River Rd.	96.25	N	97.5	N	93.8	N	51.2	Y	95	N
Orestimba Creek at Hwy 33	6.25	Y	66.3	N	32.5	Y	N/A	N/A	52.5	Y
Los Banos Creek at China Camp Rd.	100	N	93.8	N	91.3	Y	58.8	Y	95	N
Newman Wasteway	98.75	N	90	N	76.3	Y	72.5	Y	90	N
Los Banos Creek at Hwy 140	98.75	N	95	N	97.5	N	56.2	Y	93.75	N
Salt Slough at Lander	97.5	N	100	N	98.8	N	62.5	Y	92.5	N
Mud Slough	100	N	98.8	N	97.5	N	76.2	Y	92.8	N

Test species in all samples was *Hyalella azteca*
N/A indicates no sample taken or criteria not applicable.

It is significant to note that of the six locations that exhibited sediment toxicity, all of them have shown toxicity in at least three previous events since the beginning of the Westside Coalition's monitoring program. In October of 2006, the Westside Coalition authorized sediment pesticide analyses of sample from Ingram Creek and Orestimba Creek at Highway 33. These samples were analyzed for organophosphate, organochlorine, and pyrethroid pesticide groups as well as for some other chemical and physical properties. In both the Orestimba and Ingram Creek sample, low levels of DDT, DDE, DDD were detected, along with cyhalothrin. Bifenthrin and permethrin were also detected in the Orestimba Creek sample. No organophosphorous pesticides were detected in either sample. **Table 9** summarizes the analytical results. The Laboratory report is included in Appendix F, with the sediment toxicity results from Event 26.

Table 9: Sediment Pesticide Results.

Material	Ingram Creek	Orestimba Creek
4,4'-DDD (mg/kg)	0.0003J	0.0006J
4,4'-DDE (mg/kg)	0.0026J	0.0050J
4,4'-DDT (mg/kg)	0.0007J	0.0019J
Bifenthrin (mg/kg)	Not Detected	0.003
Cyhalothrin (mg/kg)	0.015	0.006
Permethrin (mg/kg)	Not Detected	0.011

J indicates estimated value below reporting limit.

Exceedences of Recommended Water Quality Values

In addition to aquatic and sediment toxicity screenings, water chemistry analyses were compared to recommended water quality values[1] (RWQV).

- **Field, General Physical and Drinking Water Quality Exceedences.** Comparisons were made to four RWQVs. **Attachment 4** tabulates the results for these constituents and the comparison to the RWQVs. The Westside Coalition performed analyses or observed more than 2500 parameters during the reporting period, during which, 122 (5%) results were greater than the RWQVs. E. coli results accounted for 43 of these exceedences, 22 for TDS, 13 for TSS, 15 for electrical conductivity, 5 for Dissolved Oxygen, and 24 for pH. In the case of E. coli, it is not clear that discharge from irrigated agriculture is contributing to E. coli contamination, and the Westside Coalition is participating in a study by U.C. Davis to determine the source of the E. Coli. Samples were collected in September, however the results are not yet available.

- **Pesticide exceedences.** The Westside Coalition tested for 1,660 pesticides during the reporting period. These analyses resulted in 120 detections, of which, 55 were greater than established RWQVs. Eight pesticides constituted the 55 exceedances, which are listed in **Table 10** (below).

[1] Water Quality Limits were taken from a Central Valley Regional Water Quality Control Board letter to the Westside Coalition, dated 30 September 2005.

Table 10: Pesticide Exceedances

Pesticide	Number of Exceedances
4,4'-DDE	17
Chlorpyrifos	15
4,4'-DDT	9
Dimethoate	4
Diazinon	3
Lambda cyhalothrin	3
Methyl parathion	3
Esfenvalerate/Fenvalerate	1

SECTION 7: ACTIONS TAKEN TO ADDRESS WATER QUALITY IMPACTS

1. Reporting and Outreach:

Since the inception of monitoring in July of 2004, the Westside Coalition has held numerous outreach meetings across the coalition area, where we have presented information on the coalition activities including monitoring results and recommended BMP implementation. 43 meetings with presentations to over 2,500 people have occurred. These outreach meetings have been documented in the reports to the Irrigated Lands program. **Table 11** shows the meetings that have been held during this reporting period.

These outreach meetings have included coalition and district meetings to inform growers, landowners and other interested parties about the Westside Coalition and to discuss issues that have been identified as a result of the monitoring program. Specific water quality issues encountered within the Westside Coalition monitoring program have also resulted in meetings with the affected parties focusing on solutions. Other types of outreach meetings have included West Stanislaus Resource Conservation District (WSRCD) meetings, county ag commissioner meetings, pest control advisor and grower meetings organized by the Westside Coalition, Coalition for Urban/Rural Environmental Stewardship (CURES), the WSRCD and others. Outreach has also included regular meetings with Regional Board Ag Waiver staff, and preparation and distribution of newsletters.

There are also monthly meetings of the governing body for the Westside Coalition that the continuing issues are discussed.

Pesticide manufacturers are also supporting the Westside Coalition's grower and PCA outreach through sponsorship and participation in some of the landowner meetings. They have also provided technical and BMP information for use in publications and presentations developed by CURES Information on how to implement these label changes as well as other best management practices were presented at each of the landowner meetings described above.

Recent editions of the *Water Coalition Newsletter*, a publication covering waiver activities and BMP development for irrigated agriculture that is published by CURES through support from the

Almond Board of California, have been distributed to growers by districts within the Westside Coalition. Newsletters distributed by individual water districts have also included articles that update landowners on the conditional waiver program. Regular water district board meetings of participants in the Westside Coalition also include discussion of the Waiver and implementation measures.

Table 11: Outreach Meetings

Date	Group	Location	Description	Estimated Attendance
5/4/2006	San Luis & Delta-Mendota Wtr Auth. Bd Mtng	Los Banos	Regulatory Updates	35
5/10/2006	Stanisalus County Ag Comm/West Stan RCD	Grayson	Meeting regarding BMP development	25
8/22/2006	Various sponsored by Fresno County Farm Bureau, California Cotton Ginners Association, Westside San Joaquin River Watershed Coalition and CURES	Mendota	Meeting regarding Cotton BMP's	30
9/7/2006	Blewett Mutual Water Co	Vernalis	Meeting with Frank Bettencourt,operator of system to review drainage	1
9/20/2006	El Solyo Water District	Vernalis	Met with Board to review drainage issues and BMP's	9
10/11/2006	Gustine Drainage District	Gustine	Met with Board to review drainage issues and BMP's	6
11/27/2006	Salt Slough at Sand Dam Watershed	Dos Palos	Provdied information on water quality exceedences and best management practices	20
11/30/2006	Orestimba creek Watershed	Newman	Provdied information on water quality exceedences and best management practices	35

2. BMP Implementation:

Several specific projects have already been implemented within the Westside Coalition. These efforts on the ground to improve water quality include:

- Tailwater return systems have been installed in Tranquillity ID, the Grassland Drainage Area, Columbia Canal Company, Central California ID and Stevinson Water District. These projects and proposed future projects should yield immediate benefits to water quality in the affected streams and in the San Joaquin River.

- Construction of a regional tailwater return project to prevent surface runoff from entering the San Joaquin River and to improve water supplies within Patterson ID is complete and the project is operational, resulting in water quality improvements to the San Joaquin River. This return system intercepts water from the Marshall Road Drain and diverts it into a 65± acre foot reservoir, where it is returned to the irrigation system. The reservoir collects approximately 2000 cubic yards of sediment that settles out of the diverted water each year.

- Construction of a second tailwater return project in Patterson ID is currently underway and is expected to be completed by 2008. The project includes a 50± acre foot reservoir will collect tail water and operational spills from five canal laterals that would otherwise discharge into Del Puerto Creek. The project could potentially affects up to 4,500 acres by intercepting tail water and settling out suspended solids.

- A project to identify and design BMP's for reduction of discharge from the Orestimba Creek watershed is completed; project BMP recommendations were developed in binder format and distributed to landowners/operators.

- Landowners are continuing to install drip and micro spray irrigation systems. These systems reduce tailwater generation and subsequent discharge.

The Westside Coalition is also in the process of developing additional best management practices through several projects. These projects include:

- Demonstration of an achievable reduction of chlorpyrifos in drainage water discharging from the tributary watershed of Orestimba Creek into the San Joaquin River from alfalfa, vegetable and other row crop farms. Vegetated ditch BMPs have been constructed and will be tested this summer. PAM calcium applications and constructed wetlands will also be evaluated this summer. Work will include field site assessments, grower publications and BMP outreach.

- Examination and evaluation of four BMP strategies currently being used in the region for the control of sediments and pesticides: drainage retention ponds (reservoirs), constructed wetlands, vegetated ditches, PAM applications, and use of pesticide-degrading enzymes. Vegetated ditches have been constructed and will be tested this summer. Data has been compiled from previous studies. The project includes development of guidelines for BMP selection and grower outreach and education.

Table 12 lists the BMP development projects within the Westside Coaltion.

Table 12 : BMP Project Development Summary

Line No.	Funding Source	Title	Sponsor	Description	Status
	Current Projects:				
1	DWR Water Use Efficiency Funding	Marshall Road Reservoir	Patterson I. D.	Construction of regional tailwater return project to prevent surface runoff from entering the San Joaquin River and to improver water supplies within Patterson ID.	Project complete and operational, resulting in water quality improvements to the SJR.
2	CALFED Drinking Water Program - Prop 13	Orestimba Creek Watershed - Agricultural Water Quality Pilot Program	CURES	Identify and design BMP's for reduction of discharge from the Orestimba Creek watershed.	Project completed, project BMP recommendations developed in binder format and distributed to landowners/operators.
3	PRISM Grant - Dept of Pesticide Regulation	PIN No. 17 - Western San Joaquin Valley Pesticide BMP Implementation Program	SJVDA - Transferred to SL&D-MWA June 21, 2004	Demonstrate an achievable reduction of chlorpyrifos in drainage water discharging from the tributary watershed of Orestimba Creek into the San Joaquin River from alfalfa, vegetable and other row crop farms	Vegetated ditches BMP have been constructed and will be tested this summer. PAM calcium applications and constructed wetlands to be evaluated this summer. Work will include field site assessments, grower publications and BMP outreach.
4	CALFED Drinking Water Program - Prop 13	PIN No. 471 - Agricultural Discharge Management Program Monitoring and Evaluation - West Stanislaus County	SJVDA - Transferred to SL&D-MWA August 5, 2004	Examine and evaluate four BMP strategies currently being used in the region for the control of sediments and pesticides: drainage retention ponds (reservoirs), constructed wetlands, vegetated ditches and PAM applications.	Vegetated ditches BMP have been constructed and will be tested this summer. Data has been compiled from previous studies. Project includes development of guidelines for BMP selection and grower outreach and education.
5	CALFED Water Use Efficiency Grant	Decision support for implementation and evaluation of agricultural water reuse best management practices to improve district-level irrigation efficiency	Patterson ID	Marshall Road type reservoir on district's north side, return water storage and delivery	
6	SWRCB Ag Water Quality Grant Program - Prop 50 or Federal 319(h)	Real-time salt & nutrient drainage load reduction strategies - PIN 2168	Patterson ID & W. Stan ID	Marshall Road type reservoir on district's north side, return water storage and delivery and comparing it to private reservoir project in W. Stan	
7	SWRCB Ag Water Quality Grant Program - Prop 50 or Federal 319(h)	Adaptive, coordinated real-time management of wetland drainage - PIN 2216	Grassland Water District		

3. Monitoring Results:

In July of 2006, the Westside Coalition adjusted it's monitoring program to include the Phase II constituents, as listed in the MRP (See **Table 7**). This information, along with the results gathered during the previous two years, has allowed the Westside Coalition to identify problem areas and issues. Details of sites exhibiting significant toxicity during this monitoring period are included in **Attachment 2** and all results that exceeded RWQVs are included in **Attachment 4**. This information, along with results from previous years will be used as talking points during upcoming grower meetings to outline the problem issues and sites. Additionally, this data is being used to develop a management plan which will outline the approach the Westside Coalition will use to improve water quality. A number of preliminary conclusions can be made from the data collected so far:

- **Sediment Toxicity:** Six locations indicated significant toxicity from the September 06 sampling (see **Table 8**). All six of these sites were located in the northern region of the Westside Coalition and four of them (Hospital Creek, Ingram Creek, Westley

Wasteway, and Del Puerto Creek at Highway 33) have indicated toxicity in at least four of the last five sampling events. Additionally, these four sites are all in the same vicinity. In the southern region, three sites have never measured significant toxicity during the Westside Coalition's monitoring program, and four sites have only measured toxicity once. The Westside Coalition has supplied additional sediment sample to the Regional Board's SWAMP program on two occasions, and performed it's own sediment pesticide analysis on samples collected in September of this year. Although no definitive conclusions can be made from these results, the detected presence of pyrethroid and organochlorine pesticides hint that pesticides may be a possible factor. Overall, the five sediment monitoring events provide the following preliminary conclusions: 1) the sediment toxicity problem is generally confined to a localized area in the northern region of the coalition. 2) Initial data indicates a possible pesticide connection within that region, although many of the detected pesticides were measured below effect concentration. 3) Outside of this northern region, the sediment toxicity testing indicates a much less significant issue.

- **Aquatic Toxicity:** During this monitoring period, four samples indicated significant toxicity to *Ceriodaphnia dubia*. In all four cases, follow up toxicity testing, as well as pesticide analysis results indicated pesticide were the likely cause. This has been the case in may of the *Ceriodaphnia dubia* toxicity hits since the beginning of the monitoring program and has been a topic discussed with growers, PCAs, and applicators in all of the regions of the Westside Coalition. The Coalition feels that progress and improvements are being made in the arena, however there is still work to be done.
- **Pesticide Anlanyses:** During this reporting period, 55 pesticide detections exceeded RWQVs. DDT/DDE accounted for 26 (47%) of these detections, Chlorpyrifos accounted for 15 (27%), Dimethoate – 4 (7%), Diazinon – 3 (5%), Methylparathion – 3 (5%), Lambda cyhalothrin – 3 (5%), and Esfenvalerate/Fenvalerate accounted for 1 (2%). In the case of DDT/DDE, this substance has been banned since 1972 and is likely being detected from legacy use prior to that period. It is doubtful that growers in the Coalition can do very much to impact the presence of these materials within the watershed. Chlorpyrifos has been the subject of many grower meetings and has show a significant reduction in the number of exceedances since the same period last year (Chlorpyrifos detections exceeded the RWQV 23 times during the same period in 2005, a 35% reduction). The Westside Coalition believes that increased awareness resulting from Coalition-Grower meetings is at least partially responsible for this improvement. The other materials show little difference from the previous year, or have no historical data.
- **General Chemistry and Field Observations:** The monitoring results during this reporting period indicated the same issues as in previous reports. E. Coli continues to be the leading source of exceedances (43 during this period) in the category and the Westside Coalition is participating in a study to attempt to determine the source of this constituent. Other constituent exceedances include EC/TDS (15 and 22, respectively), TSS (13 exceedances), pH (24 exceedances), and DO (5 exceedances). With many of these constituents, the source of the exceedance is neither clear nor easily traceable, and often can be found in the source water itself (such as the San Joaquin River at Sack Dam). Although the Westside Coalition is aware of the need to

address these issues, limited resources has forced the Coalition to focus more on pesticide and toxicity exceedances.

SECTION 8: COMMUNICATION REPORTS

Exceedance and communication reports were submitted to the Central Valley Regional Water Quality Control Board in response to monitoring results for the reporting period. These reports are included in **Appendix B.** The communication reports describe the water quality objective violation, the follow-up testing that occurred, and the follow-up test results.

Follow-up included reporting statistically significant toxic events and exceedences of water quality values to the overlying district and to individual coalition participants. The districts would then communicate with the affected growers to notify them there is a problem. Meetings are then be organized at the Coalition level as required to inform landowners, operators, PCA's, chemical applicators and others on monitoring results and likely best management measures that could be undertaken to minimize these problems (See **Table 8**).

Newsletters and literature have been distributed through meetings and district mailings regarding events within the Westside Coalition and actions that could be taken.

SECTION 9: CONCLUSIONS AND RECOMMENDATIONS

The Westside Coalition's monitoring program has identified constituents of concern. Beginning in July, 2006, Phase II monitoring was initiated. On July 31, 2006 the Westside Coalition submitted a water quality strategy to address items of concern from the monitoring program. Through outreach and development of BMP's items from this strategy are already being implemented. Work will begin this next year on further development of this strategy through a management plan request received from he Regional Board.

Attachment 1
Sampling Event Details

Event 22 May 06		BSK		APPL	PER				Dup?
		Gen Phy	Dmk Wtr	Pest	Sed Tox	CD Tox	PP Tox	SC Tox	
Hospital Creek at River Road	HCARR	x	x	x		x	x	x	
Ingram Creek at River Road	ICARR	x	x	x		x	x	x	
Westley Wasteway nr Cox Road	WWNCR	x	x	x		x	x	x	x
Del Puerto Creek nr Cox Road	DPCCR	x	x	x		x	x	x	
Del Puerto Creek at Hwy 33	DPCHW	x	x	x		x	x	x	
Salado Creek nr Olive Ave	SCOAV	SJR Backwater							
Ramona Lake nr Fig Avenue	ROLFA	SJR Backwater							
Marshall Road Drain nr River Road	MRDRR	SJR Backwater							
Orestimba Creek at River Road	OCARR	x	x	x		x	x	x	
Orestimba Creek at Highway 33	OCAHW	x	x	x		x	x	x	
Newman Wasteway nr Hills Ferry Rd	NWHFR	x	x	x		x	x	x	
SJR at Sack Dam	SJRSD	x	x						
SJR at Lander Ave	SJRLA	x	x	x		x	x	x	
Mud Sl upstream of San Luis Drain	MSUSL	x	x	x		x	x	x	
Salt Sl at Lander Ave	SSALA	x	x	x		x	x	x	
Salt Sl at Sand Dam	SSASD	x	x	x		x	x	x	
Los Banos Cr at Hwy 140	LBCHW	x	x	x		x	x	x	
Los Banos Cr at China Camp Road	LBCCC	No Flow							
Turner Slough nr Edminster Road	TSAER	x	x	x		x	x	x	

Event 23 June 06		BSK		APPL	PER				Dup?
		Gen Phy	Dmk Wtr	Pest	Sed Tox	CD Tox	PP Tox	SC Tox	
Hospital Creek at River Road	HCARR	x	x	x		x	x	x	
Ingram Creek at River Road	ICARR	x	x	x		x	x	x	
Westley Wasteway nr Cox Road	WWNCR	x	x	x		x	x	x	
Del Puerto Creek nr Cox Road	DPCCR	x	x	x		x	x	x	x
Del Puerto Creek at Hwy 33	DPCHW	x	x	x		x	x	x	
Salado Creek nr Olive Ave	SCOAV	SJR Backwater							
Ramona Lake nr Fig Avenue	ROLFA	SJR Backwater							
Marshall Road Drain nr River Road	MRDRR	x	x	x		x	x	x	
Orestimba Creek at River Road	OCARR	x	x	x		x	x	x	
Orestimba Creek at Highway 33	OCAHW	x	x	x		x	x	x	
Newman Wasteway nr Hills Ferry Rd	NWHFR	x	x	x		x	x	x	
SJR at Sack Dam	SJRSD	x	x						
SJR at Lander Ave	SJRLA	x	x	x		x	x	x	
Mud Sl upstream of San Luis Drain	MSUSL	x	x	x		x	x	x	
Salt Sl at Lander Ave	SSALA	x	x	x		x	x	x	
Salt Sl at Sand Dam	SSASD	x	x	x		x	x	x	
Los Banos Cr at Hwy 140	LBCHW	x	x	x		x	x	x	
Los Banos Cr at China Camp Road	LBCCC	No Flow							
Turner Slough nr Edminster Road	TSAER	x	x	x		x	x	x	

Event 24 July 06 (Begin Phase II)		CalTest		APPL	PER				Dup?
		Gen Phy	Dmk Wtr	Pest	Sed Tox	CD Tox	PP Tox	SC Tox	
Hospital Creek at River Road	HCARR	x	x	x		x	x	x	
Ingram Creek at River Road	ICARR	x	x	x		x	x	x	
Westley Wasteway nr Cox Road	WWNCR	No Flow							
Del Puerto Creek nr Cox Road	DPCCR	x	x	x		x	x	x	
Del Puerto Creek at Hwy 33	DPCHW	x	x	x		x	x	x	x
Salado Creek nr Olive Ave	SCOAV	SJR Backwater							
Ramona Lake nr Fig Avenue	ROLFA	x	x	x		x	x	x	
Marshall Road Drain nr River Road	MRDRR	x	x	x		x	x	x	
Orestimba Creek at River Road	OCARR	x	x	x		x	x	x	
Orestimba Creek at Highway 33	OCAHW	x	x	x		x	x	x	
Newman Wasteway nr Hills Ferry Rd	NWHFR	x	x	x		x	x	x	
SJR at Sack Dam	SJRSD	x	x						
SJR at Lander Ave	SJRLA	x	x	x		x	x	x	
Mud Sl upstream of San Luis Drain	MSUSL	x	x	x		x	x	x	
Salt Sl at Lander Ave	SSALA	x	x	x		x	x	x	
Salt Sl at Sand Dam	SSASD	x	x	x		x	x	x	
Los Banos Cr at Hwy 140	LBCHW	x	x	x		x	x	x	
Los Banos Cr at China Camp Road	LBCCC	No Flow							
Turner Slough nr Edminster Road	TSAER	x	x	x		x	x	x	

Event 25 August 06		CalTest		APPL	PER				Dup?
		Gen Phy	Dmk Wtr	Pest	Sed Tox	CD Tox	PP Tox	SC Tox	
Hospital Creek at River Road	HCARR	x	x	x		x	x	x	
Ingram Creek at River Road	ICARR	x	x	x		x	x	x	
Westley Wasteway nr Cox Road	WWNCR	x	x	x		x	x	x	
Del Puerto Creek nr Cox Road	DPCCR	x	x	x		x	x	x	
Del Puerto Creek at Hwy 33	DPCHW	x	x	x		x	x	x	
Salado Creek nr Olive Ave	SCOAV	SJR Backwater							
Ramona Lake nr Fig Avenue	ROLFA	x	x	x		x	x	x	
Marshall Road Drain nr River Road	MRDRR	x	x	x		x	x	x	x
Orestimba Creek at River Road	OCARR	x	x	x		x	x	x	
Orestimba Creek at Highway 33	OCAHW	x	x	x		x	x	x	
Newman Wasteway nr Hills Ferry Rd	NWHFR	x	x	x		x	x	x	
SJR at Sack Dam	SJRSD	x	x						
SJR at Lander Ave	SJRLA	x	x	x		x	x	x	
Mud Sl upstream of San Luis Drain	MSUSL	x	x	x		x	x	x	
Salt Sl at Lander Ave	SSALA	x	x	x		x	x	x	
Salt Sl at Sand Dam	SSASD	x	x	x		x	x	x	
Los Banos Cr at Hwy 140	LBCHW	x	x	x		x	x	x	
Los Banos Cr at China Camp Road	LBCCC	No Flow							
Turner Slough nr Edminster Road	TSAER	x	x	x		x	x	x	

Event 26 September 06		CalTest		APPL	PER				Dup?
		Gen Phy	Drnk Wtr	Pest	Sed Tox	CD Tox	PP Tox	SC Tox	
Hospital Creek at River Road	HCARR	x	x		x				
Ingram Creek at River Road	ICARR	x	x		x				
Westley Wasteway nr Cox Road	WWNCR	x	x		x				
Del Puerto Creek nr Cox Road	DPCCR	x	x		x				
Del Puerto Creek at Hwy 33	DPCHW	No Flow			x				
Salado Creek nr Olive Ave	SCOAV	SJR Backwater							
Ramona Lake nr Fig Avenue	ROLFA	x	x						
Marshall Road Drain nr River Road	MRDRR	x	x						
Orestimba Creek at River Road	OCARR	x	x		x				
Orestimba Creek at Highway 33	OCAHW	x	x		x				
Newman Wasteway nr Hills Ferry Rd	NWHFR	x	x		x				
SJR at Sack Dam	SJRSD	x	x						
SJR at Lander Ave	SJRLA	x	x	x	x	x	x	x	
Mud Sl upstream of San Luis Drain	MSUSL	x	x	x	x	x	x	x	
Salt Sl at Lander Ave	SSALA	x	x	x	x	x	x	x	x
Salt Sl at Sand Dam	SSASD	x	x		x				
Los Banos Cr at Hwy 140	LBCHW	x	x	x	x	x	x	x	
Los Banos Cr at China Camp Road	LBCCC	No Flow			x				
Turner Slough nr Edminster Road	TSAER	x	x		x				

Event 27 October 06		CalTest		APPL	PER				Dup?
		Gen Phy	Drnk Wtr	Pest	Sed Tox	CD Tox	PP Tox	SC Tox	
Hospital Creek at River Road	HCARR	x	x						
Ingram Creek at River Road	ICARR	x	x						
Westley Wasteway nr Cox Road	WWNCR	x	x						
Del Puerto Creek nr Cox Road	DPCCR	x	x						
Del Puerto Creek at Hwy 33	DPCHW	x	x						
Salado Creek nr Olive Ave	SCOAV	SJR Backwater							
Ramona Lake nr Fig Avenue	ROLFA	x	x						
Marshall Road Drain nr River Road	MRDRR	x	x						
Orestimba Creek at River Road	OCARR	x	x						
Orestimba Creek at Highway 33	OCAHW	x	x						
Newman Wasteway nr Hills Ferry Rd	NWHFR	x	x						
SJR at Sack Dam	SJRSD	x	x						
SJR at Lander Ave	SJRLA	x	x	x		x	x	x	
Mud Sl upstream of San Luis Drain	MSUSL	x	x	x		x	x	x	x
Salt Sl at Lander Ave	SSALA	x	x	x		x	x	x	
Salt Sl at Sand Dam	SSASD	x	x						
Los Banos Cr at Hwy 140	LBCHW	x	x	x		x	x	x	
Los Banos Cr at China Camp Road	LBCCC	No Flow							
Turner Slough nr Edminster Road	TSAER	x	x						

Attachment 2
Significant Aquatic Toxicity Results

Westside San Joaquin River Watershed Coalition
Significant Aquatic Toxicity Results

Monitoring Site	Sample Date	Event	Reactive Species	Results	Control Results	Units	Flow (cfs)	Temp (c)	EC (umho/cm)	pH	DO (mg/L)
Newman Wasteway near Hills Ferry Road	5/9/2006	22	Pimephales promelas	70	100	% survival		21.94	283	7.73	8.37

Followup:
Follow-up sample was collected on 5/17/06 and tested for Fathead toxicity. No toxicity was measured. Toxicity measured in the initial test was indicative of pathogen interference.

Water Chemistry

Bromide (Br)	0.065	mg/L
Dissolved Organic Carbon (DOC)	4.2	mg/L
E. coli (3x5 MTF)	170	MPN/100mLs
Total Organic Carbon (TOC)	4.9	mg/L
Total Dissolved Solids (TDS)	190	mg/L
Total Suspended (TSS)	32	mg/L
Turbidity	31	NTU

Detected Pesticides

Monitoring Site	Sample Date	Event	Reactive Species	Results	Control Results	Units	Flow (cfs)	Temp (c)	EC (umho/cm)	pH	DO (mg/L)
Turner Slough at Edminster Road	5/9/2006	22	Pimephales promelas	77	100	% survival	0	20.68	145	8.34	5.15

Followup:
Follow-up sample was collected on 5/17/06 and tested for Fathead toxicity. No toxicity was measured. Toxicity measured in the initial test was indicative of pathogen interference.

Water Chemistry

Bromide (Br)	0.024	mg/L
Dissolved Organic Carbon (DOC)	5.3	mg/L
E. coli (3x5 MTF)	11	MPN/100mLs
Total Organic Carbon (TOC)	7.4	mg/L
Total Dissolved Solids (TDS)	100	mg/L
Total Suspended (TSS)	7.0	mg/L
Turbidity	4.0	NTU

Detected Pesticides

Trifluralin	0.10B	ug/L

J = Estimated value, below PQL.
Y = % Difference primary and confirmation column is >40%.
B = Constituent also detected in blank sample.

Monitoring Site	Sample Date	Event	Reactive Species	Results	Control Results	Units	Flow (cfs)	Temp (c)	EC (µmho/cm)	pH	DO (mg/L)
Hospital Creek at River Road	6/13/2006	23	Pimephales promelas	55	100	% survival	3	17.54	103	7.89	9.53

Followup:

Follow-up sample was collected on 6/19/06 and tested for Fathead toxicity. No toxicity was measured. Toxicity measured in the initial test was indicative of pathogen interference.

Water Chemistry

Bromide (Br)	0.030	mg/L
Dissolved Organic Carbon (DOC)	2.9	mg/L
E. coli (3x5 MTF)	500	MPN/100mLs
Total Organic Carbon (TOC)	3.5	mg/L
Total Dissolved Solids (TDS)	87	mg/L
Total Suspended (TSS)	440	mg/L
Turbidity	120	NTU

Detected Pesticides

Trifluralin	0.15	ug/L

J = Estimated value, below PQL.
Y = % Difference primary and confirmation column is >40%.
B = Constituent also detected in blank sample.

Monitoring Site	Sample Date	Event	Reactive Species	Results	Control Results	Units	Flow (cfs)	Temp (c)	EC (µmho/cm)	pH	DO (mg/L)
Orestimba Creek at Hwy 33	7/11/2006	24	Ceriodaphnia dubia	0	100	% survival	11	30.6	510	8.4	5.58

Followup:

Dilution series indicated >16 TU. TIE indicated non-polar organic materials were the main cause of toxicity. Follow-up sample collected on 7/17 and measured 0% survival.

Water Chemistry

Bromide	ND	mg/L
Dissolved Organic Carbon	9.6	mg/L
E. Coli	690	MPN/100mL
Total Organic Carbon	10	mg/L
Color	140	CU
Hardness (as CACO3)	170	mg/L
Total Dissolved Solids	360	mg/L
Total Suspended Solids	190	mg/L
Turbidity	100	NTU
Arsenic	3.9	ug/L
Boron	0.21	mg/L
Cadmium	0.1J	ug/L
Copper	12	ug/L
Lead	8.6	ug/L
Nickel	15	ug/L
Selenium	ND	ug/L
Zinc	34	ug/L
Ammonia (as N)	ND	mg/L
Nitrogen, Nitrate (as N)	5.7	mg/L
Nitrogen, Nitrite	0.024J	mg/L
Phosphate as P,Ortho dissolved	0.12	mg/L
Total Kjeldahl Nitrogen	1.1	mg/L
Total Phosphate as P	0.25	mg/L

Detected Pesticides

4,4'-DDE	0.087	ug/L
4,4'-DDT	0.055	ug/L
Chlorpyrifos	0.72	ug/L
Diazinon	1.2	ug/L
Dieldrin	0.0096J	ug/L
Dimethoate	0.17	ug/L

J = Estimated value, below PQL.
Y = % Difference primary and confirmation column is >40%.
B = Constituent also detected in blank sample.

Monitoring Site	Sample Date	Event	Reactive Species	Results	Control Results	Units	Flow (cfs)	Temp (c)	EC (umho/cm)	pH	DO (mg/L)
Orestimba Creek at River Road	7/11/2006	24	Ceriodaphnia dubia	0	100	% survival	70	25.48	439	8	5.32

Followup:

Dilution series indicated 5.5 TU. TIE indicated non-polar organic materials were the main cause of toxicity and metabolically-activiated substances contributed. Follow-up sample collected on 7/17 and measured 0% survival.

Water Chemistry

Bromide	ND	mg/L
Dissolved Organic Carbon	12	mg/L
E. Coli	650	MPN/100mL
Total Organic Carbon	11	mg/L
Color	320	CU
Hardness (as CACO3)	160	mg/L
Total Dissolved Solids	360	mg/L
Total Suspended Solids	240	mg/L
Turbidity	150	NTU
Arsenic	4.5	ug/L
Boron	0.21	mg/L
Cadmium	0.1	ug/L
Copper	17	ug/L
Lead	8.8	ug/L
Nickel	42	ug/L
Selenium	ND	ug/L
Zinc	45	ug/L
Ammonia (as N)	ND	mg/L
Nitrogen, Nitrate (as N)	2.4	mg/L
Nitrogen, Nitrite	0.041	mg/L
Phosphate as P,Ortho dissolved	0.13	mg/L
Total Kjeldahl Nitrogen	1.4	mg/L
Total Phosphate as P	0.52	mg/L

Detected Pesticides

4,4'-DDE	0.078	ug/L
4,4'-DDT	0.029	ug/L
Chlorpyrifos	0.51	ug/L
Diazinon	0.017J	ug/L
Dicofol	0.27	ug/L
Dimethoate	0.19	ug/L

J = Estimated value, below PQL.
Y = % Difference primary and confirmation column is >40%.
B = Constituent also detected in blank sample.

Monitoring Site	Sample Date	Event	Reactive Species	Results	Control Results	Units	Flow (cfs)	Temp (c)	EC (µmho/cm)	pH	DO (mg/L)
Ramona Lake near Fig Avenue	7/17/2006	24-RS	Ceriodaphnia dubia	5	95	% survival	0	26.58	1182	8.01	5.68

Followup:

Dilution series indicated 3.6 TU. TIE indicated non-polar organic materials were the main cause of toxicity and metabolically-activiated substances contributed. Follow-up sample collected on 7/25 and measured 0% survival.

Water Chemistry

Bromide	J0.52	mg/L
Dissolved Organic Carbon	5.9	mg/L
E. Coli	210	MPN/100mL
Total Organic Carbon	7.1	mg/L
Color	85	CU
Hardness (as CACO3)	290	mg/L
Total Dissolved Solids	800	mg/L
Total Suspended Solids	110	mg/L
Turbidity	64	NTU
Arsenic	3.9	ug/L
Boron	670	ug/L
Cadmium	0.2	ug/L
Copper	7.9	ug/L
Lead	1.8	ug/L
Nickel	13	ug/L
Selenium	2	ug/L
Zinc	21	ug/L
Ammonia (as N)	0.19	mg/L
Nitrogen, Nitrate (as N)	2.9	mg/L
Nitrogen, Nitrite	0.11	mg/L
Phosphate as P,Ortho dissolved	0.031	mg/L
Total Kjeldahl Nitrogen	1.9	mg/L
Total Phosphate as P	0.2	mg/L

Detected Pesticides

Chlorpyrifos	0.29	ug/L
Dimethoate	0.11	ug/L

J = Estimated value, below PQL.
Y = % Difference primary and confirmation column is >40%.
B = Constituent also detected in blank sample.

Monitoring Site	Sample Date	Event	Reactive Species	Results	Control Results	Units	Flow (cfs)	Temp (c)	EC (µmho/cm)	pH	DO (mg/L)
Salt Slough at Sand Dam	8/8/2006	25	Ceriodaphnia dubia	0	95	% survival	92.31	21.49	744	6.98	7.28

Followup:

Dilution series indicated 2.8 TU. TIE indicated non-polar organic materials were the main cause of toxicity and metabolically-activiated substances contributed. Follow-up sample collected on 8/15 and measured 10% survival.

Water Chemistry

Bromide	ND	mg/L
Dissolved Organic Carbon	4.8	mg/L
E. Coli	110	MPN/100mL
Total Organic Carbon	4.7	mg/L
Color	75	CU
Hardness (as CACO3)	160	mg/L
Total Dissolved Solids	380	mg/L
Total Suspended Solids	110	mg/L
Turbidity	63	NTU
Arsenic	6.7	ug/L
Boron	170	ug/L
Cadmium	0.03J	ug/L
Copper	5.9	ug/L
Lead	1.7	ug/L
Nickel	8.1	ug/L
Selenium	1	ug/L
Zinc	15	ug/L
Ammonia (as N)	ND	mg/L
Nitrogen, Nitrate (as N)	1.4	mg/L
Nitrogen, Nitrite	0.075	mg/L
Ortho Phosphate as P	0.29	mg/L
Total Kjeldahl Nitrogen	1.3	mg/L
Total Phosphate as P	0.46	mg/L

Detected Pesticides

Chlorpyrifos	0.23	ug/L
Dicofol	0.045J	ug/L
Methomyl	0.35	ug/L

J = Estimated value, below PQL.
Y = % Difference primary and confirmation column is >40%.
B = Constituent also detected in blank sample.

Attachment 3
Field Quality Control Sample Results

Field Quality Control Samples

Field Blank

Analyte/Species	Event	FB	Units	Type	% Difference
Sample Date: 5/9/2006 Site: WWNCR					
Bromide (Br)	0.044	ND	mg/L	General Chemistry	0%
Dissolved Organic Carbon (DOC)	6.2	ND	mg/L	General Chemistry	0%
E. coli (3x5 MTF)	170	<2	MPN/100mLs	General Chemistry	0%
Total Dissolved Solids (TDS)	150	10	mg/L	General Chemistry	7%
Total Organic Carbon (TOC)	8.1	ND	mg/L	General Chemistry	0%
Total Suspended (TSS)	75	ND	mg/L	General Chemistry	0%
Turbidity	79	0.17	NTU	General Chemistry	0%
Azinphosmethyl	Not detected	Not detected	ug/L	Pesticide	
Bolstar	Not detected	Not detected	ug/L	Pesticide	
Chlorpyrifos	Not detected	Not detected	ug/L	Pesticide	
Coumaphos	Not detected	Not detected	ug/L	Pesticide	
Def	Not detected	Not detected	ug/L	Pesticide	
Demeton-S	Not detected	Not detected	ug/L	Pesticide	
Diazinon	Not detected	Not detected	ug/L	Pesticide	
Dichlorvos	Not detected	Not detected	ug/L	Pesticide	
Dimethoate	Not detected	Not detected	ug/L	Pesticide	
Disulfoton	Not detected	Not detected	ug/L	Pesticide	
EPN	Not detected	Not detected	ug/L	Pesticide	
EPTC	Not detected	Not detected	ug/L	Pesticide	
Ethion	Not detected	Not detected	ug/L	Pesticide	
Ethoprop	Not detected	Not detected	ug/L	Pesticide	
Fenamiphos	Not detected	Not detected	ug/L	Pesticide	
Fensulfothion	Not detected	Not detected	ug/L	Pesticide	
Fenthion	Not detected	Not detected	ug/L	Pesticide	
Malathion	Not detected	Not detected	ug/L	Pesticide	
Merphos	Not detected	Not detected	ug/L	Pesticide	
Mevinphos	Not detected	Not detected	ug/L	Pesticide	
Naled	Not detected	Not detected	ug/L	Pesticide	
Parathion, ethyl	Not detected	Not detected	ug/L	Pesticide	
Parathion, methyl	Not detected	Not detected	ug/L	Pesticide	
Phorate	Not detected	Not detected	ug/L	Pesticide	
Prowl	0.23	Not detected	ug/L	Pesticide	0%
Trichloronate	Not detected	Not detected	ug/L	Pesticide	
Trifluralin	0.97B	0.21B	ug/L	Pesticide	22%
Sample Date: 6/13/2006 Site: DPCCR					
Bromide (Br)	0.53	ND	mg/L	General Chemistry	0%
Dissolved Organic Carbon (DOC)	2.1	0.57	mg/L	General Chemistry	27%
E. coli (3x5 MTF)	500	<2	MPN/100mLs	General Chemistry	0%
Total Dissolved Solids (TDS)	540	ND	mg/L	General Chemistry	0%
Total Organic Carbon (TOC)	2.2	0.43	mg/L	General Chemistry	20%
Total Suspended (TSS)	59	ND	mg/L	General Chemistry	0%
Turbidity	38	0.050	NTU	General Chemistry	0%
Azinphosmethyl	Not detected	Not detected	ug/L	Pesticide	

Event = Event Sample Result FB = Field Blank Sample Result

Field Quality Control Samples

Field Blank

Analyte/Species	Event	FB	Units	Type	% Difference
Bolstar	Not detected	Not detected	ug/L	Pesticide	
Chlorpyrifos	Not detected	Not detected	ug/L	Pesticide	
Coumaphos	Not detected	Not detected	ug/L	Pesticide	
Def	Not detected	Not detected	ug/L	Pesticide	
Demeton-S	Not detected	Not detected	ug/L	Pesticide	
Diazinon	Not detected	Not detected	ug/L	Pesticide	
Dichlorvos	Not detected	Not detected	ug/L	Pesticide	
Dimethoate	0.16	Not detected	ug/L	Pesticide	0%
Disulfoton	Not detected	Not detected	ug/L	Pesticide	
EPN	Not detected	Not detected	ug/L	Pesticide	
EPTC	Not detected	Not detected	ug/L	Pesticide	
Ethion	Not detected	Not detected	ug/L	Pesticide	
Ethoprop	Not detected	Not detected	ug/L	Pesticide	
Fenamiphos	Not detected	Not detected	ug/L	Pesticide	
Fensulfothion	Not detected	Not detected	ug/L	Pesticide	
Fenthion	Not detected	Not detected	ug/L	Pesticide	
Malathion	Not detected	Not detected	ug/L	Pesticide	
Merphos	Not detected	Not detected	ug/L	Pesticide	
Mevinphos	Not detected	Not detected	ug/L	Pesticide	
Naled	Not detected	Not detected	ug/L	Pesticide	
Parathion, ethyl	Not detected	Not detected	ug/L	Pesticide	
Parathion, methyl	Not detected	Not detected	ug/L	Pesticide	
Phorate	Not detected	Not detected	ug/L	Pesticide	
Prowl	Not detected	Not detected	ug/L	Pesticide	
Trichloronate	Not detected	Not detected	ug/L	Pesticide	
Trifluralin	0.15	0.051J	ug/L	Pesticide	34%
Sample Date: 7/11/2006 Site: DPCHW					
Ammonia (as N)	ND	ND	mg/L	General Chemistry	
Arsenic	2.2	ND	ug/L	General Chemistry	0%
Boron	0.092J	ND	mg/L	General Chemistry	0%
Bromide	0.049J	ND	mg/L	General Chemistry	0%
Cadmium	ND	ND	ug/L	General Chemistry	
Color	70	ND	CU	General Chemistry	0%
Copper	7.7	ND	ug/L	General Chemistry	0%
Dissolved Organic Carbon	5.7	ND	mg/L	General Chemistry	0%
E. Coli	280	ND	MPN/100mL	General Chemistry	0%
Hardness (as CACO3)	64	ND	mg/L	General Chemistry	0%
Lead	1.3	ND	ug/L	General Chemistry	0%
Nickel	12	ND	ug/L	General Chemistry	0%
Nitrogen, Nitrate (as N)	0.5	ND	mg/L	General Chemistry	0%
Nitrogen, Nitrite	0.011J	ND	mg/L	General Chemistry	0%
Phosphate as P,Ortho dissolved	0.17	ND	mg/L	General Chemistry	0%
Selenium	3	ND	ug/L	General Chemistry	0%
Total Dissolved Solids	140	7700	mg/L	General Chemistry	5500%
Total Kjeldahl Nitrogen	0.49	ND	mg/L	General Chemistry	0%

Event = Event Sample Result FB = Field Blank Sample Result

Field Quality Control Samples

Field Blank

Analyte/Species	Event	FB	Units	Type	% Difference
Total Organic Carbon	6.1	ND	mg/L	General Chemistry	0%
Total Phosphate as P	0.19	0.020J	mg/L	General Chemistry	11%
Total Suspended Solids	47	ND	mg/L	General Chemistry	0%
Turbidity	38	ND	NTU	General Chemistry	0%
Zinc	12	0.58J	ug/L	General Chemistry	5%
4,4'-DDE	0.011	Not detected	ug/L	Pesticide	0%
4,4'-DDT	Not detected	Not detected	ug/L	Pesticide	
4,4'-TDE/DDD	Not detected	Not detected	ug/L	Pesticide	
Aldicarb	Not detected	Not detected	ug/L	Pesticide	
Atrazine	Not detected	Not detected	ug/L	Pesticide	
Azinphosmethyl	Not detected	Not detected	ug/L	Pesticide	
Bifenthrin	Not detected	Not detected	ug/L	Pesticide	
Carbaryl	Not detected	Not detected	ug/L	Pesticide	
Carbofuran	Not detected	Not detected	ug/L	Pesticide	
Chlorpyrifos	0.014J	Not detected	ug/L	Pesticide	0%
Cyanazine	Not detected	Not detected	ug/L	Pesticide	
Cyfluthrin	Not detected	Not detected	ug/L	Pesticide	
Cypermethrin	Not detected	Not detected	ug/L	Pesticide	
Diazinon	Not detected	Not detected	ug/L	Pesticide	
Dicofol	Not detected	Not detected	ug/L	Pesticide	
Dieldrin	Not detected	Not detected	ug/L	Pesticide	
Dimethoate	0.43	Not detected	ug/L	Pesticide	0%
Disulfoton	Not detected	Not detected	ug/L	Pesticide	
Diuron	Not detected	Not detected	ug/L	Pesticide	
Endrin	Not detected	Not detected	ug/L	Pesticide	
Esfenvalerate/Fenvalerate	Not detected	Not detected	ug/L	Pesticide	
Lambda cyhalothrin	Not detected	Not detected	ug/L	Pesticide	
Linuron	Not detected	Not detected	ug/L	Pesticide	
Malathion	Not detected	Not detected	ug/L	Pesticide	
Methamidophos	Not detected	Not detected	ug/L	Pesticide	
Methidathion	Not detected	Not detected	ug/L	Pesticide	
Methiocarb	Not detected	Not detected	ug/L	Pesticide	
Methomyl	Not detected	Not detected	ug/L	Pesticide	
Methoxychlor	Not detected	Not detected	ug/L	Pesticide	
Molinate	Not detected	Not detected	ug/L	Pesticide	
Oxamyl	Not detected	Not detected	ug/L	Pesticide	
Parathion, methyl	0.098J	0.11	ug/L	Pesticide	112%
Permethrin	Not detected	Not detected	ug/L	Pesticide	
Phorate	Not detected	Not detected	ug/L	Pesticide	
Phosmet	Not detected	Not detected	ug/L	Pesticide	
Simazine	Not detected	Not detected	ug/L	Pesticide	
Thiobencarb	Not detected	Not detected	ug/L	Pesticide	
Sample Date:	**8/8/2006**	**Site: MRDRR**			
Ammonia (as N)	0.11	ND	mg/L	General Chemistry	0%
Arsenic	4.8	ND	ug/L	General Chemistry	0%

Event = Event Sample Result FB = Field Blank Sample Result

Field Quality Control Samples

Field Blank

Analyte/Species	Event	FB	Units	Type	% Difference
Boron	350	1	ug/L	General Chemistry	0%
Bromide	ND	ND	mg/L	General Chemistry	
Cadmium	0.1	ND	ug/L	General Chemistry	0%
Color	200	ND	CU	General Chemistry	0%
Copper	12	1.1	ug/L	General Chemistry	9%
Dissolved Organic Carbon	5.6	ND	mg/L	General Chemistry	0%
E. Coli	74	ND	MPN/100mL	General Chemistry	0%
Hardness (as CACO3)	270	ND	mg/L	General Chemistry	0%
Lead	4.5	ND	ug/L	General Chemistry	0%
Nickel	13	ND	ug/L	General Chemistry	0%
Nitrogen, Nitrate (as N)	2.9	0.021J	mg/L	General Chemistry	1%
Nitrogen, Nitrite	0.099	ND	mg/L	General Chemistry	0%
Ortho Phosphate as P	0.15	ND	mg/L	General Chemistry	0%
Selenium	ND	ND	ug/L	General Chemistry	
Total Dissolved Solids	440	ND	mg/L	General Chemistry	0%
Total Kjeldahl Nitrogen	1.4	ND	mg/L	General Chemistry	0%
Total Organic Carbon	5.2	ND	mg/L	General Chemistry	0%
Total Phosphate as P	0.41	0.02	mg/L	General Chemistry	5%
Total Suspended Solids	180	ND	mg/L	General Chemistry	0%
Turbidity	120	0.12	NTU	General Chemistry	0%
Zinc	36	2	ug/L	General Chemistry	6%
4,4'-DDE	Not detected	Not detected	ug/L	Pesticide	
4,4'-DDT	Not detected	Not detected	ug/L	Pesticide	
4,4'-TDE/DDD	Not detected	Not detected	ug/L	Pesticide	
Aldicarb	Not detected	Not detected	ug/L	Pesticide	
Atrazine	Not detected	Not detected	ug/L	Pesticide	
Azinphosmethyl	Not detected	Not detected	ug/L	Pesticide	
Bifenthrin	Not detected	Not detected	ug/L	Pesticide	
Carbaryl	Not detected	Not detected	ug/L	Pesticide	
Carbofuran	Not detected	Not detected	ug/L	Pesticide	
Chlorpyrifos	Not detected	Not detected	ug/L	Pesticide	
Cyanazine	Not detected	Not detected	ug/L	Pesticide	
Cyfluthrin	Not detected	Not detected	ug/L	Pesticide	
Cypermethrin	Not detected	Not detected	ug/L	Pesticide	
Diazinon	Not detected	Not detected	ug/L	Pesticide	
Dicofol	Not detected	Not detected	ug/L	Pesticide	
Dieldrin	Not detected	Not detected	ug/L	Pesticide	
Dimethoate	0.74E	Not detected	ug/L	Pesticide	0%
Dimethoate	0.67	Not detected	ug/L	Pesticide	0%
Disulfoton	Not detected	Not detected	ug/L	Pesticide	
Diuron	Not detected	Not detected	ug/L	Pesticide	
Endrin	Not detected	Not detected	ug/L	Pesticide	
Esfenvalerate/Fenvalerate	Not detected	Not detected	ug/L	Pesticide	
Lambda cyhalothrin	0.0085J	Not detected	ug/L	Pesticide	0%
Linuron	Not detected	Not detected	ug/L	Pesticide	

Event = Event Sample Result FB = Field Blank Sample Result

Field Quality Control Samples

Field Blank

Analyte/Species	Event	FB	Units	Type	% Difference
Malathion	Not detected	Not detected	ug/L	Pesticide	
Methamidophos	Not detected	Not detected	ug/L	Pesticide	
Methidathion	Not detected	Not detected	ug/L	Pesticide	
Methiocarb	Not detected	Not detected	ug/L	Pesticide	
Methomyl	Not detected	Not detected	ug/L	Pesticide	
Methoxychlor	Not detected	Not detected	ug/L	Pesticide	
Molinate	Not detected	Not detected	ug/L	Pesticide	
Oxamyl	Not detected	Not detected	ug/L	Pesticide	
Parathion, methyl	Not detected	Not detected	ug/L	Pesticide	
Permethrin	Not detected	Not detected	ug/L	Pesticide	
Phorate	Not detected	Not detected	ug/L	Pesticide	
Phosmet	Not detected	Not detected	ug/L	Pesticide	
Simazine	Not detected	Not detected	ug/L	Pesticide	
Thiobencarb	Not detected	Not detected	ug/L	Pesticide	
Sample Date: 9/12/2006 Site: SSALA					
Ammonia (as N)	ND	ND	mg/L	General Chemistry	
Arsenic	6	ND	ug/L	General Chemistry	0%
Boron	460	4	ug/L	General Chemistry	1%
Bromide	0.57J	ND	mg/L	General Chemistry	0%
Cadmium	0.04J	ND	ug/L	General Chemistry	0%
Color	26	ND	CU	General Chemistry	0%
Copper	5.9	ND	ug/L	General Chemistry	0%
Dissolved Organic Carbon	5.9	0.31J	mg/L	General Chemistry	5%
Dissolved Organic Carbon	6.3	0.31J	mg/L	General Chemistry	5%
E. Coli	110	ND	MPN/100mL	General Chemistry	0%
Hardness (as CACO3)	200	ND	mg/L	General Chemistry	0%
Lead	1.4	ND	ug/L	General Chemistry	0%
Nickel	9.3	ND	ug/L	General Chemistry	0%
Nitrogen, Nitrate-Nitrite	0.41	ND	mg/L	General Chemistry	0%
Nitrogen, Nitrite	0.0063J	ND	mg/L	General Chemistry	0%
Ortho Phosphate as P	0.14	ND	mg/L	General Chemistry	0%
Selenium	1	ND	ug/L	General Chemistry	0%
Total Dissolved Solids	640	ND	mg/L	General Chemistry	0%
Total Kjeldahl Nitrogen	0.8	ND	mg/L	General Chemistry	0%
Total Organic Carbon	5.7	0.35J	mg/L	General Chemistry	6%
Total Phosphate as P	0.37	0.013	mg/L	General Chemistry	4%
Total Suspended Solids	95	ND	mg/L	General Chemistry	0%
Turbidity	42	0.14	NTU	General Chemistry	0%
Zinc	13	1	ug/L	General Chemistry	8%
4,4'-DDE	Not detected	Not detected	ug/L	Pesticide	
4,4'-DDT	Not detected	Not detected	ug/L	Pesticide	
4,4'-TDE/DDD	Not detected	Not detected	ug/L	Pesticide	
Aldicarb	Not detected	Not detected	ug/L	Pesticide	
Atrazine	Not detected	Not detected	ug/L	Pesticide	
Azinphosmethyl	Not detected	Not detected	ug/L	Pesticide	

Event = Event Sample Result FB = Field Blank Sample Result

Field Quality Control Samples

Field Blank

Analyte/Species	Event	FB	Units	Type	% Difference
Bifenthrin	Not detected	Not detected	ug/L	Pesticide	
Carbaryl	Not detected	Not detected	ug/L	Pesticide	
Carbofuran	Not detected	Not detected	ug/L	Pesticide	
Chlorpyrifos	0.047	Not detected	ug/L	Pesticide	0%
Cyanazine	Not detected	Not detected	ug/L	Pesticide	
Cyfluthrin	Not detected	Not detected	ug/L	Pesticide	
Cypermethrin	Not detected	Not detected	ug/L	Pesticide	
Diazinon	Not detected	Not detected	ug/L	Pesticide	
Dicofol	Not detected	Not detected	ug/L	Pesticide	
Dieldrin	Not detected	Not detected	ug/L	Pesticide	
Dimethoate	Not detected	Not detected	ug/L	Pesticide	
Disulfoton	Not detected	Not detected	ug/L	Pesticide	
Diuron	Not detected	Not detected	ug/L	Pesticide	
Endrin	Not detected	Not detected	ug/L	Pesticide	
Esfenvalerate/Fenvalerate	Not detected	Not detected	ug/L	Pesticide	
Lambda cyhalothrin	Not detected	Not detected	ug/L	Pesticide	
Linuron	Not detected	Not detected	ug/L	Pesticide	
Malathion	Not detected	Not detected	ug/L	Pesticide	
Methamidophos	Not detected	Not detected	ug/L	Pesticide	
Methidathion	Not detected	Not detected	ug/L	Pesticide	
Methiocarb	Not detected	Not detected	ug/L	Pesticide	
Methomyl	0.17	Not detected	ug/L	Pesticide	0%
Methoxychlor	Not detected	Not detected	ug/L	Pesticide	
Molinate	Not detected	Not detected	ug/L	Pesticide	
Oxamyl	Not detected	Not detected	ug/L	Pesticide	
Parathion, methyl	Not detected	Not detected	ug/L	Pesticide	
Permethrin	Not detected	Not detected	ug/L	Pesticide	
Phorate	Not detected	Not detected	ug/L	Pesticide	
Phosmet	Not detected	Not detected	ug/L	Pesticide	
Simazine	Not detected	Not detected	ug/L	Pesticide	
Thiobencarb	Not detected	Not detected	ug/L	Pesticide	
Sample Date: 10/10/2006 Site: MSUSL					
Ammonia (as N)	ND	ND	mg/L	General Chemistry	
Arsenic	4.8	0.3J	ug/L	General Chemistry	6%
Boron	660	2	ug/L	General Chemistry	0%
Bromide	0.41J	ND	mg/L	General Chemistry	0%
Cadmium	0.03J	ND	ug/L	General Chemistry	0%
Color	90	ND	CU	General Chemistry	0%
Copper	3.2	ND	ug/L	General Chemistry	0%
Dissolved Organic Carbon	5.7	0.40J	mg/L	General Chemistry	7%
Dissolved Organic Carbon	12	0.40J	mg/L	General Chemistry	3%
E. Coli	170	ND	MPN/100mL	General Chemistry	0%
Hardness (as CACO3)	200	ND	mg/L	General Chemistry	0%
Lead	0.8	ND	ug/L	General Chemistry	0%
Nickel	7.6	ND	ug/L	General Chemistry	0%

Event = Event Sample Result FB = Field Blank Sample Result

Field Quality Control Samples

Field Blank

Analyte/Species	Event	FB	Units	Type	% Difference
Nitrogen, Nitrate (as N)	0.1	ND	mg/L	General Chemistry	0%
Nitrogen, Nitrite	0.0055J	ND	mg/L	General Chemistry	0%
Ortho Phosphate as P	0.36	ND	mg/L	General Chemistry	0%
Selenium	2	ND	ug/L	General Chemistry	0%
Total Dissolved Solids	490	ND	mg/L	General Chemistry	0%
Total Kjeldahl Nitrogen	1.5	ND	mg/L	General Chemistry	0%
Total Organic Carbon	12	0.38J	mg/L	General Chemistry	3%
Total Phosphate as P	0.58	0.011	mg/L	General Chemistry	2%
Total Suspended Solids	50	ND	mg/L	General Chemistry	0%
Turbidity	21	0.06	NTU	General Chemistry	0%
Zinc	6	0.8J	ug/L	General Chemistry	13%
4,4'-DDE	Not detected	Not detected	ug/L	Pesticide	
4,4'-DDT	Not detected	Not detected	ug/L	Pesticide	
4,4'-TDE/DDD	Not detected	Not detected	ug/L	Pesticide	
a-BHC	Not detected	Not detected	ug/L	Pesticide	
Aldicarb	Not detected	Not detected	ug/L	Pesticide	
Aldrin	Not detected	Not detected	ug/L	Pesticide	
Atrazine	Not detected	Not detected	ug/L	Pesticide	
Azinphosmethyl	Not detected	Not detected	ug/L	Pesticide	
b-BHC	Not detected	Not detected	ug/L	Pesticide	
Bifenthrin	Not detected	Not detected	ug/L	Pesticide	
Carbaryl	Not detected	Not detected	ug/L	Pesticide	
Carbofuran	Not detected	Not detected	ug/L	Pesticide	
Chlorpyrifos	Not detected	Not detected	ug/L	Pesticide	
Cyanazine	Not detected	Not detected	ug/L	Pesticide	
Cyfluthrin	Not detected	Not detected	ug/L	Pesticide	
Cypermethrin	Not detected	Not detected	ug/L	Pesticide	
d-BHC	Not detected	Not detected	ug/L	Pesticide	
Diazinon	Not detected	Not detected	ug/L	Pesticide	
Dicofol	Not detected	Not detected	ug/L	Pesticide	
Dieldrin	Not detected	Not detected	ug/L	Pesticide	
Dimethoate	Not detected	Not detected	ug/L	Pesticide	
Disulfoton	Not detected	Not detected	ug/L	Pesticide	
Diuron	Not detected	Not detected	ug/L	Pesticide	
Endrin	Not detected	Not detected	ug/L	Pesticide	
Esfenvalerate/Fenvalerate	Not detected	Not detected	ug/L	Pesticide	
g-BHC (Lindane)	Not detected	Not detected	ug/L	Pesticide	
Heptachlor	Not detected	Not detected	ug/L	Pesticide	
Heptachlor epoxide	Not detected	Not detected	ug/L	Pesticide	
Lambda cyhalothrin	Not detected	Not detected	ug/L	Pesticide	
Linuron	Not detected	Not detected	ug/L	Pesticide	
Malathion	Not detected	Not detected	ug/L	Pesticide	
Methamidophos	Not detected	Not detected	ug/L	Pesticide	
Methidathion	Not detected	Not detected	ug/L	Pesticide	
Methiocarb	Not detected	Not detected	ug/L	Pesticide	

Event = Event Sample Result FB = Field Blank Sample Result

Field Quality Control Samples
Field Blank

Analyte/Species	Event	FB	Units	Type	% Difference
Methomyl	Not detected	Not detected	ug/L	Pesticide	
Methoxychlor	Not detected	Not detected	ug/L	Pesticide	
Molinate	Not detected	Not detected	ug/L	Pesticide	
Oxamyl	Not detected	Not detected	ug/L	Pesticide	
Parathion, methyl	Not detected	Not detected	ug/L	Pesticide	
Permethrin	Not detected	Not detected	ug/L	Pesticide	
Phorate	Not detected	Not detected	ug/L	Pesticide	
Phosmet	Not detected	Not detected	ug/L	Pesticide	
Simazine	Not detected	Not detected	ug/L	Pesticide	
Thiobencarb	Not detected	Not detected	ug/L	Pesticide	
Toxaphene	Not detected	Not detected	ug/L	Pesticide	

Event = Event Sample Result FB = Field Blank Sample Result

Field Quality Control Samples

Field Duplicate and RPD Calculation

Analyte/Species	Type	Event	FD	Units	RPD
Sample Date: 5/9/2006	**Site: Westley Wasteway near Cox Road**				
Ceriodaphnia dubia	Aquatic Toxicity	100	95	% survival	5%
Pimephales promelas	Aquatic Toxicity	95	100	% survival	5%
Selenastrum capricornutum	Aquatic Toxicity	2704000	2165000	cells/mL	20%
pH	Field Data	7.9	7.9	Std.Unit	0%
Dissolved Organic Carbon (DOC)	General Chemistry	6.2	5.8	mg/L	6%
Total Organic Carbon (TOC)	General Chemistry	8.1	7.8	mg/L	4%
Turbidity	General Chemistry	79	96	NTU	22%
Azinphosmethyl	Pesticide	Not detected	Not detected	ug/L	NA
Bolstar	Pesticide	Not detected	Not detected	ug/L	NA
Chlorpyrifos	Pesticide	Not detected	Not detected	ug/L	NA
Coumaphos	Pesticide	Not detected	Not detected	ug/L	NA
Def	Pesticide	Not detected	Not detected	ug/L	NA
Demeton-S	Pesticide	Not detected	Not detected	ug/L	NA
Diazinon	Pesticide	Not detected	Not detected	ug/L	NA
Dichlorvos	Pesticide	Not detected	Not detected	ug/L	NA
Dimethoate	Pesticide	Not detected	Not detected	ug/L	NA
Disulfoton	Pesticide	Not detected	Not detected	ug/L	NA
EPN	Pesticide	Not detected	Not detected	ug/L	NA
EPTC	Pesticide	Not detected	Not detected	ug/L	NA
Ethion	Pesticide	Not detected	Not detected	ug/L	NA
Ethoprop	Pesticide	Not detected	Not detected	ug/L	NA
Fenamiphos	Pesticide	Not detected	Not detected	ug/L	NA
Fensulfothion	Pesticide	Not detected	Not detected	ug/L	NA
Fenthion	Pesticide	Not detected	Not detected	ug/L	NA
Malathion	Pesticide	Not detected	Not detected	ug/L	NA
Merphos	Pesticide	Not detected	Not detected	ug/L	NA
Mevinphos	Pesticide	Not detected	Not detected	ug/L	NA
Naled	Pesticide	Not detected	Not detected	ug/L	NA
Parathion, ethyl	Pesticide	Not detected	Not detected	ug/L	NA
Parathion, methyl	Pesticide	Not detected	Not detected	ug/L	NA
Phorate	Pesticide	Not detected	Not detected	ug/L	NA
Prowl	Pesticide	0.23	0.22	ug/L	4%
Trichloronate	Pesticide	Not detected	Not detected	ug/L	NA
Trifluralin	Pesticide	0.97B	0.82B	ug/L	15%
Sample Date: 6/13/2006	**Site: Del Puerto Creek near Cox Road**				
Ceriodaphnia dubia	Aquatic Toxicity	100	100	% survival	0%
Pimephales promelas	Aquatic Toxicity	98	98	% survival	0%
Selenastrum capricornutum	Aquatic Toxicity	1840000	1970000	cells/mL	7%
pH	Field Data	8.2	8.2	Std.Unit	0%
Dissolved Organic Carbon (DOC)	General Chemistry	2.1	2.1	mg/L	0%
Total Organic Carbon (TOC)	General Chemistry	2.2	2.2	mg/L	0%

Event = Event Sample Results FD = Field Duplicate Sample Results RPD = Relative percent difference

Field Quality Control Samples

Field Duplicate and RPD Calculation

Analyte/Species	Type	Event	FD	Units	RPD
Turbidity	General Chemistry	38	35	NTU	8%
Azinphosmethyl	Pesticide	Not detected	Not detected	ug/L	NA
Bolstar	Pesticide	Not detected	Not detected	ug/L	NA
Chlorpyrifos	Pesticide	Not detected	Not detected	ug/L	NA
Coumaphos	Pesticide	Not detected	Not detected	ug/L	NA
Def	Pesticide	Not detected	Not detected	ug/L	NA
Demeton-S	Pesticide	Not detected	Not detected	ug/L	NA
Diazinon	Pesticide	Not detected	Not detected	ug/L	NA
Dichlorvos	Pesticide	Not detected	Not detected	ug/L	NA
Dimethoate	Pesticide	0.16	0.18	ug/L	13%
Disulfoton	Pesticide	Not detected	Not detected	ug/L	NA
EPN	Pesticide	Not detected	Not detected	ug/L	NA
EPTC	Pesticide	Not detected	Not detected	ug/L	NA
Ethion	Pesticide	Not detected	Not detected	ug/L	NA
Ethoprop	Pesticide	Not detected	Not detected	ug/L	NA
Fenamiphos	Pesticide	Not detected	Not detected	ug/L	NA
Fensulfothion	Pesticide	Not detected	Not detected	ug/L	NA
Fenthion	Pesticide	Not detected	Not detected	ug/L	NA
Malathion	Pesticide	Not detected	Not detected	ug/L	NA
Merphos	Pesticide	Not detected	Not detected	ug/L	NA
Mevinphos	Pesticide	Not detected	Not detected	ug/L	NA
Naled	Pesticide	Not detected	Not detected	ug/L	NA
Parathion, ethyl	Pesticide	Not detected	Not detected	ug/L	NA
Parathion, methyl	Pesticide	Not detected	Not detected	ug/L	NA
Phorate	Pesticide	Not detected	Not detected	ug/L	NA
Prowl	Pesticide	Not detected	Not detected	ug/L	NA
Trichloronate	Pesticide	Not detected	Not detected	ug/L	NA
Trifluralin	Pesticide	0.15	0.13	ug/L	13%

Sample Date: 7/11/2006 Site: Del Puerto Creek at Hwy 33

Analyte/Species	Type	Event	FD	Units	RPD
Ceriodaphnia dubia	Aquatic Toxicity	100	100	% survival	0%
Pimephales promelas	Aquatic Toxicity	98	95	% survival	3%
Selenastrum capricornutum	Aquatic Toxicity	1720000	1820000	cells/ml	6%
Ammonia (as N)	General Chemistry	ND	ND	mg/L	NA
Arsenic	General Chemistry	2.2	2.4	ug/L	9%
Boron	General Chemistry	0.092J	0.090J	mg/L	2%
Bromide	General Chemistry	0.049J	0.040J	mg/L	18%
Cadmium	General Chemistry	ND	ND	ug/L	NA
Color	General Chemistry	70	70	CU	0%
Copper	General Chemistry	7.7	7.6	ug/L	1%
Dissolved Organic Carbon	General Chemistry	5.7	6.1	mg/L	7%
E. Coli	General Chemistry	280	290	MPN/100	4%
Hardness (as CACO3)	General Chemistry	64	58	mg/L	9%
Lead	General Chemistry	1.3	1.6	ug/L	23%

Event = Event Sample Results FD = Field Duplicate Sample Results RPD = Relative percent difference

Field Quality Control Samples
Field Duplicate and RPD Calculation

Analyte/Species	Type	Event	FD	Units	RPD
Nickel	General Chemistry	12	12	ug/L	0%
Nitrogen, Nitrate (as N)	General Chemistry	0.5	6.3	mg/L	1,160% *
Nitrogen, Nitrite	General Chemistry	0.011J	0.0064J	mg/L	42% *
Phosphate as P,Ortho dissolved	General Chemistry	0.17	0.21	mg/L	24%
Selenium	General Chemistry	3	2J	ug/L	33% *
Total Dissolved Solids	General Chemistry	140	190	mg/L	36% *
Total Kjeldahl Nitrogen	General Chemistry	0.49	0.53	mg/L	8%
Total Organic Carbon	General Chemistry	6.1	6.3	mg/L	3%
Total Phosphate as P	General Chemistry	0.19	0.17	mg/L	11%
Total Suspended Solids	General Chemistry	47	180	mg/L	283% *
Turbidity	General Chemistry	38	59	NTU	55% *
Zinc	General Chemistry	12	16	ug/L	33% *
4,4'-DDE	Pesticide	0.011	0.0067J	ug/L	39% *
4,4'-DDT	Pesticide	Not detected	Not detected	ug/L	NA
4,4'-TDE/DDD	Pesticide	Not detected	Not detected	ug/L	NA
Aldicarb	Pesticide	Not detected	Not detected	ug/L	NA
Atrazine	Pesticide	Not detected	Not detected	ug/L	NA
Azinphosmethyl	Pesticide	Not detected	Not detected	ug/L	NA
Bifenthrin	Pesticide	Not detected	Not detected	ug/L	NA
Carbaryl	Pesticide	Not detected	Not detected	ug/L	NA
Carbofuran	Pesticide	Not detected	Not detected	ug/L	NA
Chlorpyrifos	Pesticide	0.014J	Not detected	ug/L	100% *
Cyanazine	Pesticide	Not detected	0.10J	ug/L	NA
Cyfluthrin	Pesticide	Not detected	Not detected	ug/L	NA
Cypermethrin	Pesticide	Not detected	Not detected	ug/L	NA
Diazinon	Pesticide	Not detected	Not detected	ug/L	NA
Dicofol	Pesticide	Not detected	Not detected	ug/L	NA
Dieldrin	Pesticide	Not detected	Not detected	ug/L	NA
Dimethoate	Pesticide	0.43	Not detected	ug/L	100% *
Disulfoton	Pesticide	Not detected	Not detected	ug/L	NA
Diuron	Pesticide	Not detected	Not detected	ug/L	NA
Endrin	Pesticide	Not detected	Not detected	ug/L	NA
Esfenvalerate/Fenvalerate	Pesticide	Not detected	Not detected	ug/L	NA
Lambda cyhalothrin	Pesticide	Not detected	Not detected	ug/L	NA
Linuron	Pesticide	Not detected	Not detected	ug/L	NA
Malathion	Pesticide	Not detected	Not detected	ug/L	NA
Methamidophos	Pesticide	Not detected	Not detected	ug/L	NA
Methidathion	Pesticide	Not detected	Not detected	ug/L	NA
Methiocarb	Pesticide	Not detected	Not detected	ug/L	NA
Methomyl	Pesticide	Not detected	Not detected	ug/L	NA
Methoxychlor	Pesticide	Not detected	Not detected	ug/L	NA
Molinate	Pesticide	Not detected	Not detected	ug/L	NA
Oxamyl	Pesticide	Not detected	Not detected	ug/L	NA
Parathion, methyl	Pesticide	0.098J	Not detected	ug/L	100% *

Event = Event Sample Results FD = Field Duplicate Sample Results RPD = Relative percent difference

Field Quality Control Samples

Field Duplicate and RPD Calculation

Analyte/Species	Type	Event	FD	Units	RPD
Permethrin	Pesticide	Not detected	Not detected	ug/L	NA
Phorate	Pesticide	Not detected	Not detected	ug/L	NA
Phosmet	Pesticide	Not detected	Not detected	ug/L	NA
Simazine	Pesticide	Not detected	Not detected	ug/L	NA
Thiobencarb	Pesticide	Not detected	Not detected	ug/L	NA

Sample Date: 8/8/2006 **Site: Marshall Road Drain near River Road**

Analyte/Species	Type	Event	FD	Units	RPD
Ceriodaphnia dubia	Aquatic Toxicity	95	100	% survival	5%
Pimephales promelas	Aquatic Toxicity	100	97.5	% survival	3%
Selenastrum capricornutum	Aquatic Toxicity	1444750	956250	cells/ml	34% *
Ammonia (as N)	General Chemistry	0.11	ND	mg/L	100% *
Arsenic	General Chemistry	4.8	4.8	ug/L	0%
Boron	General Chemistry	350	340	ug/L	3%
Bromide	General Chemistry	ND	ND	mg/L	NA
Cadmium	General Chemistry	0.1	0.1	ug/L	0%
Color	General Chemistry	200	250	CU	25% *
Copper	General Chemistry	12	12	ug/L	0%
Dissolved Organic Carbon	General Chemistry	5.6	20	mg/L	257% *
E. Coli	General Chemistry	74	86	MPN/100	16%
Hardness (as CACO3)	General Chemistry	270	210	mg/L	22%
Lead	General Chemistry	4.5	4.6	ug/L	2%
Nickel	General Chemistry	13	13	ug/L	0%
Nitrogen, Nitrate (as N)	General Chemistry	2.9	11	mg/L	279% *
Nitrogen, Nitrite	General Chemistry	0.099	0.094	mg/L	5%
Ortho Phosphate as P	General Chemistry	0.15	0.16	mg/L	7%
Selenium	General Chemistry	ND	1	ug/L	NA
Total Dissolved Solids	General Chemistry	440	510	mg/L	16%
Total Kjeldahl Nitrogen	General Chemistry	1.4	1.4	mg/L	0%
Total Organic Carbon	General Chemistry	5.2	5.6	mg/L	8%
Total Phosphate as P	General Chemistry	0.41	0.42	mg/L	2%
Total Suspended Solids	General Chemistry	180	200	mg/L	11%
Turbidity	General Chemistry	120	120	NTU	0%
Zinc	General Chemistry	36	34	ug/L	6%
4,4'-DDE	Pesticide	Not detected	Not detected	ug/L	NA
4,4'-DDT	Pesticide	Not detected	Not detected	ug/L	NA
4,4'-TDE/DDD	Pesticide	Not detected	Not detected	ug/L	NA
Aldicarb	Pesticide	Not detected	Not detected	ug/L	NA
Atrazine	Pesticide	Not detected	Not detected	ug/L	NA
Azinphosmethyl	Pesticide	Not detected	Not detected	ug/L	NA
Bifenthrin	Pesticide	Not detected	Not detected	ug/L	NA
Carbaryl	Pesticide	Not detected	Not detected	ug/L	NA
Carbofuran	Pesticide	Not detected	Not detected	ug/L	NA
Chlorpyrifos	Pesticide	Not detected	0.014J	ug/L	NA
Cyanazine	Pesticide	Not detected	Not detected	ug/L	NA

Event = Event Sample Results FD = Field Duplicate Sample Results RPD = Relative percent difference

Field Quality Control Samples

Field Duplicate and RPD Calculation

Analyte/Species	Type	Event	FD	Units	RPD
Cyfluthrin	Pesticide	Not detected	Not detected	ug/L	NA
Cypermethrin	Pesticide	Not detected	Not detected	ug/L	NA
Diazinon	Pesticide	Not detected	Not detected	ug/L	NA
Dicofol	Pesticide	Not detected	0.019J	ug/L	NA
Dieldrin	Pesticide	Not detected	Not detected	ug/L	NA
Dimethoate	Pesticide	0.67	0.66	ug/L	1%
Disulfoton	Pesticide	Not detected	Not detected	ug/L	NA
.Diuron	Pesticide	Not detected	Not detected	ug/L	NA
Endrin	Pesticide	Not detected	Not detected	ug/L	NA
Esfenvalerate/Fenvalerate	Pesticide	Not detected	Not detected	ug/L	NA
Lambda cyhalothrin	Pesticide	0.0085J	0.0087J	ug/L	2%
Linuron	Pesticide	Not detected	Not detected	ug/L	NA
Malathion	Pesticide	Not detected	Not detected	ug/L	NA
Methamidophos	Pesticide	Not detected	Not detected	ug/L	NA
Methidathion	Pesticide	Not detected	Not detected	ug/L	NA
Methiocarb	Pesticide	Not detected	Not detected	ug/L	NA
Methomyl	Pesticide	Not detected	Not detected	ug/L	NA
Methoxychlor	Pesticide	Not detected	Not detected	ug/L	NA
Molinate	Pesticide	Not detected	Not detected	ug/L	NA
Oxamyl	Pesticide	Not detected	Not detected	ug/L	NA
Parathion, methyl	Pesticide	Not detected	Not detected	ug/L	NA
Permethrin	Pesticide	Not detected	Not detected	ug/L	NA
Phorate	Pesticide	Not detected	Not detected	ug/L	NA
Phosmet	Pesticide	Not detected	Not detected	ug/L	NA
Simazine	Pesticide	Not detected	Not detected	ug/L	NA
Thiobencarb	Pesticide	Not detected	Not detected	ug/L	NA
Sample Date: 9/11/2006	**Site: Salt Slough at Lander Ave**				
Hyalella azteca	Sediment Toxicity	97.5	96.25	% survival	1%
Sample Date: 9/12/2006	**Site: Salt Slough at Lander Ave**				
Ceriodaphnia dubia	Aquatic Toxicity	100	95	% survival	5%
Pimephales promelas	Aquatic Toxicity	100	100	% survival	0%
Selenastrum capricornutum	Aquatic Toxicity	1873075	1758825	cells/ml	6%
Ammonia (as N)	General Chemistry	ND	ND	mg/L	NA
Arsenic	General Chemistry	6	5.3	ug/L	12%
Boron	General Chemistry	460	450	ug/L	2%
Bromide	General Chemistry	0.57J	0.34J	mg/L	40% *
Cadmium	General Chemistry	0.04J	0.04J	ug/L	0%
Color	General Chemistry	26	65	CU	150% *
Copper	General Chemistry	5.9	5.5	ug/L	7%
Dissolved Organic Carbon	General Chemistry	6.3	5.8	mg/L	8%
Dissolved Organic Carbon	General Chemistry	5.9	5.8	mg/L	2%
E. Coli	General Chemistry	110	88	MPN/100	20%

Event = Event Sample Results   FD = Field Duplicate Sample Results   RPD = Relative percent difference

Field Quality Control Samples

Field Duplicate and RPD Calculation

Analyte/Species	Type	Event	FD	Units	RPD
Hardness (as CACO3)	General Chemistry	200	200	mg/L	0%
Lead	General Chemistry	1.4	1.3	ug/L	7%
Nickel	General Chemistry	9.3	8.8	ug/L	5%
Nitrogen, Nitrate-Nitrite	General Chemistry	0.41	0.4	mg/L	2%
Nitrogen, Nitrite	General Chemistry	0.0063J	0.0059J	mg/L	6%
Ortho Phosphate as P	General Chemistry	0.14	0.14	mg/L	0%
Selenium	General Chemistry	1	1J	ug/L	0%
Total Dissolved Solids	General Chemistry	640	580	mg/L	9%
Total Kjeldahl Nitrogen	General Chemistry	0.8	0.82	mg/L	2%
Total Organic Carbon	General Chemistry	5.7	6.1	mg/L	7%
Total Phosphate as P	General Chemistry	0.37	0.36	mg/L	3%
Total Suspended Solids	General Chemistry	95	100	mg/L	5%
Turbidity	General Chemistry	42	46	NTU	10%
Zinc	General Chemistry	13	12	ug/L	8%
4,4'-DDE	Pesticide	Not detected	Not detected	ug/L	NA
4,4'-DDT	Pesticide	Not detected	Not detected	ug/L	NA
4,4'-TDE/DDD	Pesticide	Not detected	Not detected	ug/L	NA
Aldicarb	Pesticide	Not detected	Not detected	ug/L	NA
Atrazine	Pesticide	Not detected	Not detected	ug/L	NA
Azinphosmethyl	Pesticide	Not detected	Not detected	ug/L	NA
Bifenthrin	Pesticide	Not detected	Not detected	ug/L	NA
Carbaryl	Pesticide	Not detected	Not detected	ug/L	NA
Carbofuran	Pesticide	Not detected	Not detected	ug/L	NA
Chlorpyrifos	Pesticide	0.047	0.04	ug/L	15%
Cyanazine	Pesticide	Not detected	Not detected	ug/L	NA
Cyfluthrin	Pesticide	Not detected	Not detected	ug/L	NA
Cypermethrin	Pesticide	Not detected	Not detected	ug/L	NA
Diazinon	Pesticide	Not detected	Not detected	ug/L	NA
Dicofol	Pesticide	Not detected	Not detected	ug/L	NA
Dieldrin	Pesticide	Not detected	Not detected	ug/L	NA
Dimethoate	Pesticide	Not detected	Not detected	ug/L	NA
Disulfoton	Pesticide	Not detected	Not detected	ug/L	NA
Diuron	Pesticide	Not detected	Not detected	ug/L	NA
Endrin	Pesticide	Not detected	Not detected	ug/L	NA
Esfenvalerate/Fenvalerate	Pesticide	Not detected	Not detected	ug/L	NA
Lambda cyhalothrin	Pesticide	Not detected	Not detected	ug/L	NA
Linuron	Pesticide	Not detected	Not detected	ug/L	NA
Malathion	Pesticide	Not detected	Not detected	ug/L	NA
Methamidophos	Pesticide	Not detected	Not detected	ug/L	NA
Methidathion	Pesticide	Not detected	Not detected	ug/L	NA
Methiocarb	Pesticide	Not detected	Not detected	ug/L	NA
Methomyl	Pesticide	0.17	0.22	ug/L	29% *
Methoxychlor	Pesticide	Not detected	Not detected	ug/L	NA
Molinate	Pesticide	Not detected	Not detected	ug/L	NA

Event = Event Sample Results FD = Field Duplicate Sample Results RPD = Relative percent difference

Field Quality Control Samples

Field Duplicate and RPD Calculation

Analyte/Species	Type	Event	FD	Units	RPD
Oxamyl	Pesticide	Not detected	Not detected	ug/L	NA
Parathion, methyl	Pesticide	Not detected	Not detected	ug/L	NA
Permethrin	Pesticide	Not detected	Not detected	ug/L	NA
Phorate	Pesticide	Not detected	Not detected	ug/L	NA
Phosmet	Pesticide	Not detected	Not detected	ug/L	NA
Simazine	Pesticide	Not detected	Not detected	ug/L	NA
Thiobencarb	Pesticide	Not detected	Not detected	ug/L	NA

Sample Date: 10/10/2006 Site: Mud Slough Upstream of San Luis Drain

Analyte/Species	Type	Event	FD	Units	RPD
Ammonia (as N)	General Chemistry	ND	ND	mg/L	NA
Arsenic	General Chemistry	4.8	4.9	ug/L	2%
Boron	General Chemistry	660	610	ug/L	8%
Bromide	General Chemistry	0.41J	0.32J	mg/L	22%
Cadmium	General Chemistry	0.03J	0.02J	ug/L	33% *
Color	General Chemistry	90	85	CU	6%
Copper	General Chemistry	3.2	3.1	ug/L	3%
Dissolved Organic Carbon	General Chemistry	12	8.9	mg/L	26% *
Dissolved Organic Carbon	General Chemistry	5.7	8.9	mg/L	56% *
E. Coli	General Chemistry	170	230	MPN/100	35% *
Hardness (as CACO3)	General Chemistry	200	220	mg/L	10%
Lead	General Chemistry	0.8	0.73	ug/L	9%
Nickel	General Chemistry	7.6	7.3	ug/L	4%
Nitrogen, Nitrate (as N)	General Chemistry	0.1	0.092	mg/L	8%
Nitrogen, Nitrite	General Chemistry	0.0055J	0.0055J	mg/L	0%
Ortho Phosphate as P	General Chemistry	0.36	0.35	mg/L	3%
Selenium	General Chemistry	2	ND	ug/L	100% *
Total Dissolved Solids	General Chemistry	490	480	mg/L	2%
Total Kjeldahl Nitrogen	General Chemistry	1.5	1.5	mg/L	0%
Total Organic Carbon	General Chemistry	12	6.2	mg/L	48% *
Total Phosphate as P	General Chemistry	0.58	0.56	mg/L	3%
Total Suspended Solids	General Chemistry	50	56	mg/L	12%
Turbidity	General Chemistry	21	22	NTU	5%
Zinc	General Chemistry	6	6	ug/L	0%
4,4'-DDE	Pesticide	Not detected	Not detected	ug/L	NA
4,4'-DDT	Pesticide	Not detected	Not detected	ug/L	NA
4,4'-TDE/DDD	Pesticide	Not detected	Not detected	ug/L	NA
a-BHC	Pesticide	Not detected	Not detected	ug/L	NA
Aldicarb	Pesticide	Not detected	Not detected	ug/L	NA
Aldrin	Pesticide	Not detected	Not detected	ug/L	NA
Atrazine	Pesticide	Not detected	Not detected	ug/L	NA
Azinphosmethyl	Pesticide	Not detected	Not detected	ug/L	NA
b-BHC	Pesticide	Not detected	Not detected	ug/L	NA
Bifenthrin	Pesticide	Not detected	Not detected	ug/L	NA
Carbaryl	Pesticide	Not detected	Not detected	ug/L	NA

Event = Event Sample Results FD = Field Duplicate Sample Results RPD = Relative percent difference

Field Quality Control Samples

Field Duplicate and RPD Calculation

Analyte/Species	Type	Event	FD	Units	RPD
Carbofuran	Pesticide	Not detected	Not detected	ug/L	NA
Chlorpyrifos	Pesticide	Not detected	Not detected	ug/L	NA
Cyanazine	Pesticide	Not detected	Not detected	ug/L	NA
Cyfluthrin	Pesticide	Not detected	Not detected	ug/L	NA
Cypermethrin	Pesticide	Not detected	Not detected	ug/L	NA
d-BHC	Pesticide	Not detected	Not detected	ug/L	NA
Diazinon	Pesticide	Not detected	Not detected	ug/L	NA
Dicofol	Pesticide	Not detected	Not detected	ug/L	NA
Dieldrin	Pesticide	Not detected	Not detected	ug/L	NA
Dimethoate	Pesticide	Not detected	Not detected	ug/L	NA
Disulfoton	Pesticide	Not detected	Not detected	ug/L	NA
Diuron	Pesticide	Not detected	Not detected	ug/L	NA
Endrin	Pesticide	Not detected	Not detected	ug/L	NA
Esfenvalerate/Fenvalerate	Pesticide	Not detected	Not detected	ug/L	NA
g-BHC (Lindane)	Pesticide	Not detected	Not detected	ug/L	NA
Heptachlor	Pesticide	Not detected	Not detected	ug/L	NA
Heptachlor epoxide	Pesticide	Not detected	Not detected	ug/L	NA
Lambda cyhalothrin	Pesticide	Not detected	Not detected	ug/L	NA
Linuron	Pesticide	Not detected	Not detected	ug/L	NA
Malathion	Pesticide	Not detected	Not detected	ug/L	NA
Methamidophos	Pesticide	Not detected	Not detected	ug/L	NA
Methidathion	Pesticide	Not detected	Not detected	ug/L	NA
Methiocarb	Pesticide	Not detected	Not detected	ug/L	NA
Methomyl	Pesticide	Not detected	Not detected	ug/L	NA
Methoxychlor	Pesticide	Not detected	Not detected	ug/L	NA
Molinate	Pesticide	Not detected	Not detected	ug/L	NA
Oxamyl	Pesticide	Not detected	Not detected	ug/L	NA
Parathion, methyl	Pesticide	Not detected	Not detected	ug/L	NA
Permethrin	Pesticide	Not detected	Not detected	ug/L	NA
Phorate	Pesticide	Not detected	Not detected	ug/L	NA
Phosmet	Pesticide	Not detected	Not detected	ug/L	NA
Simazine	Pesticide	Not detected	Not detected	ug/L	NA
Thiobencarb	Pesticide	Not detected	Not detected	ug/L	NA
Toxaphene	Pesticide	Not detected	Not detected	ug/L	NA

Event = Event Sample Results FD = Field Duplicate Sample Results RPD = Relative percent difference

Attachment 4
Exceedance of Recommended Water Quality Values

Westside San Joaquin River Watershed Coalition

Exceedance Report

Del Puerto Creek at Hwy 33

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
pH	23	6/13/2006	8.63			8.5	6.5
4,4'-DDE	24	7/11/2006	0.011	ug/L		0.00059	
E. Coli	24	7/11/2006	280	MPN/100mL		220	
Parathion, methyl	24	7/11/2006	0.098J	ug/L		0.08	
pH	24	7/11/2006	8.96			8.5	6.5
4,4'-DDE	25	8/8/2006	0.0082J	ug/L		0.00059	
E. Coli	25	8/8/2006	650	MPN/100mL		220	
Lambda cyhalothrin	25	8/8/2006	0.005J	ug/L		0.00041	
DO	26	9/11/2006	4.98	mg/L			5
Hyalella azteca	26	9/11/2006	1.25	% survival	Yes		
pH	26	9/12/2006	6.08	units		8.5	6.5
pH	27	10/10/2006	6.32			8.5	6.5

Del Puerto Creek near Cox Road

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
E. Coli	23	6/13/2006	500	MPN/100mLs		220	
Total Dissolved Solids	23	6/13/2006	540	mg/L		500	
4,4'-DDE	24	7/11/2006	0.02	ug/L		0.00059	
Parathion, methyl	24	7/11/2006	0.16	ug/L		0.08	
Total Dissolved Solids	24	7/11/2006	510	mg/L		500	
4,4'-DDE	25	8/8/2006	0.0067J	ug/L		0.00059	
Chlorpyrifos	25	8/8/2006	0.033	ug/L		0.014	
E. Coli	25	8/8/2006	250	MPN/100mL		220	
Hyalella azteca	26	9/11/2006	55	% survival	Yes		
E. Coli	26	9/12/2006	290	MPN/100mL		220	
pH	26	9/12/2006	6.41	units		8.5	6.5
E. Coli	27	10/10/2006	730	MPN/100mL		220	

Hospital Creek at River Road

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
E. Coli	22	5/9/2006	900	MPN/100mLs		220	
E. Coli	23	6/13/2006	500	MPN/100mLs		220	
Pimephales promelas	23	6/13/2006	55	% survival	Yes		
Total Suspended Solids	23	6/13/2006	440	mg/L		400	
4,4'-DDE	24	7/11/2006	0.015	ug/L		0.00059	
Diazinon	24	7/11/2006	0.062Y	ug/L		0.05	
Total Suspended Solids	24	7/11/2006	840	mg/L		400	
4,4'-DDE	25	8/8/2006	0.033	ug/L		0.00059	
4,4'-DDT	25	8/8/2006	0.0097J	ug/L		0.00059	
E. Coli	25	8/8/2006	>2400	MPN/100mL		220	
pH	25	8/8/2006	6.32			8.5	6.5

WQV = Water Quality Value as established by the Central Valley Regional Water Quality Control Board

Hyalella azteca	26	9/11/2006	1.25	% survival	Yes		
Total Suspended Solids	26	9/12/2006	1600	mg/L		400	
E. Coli	27	10/10/2006	>2400	MPN/100mL		220	

Ingram Creek at River Road

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
4,4'-DDE	24	7/11/2006	0.079	ug/L		0.00059	
4,4'-DDT	24	7/11/2006	0.032	ug/L		0.00059	
Chlorpyrifos	24	7/11/2006	0.018J	ug/L		0.014	
Dimethoate	24	7/11/2006	1.4	ug/L		1	
Parathion, methyl	24	7/11/2006	0.17	ug/L		0.08	
Total Suspended Solids	24	7/11/2006	690	mg/L		400	
4,4'-DDE	25	8/8/2006	0.066	ug/L		0.00059	
4,4'-DDT	25	8/8/2006	0.026	ug/L		0.00059	
Chlorpyrifos	25	8/8/2006	0.017J	ug/L		0.014	
Dimethoate	25	8/8/2006	1.7	ug/L		1	
Total Suspended Solids	25	8/8/2006	410	mg/L		400	
Hyalella azteca	26	9/11/2006	0	% survival	Yes		
Total Suspended Solids	26	9/12/2006	840	mg/L		400	
Total Suspended Solids	27	10/10/2006	2600	mg/L		400	

Los Banos Creek at China Camp Road

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
EC	26	9/11/2006	3049	µmhos/cm		900	
pH	26	9/11/2006	6.4	units		8.5	6.5

Los Banos Creek at Hwy 140

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
E. Coli	22	5/9/2006	1600	MPN/100mLs		220	
EC	23	6/13/2006	1041	µmhos/cm		900	
Total Dissolved Solids	23	6/13/2006	690	mg/L		500	
E. Coli	24	7/11/2006	280	MPN/100mL		220	
Total Dissolved Solids	24	7/11/2006	720	mg/L		500	
Total Suspended Solids	24	7/11/2006	510	mg/L		400	
E. Coli	25	8/8/2006	2000	MPN/100mL		220	
EC	25	8/8/2006	1040	µmhos/cm		900	
EC	26	9/11/2006	1152	µmhos/cm		900	
Total Dissolved Solids	26	9/12/2006	700	mg/L		500	
E. Coli	27	10/10/2006	1700	MPN/100mL		220	

Marshall Road Drain near River Road

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
E. Coli	23	6/13/2006	300	MPN/100mLs		220	
4,4'-DDE	24	7/11/2006	0.03	ug/L		0.00059	

4,4'-DDT	24	7/11/2006	0.015	ug/L		0.00059	
Chlorpyrifos	24	7/11/2006	0.019J	ug/L		0.014	
Diazinon	24	7/11/2006	0.22	ug/L		0.05	
Dimethoate	24	7/11/2006	1.2	ug/L		1	
E. Coli	24	7/11/2006	>2400	MPN/100mL		220	
Lambda cyhalothrin	24	7/11/2006	0.03	ug/L		0.00041	
Total Dissolved Solids	24	7/11/2006	640	mg/L		500	
Total Suspended Solids	24	7/11/2006	560	mg/L		400	
Lambda cyhalothrin	25	8/8/2006	0.0085J	ug/L		0.00041	
E. Coli	26	9/12/2006	230	MPN/100mL		220	
pH	26	9/12/2006	6.47	units		8.5	6.5
Total Dissolved Solids	26	9/12/2006	1100	mg/L		500	
Total Suspended Solids	26	9/12/2006	2300	mg/L		400	
E. Coli	27	10/10/2006	410	MPN/100mL		220	

Mud Slough Upstream of San Luis Drain

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
E. Coli	22	5/9/2006	300	MPN/100mLs		220	
EC	24	7/11/2006	957	µmhos/cm		900	
Total Dissolved Solids	24	7/11/2006	610	mg/L		500	
Chlorpyrifos	25	8/8/2006	0.016J	ug/L		0.014	
E. Coli	25	8/8/2006	770	MPN/100mL		220	
E. Coli	26	9/12/2006	410	MPN/100mL		220	

Newman Wasteway near Hills Ferry Road

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
Pimephales promelas	22	5/9/2006	70	% survival	Yes		
4,4'-DDE	24	7/11/2006	0.0057J	ug/L		0.00059	
E. Coli	24	7/11/2006	>2400	MPN/100mL		220	
Total Dissolved Solids	24	7/11/2006	670	mg/L		500	
E. Coli	25	8/8/2006	410	MPN/100mL		220	
EC	25	8/8/2006	1178	µmhos/cm		900	
EC	25	8/8/2006	921	µmhos/cm		900	
Total Dissolved Solids	25	8/8/2006	780	mg/L		500	
EC	26	9/11/2006	915	µmhos/cm		900	
Total Dissolved Solids	26	9/12/2006	580	mg/L		500	
E. Coli	27	10/10/2006	550	MPN/100mL		220	
EC	27	10/10/2006	1485	µmhos/cm		900	
Total Dissolved Solids	27	10/10/2006	1100	mg/L		500	

Orestimba Creek at Hwy 33

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
E. Coli	22	5/9/2006	300	MPN/100mLs		220	
4,4'-DDE	23	6/13/2006	0.011	ug/L		0.00059	

WQV = Water Quality Value as established by the Central Valley Regional Water Quality Control Board

E. Coli	23	6/13/2006	500	MPN/100mLs		220	
4,4'-DDE	24	7/11/2006	0.087	ug/L		0.00059	
4,4'-DDT	24	7/11/2006	0.055	ug/L		0.00059	
Ceriodaphnia dubia	24	7/11/2006	0	% survival	Yes		
Chlorpyrifos	24	7/11/2006	0.72	ug/L		0.014	
Diazinon	24	7/11/2006	1.2	ug/L		0.05	
E. Coli	24	7/11/2006	690	MPN/100mL		220	
4,4'-DDE	25	8/9/2006	0.29	ug/L		0.00059	
4,4'-DDT	25	8/9/2006	0.13	ug/L		0.00059	
Chlorpyrifos	25	8/9/2006	0.051	ug/L		0.014	
E. Coli	25	8/9/2006	1200	MPN/100mL		220	
Esfenvalerate/Fenvalerate	25	8/9/2006	0.021	ug/L		0.007	
Total Suspended Solids	25	8/9/2006	1500	mg/L		400	
Hyalella azteca	26	9/11/2006	6.25	% survival	Yes		
E. Coli	26	9/12/2006	>2400	MPN/100mL		220	

Orestimba Creek at River Road

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
E. Coli	22	5/9/2006	300	MPN/100mLs		220	
4,4'-DDE	23	6/13/2006	0.013	ug/L		0.00059	
Chlorpyrifos	23	6/13/2006	0.032	ug/L		0.014	
4,4'-DDE	24	7/11/2006	0.078	ug/L		0.00059	
4,4'-DDT	24	7/11/2006	0.029	ug/L		0.00059	
Ceriodaphnia dubia	24	7/11/2006	0	% survival	Yes		
Chlorpyrifos	24	7/11/2006	0.51	ug/L		0.014	
E. Coli	24	7/11/2006	650	MPN/100mL		220	
4,4'-DDE	25	8/9/2006	0.031	ug/L		0.00059	
4,4'-DDT	25	8/9/2006	0.013	ug/L		0.00059	
Chlorpyrifos	25	8/9/2006	0.052	ug/L		0.014	
Dimethoate	25	8/9/2006	1.8	ug/L		1	
E. Coli	25	8/9/2006	290	MPN/100mL		220	
E. Coli	26	9/12/2006	260	MPN/100mL		220	
E. Coli	27	10/10/2006	370	MPN/100mL		220	
pH	27	10/10/2006	6.42			8.5	6.5

Ramona Lake near Fig Avenue

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
Ceriodaphnia dubia	24-R	7/17/2006	5	% survival	Yes		
Chlorpyrifos	24-R	7/17/2006	0.29	ug/L		0.014	
EC	24-R	7/17/2006	1182	µmhos/cm		900	
Total Dissolved Solids	24-R	7/17/2006	800	mg/L		500	
EC	24-R	7/25/2006	1385	µmhos/cm		900	
E. Coli	25	8/8/2006	1000	MPN/100mL		220	
EC	25	8/8/2006	1002	µmhos/cm		900	

WQV = Water Quality Value as established by the Central Valley Regional Water Quality Control Board

Total Dissolved Solids	25	8/8/2006	640	mg/L		500	
E. Coli	26	9/12/2006	330	MPN/100mL		220	
Total Dissolved Solids	26	9/12/2006	580	mg/L		500	
Total Dissolved Solids	27	10/10/2006	520	mg/L		500	

Salt Slough at Lander Ave

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
pH	22	5/9/2006	6.49			8.5	6.5
Total Dissolved Solids	24	7/11/2006	610	mg/L		500	
Chlorpyrifos	25	8/8/2006	0.039	ug/L		0.014	
E. Coli	25	8/8/2006	490	MPN/100mL		220	
Total Dissolved Solids	25	8/8/2006	530	mg/L		500	
EC	26	9/11/2006	939	µmhos/cm		900	
Chlorpyrifos	26	9/12/2006	0.047	ug/L		0.014	
Total Dissolved Solids	26	9/12/2006	640	mg/L		500	
EC	27	10/10/2006	1131	µmhos/cm		900	
Total Dissolved Solids	27	10/10/2006	710	mg/L		500	

Salt Slough at Sand Dam

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
DO	22	5/9/2006	4.47	mg/L			5
pH	23	6/13/2006	6.43			8.5	6.5
DO	24	7/11/2006	4.96	mg/L			5
Total Dissolved Solids	24	7/11/2006	550	mg/L		500	
Ceriodaphnia dubia	25	8/8/2006	0	% survival	Yes		
Chlorpyrifos	25	8/8/2006	0.23	ug/L		0.014	
pH	25	8/8/2006	6.33	units		8.5	6.5
Total Dissolved Solids	27	10/10/2006	520	mg/L		500	

San Joaquin River at Lander Ave

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
pH	22	5/9/2006	5.43			8.5	6.5
Total Dissolved Solids	24	7/11/2006	530	mg/L		500	

San Joaquin River at Sack Dam

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
pH	23	6/13/2006	9.78			8.5	6.5
pH	24	7/11/2006	8.61			8.5	6.5
pH	25	8/8/2006	5.29	units		8.5	6.5

Turner Slough at Edminster Road

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
Pimephales promelas	22	5/9/2006	77	% survival	Yes		
DO	22-R	5/17/2006	3.24	mg/L			5

WQV = Water Quality Value as established by the Central Valley Regional Water Quality Control Board

DO	23	6/13/2006	3.48	mg/L			5
E. Coli	23	6/13/2006	900	MPN/100mLs		220	
pH	23	6/13/2006	5.91			8.5	6.5
E. Coli	24	7/11/2006	>2400	MPN/100mL		220	
pH	24	7/11/2006	6.24			8.5	6.5
E. Coli	25	8/8/2006	2000	MPN/100mL		220	
pH	25	8/8/2006	5.22			8.5	6.5
pH	25	8/8/2006	5.97	units		8.5	6.5
pH	26	9/11/2006	4.22	units		8.5	6.5
E. Coli	26	9/12/2006	1200	MPN/100mL		220	
EC	27	10/10/2006	1465	µmhos/cm		900	

Westley Wasteway near Cox Road

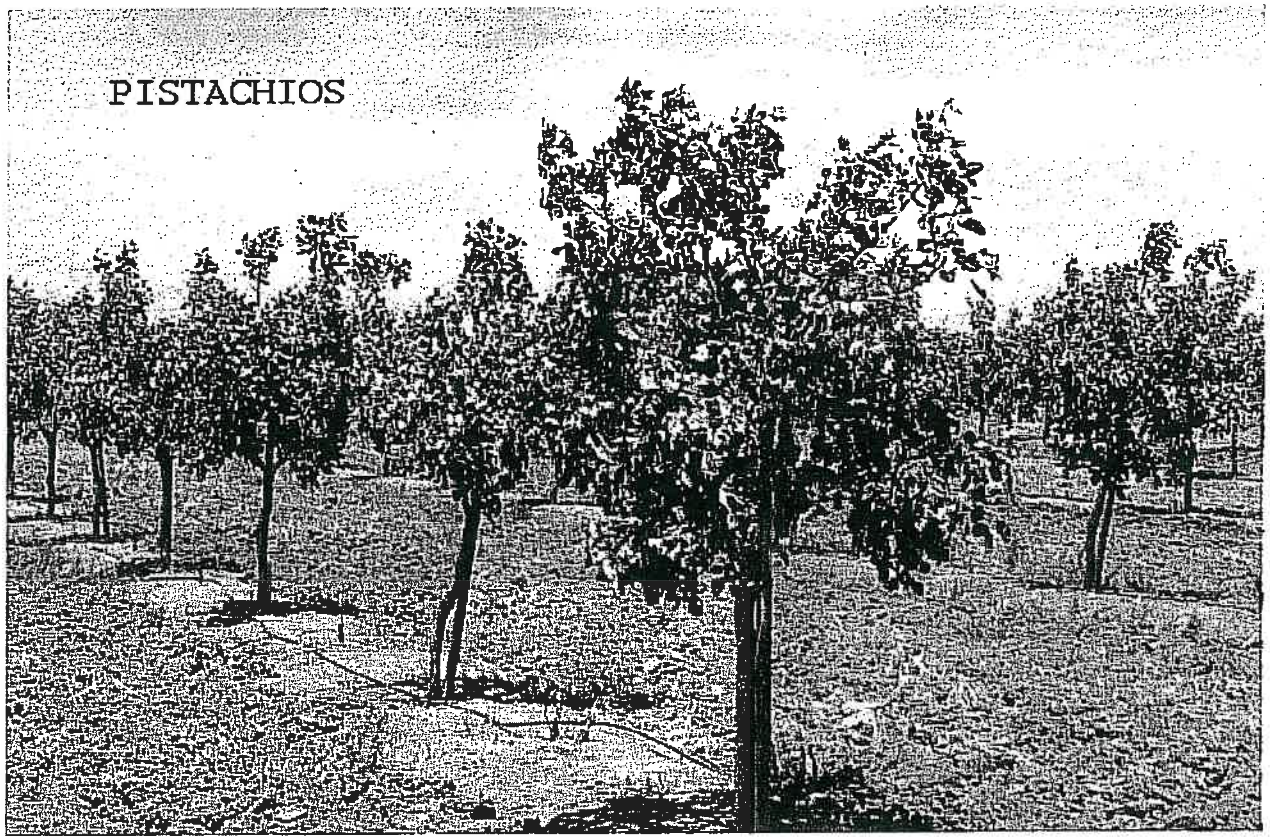
Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
pH	22	5/9/2006	8.87			8.5	6.5
Chlorpyrifos	23	6/13/2006	0.032	ug/L		0.014	
E. Coli	23	6/13/2006	900	MPN/100mLs		220	
Total Suspended Solids	23	6/13/2006	1400	mg/L		400	
4,4'-DDE	25	8/8/2006	0.06	ug/L		0.00059	
4,4'-DDT	25	8/8/2006	0.024	ug/L		0.00059	
E. Coli	25	8/8/2006	920	MPN/100mL		220	
Total Suspended Solids	25	8/8/2006	860	mg/L		400	
Hyalella azteca	26	9/11/2006	1.25	% survival	Yes		
pH	26	9/12/2006	5.56	units		8.5	6.5
Total Suspended Solids	26	9/12/2006	560	mg/L		400	
pH	27	10/10/2006	6.37			8.5	6.5

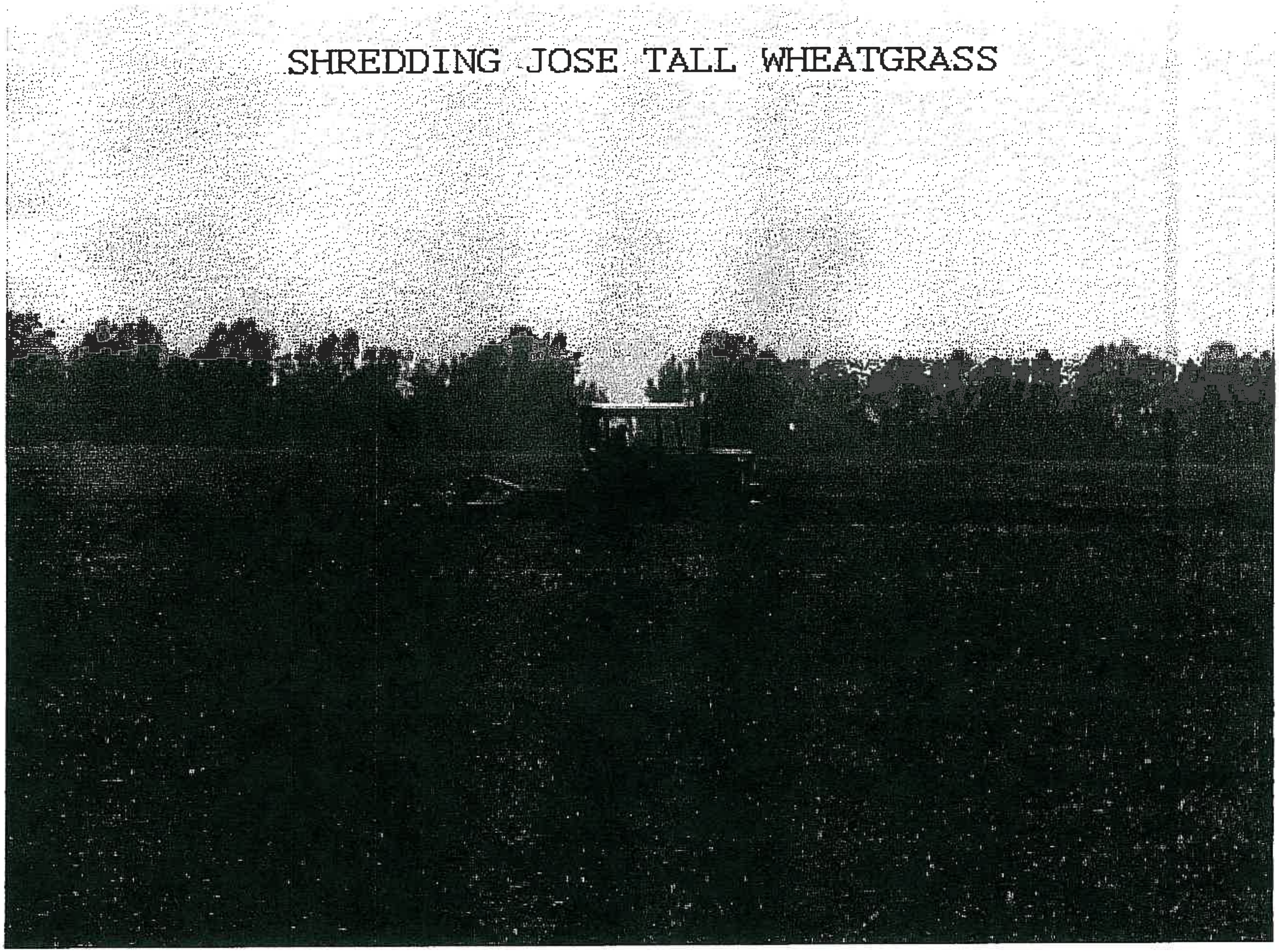
EXHIBIT 3

SAN JOAQUIN RIVER WATER QUALITY IMPROVEMENT PROJECT

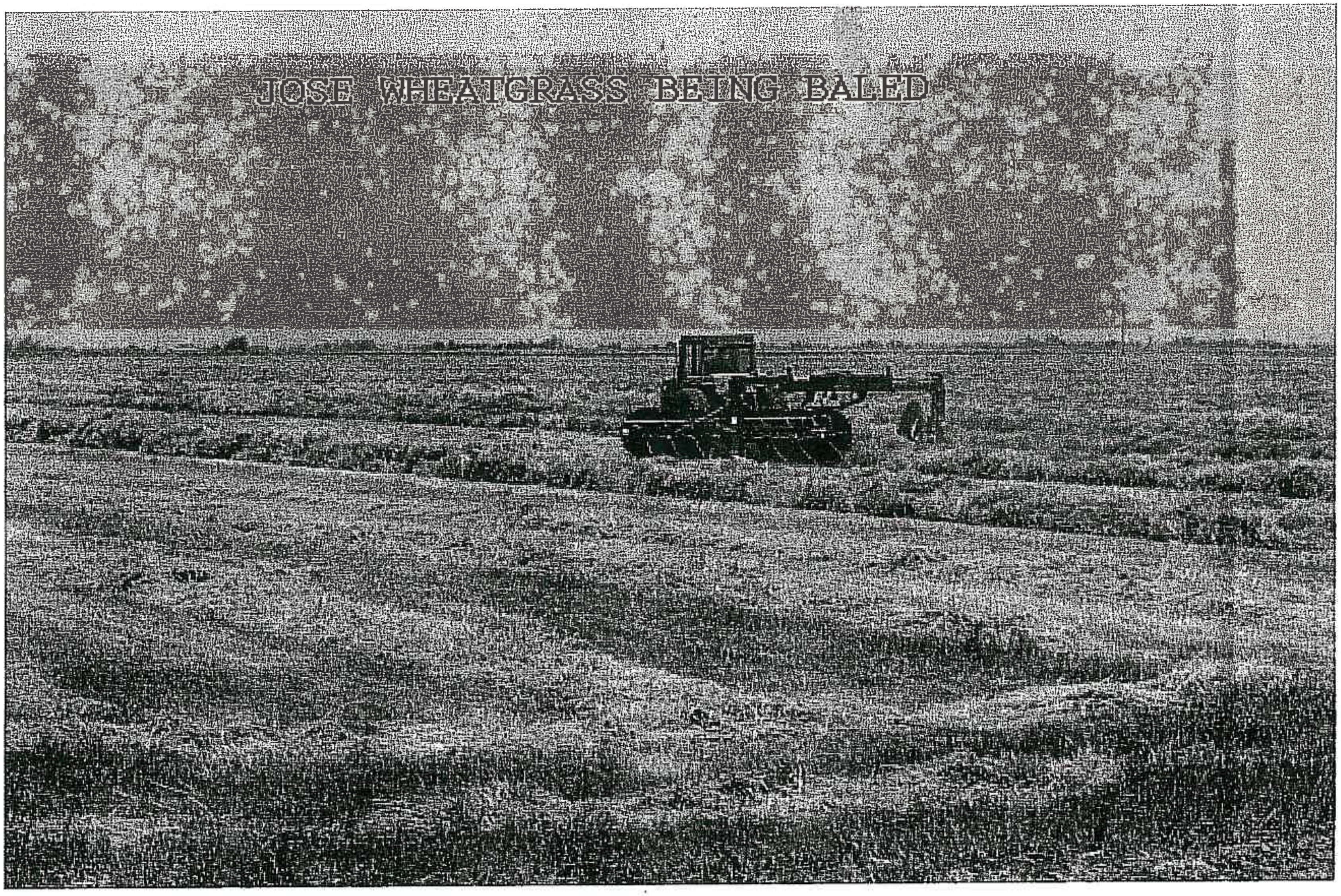
REUSE PHOTOS

SAN JOAQUIN RIVER WATER QUALITY IMPROVEMENT PROJECT

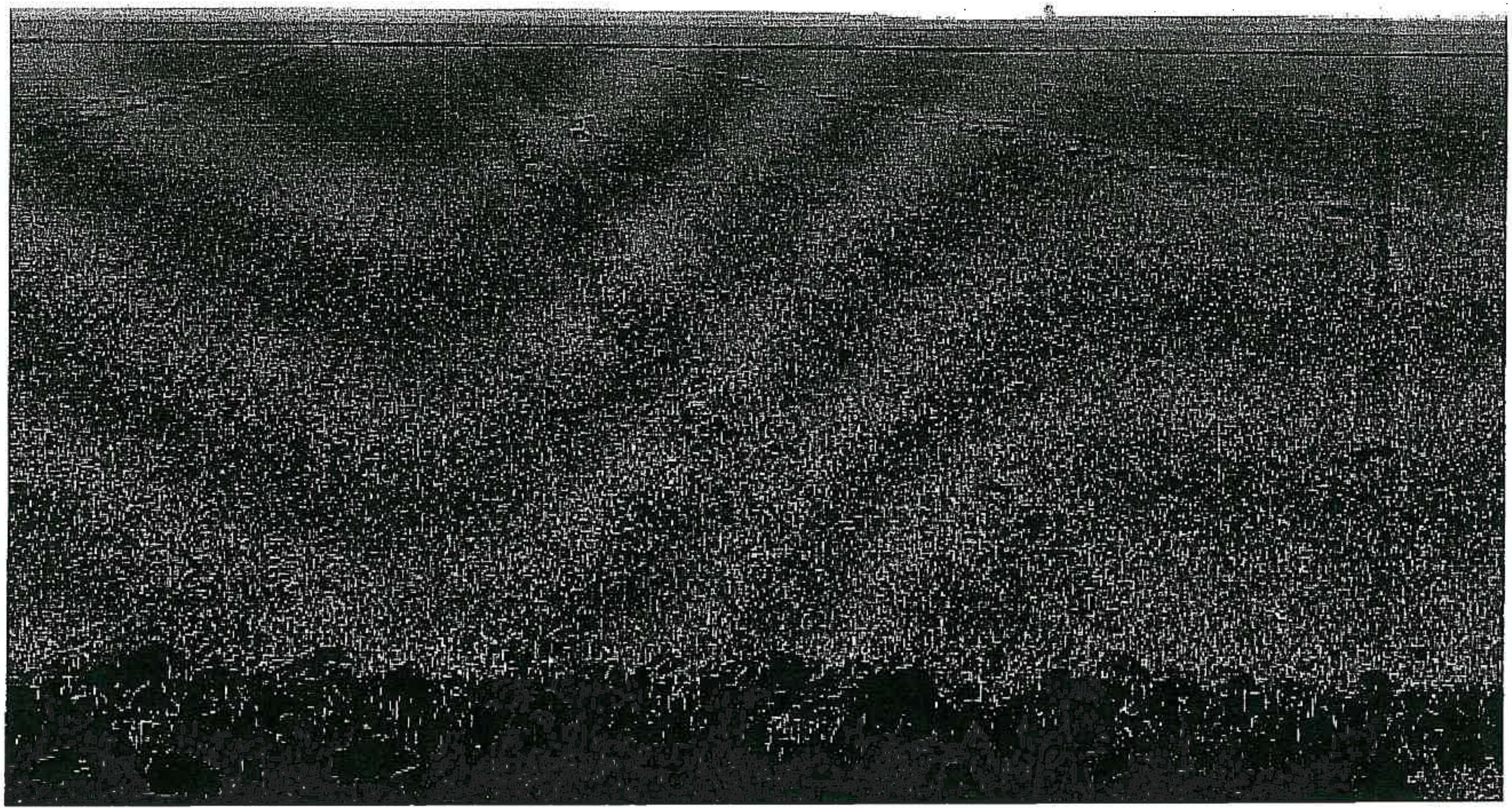

PISTACHIOS

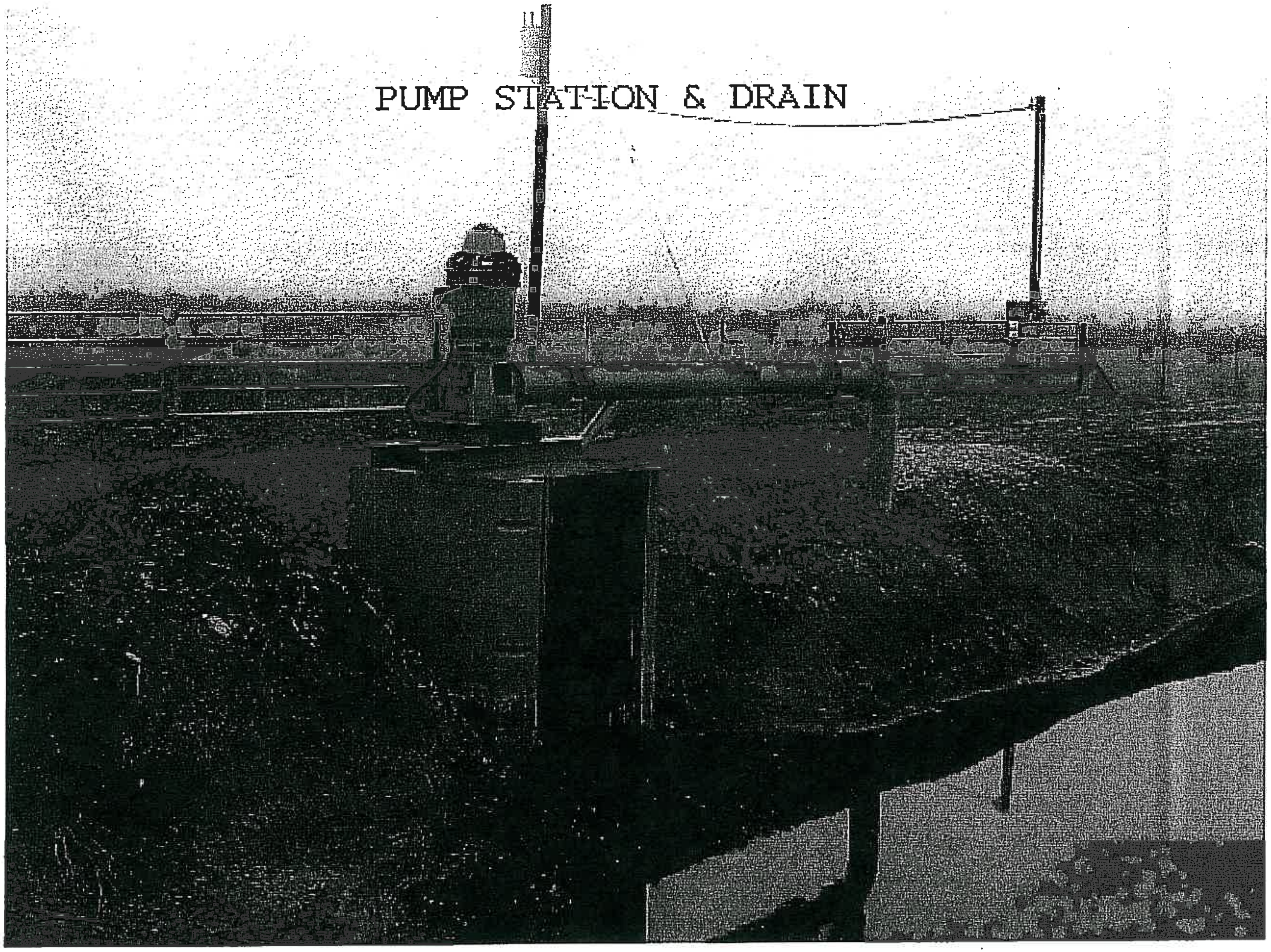


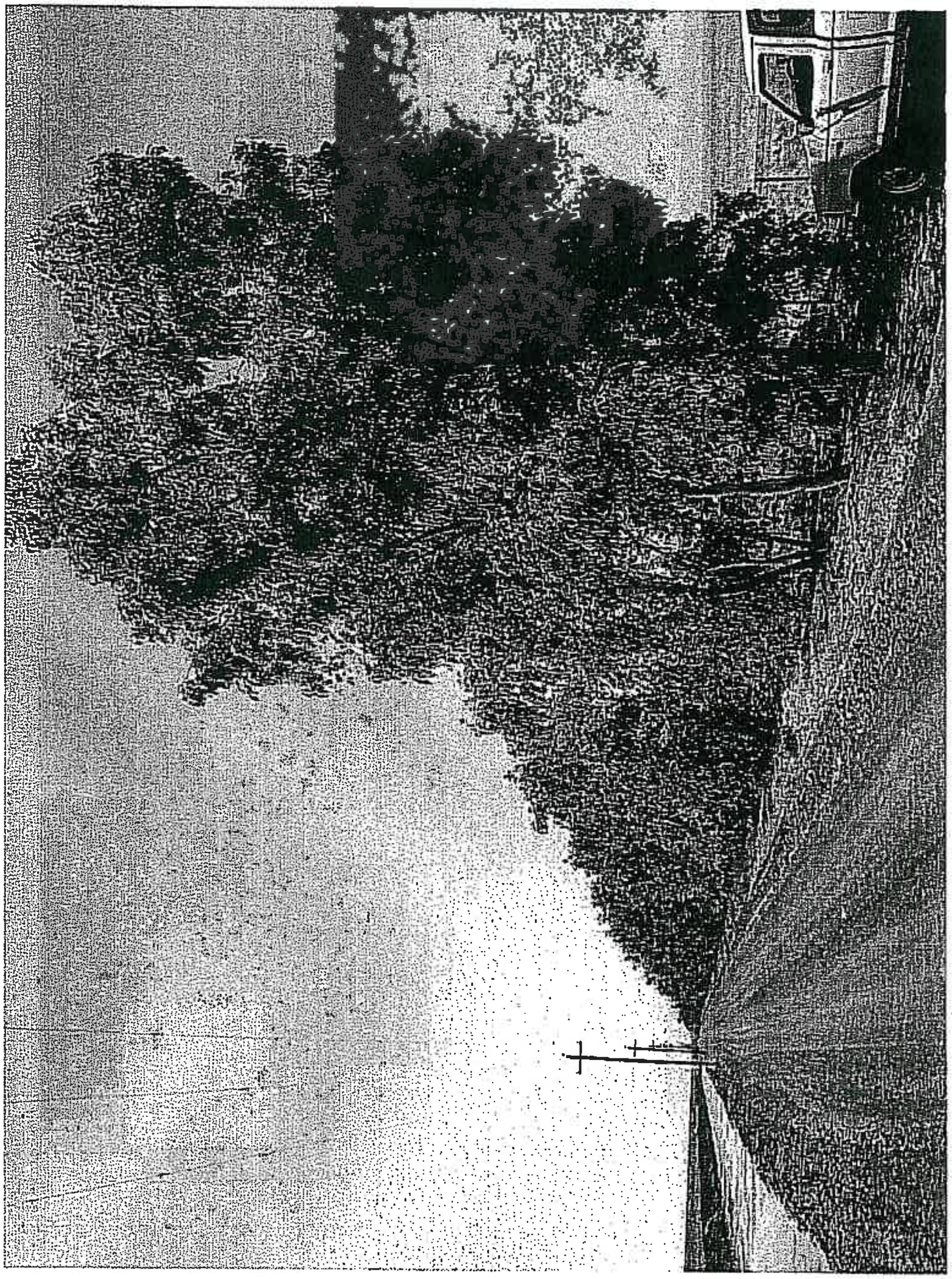
SHREDDING JOSE TALL WHEATGRASS


JOSE WHEATGRASS BEING BALED

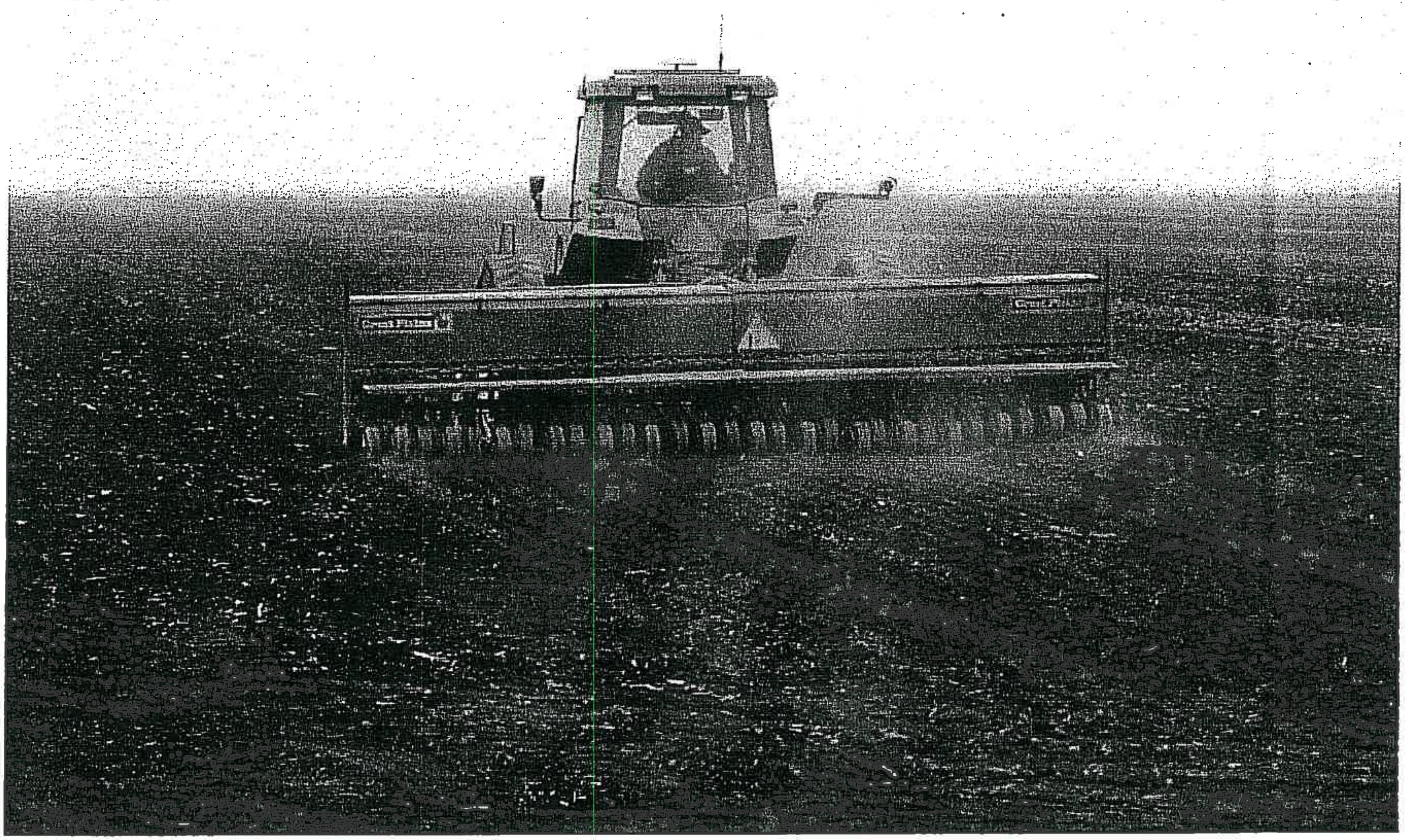
NEW ALFALFA

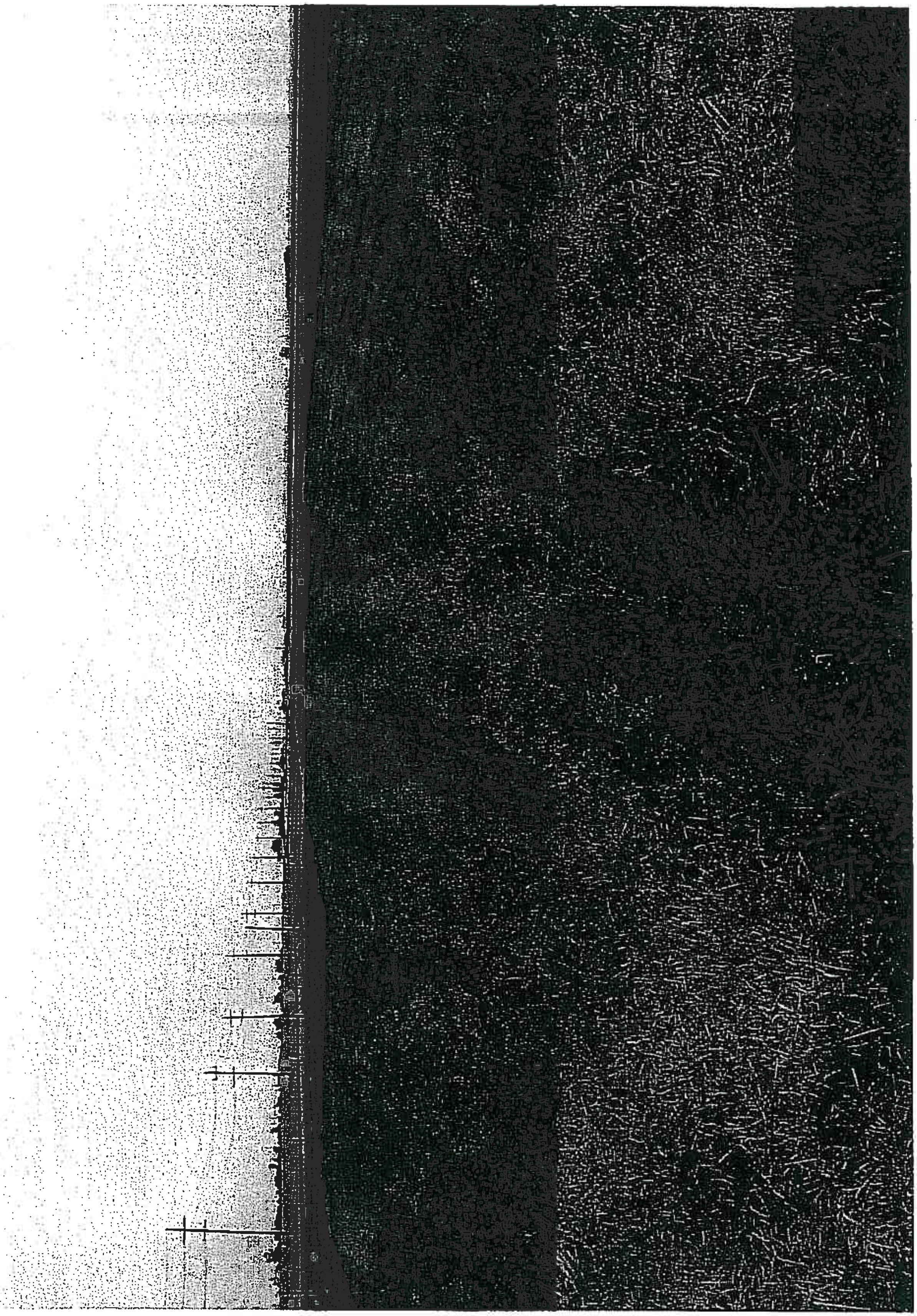


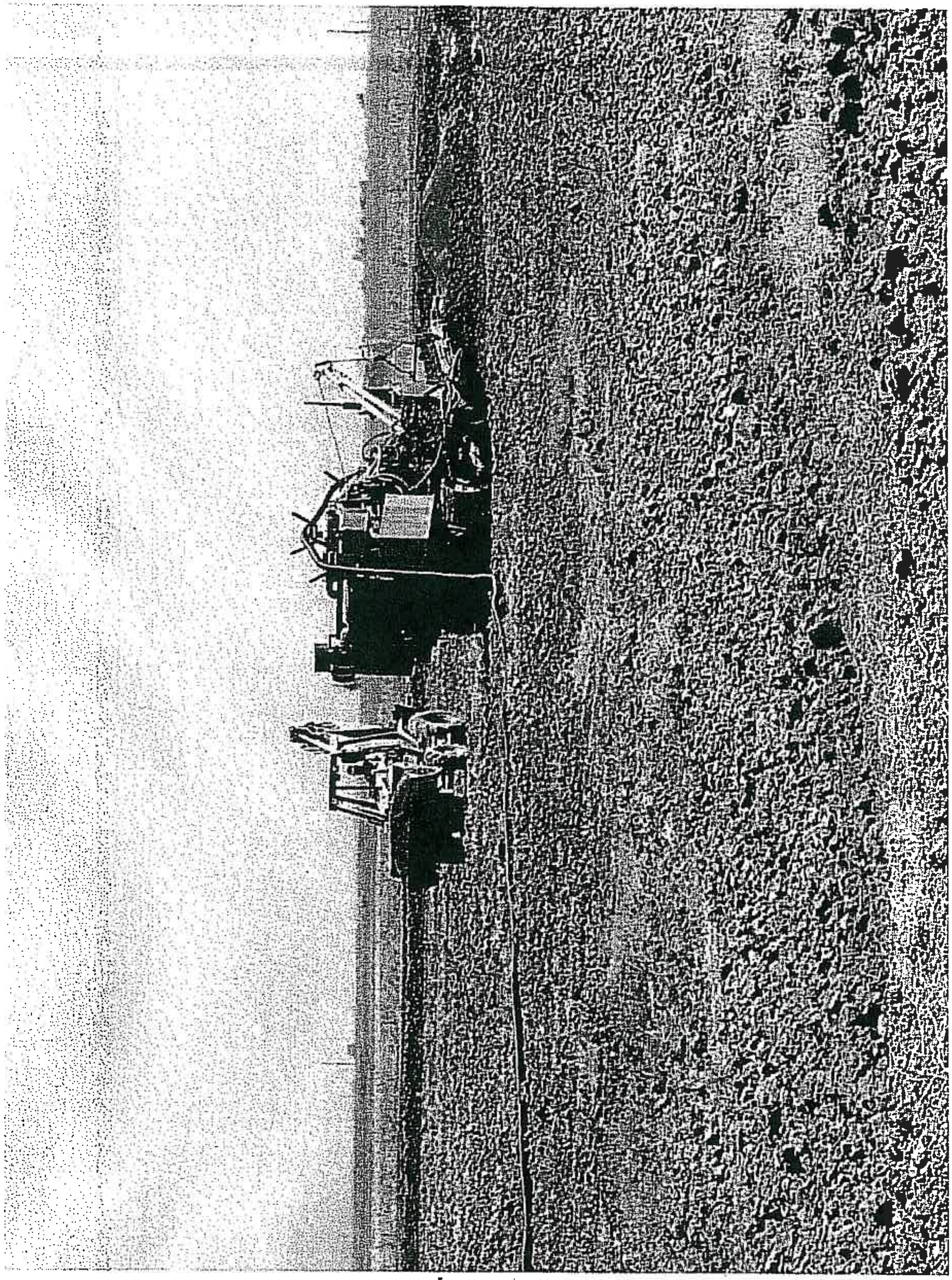

PUMP STATION & DRAIN

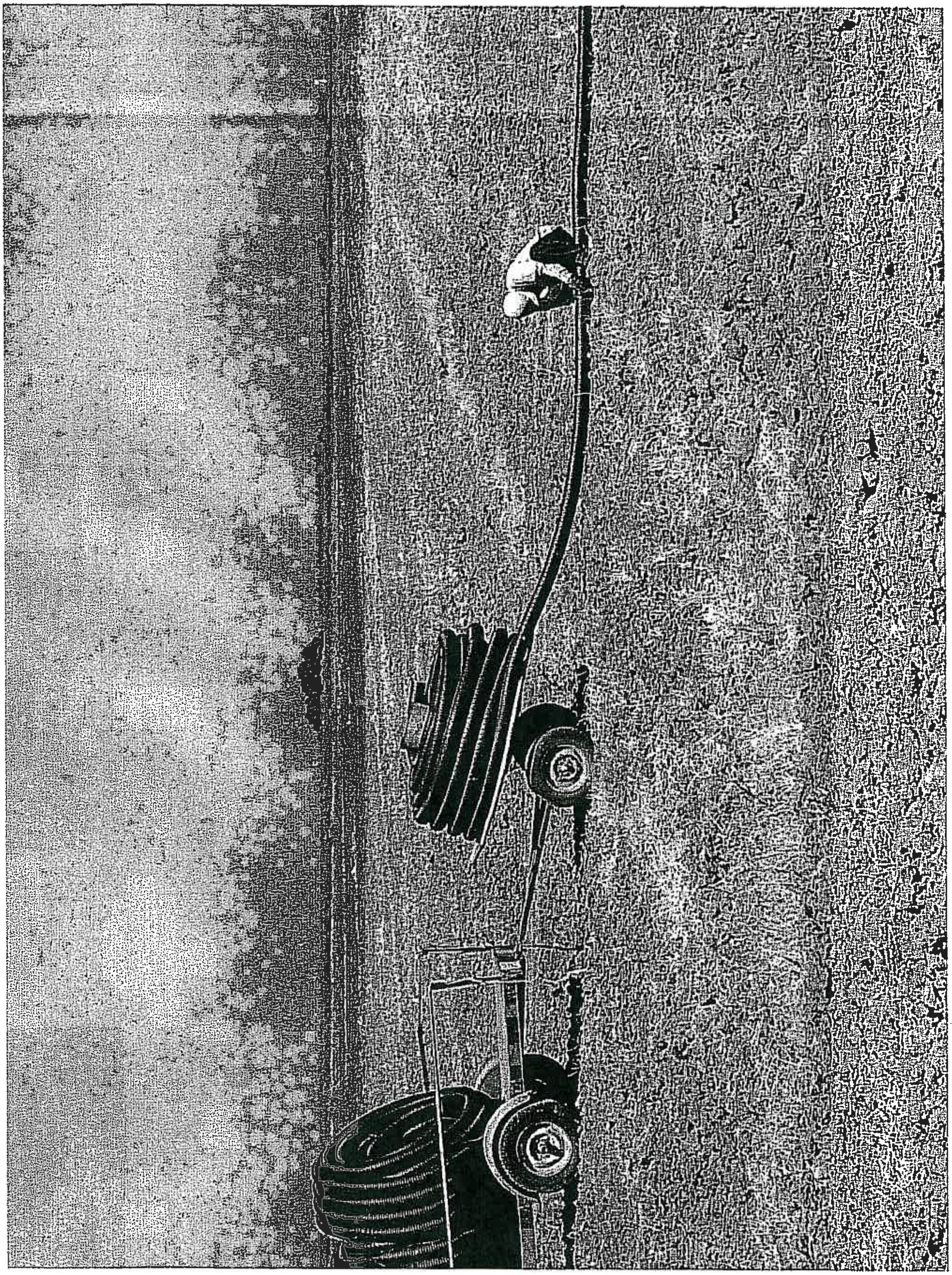


Seeding Field 11-1(Jose Tall Wheatgrass)









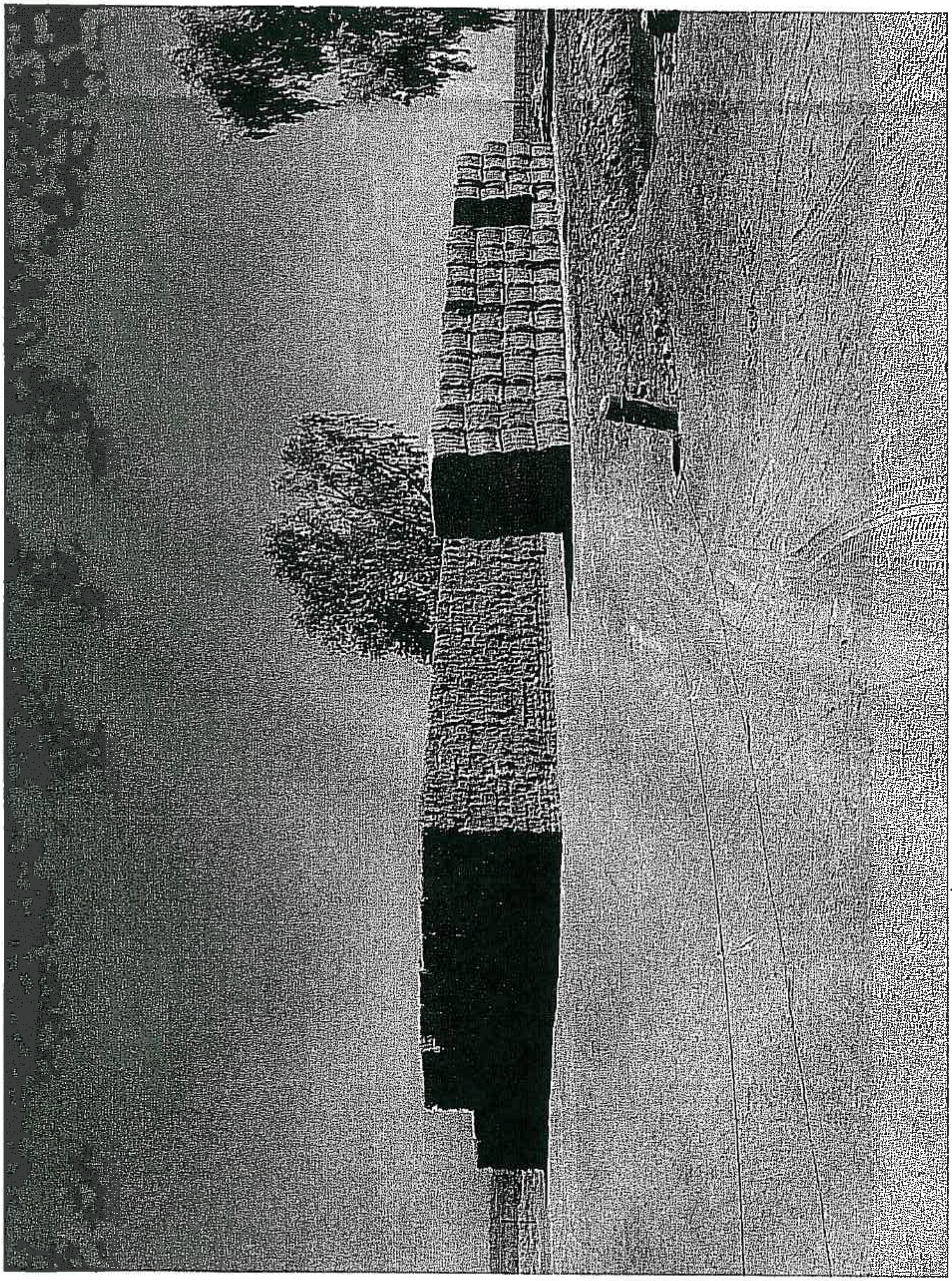


EXHIBIT 4

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY

December 29, 2006

Rudy Schnagl
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive #200
Rancho Cordova, CA 95670-6114

Subject: Waste Discharge Requirement Order No. 5-01-234, Update of Long Term Drainage Management Plan.

Dear Rudy,

The above Waste Discharge Requirements (WDR) requires submission of an update of the long-term drainage management plan for the Grassland Bypass Project. The WDR's were issued to the San Luis & Delta-Mendota Water Authority (Water Authority) and the U. S. Bureau of Reclamation. The Water Authority members that participate in the Grassland Bypass Project are hereafter referred to the Grassland Area Farmers.

The long-term drainage management plan was submitted on September 30, 1998 in compliance with WDR No. 98-171. The plan was updated on July 1, 1999, January 1, 2000, January 1, 2001, December 31, 2001, December 24, 2002, December 31, 2003, December 31, 2004, and December 30, 2005.

Milestones since Last Update

The milestones that have occurred for the Grassland Bypass Channel Project since the December 30, 2005 update are as follows:

- The Grassland Area Farmers have reduced the discharge of selenium from the Grassland Drainage Area by 70% since the beginning of the project as measured at the end of Water Year 2006, despite wet weather conditions which caused a 25% increase in flow within a 48 hour period. Strong storm systems dropped significant rainfall over the Grassland Drainage Area in December 2005, and January and March 2006, resulting in a selenium load exceedance in January 2006 by 310 pounds (147%). The wet winter and spring continued to aggravate drainage conditions through summer months, however, drainage management activities implemented by the Grassland Area FArmers prevented any additional monthly exceedences and, based on our projections, the annual load target was not exceeded.

- The Grassland Area Farmers have continued to develop funding for the Westside Regional Drainage Plan as described in our 2004 and 2005 annual report. The Water Authority on behalf of the Grassland Area Farmers have submitted proposals

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for funding under Proposition 40 and 50, and are currently on the list to receive $26 million in funding though those programs.

- The Grassland Area Farmers continue to utilize and expand the San Joaquin River Water Quality Improvement Project (SJRIP). The total cropped acreage of the SJRIP has been increased in 2006 to approximately 3,500 acres and the project reused more than 9,100 acre feet of subsurface drain water.

- The Grassland Area Farmers are continuing to work closely with the U.S. Bureau of Reclamation to develop an in-valley drainage solution for the Grassland Drainage Area. The In-Valley Solution Plan includes irrigation improvements, seepage reduction, land retirement, recirculation, drainage reuse, and drainage treatment.

- The discharge from the Grassland Bypass Project in Calendar Year 2005 was 4,290 pounds of selenium with a load limit of 4,566 pounds.

Statement of Goals

The principal goal of the Grassland Area Farmers remains as described in the September 30, 1998 long term drainage management plan. This goal is summarized as providing for the achievement of the water quality objectives fixed by the Regional Board and their Basin Plan related to subsurface drainage discharges from the drainage area while maintaining viable agricultural production in that area.

Meeting Water Quality Objectives within Grassland Area Channels

The Regional Board has established a two parts per billion monthly average selenium objective for water delivery channels within the wetland areas. Previous long term drainage management plans discussed the activities within the Grassland Drainage Area to meet this water quality objective. The objective has been exceeded on a few occasions. During 1997 and 1998 there were storm water discharges caused by excessive rainfall and discharge from coastal streams. Subsequent to that time the Grassland Area Farmers have taken actions as submitted to the Regional Board to prevent discharges to wetland areas during non-storm event periods. This has been successful in eliminating discharges from the Grassland Drainage Area that might cause exceedence of the two parts per billion water quality objective. However, in February of 2005, significant storm events required the Grassland Area Farmers to divert water through the Agatha Canal. No diversions into wetland channels have been made since that time.

Uncontrolled Discharges

The Grassland Area Farmers are continuing to work with the USBR and USGS to identify sources of high drainage flows in extreme wet weather events. In September, 2005 the USGS issued a draft of their report "Update Of A Ground-Water Flow Model For The Central Part Of The Western San Joaquin Valley, California". This is the first product of the work that is supposed to assist in identifying these sources. Another source that continues to be of interest is contribution from seepage out of the San Luis Canal/California Aqueduct. This issue was described in the 2004 annual report.

Future Regulation and Milestones

The Regional Board has adopted a TMDL for salt and boron and one for dissolved oxygen. These TMDLs have subsequently been approved by the State Board and the State Office of Administrative Law. These regulations encompass discharges from a much larger area than the Grassland Drainage Area. The Grassland Area Farmers are a participant in these processes.

Discharge during Water Year 2006

Table 1 sets forth discharges from the Grassland Drainage Area for the period Water Year 1995 through Water Year 2006. The Grassland Bypass Project began in Water Year 1997. The volume of drainage has been reduced significantly since this time including a selenium load reduction of 70% in Water Year 2006 compared to pre-project discharges in Water Year 1996. The volume of drainage discharge was reduced by 55%, the salt load by 49%, and the boron load by 38% when compared to pre-project (WY 1996) discharges. Selenium load discharged from the Grassland Drainage Area compared with 2006 monthly targets in WDR 5-01-234 are shown in Figure 1. Selenium discharges were exceeded in January. Figure 2 shows the 2006 discharged load along with historic discharges and the "glidepath" in the Use Agreement incorporating the load values from the August 4, 2005 request for revision of the TMML for selenium. Figure 3 compares actual discharges to the revised load values starting in 2002. Figure 4 shows an estimate of the impact of control activities that occurred during Water Year 2006. Conservation, which includes improved irrigation application, tiered water pricing, tailwater controls and our tradable loads program accounted for a reduction of approximately 4,000 pounds of selenium from historic loads. Reuse and treatment, which includes recycling, use of subsurface drainage water on salt tolerant crops and displacement of subsurface drainage water such as for wetting of roadways for dust control, resulted in a 5,100 pound reduction in discharge in Water Year 2005. The remaining 3,600 pounds was discharged to the San Joaquin River through the Grassland Bypass Project. Figure 3 also shows the estimated impact of the San Joaquin River Water Quality Improvement Project, as well as the impact of an additional 2,000 acres of reuse area.

Water Year 2006 was designated a wet year type in accordance with the Waste Discharge Requirements. During Water Year 2006 the 4-day average selenium concentration at Crows Landing did not exceed 5 ppb in all months where data was available. This is in compliance with the October 1, 2005 water quality objective for above normal and wet year types.

Tools to be used For Long Term Drainage Management

Conservation, reuse and treatment, and river discharge will continue to be the main tools available to the Grassland Area Farmers during the next several years.

During Water Year 2001, Panoche Drainage District on behalf of the other Grassland Area Farmers implemented the San Joaquin River Water Quality Improvement Project (SJRIP). Table 2 shows the usage of subsurface drainage water within the SJRIP area in 2006. The project resulted in a displacement of 2,825 pounds of selenium. The SJRIP is a multi-phase project, which was initiated with the purchase of 4,000 acres of land in the year 2000 within the Grassland Drainage Area by Panoche Drainage District. During 2006, 3,500 acres were irrigated within the 4,000 acre area. Additionally, the Grassland Area Farmers are in the process of designing and constructing a number of infrastructure projects that will increase the operational flexibility and efficiency of the SJRIP. Future phases call for installing subsurface tile drainage systems in the remainder of the SJRIP area to maintain a salt balance within the soil and for disposal of the collected water through treatment and salt disposal options. Panoche Drainage District and Firebaugh Canal Water District have partnered with the USBR to fund USDesal (a private company) in the investigation of a treatment process to treat drain water. Significant funding is still required to complete the SJRIP Project and other components of the drainage solution, and the Grassland Area Farmers are aggressively seeking this additional funding.

Panoche Drainage District is also taking the lead in expanding the acreage of the SJRIP. This includes seeking funding through implementation of the Westside Regional Drainage Plan through the efforts of the San Joaquin River Water Quality Management Group.

Future Needs

In order to maintain the drainage control strategy for the Grassland Area Farmers, there are several needs. They are as follows:

- The completion of the SJRIP Project including the planting and construction of subsurface drainage systems.

- Purchase of additional SJRIP lands of up to 2,000 acres for planting of additional cropping to be irrigated with subsurface drainage water.

- Implementation of treatment and disposal of salt from the SJRIP lands. The USBR is a partner with Panoche Drainage District and other areas in the Grassland Drainage Area working on further research and implementation of these treatment and disposal options. The USBR is also proceeding with their San Luis Drainage Feature Re-evaluation process, which includes options for future salt disposal.

- Investigations need to be completed on the identification of contributions to subsurface drainage within the Grassland Drainage Area from other sources, primarily the uncontrolled discharges described above. Once this has been determined, then control and participation by other parties will need to be identified.

- Retirement of land could be part of the ultimate solution to the problem within the Grassland Drainage Area. The Grassland Area Farmers have developed a land retirement policy that was identified and described in the September 30, 1998 Long Term Drainage Management Plan. In addition to this plan, Broadview Water District has recently been purchased and has been fallowed. Other lands within the Grassland Drainage Area are also being considered for fallowing.

- The Grassland Area Farmers and other local interests have been participating with the USBR in their San Luis Drainage Feature Re-Evaluation Program. The goal of the Grassland Area Farmers is to develop local projects that can be implemented to meet the selenium load reduction targets, while still a viable agricultural economy.

Recent Developments

There are three recent and on-going developments related to efforts of the Grassland Area Farmers to meet the regulatory requirements of the Waste Discharge Permit and the Use Agreement. The first two were indicated in the 2004 annual report.

- The Westside Regional Drainage Plan has been developed by the San Joaquin River Exchange Contractors Water Authority, the Broadview Water District, Panoche Water District and Westlands Water District. This process is meant to complement the USBR San Luis Drain Feature Re-evaluation process and to help resolve long standing drainage issues within the area. The Grassland Area Farmers are aggressively pursuing funding opportunities to implement the Westside Regional Drainage Plan, and have met on a number of occasions with the USBR to move this plan forward.

- The San Joaquin River Water Quality Management Group was formed out of the "UOP Discussions" between statewide water interests and Delta interests to develop a plan to meet Vernalis salinity objectives. There are many components to this plan that is being developed, one of the major ones being the future reductions of discharge from the Grassland Drainage Area.

- In the Spring of 2006, the Grassland Area Farmers submitted proposals to the Proposition 40 Consolidated Grants program and the Proposition 50 Integrated Regional Watershed Management program. As of November, 2006, the Grassland Area Farmers have been notified that some of these projects are being recommended for $26 million in funding.

- In December, 2006 the Grassland Area Farmers complied with the requirement in the Use Agreement that a Mud Slough Compliance Plan be developed by 2006 to meet Mud Slough water quality objectives. This letter also outlined a process to continue discharges to the San Joaquin River beyond the term of the current Use Agreement, which expires in December, 2009.

Conclusion

The Grassland Area Farmers are committed to a reasonable process that will meet the goals as earlier stated. This includes maintaining efforts to meet current monthly and annual selenium targets while at the same time aggressively pursuing the long term solutions and funding that will be necessary to meet the future requirements.

If you should have any questions please feel free to call. I can be reached at (559) 582-9237.

Very Truly Yours,

Joseph C. McGahan
Drainage Coordinator
Grassland Area Farmers

JCM/jcl

Cc: Dan Nelson, SL&D-MWA
Grassland Basin Drainage Steering Committee
Mike Delamore, USBR
Kirk Rodgers, USBR

Table 1
Discharge Comparison from Grassland Drainage Area
Values October thru September

	WY 95	WY 96	WY 97	WY 98	WY 99	WY 00	WY 01
Volume (AF)	57,574	52,978	39,856	49,289	32,317	31,342	28,235
Se (lbs)	11,875	10,034	7,096	9,118	5,124	4,603	4,377
Salt (tons)	237,530	197,526	172,602	213,533	149,081	139,303	142,415
B (1,000 lbs)	868	723	753	983	630	619	423
Se (ppm)	0.076	0.070	0.066	0.068	0.058	0.054	0.057
Salt (µmhos/cm)	4,102	3,707	4,306	4,308	4,587	4,420	5,016
Boron (ppm)	5.5	5.0	7.0	7.3	7.2	7.3	5.5

	WY 02	WY 03	WY 04	WY 05	WY 06	Reduction from WY 96 to WY 05
Volume (AF)	28,358	27,345	27,640	29,957	25,995	.55%
Se (lbs)	3,939	4,032	3,860	4,305	3,583	70%
Salt (tons)	128,411	126,500	121,138	138,908	120,258	49%
B (1,000 lbs)	544	554	530	585	540	38%
Se (ppm)	0.051	0.054	0.051	0.053	0.051	
Salt (µmhos/cm)	4,503	4,600	4,358	4,611	4,600	
Boron (ppm)	7.1	7.5	7.1	7.2	7.6	

Note: WY 97, 98, & 05 include discharges through Grasslands
Note: GAF quality data used where RWQCB data was missing or pending.

Table 2
San Joaquin River Water Quality Improvement Project
Calendar Year 2006

MONTH	WATER APPLIED (AF) DRAIN	OTHER	TOTAL	SELENIUM LBS	SALT TONS	BORON LBS
JAN 06						
FEB	451	478	929	93	2,705	6,790
MAR	1,159	210	1,369	324	5,900	24,180
APR	1,104	0	1,104	300	5,679	20,704
MAY	737	382	1,119	263	4,786	18,435
JUN	1,630	642	2,272	556	9,784	31,232
JUL	1,534	727	2,261	417	8,456	32,240
AUG	1,395	642	2,037	479	7,962	30,610
SEP	914	496	1,410	322	5,375	17,764
OCT	215	68	283	71	1,235	2,334
NOV						
DEC						
TOTAL	**9,139**	**3,645**	**12,784**	**2,825**	**51,882**	**184,289**

Figure 1
Discharge from the Grassland Drainage Area
October 2005 through September 2006

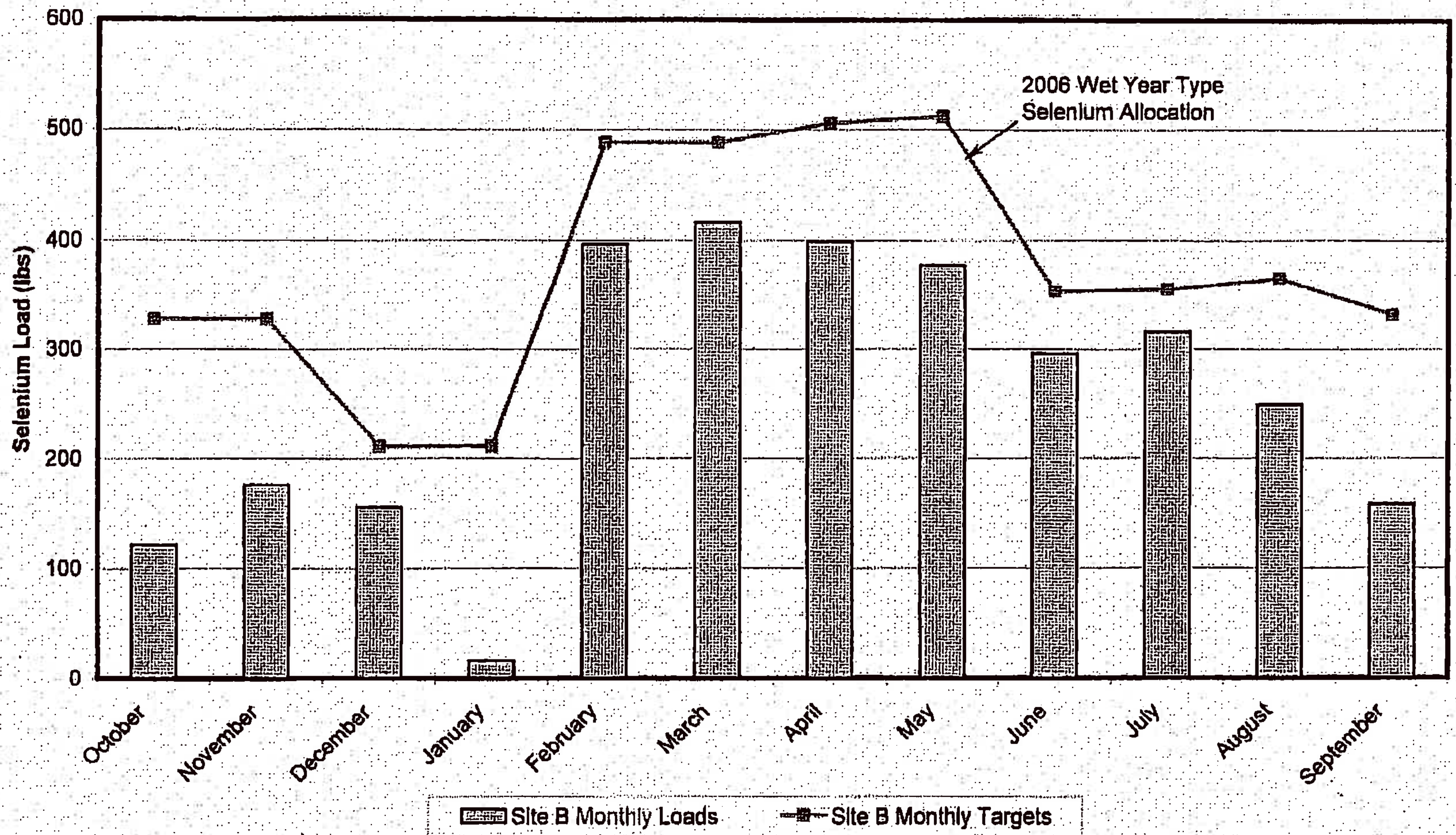


Figure 2
Grassland Drainage Area
Selenium Discharge and Targets

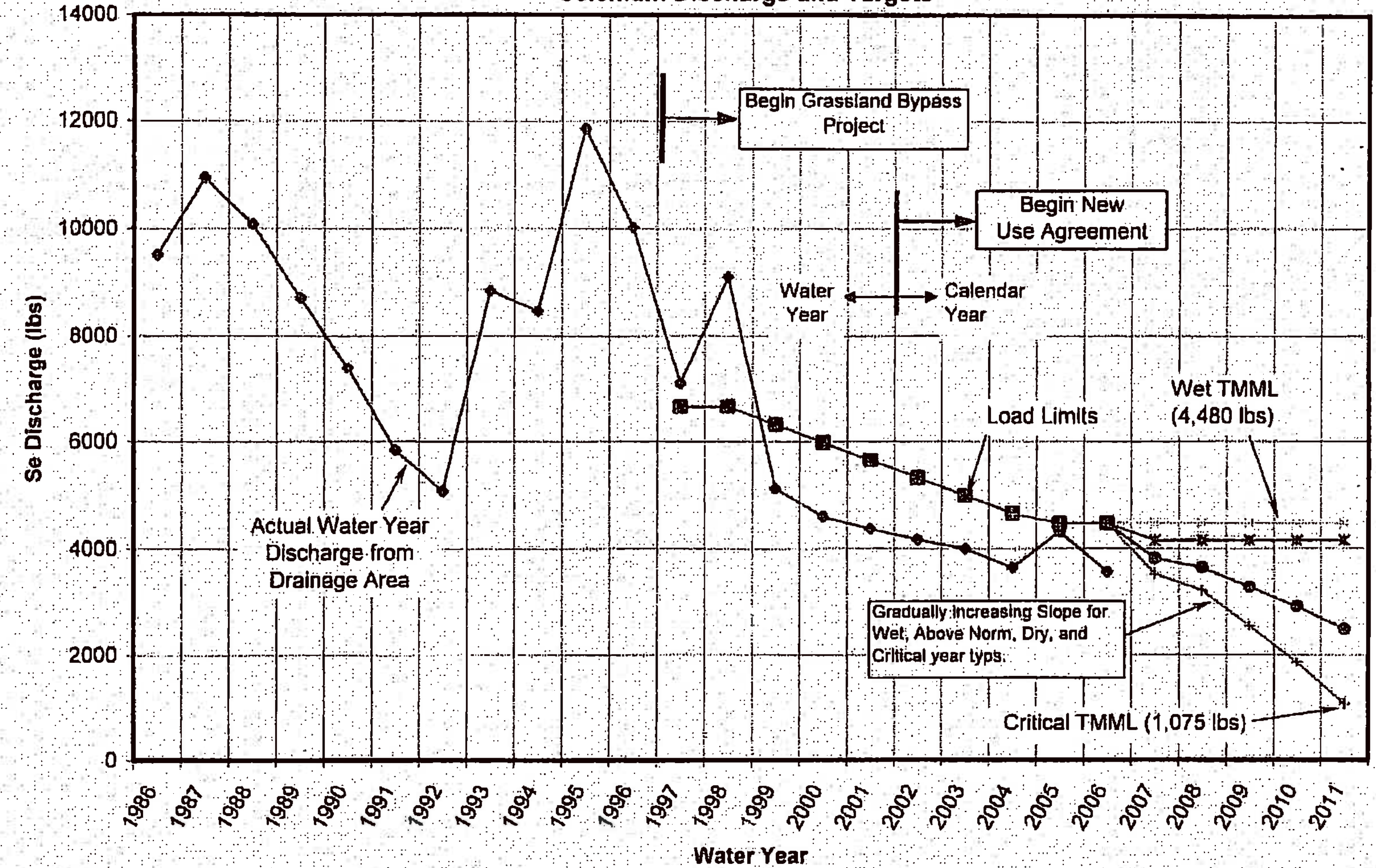


Figure 3
Grassland Bypass Project
Annual Selenium Load Discharge and Values

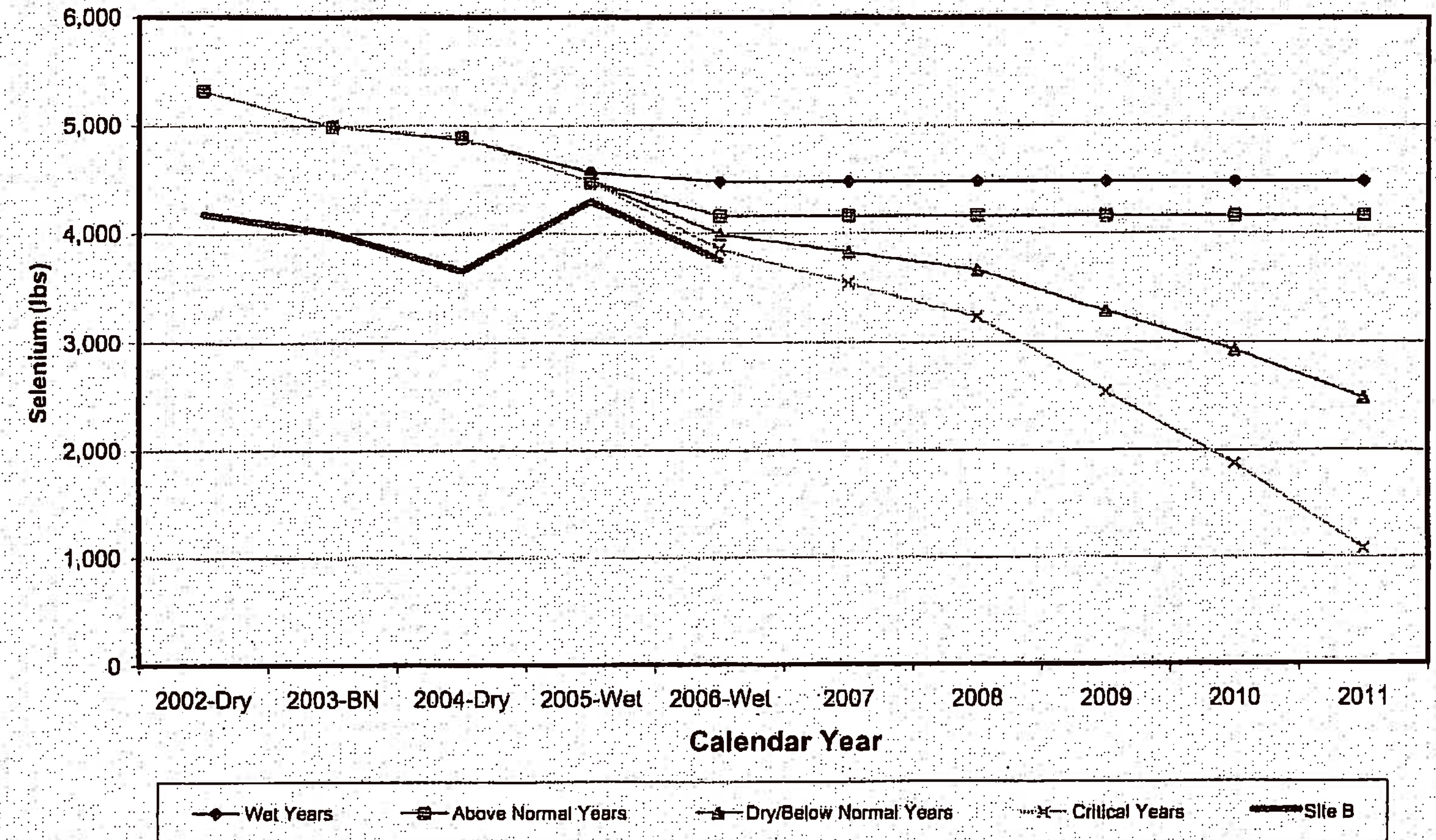
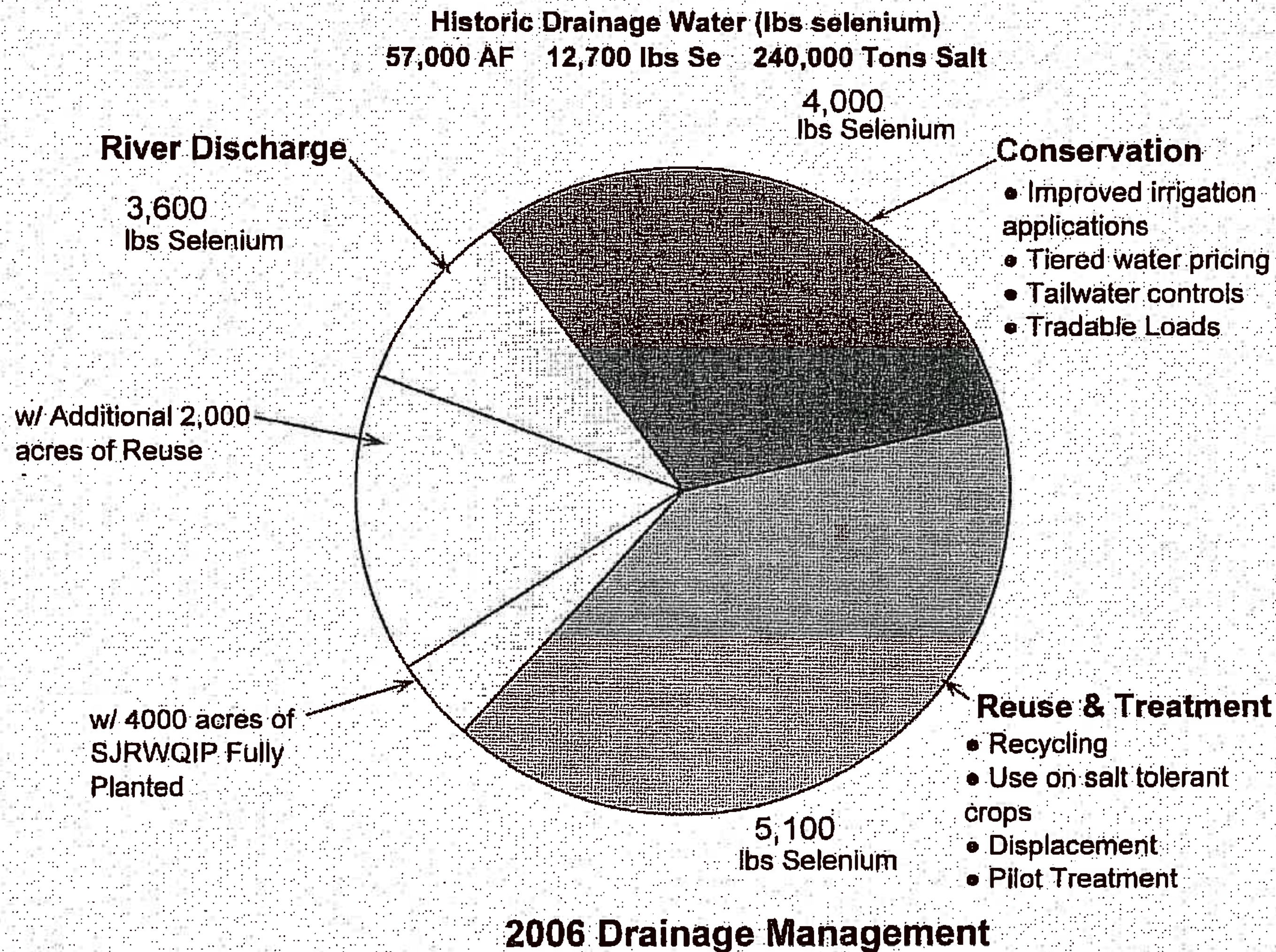


Figure 4


Historic Drainage Water (lbs selenium)
57,000 AF 12,700 lbs Se 240,000 Tons Salt
4,000
lbs Selenium
Conservation
• Improved irrigation applications
• Tiered water pricing
• Tailwater controls
• Tradable Loads
River Discharge
3,600
lbs Selenium
w/ Additional 2,000 acres of Reuse
w/ 4000 acres of SJRWQIP Fully Planted
Reuse & Treatment
• Recycling
• Use on salt tolerant crops
• Displacement
• Pilot Treatment
5,100
lbs Selenium
2006 Drainage Management

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January 8, 2007

Ms. Gita Kapahi, Chief
Bay Delta/Special Projects Unit
State Water Resources Control Board
P. O. Box 2000
Sacramento, CA 95812-2000

Re: Correction to Southern Delta Salinity Workshop Comments

Dear Ms. Kapahi:

On January 5, 2007, the San Luis & Delta-Mendota Water Authority submitted a letter to the State Water Resources Control Board, providing its comments for the scheduled workshop on the southern Delta water quality objectives for salinity. On page 14 of its letter, the Authority wrote that the Westside San Joaquin River Watershed Coalition submitted numerous reports to the Regional Board as required by the Irrigated Lands Program, including six semi-annual monitoring reports. The referenced number of semi-annual reports is incorrect. In fact, the Westside Coalition has submitted only four reports. Please excuse the error. I apologize for any inconvenience it has caused.

Very truly yours,

DIEPENBROCK HARRISON
A Professional Corporation

By [signature]
Jon D. Rubin
Attorneys for the San Luis & Delta-Mendota Water Authority

cc: Daniel Nelson

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January 11, 2007

Ms. Gita Kapahi
Chief
SWRCB
Bay Delta/Special Projects Unit
1001 I Street, 14th Floor
Sacramento, California 95812-2000

Re: Southern Delta Salinity Workshop

Dear Ms. Kapahi

Enclosed please find an original and ten copies of the comments of the Kern County Water Agency on the Southern Delta Salinity Workshop, scheduled for January 16 and 19, 2007. Thank you for your consideration of these comments. If you have any questions, please feel free to contact us.

Sincerely,

KRONICK, MOSKOVITZ, TIEDEMANN & GIRARD
A Law Corporation
CLIFFORD W. SCHULZ
HANSPETER WALTER

HW/dk
Enclosures
850599.1 50.502

OPENING STATEMENT OF THE KERN COUNTY WATER AGENCY FOR THE STATE WATER RESOURCES CONTROL BOARD'S CONSIDERATION OF SALINITY OBJECTIVES FOR THE SOUTH DELTA

(Presented January 16, 2007)

Introduction

Today the State Board begins what the Kern County Water Agency hopes will be a one or two year process to seriously and scientifically reexamine the facts and mythologies that surround the agricultural salinity needs and rights in the southern portion of the Sacramento-San Joaquin Delta. This process needs to consider not only the water quality requirements of crops now grown in the southern Delta, but also the history of the region's water supply and irrigated agriculture, the causes of salinity degradation, and the logical cures for any impairments.

Fifteen or twenty years or more has passed since southern Delta salinity has been rigorously examined. During that time far more sophisticated tools have been developed to study Delta hydrology and how salinity moves and is concentrated. Further, better scientific techniques have been developed to measure crop responses to salinity and to manage salt buildup. These tools now need to be applied specifically to the southern Delta channels, soils, and crops. This work should be done by independent scientists. This will take time and this first workshop should be viewed only as the beginning of the effort. No one should believe that two days of workshops can provide the State Board with the kind of data that a serious evaluation will require.

In addition, since the State Board last considered the rights and needs of southern Delta farmers, two important judicial decisions have been penned by Justice Robie of the Third District Court of Appeal. These decisions will require the State Board to modify the way it procedurally and substantively approaches water quality control planning. In particular, the substantive rights and obligations of the parties to these ever-ongoing Delta hearings have been clarified in several important respects.

This opening statement will first describe the legal backdrop. It will then focus on the fact development process that we believe is required to ascertain if proposed water quality objectives will provide a reasonable level of protection to the agricultural beneficial use and how best to implement those objectives.

Legal Background

Often, one hears the over-simplistic statement that the Porter-Cologne Act (Water Code section 13000 et seq.) mandates that the State Board identify the water quality that will fully protect the identified beneficial use (in this case agricultural irrigation) and then establish a program to ensure that such water quality is achieved. In reality, the statutory guidelines and the task of applying them are far more complex, and involve, like all exercises of this type, crafting a reasonable balance between competing needs.

Water Code sections 13240 and 13241 define the balancing process as follows:

> 13240. Each regional board shall formulate and adopt water quality control plans for all areas within the region. Such plans shall conform to the policies set forth in Chapter 1 (commencing with Section 13000) of this division and any state policy for water quality control. ....
>
> 13241. Each regional board shall establish such water quality objectives in water quality control plans *as in its judgment will ensure the reasonable protection* of beneficial uses and the prevention of nuisance; however, it is recognized that it may be possible for the quality of water to be changed to some degree without unreasonably affecting beneficial uses. Factors to be considered by a regional board in establishing water quality objectives shall include, but not necessarily be limited to, all of the following:
>
> (a) Past, present, and probable future beneficial uses of water.
>
> (b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.
>
> (c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.
>
> (d) Economic considerations.
>
> (e) The need for developing housing within the region.
>
> (f) The need to develop and use recycled water.
>
> (Italics added.)

Water Code section 13000 sets out the primary policy referred to in section 13240:

> The Legislature finds and declares that the people of the state have a primary interest in the conservation, control, and utilization of the water resources of the state, and that the quality of all the waters of the state shall be protected for use and enjoyment by the people of the state
>
> The Legislature further finds and declares that activities and factors which may affect the quality of the waters of the state shall be regulated to attain the highest water quality *which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible.* (Italics added.)

Thus, clearly, salinity objectives for southern Delta agriculture must be established with reference to (i) past, present, and probable future uses of the water, (ii) the quality of the water available, (iii) statewide economic considerations, and (iv) the competing demands for water for all beneficial uses inside and outside the Delta. All of this information is required to determine if a proposed objective meets the statutorily mandated reasonableness criterion.

The importance of balance and reasonableness was highlighted by the recent Third District Court of Appeal opinion in the *State Water Resources Control Board Cases* (2006) 136 Cal.App.4th 674. There, in reviewing water rights Decision 1641, the Court of Appeal was faced with a contention by the State Board that "[n]othing in the Porter-Cologne Act mandates the Board to adopt all of the flow-dependent objectives in a water quality control plan when it issues a water right decision." In this case, the State Board had argued that it was only required to consider such objectives; and was not required to implement them. The Court of Appeal disagreed:

> Section 13247 – part of the Porter-Cologne Act – provides that "[s]tate offices, departments, and boards, in carrying out activities which may affect water quality, shall comply with water quality control plans approved or adopted by the state board unless otherwise directed or authorized by statute ... ." (Italics added.) Here, in the plan of implementation in the 1995 Bay-Delta Plan, the Board

> specifically stated that "[t]he water right decision ... will allocate responsibility for meeting the [water supply-related] objectives among water rights holders in the Bay-Delta Estuary watershed ... ." (1995 Bay-Delta Plan, p. 27, italics added.) Thus, the 1995 Bay-Delta Plan specifically identified this water rights proceeding and Decision 1641 as the action "necessary to achieve the [river flow] objectives" of the 1995 Bay-Delta Plan, including the Vernalis pulse flow objective. (§ 13242, subd. (a).) Certainly, in conducting a water rights proceeding for the express purpose of allocating responsibility for meeting a water quality objective in a water quality control plan, the Board is "carrying out [an] activit[y] which may affect water quality." (§ 13247.) Accordingly, the Board was compelled by section 13247 to comply with the 1995 Bay-Delta Plan unless another statute authorized the Board not to comply with the plan. (136 Cal.App.4th 647, 730)

The implications of this ruling will, and must, alter the way the State Board approaches development of water quality objectives. Now, before the Board establishes a salinity or other objective that it expects to implement through water rights actions, it needs to consider and decide that the objective is capable, legally and practically, of being fully met by imposing terms and conditions on water rights permits. According to the Court of Appeal, Water Code section 13247 "compels" full implementation of that objective through water rights actions unless another statute authorizes a different result. Kern suggests that a water quality objective that is to be implemented solely through water rights actions, but which legally cannot be fully accomplished in that fashion or can only be fully accomplished by dramatically impacting other beneficial uses, *per se* fails the reasonable protection standard established by Water Code section 13241.

When evaluating whether a proposed Delta salinity objective meets the statutory reasonable protection standard, the *State Water Resources Control Board Cases*, and the even more recent decision in *El Dorado Irrigation District v. SWRCB* (2006) 142 Cal.App.4th 937, combine to articulate a second important rule that the State Board must factor into its planning process. In the *El Dorado* case, the Court of Appeal expressly addressed the issue of whether the area of origin statutes can be interpreted to require the State Water Project ("SWP") to release previously stored water to benefit in-basin water users such as El Dorado. The answer was a resounding "no:"

> In any event, ... section 11462 contradicts the trial court's conclusion that appropriators in an area of origin may assert a priority to water from that area that was properly stored by another in an earlier season. That statute provides that the area of origin statutes do not "require the department to furnish to any person without adequate compensation therefor any water made available by the construction of any works by the department."
>
> This provision reveals that the Legislature did not intend to give users within an area of origin the right to water stored by the Department without paying for it. Since the burden of the area of origin provision in section 11460 falls as much on the Bureau as it does on the Department, there is no reason to believe the Legislature did not intend the Bureau to equally benefit from the provisions of section 11462. In other words, although El Dorado may be entitled to assert a priority under section 11460 over the Bureau and the Department to the diversion of water originating in the watershed of the South Fork American River, that priority does not extend to water the projects have properly diverted to storage at an earlier date. If El Dorado wants water properly stored by the projects, it must pay for it. (142 Cal.App.4th 937, 976)

Similarly, in the *State Water Resources Control Board Cases*, in response to claims by the Central Delta Water Agency, the Court of Appeal rejected the argument that the Delta Protection Act (Water Code section 12000 *et seq.*) required the SWP to provide stored water when necessary to meet the water quality needs of Delta diverters. The Court stated:

> As for the argument of the Central Delta parties that the Delta Protection Act gives Delta riparians and appropriators a right to water stored upstream by others, we disagree. Nothing in the Delta Protection Act purports to grant any kind of water right to any particular party. (136 Cal.App.4th 647, 771-772)

After years of argument and counterargument by the various Delta parties, it is now clearly the law of this State that Delta water users,[1] do not have the right to demand that the SWP provide water quality enhancements through stored water releases to those who have chosen to own and farm lands that are naturally prone, particularly in drier year types, to saline water conditions.

Kern is intentionally using the term "enhancements" to distinguish any obligation to mitigate significant impacts to Delta water quality that are caused by SWP operations from an improvement in water quality above that which would have existed if the SWP were not operating in the Delta. This distinction is in harmony with the State Board's recently adopted 2006 Delta Water Quality Control Plan, which states at page 3:

> This plan establishes water quality control objectives for which implementation can be fully accomplished only if the State Water Board assigns some measure of responsibility to water right holders and water users *to mitigate for the effects on the designated beneficial uses of their diversions and use of water.* (Italics added.)

The State Board's recognition that the obligations of water rights holders are limited to mitigating their impacts meets the directives of the two recent Court of Appeal decisions and ensures that the owners and operators of upstream storage facilities are not required to subsidize riparians and appropriators in the Delta who may wish to lower their agricultural production costs by gaining artificial enhancements of their water quality from projects that are being financed by others. The Delta has always – from the day the first land reclamation occurred – been subject to the water quality vagaries that are inherent in a location so close to the ocean and at the mouth of the water course.

Fact Development

The statutory language and the referenced Court of Appeal decisions guide the type of factual issues that must be considered by the State Board as it considers whether a proposed southern Delta salinity objective is reasonable. Kern breaks factual issues into

[1] With the exception of those within the North Delta Water Agency, which had the foresight to sign an agreement with DWR for water quality services.

four separate, but related, areas of inquiry – (i) the natural water quality regimen, (ii) the crops that have been grown, are being grown, and may be grown in the south Delta and their salinity tolerance, (iii) the impacts on other beneficial uses of various levels of salinity protection, and (iv) determining the mitigation responsibilities, if any, of the SWP, CVP, and possibly other upstream water users.

1. Establish An Historic Baseline.

The State Board should develop data on the historic patterns of flow and water quality on which southern Delta agriculture was established. This information is central to determining what constitutes a reasonable level of protection and to establishing a baseline condition against which impacts and mitigation responsibilities, if any, of SWP operations can be measured.

Water Code section 13241(b), quoted above, requires the State Board, before it sets a water quality objective, to consider the "environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto." In this case the historic water quality that existed before the SWP was in place best describes the water quality (salinity level) that is available for diversion under the riparian and appropriative rights of Delta water users. Further, because we are dealing with a tidal estuary, those salinity levels vary widely from year to year and month to month, depending largely on the whims of mother nature. Yet, despite the natural variability demonstrated by the historical data, the existing southern Delta agricultural objectives are unique among the Delta agricultural water quality objectives in their failure to include *any* dry year relaxation provisions. In order to meet the statutory reasonableness criterion, a southern Delta salinity objective, like the other Delta agricultural objectives, should reflect the natural variations that are demonstrated by the historical record.

This need to recognize the natural variation in salinity is not a new and novel concept. In 1922, years before the CVP and SWP existed, the California Supreme Court in *Town of Antioch v. Williams Irrigation District* ((1922) 188 Cal. 451) was faced with a request for an injunction by the Town to stop upstream Sacramento River irrigators from diverting water that reduced Delta outflow to a point where salinity intrusion from Suisun Bay made the Town's water supply too salty for domestic use. The Supreme Court rejected the requested relief, as follows:

> The place where the river water meets and overcomes the inflowing tide is not fixed. It changes with the rise and fall of the rivers and tides. The tides vary in height. The rivers vary much more in their volume and height. Hence, it follows that where there is fresh water one day there may be salt water a week, or even a day, thereafter. At a point near to that meeting place, the diversions of the riparian owners, of which no complaint is here made, may change the character of the water at any time. Dry seasons advance the point of meeting farther up the stream, and wet seasons drive it farther into the bay. *Any person who appropriates water from one of these rivers at a point near to that meeting of the waters must take notice of these conditions and his rights will necessarily be restricted thereby.* He acts at his peril with regard to them. He must also take notice of the policy of our law, which undoubtedly favors in every possible manner the use of the waters of the streams for the purpose of irrigating the lands of the state to render them fertile and productive, and discourages and forbids every kind of unnecessary waste thereof.
>
> The record in this case shows that in the extreme dry season in the year 1920 the flow of the river at the city of Sacramento was reduced to 420 second - feet, largely by the diversions of the defendants. The claim of the city of Antioch is that for its protection the flow at that point must be maintained at 3,500 second - feet. In effect, therefore, its claim is that 3,080 second - feet of water otherwise available for irrigation above must at all times be kept flowing down the river into the bay, without any other beneficial use whatever, in order that the city of Antioch may be able to take less than one second - foot of fresh water therefrom at its pumping plant near the mouth of one of the rivers. Not only this, but, if its claim is allowed, every other prior user of water who takes it out near to the meeting place of the waters must be allowed the same right. And as the close proximity of the place of diversion to the meeting of the waters would not divest or affect the right as against subsequent appropriators above, one whose pump was a hundred yards above the highest known rise of the salt water would have the right to keep practically the entire

> river flowing down to his pump so as to keep the salt water therefrom. Thus a single appropriator of water for the domestic use of one family, taking probably less than a fiftieth part of a second - foot of fresh water for actual use, would, in practical results, appropriate or control 3,080 second-feet of water of the river to supply his pipe with that infinitesimal quantity, and in that way he would keep more than 300,000 acres of fertile land in the valley above dry and unproductive. By a valid appropriation of one miner's inch he would, in effect, appropriate all the water flowing in both of these large rivers. It would be hard to conceive of a greater waste for so small a benefit.... (188 Cal. 451, 460; Italics added.)

By evaluating the historic flows and water quality, the State Board can begin the task of determining if and when relaxations of the objectives may be reasonable and also develop data that will aid the investigations related to export project impacts, if any, on otherwise existing salinity conditions. This type of data will also allow the State Board to comply with Water Code section 13241(b).

This historic data is available from many sources. For example, in 1931, the State of California, published, for that era, a monumental work detailing historic salinity patterns in the Delta and the responses of irrigators to the annual influxes of salinity which has been magnified by the growth of upstream irrigation uses. Bulletin 27 contains pages and pages of tables that show, from year to year and within each individual year during the 1920s, the flows and resulting salinity levels in the Delta. These early years are essential to a reasonableness evaluation, as the data is not clouded by operation of the CVP or SWP. In particular, data from 1926 (a dry year under both the Sacramento River 40-30-30 and San Joaquin River 60-20-20 formulas) and 1931 (a critical year under those formulas) indicate how much salinity varied in the drier years and how the farmers responded. Kern will continue to develop historic data and urges the State Board to consider these types of analyses in its deliberations.

2. <u>Reexamine The 1978 and 1990 Agricultural Salinity tolerance Materials And Update Them With More Current Studies That Focus On Southern Delta Conditions.</u>

The earlier southern Delta salinity workshops and the CDO proceedings were filled with conflicting opinions concerning the outcome of the studies that began over thirty years ago to ascertain the salt tolerance of key crops grown in the Delta. Attempts to introduce more recent scientific information that suggested gaps and/or errors in the earlier studies were met with objections that they did not focus on or reflect actual field conditions in the southern Delta. In particular, there was debate concerning how rainfall was or was not considered and whether the tighter soils and higher water tables in the southern Delta were taken into account.

Kern has begun to review the earlier reports and finds that most focused on the needs of corn grown in the peat-soil areas of the Delta. The southern Delta is predominantly mineral soils that are surface irrigated. Therefore, these peat-soil studies, while somewhat relevant to the issue of how a crop responds to the salinity levels in the soil water extract (EC_{SW}), are not relevant for determining the ratio of irrigation water salinity (EC_W) to the EC of the soil water extract. There were, however, several field studies in the southern Delta, including a 1976 study by Myer et al., that looked at nine locations in the southern Delta that were growing alfalfa, winter oats, summer corn, tomatoes, sugar beets, and walnuts.

In May, 1991, fifteen years after the studies were completed, the State Board, in its "Water Quality Control Plan For Salinity," established a 0.7/1.0 EC salinity objective for the southern Delta. However, the staff analysis set out in the Plan contains the following statement:

> In developing objectives for beans and alfalfa, the evidence and exhibits from the Phase I hearing, information from the DWR-sponsored South Delta Agricultural Workgroup, and the southern Delta negotiations were taken into consideration.

> Within the subworkgroup, three key issues were discussed that influence the level of salinity required for the protection of beans and alfalfa: crop response during the early stages of growth, the determinations of leaching fractions, and the effectiveness of rainfall in reducing soil salinity during the irrigation season. The members of the subworkgroup have been unable to reach consensus. Consequently, the State Board has decided to base its analysis ... on the University of California's "Guidelines for The Interpretation of Water Quality for Agriculture", and the Delta Plan. (1978, Delta Plan, UC ex. D)

As far as Kern knows, there has been no change in the status of the studies or in the lack of consensus among the involved parties. Yet, there have been new studies and a continuing debate over the conclusions reached through the earlier work that was left unresolved in the early 1990s. These current proceedings are the place to review the data, evaluate whether the 30-year old studies meet current scientific standards, and perhaps even reach consensus on the land, water, and crop management questions that were left unresolved.

Kern believes that the measuring period for the southern Delta salinity objectives should be one of the issues reviewed. Currently, it is a running 30-day average. From the earlier studies, it appears that the ratio of EC_W to EC_{SW} is based on the average quality of the applied irrigation water over the entire growing season. The studies also suggest that some of the important crops may be less salt tolerant at the seedling stage and more tolerant later in the growing season. Thus, if an EC less than the selected objective is provided in the spring when natural patterns of river flow often provide better quality water, it may be possible to establish objectives that more closely mimic the natural seasonal patterns of salinity in the Delta (fresher in the Spring and more saline in the summer and fall) by allowing salinities to exceed, for example, 0.7 in the late summer as long as the average over the growing season does not exceed the objective.

As can be seen from the preceding paragraph, Kern is not, at this time, contending that 0.7 EC is an incorrect objective. Instead, we are asking that this objective be scientifically reviewed because many questions were left open in the past. If it turns out that the objective is unnecessarily low, it can be revised. Even if it stays the same, there may be better ways of measuring compliance that reflect natural inter-monthly salinity variations, which are closely related to the ability of water flows and/or water rights actions to meet the current objectives in the low-flow summer months.

Kern strongly recommends that the State Board retain independent experts to review the earlier studies, develop a methodology for updating that information, and carry out southern Delta-specific studies that will address the existing uncertainties. To avoid unnecessary effort and expenses, the initial work should encompass a review of what is presently available and a recommendation to the State Board and the interested parties as to the gaps or uncertainties that need further work. A workgroup of the type referred to in the 1991 Plan referenced above could be established to provide guidance to the independent experts.

3. Determine The Effects of SWP Operations On Salinity Levels In The Southern Delta.

As noted earlier in this statement, one purpose of these southern Delta proceedings should be to determine to what extent holders of water rights should be required "to mitigate for the effects on the designated beneficial uses of their diversions and use of water." During the 1995 water quality planning process and the hearing that led to Decision 1641, language crept into both the plan and the decision that Kern believes has little or no basis in fact, but which if accepted would support an SWP mitigation obligation. For example, in the 1995 Water Quality Control Plan, the State Board found:

> Elevated salinity in the southern Delta is caused by low flows, salts imported in irrigation water *by the State* and federal *water projects*, and discharges of land-derived salts, primarily from agricultural drainage. (1995 Plan, page 29; Italics added.)

In Decision 1641, the State Board found:

> Water quality in the southern Delta downstream of Vernalis is influenced by San Joaquin River inflow; tidal action; *diversions of water by the SWP*, CVP, and local water users; agricultural return flows; and channel capacity. (Decision 1641, page 86; Italics added.)

As to the first quoted statement, the SWP does deliver contract water into the San Joaquin River Basin. All deliveries of SWP water within the Central Valley are south of the San Joaquin River watershed. This southern Delta salinity review finally provides Kern and the other SWP contractors an opportunity to correctly and more precisely state the causes of salt loading into the San Joaquin River. Kern, in cooperation with DWR, will provide precise data on this topic, because a correct analysis is central to determining if the SWP has a mitigation obligation to maintain certain salinity conditions in the southern Delta.

Kern believes that the State Board must evaluate the salt loading problems on the San Joaquin River upstream from Vernalis in order to determine what is a reasonable salinity objective for the southern Delta. Further, without such information, the State Board will likely be unable to fashion a successful implementation program that is aimed at the proper parties. Since the SWP is not a contributor of any significant level of salts to the San Joaquin River, a mitigation responsibility for salt loading should not exist.[2]

As to the second quoted paragraph, along with DWR, Kern believes that the statement that SWP pumping degrades southern Delta water quality is without technical support. Once again, the truth of the statement, or the lack thereof, is central to the allocation of responsibility to mitigate impacts on water quality. Primarily relying on DWR, Kern will be urging that the State Board's revised water quality plan for southern Delta salinity accurately recite the extent and nature of the effects of SWP Delta operations on salinity in the region. In many cases, we believe the State Board will find that those operations actually improve rather than degrade the situation.

4. The Impact Of South Delta Salinity Objectives On Other Beneficial Uses.

Perhaps the most difficult aspect of setting southern Delta salinity objectives is determining reasonableness. As noted in the legal introduction to this statement, Judge Robie's opinion on Decision 1641 clearly holds that a water quality objective that the State Board designates for implementation solely pursuant to the Board's water rights

[2] Kern is not saying that DWR should not participate in the efforts to reduce salinity in the upper San Joaquin River. DWR should and will do so in its roll as a statewide water agency, rather than as the operator of the SWP. The issue is largely who pays rather than should DWR participate in the process.

authority must be fully implemented through the water rights process. The Board does not have the authority to decline to fully implement the objective, only to go back and amend the objective in a new water quality proceeding. This ruling makes it very important that the State Board, once the mitigation responsibilities of water rights holders have been determined, consider (i) whether it has the authority to further implement the objective through water rights orders and (ii) the impact on other beneficial uses of the water of trying to fully implement the objective through such orders. If a program of implementation cannot be developed that complies with the Court of Appeal decisions and avoids unreasonable impacts on other beneficial uses, either the program of implementation needs to be revised or the objective itself is unreasonable.

There seems to be consensus that trying to meet the objectives by pumping cessations or releases of stored water from the Sacramento River into the northern Delta is no better then jousting at windmills – a futile effort. Nevertheless, there is language in the State Board's recent Cease and Desist Order against DWR and the USBR that may indicate that the State Board holds a contrary view. In ordering paragraph 4 (page 30) of the CDO, the State Board ruled:

> Corrective actions [for threatened southern Delta salinity exceedances] may include but are not limited to additional releases from upstream Central Valley Project (CVP) facilities or south of the Delta State Water Project (SWP) or CVP facilities, modification in the timing of releases from Project facilities, reduction in exports, ...

This reference to releases from upstream CVP reservoirs and a separate reference to similar releases south of the Delta, leads Kern to conclude that the Board may believe that such releases could both work and be reasonable. Therefore, Kern, in conjunction with DWR and other SWP contractors, will provide data on the water and dollar costs related to meeting the southern Delta objectives through storage releases or pumping curtailments.

In addition, southern Delta water users have suggested that there are other means for meeting the objectives that are reasonable and involve only actions in the Delta or on the San Joaquin River system. Kern, in conjunction with DWR and other SWP contractors, will develop information on the feasibility and cost of facilities such as low-lift pumps or recirculation of Delta water down the San Joaquin River. These materials will not be limited to technical feasibility, but will also address issues such as the possible impacts on fishery resources of a recirculation program.

Further, to the extent such actions are not required to mitigate SWP impacts, issues of financial responsibility come to the forefront. If the southern Delta water users need better water quality than is reasonably provided by the natural flows that define their water rights, they do have the option of paying for the costs of an improved supply.

The South Delta Water Agency was formed for the primary purpose of entering into "one or more agreements with the United States and with the State of California" to assure the availability of a dependable water supply of adequate quality. (West Water Code Appendix, section 116-4-1) If the Agency's representatives believe that higher quality water is needed within the Agency's boundaries, it has the authority to contract with DWR to construct and operate, for example, low lift pumps if they believe they would work. What they cannot request is that, beyond mitigation, DWR (and therefore the SWP contractors) pay for the facilities needed to enhance their local water users' supplies. Kern believes that contracting for the infrastructure and/or water needed to reduce salinity levels may be an appropriate addition to the program of implementation. It would likely be a recommendation for appropriate action to another public agency (the South Delta Water Agency), as authorized by Water Code section 13242(a). The key here is that the State Board not impose a financial or water supply burden on third parties for implementation actions that should appropriately be borne by the benefited parties. In Kern's view, that would be unreasonable *per se*.

Conclusion

Southern Delta salinity is a complex topic that involves law, facts, and policy. Kern urges the Board to establish a reasonable schedule for completing the workshop and hearing phase of its deliberations that takes into account the need to bring consultants on board who can address the fundamental question of what irrigation water salinity is required to grow the crops now grown in the Delta with appropriate farm management practices in place. In addition, the effort involved in developing the model-runs and baseline data that will tease out project impacts and mitigation responsibilities, if any, is not a simple process. However, these secondary tasks can easily be completed before the salt tolerance work can be finished. In other words, the rest of the fact development is not on the critical path.

Kern also reiterates its view that the State Board should retain an independent agricultural expert to do the required work. If that does not happen, the parties will each need to produce their own experts, which will be more contentious and expensive. Kern and other SWP contractors are willing to consider funding a Board expert if it relieves them of the equal or greater expense of hiring their own. We also recommend that a workgroup of the type established in the late 1980s be instituted for these proceedings.

Kern and the other SWP contractors will work diligently to bring to the State Board the best data currently available and we look forward to a long-needed final outcome that will withstand scientific and legal scrutiny yet protect the legitimate rights and expectations of both the southern Delta irrigators and the SWP and its contractors.

EXHIBIT 2

9/17/08 Bd. Wrkshp
San Joaquin River Flows
Deadline: 9/3/08 by 12:00 p.m.

dh
diepenbrock•harrison
A PROFESSIONAL CORPORATION

September 3, 2008

RECEIVED
SEP - 3 2008
SWRCB EXECUTIVE

Jeanine Townsend, Clerk to the Board
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812

Re: ***Materials for San Joaquin River Flow and Southern Delta Salinity Workshop***

Dear Ms. Townsend:

Pursuant to the August 11, 2008, notice of public workshop titled "Discussion of the San Joaquin River Flow Objectives for the San Francisco/Sacramento-San Joaquin Delta Estuary and an Update on Southern Delta Salinity" ("Workshop"), the San Luis & Delta-Mendota Water Authority ("Authority") and Westlands Water District ("Westlands") submit the enclosed materials, which are: (1) the annual Vernalis Adaptive Management Plan ("VAMP") reports from 2000 to 2007, (2) the July 31, 2008, Westside San Joaquin River Watershed Coalition Semi-Annual Monitoring Report, and (3) the December 28, 2007 Water Discharge Requirement Order No. 5-01-234, Update of Long-term Drainage Management Plan. The Authority and Westlands will supplement these materials with an oral presentation at the Workshop.

Specifically, at the Workshop, the Authority and Westlands intend to provide an overview of the VAMP and an update on existing data produced from the experiment. The Authority and Westlands also intend to highlight the ongoing efforts of the Authority and its member agencies, which have improved water quality in the San Joaquin River and the perceived impact on water quality in the Delta.

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SACRAMENTO, CA 95814
WWW.DIEPENBROCK.COM 916 492.5000
FAX: 916 446.4535

Thank you for your consideration of the enclosed materials. The Authority and Westlands look forward to presenting at the Workshop.

Very truly yours,

DIEPENBROCK HARRISON
A Professional Corporation

Valerie C. Kincaid
Attorneys for the San Luis & Delta-Mendota Water Authority and Westlands Water District

VCK:jvo

Enclosures

December 28, 2007

Rudy Schnagl
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive #200
Rancho Cordova, CA 95670-6114

Subject: Waste Discharge Requirement Order No. 5-01-234, Update of Long Term Drainage Management Plan.

Dear Rudy,

The above Waste Discharge Requirements (WDR) requires submission of an update of the long-term drainage management plan for the Grassland Bypass Project. The WDR's were issued to the San Luis & Delta-Mendota Water Authority (Water Authority) and the U. S. Bureau of Reclamation. The Water Authority members that participate in the Grassland Bypass Project are hereafter referred to as the Grassland Area Farmers.

The long-term drainage management plan was submitted on September 30, 1998 in compliance with WDR No. 98-171. The plan was updated on July 1, 1999, January 1, 2000, January 1, 2001, December 31, 2001, December 24, 2002, December 31, 2003, December 31, 2004, December 30, 2005, and December 29, 2006.

Milestones since Last Update

The milestones that have occurred for the Grassland Bypass Channel Project since the 2006 update are as follows:

- The Grassland Area Farmers have reduced the discharge of selenium from the Grassland Drainage Area by 79% since the beginning of the project as measured at the end of Water Year 2007. There were no exceedances of monthly selenium load allocations during Water Year 2007.
- The Grassland Area Farmers have continued to develop funding for the Westside Regional Drainage Plan as described in previous reports. In October 2007, the Water Authority executed a grant agreement under Proposition 50 for $25 million to implement portions of the Westside Regional Drainage Plan. Additionally, a $1 million grant was awarded under the Consolidated Grant program for improvements to irrigation distribution systems in Firebaugh Canal Water District and Panoche Water District. These improvements are expected to reduce seepage into the shallow water table by 900 acre feet annually and recover approximately 1,400 acre feet of operational spill water.

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LOS BANOS, CA
93635
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- The Grassland Area Farmers continue to utilize and expand the San Joaquin River Water Quality Improvement Project (SJRIP). The total cropped acreage of the SJRIP has been increased in 2007 to over 3,800 acres and the project reused more than 11,000 acre feet of subsurface drain water.

- The Grassland Area Farmers are continuing to work closely with the U.S. Bureau of Reclamation to develop an in-valley drainage solution for the Grassland Drainage Area. The In-Valley Solution Plan includes irrigation improvements, seepage reduction, land retirement, recirculation, drainage reuse, and drainage treatment.

- The discharge from the Grassland Bypass Project in Calendar Year 2006 (a wet year type) was 3,775 pounds of selenium with a load limit of 4,480 pounds. It is anticipated that the discharge during Calendar Year 2007 (a critical year type) will be approximately 35% below the annual load limit of 3,196 pounds, with no monthly exceedances.

Statement of Goals

The principal goal of the Grassland Area Farmers remains as described in the September 30, 1998 long term drainage management plan. This goal is summarized as providing for the achievement of the water quality objectives fixed by the Regional Board and their Basin Plan related to subsurface drainage discharges from the drainage area while maintaining viable agricultural production in that area.

Meeting Water Quality Objectives within Grassland Area Channels

The Regional Board has established a two parts per billion monthly average selenium objective for water delivery channels within the wetland areas. Previous long term drainage management plans discussed the activities within the Grassland Drainage Area to meet this water quality objective. The objective has been exceeded on a few occasions. During 1997 and 1998 there were storm water discharges caused by excessive rainfall and discharge from coastal streams. Subsequent to that time the Grassland Area Farmers have taken actions as submitted to the Regional Board to prevent discharges to wetland areas during non-storm event periods. This has been successful in eliminating discharges from the Grassland Drainage Area that might cause exceedence of the two parts per billion water quality objective. However, in February of 2005, significant storm events required the Grassland Area Farmers to divert water through the Agatha Canal. No diversions into wetland channels have been made since that time.

Uncontrolled Discharges

The Grassland Area Farmers are continuing to work with the USBR and USGS to identify sources of high drainage flows in extreme wet weather events. In September, 2005 the USGS issued a draft of their report "Update Of A Ground-Water Flow Model For The Central Part Of The Western San Joaquin Valley, California". This is the first product of the work that is supposed to assist in identifying these sources. Another source that continues to be of interest is contribution from seepage out of the San Luis Canal/California Aqueduct. This issue was described in the 2004 annual report.

Future Regulation and Milestones

The Regional Board has adopted a TMDL for salt and boron and one for dissolved oxygen. These TMDLs have subsequently been approved by the State Board and the State Office of Administrative Law. These regulations encompass discharges from a much larger area than the Grassland Drainage Area. The Grassland Area Farmers are a participant in these processes.

Discharge during Water Year 2007

Table 1 sets forth discharges from the Grassland Drainage Area for the period Water Year 1995 through Water Year 2007. The Grassland Bypass Project began in Water Year 1997. The volume of drainage has been reduced significantly since this time including a selenium load reduction of 79% in Water Year 2007 compared to pre-project discharges in Water Year 1995. The volume of drainage discharge was reduced by 68%, the salt load by 66%, and the boron load by 61% when compared to pre-project (WY 1995) discharges. Selenium load discharged from the Grassland Drainage Area compared with 2007 monthly targets in WDR 5-01-234 are shown in Figure 1. Figure 2 shows the 2007 discharged load along with historic discharges and the "glidepath" in the Use Agreement incorporating the load values from the August 4, 2005 request for revision of the TMML for selenium. Figure 3 compares actual discharges to the revised load values starting in 2002. Figure 4 shows an estimate of the impact of control activities that occurred during Water Year 2007. Conservation, which includes improved irrigation application, tiered water pricing, tailwater controls and our tradable loads program accounted for a reduction of approximately 2,900 pounds of selenium from historic loads. Reuse and treatment, which includes recycling, use of subsurface drainage water on salt tolerant crops and displacement of subsurface drainage water such as for wetting of roadways for dust control, resulted in a 7,200 pound reduction in discharge in Water Year 2007. The remaining 2,600 pounds was discharged to the San Joaquin River through the Grassland Bypass Project.

Water Year 2007 was designated a critical year type in accordance with the Waste Discharge Requirements. The applicable performance goal from the waste Discharge Requirements is 5 ppb selenium monthly mean. During Water Year 2007 this performance goal was met and exceeded as the 4-day average selenium concentration at Crows Landing did not exceed 5 ppb in all months through mid August where data was available. This is in compliance with the October 1, 2005 water quality objective for above normal and wet year types.

Tools to be used For Long Term Drainage Management

Conservation, reuse and treatment, and river discharge will continue to be the main tools available to the Grassland Area Farmers during the next several years.

During Water Year 2001, Panoche Drainage District on behalf of the other Grassland Area Farmers implemented the San Joaquin River Water Quality Improvement Project (SJRIP). Table 2 shows the usage of subsurface drainage water within the SJRIP area in 2007. The project resulted in a displacement of 3,441 pounds of selenium. The SJRIP is a multi-phase project, which was initiated with the purchase of 4,000 acres of land in the year 2000 within the Grassland Drainage Area by Panoche Drainage District. During 2007, 3,800 acres were irrigated within the 4,000 acre area. Additionally, the Grassland Area Farmers are in the process of designing and constructing a number of infrastructure projects that will increase the operational flexibility and efficiency of the SJRIP. Future phases call for installing subsurface tile drainage systems in the remainder of the SJRIP area to maintain a salt balance within the soil and for disposal of the collected water through treatment and salt disposal options.

In October, 2007, the Water Authority was awarded a $25 million grant which includes funds to purchase and develop an additional 2,000 acres. This additional acreage, once developed, will further reduce the volume of subsurface drainage discharged from the Grassland Drainage Area. Other funds within this grant will be used to investigate drainage treatment options for final salt disposal.

Future Needs

In order to maintain the drainage control strategy for the Grassland Area Farmers, there are several needs. They are as follows:

- The completion of the SJRIP Project including planting and construction of subsurface drainage systems.
- Purchase of additional SJRIP lands of up to 2,000 acres for planting of additional cropping to be irrigated with subsurface drainage water.
- Implementation of treatment and disposal of salt from the SJRIP lands.
- Investigations need to be completed on the identification of contributions to subsurface drainage within the Grassland Drainage Area from other sources, primarily the uncontrolled discharges described above. Once this has been determined, then control and participation by other parties will need to be identified.
- Retirement of land could be part of the ultimate solution to the problem within the Grassland Drainage Area. The Grassland Area Farmers have developed a land retirement policy that was identified and described in the September 30, 1998 Long Term Drainage Management Plan. In addition to this plan, Broadview Water District has recently been purchased and has been fallowed. Other lands within the Grassland Drainage Area are also being considered for fallowing.

- The Grassland Area Farmers and other local interests have been participating with the USBR in their San Luis Drainage Feature Re-Evaluation Program. The goal of the Grassland Area Farmers is to develop local projects that can be implemented to meet the selenium load reduction targets, while still a viable agricultural economy.

- The Grassland Are Farmers continue to work with the USBR, other local stakeholders and interested parties to resolve long standing drainage issues through a drainage settlement process. The main component would be full implementation of the Westside Regional Drainage Plan.

Recent Developments

There are three recent and on-going developments related to efforts of the Grassland Area Farmers to meet the regulatory requirements of the Waste Discharge Permit and the Use Agreement. The first two were indicated in the 2004 annual report.

- The Westside Regional Drainage Plan has been developed by the San Joaquin River Exchange Contractors Water Authority, the Broadview Water District, Panoche Water District and Westlands Water District. This process is meant to complement the USBR San Luis Drain Feature Re-evaluation process and to help resolve long standing drainage issues within the area. The Grassland Area Farmers are aggressively pursuing funding opportunities to implement the Westside Regional Drainage Plan, and have met on a number of occasions with the USBR to move this plan forward.

- The San Joaquin River Water Quality Management Group was formed out of the "UOP Discussions" between statewide water interests and Delta interests to develop a plan to meet Vernalis salinity objectives. There are many components to this plan that is being developed, one of the major ones being the future reductions of discharge from the Grassland Drainage Area.

- In the Spring of 2006, the Grassland Area Farmers submitted proposals to the Proposition 40 Consolidated Grants program and the Proposition 50 Integrated Regional Watershed Management program. These funds were awarded and are currently being used to implement portions of the Westside Regional Drainage Plan.

- In December, 2006 the Grassland Area Farmers complied with the requirement in the Use Agreement that a Mud Slough Compliance Plan be developed by 2006 to meet Mud Slough water quality objectives. This letter also outlined a process to continue discharges to the San Joaquin River beyond the term of the current Use Agreement, which expires in December, 2009.

In the summer of 2007 the Grassland Area Farmers initiated discussions with stakeholders regarding a time extension of the Grassland Bypass Project. The discharge of selenium and salinity has significantly reduced since the initiation of the Grassland Bypass Project. The Westside Regional Drainage Plan has been developed and significant funding has been obtained to implement parts of the plan. However, the final funding and technical steps are not yet in place and therefore the Grassland Area Farmers are requesting up to a 10 year extension of the Use Agreement. This action will require a Basin Plan Amendment and revised Waste Discharge Requirements. The environmental review process has begun on this action and a scoping meeting is scheduled for January 17, 2008 in Los Banos.

Conclusion

The Grassland Area Farmers are committed to a reasonable process that will meet the goals as earlier stated. This includes maintaining efforts to meet current monthly and annual selenium targets while at the same time aggressively pursuing the long term solutions and funding that will be necessary to meet the future requirements.

If you should have any questions please feel free to call. I can be reached at (559) 582-9237.

Very Truly Yours,

Joseph C. McGahan
Drainage Coordinator
Grassland Area Farmers

JCM/jcl

Cc: Dan Nelson, SL&D-MWA
Grassland Basin Drainage Steering Committee
John Davis , USBR
Mike Delamore, USBR

Table 1
Discharge Comparison from Grassland Drainage Area
Values October thru September

	WY 95	WY 96	WY 97	WY 98	WY 99	WY 00	WY 01
Volume (AF)	57,574	52,978	39,856	49,289	32,317	31,342	28,235
Se (lbs)	11,875	10,034	7,096	9,118	5,124	4,603	4,377
Salt (tons)	237,530	197,526	172,602	213,533	149,081	139,303	142,415
B (1,000 lbs)	868	723	753	983	630	619	423
Se (ppm)	0.076	0.070	0.066	0.068	0.058	0.054	0.057
Salt (µmhos/cm)	4,102	3,707	4,306	4,308	4,587	4,420	5,016
Boron (ppm)	5.5	5.0	7.0	7.3	7.2	7.3	5.5

	WY 02	WY 03	WY 04	WY 05	WY 06	WY 07	Reduction from WY 95 to WY 06
Volume (AF)	28,358	27,345	27,640	29,957	25,995	18,531	68%
Se (lbs)	3,939	4,032	3,860	4,305	3,583	2,551	79%
Salt (tons)	128,411	126,500	121,138	138,908	120,258	81,072	66%
B (1,000 lbs)	544	554	530	585	540	338	61%
Se (ppm)	0.051	0.054	0.051	0.053	0.051	0.051	
Salt (µmhos/cm)	4,503	4,600	4,358	4,611	4,600	4,350	
Boron (ppm)	7.1	7.5	7.1	7.2	7.6	6.7	

Note: WY 97, 98, & 05 include discharges through Grasslands
Note: GAF quality data used where RWQCB data was missing or pending.

Table 2
San Joaquin River Improvement Project
Calendar Year 2007

	WATER APPLIED (AF)			SELENIUM	SALT	BORON
MONTH	DRAIN	OTHER	TOTAL	LBS	TONS	LBS
JAN 07		585	585			
FEB	466	289	755	153	2,490	8,698
MAR	964	409	1,373	185	3,567	10,269
APR	1,307	779	2,086	372	6,400	21,515
MAY	1,432	341	1,773	626	8,832	36,518
JUN	2,048	640	2,688	630	11,847	44,522
JUL	1,587	458	2,045	456	9,924	34,512
AUG	1,492	838	2,330	494	7,981	29,537
SEP	897	410	1,307	207	4,863	10,871
OCT	951	165	1,116	309	5,118	13,084
NOV	89	302	391	9	390	1,056
DEC	0	0	0	0	0	0
TOTAL	**11,233**	**5,216**	**16,449**	**3,441**	**61,412**	**210,582**

Figure 1
Discharge from the Grassland Drainage Area
October 2006 through September 2007

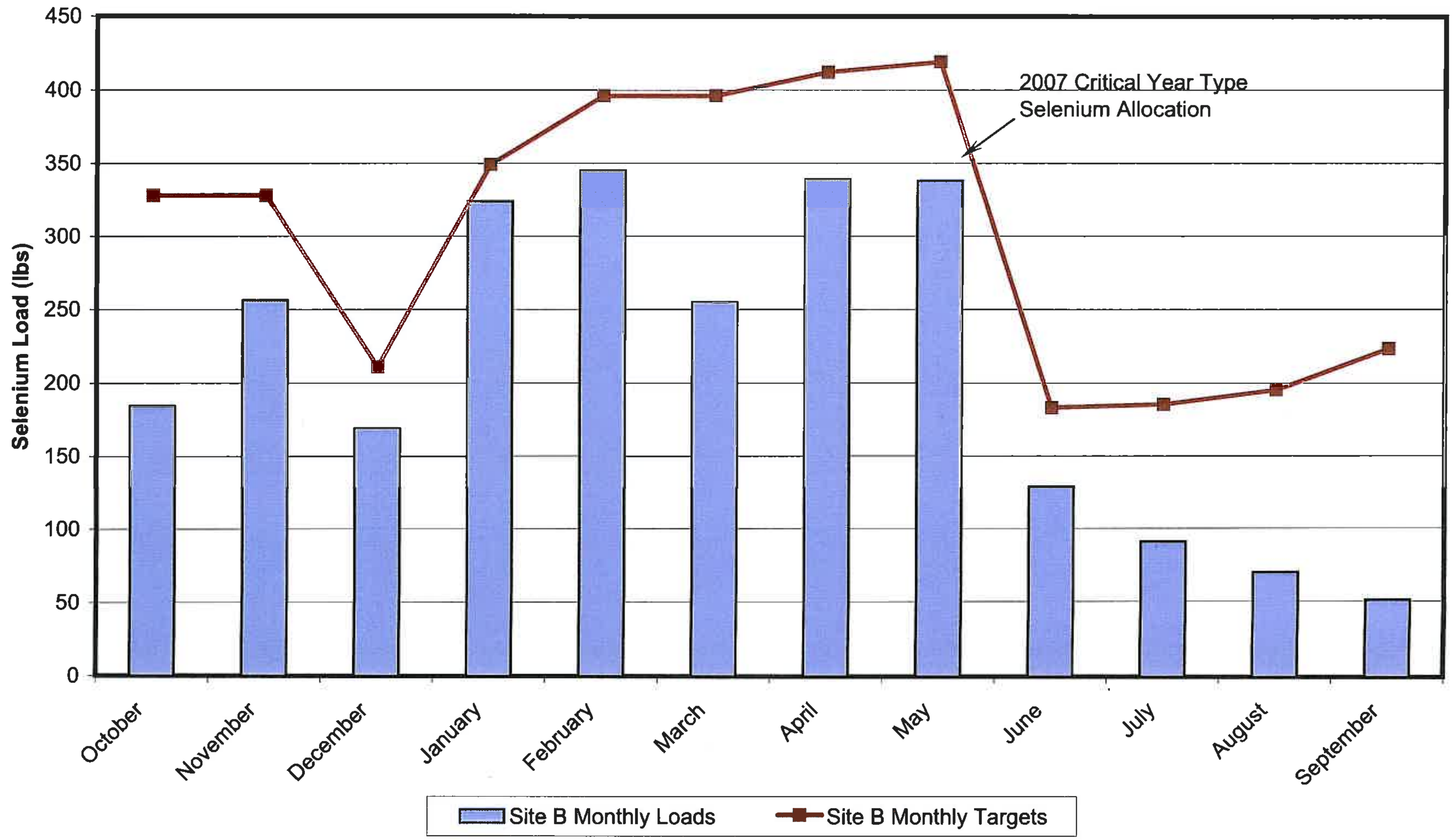


Figure 2
Grassland Drainage Area
Selenium Discharge and Targets

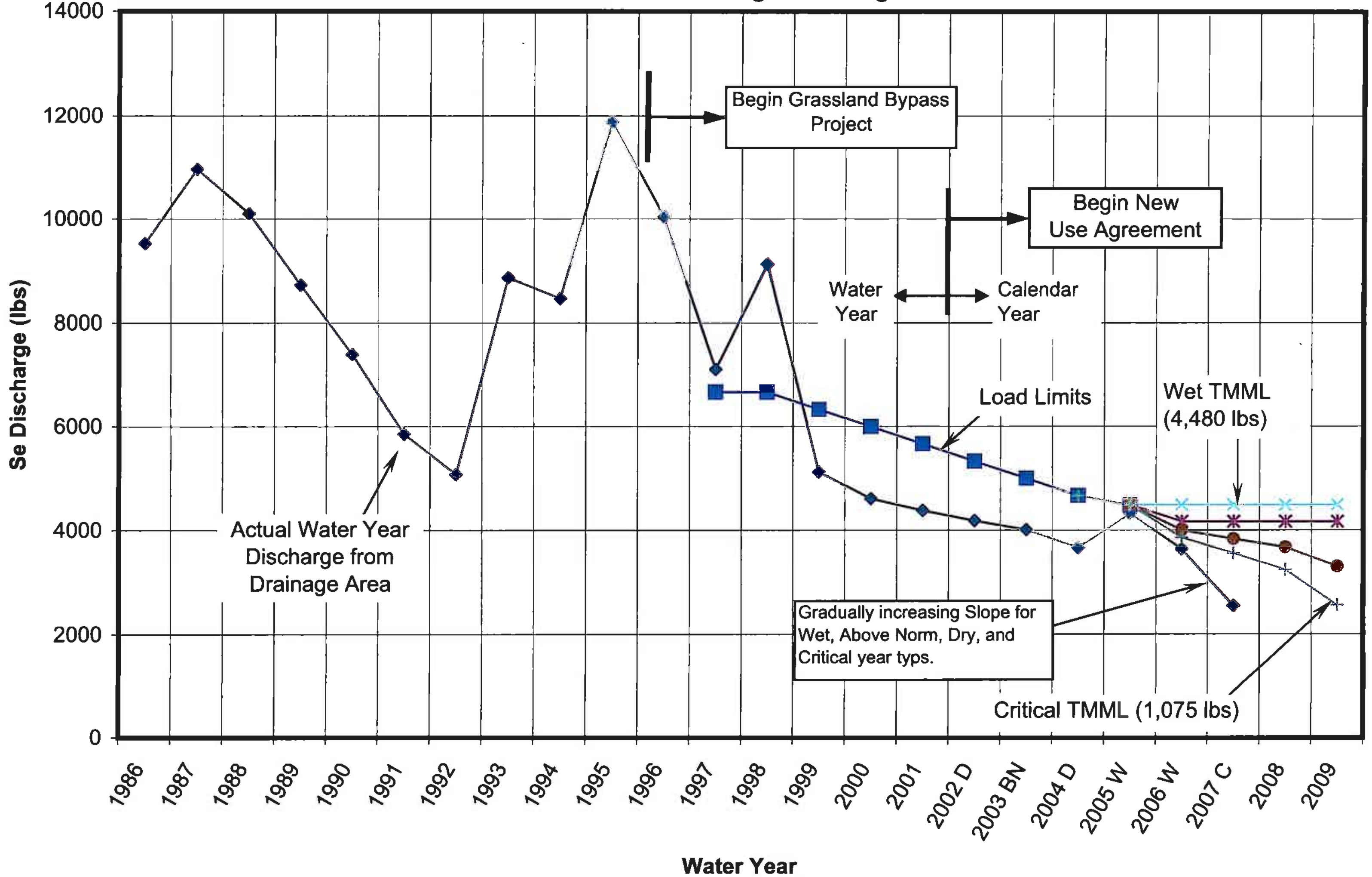


Figure 3
Grassland Bypass Project
Annual Selenium Load Discharge and Values

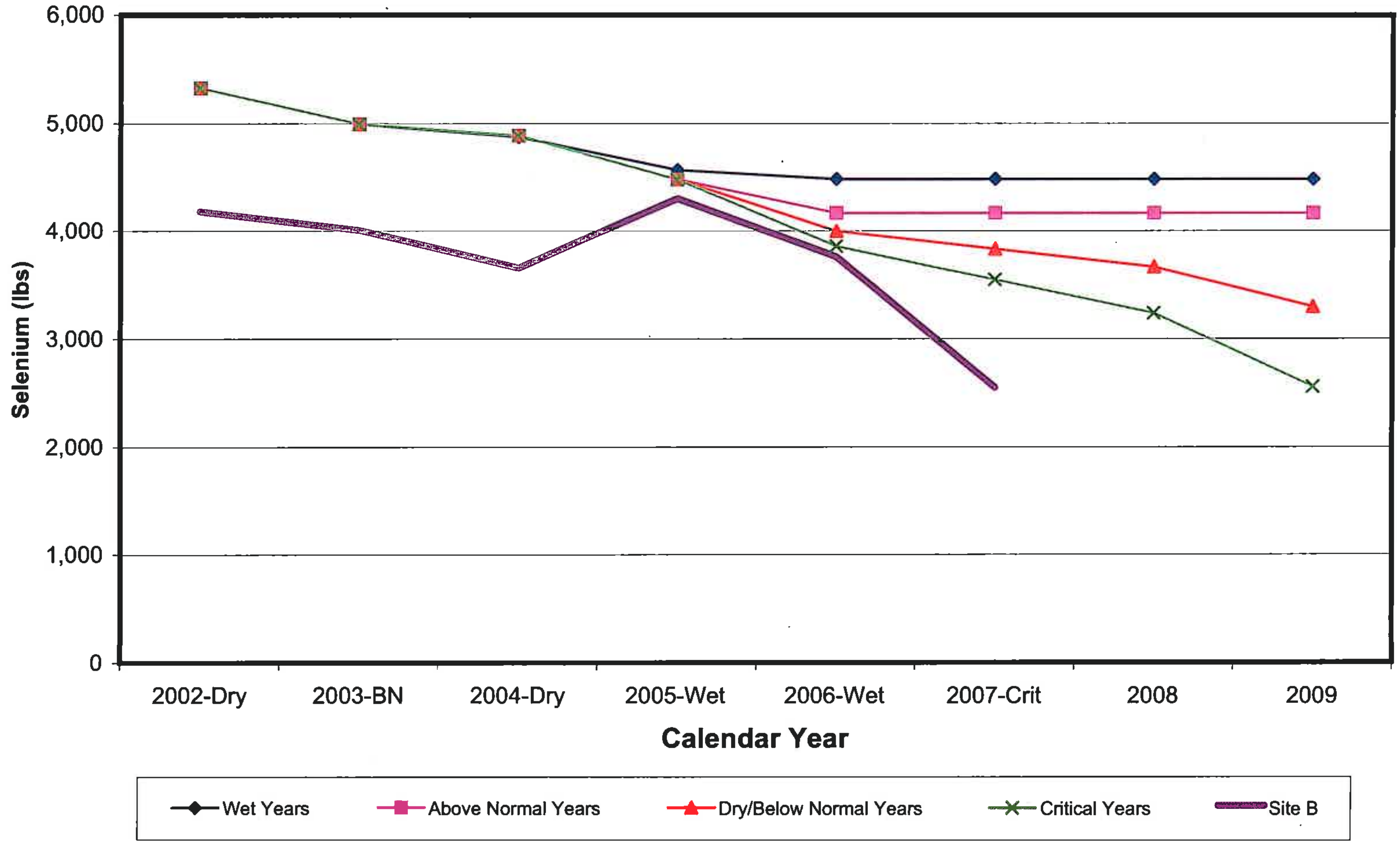
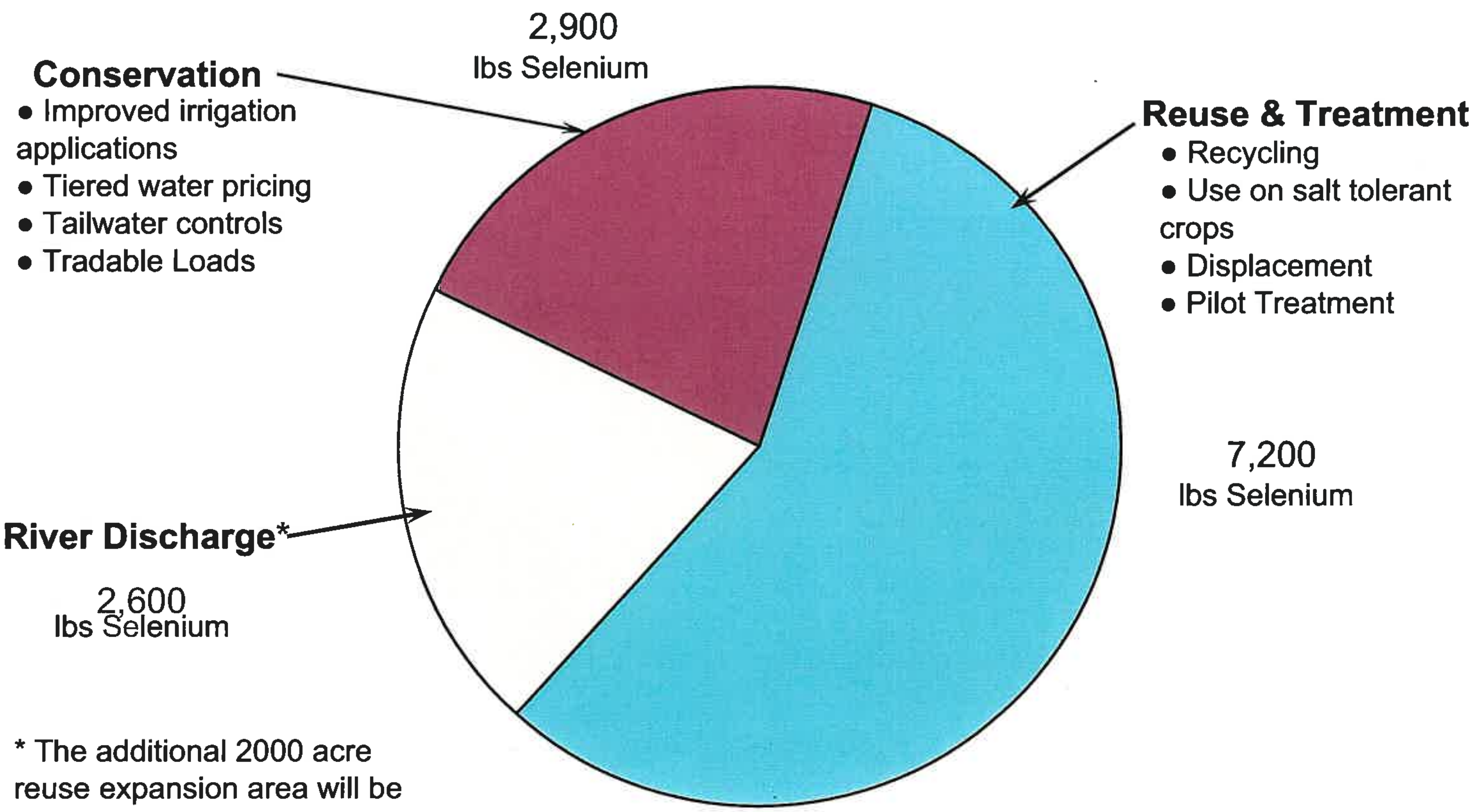


Figure 4

Historic Drainage Water (lbs selenium)
57,000 AF 12,700 lbs Se 240,000 Tons Salt



* The additional 2000 acre reuse expansion area will be able to manage this discharge in most years.

2007 Drainage Management

SAN JOAQUIN VALLEY DRAINAGE AUTHORITY

P O Box 2157 Los Banos, CA 93635
209 826 9696 Phone 209 826 9698 Fax

July 31, 2008

Pamela Creedon, Executive Officer
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive #200
Rancho Cordova, CA. 95670-6114

Subject: Westside San Joaquin River Watershed Coalition
Submittal of July 31, 2008 semi-annual monitoring report

Dear Pamela,

Attached is the July 31, 2008 semi-annual monitoring report as required under our Monitoring and Reporting Plan. This report covers the non-irrigation season monitoring from November 2007 through February 2008.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment for violations.

If you should have any questions on the information submitted in this report, please give me a call directly at 559-582-9237.

Joseph C. McGahan
Watershed Coordinator
Westside San Joaquin River Watershed Coalition

San Joaquin Valley Drainage Authority

Westside San Joaquin River Watershed Coalition

Semi-Annual Monitoring Report

2007/2008 Non-Irrigation Season Report

Covering the period: November 2007 through February 2008

(Sampling Events 39 through 41 including Rain Event 6)

July 31, 2008

Prepared by:
Summers Engineering, Inc.
Consulting Engineers
Hanford California

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SECTION 1: EXECUTIVE SUMMARY

In June, 2003, the San Joaquin Valley Drainage Authority (SJVDA) submitted a Conditional Waiver Report for the Westside San Joaquin River Watershed Coalition (Westside Coalition). The Westside Coalition watershed generally lies on the westside of the San Joaquin River from approximately the Stanislaus River on the north to 10 miles south of Mendota and encompasses an area of approximately 460,500 acres. There are approximately 4,000 landowners and 1,500 operators within the watershed. Most of the watershed receives water supplies from the Central Valley Project, while certain areas receive water from the State Water Project. In addition, some areas receive supplies from the San Joaquin River and local water sources, one area receives a Kings River supply, and some areas receive water from groundwater wells. The Delta-Mendota Canal and San Luis Canal run through the center of the watershed. Water deliveries are made to Federal Central Valley Project Contractors and to San Joaquin River Exchange Contractors from these facilities. State water deliveries are also made to one area.

The Grassland Drainage Area encompasses 97,400 acres that are geographically within the watershed. The Grassland Drainage Area is covered under waste discharge requirements (No. 5-01-234), which regulates the discharge of subsurface drainage water through the San Luis Drain to the San Joaquin River. The area coordinates its separate monitoring and reporting program under the above waste discharge requirements.

The described Westside Coalition area also includes federal, state and private managed wetlands. These areas share water delivery and drainage conveyance systems with the surrounding agricultural areas. Due to the integrated nature of the water facilities the managed wetlands have joined the Westside Coalition as a wetland sub-watershed participant to comply with the Conditional Waiver and effectively and efficiently address water quality issues. The effects of discharges form the wetland areas are covered in this monitoring program.

The communities of Grayson, Westley, Vernalis, Crows Landing, Patterson, Newman, Gustine, Stevinson, Los Banos, Dos Palos, South Dos Palos, Firebaugh, Mendota and Tranquillity lie within the geographic area of the Westside Coalition. These communities do not have discharges from irrigated lands and are not included in the Westside Coalition, but contribute storm waters and municipal waste waters to the watershed and may impact discharges from irrigated lands.

Interstate Highway 5 and State Highways 33, 140, 165 and 152 and many county roads run through the geographic area of the Westside Watershed. Storm water discharges from these roads and highways could contribute contaminants to the same water bodies that carry agricultural return water.

The San Joaquin Valley Drainage Authority, a joint powers agency, is the umbrella organization for the Westside Coalition for purposes of the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands within the Central Valley Region (Resolution No.R5-2003-0105). On July 30, 2004, the Westside Coalition received approval for its irrigated agricultural monitoring plan from the Central Valley Regional Water Quality Control Board. The first sampling event took place on July 6, 2004, with subsequent event samples collected monthly. This report covers the 2007/2008 Non-irrigation season sampling events beginning November 2007 through February 2008 (Events 39 through 41), including Rain Event 6, which occurred in January 2008.

The Monitoring and Reporting Plan for the Westside Coalition includes a monthly sampling plan for 19 monitoring sites within the coalition area as well as plans for sampling for two rain events during each year. During any given sampling event, each accessible site is visited, visually assessed, and samples are collected in accordance with the field sampling manual. **Table 1**, below, shows the monitoring events summary by site for the reporting period.

Table 1: November 2007 through February 2008 Sampling Events Summary

Site Designation	Site	Event 39	Event 40	Rain Event 6	Event 41
		Nov	Dec	Jan	Feb
1	Hospital Cr at River Road	NF	NF	S	NF
2	Ingram Cr at River Road	S	NF	S	S
3	Westley Wasteway near Cox Road	NF	NF	NA	NF
4	Del Puerto Cr near Cox Road	NF	NF	S	S
5	Del Puerto Cr at Hwy 33	NF	NF	S	S
6	Salado Cr near Olive Ave.	NF	NF	NA	NA
7	Ramona Lake near Fig Avenue	S	NF	S	NF
8	Marshall Road Drain near River Road	NF	S	S	NF
9	Orestimba Cr at River Road	S	S	S	S
10	Orestimba Cr at Hwy 33	S	S	S	S
11	Newman Wasteway near Hills Ferry Road	S	S	S	S
12	San Joaquin River at Sack Dam	S	S	S	S
13	San Joaquin River at Lander Avenue	S	S	S	S
14	Mud Slough u/s San Luis Drain	S	S	S	S
15	Salt Slough at Lander Avenue	S	S	S	S
16	Salt Slough at Sand Dam	S	S	S	S
17	Los Banos Creek at Highway 140	S	S	S	S
18	Los Banos Creek at China Camp Road	S	NF	S	NF
19	Turner Slough near Edminster Road	NF	NF	NA	NF
20	Little Panoche Creek 1	NF	NF	NF	NF
21	Little Panoche Creek 2	NF	NF	NF	NF
22	Little Panoche Creek 3	NF	NF	NF	NF
23	Little Panoche Creek 4	NF	NF	NF	NF
24	Little Panoche Creek 5	NF	NF	NF	NF
25	Little Panoche Creek 6	NF	NF	NF	NF
26	Shields Avenue Drain at I-5	NF	NF	NF	NF
27	Russell Avenue Drain at the SLC	NF	NF	NF	NF
28	Los Banos Creek at Sunset Ave.	NF	NF	NF	NF

Notes: S = Water sampled according to the MRP.
NF = Not sampled due to lack of flow.
NA = Not sampled due to lack of safe access

The objectives of the original monitoring program are:

- To assess the existing water quality characteristics of major agricultural drains within the watershed area.
- To determine the location and magnitude of water quality problems.
- To determine the cause of water quality problems and develop solutions.

In 2007, the Westside Coalition began development of a management plan based the results of the monitoring efforts. In support of this management plan, a revised monitoring and reporting plan (Revised MRP) was developed and submitted to the Regional Board. This Revised MRP was provisionally adopted and implemented in March 2008. A revised QAPP is currently in development.

Two sampling crews have been trained by the analytical laboratories to collect samples according to the Westside Coalition's QAPP and Field Sampling Manual. These crews are responsible for collecting samples at each of the 19 sites; the field coordinator for the northerly region is responsible for collecting samples from sites 1 through 10. The field coordinator for the southerly region and is responsible for collecting samples from sites 11 through 19. The sampling crew for the northerly region is comprised of staff from Del Puerto Water District and Patterson Irrigation District. The southerly sampling crew is staffed by Central California Irrigation District. The sampling responsibilities include completion of the field data sheets, collection of water and sediment samples, completion of labels and chain of custody sheets, and coordination with the labs for sample pickup. The parameters analyzed at each site are shown in **Table 2**. The laboratory, method, and constituents analyzed are shown in **Table 3.**

In addition to the constituents presented in **Table 3**, aquatic toxicity samples were collected and analyzed. These samples were analyzed by Pacific Ecorisk, Inc. using the methods described below:

- *Ceriodaphnia dubia*: "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (USEPA 2002a).
- *Pimephales promelas*: "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (USEPA 2002a).
- *Selenastrum capricornutum*: "Short-term Methods for Estimated the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms" (USEPA 2002b).
- *Hyalella azteca*: "Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Organisms" (USEPA 2000).

Fifteen of the 19 monitoring sites are located on streams that dominated by summer agricultural drainage runoff. The irrigation season within the Westside Coalition typically starts in March, with pre-irrigation and typically ends in August, just before harvest of the late season crops (such as cotton and fall corn). Because the irrigation period is also when pesticides are applied, and most likely to be carried off by tailwater drainage, the Westside Coalition has targeted this period for pesticide and toxicity analysis. See the Monitoring and Reporting Plan, page 8 (April 1, 2004). All monitoring events during this reporting period occurred during the non-irrigation season or rain event. Four of the monitoring sites received agricultural drainage during the irrigation season and wetland drainage during the fall and winter (SJR at Lander Ave., Mud Sl.

u/s San Luis Drain, Salt Sl. at Lander Ave. and Los Banos Creek at Hwy 140). Because of this, these four sites are tested for pesticides and toxicity year-round.

Table 2: Monitoring Stations and Samples

Map Designation	Site Description	General Physical	Irrigation Season Aquatic Toxicity	Winter Aquatic Toxicity	Sediment Toxicity	Drinking Water Constituents	Pesticide Sampling
	1	3	4	5	6	7	8
1	Hospital Creek at River Road	x	x		x	x	x
2	Ingram Creek at River Road	x	x		x	x	x
3	Westley Wasteway nr Cox Road	x	x		x	x	x
4	Del Puerto Creek nr Cox Road	x	x		x	x	x
5	Del Puerto Creek at Hwy 33	x	x		x	x	x
6	Salado Creek nr Olive Ave	x	x		x	x	x
7	Ramona Lake nr Fig Avenue	x	x		x	x	x
8	Marshall Road Drain nr River Road	x	x			x	x
9	Orestimba Creek at River Road	x	x		x	x	x
10	Orestimba Creek at Highway 33	x	x		x	x	x
11	Newman Wasteway nr Hills Ferry Rd	x	x		x	x	x
12	SJR at Sack Dam	x					
13	SJR at Lander Ave	x	x	x	x	x	x
14	Mud Sl upstream of San Luis Drain	x	x	x	x	x	x
15	Salt Sl at Lander Ave	x	x	x	x	x	x
16	Salt Sl at Sand Dam	x	x		x	x	x
17	Los Banos Cr at Hwy 140	x	x	x	x	x	x
18	Los Banos Cr at China Camp Road	x	x		x	x	x
19	Turner Slough nr Edminster Road	x	x		x	x	x
20	Little Panoche Creek 1	x	x		x	x	x
21	Little Panoche Creek 2	x	x		x	x	x
22	Little Panoche Creek 3	x	x		x	x	x
23	Little Panoche Creek 4	x	x		x	x	x
24	Little Panoche Creek 5	x	x		x	x	x
25	Little Panoche Creek 6	x	x		x	x	x
26	Shields Avenue Drain at I-5	x	x		x	x	x
27	Russell Avenue Drain at the SLC	x	x		x	x	x
28	Los Banos Creek at Sunset Ave.	x	x		x	x	x
	Number of sites	28	27	4	26	27	27
	Times per year	13	8	4	2	13	8
	Total	364	216	16	52	351	216

Table 3: Analytes, Laboratories, and Methods.

	Constituent	Laboratory	Method	Units	Laboratory SOP No.
Field Data	pH	Field Crew	YSI meter	-	Field Manual
	Temperature	Field Crew	YSI meter	°C	Field Manual
	Conductivity	Field Crew	YSI meter	µmhos/cm	Field Manual
	Dissolved Oxygen	Field Crew	YSI meter	mg/L	Field Manual
	Flow	Field Crew	Estimate	cfs	Field Manual
Gen. Phy. / D.W.	Color (A.P.H.A.)	Caltest	SM 2120B	-	COLOR-rev4E
	pH	Caltest	SM 4500-H+B	-	PH-rev4
	TDS	Caltest	SM 2540C	mg/L	TDS-rev4E
	TSS	Caltest	SM 2540D	mg/L	TSS-rev4
	Turbidity	Caltest	SM 2130B	NTU	TURB-rev4E
	Hardness	Caltest	EPA 130.2	mg/L	HARD-rev5E
	Metals	Caltest	EPA 200.7, 200.8	mg/L	M-ICP-rev10E & 2008rev5Ea
	Bromide/Nitrate	Caltest	EPA 300.0	mg/L	DIONEX-rev5E
	Nitrogen, Nitrite	Caltest	EPA 354.1	mg/L	NO2-rev6
	TKN	Caltest	EPA 351.3	mg/L	NH3-TKN-rev6E
	Phosphate	Caltest	EPA 365.2	mg/L	PHOS-rev4
	Ammonia (as N)	Caltest	EPA 350.2	mg/L	NH3-TKN-rev6E
	DOC	Caltest	SM 5310-B/C	mg/L	TOC-D0C-rev7E
	TOC	Caltest	SM 5310-B/C	mg/L	TOC-D0C-rev7E
	E. Coli	Caltest	SM 9221BF/9223-B	MPN	MMOMUG-rev8E
Pesticides	Organophosphates	APPL	EPA 8141A	µg/L	ANA8141A
	Organochlorines	APPL	8081A/8082	µg/L	ANA8081A
	Carbamates	APPL	EPA 8321A LL	µg/L	HPL8321A
	Pyrethroids	APPL	EPA 8081A-P	µg/L	ANA8081A
	Herbicides	APPL	EPA 619	µg/L	ANA8151A
Toxicity	*Ceriodaphnia d.*	PER	EPA-821-R-02-012	% survival	Acute Cerio SOP
	Selenastrum c.	PER	EPA-821-R-02-013 & EPA-600-4-91-002	cell growth	Chronic Selenastrum SOP
	Pimephales p.	PER	EPA-821-R-02-012	% survival	Acute FHM SOP
	Hyalella a.	PER	EPA-600-R-99-064	% survival	10-D HyalellaAcuteSedTest

CalTest Labs in Napa, California
APPL labs in Fresno, California
Pacific Ecorisk (PER) in Martinez, California

Attachment 1 details the samples collected at each site during each sampling event. A summary of the monitoring results is presented in **Appendix A**. Significant aquatic toxicity was measured eight times, during two sampling events (Event 39 in November and Rain Event 6 in January) and at seven sites during the reporting period. Four of these measurements affected *Ceriodaphnia dubia* and four affected algae. No toxicity was measured for fathead minnow. All but one measurement of toxicity (for *Ceriodaphnia dubia*) occurred during Rain Event 6. These results, along with associated water quality and flow data, are summarized in **Attachment 2**. Details of the aquatic toxicity analyses are shown in **Appendix C**.

Quality control samples were collected in addition to the event analysis sample. The quality control samples included field blanks, field duplicates, and matrix spike/matrix spike duplicate samples (MS/MSD). No significant quality control events were encountered, although there were some of minor quality control issues, including exceedance of the field duplicate RPD value, hold time violation, or control sample failure. Results of the Quality Control samples are discussed in Section 4.

Nine sites within San Luis Water District (SLWD) were monitored monthly in accordance with the Monitoring and Reporting Plan, including daily visits during Rain Event 6. SLWD has implemented an aggressive tailwater prohibition and none of these sites discharged during this reporting period. No samples have been collected at any of the SLWD sites since they joined the Westside Coalition.

Monitoring Toxicity Event Summaries.

The 2007/2008 non-irrigation season was extremely dry and 25% of the sites visited during the reporting period were observed to have no flow. One Rain Event was sampled during this reporting period.

Event 39, November 13, 2007.

Non-irrigation season water samples were collected on November 13th from all sites except Hospital Creek (no flow), Westley Wasteway (no flow), Del Puerto Creek at River Road and at Highway 33 (no flow), Salado Creek (no flow), Turner Slough (no flow), and the San Luis Water District Sites (no flow). Samples were collected in accordance with the original MRP submitted in April 2004. A reduction in *Ceriodaphnia dubia* survival was measured at Salt Slough at Lander Avenue (33% different from control). A follow-up sample was collected on November 20th and no toxicity was observed.

Event 40, December 11, 2007.

Non-irrigation season water samples were collected on December 11th from ten sites within the Westside Coalition. Nine sites had no flow: Hospital Creek, Ingram Creek, Westley Wasteway, Del Puerto Creek (both sites), Salado creek, Ramona Lake, Marshall Road Drain, Los Banos Creek at China Camp Road, and Turner Slough. Sites within San Luis Water District also had no flow. No significant toxicity was observed.

Rain Event 6, January 5th, 6th, and 7th, 2008.

From January 3rd through January 7th, 2008, a series of storms moved across the Westside Coalition. Table 4, below, summarized the total precipitation for CIMIS stations 7, 92, and 161 for that period.

Table 4

Station No.	Subarea	Total Precipitation
7 (Firebaugh/Telles)	Grasslands	0.55"
92 (Kesterson)	Los Banos	0.02"
161 (Patterson)	Patterson	2.59"

The precipitation was sufficient to cause surface runoff to discharge at sites within the Northern and Southern regions of the Westside Coalition although the flow rate at several sites was small. Sites within San Luis Water District were monitored on a daily basis during this period but no runoff was observed and no samples were collected. Samples were collected at all other sites except Westley Wasteway (no access), Salado Creek (no access), and Turner Slough (no access).

Toxicity to *Ceriodaphnia dubia* was measured at Hospital Creek (0% survival), Del Puerto Creek at Highway 33 (70% survival), and Ramona Lake (0% survival). Dilution series and TIE testing were performed on the Hospital and Del Puerto Creek samples and a follow up sample was collected at Ramona Lake. See Attachment 2 for the results. Toxicity to algae was measured at Hospital Creek (3% of control growth), Ingram Creek (12% of control growth), Marshall Road Drain (1% of control growth), and Orestimba Creek at River Road (69% of control growth). Dilution series and TIE testing was performed on each of the toxic samples except Orestimba Creek (algal growth was above the trigger). See attachment 2. No toxicity to fathead minnow was measured.

- Samples measuring *Ceriodaphnia dubia* toxicity. Chlorpyrifos (0.039µg/L), Diazinon (0.068µg/L) and Methyl Parathion (0.59µg/L) were measured at Hospital Creek and are consistent with the findings of the TIE as the probable cause of toxicity. No pesticides were detected at either the Del Puerto Creek or Ramona Lake sites and the cause of toxicity is no known. The Ramona Lake TIE was inconclusive and the resample measured no toxicity.
- Sample measuring algae toxicity. Diuron and copper were detected in all four samples that measured algae toxicity and are likely the cause of toxicity. Diuron is commonly used for weed control at road edges and canal banks and is used by both county road maintenance agencies and the California Department of Transportation.

Event 41, February 12, 2008.
Non-irrigation season samples were collected on February 12th at the Westside Coalition monitoring sites. Hospital Creek, Westley Wasteway, Ramona Lake, Marshall Road Drain, Los Banos Creek at China Camp Road, and Turner Slough did not have any flow and no samples were collected. No access was available to Salado Creek. No significant toxicity was observed.

SECTION 2: SAMPLING SITES DESCRIPTION

Figure 1 shows the Westside Coalition area and the location of the monitoring sites. Following is a description and rationale for the monitoring sites.

- Hospital and Ingram Creek (Designation 1 & 2, Table 2 of MRP). The confluence of Hospital and Ingram creeks is on the 303(d) list for pesticides. The sites are each located on the individual creeks, upstream of the confluence. Both of these creeks are significant drainages for the Patterson subarea. Ingram Creek site water is analyzed for Group A pesticides. Flow at both of these sites is measured with a sharp-crested weir.
- Westley Wasteway (Designation 3). Westley Wasteway is a significant drainage for the Patterson Subarea for both tailwater and storm runoff. Land use upstream of this monitoring station is similar to that of Del Puerto Creek. Westley Wasteway site water is analyzed for Group A pesticides. Flow at this site is measured with a sharp-crested weir.
- Del Puerto Creek (Designations 4 and 5). Del Puerto Creek is on the 303(d) list for pesticides and is a major drainage for the Patterson subarea and major storm runoff collector. Two stations are identified on this waterbody; one near the discharge to the San Joaquin River, and one at Highway 33, near the middle of the Patterson subarea. Biological assessments are performed on Del Puerto creek to assess its overall health,

which will be useful in relating to collected water quality data. Del Puerto Creek site water is analyzed for Group A pesticides. A stage-discharge curve has been developed for Del Puerto Creek near Cox Road, and is used to estimate flow. Discharge at Del Puerto Creek at Highway 33 is estimated by timing a floating object over a set distance and applied over the measured cross section.

- Salado Creek, Ramona Lake, and Marshall Road Drain (Designations 6, 7 & 8). All three of these are significant drainages for the Patterson subarea. All three carry tail water from similar landuse areas, as well as operational spills. Salado Creek also collects storm water runoff from the City of Patterson. The outlet of Salado Creek is a pipe discharge into the San Joaquin River, and access for sampling is subject to the water level and flow conditions of the River, which frequently prevent sample collection. The Westside Coalition has proposed discontinuing monitoring at this location, pending approval of the Regional Board. Water from all three of these sites is analyzed for Group A pesticides. All three of these discharges are piped and direct measurement of discharge cannot be safely performed during sample collection. Discharge at Marshall Road Drain and Ramona Lake are measured through the San Joaquin River Dissolved Oxygen Upstream Studies program.
- Orestimba Creek (Designation 9). There are two monitoring locations on Orestimba Creek; one near the discharge point to the San Joaquin River; and one upstream at Highway 33. The importance of Orestimba Creek is similar to that of Del Puerto: it is on the 303(d) list for pesticides, is a major drainage for the Patterson subarea, and is included in the biological assessment portion of the monitoring program. Orestimba Creek site water is analyzed for Group A pesticides. Flow data for Orestimba Creek at River Road is collected and reported by USGS. Discharge at Orestimba Creek at Highway 33 is estimated by timing a floating object over a set distance and applied over the measured cross section.
- Newman Wasteway (Designation 11). The Newman Wasteway is a significant drainage for the Patterson subarea and is on the 303(d) list for salt and pesticides. This measures drainage that originates from the southerly region of the Patterson subarea. Newman Wasteway site water is analyzed for Group A pesticides. Discharge at Newman Wasteway is estimated by timing a floating object over a set distance and applied over the measured cross section.
- The San Joaquin River at Sack Dam and Lander Avenue (Designations 12 & 13). These are baseline sites to establish the water quality backdrop in the San Joaquin River. The Sack Dam site is a water supply site that delivers water to agricultural areas within the Dos Palos Subarea as well as wetland water supplies. It can also receive agricultural return waters from the Tranquillity subarea. It is included to determine supply side water quality that may be affected by upstream discharge. San Joaquin River at Lander Avenue site water is analyzed for Group A pesticides. Discharge through the Lander Avenue site is reported through CDEC. Discharge past Sack Dam is visually assessed.
- Mud Slough and Salt Slough (Designations 14, 15 & 16). These sites measure both drainage originating from the Los Banos and Dos Palos subareas that flow through the wetlands, as well as discharge from the wetlands themselves. Both Mud and Salt Sloughs are on the 303(d) list for a variety of constituents. In addition to the Westside Coalition's monitoring program, the Central Valley Regional Water Quality Control Board, Surface Water Ambient Monitoring Program (SWAMP) collects and analyzes samples from these

sites throughout the year. These samples are analyzed for selenium, boron, and EC, along with other constituents. The SWAMP Data is available via the internet at: http://www.waterboards.ca.gov/centralvalley/programs/agunit/swamp/index.html. Mud Slough and Salt Slough at Lander Avenue site water is analyzed for Group A pesticides. Discharge through Mud Slough is calculated as the difference between the flow at Mud Slough downstream of the San Luis Drain, and San Luis Drain discharge measured at Site B. Discharge at Salt Slough at Sand Dam is measured through a sharp-crested weir at the dam. Discharge at Salt Slough at Lander Avenue is reported through CDEC.

- Los Banos Creek (Designations 17 & 18). Los Banos Creek carries storm water runoff from the Coastal Mountain Range, the City of Los Banos, and from the adjacent agricultural lands and wetlands. It also receives tail water from the Los Banos subarea. Two stations have been established on this waterbody, one upstream of the wetland area within the Los Banos subarea, and one within the wetlands. Discharge through both of these sites is estimated by timing a floating object over a set distance and applied over the measured cross section.
- Turner Slough (Designation 19). This station is located on the eastside of the San Joaquin River and measures drainage from a portion of the Patterson subarea. Site water from Turner Slough is analyzed for Group A pesticides. Discharge through Turner Slough is estimated by timing a floating object over a set distance and applied over the measured cross section.
- Little Panoche Creek. This creek is monitored as part of the San Luis Water District monitoring plan. There are six sites on this creek. The creek has the ability to convey storm runoff from adjacent orchards as well as releases from Little Panoche Reservoir. These sites are visited monthly and samples are collected in water is present. No samples have been collected since they have been incorporated into the Westside Coalition's monitoring program. Discharge through these sites will be estimated by timing a floating object over a set distance and applied over the measured cross section.
- Shields Avenue at I-5. This is an edge of road ditch that can collect runoff from adjacent farmed fields as well as road runoff from Shields Avenue. This site is part of the San Luis Water District monitoring program and has not conveyed water since the inception of their program. Discharge through this site will be estimated by timing a floating object over a set distance and applied over the measured cross section.
- Russell Avenue Drain at the San Luis Canal. This is an edge of road ditch that can collect runoff from adjacent farmed fields as well as road runoff from Russell Avenue. This site is part of the San Luis Water District monitoring program and has not conveyed water since the inception of their program. Discharge through this site will be estimated by timing a floating object over a set distance and applied over the measured cross section.
- Los Banos Creek at Sunset Avenue. This site is on Los Banos Creek at the eastern boundary of San Luis Water District and is part of the San Luis Water District Monitoring Program. It was dry during the monitoring period. There is a potential for minimal agricultural inputs at this site and most of the water conveyed would likely be releases from Los Banos Reservoir or upstream gravel pits. Discharge through this site will be estimated by timing a floating object over a set distance and applied over the measured cross section.

More than 59 different varieties of crops are grown within the Westside Coalition watershed area, ranging from fruit and nut trees to melons and cotton. **Table 5** shows the top twenty crops within the watershed area based on 2006 DPR pesticide use data.

These crops are dispersed approximately evenly throughout the watershed area, with the exceptions of cotton (mostly in the Los Banos, Dos Palos and Tranquillity subareas), rice (Dos Palos subarea only), and fruit trees (mostly in the Patterson subarea). The planting practices are typical for conventional agriculture within the Central Valley. A complete crop list and detailed crop calendar was presented in the "Watershed Evaluation Report", submitted in April, 2004.

In general, annual field crops (cotton, tomatoes, melons, etc.) are planted in the spring between March and May, and harvested in the late summer and early fall, depending on the crop. Orchard crops come out of dormancy between March and April, and are harvested in the late summer and fall.

Table 5: Top 20 Crops Grown

Fresno	Merced	Stanislaus
Cotton	Almonds	Almonds
Grapes	Cotton	Walnuts
Almonds	Alfalfa	Corn
Tomatoes	Tomatoes	Alfalfa
Alfalfa	Grapes	Peaches
Lettuce	Corn	Tomatoes
Corn	Pistachios	Grapes
Citrus	Oats	Dry Beans
Mellons	Peaches	Apricots
Nectarines	Wheat	Oats
Peaches	Mellons	Nursery
Pistachios	Walnuts	Mellons
Onion	Sugar Beets	Broccoli
Sugar Beets	Green Beans	Cherrys
Wheat	Sweet Potato	Green Beans
Plums	Rice	Apples
Garlic	Prunes	Lettuce
Broccoli	Onion	Wheat
Peppers	Nursery	Spinach

Data from 2006 DPR Pesticide Use database.

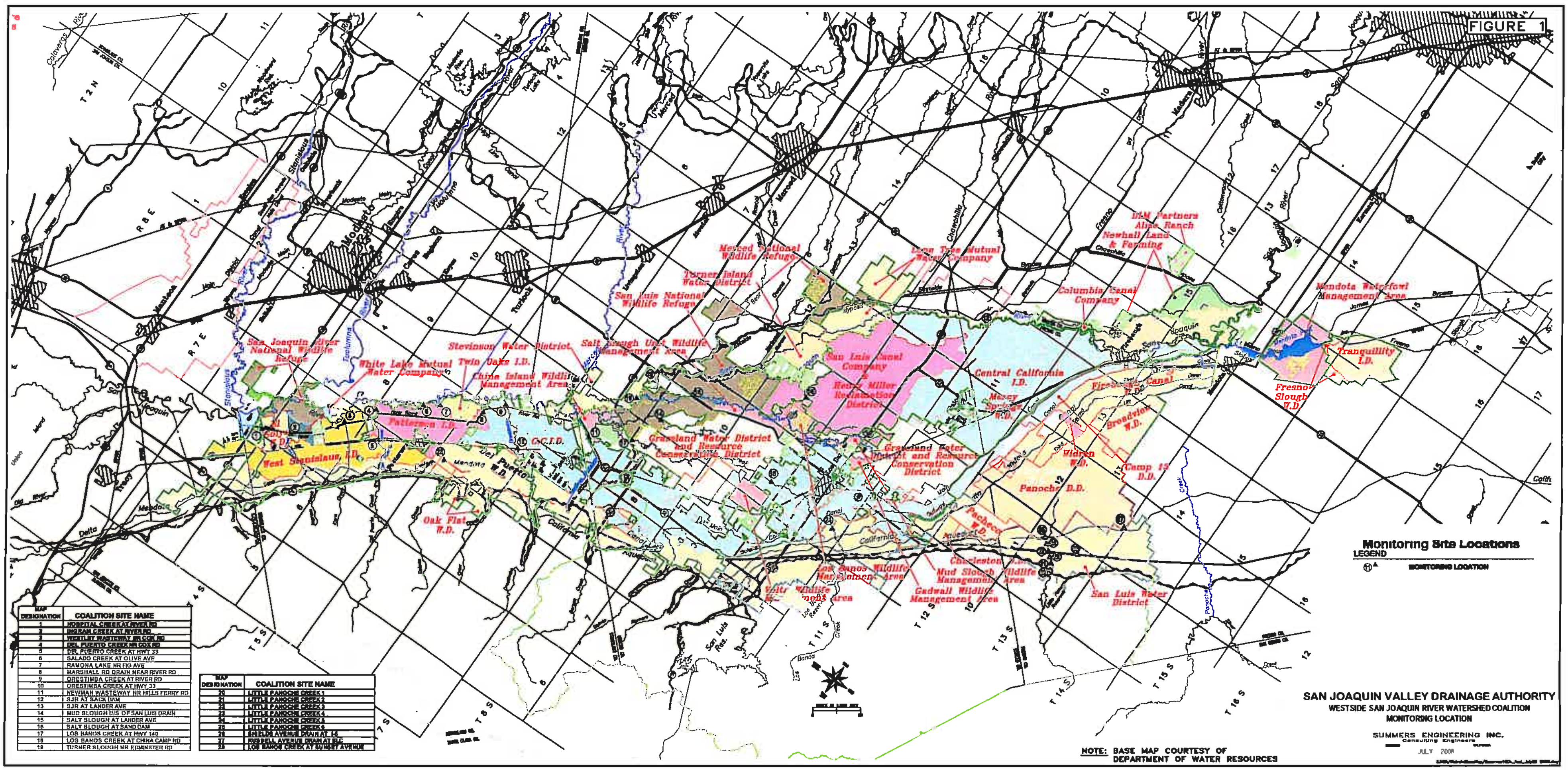
Annual field crops are typically planted as seed or transplants after the field has been pre-irrigated to provide salt leaching and soil moisture for germination. These crops are usually furrow irrigated using either a plowed head ditch or gated pipe, but may also be sprinkler or sub-surface drip irrigated. Permanent field crops such as pasture or alfalfa are usually flood or sprinkler irrigated. The younger fruit and nut trees are almost universally irrigated with drip or micro-sprinkler systems, though many of the older orchards are still flood irrigated.

Table 6 shows the types of pesticides used in 2006 reported from the California Department of Pesticide Regulation, by sub-watershed and crop type. This area includes 10 of the 19 monitoring sites within the Westside Coalition, 3 of which are on the 303d list for pesticides.

Table 6: Stanislaus County 2006 Pesticide Use by Subwatershed

	Pesticide Type	Fallow / Native	Field Crops	Pasture	Orchard Crops	Vineyards	Nursery
Del Puerto Cr. Subwatershed	Carbamates		X		X		
	Herbicides	X	X	X	X	X	
	Organochlorine		X		X		
	Organophosphorus		X	X	X		
	Pyrethroid		X		X	X	
Hospital/Ingram Cr. Subwatershed	Carbamates		X		X		
	Herbicides	X	X		X	X	
	Organochlorine		X		X		
	Organophosphorus		X		X		
	Pyrethroid		X		X	X	
Orestimba Cr. Subwatershed	Carbamates		X		X		
	Herbicides	X	X	X	X		X
	Organochlorine		X		X		
	Organophosphorus		X		X		
	Pyrethroid		X		X		
Salado Creek Subwatershed	Carbamates		X		X		
	Herbicides	X	X	X	X		
	Organochlorine		X		X		
	Organophosphorus		X		X		
	Pyrethroid		X		X		
Westley Wasteway Subwatershed	Carbamates		X		X		
	Herbicides	X	X		X	X	
	Organochlorine		X				
	Organophosphorus		X		X		
	Pyrethroid		X		X	X	

Note: Shaded regions indicate no recorded pesticide application on that crop type in that subwatershed.



MAP DESIGNATION	COALITION SITE NAME
1	HOSPITAL CREEK AT RIVER RD
2	INGRAM CREEK AT RIVER RD
3	WESTLEY WASTEWAY NR COX RD
4	DEL PUERTO CREEK NR COX RD
5	DEL PUERTO CREEK AT HWY 33
6	SALADO CREEK AT OLIVE AVE
7	RAMONA LAKE NR FIG AVE
8	MARSHALL RD DRAIN NEAR RIVER RD
9	ORESTIMBA CREEK AT RIVER RD
10	ORESTIMBA CREEK AT HWY 33
11	NEWMAN WASTEWAY NR HILLS FERRY RD
12	SJR AT SACK DAM
13	SJR AT LANDER AVE
14	MUD SLOUGH U/S OF SAN LUIS DRAIN
15	SALT SLOUGH AT LANDER AVE
16	SALT SLOUGH AT SAND DAM
17	LOS BANOS CREEK AT HWY 140
18	LOS BANOS CREEK AT CHINA CAMP RD
19	TURNER SLOUGH NR EDMINSTER RD

MAP DESIGNATION	COALITION SITE NAME
20	LITTLE PANOCHE CREEK 1
21	LITTLE PANOCHE CREEK 2
22	LITTLE PANOCHE CREEK 3
23	LITTLE PANOCHE CREEK 4
24	LITTLE PANOCHE CREEK 5
25	LITTLE PANOCHE CREEK 6
26	SHIELDS AVENUE DRAIN AT I-5
27	RUSSELL AVENUE DRAIN AT ELC
28	LOS BANOS CREEK AT SUNSET AVENUE

Table 7 shows the 10 most commonly applied pesticides (by acreage) for the three major counties occupied by the Westside Coalition.

Table 7: Most Commonly Applied Pesticides by County (2006).

Fresno		Merced		Stanislaus	
Pesticide	Class	Pesticide	Class	Pesticide	Class
Ethephon	OP	Ethephon	OP	Lambda-cyhalothrin	Pyrethroid
Chlorpyrifos	OP	Chlorpyrifos	OP	Dimethoate	OP
Methomyl	Carbamates	Lambda-cyhalothrin	Pyrethroid	Esfenvalerate	Pyrethroid
Lambda-cyhalothrin	Pyrethroid	Cyfluthrin	Pyrethroid	Chlorpyrifos	OP
Esfenvalerate	Pyrethroid	Mehtomyl	Carbamate	Methomyl	Carbamates
Naled	OP	Dicofol	OC	Permethrin	Pyrethroid
Cyfluthrin	Pyrethroid	Malithion	OP	Parathion-Methyl	OP
Permethrin	Pyrethroid	Aldicarb	Carbamate	Bifenthrin	Pyrethroid
Bifenthrin	Pyrethroid	Dimethoate	OP	Ethephon	OP
Diazinon	OP	Esfenvalerate	Pyrethroid	Dicofol	OC

SECTION 3: FIELD SAMPLING PROCEEDURE

Field water quality data and sample collections were collected as outlined in the Westside Coalition's Quality Assurance Project Plan (QAPP) and Field Sampling Manual. Two sampling crews are responsible for collecting samples at each of the 19 sites; the field coordinator for the northerly region is responsible for collecting samples from sites 1 through 10. The field coordinator for the southerly region and is responsible for collecting samples from sites 11 through 19. The sampling crew for the northerly region is comprised of staff from Del Puerto Water District and Patterson Irrigation District. The southerly sampling crew is staffed by Central California Irrigation District. These responsibilities include completion of the field data sheets, collection of water and sediment samples, completion of labels and chain of custody sheets, and coordination with the labs for sample pickup. Samples are collected either as a direct grab from the waterbody or as a bucket grab, where a large volume of water is collected in a stainless steel bucket and transferred to the sample bottles. Details of these collection methods are explained in Field Sampling manual. The list of tested constituents is shown in **Table 8**, below.

Table 8: Current Monitoring Constituents

Pesticides

Material	Class
Aldicarb	Carbamate
Carbaryl	Carbamate
Carbofuran	Carbamate
Diuron	Carbamate
Linuron	Carbamate
Methiocarb	Carbamate
Methomyl	Carbamate
Oxamyl	Carbamate
4,4'-DDE	Organochlorine
4,4'-DDT	Organochlorine
4,4'-TDE/DDD	Organochlorine
Dicofol	Organochlorine
Dieldrin	Organochlorine
Endrin	Organochlorine
Methoxychlor	Organochlorine
Methamidophos	Organophosphate
Azinphosmethyl	Organophosphate
Chlorpyrifos	Organophosphate
Diazinon	Organophosphate
Dimethoate	Organophosphate
Disulfoton	Organophosphate
Malathion	Organophosphate
Methidathion	Organophosphate
Parathion, methyl	Organophosphate
Phorate	Organophosphate
Phosmet	Organophosphate
Bifenthrin	Pyrethroid
Cyfluthrin	Pyrethroid
Cypermethrin	Pyrethroid
Esfenvalerate/Fenvalerate	Pyrethroid
Lambda cyhalothrin	Pyrethroid
Permethrin	Pyrethroid
Atrazine	Triazine
Cyanazine	Triazine
Diuron	Triazine
Linuron	Triazine
Molinate	Triazine
Simazine	Triazine
Thiobencarb	Triazine

General Chemistry Constituents

Material	Class
Bromide	Drinking Water
E. Coli	Drinking Water
Color	General Physical
Dissolved Organic Carbon	General Physical
Hardness (as CACO3)	General Physical
Total Dissolved Solids	General Physical
Total Organic Carbon	General Physical
Total Suspended Solids	General Physical
Turbidity	General Physical
Arsenic	Metal
Boron	Metal
Cadmium	Metal
Copper	Metal
Lead	Metal
Nickel	Metal
Selenium	Metal
Zinc	Metal
Ammonia (as N)	Nutrient
Nitrogen, Nitrate (as N)	Nutrient
Nitrogen, Nitrite	Nutrient
Phosphate as P,Ortho dissolved	Nutrient
Total Kjeldahl Nitrogen	Nutrient
Total Phosphate as P	Nutrient

Field Measurements

Material
DO
EC
Est Depth
pH
Flow
Staff Gage
Temp

Toxicity Analyses

Material	Class
Hyalella azteca	Sediment Toxicity
Pimephales promelas	Fathead Minnow
Selenastrum capricornutum	Algae
Ceriodaphnia dubia	Water Flea

SECTION 4: FIELD QUALITY CONTROL SAMPLES

Field quality control samples included the collection of field duplicate samples for aquatic toxicity analysis, and the collection of both field duplicate and field blank samples for pesticides, drinking water, and general physical constituent analysis. It should be noted that the field duplicate samples are typically collected as separate samples simultaneously with the event sample (as opposed to field split samples). The calculated relative percent difference (RPD) between the event sample and field duplicate sample should be considered measurements of site water variability.

- **Water Chemistry Analyses.** Field duplicate and field blank samples were collected at three sampling events during the reporting period and analyzed for general chemistry and drinking water constituents. A comparison of the event samples, duplicate samples, and blank samples is tabulated in **Attachment 3**. A total of 66 duplicate analyses were completed and compared to the event sample results. Six duplicate samples exceeded the 25% relative percent difference (RPD) established in the QAPP for:

Color	E. Coli	Hardness
Nitrate	Total Suspended Solids	Turbidity

  Three field blank sample sets were analyzed during the report period (66 results, total). Of these, none resulted in values greater than 20% of the event sample result.

  There were some samples that were analyzed or re-analyzed outside of the designated hold-time. It is not expected that these hold-time violations will significantly affect the data usability.

- **Pesticide Analyses.** Two field duplicate and field blank samples sets were collected during the reporting period and analyzed for pesticides. There were no detections of pesticides for any of the field blank samples. Calculated RPD for Field duplicate results were greater than 25% for four analytes during Rain Event 6 (January 2008). The RPD was 44% for Chlorpyrifos, 30% for DDE, 43% for Diazinon, and 48% for Methyl-parathion. All other RPDs were within the 25% margin. These variations likely demonstrate the site water variability and are not expected to affect data usability. The results of the field blank, field duplicate and event sample comparisons are tabulated in **Attachment 3**.

- **Aquatic Toxicity Analyses.** Field duplicate samples were collected and analyzed for toxicity to all three species for two of the aquatic toxicity events tested during the reporting period. Field duplicate results were acceptable for all of the tests, although the Rain Event 6 (January 2008) algae duplicate RPD measured 25%.

- **Sediment Toxicity Analysis.** There were no sediment toxicity analyses performed during this reporting period.

SECTION 5: ANALYTICAL METHODS

Table 3 indicates the laboratories responsible for the analytical results of this monitoring program, the analytical method used, and the standard operating procedure (SOP) document number. This table includes the additional Phase II constituents.

Chain of Custody (COC) sheets were maintained from the time of sample collection to receipt at the laboratories. Copies of the COC sheets are included in **Appendix A**, along with a summary of the data results. The data summary includes all of the field readings, analytical chemistry results, pesticide scan results, and toxicity test results (including results from the initial screening tests, dilution series, and TIE's). The original laboratory reports are included in **Appendix C**. These reports also include all of the field and internal quality control results.

The laboratory original data sheets (raw data) for the toxicity results are included in **Appendix C**, as part of the laboratory reports. Raw data for general physical results, drinking water results, and pesticide results are kept by the laboratories for a minimum of five years and are available upon request.

SECTION 6: DATA INTERPRETATION

The primary objective of the monitoring program is to identify water bodies that are adversely affected by agricultural discharges. The monitoring program has used a combination of toxicity tests and pesticide analyses, along with close coordination among districts and growers to not only identify problem areas but also to determine the magnitude and cause of the problems.

The Westside Coalition's monitoring program includes 28 stations on the Westside of the San Joaquin Valley (see **Table 1** and **Figure 1**). These stations were selected to provide a representative snapshot of all of the various regions of the watershed. A summary of this data is presented in **Appendix A**, and the laboratory data reports are provided in **Appendix C**.

All of the analyzed parameters were reviewed regularly to evaluate the overall health of the water bodies within the coalition area. This reporting period covered only non-irrigation months with limited agricultural activity. Eight measurements of significant aquatic toxicity were measured, all but one of which occurred during Rain Event 6 (January 2008). Four of the toxicity measurements were to *Ceriodaphnia dubia*, with the remaining to algae.

Ceriodaphnia dubia. Toxicity was measured once during Event 39 (November 2007) at Salt Slough at Lander Avenue. Survival was measured at 60% (33% different from control). No pesticides were detected and a resample indicated no toxicity. The remaining three toxicity measurements occurred during Rain Event 6 at Hospital Creek and Ramona Lake (both 0% survival) and at Del Puerto Creek at Highway 33 (70% survival – 26% different from control). Chlorpyrifos, DDE, Diazinon, and Methyl Parathion were detected at Hospital Creek and likely contributed to the toxicity. No pesticides were detected in either the Ramona Lake nor Del Puerto Creek samples and the cause of toxicity at both of those sites is unknown. See **Attachment 2**.

Selenastrum capricornutum. Toxicity was measured to algae four times during the reporting period, all of which occurred during Rain Event 6. Severe reductions in growth (>90% difference from control) were observed in the Hospital Creek, Ingram Creek, and Marshall Road Drain samples, with a 31% difference from control measured at Orestimba Creek at River Road. Diuron was detected at all four sites and likely contributed to the toxicity. This is consistent with previous rain events. See **Attachment 2**.

Pimephales Prromelas. No toxicity to fathead minnow was observed during this reporting period.

A variety of pesticide analyses were conducted in tandem with the toxicity screening. During the reporting period, there were 41 detections of 10 different pesticides.

- Chlorpyrifos (6 detections): Chlorpyrifos is an organophosphate pesticide used to control a wide range of insects in orchards, pasture, and field crops. It can be used as a dormant spray for fruit and nut trees.
- Cyanazine (2 detection): Cyanazine is a triazine pre- and post- emergent herbicide to control annual grasses and broadleaf weeds.
- DDT/DDE (8 detections): DDT is an organochlorine pesticide that was banned for agricultural use in 1972. It is a legacy pesticide that is still detected in the watershed relatively low levels. DDE and DDD have no commercial value but are compounds normally associated with the degradation of DDT.
- Diazinon (3 detection): Diazinon is an organophosphate pesticide used to control a wide range of insects and is frequently applied to nut trees, melons, and tomatoes, and is often used as a dormant spray for trees.
- Dieldrin (1 detections): Dieldrin is an orgaonchlorine insecticide that was used on a variety of field and orchard crops including cotton, corn, and citrus. Most uses of Dieldrin were banned in 1987.
- Dimethoate (1 detections): Dimethoate is an organophosphate pesticide used to control a wide range of insects. It is used on a variety of field crops including alfalfa, beans, tomatoes, and cotton.
- Diuron (10 detections): Diuron is a substitute urea herbicide used to control weeds in a variety of field crops including cotton, alfalfa, and wheat. It is also effective in controlling algae. Two of the Diuron detections occurred in Event 41 (February), with the remaining occurring in Rain Event 6.
- Methyl parathion (1 detection): Methyl parathion is an organophosphate pesticide used to control a wide range of insects. It is approved for a variety of non-food crops including alfalfa, cotton, and silage corn.
- Simazine (9 detections): Simazine is a triazine herbicide used to control broadleaf weeds and annual grasses in a variety of field crops.

Exceedences of Recommended Water Quality Values

Water chemistry analyses were compared to recommended water quality values[1] (RWQV).

- **Field, General Physical and Drinking Water Quality Exceedences.** Comparisons were made to seven RWQVs. **Attachment 4** tabulates the results for these constituents and the comparison to the RWQVs. The Westside Coalition performed analyses or observed almost 1,500 field and chemistry (non-pesticide) parameters during the reporting period, during which, 74 (5%) results were greater than the RWQVs. Electrical

[1] Water Quality Limits were taken from a Central Valley Regional Water Quality Control Board letter to the Westside Coalition, dated 30 September 2005.

Conductivity and TDS accounted for 24 and 28 of these exceedances (respectively). E. coli results accounted for 17 of these exceedences, 1 for TSS, 1 for Dissolved Oxygen, and 2 for pH, and 1 for boron.

- **Pesticide exceedences.** The Westside Coalition tested for 1,050 pesticides during the reporting period. These analyses resulted in 41 detections, of which, 13 were greater than established RWQVs. Of the 13 exceedances, 8 were caused by legacy pesticides (either DDT, or DDE), which are not currently in use. Five pesticides constituted the 13 exceedances, which are listed in **Table 9** (below).

Table 9: Pesticide Exceedances

Pesticide	Number of Exceedances
Chlorpyrfos	2
Diazinon	2
Methyl Parathion	1
DDT	2
DDE	6

SECTION 7: ACTIONS TAKEN TO ADDRESS WATER QUALITY IMPACTS

1. Reporting and Outreach:

Outreach included update presentations at regular board meetings of the West Stanislaus Resource Conservation District and the El Solyo Water District. Presentations to these groups focused on providing updates and results of BMP studies undertaken in this project. A meeting was also held with the manger of the Blewett Mutual Water Company. Regular updates were also given at the monthly meeting of the Westside Coalition. A tabulation of meetings is shown in **Table 10**.

Table 10: Outreach Meetings.

Date	Group	Location	Description	Approximate Attendance
5/10/2007	Landowner Tailgate	Patterson	Sediment, pesticides.	1
5/22/2007	Water District Managers	Los Banos	Water quality issues	10
5/30/2007	Patterson ID Workshop	Westley	toxicity, pesticides, sediment, and others	30
6/13/2007	W. Stan. RCD - Board of Directors	Patterson	Water quality issues	8
6/26/2007	Water District Managers	Los Banos	Water quality issues	10
7/24/2007	Water District Managers	Los Banos	Water quality issues	10
8/28/2007	Water District Managers	Los Banos	Water quality issues	10
9/25/2007	Water District Managers	Los Banos	Water quality issues	10
10/18/2007	BMP Field Day	Patterson	BMP treatments for sediment, PAM, Land Guard emzyme, sediment ponds, recirculation systems, funding sources	50
11/27/2007	Dept of Fish and Game	Fresno	Update on wetland compliance with Ag Waiver	2

Pesticide manufacturers are also responding to the water monitoring results from the Westside Coalition through sponsorship and participation in developing BMP literature that has been distributed at grower meetings through their ongoing relationship with CURES. These BMP publications cover changes in CAL-EPA approved labels for chlorpyrifos and diazinon and stewardship practices for pyrethroid insecticides (these publications are included in the project's "Grower Handbook: Management Practices for Protecting Water Quality.") Information on label changes as well as other best management practices specific to these pesticides was also presented at the grower/PCA meetings.

Grower outreach continued during this reporting period. Through close partnership with the West Stanislaus Resource Conservation District, the local water districts and the Westside Coalition, CURES conducted nine outreach meetings that were organized for growers and PCAs in the region. At each meeting, the latest information on the BMP studies conducted in this grant as well as other BMPs applicable to managing sediment and pesticide runoff were provided. In addition, a number of "tailgate meetings" were held with individual large-acreage growers at their farm offices. Growers were selected based on having properties near or adjoining Orestimba Creek. These informal meetings were facilitated by CURES staff, the Del Puerto Water District or the Central California Irrigation District and were found to be an effective way to discuss the results of water and sediment monitoring and the requirements for Management Plans in the coalition area.

2. BMP Implementation:

During this reporting period, the Westside Coalition continued the development of a Management Plan. The Management Plan includes details on the finding of the first three years of monitoring as well as plans to improve water quality where appropriate. The Management Plan also includes a focused watershed plan for Ingram and Hospital Creeks. The Management Plan is expected to be submitted to the Regional Board by the end of July.

In support of the Management Plan activities, a revised Monitoring and Reporting Plan (MRP) has also been developed. This MRP is structured to target monitoring activities according to the water quality issues of concern within each subwatershed. It is designed to be a flexible plan the adjusts to changes in conditions. An initial revision to the MRP was submitted to the Regional Board in February 2008, with the final plan expected by the end of July.

In addition to these activities, efforts continue by growers and the Coalition to install and evaluate numerous management practices to mitigate sediment and pesticide runoff from irrigated cropland in the Westside Coalition region. Of specific note are the installation of a number of tailwater management systems and other BMPs that will likely affect the water quality during the 2008 irrigation season.

- Completion of the Westley Tailwater Return System project. With funding from a Proposition 50 grant, Patterson Irrigation District and West Stanislaus Irrigation District completed a tailwater return system during this reporting period. The pond consisted of an initial and primary collection basin, as well as a return pump and pipeline. The pond collected tailwater from a 550 acre field of row crops that previously discharged directly into Ingram Creek. Since the completion of this project, tailwater is routed into the pond, where it is detained so that silt can settle out. If there is irrigation demand, the water is returned to the irrigation system, otherwise it is decanted out of the pond and into Ingram Creek.

Westley Tailwater Pond – Ingram Creek in the background. Initial basin in the foreground

Westley Tailwater Pond – Pump station in the primary basin.

- Construction of the Northside Recovery System in Patterson Irrigation District was completed during the winter of 2008 and will be operational for the 2008 irrigation season. This project will collect tailwater from approximately 4,500 acres in northern Patterson Irrigation District. The system includes a 55 acre foot reservoir, five return pump stations, and four pipelines to collect and redistribute tailwater within Patterson's irrigation system. Prior to this project, discharges from this region would largely discharge into Del Puerto Creek downstream of Highway 33. It is expected that this project will significantly improve some of the water quality issues measured at Del Puerto Creek near Cox Road.

Tailwater entering the reservoir during the initial filling. Incoming flow is about 5 cfs.

Reservoir pump station. Tailwater will enter the reservoir through the pipeline outlet (foreground) and recirculated into the irrigation system through the pump station.

- The Westside Coalition is in the process of developing a Focused Watershed Plan for Ingram and Hospital Creeks. This plan will outline specific actions that the Coalition will undertake to improve water quality within these two watersheds. The Focused Watershed Plan includes a surveillance level monitoring program that will specifically monitoring the impacts of in-field management activities such as sediment ponds.

- A BMP Handbook continues to be distributed to landowners in the Coalition region. The Handbook was developed as part of a project to identify and design BMP's for reduction of discharge from the Orestimba Creek watershed.

- Landowners are continuing to install drip and micro spray irrigation systems. These systems reduce or eliminate irrigation drainage water and subsequent discharges. Since 2006, high efficiency irrigation systems (drip and micro sprinklers) have been installed on over 460 acres of farmland within the Orestimba Creek subwatershed

2007/08 BMP Evaluations

The Westside Coalition collaborated with a Regional Board funded grant project in the Orestimba Creek and Del Puerto Creek subwatersheds, partnering with the San Luis and Delta Mendota Water Authority (SLDWA). The project was funded by the Pesticide Research and Investigation of Source Management Program (PRISM) using Proposition 13 Funds. The project, entitled "Western San Joaquin Valley Pesticide BMP Implementation Program", evaluated the effectiveness of three best management practices (BMPs) used in irrigated cropland, conducted a baseline survey of grower practices in the Orestimba and Del Puerto watersheds (two tributaries of the San Joaquin River in western Stanislaus County) and implemented a significant grower outreach program. The project, both the BMP effectiveness study and outreach, served and continue to provide important information for growers operating in the project region as they comply with requirements in the ILRP.

The BMPs evaluated in the project included one newly emerging practice and three existing practices: vegetated drainage ditches, treatment of irrigation tailwater with polyacrylamide (PAM) and constructed wetlands. The existing practices are suited to local conditions in the Orestimba and Del Puerto Creek watersheds and are used to reduce pesticide residues in irrigation tailwater. The implementation of vegetated ditches and PAM on selected commercial size fields was comprehensively monitored to evaluate the effectiveness of these technologies in reducing pesticide contamination and sediment loads in the irrigation return flows from participating farmlands. In addition to these two BMPs, a constructed wetland, riparian to the San Joaquin River and designed to receive irrigation runoff, was monitored for pesticide levels to establish baseline data for future mitigation at the site. The implementation and/or assessment of BMPs through this project affected approximately 4100 acres of cropland in the Orestimba and Del Puerto Creek subwatersheds

Project results indicate that constructed vegetated ditches are an effective management practice for reducing pesticide concentrations in irrigation return flows, with chlorpyrifos reductions averaging between 25% and 38% and lambda-cyhalothrin reductions averaging between 11% and 49% under the conditions of the project studies. There was little effect on the sediment loads in these studies, although this was not unexpected as these studies were run in alfalfa where sediment movement tends to be minimal.

The results from the PAM study were disappointing in that there was no noticeable effect of PAM on the offsite movement of chlorpyrifos, an insecticide that moves offsite in the dissolved form. However, there was a significant, observable reduction in the sediment load when using PAM in this study. This has significance for non-water soluble pesticides such as the pyrethroids which have a greater propensity for binding to soil particles. PAM should be able to significantly reduce the off-site movement of these materials. Another observation from this study was that delaying irrigation (up to four days), did not appreciably slow chlorpyrifos movement from a minimally vegetated or bare ground scenario typically found in newly emerging row crops.

The primary objective of the wetlands study was to determine the wetland's effectiveness in reducing the mass of organophosphate (OP) pesticides in discharge. Tailwater was diverted through the wetlands and tested as it entered and exited. The study was performed during July, typically the peak pesticide application month. However, of the ten OP insecticides measured, only dimethoate was found at measureable levels (87% of the samples collected). Additionally, on-site flow complications and poor analytical QC results made the usable conclusions regarding pesticide removal impossible. Other wetland flow-through studies suggest that wetlands have a beneficial impact on overall water quality but these other studies did not analyze for pesticides.

Another phase of this grant was to identify a minimum of twenty growers in the Orestimba and Del Puerto Creek watersheds that would potentially participate in site assessments of their properties to evaluate BMP implementation. Assessments were to be conducted by licensed Pest Control Advisors (PCAs) in the management area. It was initially found that there was some reluctance by growers to participate in the program due to 1) a limited number of growers in the Orestimba/Del Puerto Creek watersheds and 2) the Irrigated Lands Regulatory Program. Growers were concerned that the site assessments would provide detailed information about their field operations that might potentially be made public record and could be used if exceedances were found in either creek. After these concerns were alleviated, a total of 22 growers participated in this baseline survey. Survey results indicated a medium to high level of understanding of water quality issues in the region and related BMPs. The orchard and row crop farms covered in this survey have an excellent pest management program and closely follow PCA recommendations for scouting, resistance management, and treatment. Most of the respondents calibrate their sprayers prior to each application and all calibrated at least once per year.

3. Monitoring Results:

Data gathered since the inception of the monitoring program has allowed the Westside Coalition to identify problem areas and issues. Details of sites exhibiting significant toxicity during this monitoring period are included in **Attachment 2** and all results that exceeded RWQVs are included in **Attachment 4**. This information, along with results from previous years will be used as talking points during upcoming grower meetings to outline the problem issues and sites as well as for the development of the revised MRP, the Management Plan, and the Focused Watershed Plan. A number of preliminary conclusions can be made from the data collected so far:

- **Sediment Toxicity:** No sediment toxicity tests were performed during this reporting period. Sediment samples were collected by the Westside Coalition in March 2008 and will be discussed in the 2008 Irrigation Season monitoring report that will be submitted in the fall of 2008.
- **Aquatic Toxicity:** During this reporting period, 8 samples indicated significant toxicity; four to algae and four *ceriodaphnia dubia.* One measurement of *ceriodaphnia dubia* toxicity occurred in November 2007, with all other toxicity measurements occurring during Rain Event 6. **Attachment 2** provides monitoring results for all of the sites that measured significant toxicity, including a discussion of the TIE and dilution series findings. It is significant to note that virtually all of the measured toxicity occurred during the rain event. In all of the instances of algae toxicity, Diuron and copper were detected in the sample. Diuron is a common herbicide used by state and municipal transportation agencies as well as agricultural districts and growers. Although no direct evidence exists, it seems that surface runoff from rainfall is picking up diuron as it flows across areas of application and carrying it into the waterways. Pesticide use data for the reporting period is not yet available but the 2006 data from Department of Pesticide Regulation indicates that about 50% of the pounds of Diuron applied in Stanislaus County are for non-agricultural purposes (assumed to be right-of-way applications) during the December through February period. Of the four measurements of significant toxicity to *ceriodaphnia dubia*, insecticides were detected only at Hospital Creek. The other three sites detected no pesticides and the TIEs performed were inconclusive.
- **Pesticide Analyses:** During this reporting period, 13 pesticide detections exceeded RWQVs (see **Table 9**). All of the pesticide exceedances occurred during Rain Event 6.
- **General Chemistry and Field Observations:** The monitoring results during this reporting period indicated the same issues as in previous reports. EC/TDS measured the largest number of exceedances for this reporting period (24 and 28 exceedances, respectively), which is not surprising given the very dry hydrologic year. E. Coli continues to be a leading source of exceedances (17 during this period). Other constituent exceedances include TSS (1 exceedance), pH (2 exceedances), DO (1 exceedance) and Boron (1 exceedance). With many of these constituents, the source of the exceedance is neither clear nor easily traceable, and often can be found in the source water itself (such as the San Joaquin River at Sack Dam).

SECTION 8: COMMUNICATION REPORTS

Exceedance reports were submitted to the Central Valley Regional Water Quality Control Board in response to monitoring results for the reporting period. These reports are included in **Appendix B.**

Follow-up included reporting statistically significant toxic events and exceedences of water quality values to the overlying districts, PCA's and to individual coalition participants. The districts would then communicate with the affected growers to notify them there is a problem. Meetings are then be organized at the Coalition level as required to inform landowners, operators, PCA's, chemical applicators and others on monitoring results and likely best management measures that could be undertaken to minimize these problems (See **Table 10**).

SECTION 9: CONCLUSIONS AND RECOMMENDATIONS

The Westside Coalition's monitoring program has identified constituents of concern (see **Attachments 2** and **4** and **Table 9**). The Westside Coalition is in the process of developing a Management Plan, Focused Watershed Plan, and a revised Monitoring and Reporting Plan to address the water quality concerns discovered by previous monitoring. We are in the process of meeting with Regional Board staff to finalize the details of these plans. The management and monitoring plans are expected to be implemented in July of 2008.

Attachment 1
Sampling Event Details

Event 39 November 07		Caltest Gen Phy	 Dmk Wtr	APPL Pest	PER Sed Tox	 CD Tox	 PP Tox	 SC Tox	Dup?
Hospital Creek at River Road	HCARR	No Flow							
Ingram Creek at River Road	ICARR	x	x						
Westley Wasteway nr Cox Road	WWNCR	No Flow							
Del Puerto Creek nr Cox Road	DPCCR	No Flow							
Del Puerto Creek at Hwy 33	DPCHW	No Flow							
Salado Creek nr Olive Ave	SCOAV	No Flow							
Ramona Lake nr Fig Avenue	ROLFA	x	x						
Marshall Road Drain nr River Road	MRDRR	No Flow							
Orestimba Creek at River Road	OCARR	x	x						
Orestimba Creek at Highway 33	OCAHW	x	x						
Newman Wasteway nr Hills Ferry Rd	NWHFR	x	x						
SJR at Sack Dam	SJRSD	x	x						
SJR at Lander Ave	SJRLA	x	x	x		x	x	x	
Mud Sl upstream of San Luis Drain	MSUSL	x	x	x		x	x	x	
Salt Sl at Lander Ave	SSALA	x	x	x		x	x	x	
Salt Sl at Sand Dam	SSASD	x	x						
Los Banos Cr at Hwy 140	LBCHW	x	x	x		x	x	x	x
Los Banos Cr at China Camp Road	LBCCC	x	x						
Turner Slough nr Edminster Road	TSAER	No Flow							

Event 40 December 07		CalTest Gen Phy	 Dmk Wtr	APPL Pest	PER Sed Tox	 CD Tox	 PP Tox	 SC Tox	Dup?
Hospital Creek at River Road	HCARR	No Flow							
Ingram Creek at River Road	ICARR	No Flow							
Westley Wasteway nr Cox Road	WWNCR	No Flow							
Del Puerto Creek nr Cox Road	DPCCR	No Flow							
Del Puerto Creek at Hwy 33	DPCHW	No Flow							
Salado Creek nr Olive Ave	SCOAV	No Flow							
Ramona Lake nr Fig Avenue	ROLFA	No Flow							
Marshall Road Drain nr River Road	MRDRR	x	x						
Orestimba Creek at River Road	OCARR	x	x						
Orestimba Creek at Highway 33	OCAHW	x	x						
Newman Wasteway nr Hills Ferry Rd	NWHFR	x	x						
SJR at Sack Dam	SJRSD	x	x						
SJR at Lander Ave	SJRLA	x	x	x		x	x	x	
Mud Sl upstream of San Luis Drain	MSUSL	x	x	x		x	x	x	
Salt Sl at Lander Ave	SSALA	x	x	x		x	x	x	x
Salt Sl at Sand Dam	SSASD	x	x						
Los Banos Cr at Hwy 140	LBCHW	x	x	x		x	x	x	
Los Banos Cr at China Camp Road	LBCCC	No Flow							
Turner Slough nr Edminster Road	TSAER	No Flow							

Rain Event 6 January 07		Caltest Gen Phy	 Dmk Wtr	APPL Pest	PER Sed Tox	 CD Tox	 PP Tox	 SC Tox	Dup?
Hospital Creek at River Road	HCARR	x	x	x		x	x	x	x
Ingram Creek at River Road	ICARR	x	x	x		x	x	x	
Westley Wasteway nr Cox Road	WWNCR	No Access							
Del Puerto Creek nr Cox Road	DPCCR	x	x	x		x	x	x	
Del Puerto Creek at Hwy 33	DPCHW	x	x	x		x	x	x	
Salado Creek nr Olive Ave	SCOAV	No Access							
Ramona Lake nr Fig Avenue	ROLFA	x	x	x		x	x	x	
Marshall Road Drain nr River Road	MRDRR	x	x	x		x	x	x	
Orestimba Creek at River Road	OCARR	x	x	x		x	x	x	
Orestimba Creek at Highway 33	OCAHW	x	x	x		x	x	x	
Newman Wasteway nr Hills Ferry Rd	NWHFR	x	x	x		x	x	x	
SJR at Sack Dam	SJRSD	x	x	x		x	x	x	
SJR at Lander Ave	SJRLA	x	x	x		x	x	x	
Mud Sl upstream of San Luis Drain	MSUSL	x	x	x		x	x	x	
Salt Sl at Lander Ave	SSALA	x	x	x		x	x	x	
Salt Sl at Sand Dam	SSASD	x	x	x		x	x	x	
Los Banos Cr at Hwy 140	LBCHW	x	x	x		x	x	x	
Los Banos Cr at China Camp Road	LBCCC	x	x	x		x	x	x	
Turner Slough nr Edminster Road	TSAER	No Access							

Event 41 February 07		CalTest Gen Phy	 Dmk Wtr	APPL Pest	PER Sed Tox	 CD Tox	 PP Tox	 SC Tox	Dup?
Hospital Creek at River Road	HCARR	No Flow							
Ingram Creek at River Road	ICARR	x	x						
Westley Wasteway nr Cox Road	WWNCR	No Flow							
Del Puerto Creek nr Cox Road	DPCCR	x	x						
Del Puerto Creek at Hwy 33	DPCHW	x	x						
Salado Creek nr Olive Ave	SCOAV	No Access							
Ramona Lake nr Fig Avenue	ROLFA	No Flow							
Marshall Road Drain nr River Road	MRDRR	No Flow							
Orestimba Creek at River Road	OCARR	x	x						
Orestimba Creek at Highway 33	OCAHW	x	x						
Newman Wasteway nr Hills Ferry Rd	NWHFR	x	x						
SJR at Sack Dam	SJRSD	x	x						
SJR at Lander Ave	SJRLA	x	x	x		x	x	x	
Mud Sl upstream of San Luis Drain	MSUSL	x	x	x		x	x	x	
Salt Sl at Lander Ave	SSALA	x	x	x		x	x	x	
Salt Sl at Sand Dam	SSASD	x	x						
Los Banos Cr at Hwy 140	LBCHW	x	x	x		x	x	x	x
Los Banos Cr at China Camp Road	LBCCC	No Flow							
Turner Slough nr Edminster Road	TSAER	No Flow							

Attachment 2
Significant Aquatic Toxicity Results

Westside San Joaquin River Watershed Coalition
Significant Aquatic Toxicity Results

Monitoring Site	Sample Date	Event	Reactive Species	Results	Control Results	Percent Difference	Units
Salt Slough at Lander Ave	11/13/2007	39	Ceriodaphnia dubia	60	90	33%	%

Followup: TIE and dilution series not required. Resample measured no significant toxicity.

Field Data

DO	6.69	mg/l
EC	1592	µmhos/cm
Est Depth	2.8	ft
Flow	118	cfs
pH	7.55	
Staff Gage	65.5	ft
Temp	14.77	c

Water Chemistry

Bromide	6.6	mg/L
Dissolved Organic Carbon	6.5	mg/L
E. Coli	240	MPN/100mL
Total Organic Carbon	6.7	mg/L
Color	40	CU
Hardness (as CACO3)	390	mg/L
Total Dissolved Solids	1000	mg/L
Total Suspended Solids	49	mg/L
Turbidity	24	NTU
Arsenic	4.7	ug/L
Boron	840	ug/L
Cadmium	ND	ug/L
Copper	3.2	ug/L
Lead	0.68	ug/L
Nickel	5.4	ug/L
Selenium	1.3	ug/L
Zinc	8	ug/L
Ammonia (as N)	0.13	mg/L
Nitrogen, Nitrate (as N)	0.97	mg/L
Nitrogen, Nitrite	J0.0080	mg/L
Ortho Phosphate as P	0.08	mg/L
Total Kjeldahl Nitrogen	0.71	mg/L

Detected Pesticides

J = Estimated value, below PQL.
Y = % Difference primary and confirmation column is >40%.
B = Constituent also detected in blank sample.

Monitoring Site	Sample Date	Event	Reactive Species	Results	Control Results	Percent Difference	Units
Hospital Creek at River Road	1/5/2008	R6	Ceriodaphnia dubia	0	100	100%	%

Followup: Dilution series measured 3.3TU. TIE results suggest non-polar organics and metals contributed to the cause of toxicity.

Field Data

DO	5.07	mg/l
EC	176	µmhos/cm
Est Depth		ft
Flow	0.2	cfs
pH	7.26	
Staff Gage	0.1	ft
Temp	10.15	c

Water Chemistry

Bromide	ND	mg/L
Dissolved Organic Carbon	25	mg/L
E. Coli	>2400	MPN/100mL
Total Organic Carbon	24	mg/L
Color	350	CU
Hardness (as CACO3)	180	mg/L
Total Dissolved Solids	360	mg/L
Total Suspended Solids	120	mg/L
Turbidity	460	NTU
Arsenic	8.7	ug/L
Boron	480	ug/L
Cadmium	0.2	ug/L
Copper	36	ug/L
Lead	8.8	ug/L
Nickel	50	ug/L
Selenium	J0.62	ug/L
Zinc	110	ug/L
Ammonia (as N)	ND	mg/L
Nitrogen, Nitrate (as N)	2.2	mg/L
Nitrogen, Nitrite	J0.024	mg/L
Ortho Phosphate as P	4.3	mg/L
Total Kjeldahl Nitrogen	2.9	mg/L

Detected Pesticides

Chlorpyrifos	0.039	µg/L
DDE(p,p')	0.02	µg/L
Diazinon	0.068	µg/L
Diuron	0.22	µg/L
Parathion, Methyl	0.59	µg/L
Simazine	0.16	µg/L

J = Estimated value, below PQL.
Y = % Difference primary and confirmation column is >40%.
B = Constituent also detected in blank sample.

Monitoring Site	Sample Date	Event	Reactive Species	Results	Control Results	Percent Difference	Units
Hospital Creek at River Road	1/5/2008	R6	Selenastrum capricornutum	67,800	2,370,000	97%	cells/ml

Followup: Dilution series measured 11.2 TU. TIE results suggest that both non-polar organics and divalent cations contributed to the toxicity but only when present together.

Field Data

DO	5.07	mg/l
EC	176	µmhos/cm
Est Depth		ft
Flow	0.2	cfs
pH	7.26	
Staff Gage	0.1	ft
Temp	10.15	c

Water Chemistry

Bromide	ND	mg/L
Dissolved Organic Carbon	25	mg/L
E. Coli	>2400	MPN/100mL
Total Organic Carbon	24	mg/L
Color	350	CU
Hardness (as CACO3)	180	mg/L
Total Dissolved Solids	360	mg/L
Total Suspended Solids	120	mg/L
Turbidity	460	NTU
Arsenic	8.7	ug/L
Boron	480	ug/L
Cadmium	0.2	ug/L
Copper	36	ug/L
Lead	8.8	ug/L
Nickel	50	ug/L
Selenium	J0.62	ug/L
Zinc	110	ug/L
Ammonia (as N)	ND	mg/L
Nitrogen, Nitrate (as N)	2.2	mg/L
Nitrogen, Nitrite	J0.024	mg/L
Ortho Phosphate as P	4.3	mg/L
Total Kjeldahl Nitrogen	2.9	mg/L

Detected Pesticides

Chlorpyrifos	0.039	µg/L
DDE(p,p')	0.02	µg/L
Diazinon	0.068	µg/L
Diuron	0.22	µg/L
Parathion, Methyl	0.59	µg/L
Simazine	0.16	µg/L

J = Estimated value, below PQL.
Y = % Difference primary and confirmation column is >40%.
B = Constituent also detected in blank sample.

Monitoring Site	Sample Date	Event	Reactive Species	Results	Control Results	Percent Difference	Units
Ingram Creek at River Road	1/5/2008	R6	Selenastrum capricornutum	278,000	2,370,000	88%	cells/ml

Followup: Dilution series measured <1 TU and TIE was inconclusive.

Field Data

DO	6.13	mg/l
EC	751	µmhos/cm
Est Depth	1.1	ft
Flow	1.4	cfs
pH	7.38	
Staff Gage	0.12	ft
Temp	11.44	c

Water Chemistry

Bromide	J0.076	mg/L
Dissolved Organic Carbon	7	mg/L
E. Coli	>2400	MPN/100mL
Total Organic Carbon	9.2	mg/L
Color	120	CU
Hardness (as CACO3)	340	mg/L
Total Dissolved Solids	760	mg/L
Total Suspended Solids	110	mg/L
Turbidity	140	NTU
Arsenic	14	ug/L
Boron	730	ug/L
Cadmium	J0.1	ug/L
Copper	13	ug/L
Lead	3.7	ug/L
Nickel	20	ug/L
Selenium	1.7	ug/L
Zinc	54	ug/L
Ammonia (as N)	J0.099	mg/L
Nitrogen, Nitrate (as N)	9.6	mg/L
Nitrogen, Nitrite	0.049	mg/L
Ortho Phosphate as P	0.36	mg/L
Total Kjeldahl Nitrogen	1.4	mg/L

Detected Pesticides

Chlorpyrifos	0.013	µg/L
DDE(p,p')	0.021	µg/L
DDT(p,p')	0.0086	µg/L
Diazinon	0.055	µg/L
Diuron	2.9	µg/L
Simazine	20	µg/L

J = Estimated value, below PQL.
Y = % Difference primary and confirmation column is >40%.
B = Constituent also detected in blank sample.

Monitoring Site	Sample Date	Event	Reactive Species	Results	Control Results	Percent Difference	Units
Marshall Road Drain near River Road	1/5/2008	R6	Selenastrum capricornutum	30,500	2,370,000	99%	cells/ml

Followup: Dilution series measured 5.2 TU. TIE suggest divalent cations caused toxicity. Diuron also present in the sample.

Field Data

DO	7.03	mg/l
EC	152	µmhos/cm
Est Depth		ft
Flow		cfs
pH	7.4	
Staff Gage		ft
Temp	10.17	c

Water Chemistry

Bromide	ND	mg/L
Dissolved Organic Carbon	9.2	mg/L
E. Coli	>2400	MPN/100mL
Total Organic Carbon	7.5	mg/L
Color	300	CU
Hardness (as CACO3)	140	mg/L
Total Dissolved Solids	300	mg/L
Total Suspended Solids	180	mg/L
Turbidity	470	NTU
Arsenic	8.5	ug/L
Boron	86	ug/L
Cadmium	0.2	ug/L
Copper	30	ug/L
Lead	13	ug/L
Nickel	52	ug/L
Selenium	J0.61	ug/L
Zinc	99	ug/L
Ammonia (as N)	J0.099	mg/L
Nitrogen, Nitrate (as N)	7.3	mg/L
Nitrogen, Nitrite	0.046	mg/L
Ortho Phosphate as P	0.89	mg/L
Total Kjeldahl Nitrogen	1.8	mg/L

Detected Pesticides

Chlorpyrifos	0.079	µg/L
DDE(p,p')	0.033	µg/L
DDT(p,p')	0.02	µg/L
Dimethoate	0.11	µg/L
Diuron	14	µg/L
Simazine	0.37	µg/L

J = Estimated value, below PQL.
Y = % Difference primary and confirmation column is >40%.
B = Constituent also detected in blank sample.

Monitoring Site	Sample Date	Event	Reactive Species	Results	Control Results	Percent Difference	Units
Orestimba Creek at River Road	1/5/2008	R6	Selenastrum capricornutum	1,630,000	2,370,000	31%	cells/ml

Followup: No follow-up performed.

Field Data

DO	7.3	mg/l
EC	221	µmhos/cm
Est Depth		ft
Flow	240	cfs
pH	7.67	
Staff Gage		ft
Temp	10.16	c

Water Chemistry

Bromide	ND	mg/L
Dissolved Organic Carbon	14	mg/L
E. Coli	>2400	MPN/100mL
Total Organic Carbon	16	mg/L
Color	500	CU
Hardness (as CACO3)	180	mg/L
Total Dissolved Solids	280	mg/L
Total Suspended Solids	650	mg/L
Turbidity	600	NTU
Arsenic	7.2	ug/L
Boron	150	ug/L
Cadmium	0.2	ug/L
Copper	40	ug/L
Lead	16	ug/L
Nickel	120	ug/L
Selenium	J0.86	ug/L
Zinc	240	ug/L
Ammonia (as N)	ND	mg/L
Nitrogen, Nitrate (as N)	3.8	mg/L
Nitrogen, Nitrite	J0.017	mg/L
Ortho Phosphate as P	0.44	mg/L
Total Kjeldahl Nitrogen	4	mg/L

Detected Pesticides

Chlorpyrifos	0.0091	µg/L
DDE(p,p')	0.015	µg/L
Diuron	3.6	µg/L
Simazine	0.18	µg/L

J = Estimated value, below PQL.
Y = % Difference primary and confirmation column is >40%.
B = Constituent also detected in blank sample.

Monitoring Site	Sample Date	Event	Reactive Species	Results	Control Results	Percent Difference	Units
Del Puerto Creek at Hwy 33	1/6/2008	R6	Ceriodaphnia dubia	70	95	26%	%

Followup: No follow-up performed

Field Data

DO	6.53	mg/l
EC	374	µmhos/cm
Est Depth		ft
Flow		cfs
pH	7.64	
Staff Gage		ft
Temp	8.24	c

Water Chemistry

Bromide	ND	mg/L
Dissolved Organic Carbon	12	mg/L
E. Coli	690	MPN/100mL
Total Organic Carbon	12	mg/L
Color	180	CU
Hardness (as CACO3)	300	mg/L
Total Dissolved Solids	390	mg/L
Total Suspended Solids	44	mg/L
Turbidity	62	NTU
Arsenic	1.9	ug/L
Boron	450	ug/L
Cadmium	J0.05	ug/L
Copper	8.2	ug/L
Lead	1.7	ug/L
Nickel	21	ug/L
Selenium	1.5	ug/L
Zinc	23	ug/L
Ammonia (as N)	ND	mg/L
Nitrogen, Nitrate (as N)	2.6	mg/L
Nitrogen, Nitrite	J0.020	mg/L
Ortho Phosphate as P	0.1	mg/L
Total Kjeldahl Nitrogen	1.1	mg/L

Detected Pesticides

J = Estimated value, below PQL.
Y = % Difference primary and confirmation column is >40%.
B = Constituent also detected in blank sample.

Monitoring Site	Sample Date	Event	Reactive Species	Results	Control Results	Percent Difference	Units
Ramona Lake near Fig Avenue	1/6/2008	R6	Ceriodaphnia dubia	0	95	100%	%

Followup: The TIE and Dilution Series measured no toxicity (<1 TU). The TIE was inconclusive. Resample collected on 1/9/08 - no toxicty was observed.

Field Data

DO	5.85	mg/l
EC	969	µmhos/cm
Est Depth		ft
Flow		cfs
pH	7.77	
Staff Gage		ft
Temp	9.36	c

Water Chemistry

Bromide	J0.43	mg/L
Dissolved Organic Carbon	4.3	mg/L
E. Coli	920	MPN/100mL
Total Organic Carbon	5	mg/L
Color	65	CU
Hardness (as CACO3)	350	mg/L
Total Dissolved Solids	930	mg/L
Total Suspended Solids	34	mg/L
Turbidity	32	NTU
Arsenic	2.5	ug/L
Boron	820	ug/L
Cadmium	ND	ug/L
Copper	5.4	ug/L
Lead	1.4	ug/L
Nickel	7.9	ug/L
Selenium	1.9	ug/L
Zinc	26	ug/L
Ammonia (as N)	0.52	mg/L
Nitrogen, Nitrate (as N)	E11	mg/L
Nitrogen, Nitrite	0.05	mg/L
Ortho Phosphate as P	0.075	mg/L
Total Kjeldahl Nitrogen	1.9	mg/L

Detected Pesticides

J = Estimated value, below PQL.
Y = % Difference primary and confirmation column is >40%.
B = Constituent also detected in blank sample.

Attachment 3
Field Quality Control Sample Results

Field Quality Control Samples
Field Duplicate and RPD Calculation

Analyte/Species	Type	Event	QC Code	FD	QC Code	Units	RPD	
Sample Date: 11/13/2007		**Site: Los Banos Creek at Hwy 140**						
Ammonia (as N)	General Chemistry	0.16		J0.077		mg/L	NA	
Arsenic	General Chemistry	4.7		4.8		ug/L	2%	
Boron	General Chemistry	580		610		ug/L	5%	
Bromide	General Chemistry	ND		J0.065		mg/L	NA	
Cadmium	General Chemistry	ND		J0.05		ug/L	NA	
Color	General Chemistry	50		50		CU	0%	
Copper	General Chemistry	2		2.1		ug/L	5%	
Dissolved Organic Carbon	General Chemistry	14		13		mg/L	7%	
E. Coli	General Chemistry	>2400		>2400		MPN/100mL	NA	
Hardness (as CACO3)	General Chemistry	270		280		mg/L	4%	
Lead	General Chemistry	0.39		0.44		ug/L	12%	
Nickel	General Chemistry	4.5		4.9		ug/L	9%	
Nitrogen, Nitrate (as N)	General Chemistry	0.11		0.12		mg/L	9%	
Nitrogen, Nitrite	General Chemistry	J0.011		J0.010		mg/L	NA	
Ortho Phosphate as P	General Chemistry	0.34		0.35		mg/L	3%	
Selenium	General Chemistry	1.1		1.1		ug/L	0%	
Total Dissolved Solids	General Chemistry	600		590		mg/L	2%	
Total Kjeldahl Nitrogen	General Chemistry	0.91		0.94		mg/L	3%	
Total Organic Carbon	General Chemistry	15		15		mg/L	0%	
Total Suspended Solids	General Chemistry	7		ND		mg/L	NA	
Turbidity	General Chemistry	10		11		NTU	10%	
Zinc	General Chemistry	4		4		ug/L	0%	
Sample Date: 1/5/2008		**Site: Hospital Creek at River Road**						
Ceriodaphnia dubia	Aquatic Toxicity	0		0		%	NA	
Pimephales Promelas	Aquatic Toxicity	97.5		100		%	3%	
Selenastrum capricornutum	Aquatic Toxicity	67800		53000		cells/ml	25%	
Ammonia (as N)	General Chemistry	ND		ND		mg/L	NA	
Arsenic	General Chemistry	8.7		8.8		ug/L	1%	
Boron	General Chemistry	480		460		ug/L	4%	
Bromide	General Chemistry	ND		ND		mg/L	NA	
Cadmium	General Chemistry	0.2		0.2		ug/L	0%	
Color	General Chemistry	350		700		CU	67%	*
Copper	General Chemistry	36		36		ug/L	0%	
Dissolved Organic Carbon	General Chemistry	25		23		mg/L	8%	
E. Coli	General Chemistry	>2400		>2400		MPN/100mL	NA	
Hardness (as CACO3)	General Chemistry	180		120		mg/L	40%	*
Lead	General Chemistry	8.8		8.9		ug/L	1%	
Nickel	General Chemistry	50		50		ug/L	0%	
Nitrogen, Nitrate (as N)	General Chemistry	2.2		21		mg/L	162%	*
Nitrogen, Nitrite	General Chemistry	J0.024		J0.016		mg/L	NA	

Event = Event Sample Results FD = Field Duplicate Sample Results RPD = Relative percent difference

Field Quality Control Samples

Field Duplicate and RPD Calculation

Analyte/Species	Type	Event	QC Code	FD	QC Code	Units	RPD	
Ortho Phosphate as P	General Chemistry	4.3		5.2		mg/L	19%	
Selenium	General Chemistry	J0.62		J0.66		ug/L	NA	
Total Dissolved Solids	General Chemistry	360		360		mg/L	0%	
Total Kjeldahl Nitrogen	General Chemistry	2.9		2.8		mg/L	4%	
Total Organic Carbon	General Chemistry	24		23		mg/L	4%	
Total Suspended Solids	General Chemistry	120		100		mg/L	18%	
Turbidity	General Chemistry	460		470		NTU	2%	
Zinc	General Chemistry	110		110		ug/L	0%	
Aldicarb	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA	
Aldrin	Pesticide	-0.009	ND	-0.009	ND	µg/L	NA	
Atrazine	Pesticide	-0.07	ND	-0.07	ND	µg/L	NA	
Bifenthrin	Pesticide	-0.006	ND	-0.006	ND	µg/L	NA	
Carbaryl	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA	
Carbofuran	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA	
Chlorpyrifos	Pesticide	0.039		0.025		µg/L	44%	*
Cyanazine	Pesticide	-0.09	ND	-0.09	ND	µg/L	NA	
DDD(p,p')	Pesticide	-0.003	ND	-0.003	ND	µg/L	NA	
DDE(p,p')	Pesticide	0.02		0.027		µg/L	30%	*
DDT(p,p')	Pesticide	-0.007	ND	-0.007	ND	µg/L	NA	
Diazinon	Pesticide	0.068		0.044		µg/L	43%	*
Dicofol	Pesticide	-0.01	ND	-0.01	ND	µg/L	NA	
Dieldrin	Pesticide	-0.005	ND	-0.005	ND	µg/L	NA	
Dimethoate	Pesticide	-0.08	ND	-0.08	ND	µg/L	NA	
Disulfoton	Pesticide	-0.02	ND	-0.02	ND	µg/L	NA	
Diuron	Pesticide	0.22	DNQ	0.21	DNQ	µg/L	5%	
Endosulfan I	Pesticide	-0.005	ND	-0.005	ND	µg/L	NA	
Endosulfan II	Pesticide	-0.004	ND	-0.004	ND	µg/L	NA	
Endrin	Pesticide	-0.007	ND	-0.007	ND	µg/L	NA	
Heptachlor	Pesticide	-0.008	ND	-0.008	ND	µg/L	NA	
Heptachlor epoxide	Pesticide	-0.007	ND	-0.007	ND	µg/L	NA	
Linuron	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA	
Malathion	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA	
Methamidophos	Pesticide	-0.01	ND	-0.01	ND	µg/L	NA	
Methidathion	Pesticide	-0.04	ND	-0.04	ND	µg/L	NA	
Methiocarb	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA	
Methomyl	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA	
Methoxychlor	Pesticide	-0.008	ND	-0.008	ND	µg/L	NA	
Molinate	Pesticide	-0.13	ND	-0.13	ND	µg/L	NA	
Oxamyl	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA	
Parathion, Methyl	Pesticide	0.59		0.36		µg/L	48%	*
Phorate	Pesticide	-0.07	ND	-0.07	ND	µg/L	NA	
Phosmet	Pesticide	-0.06	ND	-0.06	ND	µg/L	NA	
Simazine	Pesticide	0.16	DNQ	-0.08	ND	µg/L	NA	

Event = Event Sample Results   FD = Field Duplicate Sample Results   RPD = Relative percent difference

Field Quality Control Samples

Field Duplicate and RPD Calculation

Analyte/Species	Type	Event	QC Code	FD	QC Code	Units	RPD	
Thiobencarb	Pesticide	-0.06	ND	-0.06	ND	µg/L	NA	
Toxaphene	Pesticide	-0.38	ND	-0.38	ND	µg/L	NA	

Sample Date: 2/12/2008 Site: Los Banos Creek at Hwy 140

Analyte/Species	Type	Event	QC Code	FD	QC Code	Units	RPD	
Ceriodaphnia dubia	Aquatic Toxicity	100		100		%	0%	
Pimephales promelas	Aquatic Toxicity	100		100		%	0%	
Selenastrum capricornutum	Aquatic Toxicity	2580000		2540000		cells/ml	2%	
Ammonia (as N)	General Chemistry	0.22		J0.044		mg/L	NA	
Arsenic	General Chemistry	6.3		6.1		ug/L	3%	
Boron	General Chemistry	1800		1800		ug/L	0%	
Bromide	General Chemistry	1.4		1.5		mg/L	7%	
Cadmium	General Chemistry	ND		ND		ug/L	NA	
Color	General Chemistry	120		100		CU	18%	
Copper	General Chemistry	4.7		4.7		ug/L	0%	
Dissolved Organic Carbon	General Chemistry	18		18		mg/L	0%	
E. Coli	General Chemistry	160		230		MPN/100mL	36%	*
Hardness (as CACO3)	General Chemistry	550		520		mg/L	6%	
Lead	General Chemistry	1		1.1		ug/L	10%	
Nickel	General Chemistry	11		11		ug/L	0%	
Nitrogen, Nitrate (as N)	General Chemistry	0.28		0.28		mg/L	0%	
Nitrogen, Nitrite	General Chemistry	J0.017		J0.017		mg/L	NA	
Ortho Phosphate as P	General Chemistry	0.19		0.2		mg/L	5%	
Selenium	General Chemistry	1.4		1.5		ug/L	7%	
Total Dissolved Solids	General Chemistry	1400		1400		mg/L	0%	
Total Kjeldahl Nitrogen	General Chemistry	2.3		2.3		mg/L	0%	
Total Organic Carbon	General Chemistry	20		20		mg/L	0%	
Total Suspended Solids	General Chemistry	130		54		mg/L	83%	*
Turbidity	General Chemistry	55		32		NTU	53%	*
Zinc	General Chemistry	8		8		ug/L	0%	
Aldicarb	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA	
Aldrin	Pesticide	-0.009	ND	-0.009	ND	µg/L	NA	
Atrazine	Pesticide	-0.07	ND	-0.07	ND	µg/L	NA	
Bifenthrin	Pesticide	-0.006	ND	-0.006	ND	µg/L	NA	
Carbaryl	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA	
Carbofuran	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA	
Chlorpyrifos	Pesticide	-0.003	ND	-0.003	ND	µg/L	NA	
Cyanazine	Pesticide	-0.09	ND	-0.09	ND	µg/L	NA	
DDD(p,p')	Pesticide	-0.003	ND	-0.003	ND	µg/L	NA	
DDE(p,p')	Pesticide	-0.004	ND	-0.004	ND	µg/L	NA	
DDT(p,p')	Pesticide	-0.007	ND	-0.007	ND	µg/L	NA	
Diazinon	Pesticide	-0.004	ND	0.033	Y	µg/L	NA	
Dicofol	Pesticide	-0.01	ND	-0.01	ND	µg/L	NA	
Dieldrin	Pesticide	-0.005	ND	-0.005	ND	µg/L	NA	

Event = Event Sample Results FD = Field Duplicate Sample Results RPD = Relative percent difference

Field Quality Control Samples

Field Duplicate and RPD Calculation

Analyte/Species	Type	Event	QC Code	FD	QC Code	Units	RPD
Dimethoate	Pesticide	-0.08	ND	-0.08	ND	µg/L	NA
Disulfoton	Pesticide	-0.02	ND	-0.02	ND	µg/L	NA
Diuron	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA
Endosulfan I	Pesticide	-0.005	ND	-0.005	ND	µg/L	NA
Endosulfan II	Pesticide	-0.004	ND	-0.004	ND	µg/L	NA
Endrin	Pesticide	-0.007	ND	-0.007	ND	µg/L	NA
Heptachlor	Pesticide	-0.008	ND	-0.008	ND	µg/L	NA
Heptachlor epoxide	Pesticide	-0.007	ND	-0.007	ND	µg/L	NA
Linuron	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA
Malathion	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA
Methamidophos	Pesticide	-0.01	ND	-0.01	ND	µg/L	NA
Methamidophos	Pesticide	-0.01	ND	0.421		µg/L	NA
Methamidophos	Pesticide	-0.01	ND	0.418		µg/L	NA
Methidathion	Pesticide	-0.04	ND	-0.04	ND	µg/L	NA
Methiocarb	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA
Methomyl	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA
Methoxychlor	Pesticide	-0.008	ND	-0.008	ND	µg/L	NA
Molinate	Pesticide	-0.13	ND	-0.13	ND	µg/L	NA
Oxamyl	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA
Parathion, Methyl	Pesticide	-0.075	ND	-0.075	ND	µg/L	NA
Phorate	Pesticide	-0.072	ND	-0.072	ND	µg/L	NA
Phosmet	Pesticide	-0.06	ND	-0.06	ND	µg/L	NA
Simazine	Pesticide	-0.08	ND	-0.08	ND	µg/L	NA
Thiobencarb	Pesticide	-0.06	ND	-0.06	ND	µg/L	NA
Toxaphene	Pesticide	-0.38	ND	-0.38	ND	µg/L	NA

Event = Event Sample Results   FD = Field Duplicate Sample Results   RPD = Relative percent difference

Field Quality Control Samples

Field Blank

Analyte/Species	Type	Event	QC Code	FB	QC Code	Units	% Difference
Sample Date: 11/13/2007 Site: LBCHW							
Ammonia (as N)	General Chemistry	0.16		ND		mg/L	NA
Arsenic	General Chemistry	4.7		ND		ug/L	NA
Boron	General Chemistry	580		J3		ug/L	NA
Bromide	General Chemistry	ND		ND		mg/L	NA
Cadmium	General Chemistry	ND		J0.04		ug/L	NA
Color	General Chemistry	50		ND		CU	NA
Copper	General Chemistry	2		J0.1		ug/L	NA
Dissolved Organic Carbon	General Chemistry	14		1.1		mg/L	8%
E. Coli	General Chemistry	>2400		ND		MPN/100mL	NA
Hardness (as CACO3)	General Chemistry	270		ND		mg/L	NA
Lead	General Chemistry	0.39		ND		ug/L	NA
Nickel	General Chemistry	4.5		ND		ug/L	NA
Nitrogen, Nitrate (as N)	General Chemistry	0.11		ND		mg/L	NA
Nitrogen, Nitrite	General Chemistry	J0.011		ND		mg/L	NA
Ortho Phosphate as P	General Chemistry	0.34		ND		mg/L	NA
Selenium	General Chemistry	1.1		ND		ug/L	NA
Total Dissolved Solids	General Chemistry	600		ND		mg/L	NA
Total Kjeldahl Nitrogen	General Chemistry	0.91		ND		mg/L	NA
Total Organic Carbon	General Chemistry	15		0.66		mg/L	4%
Total Suspended Solids	General Chemistry	7		ND		mg/L	NA
Turbidity	General Chemistry	10		ND		NTU	NA
Zinc	General Chemistry	4		J0.8		ug/L	NA
Sample Date: 1/5/2008 Site: HCARR							
Ammonia (as N)	General Chemistry	ND		ND		mg/L	NA
Arsenic	General Chemistry	8.7		ND		ug/L	NA
Boron	General Chemistry	480		ND		ug/L	NA
Bromide	General Chemistry	ND		ND		mg/L	NA
Cadmium	General Chemistry	0.2		ND		ug/L	NA
Color	General Chemistry	350		ND		CU	NA
Copper	General Chemistry	36		J0.2		ug/L	NA
Dissolved Organic Carbon	General Chemistry	25		J0.45		mg/L	NA
E. Coli	General Chemistry	>2400		ND		MPN/100mL	NA
Hardness (as CACO3)	General Chemistry	180		ND		mg/L	NA
Lead	General Chemistry	8.8		ND		ug/L	NA
Nickel	General Chemistry	50		J0.3		ug/L	NA
Nitrogen, Nitrate (as N)	General Chemistry	2.2		J0.012		mg/L	NA
Nitrogen, Nitrite	General Chemistry	J0.024		ND		mg/L	NA
Ortho Phosphate as P	General Chemistry	4.3		ND		mg/L	NA
Selenium	General Chemistry	J0.62		ND		ug/L	NA
Total Dissolved Solids	General Chemistry	360		ND		mg/L	NA
Total Kjeldahl Nitrogen	General Chemistry	2.9		ND		mg/L	NA
Total Organic Carbon	General Chemistry	24		0.61		mg/L	3%
Total Suspended Solids	General Chemistry	120		ND		mg/L	NA

Event = Event Sample Result FB = Field Blank Sample Result

Field Quality Control Samples
Field Blank

Analyte/Species	Type	Event	QC Code	FB	QC Code	Units	% Difference
Turbidity	General Chemistry	460		ND		NTU	NA
Zinc	General Chemistry	110		4		ug/L	4%
Aldicarb	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA
Aldrin	Pesticide	-0.009	ND	-0.009	ND	µg/L	NA
Atrazine	Pesticide	-0.07	ND	-0.07	ND	µg/L	NA
Azinphos methyl	Pesticide	-0.02	ND	-0.02	ND	µg/L	NA
Bifenthrin	Pesticide	-0.006	ND	-0.006	ND	µg/L	NA
Carbaryl	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA
Carbofuran	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA
Chlordane, Alpha-	Pesticide	-0.007	ND	-0.007	ND	µg/L	NA
Chlordane, gamma-	Pesticide	-0.006	ND	-0.006	ND	µg/L	NA
Chlorpyrifos	Pesticide	0.039		-0.003	ND	µg/L	NA
Cyanazine	Pesticide	-0.09	ND	-0.09	ND	µg/L	NA
Cyhalothrin, lambda, total	Pesticide	-0.001	ND	-0.001	ND	µg/L	NA
Cypermethrin, total	Pesticide	-0.004	ND	-0.004	ND	µg/L	NA
DDD(p,p')	Pesticide	-0.003	ND	-0.003	ND	µg/L	NA
DDE(p,p')	Pesticide	0.02		-0.004	ND	µg/L	NA
DDT(p,p')	Pesticide	-0.007	ND	-0.007	ND	µg/L	NA
Diazinon	Pesticide	0.068		-0.004	ND	µg/L	NA
Dicofol	Pesticide	-0.01	ND	-0.01	ND	µg/L	NA
Dieldrin	Pesticide	-0.005	ND	-0.005	ND	µg/L	NA
Dimethoate	Pesticide	-0.08	ND	-0.08	ND	µg/L	NA
Disulfoton	Pesticide	-0.02	ND	-0.02	ND	µg/L	NA
Diuron	Pesticide	0.22	DNQ	-0.2	ND	µg/L	NA
Endosulfan I	Pesticide	-0.005	ND	-0.005	ND	µg/L	NA
Endosulfan II	Pesticide	-0.004	ND	-0.004	ND	µg/L	NA
Endrin	Pesticide	-0.007	ND	-0.007	ND	µg/L	NA
Esfenvalerate/Fenvalerate, total	Pesticide	-0.002	ND	-0.002	ND	µg/L	NA
Heptachlor	Pesticide	-0.008	ND	-0.008	ND	µg/L	NA
Heptachlor epoxide	Pesticide	-0.007	ND	-0.007	ND	µg/L	NA
Linuron	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA
Malathion	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA
Methamidophos	Pesticide	-0.01	ND	-0.01	ND	µg/L	NA
Methidathion	Pesticide	-0.04	ND	-0.04	ND	µg/L	NA
Methiocarb	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA
Methomyl	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA
Methoxychlor	Pesticide	-0.008	ND	-0.008	ND	µg/L	NA
Molinate	Pesticide	-0.13	ND	-0.13	ND	µg/L	NA
Oxamyl	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA
Paraquat dichloride	Pesticide	-0.14	ND	-0.14	ND	µg/L	NA
Parathion, Methyl	Pesticide	0.59		-0.08	ND	µg/L	NA
Permethrin, total	Pesticide	-0.009	ND	-0.009	ND	µg/L	NA
Phorate	Pesticide	-0.07	ND	-0.07	ND	µg/L	NA
Phosmet	Pesticide	-0.06	ND	-0.06	ND	µg/L	NA
Simazine	Pesticide	0.16	DNQ	-0.08	ND	µg/L	NA

Event = Event Sample Result FB = Field Blank Sample Result

Field Quality Control Samples

Field Blank

Analyte/Species	Type	Event	QC Code	FB	QC Code	Units	% Difference
Thiobencarb	Pesticide	-0.06	ND	-0.06	ND	µg/L	NA
Toxaphene	Pesticide	-0.38	ND	-0.38	ND	µg/L	NA
Sample Date: 2/12/2008 Site: LBCHW							
Ammonia (as N)	General Chemistry	0.22		ND		mg/L	NA
Arsenic	General Chemistry	6.3		ND		ug/L	NA
Boron	General Chemistry	1800		ND		ug/L	NA
Bromide	General Chemistry	1.4		ND		mg/L	NA
Cadmium	General Chemistry	ND		ND		ug/L	NA
Color	General Chemistry	120		ND		CU	NA
Copper	General Chemistry	4.7		J0.05		ug/L	NA
Dissolved Organic Carbon	General Chemistry	18		ND		mg/L	NA
E. Coli	General Chemistry	160		ND		MPN/100mL	NA
Hardness (as CACO3)	General Chemistry	550		ND		mg/L	NA
Lead	General Chemistry	1		ND		ug/L	NA
Nickel	General Chemistry	11		ND		ug/L	NA
Nitrogen, Nitrate (as N)	General Chemistry	0.28		ND		mg/L	NA
Nitrogen, Nitrite	General Chemistry	J0.017		ND		mg/L	NA
Ortho Phosphate as P	General Chemistry	0.19		ND		mg/L	NA
Selenium	General Chemistry	1.4		J0.53		ug/L	NA
Total Dissolved Solids	General Chemistry	1400		ND		mg/L	NA
Total Kjeldahl Nitrogen	General Chemistry	2.3		J0.088		mg/L	NA
Total Organic Carbon	General Chemistry	20		J0.36		mg/L	NA
Total Suspended Solids	General Chemistry	130		ND		mg/L	NA
Turbidity	General Chemistry	55		ND		NTU	NA
Zinc	General Chemistry	8		J1		ug/L	NA
Aldicarb	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA
Aldrin	Pesticide	-0.009	ND	-0.009	ND	µg/L	NA
Atrazine	Pesticide	-0.07	ND	-0.07	ND	µg/L	NA
Azinphos methyl	Pesticide	-0.02	ND	-0.02	ND	µg/L	NA
Bifenthrin	Pesticide	-0.006	ND	-0.006	ND	µg/L	NA
Carbaryl	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA
Carbofuran	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA
Chlordane, Alpha-	Pesticide	-0.007	ND	-0.007	ND	µg/L	NA
Chlordane, gamma-	Pesticide	-0.006	ND	-0.006	ND	µg/L	NA
Chlorpyrifos	Pesticide	-0.003	ND	-0.003	ND	µg/L	NA
Cyanazine	Pesticide	-0.09	ND	-0.09	ND	µg/L	NA
Cyhalothrin, lambda, total	Pesticide	-0.001	ND	-0.001	ND	µg/L	NA
Cypermethrin, total	Pesticide	-0.004	ND	-0.004	ND	µg/L	NA
DDD(p,p')	Pesticide	-0.003	ND	-0.003	ND	µg/L	NA
DDE(p,p')	Pesticide	-0.004	ND	-0.004	ND	µg/L	NA
DDT(p,p')	Pesticide	-0.007	ND	-0.007	ND	µg/L	NA
Diazinon	Pesticide	-0.004	ND	-0.004	ND	µg/L	NA
Dicofol	Pesticide	-0.01	ND	-0.01	ND	µg/L	NA
Dieldrin	Pesticide	-0.005	ND	-0.005	ND	µg/L	NA

Event = Event Sample Result FB = Field Blank Sample Result

Field Quality Control Samples

Field Blank

Analyte/Species	Type	Event	QC Code	FB	QC Code	Units	% Difference
Dimethoate	Pesticide	-0.08	ND	-0.08	ND	µg/L	NA
Disulfoton	Pesticide	-0.02	ND	-0.02	ND	µg/L	NA
Diuron	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA
Endosulfan I	Pesticide	-0.005	ND	-0.005	ND	µg/L	NA
Endosulfan II	Pesticide	-0.004	ND	-0.004	ND	µg/L	NA
Endrin	Pesticide	-0.007	ND	-0.007	ND	µg/L	NA
Esfenvalerate/Fenvalerate, total	Pesticide	-0.002	ND	-0.002	ND	µg/L	NA
Heptachlor	Pesticide	-0.008	ND	-0.008	ND	µg/L	NA
Heptachlor epoxide	Pesticide	-0.007	ND	-0.007	ND	µg/L	NA
Linuron	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA
Malathion	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA
Methamidophos	Pesticide	-0.01	ND	-0.01	ND	µg/L	NA
Methidathion	Pesticide	-0.04	ND	-0.04	ND	µg/L	NA
Methiocarb	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA
Methomyl	Pesticide	-0.05	ND	-0.05	ND	µg/L	NA
Methoxychlor	Pesticide	-0.008	ND	-0.008	ND	µg/L	NA
Molinate	Pesticide	-0.13	ND	-0.13	ND	µg/L	NA
Oxamyl	Pesticide	-0.2	ND	-0.2	ND	µg/L	NA
Paraquat dichloride	Pesticide	-0.21	ND	-0.21	ND	µg/L	NA
Parathion, Methyl	Pesticide	-0.075	ND	-0.075	ND	µg/L	NA
Permethrin, total	Pesticide	-0.009	ND	-0.009	ND	µg/L	NA
Phorate	Pesticide	-0.072	ND	-0.072	ND	µg/L	NA
Phosmet	Pesticide	-0.06	ND	-0.06	ND	µg/L	NA
Simazine	Pesticide	-0.08	ND	-0.08	ND	µg/L	NA
Thiobencarb	Pesticide	-0.06	ND	-0.06	ND	µg/L	NA
Toxaphene	Pesticide	-0.38	ND	-0.38	ND	µg/L	NA

Event = Event Sample Result   FB = Field Blank Sample Result.

Attachment 4
Exceedance of Recommended Water Quality Values

Westside San Joaquin River Watershed Coalition

Number of Water Quality Value Exceedances for the period of 11/1/2007 to 2/29/2008

Type	Constituient	# of Exceedances	# of Tests
Aquatic Toxicity	Ceriodaphnia dubia	4	27
Aquatic Toxicity	Selenastrum capricornutum	4	27
Field Data	DO	1	51
Field Data	EC	24	51
Field Data	pH	2	51
General Chemistry	Boron	1	45
General Chemistry	E. Coli	17	45
General Chemistry	Total Dissolved Solids	28	49
General Chemistry	Total Suspended Solids	1	49
Pesticide	Chlorpyrifos	2	23
Pesticide	DDE(p,p')	6	23
Pesticide	DDT(p,p')	2	23
Pesticide	Diazinon	2	23
Pesticide	Parathion, methyl	1	23

Westside San Joaquin River Watershed Coalition

Number of Water Quality Value Exceedances for the period of 11/1/2007 to 2/29/2008

Del Puerto Creek at Hwy 33

Type	Constituient	# of Exceedances	# of Tests
Aquatic Toxicity	Ceriodaphnia dubia	1	1
General Chemistry	E. Coli	1	2
General Chemistry	Total Dissolved Solids	1	2

Del Puerto Creek near Cox Road

Type	Constituient	# of Exceedances	# of Tests
General Chemistry	E. Coli	1	2
General Chemistry	Total Dissolved Solids	1	2

Hospital Creek at River Road

Type	Constituient	# of Exceedances	# of Tests
Aquatic Toxicity	Ceriodaphnia dubia	1	1
Aquatic Toxicity	Selenastrum capricornutum	1	1
General Chemistry	E. Coli	1	1
Pesticide	Chlorpyrifos	1	1
Pesticide	DDE(p,p')	1	1
Pesticide	Diazinon	1	1
Pesticide	Parathion, methyl	1	1

Ingram Creek at River Road

Type	Constituient	# of Exceedances	# of Tests
Aquatic Toxicity	Selenastrum capricornutum	1	1
Field Data	DO	1	3
Field Data	EC	1	3
General Chemistry	E. Coli	1	3
General Chemistry	Total Dissolved Solids	3	3
Pesticide	DDE(p,p')	1	1
Pesticide	DDT(p,p')	1	1
Pesticide	Diazinon	1	1

Los Banos Creek at China Camp Road

Type	Constituient	# of Exceedances	# of Tests
Field Data	EC	1	2
General Chemistry	Boron	1	2
General Chemistry	E. Coli	2	2
General Chemistry	Total Dissolved Solids	1	2

Los Banos Creek at Hwy 140

Type	Constituient	# of Exceedances	# of Tests
Field Data	EC	4	4

General Chemistry	E. Coli	1	4
General Chemistry	Total Dissolved Solids	4	4

Marshall Road Drain near River Road

Type	Constituent	# of Exceedances	# of Tests
Aquatic Toxicity	Selenastrum capricornutum	1	1
General Chemistry	E. Coli	1	2
General Chemistry	Total Dissolved Solids	1	2
Pesticide	Chlorpyrifos	1	1
Pesticide	DDE(p,p')	1	1
Pesticide	DDT(p,p')	1	1

Mud Slough Upstream of San Luis Drain

Type	Constituent	# of Exceedances	# of Tests
Field Data	EC	4	4
General Chemistry	Total Dissolved Solids	4	4

Newman Wasteway near Hills Ferry Road

Type	Constituent	# of Exceedances	# of Tests
Field Data	EC	4	4
General Chemistry	E. Coli	2	4
General Chemistry	Total Dissolved Solids	3	4
Pesticide	DDE(p,p')	1	1

Orestimba Creek at Hwy 33

Type	Constituent	# of Exceedances	# of Tests
General Chemistry	E. Coli	2	4
General Chemistry	Total Dissolved Solids	1	4
Pesticide	DDE(p,p')	1	1

Orestimba Creek at River Road

Type	Constituent	# of Exceedances	# of Tests
Aquatic Toxicity	Selenastrum capricornutum	1	1
General Chemistry	E. Coli	3	4
General Chemistry	Total Suspended Solids	1	4
Pesticide	DDE(p,p')	1	1

Ramona Lake near Fig Avenue

Type	Constituent	# of Exceedances	# of Tests
Aquatic Toxicity	Ceriodaphnia dubia	1	1
Field Data	EC	2	3
Field Data	pH	1	3
General Chemistry	E. Coli	1	2

General Chemistry	Total Dissolved Solids	2	2

Salt Slough at Lander Ave

Type	Constituient	# of Exceedances	# of Tests
Aquatic Toxicity	Ceriodaphnia dubia	1	4
Field Data	EC	5	5
General Chemistry	E. Coli	1	4
General Chemistry	Total Dissolved Solids	4	4

Salt Slough at Sand Dam

Type	Constituient	# of Exceedances	# of Tests
General Chemistry	Total Dissolved Solids	1	4

San Joaquin River at Lander Ave

Type	Constituient	# of Exceedances	# of Tests
Field Data	EC	3	4
Field Data	pH	1	4
General Chemistry	Total Dissolved Solids	2	3

Westside San Joaquin River Watershed Coalition

Water Quality Value Exceedances for the period of 11/1/2007 to 2/29/2008

Del Puerto Creek at Hwy 33

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
Ceriodaphnia dubia	R6	1/6/2008	70	%	Yes		
E. Coli	R6	1/6/2008	690	MPN/100mL		220	
Total Dissolved Solids	41	2/12/2008	550	mg/L		500	

Del Puerto Creek near Cox Road

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
E. Coli	R6	1/6/2008	2000	MPN/100mL		220	
Total Dissolved Solids	41	2/12/2008	530	mg/L		500	

Hospital Creek at River Road

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
Ceriodaphnia dubia	R6	1/5/2008	0	%	Yes		
Chlorpyrifos	R6	1/5/2008	0.039	µg/L		0.014	
DDE(p,p')	R6	1/5/2008	0.02	µg/L		0.00059	
Diazinon	R6	1/5/2008	0.068	µg/L		0.05	
E. Coli	R6	1/5/2008	>2400	MPN/100mL		220	
Parathion, methyl	R6	1/5/2008	0.59	µg/L		0.08	
Selenastrum capricornutum	R6	1/5/2008	67800	cells/ml	Yes		

Ingram Creek at River Road

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
Total Dissolved Solids	39	11/13/2007	730	mg/L		500	
DDE(p,p')	R6	1/5/2008	0.021	µg/L		0.00059	
DDT(p,p')	R6	1/5/2008	0.0086 DNQ	µg/L		0.00059	
Diazinon	R6	1/5/2008	0.055	µg/L		0.05	
E. Coli	R6	1/5/2008	>2400	MPN/100mL		220	
Selenastrum capricornutum	R6	1/5/2008	278000	cells/ml	Yes		
Total Dissolved Solids	R6	1/5/2008	760	mg/L		500	
DO	41	2/12/2008	2.51	mg/l			5
EC	41	2/12/2008	1420	µmhos/cm		900	
Total Dissolved Solids	41	2/12/2008	1300	mg/L		500	

Los Banos Creek at China Camp Road

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
E. Coli	39	11/13/2007	330	MPN/100mL		220	
Boron	R6	1/5/2008	2200	ug/L		2000	
E. Coli	R6	1/5/2008	1400	MPN/100mL		220	
EC	R6	1/5/2008	2011	µmhos/cm		900	
Total Dissolved Solids	R6	1/5/2008	1300	mg/L		500	

WQV = Water Quality Value as established by the Central Valley Regional Water Quality Control Board

DNQ = Detected, Not Quantifiable

Westside San Joaquin River Watershed Coalition

Water Quality Value Exceedances for the period of 11/1/2007 to 2/29/2008

Los Banos Creek at Hwy 140

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
E. Coli	39	11/13/2007	>2400	MPN/100mL		220	
EC	39	11/13/2007	991	µmhos/cm		900	
Total Dissolved Solids	39	11/13/2007	600	mg/L		500	
EC	40	12/11/2007	1167	µmhos/cm		900	
Total Dissolved Solids	40	12/11/2007	710	mg/L		500	
EC	R6	1/5/2008	1129	µmhos/cm		900	
Total Dissolved Solids	R6	1/5/2008	690	mg/L		500	
EC	41	2/12/2008	2182	µmhos/cm		900	
Total Dissolved Solids	41	2/12/2008	1400	mg/L		500	

Marshall Road Drain near River Road

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
Total Dissolved Solids	40	12/11/2007	1100	mg/L		500	
Chlorpyrifos	R6	1/5/2008	0.079	µg/L		0.014	
DDE(p,p')	R6	1/5/2008	0.033	µg/L		0.00059	
DDT(p,p')	R6	1/5/2008	0.02	µg/L		0.00059	
E. Coli	R6	1/5/2008	>2400	MPN/100mL		220	
Selenastrum capricornutum	R6	1/5/2008	30500	cells/ml	Yes		

Mud Slough Upstream of San Luis Drain

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
EC	39	11/13/2007	1305	µmhos/cm		900	
Total Dissolved Solids	39	11/13/2007	820	mg/L		500	
EC	40	12/11/2007	1515	µmhos/cm		900	
Total Dissolved Solids	40	12/11/2007	910	mg/L		500	
EC	R6	1/5/2008	1675	µmhos/cm		900	
Total Dissolved Solids	R6	1/5/2008	1100	mg/L		500	
EC	41	2/12/2008	2047	µmhos/cm		900	
Total Dissolved Solids	41	2/12/2008	1300	mg/L		500	

Newman Wasteway near Hills Ferry Road

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
E. Coli	39	11/13/2007	580	MPN/100mL		220	
EC	39	11/13/2007	1646	µmhos/cm		900	
Total Dissolved Solids	39	11/13/2007	1100	mg/L		500	
EC	40	12/11/2007	1594	µmhos/cm		900	
Total Dissolved Solids	40	12/11/2007	1000	mg/L		500	
DDE(p,p')	R6	1/5/2008	0.0055 DNQ	µg/L		0.00059	
E. Coli	R6	1/5/2008	>2400	MPN/100mL		220	
EC	R6	1/5/2008	947	µmhos/cm		900	

WQV = Water Quality Value as established by the Central Valley Regional Water Quality Control Board

DNQ = Detected, Not Quantifiable

EC	41	2/12/2008	1897	µmhos/cm		900	
Total Dissolved Solids	41	2/12/2008	1300	mg/L		500	

Orestimba Creek at Hwy 33

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
DDE(p,p')	R6	1/5/2008	0.01	µg/L		0.00059	
E. Coli	R6	1/5/2008	>2400	MPN/100mL		220	
E. Coli	41	2/12/2008	>2400	MPN/100mL		220	
Total Dissolved Solids	41	2/12/2008	510	mg/L		500	

Orestimba Creek at River Road

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
E. Coli	39	11/13/2007	550	MPN/100mL		220	
DDE(p,p')	R6	1/5/2008	0.015	µg/L		0.00059	
E. Coli	R6	1/5/2008	>2400	MPN/100mL		220	
Selenastrum capricornutum	R6	1/5/2008	1630000	cells/ml	Yes		
Total Suspended Solids	R6	1/5/2008	650	mg/L		400	
E. Coli	41	2/12/2008	420	MPN/100mL		220	

Ramona Lake near Fig Avenue

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
pH	39	11/13/2007	9.03			8.5	6.5
Total Dissolved Solids	39	11/13/2007	570	mg/L		500	
Ceriodaphnia dubia	R6	1/6/2008	0	%	Yes		
E. Coli	R6	1/6/2008	920	MPN/100mL		220	
EC	R6	1/6/2008	969	µmhos/cm		900	
Total Dissolved Solids	R6	1/6/2008	930	mg/L		500	
EC	R6	1/9/2008	1100	µmhos/cm		900	

Salt Slough at Lander Ave

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
Ceriodaphnia dubia	39	11/13/2007	60	%	Yes		
E. Coli	39	11/13/2007	240	MPN/100mL		220	
EC	39	11/13/2007	1592	µmhos/cm		900	
Total Dissolved Solids	39	11/13/2007	1000	mg/L		500	
EC	39	11/20/2007	1573	µmhos/cm		900	
EC	40	12/11/2007	1521	µmhos/cm		900	
Total Dissolved Solids	40	12/11/2007	950	mg/L		500	
EC	R6	1/5/2008	1494	µmhos/cm		900	
Total Dissolved Solids	R6	1/5/2008	940	mg/L		500	
EC	41	2/12/2008	1637	µmhos/cm		900	
Total Dissolved Solids	41	2/12/2008	1100	mg/L		500	

Westside San Joaquin River Watershed Coalition

Water Quality Value Exceedances for the period of 11/1/2007 to 2/29/2008

Salt Slough at Sand Dam

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
Total Dissolved Solids	41	2/12/2008	580	mg/L		500	

San Joaquin River at Lander Ave

Analyte/Species	Event	Sample Date	Result	Units	Significant Toxicity	WQV Max	WQV Min
EC	39	11/13/2007	1166	µmhos/cm		900	
pH	39	11/13/2007	8.78			8.5	6.5
Total Dissolved Solids	39	11/13/2007	720	mg/L		500	
EC	40	12/11/2007	1525	µmhos/cm		900	
EC	R6	1/5/2008	1372	µmhos/cm		900	
Total Dissolved Solids	R6	1/5/2008	840	mg/L		500	

Appendix A
Chain of Custody Sheets and Data Summary

Appendix A
Definitions

Sample Type:
E: Event sample
FD: Field duplicate sample
FB: Field blank sample.

Result Flags:
B: Potential blank contamination. Constituent was detected in field blank sample.
E: The reported value exceeds the linear range. The sample has been reanalyzed.
J: Estimated value. The result is below detection limit.
Y: The percent difference between the primary and confirmation column is >40%. The higher value has been reported.

Note: Pesticides with results indicating "Non-Detect" are not reported in this summary. See **Table 7** for a list of analytes. See **Appendix C** for the laboratory data reports.

Appendix A
Chain of Custody Sheets

Appendix A
Aquatic Toxicity Results by Event

Appendix A

Data Summary

Appendix B
Communication Reports
Organized by Event Date

Appendix C
Laboratory Data Reports
Organized by Event Date

Field Data Sheets
CalTest General Physical, Drinking Water Data, Nutrient Data, Metals Data
APPL Pesticide Analyses
Pacific Ecorisk Toxicity Reports

EXHIBIT 3

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R. JAMES DIEPENBROCK
(1929 – 2002)

April 6, 2009

Mr. Chris Carr
State Water Resources Control Board
Division of Water Rights
P.O. Box 2000
Sacramento, CA 95812-2000

Re: Consideration of Potential Amendments to the Water Quality Control Plan For the San Francisco Bay/Sacramento-San Joaquin Delta Estuary

Dear Mr. Carr:

Diepenbrock Harrison submits this letter on behalf of the San Luis & Delta-Mendota Water Authority ("Authority") and its member agencies, in response to the revised notice of a staff workshop in the above-reference matter. According to that notice, State Water Resources Control Board ("State Water Board") staff will be available at the workshop to:

> receive information and conduct detailed discussions regarding potential amendments or revisions to the southern Delta salinity and San Joaquin River flow objectives included in the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta) (2006 Bay-Delta Plan) and their implementation.

In response thereto, the Authority provides the following initial, process-based comments. The Authority intends to provide more comprehensive and detailed comments and information at a later point in the State Water Board's process.

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1. Water Quality Objectives Need Not Provide Absolute Protection For Any Particular Beneficial Use

The State Water Board should strive to set water quality objectives that fully protect beneficial uses. However, the law does not require full protection; but instead, it yields to what is reasonable.[1] In section 13000 of the Water Code, the Legislature set forth the State Water Board's basic directive when regulating water quality. The Legislature found and declared:

> [A]ctivities and factors which may affect the quality of the waters of the state shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible.

(Water Code, § 13000 (emphasis added).) The Legislature provides the State Water Board with a more direct mandate for the adoption of water quality objectives. The Legislature requires the State Water Board "establish such water quality objectives . . . as in its judgment will ensure the reasonable protection of beneficial uses and the prevention of nuisance." (Water Code, § 13241.) Reasonable protection is not absolute, but requires a balance; the State Water Board must consider the "totality of circumstances presented." (*United States v. State Water Resources Control Board* (1986) 182 Cal.App.3d 82, 129.) The consideration of the totality of circumstances necessarily requires "balancing of competing interests" and making "policy judgments." (*Id.*, at p. 130.)

The requirement of balance is reflected in the legislative mandate imposed on the State Water Board. When developing a water quality control plan, the State Water Board must consider:

> (a) Past, present, and probable future beneficial uses of water.
>
> (b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.
>
> (c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.

[1] Indeed, full protection of a beneficial use may not be possible because that level of protection may impair another beneficial use.

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(d) Economic considerations.

(e) The need for developing housing within the region.

(f) The need to develop and use recycled water.

(Water Code, § 13241.) Thus, before setting water quality objectives, the State Water Board must be provided with information needed to determine what is "reasonable." The State Water Board must: (a) understand the relative effects on the beneficial use of varying levels of protection (b) consider what measures could be undertaken to achieve the varying levels of protection, and (c) appreciate the potential costs for each of the measures considered.

2. <u>Before Setting Water Quality Objectives, The State Water Board Must Identify The Factors That Impact Water Quality And The Extent Thereof</u>

Also, when setting water quality objectives, the State Water Board must consider the environmental characteristics of the hydrographic unit under consideration and water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area. (Water Code, § 13241(c).) To satisfy those required considerations, the State Water Board should identify factors which affect water quality within the area[2] and how each factor within the area is affecting, and may affect water quality.

For southern Delta salinity, the State Water Board undertook some of that work previously. In its D-1641, the State Water Board concluded:

> Water quality in the southern Delta downstream of Vernalis is influenced by San Joaquin River inflow; tidal action; diversions of water by the SWP, CVP, and local water users; agricultural return flows; and channel capacity. . . .

(D-1641, p. 86.)[3]

---

[2] The importance of identifying factors that affect water quality within the area of concern has recently been recognized by the State Water Board in the 2006 Plan. (*See* 2006 Plan, p. 3 (stating "This plan establishes water quality objectives for which implementation can be fully accomplished only if the State Water Board assigns some measure of <u>responsibility to water right holders and water users to mitigate for the effects</u> on the designated beneficial uses of their diversions and use of water" (emphasis added).)

[3] The State Water Board did not make similar findings relative to San Joaquin River flow.

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The starting point for reconsideration of the southern Delta salinity objectives should be the factors identified in D-1641, but only the starting point. The State Water Board must update that conclusion. It must consider existing and potential changes to San Joaquin River inflow (i.e., implications of new flow requirements that have occur since D-1641 issued or that are expected to occur), existing and projected levels of southern Delta diversions and discharges, and existing and projected levels of municipal and industrial diversions and discharges.[4] The State Water Board must also account for investments made and actions taken since data were collected to support those 2006 State Water Board findings.

With regard to the flow side, the Authority and its member agencies own no dams and do not control upstream diversions. Their primary water supply is Central Valley Project Water delivered through the Delta-Mendota Canal, with its burden of imported salt. That supply has already been severely curtailed for water quality and environmental purposes. On the water quality side, however, member agencies that discharge to the San Joaquin River have made substantial investments and implemented significant programs which address discharges. Similarly, those member agencies and/or other member agencies have also undertaken significant activities to address drainage issues within their service areas.

Specifically, the Authority and its member agencies have invested their own funds and also successfully pursued federal grants, state grants, federal appropriations, and/or State Water Board low-interest loans for programs to improve infrastructure; acquire and develop reuse areas; and encourage installation of high-efficiency irrigation systems. Some member agencies have also funded their own revolving loan programs to assist growers with return systems, drip irrigation, and other irrigation improvements. From these investments, member agencies have (1) engaged their landowners and water users to achieve broad participation in the Regional Board's Irrigated Lands Program through the Westside San Joaquin River Water Quality Coalition; are implementing an approved watershed management plan and monitoring program for which they pay; and are implementing regionally funded grants for focused programs to accelerate best management practices, (2) complied with waste discharge requirements for the Grassland Bypass Project, including significant load reductions for both selenium and salt, and/or (3) developed a long-term program for drainage management, known as the Westside Regional Drainage Plan, which builds on the Grassland Bypass Project

---

[4] The importance of that update becomes evident when considering the extent of diversions and discharges in the southern Delta, and actions authorizing municipalities to discharge in the southern Delta. (*See*, *e.g.*, Delta Atlas at pp. 32, 34, copies of which are attached hereto as Exhibit 1; Order WQO 2005-0005 (authorizing the City of Manteca to discharge at levels in excess of the southern Delta Salinity objectives).)

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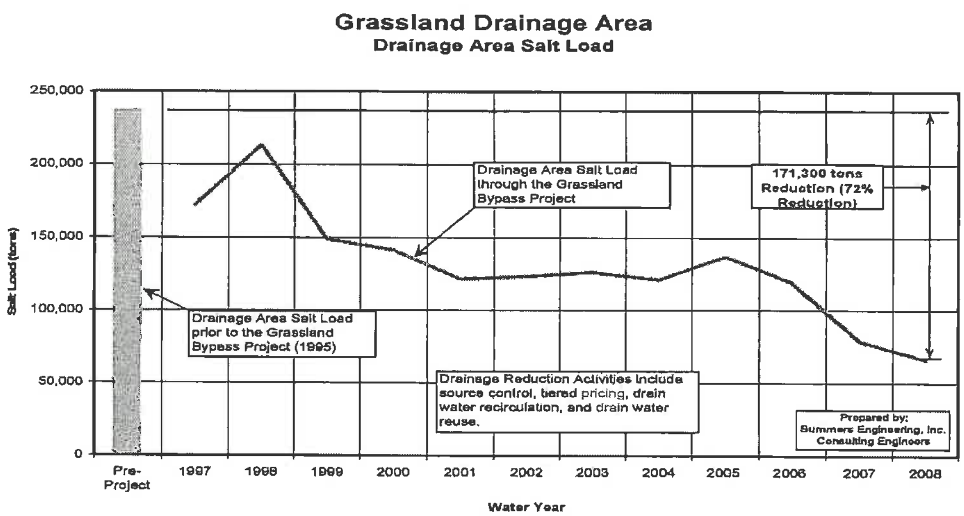
and continues as a permanent drainage solution, with the goal of ultimate in-valley management of drainage from irrigation.

The following table depicts some of the improvements resulting from the Grassland Bypass Project.



While the Project is not yet in position to assure zero discharges, the participants are working with a broad group of stakeholders to extend it while they make continued investments to reduce subsurface drainage produced on farm and within the region; to manage the remaining drainage to preserve the viability of irrigated agriculture while achieving ongoing water quality improvements; and to protect the environment. If the Project is extended, the water quality will continue to improve over the next 5-10 years until subsurface drainage generated by irrigation can be managed without discharge into the San Joaquin River system. These improvements cannot be ignored, but must be taken into consideration by the State Water Board as it reviews and updates the Water Quality Control Plan.

3. Conclusion

The Authority thanks the State Water Board and its staff for the opportunity to present these comments and to participate in the process to review and possibly revise

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the southern Delta salinity objectives and San Joaquin River objectives. The representatives of the Authority will continue to provide information to the State Water Board, consistent with the comments made herein. The Authority and its member agencies welcome the opportunity to meet with the State Water Board and its staff to answer questions or address any concerns they may have as a result of this letter.

Very truly yours,

DIEPENBROCK HARRISON
A Professional Corporation

By [signature]
Jon D. Rubin
Attorneys for the San Luis & Delta-Mendota Water Authority

cc: Daniel Nelson

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Exhibit 1

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SACRAMENTO DELTA SAN JOAQUIN ATLAS

California Department of Water Resources
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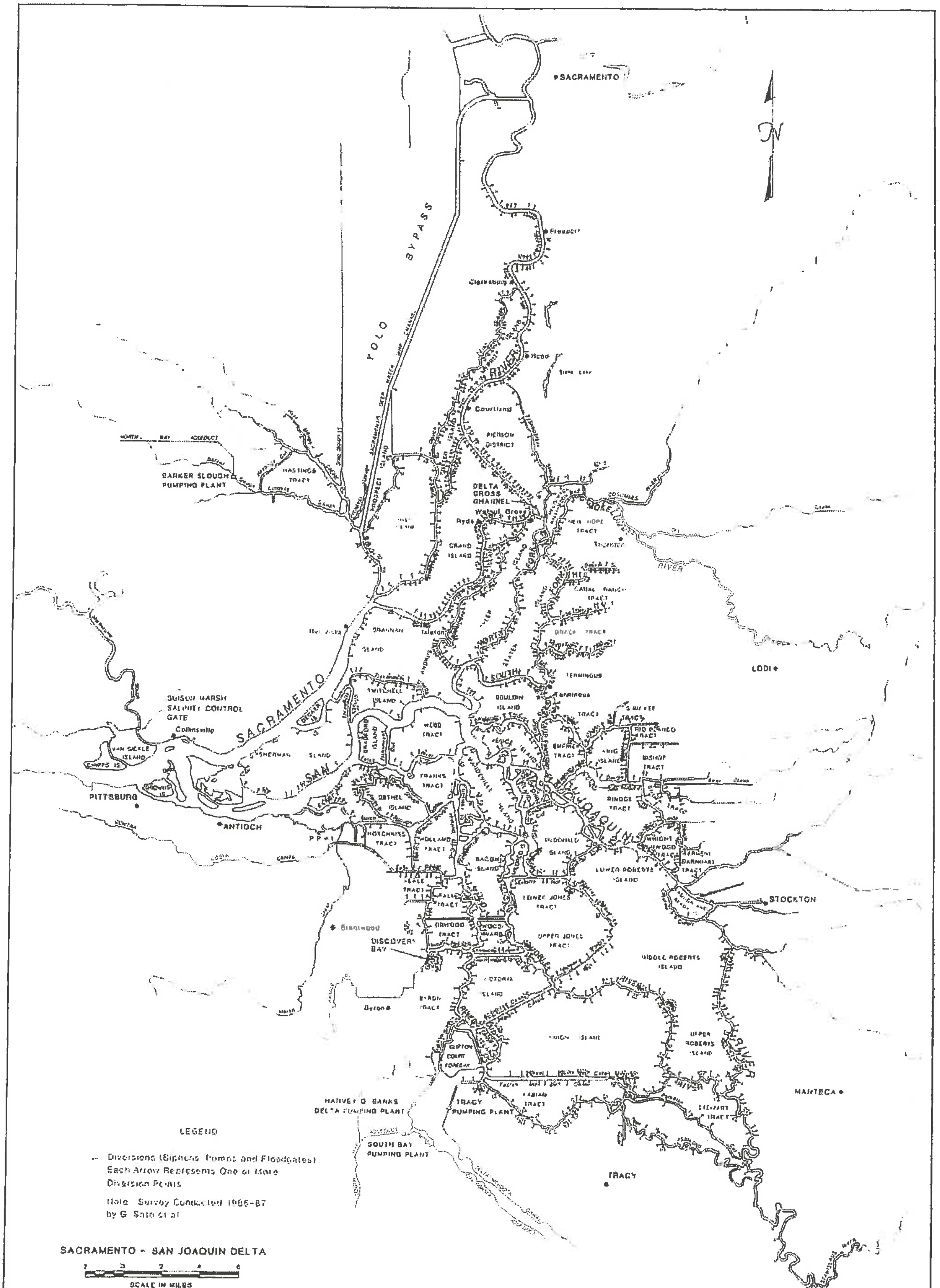

Irrigation Diversions

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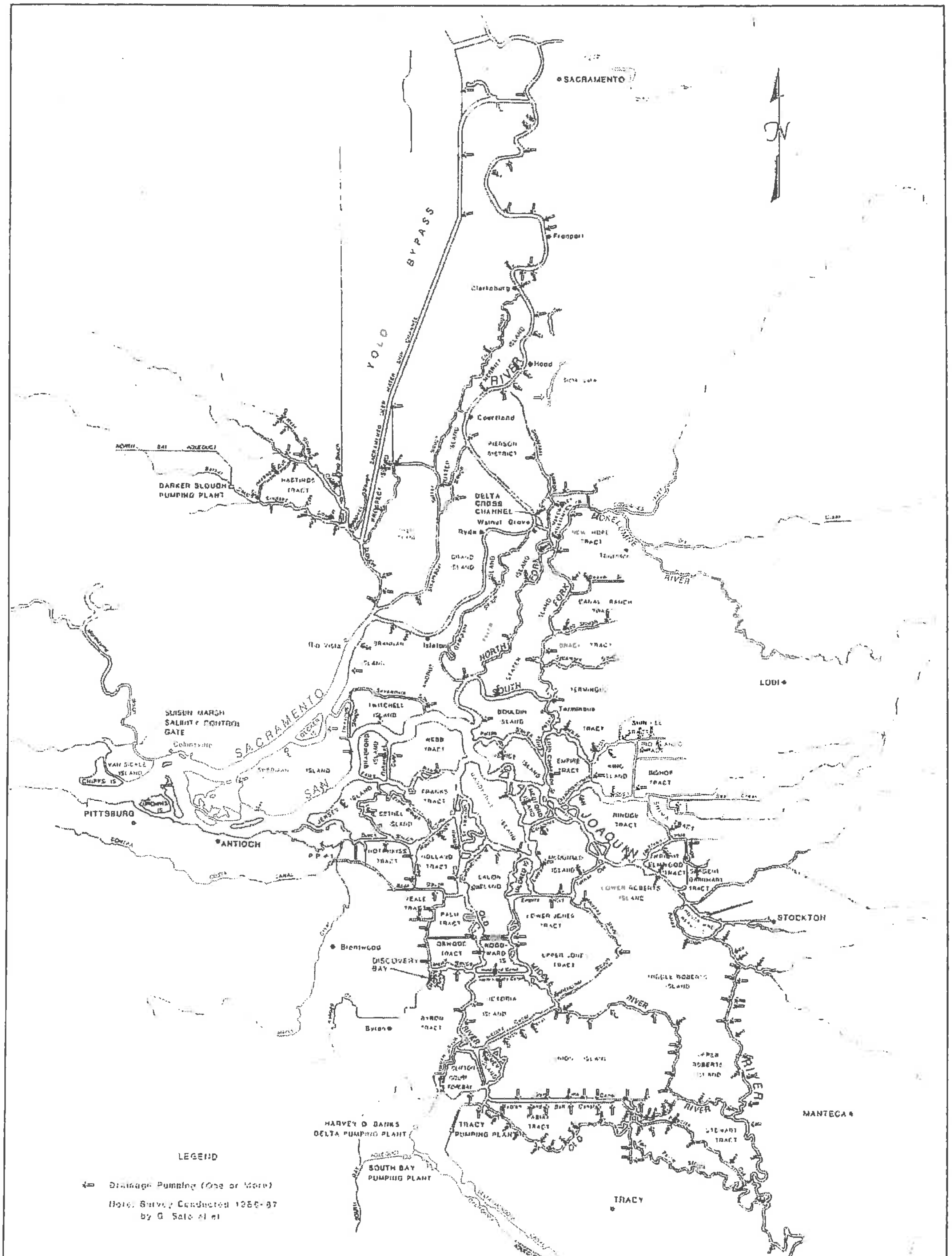

Agricultural Drainage Returns

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KRONICK MOSKOVITZ TIEDEMANN & GIRARD
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CLIFFORD W. SCHULZ

April 6, 2009

VIA E-MAIL BAY-DELTA@WATERBOARDS.CA.GOV,
and Hand Delivery

Chris Carr
State Water Resources Control Board
Division of Water Rights
Cal/EPA Headquarters
1001 "I" Street
Sacramento, CA 95814

RE: STATEMENT OF THE STATE WATER CONTRACTORS CONCERNING SOUTH DELTA SALINITY OBJECTIVES AND SAN JOAQUIN RIVER FISHERY FLOWS[1]

Dear Mr. Carr:

Legal Background

As a result of recent court decisions, the current proceedings to consider (i) appropriate water quality protection for agricultural beneficial uses within the south Delta and (ii) San Joaquin River fishery flows begin with a more well defined and settled understanding of how the interrelated legal and technical issues should be approached. In January 2006, Court of Appeal Justice Ronald Robie provided key guidance to the Board and all the interested parties. (*The State Water Resources Control Board Cases* (2206) 136 Cal.App.4th 674)

First, quoting with approval from *United States v. State Water Resources Control Board* (2006) 182 Cal. App. 3d 82, 109–110 (Italics added), Justice Robie described the statutorily derived mandates and discretion that guide the Water Board's determination of what water quality objective should be established to protect a particular beneficial use:

> In formulating a water quality control plan, the Board is invested with wide authority 'to attain the highest water quality *which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and*

[1] Presented to the State Water Resources Control Board on April 22, 2009, in response to its February 13, 2009 Notice, as revised by its March 27, 2009, Notice.

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> *detrimental, economic and social, tangible and intangible.'* (§ 13000.) In fulfilling its statutory imperative, the Board is required to 'establish such water quality objectives ... as in its judgment will ensure the *reasonable* protection of beneficial uses ...' (§ 13241), a conceptual classification far-reaching in scope. [fn. omitted.]' "Beneficial uses" of the waters of the state that may be protected against quality degradation include, but are not necessarily limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.' (§ 13050, subd. (f).) Thus, in carrying out its water quality planning function, the Board possesses broad powers and responsibilities in setting water quality [objectives]....)

This quote's emphasis on the balancing of competing values clearly follows the mandate of Article X, Section 2, of the California Constitution and is consistent with the California Supreme Court's statement in *National Audubon Society v. Superior Court* (1983) 33 Cal. 419, 421 that "All uses of water, including public trust uses, must now conform to the standard of reasonable use." Thus, a report on crop tolerance or someone's desire concerning protection of their particular beneficial use is not dispositive of what water quality objective should be adopted. Such data just begins, not ends, the Water Board's task of balancing various proposals against their impact on other statewide interests. (See *Joslin v Marin Municipal Water District* (1967) 67 Cal.2d 132, 140: "What is a reasonable use of water depends on the circumstances of each case, such an inquiry cannot be resolved *in vacuo* isolated from statewide considerations of transcendent importance.")

Second, Justice Robie distinguished the task of determining what objectives are reasonable from the separate task of determining the appropriate means for achieving those reasonable objectives. In the process, he described the Water Board's authority and discretion under its water rights jurisdiction in a manner that limits the Water Board's discretion to adopt water rights terms and conditions that deviate from the objectives established in the water quality control plan. The objectives cannot be undermined in a water rights implementation process.

These key rulings arose from challenges to the Water Board's approval of the Vernalis Adaptive Management Plan (VAMP) through water rights Decision 1641. In Decision 1641, the Water Board decided to substitute the VAMP flows for the San Joaquin River flow objectives that had been established through the 1995 Bay-Delta water quality control plan. It authorized implementation of the VAMP as an alternative means of providing certain spring San Joaquin River fishery flows and investigating the relative importance of flows versus export pumping on the survival of juvenile salmonids. Justice Robie rejected that decision as follows:

> ... [A] water quality control plan must include water quality objectives and a program of implementation needed for achieving

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those objectives. (§ 13050, subd. (j).) Moreover, the program of implementation must include "[a] description of the nature of actions which are necessary to achieve the objectives" and "[a] time schedule for the actions to be taken." (§ 13242, subds. (a), (b).)

In Decision 1641, the Board relied on the "time schedule" provision of section 13242 to justify its approval of the San Joaquin River Agreement flow regime as an "interim" requirement. On appeal, the Board likewise argues that "[t]he [Vernalis Adaptive Management Plan] experimental period constitutes a 'time schedule' for meeting the [flow] objectives" in the 1995 Bay-Delta Plan. The first flaw in that argument is that, by law, the time schedule for the actions to be taken to achieve objectives in a water quality control plan must be included as part of the plan itself. (§ 13242.) The 1995 Bay-Delta Plan contains nothing about "[t]he [Vernalis Adaptive Management Plan] experimental period." The Board must point to a time schedule in the 1995 Bay-Delta Plan that authorized it to postpone implementing the Vernalis pulse flow objective. The Board has failed to identify any such provision.

The second flaw in the Board's argument is that, regardless of the timing issue, the Board has failed to identify anything in the plan that authorized it to implement a flow objective other than the Vernalis pulse flow objective, even temporarily. The Vernalis pulse flow objective required a minimum monthly average flow of water at a particular point in the San Joaquin River for a 31-day period in April and May each year, ranging from 3,110 to 8,620 cubic feet per second. Nothing in the 1995 Bay-Delta Plan authorized the Board to implement a different flow regime that could provide less than that amount of water.

This same flaw defeats arguments made by San Joaquin River Group and State Water Contractors. The San Joaquin River Group contends that under the 1995 Bay-Delta Plan, because there was no specific schedule for achieving the Vernalis pulse flow objective, the Plan provided that implementation "should be immediate." San Joaquin River Group then argues at length about the meaning of the word "should," concluding that because "should" is generally permissive and advisory, the Board had the power not to implement the Vernalis pulse flow objective immediately and instead provide for a staged implementation. San Joaquin River Group points to nothing in the plan, however, that authorized the

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> Board to implement a different flow objective than the Vernalis pulse flow objective, even on a temporary basis.

The decision then significantly concluded:

> Contrary to State Water Contractors' assertion, the trial court's decision does not rest on "the assumption that water right decisions adopted by the ... Board must provide for full and immediate implementation of the water quality objectives set forth in any applicable water quality control plan." The trial court's decision rests on the conclusion (with which we agree) that when a water quality control plan calls for a particular flow objective to be achieved by allocating responsibility to meet that objective in a water rights proceeding, and the plan does *not* provide for any alternate, experimental flow objective to be met on an interim basis, the decision in that water rights proceeding must fully implement the flow objective provided for in the plan. *The guiding principle is that the Board's power to act in a water rights proceeding commenced to implement a water quality control plan is constrained by the terms of the plan it is implementing.*

In a few lines of text, Justice Robie put the Water Board on notice that the determination as to whether and to what extent water quality objectives should, in the public interest, be implemented by water rights holders must be considered in the quasi-legislative basin planning process No longer can that task be left to the quasi-judicial water rights process. As a result, the language of the water quality plan, if not carefully worded, may be controlling in subsequent water rights hearings, and the Water Board's water rights discretion "constrained" by the language included in the plan.

Thus, a more critical examination of all relevant data needs to occur at the basin planning stage to ensure that a proposed water quality objective is reasonable in light of "all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible." The limits on Water Board authority to deviate from an approved objective[2] based on additional information derived from during later quasi-judicial water rights hearings, calls out for development, presentation, and consideration of detailed testimony and exhibits during the basin planning proceedings. Similarly, water quality control plan implementation provisions must be carefully worded to ensure that they are broad enough to enable the Water Board, during water rights hearings, to balance the impacts of using vital public water supplies for dilution of pollution against other available methods to achieve the water quality goal that will better serve the overall public interest.

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[2] Justice Robie indicated that such a change could only be accomplished by reinitiating the water quality control planning process.

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This legal backdrop has led the State Water Contractors to treat the forthcoming quasi-legislative proceedings as the forum within which the Water Board will make most of the important discretionary decisions concerning the way water in the portion of the Delta dominated by San Joaquin River flows will be managed in the future. The SWC and its members plan to present significant technical data in the form of historical materials, model output, and statements by experts in the fields of hydrology, hydraulics, fisheries biology, water quality, agronomy, and other relevant disciplines. The factors that the SWC and its members consider to be the most important and the process that they recommend be followed are spelled out in more detail in the remainder of this statement

South Delta Salinity

In its 2006 water quality control plan, the Water Board continued to rely on a factual misstatement concerning the causes of higher salinities in the south Delta that first appeared in the 1995 plan:

> Elevated salinity in the southern Delta is caused by various factors, including low flows; salts imported to the San Joaquin Basin in irrigation water; municipal discharges; subsurface accretions from groundwater; tidal actions; *diversions of water by the SWP*, CVP, and local water users; channel capacity; and discharges from land-derived salts, primarily from agricultural drainage. (2006 Plan, p. 27; italics added.)

To the extent that this sentence implies that the operation of the Banks Pumping Plant causes a measurable degradation of salinity conditions in the south Delta from that which would exist in the absence of those pumping operations, the statement in incorrect. Hydrology and DSM II modeling have demonstrated that Banks pumping does not increase salinity concentrations in the south Delta. In fact, the salinity of San Joaquin River inflow at Vernalis, together with discharges of agricultural drainage from the south Delta islands, are the primary drivers that control salinity at the four south Delta compliance locations. The SWC will participate in producing the latest DSM II and related studies that will once again demonstrate that there is no correlation between SWP pumping and increases in south Delta salinity. These studies will also address contentions that the pumping operations have created null zones where lack of positive flows cause salts to concentrate.

To the extent that the quotation above implicitly contends that the SWP is degrading south Delta salinity levels because the Banks Pumping Plant operations import salts to the San Joaquin Basin, that contention is flawed for several reasons. First, no SWP water is delivered within the San Joaquin Basin except for the Oak Flat Water District which has a Table A allocation of 5700 acre feet and is located six to eight miles west of the San Joaquin River and west of both the California Aqueduct and the Delta Mendota Canal. There is no data that indicates that saline return flows from this area reach the San Joaquin River. Second, the only non-SWP water that is moved through SWP facilities is CVP water wheeled through joint-point

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operations. The SWC will supply the Water Board with exhibits describing the amounts of water wheeled for the CVP and their ultimate destinations. Some of that water, such as that moved to the Cross Valley Canal in Kern County, cannot impact water quality in the San Joaquin Basin. As for CVP wheeled water that may be used within the San Joaquin Basin, Water Code section 1810 et seq. obligates the owners of public water facilities to make capacity available to transfer water from one place to another based on State policy that unused capacity in existing infrastructure should be fully utilized to avoid wasteful construction of redundant facilities and allow water markets to function more efficiently. To the extent that CVP water moved through the SWP facilities imports salts which may slightly impact south Delta salinity levels, the responsibility for that impact, if any, should as a matter of good policy and fairness rest with the entity using the water, not the entity that complies with State law and provides access to excess conveyance capacity. Statements by Water Board staff that it is appropriate to make the SWP jointly liable for maintaining south Delta salinity levels because it assists the CVP in importing salts to the San Joaquin Basin, should be expressly disavowed by the Water Board as a position contrary to State law and policy. One person has described the contrary position as "no good deed goes unpunished."

Finally, the SWC believes the Board must carefully consider how recent Delta smelt protection actions will affect both the reasonableness of any proposed south Delta salinity objective and the means available to implement such objectives through modifications in export water operations. As noted previously, San Joaquin River inflow and the quality of that inflow are the central drivers that control south Delta salinity levels. Even if SWP Delta operations could improve salinity conditions at the south Delta compliance locations (which we do not believe is the case), that could only occur through even greater Old and Middle Rivers reverse flows (to draw Sacramento River water into the area) that the fishery agencies and the courts have prohibited. Further, the Water Board and the parties, this time around, need to abandon the notion that permanent, operable barriers in the South Delta will be available in the near future to improve south Delta conditions. Once again, the fishery agencies continue to oppose the installation of permanent barriers and they are not likely to exist for some time, if ever. These realities require a fresh look at what constitutes a reasonable salinity objective for the south Delta and whether salinity reduction strategies, including within the south Delta, make more sense and are more compatible with potentially conflicting fishery objectives.

In summary, it will be the SWC's position in these hearings, that no matter what salinity conditions are determined to be needed to provide reasonable protection to crops grown in the south Delta, that SWP Delta operations have not been shown to have any measurable impact on the salinity at Brandt Bridge, or at any other south Delta compliance location. Therefore, like the Vernalis salinity objective, the program of implementation for the four interior south Delta compliance locations should not designate the SWP as an entity required to help meet the objectives at those locations.

Nevertheless, the SWC will participate in and develop recommendations based on the studies being carried out by Dr. Hoffman and others to evaluate the salinity tolerance of the major crops now being grown in the south Delta. Several important considerations need to be

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kept in mind as this work product is applied to the task of setting objectives.

First, the Water Board should not rely just on steady-state data from laboratory experiments. Real time salinity levels likely control crop success as contrasted to a single average over the full growing season. It may very well be that lower salinity water is important for young seedlings and less important for mature plants. Further, historically, the south Delta has typically experienced better quality water in the spring and deteriorating water quality in the summer months as natural San Joaquin River flows drop and irrigation demands and salt laden drainage from south Delta fields increase. The Water Board should consider salinity objectives that recognize increasing crop tolerances over the growing season and the naturally occurring changes in channel salinities as the snow melt ends and river flows drop. Such objectives could provide for lower salinities in the spring and higher salinities in the summer months that properly reflect crop needs and the natural in-channel conditions that have always prevailed. In all cases, however, the salinity objective at any time should not exceed that needed for reasonable protection of the beneficial use.

Second, the Water Board should not equate reasonable protection with absolute protection (100 percent yields in all fields in all years), which has not historically occurred in the delta given its variable hydrology. If such absolute protection may cause unreasonable impacts on conflicting "demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible" (Water Code section 13000), balancing may require actions that reduce the impacts on conflicting values, such as a lesser level of protection, or a method of implementation that is staged, or a focus on other actions that increased salinity such as local discharges. This is exactly what dry-year relaxations are designed to recognize in other objectives. Further, at the present time, only a small percentage of acreage in the south Delta is farmed with the most salt-sensitive crops. It may not be reasonable to provide full salinity protection in all year types to those who choose to grow salt sensitive crops on tight soils in an area that is known to have changeable salinity water from year to year and over the months of a single year.

Third, the Water Board should not assume that the south Delta water users all have valid water rights that authorize diversions during certain low flow, summer months of dryer water years when San Joaquin River flows entering the Delta are less than the amount needed to meet all in-Delta demands. As the *Phelps* case determined, there are times when a number of south Delta landowners do not have the right to divert. In those circumstances, the level of legal demand to be protected is lower and the return flows from illegal diversions should not be allowed to degrade the in-channel supply. The combination of reducing diversions to the level authorized by legal rights combined with the reduction of in-Delta polluting discharges may significantly assist in meeting reasonable south Delta salinity objectives.

With respect to non-flow ways to improve south Delta salinity conditions, the SWC is aware of and supports the many actions that are occurring in the San Joaquin Basin, such as the Grasslands Bypass program which has significantly reduced the salt load reaching the River and ultimately the Delta. The SWC does not believe that the Water Board has taken into account the large decreases in salt load that has already occurred. The SWC is also aware that the Friant

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settlement has now been approved by Congress and that this program may provide additional flows to the lower San Joaquin River, which in conjunction with New Melones operations may improve water quality at Vernalis. It is a fact that water quality at Vernalis and local discharges from Delta cities and lands are the dominant factors that regulate salinity in the south Delta. The existence of the Brandt Bridge objective and the three interior south Delta objectives are somewhat meaningless unless these two factors are properly included as part of the equation. The SWC will urge the Water Board, in lieu of trying to enforce water operations that will be largely ineffective, unreasonable, or contrary to fishery needs, to focus on salinity reduction programs both upstream and. within the delta and to establish a schedule for compliance that provides the time for them to work.

San Joaquin River Fish Flows

Currently, San Joaquin River flows for the protection of San Joaquin River salmonids (and perhaps Delta smelt) are in effect from February through June and are measured at Airport Way Bridge – Vernalis. The Bureau of Reclamation has been assigned the interim responsibility for meeting those flow objectives, except during the spring pulse flow when the VAMP experiment calls for certain enhanced flows and reduced export pumping that are maintained to study their effect on smolt survival. During VAMP, supplemental water is provided from the major San Joaquin River tributary reservoirs. During VAMP and the remainder of the February through June time frame, Reclamation, through operation of New Melones Reservoir, ensures that the necessary base flows exist. The SWC is operating under the assumption that Reclamation, through its New Melones operations, will continue to play a major role in meeting any revised fishery flow requirements as measured at Vernalis.

Except for its financial and scientific participation in the VAMP program, the SWC and the State Water Project properly have no obligations with respect to flows at Vernalis. The SWP does not have any facilities that impact San Joaquin River flow rates. Nevertheless, the SWC is interested in the proper management of fishery flows and plans to carefully monitor the California Department of Fish and Game's proposals and the modeling and other scientific information presented to support its recommendations. However, until the SWC can review Fish and Game's recommendations and their supporting documents, the SWC is unable to describe what, if any, materials it will present.[3]

Procedures

As was pointed out at the beginning of this statement, the water quality control planning process has, for the export projects and their water users, taken on a far greater importance since

3 It should be noted that south Delta salinity levels, during part of the irrigation season, will be influenced by what fishery flows are required to be maintained at Vernalis through the end of June. However, the critical months when south Delta salinity is most difficult to control are July and August, when the snowmelt is complete and base flows entering the Delta from the south are at their lowest.

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Justice Robie described the degree to which decisions made in developing the water quality control plan may constrain the Water Board's discretion when it holds water rights hearings to implement the water quality plan. It was for that reason that the SWC supported the use of an evidentiary process for the water quality proceedings, with cross examination, to test the accuracy of claims made by all parties, including witnesses for the SWC.

At all times the SWC has supported such an evidentiary process even though water quality proceedings are quasi-legislative. The SWC's objections at the earlier Water Board workshops and meetings were not to an evidentiary process, but to the format that was being proposed. It was unrealistic to believe that they could be completed within time period proposed and the concept of filtering cross-examination questions (which were euphemistically referred to as "clarification of evidence") through Water Board staff was simply unacceptable given the importance of the hearings.

We again request that the Water Board consider providing an opportunity, even a tightly time limited opportunity, to cross-examine sworn testimony. Such time limits, if enforced, can effectively compel counsel to decide what is so important that it must be vetted through cross examination, as compared to providing rebuttal evidence. Nevertheless, the act of swearing witnesses who know they will be questioned on their opinions can lead to far more constrained and factual presentations, a factor that is of utmost importance.

The SWC looks forward to working with the Board to develop an accurate and complete administrative record for this important process.

Very truly yours,

KRONICK, MOSKOVITZ, TIEDEMANN & GIRARD

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May 15, 2009

Via e-mail: bay-delta@waterboards.ca.gov
and U.S. Mail

Mr. Chris Carr
State Water Resources Control Board
Division of Water Rights
P.O. Box 2000
Sacramento, CA 95812-2000

Re: Comment Letter – Southern Delta Salinity/San Joaquin River Flows WQCP Workshop

Dear Mr. Carr:

Diepenbrock Harrison submits this letter on behalf of the San Luis & Delta-Mendota Water Authority ("Authority") and its member agencies, in response to the "Second Revised Notice of Public Staff Workshop and Additional Opportunity to Comment on Proposed Modeling Alternatives ("Second Revised Notice"). This comment letter is intended to provide input and suggestion on the modeling approach utilized by the State Water Resources Control Board ("State Water Board") in its consideration of potential amendments to the Water Quality Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary related to southern Delta salinity and San Joaquin River flow objectives.

Simply put, the flow-based modeling approach identified in the Second Revised Notice is too narrow. To develop the range of information needed to make reasoned and informed decisions, the State Water Board should employ additional analytical tools. Specifically, the State Water Board should utilize modeling approaches that consider the effects of changes to all factors that could impact water quality, as well as approaches that compare the costs and benefits of providing different levels of protection to fish, agriculture, and water supply.

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The Authority looks forward to continuing to work with the State Water Board and other stakeholders in this effort.

Very truly yours,

DIEPENBROCK HARRISON
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JDR/jvo

{00168850; 3}

EXHIBIT 4

1/6-7/11 Bd. Wrkshop
SJR Technical Report
Deadline: 12/6/10 by 12 noon

San Luis & Delta-Mendota Water Authority
P O Box 2157
Los Banos, CA 93635

State Water Contractors
1121 L Street, Suite 1050
Sacramento, CA 95814

December 6, 2010

Ms. Jeanine Townsend, Clerk to the Board
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-2000

Re: *Comments on the Draft Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives*

Dear Ms. Townsend:

The State Water Contractors' organization ("SWC")[1] and the San Luis & Delta-Mendota Water Authority ("Authority")[2], collectively referred to as the "State and Federal Water Contractors", respectfully submit this comment letter on the draft Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives ("draft Technical Report"). While the draft Technical Report serves as a useful tool to continue the dialogue on what might be appropriate San Joaquin River flow and southern Delta salinity objectives, it fails to serve its stated purpose: namely, "to provide the Board with the scientific information and tools needed." (Draft Technical Report, p. 1.)

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1 The SWC represents twenty-seven public agencies that contract with the State of California for water from the State Water Project ("SWP"). These agencies are each organized under California law and provide water supplies to nearly 25 million Californians and 750,000 acres of prime farmland from Napa County to San Diego and points between.

2 The Authority consists of 29 member agencies, 27 of which contract with the United States Department of the Interior, Bureau of Reclamation (Reclamation), for supply of water from the Central Valley Project (CVP). The Authority's member agencies hold contracts with Reclamation for the delivery of approximately 3.3 million acre-feet of CVP water. CVP water provided to the Authority's member agencies supports approximately 1.2 million acres of agricultural land, as well as 51,500 acres of private waterfowl habitat, in California's Central Valley. The Authority's member agencies also use CVP water for more than 1 million people in the Silicon Valley and the Central Valley.

The State Water Resources Control Board ("State Board") recently issued two notices concerning potential amendments to the 2006 Water Quality Control Plan For The San Francisco Bay/Sacramento – San Joaquin River Delta ("Bay-Delta Plan"), as it relates to San Joaquin River flows (fishery) and southern Delta salinity (agriculture). The first notice, issued October 29, 2010, provided the public with the draft Technical Report and requested comments by December 6, 2010, on (a) whether the content of the draft Technical Report is sufficient to enable the State Board to establish new San Joaquin River flow and southern Delta salinity objectives and a related program of implementation, and (b) whether the State Board should consider additional information and tools to evaluate and establish these new objectives. A workshop on the draft Technical Report is to be held on January 6 and 7, 2011. The second notice, issued November 22, 2010, informed the public that an additional written submittal with respect to the Bay-Delta water quality planning process may be filed on or before February 8, 2011, covering information not necessarily related to the Technical Report, but which, nevertheless, is relevant to the State Board's consideration of the new San Joaquin River flow and southern Delta salinity objectives and a plan for their implementation. According to the second notice, this information could include economic data.

The State and Federal Water Contractors interpret these two notices as separating the Bay-Delta water quality planning process into two phases, the first focusing on the scope and content of the technical data that the State Board and its staff will consider before making their draft regulatory recommendations, and the second focusing on how that data should be interpreted so that the resulting water quality objectives and the program of implementation will meet the legal requirement that the protection of beneficial uses is "reasonable," taking all demands being made on the water, including economics, social impacts, and housing needs into consideration. (Water Code §§ 13000, 13145, and 13241.) In addition, this second phase would also involve the public trust balancing required by the *Audubon* case ((1983) 33 Cal.3d 419, 446).

These comments will focus on corrections and additions to the draft Technical Report that are needed to ensure that the State Board and its staff are considering a complete data set when evaluating how to properly carry out their regulatory obligations. Because any effort to describe the data needed to develop water quality objectives and an effective and fair program of implementation must be grounded on good science, the remainder of this introduction will describe what the State and Federal Water Contractors believe to be the foundation of "good science" at the data gathering and initial analysis stage of the process. That foundation will then be used to describe what additional materials are needed to create an accurate and complete "Technical Report." Our February 8 submittal(s) will build on this foundation and will apply the best available scientific data to it to suggest appropriate regulatory requirements. This overall good science approach is critical to ensuring that the State Board's water quality objectives are lawful, provide reasonable protection, and result in a final policy product that is consistent with, and supported by, the best available scientific data.

Since the 2006 Bay-Delta Plan was adopted, Delta science and the approaches used to evaluate Delta science have both advanced significantly. Considerable new scientific research has been undertaken and even more is underway related to the interaction between the SWP and CVP and Delta fisheries resources and the effects of other stressors. Additional efforts are assessing the available data in the context of state-of-the-art population abundance models. These data have already played a significant role in the on-going OCAP litigation pending before the United States District Court for the Eastern District of California and should be included in the data sets to be analyzed by the State Board and its staff during its development of lawful water quality objectives.

In addition, the Bay-Delta Conservation Plan participants have spent the last four years refining the way science-based contentions should be examined, compared to contrasting opinions, and finally integrated through what has become known as an "effects analysis." While these activities did not take place within the context of a State Board water quality planning process, the State and Federal Water Contractors believe that the intensive data acquisition and analysis process that was adopted for the BDCP can readily be adapted to, and should be used during, the Bay Delta Plan process.

In its February 8, 2011, submittal(s), the State and Federal Water Contractors will present a more complete exposition of how they believe the State Board should proceed in order to ensure that the best scientific and economic data are utilized to balance the competing beneficial uses of the water involved before new water quality objectives are adopted. That submittal or those submittals will also provide more detail on the legal aspects of the State Board's regulatory process. In keeping with our focus on the adequacy of the Technical Report, the key elements of a successful effects analysis that are closely tied to need to augment and correct the draft Technical Report can be summarized as follows:

1. Ensure that there is a complete presentation of the available information. We recognize that the dispersed nature of the applicable scientific data can make this difficult. However, a failure to locate and consider missing relevant data, particularly if it is critical of prevailing beliefs, can lead to conclusions that would not otherwise be drawn, can result in a biased result, and can lead to management decisions that provide little or no benefits, yet waste valuable water resources. The failure to provide a complete record that includes *all* existing – even competing – science based views can also impede the peer review process described in paragraph 3 below.[3]

2. Present the analysis in a manner that transparently and rationally explains to the reader why one analysis/conclusion is being chosen over another and provides a logic chain that

[3] In most circumstances, the State and Federal Water Contractors would define the data set as being limited to published science papers, with a preference to those that have been peer reviewed. However, with respect to Delta fishery flow objectives, a body of work exists that has been tested more rigorously most peer reviewed papers. That information is contained in declarations presented in the federal court OCAP litigation, where countervailing declarations were produced, cross examination of the declarants took place, and a judge issued rulings with respect to the adequacy of the scientific data for regulatory purposes. This type of data should be included in the data set and considered by the State Board. It meets the test for being the type of information on which responsible persons are accustomed to rely.

can be followed by those reviewing the product. The lack of such a logic chain was one major criticism of the product produced by the State Board during the Delta Flow Criteria process. The final report simply did not even recognize, much less discuss, all of the data provided by the parties and the experts, nor did it allow a reviewer to understand how certain conclusions were reached in light of other information in the record. In the context of a water quality control plan, this logic chain should enable affected parties to understand (a) the baseline water quality conditions; (b) to the extent (time and amount) those base conditions do not provide reasonable protection of beneficial uses, the cause(s) of that failure; (c) why a certain level of protection would be reasonable, taking into consideration competing demands, including social and economic impacts and the need to provide housing; and (d) why a particular program of implementation is proposed, and how it would remedy that failure.

3. Prior to issuing a draft plan for public review, have the analysis "peer reviewed" by independent experts. There are several key factors that will define whether such a review is, in fact, independent. First, to protect the objectivity of the review process, care must be taken to avoid using, as peer reviewers, the authors of any of the basic studies that underlie the State Board's work product.[4] Second, the scope of the review must not be so constrained as to impede the reviewers' ability to examine the work product as a whole. Finally, the reviewers must be given sufficient time to carry out their review and provided access to the resources (including all of the relevant data) needed to conduct a rigorous review.

SOUTH DELTA SALINITY TECHNICAL ISSUES

I. Section 2.5 – Hydrodynamics Downstream of Vernalis

The discussion of hydrodynamics downstream of Vernalis should include a reference to recent analysis by Dr. Paul Hutton of Metropolitan Water District of Southern California. His April 2008 report "A Model to Estimate Combined Old & Middle River Flows" is attached.

Dr. Hutton's report includes an analysis of the factors that affect the flow split at the Head of Old River under varying conditions of flow and barrier installation. The analysis is based on DSM2 hydrodynamic simulation and is confirmed with flow measurements at Lathrop and Stockton. The analysis portrays a flow split that is more nuanced than suggested by the SWRCB technical report statement "Flow paths downstream of Vernalis are largely affected by export operations of the two major water diverters in the Delta, the USBR and the DWR." Dr. Hutton's analysis shows that (1) net diversions by in-Delta users and South Delta agricultural barriers are important factors and (2) SWP-CVP export pumping has little influence under higher Vernalis

[4] Given the need to ensure independent review, the State and Federal Water Contractors do not support the State Board's use of the University of California Davis science group for any of the review processes. They are the authors of a substantial body of work that will be included within the scientific data set under consideration. It is, therefore, inappropriate to ask them to critique their own or their colleagues' work and expect that review to be considered objective.

flow conditions. According to his analysis, the flow split is approximately 50% of Vernalis flow in the absence of south Delta diversions (SWP-CVP exports and net diversions by in-Delta users). As these diversions increase, the volume of San Joaquin River flow entering Old River increases proportionally. For every 1000 cfs of additional diversion, Old River flows from the San Joaquin River increase approximately 17 cfs and 31 cfs with and without agricultural barriers, respectively.

Dr. Hutton's report also provides a more refined approach to estimate the amount of Old and Middle River flows in comparison to the rough estimation method presented by Contra Costa Water District which was referenced in the technical report. In particular, net In-delta diversions and pumping by Contra Costa Water District can have a major effect on Old and Middle River flows, in addition to tidal conditions. The approach is incorporated in the CALSIM II model.

II. <u>Section 4 – Southern Delta Salinity</u>

The Draft Technical Report identifies the sources of salinity in the southern Delta and includes salinity from the San Joaquin River at Vernalis and evapo-concentration of salt diverted from southern Delta channels. The Draft Technical Report does not identify SWP operations as a source of salinity loading. Nevertheless, prior State Board decisions have asserted that the SWP could be partially responsible for salt loading at Vernalis because it wheels CVP water to CVP users in the San Joaquin Basin under the Joint Point of Diversion. To ensure that these earlier, erroneous statements are not repeated in future water quality and water rights decisions, the Technical Report should include specific data describing the effects of SWP operations on southern Delta salinity conditions.

This is important because the data show that the SWP's influence on salt loading at Vernalis through delivery of SWP water to its contractors is negligible. The only water district tributary to the San Joaquin River that directly receives SWP supplies pursuant to its contract with the State, Oak Flat Water District, has an annual Table A supply of 5,400 acre-feet. Because of hydrologic and regulatory restrictions, actual SWP deliveries to Oak Flat Water District from the SWP averaged only 4,500 acre-feet between 1970 and 2007. This represents about 0.06 % of the total water supplied to the San Joaquin River watershed. In addition to SWP deliveries, some water deliveries through SWP facilities are provided through operation of the Joint Point of Diversion to CVP contract holders and other water users in the San Joaquin River watershed. Since the SWP wheels this CVP water pursuant to State statutory policy requiring DWR to allow others to wheel water in available SWP capacity (Water Code §§ 1810-1814), consistently with Federal statutory policy authorizing the Joint Point of Diversion (P.L. 99-546, October 27, 1986), and in accordance with D-1641 the SWP should not be assigned responsibility for any Delta salinity increases from these uses. Doing so would only penalize the SWP contractors for providing conveyance and transfer benefits for others consistent with these statutory policies.

As to the CVP, it is equally important that the Technical Report include specific data describing the effects of CVP operations on southern Delta salinity conditions, considering separately the effects of in-Delta pumping, operation of reservoirs on or tributary to the San Joaquin River, and discharges of drain water. It should also recognize the efforts by the Authority and its member agencies to address the salinity loading impacts of discharges of drain water. The Authority has provided and will continue to provide information to the State Board on those efforts.

DWR has done extensive analysis of circulation patterns in the south Delta (DWR 2007a) and their effects, if any, on salinity conditions. These data and their analyses should be included in the Technical Report. DWR's analysis of flow patterns in the southern Delta reached the following conclusions:

> In the South Delta, the natural flow, without exports, is the flow from the San Joaquin River making its way towards the ocean through the San Joaquin, Old and Middle Rivers. The agricultural water quality stations are upstream of Exports and do not naturally receive water from the Sacramento River. Exports pull water that contains a mixture of different sources of water, including the usually fresher Sacramento River, upstream towards the South Delta area but exports are still downstream of the South Delta Water Quality locations and cannot control the salinity at those South Delta upstream stations.

DWR's analysis also indicated that, in the absence of barrier operations, the net effect of SWP and CVP operations for compliance at the southern Delta salinity objectives is *positive*. Water quality in the southern Delta is slightly improved at some locations due to the presence of better quality water from the Sacramento River.

The draft Technical Report's analysis of factors affecting southern Delta salinity also ignores several known key sources of salinity degradation and minimizes the impacts of other sources, such as point sources. While the use of a statistical regression to estimate the degradation downstream of the San Joaquin River at Vernalis may be an acceptable approach for the Old River near Middle River and San Joaquin River at Brandt Bridge stations, it appears to have significant limitations for the Old River compliance location at Tracy Road Bridge. The San Joaquin River Group Authority has, in its submittal, listed several factors that are likely responsible for the lack of a good regression at the Tracy Bridge site. The State and Federal Water Contractors join with the SJRGA in requesting that the State Board include these data in the Technical Report for analysis purposes.

Finally, the draft Technical Report fails to identify the possible presence of additional salinity sources through high salinity groundwater accretions. Although seepage from such accretions was identified by DWR (DWR, 2007b) as a source of salinity degradation, it is completely ignored by the draft Technical Report.

In sum, for these multiple reasons, the relationship between salinity and the Old River at Tracy Road Bridge is significantly less accurate than the other relationships presented in the draft Technical Report and should be considered only as a provisional tool pending future analysis. In particular, the 85% prediction line, while conservative for 16 out of 17 years, significantly under predicts degradation for the most recent year 2009. The utility of this tool for predicting salinities under current conditions thus appears questionable. In addition, SWP and CVP diversions do not negatively impact these salinity levels.

III. Section 5 – Water Supply Impact Analysis

The technical report describes a methodology for estimating the amount of additional low-salinity flow from within the watershed that will be needed to meet a particular set of southern Delta salinity objective alternatives. By focusing solely on dilution alternatives, the methodology does not consider alternate methods of meeting salinity objectives. The methodology should be expanded to consider source reduction alternatives upstream and downstream of Vernalis.

The mass balance equation presented in the technical report as Equation 5.1 is a highly simplified representation of salt loading in the south Delta and might not be appropriate for the proposed methodology. As discussed in our comments on Section 4, only a small portion of the San Joaquin River flow at Vernalis (and additional low-salinity flow provided to meet a particular objective alternative) reaches Old River at Tracy Road Bridge. Most of the flow either stays in the river or, if diverted at the Head of Old River, flows through Grant Line Canal or Middle River. A comprehensive mass balance that accounts for such flow splits and other factors is attached. The methodology should be revised to address these factors; alternatively, the technical report should demonstrate under what conditions Equation 5.1 is an appropriate simplification.

Finally, the data in Table 5-2 seem questionable. Specifically, values under the "flow objective" column and the "salinity objective" column should sum up to the "total" column. Similar columns appear to sum correctly in Table 5-3.

SAN JOAQUIN RIVER FISH FLOWS

I. The Overall Approach To The Analysis Is Lacking Is Defective

Beneficial uses are the foundation for setting water quality objectives; the State Board is required to tailor the water quality objectives to ensure the beneficial uses are reasonably protected. (Water Code, § 13241; 33 USC § 1331.) The beneficial uses the State Board intended to protect with San Joaquin River flow objectives were clearly explained in the attachment to the Notice of Preparation for Environmental Documentation for the Update and Implementation of the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary: southern Delta Salinity and San Joaquin River Flows (NOP). There, the State Board wrote:

> The State Water Board first established the flow objectives for the San Joaquin River at Vernalis in the 1995 Bay-Delta Plan to protect fish and wildlife beneficial uses. The State Water Board set different objectives for three time periods: February through June, excluding April 15 through May 15 (spring flows); April 15 through May 15 (pulse flows); and October (fall flows). The

> spring flows are intended to provide minimum net downstream freshwater flows in the San Joaquin River to address habitat concerns from reduced flows and water quality degradation. The pulse flows were principally developed to aid in cueing chinook salmon smolt outmigration from the San Joaquin River. The fall flows were developed to provide attraction flows for adult salmon returning to the watershed to spawn.

(Attachment to NOP, p. 9.) The draft Technical Report fails to explain whether the beneficial uses are currently protected, and, if not, what the mechanism(s) are that are impairing the beneficial uses. Instead, the draft Technical Report relies heavily on conclusory statements. For example, the it states: "Scientific information indicates that reductions in flows and changes in the natural flow regime of the SJR basin resulting from water development over the past several decades are impairing fish and wildlife beneficial uses." (Draft Technical Report, p. 34.) However, the draft Technical Report does not explain the scientific support for that conclusion. Instead, it simply points to hydrologic changes attributable to "water development in the basin." (Id.) That is simply not enough. It does not comport with long established and broadly accepted criteria regarding the assessment, interpretation and application of best available scientific information.

Later, section 3.7 cites a number of scientific reports to support a conclusion that more flow will improve species abundance. (Draft Technical Report, p. 49.) But nowhere does the draft Technical Report consider science discussing the mechanisms that might be addressed through increased flow. The draft Technical Report does not answer the question: Does the science suggest increased flows are needed to produce habitat, to aid in cueing, or to provide attraction flows? It does not explain whether the science suggests that a relationship between flows and species abundance exists because the increased flows are mitigating for impacts caused by other factors – i.e., predation. Indeed, this omission from the Draft Technical Report is critical. As discussed in the Draft Technical Report, the National Marine Fisheries Service has already expressed an opinion that, "factors other than flow may be responsible for the variable escapement returns." (*Id.* at 52.) The draft Technical Report should be revised, and for each period during which a flow objective is set, should identify *why* the beneficial use is impaired. It should consider both flow and non-flow related impacts, what is affecting habitat during the spring period, what is impairing cueing for outmigration during the pulse period, and what might be reducing the ability to attract adult salmon returning to the watershed to spawn during the fall.

Another critical component of the science missing from the Draft Technical Report include data and/or analyses that would enable the State Board to consider the cost and benefit of providing increased protection for reasonable beneficial uses and compare the cost or benefit of a particular implementation action to other actions. The tools and analyses needed to allow for that consideration and comparison are "life cycle" based. At a minimum, the State Board must understand the factors that affect the fish served by the beneficial uses and understand how affecting the beneficial use at a particular life-stage will impact later stages of the life history.

II. The Analysis Fails To Consider Important Data and Scientific Reports

A. The Draft Technical Report Should Reference The Science That Shows A Lack Of Impact Of SWP Or CVP Exports On San Joaquin Salmonid Survival

The draft Technical Report acknowledges that "the effects of diversions by the Department of Water Resources [] and U.S. Bureau of Reclamation []" downstream of Vernalis "are not the subject of the State Water Board's current review." However, the State Board raises these effects as "background . . . as [they] relate[] to flows at Vernalis and protection of fish and wildlife beneficial uses . . . ." (Draft Technical Report, p. 30.) To the extent the draft Technical Report presents information that may lead to a conclusion that SWP and CVP exports are relevant to the scientific basis for alternate Vernalis flows--as background or otherwise--it is essential that the Technical Report also acknowledge and include the numerous scientific studies that conclude that there is *no* statistically significant relationship between SWP and CVP export levels and the survival of out-migrating San Joaquin River salmonids.

The relationship, or lack thereof, between SWP and CVP exports and San Joaquin River salmonid survival has been extensively analyzed by scientific experts as part of the ongoing litigation over the 2009 NMFS OCAP biological opinion ("NMFS BiOp"). In addition, a large body of scientific studies, many of which were specifically designed to examine the effect of exports on San Joaquin River salmonids, have been closely analyzed and argued by the parties. The Court has already concluded, in the context of granting Plaintiffs' motion for preliminary injunction, that NMFS's analysis of scientific data regarding exports and San Joaquin River salmonid survival does not provide *any* biological explanation, *whatsoever*, for the imposition of specific export restrictions for the benefit of San Joaquin River salmonids. (PI Ruling, p. 116, ¶¶ 50-51.)

1. Consolidated Salmonid Cases: PI Ruling

In the *Consolidated Salmonid Cases*, the Court reviewed claims that the imposition of export restrictions violated the best available science requirement. The Court determined that NMFS's conclusions regarding the regulation of exports were arbitrary and capricious. In doing so, the Court first addressed NMFS's determination that "because there was a limited amount of water available to increase flows at Vernalis, capping export levels would provide the greatest differential between flows at Vernalis and export levels." The Court concluded that "[t]his reason for controlling exports is unrelated to any direct scientific evidence connecting export levels to fish survival, making the reason arbitrary, capricious, unsupported by reasonable explanation, and not based on the best available science." (PI Ruling, pp. 36-37, ¶¶ 94-95.)

Second, the Court ruled that the specific export restrictions were "a quintessential example of arbitrary action." While declining to find that exports do not have any bearing at all on survival of San Joaquin River salmonids, the court did conclude that the studies relied upon in the NMFS BiOp do not provide *any* biological explanation, *whatsoever*, for the inclusion of the specific export restrictions in Action IV.2.1. (*Id.*, at pp. 116-117, ¶¶ 50-51.)

2. No Scientific Evidence Links SJR Salmonid Survival To SWP And CVP Exports

In the OCAP BiOp, NMFS acknowledged that "[r]ecent papers examining the effects of exports on salmon survival have been unable to prove a statistically significant reduction in survival related to exports (Newman 2008)." (NMFS BiOp, p. 426.) This is an understatement. In spite of more than two decades of focused research, *no study* has produced any statistical evidence showing a negative relationship between San Joaquin River salmonid survival and SWP/CVP export levels. (Declaration of Brad Cavallo, Doc. 452, ¶ 4.) Rather, a wide variety of statistical analyses–such as those contained in the following studies which are also relied upon in the draft Technical Report for conclusions regarding flow–show either that no relationship could be established, or there is a *positive* relationship:

* Kjelson, Loudermilk, Hood, and Brandes (1990): "*Survival of tagged smolts released under low export conditions was not greater than for those released under high export conditions* (Table 4). This was an unexpected result as we believed conditions for survival should have improved when exports were lowered, since direct losses at the Project facilities were decreased, flow in the mainstem San Joaquin was increased and reverse flows in the Delta were eliminated."

* Brandes and McLain (2001): "To determine if exports influenced the survival of smolts in the San Joaquin Delta, experiments were conducted in 1989, 1990 and 1991 at medium/high and low export levels. *Results were mixed showing in 1989 and 1990 that survival estimates between Dos Reis and Jersey Point were higher with higher exports* whereas in 1991 between Stockton and the mouth of the Mokelumne River (Tables 11 and 12) survival was shown to be lower (0.008 compared to 0.15) when exports were higher. . . . In addition, results in 1989 and 1990 also showed that survival indices of the upper Old River groups relative to the Jersey Point groups were also higher during the higher export period, but overall still about half that of the survival of smolts released at Dos Reis (Table 11)."

* California Department of Fish and Game (2005): "There is *no correlation* between exports and adult salmon escapement in the Tuolumne River two and one-half years later (Figure 24)."

* Mesick, McLain, Marston and Heyne (2007): "*[P]reliminary correlation analyses suggest that the combined State and Federal export rates during the smolt outmigration period (April 1 to June 15) have relatively little effect on the production of adult recruits in Tuolumne River compared to the effect of winter and spring flows.* Furthermore, reducing export rates from an average of 264% of Vernalis flows between 1980 and 1995 to an average of 43% of Vernalis flows and installing the Head of Old River Barrier between 1996 and 2002 during mid-April to mid-May VAMP period did not result in an increase in Tuolumne River adult recruitment (Figures 3 and 17)."

* Newman (2008): "The Bayesian hierarchical model analyzed the multiple release and recovery data, including Antioch, Chipps Island, and ocean recoveries, simultaneously. . . . *There was little evidence for any association between exports and survival, and what evidence there was pointed towards a somewhat surprising positive association with exports.*"

B. The Draft Technical Report Should Include Data Regarding Flow To SWP And CVP Export Ratios

1. <u>Data Do Not Support A Relationship Between Inflow To SWP And CVP Export Ratio And Adult Escapement</u>

In the BiOp, NMFS based its regulation of SWP and CVP exports in large part on data that compared inflow/export ratios to adult escapement two and a half years later. Figure 11 of the technical memorandum attached to the NMFS BiOp as Appendix 5 illustrates this data. While Figure 11 appears to show some correlation between higher inflow to SWP and CVP export ratios and increased adult escapement, it is of limited utility for at least two reasons: (1) by studying flow and SWP and CVP exports together, Figure 11 did not allow the reader to determine whether the increases in adult escapement are attributable to flow alone, or whether they are enhanced by the inclusion of lower export levels; and (2) adult escapement data is obfuscated by poor ocean conditions and commercial harvest, which were not accounted for in Figure 11.

Brad Cavallo analyzed NMFS's Figure 11 data along with data that compared adult escapement to flow alone and found that the San Joaquin River inflow to export ratio data provide a *poorer* fit to observed data than does San Joaquin River inflow alone: "For example, the model describing smolt survival in relation to SJR flows alone (Exhibit 1, bottom) has an r^2 value of 0.73 while the comparable model with the ratio of SJR flows to exports has an r^2 value of only 0.26 (Exhibit 2, bottom)." (Cavallo Decl., Doc. 452, ¶12, Exhibits 1 and 2.)

The Court criticized the utility of the data presented in Figure 11. In the Court's ruling on Plaintiffs' preliminary injunction motion, the Court noted that the adult escapement data in Figure 11 did not attempt to account for either variable ocean conditions or the commercial harvest of salmonids. (PI Ruling, p. 33, ¶ 85.) As a result, the court concluded that Figure 11 constitutes "[h]ighly questionable support for the BiOp's conclusion that exports negatively influence survival. . . ." (*Id.*, at pp. 113-114, ¶ 47.c.)

As a result, adult escapement data comparing inflow-to-export ratios to San Joaquin River salmonid survival does not support the conclusion that SWP and CVP export restrictions will enhance flow with best available scientific data.

2. <u>VAMP Studies</u>

VAMP studies have similarly failed to isolate a relationship between SWP and CVP exports and survival. As the draft Technical Report notes, VAMP was designed "to release fish at specific flows during a 31-day period from approximately mid-April through mid-May under specified export conditions in order to evaluate the relative effects of changes in Vernalis flow and SWP and CVP export rates on the survival of SJR salmon smolts passing through the Delta." (Draft Technical Report, p. 49.) The framework for the experimental design was developed to address concerns with earlier survival studies conducted during a period when river flows were highly variable and which had contributed some uncertainty in the relationship between river conditions and juvenile salmon survival. (Hanson, Doc. 432, ¶ 4.) VAMP represents the best large-scale experimental study of juvenile salmon survival performed on the San Joaquin River and Delta. (*Id.*)

According to Dr. Hanson, one of the original authors of VAMP, the VAMP data collected from 2000 to 2006 showed a statistically significant relationship between juvenile salmon survival and the ratio of inflow to exports, but this relationship "is strongly influenced by river flow." (Hanson, Doc. 432, ¶ 11.) By contrast, data that isolated the relationship between salmon survival and SWP/CVP exports did *not* find a statistically significant relationship. (Hanson, Doc. 496, ¶¶ 5-6.) On the basis of VAMP data, Dr. Hanson concludes: "***the relationship between flow and export rate on survival . . . has not been established.***" (*Id.*, at ¶ 5, emphasis added.) In short, VAMP data also fail to support the conclusion that SWP and CVP export restrictions will enhance salmonid survival.

C. The Draft Technical Report Should Include Science Which Shows A Lack Of Impact Of Reverse OMR Flows On Delta Fish Species

Section 3.6 of the draft Technical Report reflects the State Board's attempts to reach preliminary conclusions based upon enumerated studies and data related to the relationship between San Joaquin River flows and fall-run Chinook salmon (and steelhead) survival and abundance during the spring months. As part of this effort, Section 3.6 addresses specific "negative ecological consequences" associated with reverse (or negative) flows in Old and Middle Rivers ("OMR"). However, this section of the draft Technical Report illustrates the danger of positing preliminary conclusions from an incomplete data set. In a number of respects, the draft Technical Report fails to include the best available science related to the effects of OMR flows on Delta fish species. By reviewing only a subset of the available data, the Technical Report also misapprehends the significance of the studies cited in the Technical Report on OMR and related issues.

The impact of reverse OMR flows on Delta fish species is one of the seminal issues in the OCAP salmonid and Delta smelt lawsuits. pAs addressed in greater detail below, the federal court thoroughly reviewed the science offered in support of the biological opinions as well as declarations and testimony offered by some of the Country's most preeminent authorities on fisheries biology in opposition to the conclusions reached in the biological opinions. As part of that effort, the Court has opined regarding what is and is not the best available science with respect to OMR flows.[5] Accordingly, while the views of some of the OCAP litigation experts may differ from those of the UC Davis witnesses who are frequently trotted out at State Board

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[5] Under the Federal Endangered Species Act, an agency's actions must be based on "the best scientific and commercial data available." 16 U.S.C. § 1536(a)(2).

hearings, it is incumbent on the State Board to understand and fully consider the views of these experts, many of whom are world-renowned in their field. It is also important to consider, as well, the findings and legal conclusions reached by the federal court judge who has developed incomparable judicial expertise in Delta matters through his work over the past 20 years on Delta-related litigation.

1. Consolidated Salmonid Cases: PI Ruling

As part of its disposition of the *Consolidated Salmonid Cases*, the Court reviewed claims that the OMR flow prescriptions found in the NMFS Biological Opinion violated the best available science requirement of the Endangered Species Act. The review included RPA Action IV.2.3 (operable from January 1 to June 15 each year) which limits OMR flows to a level no more negative than -2,500 cfs to -5,000 cfs. The Court reviewed hundreds of pages of expert declarations and live testimony from experts regarding the data and studies relied upon by NMFS to set the OMR flow prescriptions.

After trial, the Court (1) rejected NMFS's use of raw salvage data to justify the OMR flow restrictions of Action IV.2.3 as "*clear scientific error and not the best available science*"; (2) found little to no scientific support for NMFS's imposition of a -5,000 cfs "ceiling" on OMR reverse flows[6]; and (3) strongly challenged the notion that juvenile salmonids behave like neutrally-buoyant particles, similar to those used in the Particle Tracking Model ("PTM") simulations. The Court also noted, approvingly, the conclusion of Dr. Richard Deriso, a nationally recognized bio-statistician that, for spring-run and winter-run Chinook salmon, "there is no statistically significant relationship between the take index and OMR flows." (*Id.*, p. 54, ¶ 125.)

2. State Board Concerns Re OMR Flows

Nonetheless, the draft Technical Report (pp. 51-52) states that OMR reverse flows (1) draw fish, particularly weak swimming larvae and juveniles, to the SWP and CVP pumps; (2) reduce spawning and rearing habitat for native fish species; (3) create a "confusing environment for migrating juvenile salmon leaving the SJR basin;" and (4) reduce the natural variability in the Delta by drawing Sacramento River water across and into the Central Delta. Each of these conclusions needs to be reconsidered after the complete data set is acquired and reviewed. Individually and collectively, these conclusions are inconsistent with scientific papers not included within the Technical Report and with expert declarations submitted in the OCAP litigation that examine, in detail, the relationship between OMR flows and fish survival.

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[6] The -5,000 cfs OMR flow limitation ceiling "is based, in large measure, on speculation. It is also based upon BiOp Figures that do not scale salvage to population size. *This is not the best available science and is arbitrary and capricious.*" (*Id.*, p. 123, ¶ 67, emphasis added; see also *id.* pp. 60-62, ¶¶ 139-144.)

3 OMR Reverse Flows Do Not Disproportionately Draw Salmonids To The Pumps

To begin, it is without dispute that juvenile salmonids are strong swimmers. Smolts are not like neutrally buoyant particles that float along passively—the basic assumption of the Particle Tracking Models used in some analyses. Rather, these strong, capable swimmers exhibit complex behavior and actively navigate, choosing preferred conditions of water quality, water velocity, turbulence, or stream morphology. ((Declaration of Steven Cramer ("Cramer Decl."), Doc. 167, paras. 6-8, 14; PI Findings, 45:12-17.)[7] They can, and do, swim against significant currents, and there are many circumstances in which juvenile salmonids do not follow the flow. (PI Findings 45:23-25; Cramer Decl., Doc. 167, paras. 6, 8.) The federal court found that juvenile salmon have a "strong swimming ability", (PI Ruling, p. 118, ¶ 56), and move approximately 3.5 times faster through the water than neutrally buoyant particles. (*Id.*, p. 46, ¶ 108; *id.*, p. 119, ¶ 57).

PTM simulations thus do not accurately represent salmonid movement and behavior. (Cramer Decl., Doc. 167, ¶ 13.) As the Court concluded, "coded wire tag salmon travel through the Delta and reach Chipps Island long before the arrival of most . . . PTM [Particle Tracking Model] particles." (PI Ruling, p. 47, ¶ 110.) Thus, particle tracking modeling can provide only "a very rough approximation of salmonid behavior." (*Id.* p. 119, ¶ 57.)

4. Salmonids Pass Quickly Through the Delta

Adding to the body of science questioning whether salmonids are adversely impacted by negative OMR flows, in-situ studies uniformly show that juvenile salmonids pass quickly through the Delta whether they enter from the Sacramento or the San Joaquin River, and are thus not exposed to OMR reverse flows for attenuated periods. For example, Baker and Morhardt (2001) report that San Joaquin River salmonid smolts pass through the Delta in a median time of 11 days, some arriving at Chipps Island as early as five days after release at the point where the San Joaquin River joins the Delta.[8] According to the authors, "This is in accordance with the *striking difference* between the *passage time of smolts and passive particles*; smolts actively swim toward the ocean." (*Id.*, emphasis added.) Regarding whether or not salmonid smolt behavior follows the movement of water in tidally driven portions of the Delta, they state, "the

[7] The OCAP litigation involves two consolidated actions before the United States District Court, Eastern District of California. One case is *San Luis & Delta-Mendota Water Authority, et al. v. Salazar, et al.*, Case No. 1:09-cv-00407 OWW GSA (commonly referred to as the "Delta Smelt Consolidated Cases"), and the other case is *San Luis & Delta-Mendota Water Authority, et al. v. Locke, et al.*, Case No. 1:09-cv-01053 OWW DLB (commonly referred to as the "Consolidated Salmonid Cases"). Pleadings referenced in this comment letter are those filed in the OCAP litigation.

[8] In one pertinent sample release from Baker and Morhardt (2001) from 1987 (see Figure 5 of that study), 80% of the released salmon smolts were recovered after two weeks, but only 0.55% of the tracer particles were recovered after two months. (*See also* Cavallo Decl., Doc. 254, para. 55.) Thus, while a substantial percentage of the particles ended up at the pumps, the fish did not. DWR conducted a similar study and came to a similar conclusion in 2009. (Cavallo Decl., Doc. 254, para. 55.)

most straightforward model, *that the movement of smolts mirrors the movement of water*, has been shown to be *incorrect*. Smolts and water travel through the Delta at very different rates and end up at very different places." (*Id.*, emphasis added.) (See also Declaration of Brad Cavallo ("Cavallo Decl."), Doc. 452, para. 54.)

Telemetry studies show that salmon smolts spend minutes or hours at channel junctions (Burau et al. 2007) and only a few days migrating through longer Delta reaches (Vogel 2004). (Cavallo Decl., Doc. 452, para. 38.) Consistently, Holbrook et al. (2009) reported that it takes an average of 1.5 days for fish to pass by the Old River junction on the San Joaquin River. (Perry and Skalski 2009 at 17-18; Holbrook et al. 2009, at 11.) According to Cavallo, recent acoustic tagging studies show that salmon smolts spend only days in the vicinity of critical Delta distributaries such as Georgiana Slough and Old River. (Cavallo Decl., Doc. 250, para. 9.)

On the Sacramento River side, Perry and Skalski (2009) reported that most tagged fish pass the Georgiana Slough and Delta Cross Channel junctions on the Sacramento River within 2 to 5 days. (*Id.*) Blake and Horn (2004) state, "[m]odel results using tracers as surrogates for juveniles showed most particles ended up at the pumping plants, yet studies with juveniles showed the majority did not become entrained as the model would have suggested." (See also Cavallo Decl., Doc. 452, para. 56.)

5. <u>Salmonid Salvage Rates</u>

As part of the draft federal salmonid litigation, experts also tested, and rejected, the assumption, reflected in the Technical Report, that salmonid survival rates decrease with increasing exports. On the Sacramento River side, Hanson (2008) calculated "salvage percentage" as the expanded number of coded wire tagged ("CWT") salmon recovered at salvage facilities divided by the total number of CWT fish released (and therefore, potentially vulnerable to entrainment). (Cavallo Decl., Doc. 452, para. 71.) Dr. Hanson analyzed data from 118 Sacramento River basin CWT releases representing more than 14 million juvenile salmon; releases that should be representative of export effects experienced by salmonid smolts migrating volitionally down the Sacramento River. (*Id.*) Dr. Hanson found his method had sufficient statistical power to detect a significant effect regarding fish size and Sacramento River *flow*, while no such relationship was observed for *exports* (Hanson 2008). (*Id.*)

According to Cavallo, if the hypothesis that more negative OMR flows entrain a greater proportion of juvenile salmonids into the central Delta were correct, we would expect "salvage proportion" for CWT fish to increase clearly and substantially with increasing exports. (*Id.*, at para. 72.) However, Exhibits 5 and 6 to the Cavallo declaration (Doc. 250) show there was no pattern of increased "salvage proportion" with increased exports. (*Id.*) In addition, the analysis set forth in Newman (2008) yielded inconclusive results regarding the significance of larger exports on salvage rate. (*Id.*, at para. 73.) As a result, Cavallo concluded that Dr. Hanson's analysis does not support a hypothesis that negative OMR flows draw a greater proportion of salmonid populations into the interior Delta. (*Id.*, at para. 73.)

Cavallo also noted that "Long-term and intensive salmon survival experiments on the [San Joaquin River] illustrate unequivocally that increased South Delta exports are *not* associated with adverse effects on juvenile salmonid survival, and also are *not* associated with decreased adult salmon escapement." (*Id.*, at para. 74.) Consistently, Newman and Brandes (2009) conclude that the model they use *without* exports is just as good a predictor of relative survival as the model used *with* exports. According to Newman and Brandes (2009), there is "thus apparently scant evidence for a relationship between Θ [relative survival] and exports." (Newman and Brandes (2009) at 20.) (Cavallo, Decl. 452, para. 78.)

The following studies also evaluate potential relationships between OMR reverse flows and salmonid survival, and have reached the conclusion that there is little to no effect:

* Vogel (2004) concluded, based upon a 2004 radio telemetry study, that the "experiments could not explain why some fish moved off the mainstem San Joaquin River into southern Delta channels. Due to the wide variation in hydrologic conditions during the two central Delta studies, it was difficult to determine the principal factors affecting fish migration. Based on limited data from these studies, it may be that a combination of a neap tide, reduced exports, and increased San Joaquin River flows is beneficial for outmigrating smolts, but more research is necessary." (Cavallo Decl., Doc. 452, para. 86.)

* The San Joaquin River Group Authority's "2005 Annual Technical Report," concludes that "Regression of exports to smolt survival without the HORB were weakly or not statistically significant (Figure 5-17) using both the Chipps Island and Antioch and ocean recoveries, but both relationships indicated survival increased as exports increased." (Cavallo Decl., Doc. 452, para. 94.) Moreover, the 2007 annual VAMP technical report states that "[t]he relationship of survival to exports is still difficult to detect based on the data gathered to date . . ." and raises the question of whether such a relationship is in fact "real." (2005 VAMP Annual Technical Report, p.7.)

* The California Department of Fish and Game ("CDFG"), "Final Draft 11-28-05 San Joaquin River Fall-run Chinook Salmon Population Model," found "[t]here is no correlation between exports and adult salmon escapement in the Tuolumne River two and one-half years later (Figure 24)." (See also Cavallo Decl., Doc. 452, para. 95.) CDFG concluded: " The Department evaluated various parameters that have been identified as influencing abundance of escapement of fall-run Chinook salmon into the SJR, such as ocean harvest, *Delta exports* and survival, abundance of spawners, and spring flow magnitude, duration and frequency. The Department found that the *non-flow parameters have little, or no, relationship to fall-run Chinook salmon population abundance in the SJR*[.]" (Cavallo Decl., Doc. 497, para. 11.)

* On the Tuolumne River, Mesick, McLain, Marston and Heyne, "Draft Limiting Factor Analyses & Recommended Studies for Fall-run Chinook Salmon and Rainbow Trout in the Tuolumne River" February 27, 2007) concluded: "[P]reliminary correlation analyses suggest that the combined State and Federal export rates during the smolt outmigration period (April 1 to June 15) have relatively little effect on the production of adult recruits in the Tuolumne River compared to the effect of winter and spring flows. Furthermore, reducing export rates from an

average of 264% of Vernalis flows between 1980 and 1995 to an average of 43% of Vernalis flows and installing the Head of Old River Barrier between 1996 and 2002 during the mid-April to mid-May VAMP period did not result in an increase in Tuolumne River adult recruitment (Figures 3 and 17)." (Mesick et al. (2007); Cavallo Decl., Doc. 452, para. 96.)

* Brandes and McLain (2001) summarized the results of the export/salmon survival research by observing that "[t]here is no empirical correlation at all between survival in Lower San Joaquin River and the rate of CVP-SWP export." (*See also* Cavallo Decl., Doc. 457, para. 97.) Based upon their review, Brandes and McLain (2001) conclude that "no relationship between export rate and smolt mortality, suitable for setting day-to-day operating levels, has been found." (See *Id.*)

Based upon the above, it is evident that the best available science does *not* support the draft Technical Report's assertion that net OMR reverse flows draw fish into the SWP and CVP export facilities. All of these materials need to be included in the Technical Report

6. OMR Reverse Flows and Reduction of Spawning and Rearing Habitat

The draft Technical Report posits that OMR reverse flows reduce spawning rearing habitat for native species, and that "any fish that enters the central or southern Delta has a high probability of being entrained and lost at the pumps." (Draft Technical Report, p. 51.) The best available science fails to support either of these assertions.

As a preliminary matter, adult salmonids are generally not known to spawn in the Delta, and certainly not within the zone of influence of the pumps. (*See* PI Findings, at pp. 56:18-20, 57:16-18; Second Supplemental Declaration of Steven Cramer, Consolidated Salmonid Cases, at p. 16:2-5 (Feb. 22, 2010) (Doc. 244); *see generally* NMFS, Biological Opinion and Conference Opinion on the Long-Term Operations of the CVP and SWP (June 4, 2009); (Cummins Decl., Doc. 445, para. 29.).) In addition, while longfin smelt are known to spawn in the Delta, longfin generally spend little time post-emergence in the Delta and primarily rear to the west of the Sacramento River and San Joaquin River confluence, in saltier waters. (Randall Baxter et al., Pelagic Organism Decline Report, 2007 Synthesis of Results (Jan 2008) p.5.)

Furthermore, in the *Consolidated Delta Smelt Cases*, the federal court rejected the FWS's assertion that SWP and CVP operations reduce the amount and quality of spawning habitat for Delta smelt because was no analysis or justification of the BiOp's flow restrictions related to critical habitat. (Findings of Fact and Conclusions of Law re Plaintiffs' Request for Preliminary Injunction Against RPA Component 2, *Delta Smelt Consolidated Cases*, No. 1:09-cv-407-OWW-DLB 13:24-114:7, 115:21-25, ¶¶ 55, 59 (May 24, 2010) (Doc. 704).)

There is also little, if any support for the draft Technical Report's overbroad statement that "[a]ny fish that enters the central or south Delta has a high probability of being entrained and lost at the pumps." To the contrary, the federal court has already found that "[t]here are serious questions whether there is support in the record for the general proposition that exports reduce survival of salmonids in the interior Delta." (PI Findings, pp. 63-64, ¶ 146.)

According to Mr. Cavallo, while juvenile salmon mortality rates are certainly higher in the interior Delta than elsewhere, the best available science does not support the idea that exports (and, thus, OMR reverse flows) are a significant contributor to poor salmonid interior Delta survival. (Cavallo Decl., Doc. 250, para. 13.)[9] While Newman and Brandes (2009) did find evidence for a negative association between exports and relative interior Delta survival, the slope coefficient was very low (~0.000025), (Newman and Brandes (2009) at 19). (*Id.*)

The draft Technical Report's citation to Kimmerer and Nobriga (2008) is also unhelpful. The Kimmerer and Nobriga (2008) article is generally related to an application of the Particle Tracking Model. However, as explained by the federal court in its PI Ruling, Kimmerer and Nobriga (2008) ["Investigating Particle Transport and Fate in the Sacramento-San Joaquin Delta Using a Particle Tracking Model"] expressly qualified their analysis by stating: "[w]e do not claim that the specific results presented here represent actual movements of salmon; rather, these results indicate what factors may or may not be important in determining how salmon smolts may move through the Delta." (PI Ruling, p. 46, ¶ 109.) Kimmerer and Nobriga (2008) also state: "We are, furthermore, not inclined to define a 'zone of influence' of the pumps on the basis of our results, since the probability of entrainment depends on time horizon which, in many cases, is too long to be useful for analyzing the movements of larval fish. By the end of the modeled time period, the fish would already have metamorphosed, and their behavior would have become more complex." (Kimmerer and Nobriga (2008), at 18; Cavallo Decl., Doc. 250, para. 8.)

Moreover, as stated above, juvenile salmonids have strong swimming ability and the ability to move volitionally. (Cramer Decl., Doc. 167, para. 14.) This is particularly true of steelhead, which are even larger than fall-run Chinook salmon, when they are traveling through the Delta. (Cummins Decl., Doc. 445, para. 31.) As a result, the draft Technical Report's proposed use of Kimmerer and Nobriga (2008) to support San Joaquin River flows for the benefit of fall-run Chinook salmon and Central Valley steelhead is scientifically untenable.

7. <u>The Claims that Reverse OMR Flows lead to a "confusing environment" for migrating Juvenile Salmon and that the movement of Sacramento River water into the Central Delta reduces natural variability are not Supported</u>

Without citation, the draft Technical Report also asserts that "net OMR flows have led to a confusing environment for migrating juvenile salmon leaving the SJR basin and that the importation of Sacramento River water into the Central Delta reduces its "natural variability. The State and Federal Water Contractors do not dispute that the SWP/CVP operations move Sacramento River water into the central and south Delta; that is the basic structure of the "through Delta" method of operating the projects. Likewise, the State and Federal Water Contractors recognize that this method of moving water across the Delta alters the otherwise existing salinity gradients in certain Delta channels. However, the draft Technical Report does

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[9] However, Cavallo noted that Newman (2008) found a relationship, albeit weak, between exports and survival in the interior Delta. (*See* PI Findings, p. 35, ¶ 90; *see also* PI Findings, p. 37, ¶ 92.)

not reference any studies or other data that connects these conditions to adverse fishery impacts derived from confusion out-migrating salmonids or whatever is meant by reduction in natural variability.

This letter has discussed numerous studies, all of which show that neither export pumping nor the reverse OMR flows that result from that pumping have a discernable impact on the survival of downstream migrating salmon or steelhead or the escapement of adults two and one-half years later. If there were population level impact from confusion or from the alleged reduction in natural variability, it would show up in study results discussed in this letter and that are in our should be in the draft Technical Report. In the absence of any such results, the statements in the draft Technical Report are speculation and should be removed.

D. Additional concerns

Finally, there is no support for the statement in the draft Technical Report that "the primary limiting factor for SJR fall-run survival and subsequent abundance is reduced flows during the spring when fry and smolts are completing the rearing phase of their life cycle and migrating from the SJR basin to the Delta. (DFG 2005a, Mesick and Marston 2007, Mesick et al. 2008, Mesick 2009)." (Draft Technical Report, p. 48.)

In the *Consolidated Salmonid Cases*, Cramer testified that poor fall-run Chinook adult returns during 2007 and 2008 could be attributed to a change in ocean conditions and very poor survival in the ocean. (PI Findings, 20:4-7, ¶ 46; PI Hr'g Tr. 111:10-112:2; 117:17-118:2 (Mar. 30, 2010).) The federal court also observed that several factors contribute to the decline of fall-run salmon, including: water temperatures, predators, and non-native species, toxics, increased salinity, alien and invasive species, predators, riparian pumping and in-Delta diversions. (PI Findings, 20:23-21:14, ¶¶ 48, 49.)

The draft Technical Report's implication that reduced spring flows are the *primary* limiting factor for San Joaquin River fall-run survival and abundance is thus unfounded, and overlooks other contributing factors affecting salmonid survival. Not understanding the affect of *other factors* on San Joaquin River fall-run salmonids *before* remedial measures are implemented isolates and compromises the Projects without benefit to the listed species. Therefore, all studies related to the non-flow factors affecting San Joaquin River salmonids need to be included in the final version of the Technical Report.

Thank you for your consideration of these comments.

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Attachment

This attachment compares equations to estimate tributary flow required to meet a south Delta salinity target based on (1) a full salt load balance (see Eq. 6) and (2) simplifying assumptions made in the draft Technical Report (see Eq. 12).

Full Salt Load Balance

Salinity at a south Delta compliance location (e.g. Old River at Tracy Road Bridge) can be computed as the flow-weighted average of salinity contributions from Vernalis, additional tributary flows needed to meet a salinity target, and local in-Delta sources:

$$EC_c = \frac{F_v EC_v Ø_v + F_T EC_T Ø_T + F_D EC_D}{F_v Ø_v + F_T Ø_T + F_D} \quad \textbf{(Eq. 1)}$$

Where:

EC_c = salinity of south Delta compliance location
EC_V = pre-dilution salinity at Vernalis
EC_T = salinity of tributary flows
EC_D = flow-weighted average salinity of local in-Delta sources
F_V = pre-dilution flow at Vernalis
F_T = tributary flow needed to meet target salinity at south Delta compliance location
F_D = local in-Delta flow contributing to salinity at south Delta compliance location
$Ø_v$ = fraction of Vernalis flow contributing to salinity at south Delta compliance location
$Ø_T$ = fraction of tributary flow contributing to salinity at south Delta compliance location

And:

$Ø_v = Ø_T = Ø$; where $0 \leq Ø \leq 1$ **(Eq. 2)**

Arrive at an equation for tributary flow needed to meet a salinity target by substituting Eq. 2 into Eq. 1, algebraically re-arranging terms, and solving for F_T:

$$EC_C (F_v Ø + F_T Ø + F_D) = F_v EC_v Ø + F_T EC_T Ø + F_D EC_D \quad \textbf{(Eq. 3)}$$

$$F_T(EC_C Ø - EC_T Ø) = F_v (EC_v Ø - EC_C Ø) + F_D (EC_D - EC_C) \quad \textbf{(Eq. 4)}$$

$$F_T = \frac{F_v Ø (EC_v - EC_C)}{Ø (EC_C - EC_T)} + \frac{F_D (EC_D - EC_C)}{Ø (EC_C - EC_T)} \quad \textbf{(Eq. 5)}$$

$$F_T = \frac{F_v (EC_v - EC_C)}{(EC_C - EC_T)} + \frac{F_D (EC_D - EC_C)}{Ø (EC_C - EC_T)} \quad \textbf{(Eq. 6)}$$

Simplified Salt Load Balance Assumed in Draft Technical Report

The simplified salt balance assumed in Equation 5.1 of the draft Technical Report can be written as follows:

$$EC_C = \frac{EC_v F_V + EC_T F_T}{F_V + F_T} + K \qquad \textbf{(Eq. 7)}$$

Where:

K = salinity degradation between Vernalis and south Delta compliance location

and other terms were defined previously. Figures 4-2 thru 4-6 present regression equations that estimate salinity at the three south Delta compliance locations as functions of Vernalis salinity. These regression equations can be used to estimate K.

Arrive at an equation for tributary flow needed to meet a salinity target by algebraically re-arranging terms and solving for F_T:

$$(EC_C - K)(F_v + F_T) = EC_v F_v + EC_T F_T \qquad \textbf{(Eq. 8)}$$

$$F_v EC_C - F_v K + F_T EC_C - F_T K = F_v EC_v + F_T EC_T \qquad \textbf{(Eq. 9)}$$

$$F_T (EC_C - K - EC_T) = F_v (EC_v - EC_C + K) \qquad \textbf{(Eq. 10)}$$

$$F_T = \frac{F_v (EC_v - EC_C + K)}{(EC_C - K - EC_T)} \qquad \textbf{(Eq. 11)}$$

$$F_T = F_V \left[\frac{EC_v - (EC_C - K)}{(EC_C - K) - EC_T} \right] \qquad \textbf{(Eq. 12)}$$

Note that the term $(EC_C - K)$ is equivalent to the term EC_{Target} defined in Eq. 5-1 of the draft Technical Report.