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Water Board Report Shows that Irrigated Agriculture Has Polluted the Delta and Most Central Valley Waterways

(Stockton, CA) The Central Valley Regional Water Quality Control Board (Regional Board) has released a landmark draft report presenting the first region-wide assessment of data collected pursuant to the Irrigated Lands Program since its inception in 2003. Data collected from some 313 sites throughout the Central Valley reveals that: 1) toxicity to aquatic life was present at 63% of the monitored sites (50% were toxic to more than one species), 2) pesticide water quality standards were exceeded at 54% of sites (many for multiple pesticides), 3) one or more metals violated criteria at 66% of the sites, 4) human health standards for bacteria were violated at 87% of monitored sites and 5) more than 80% of the locations reported exceedances of general parameters (dissolved oxygen, pH, salt, TSS). While the adequacy of monitoring (i.e., frequency and comprehensiveness of monitoring) varied dramatically from site to site, the report presents a dramatic panorama of the epidemic of pollution caused by the uncontrolled discharge of agricultural wastes.

The report is posted on the Regional Board's website at: http://www.waterboards.ca.gov/centralvalley/programs/irrigated_lands/index.html#Monitoring A brief review of the report including a zone-by-zone description of many of the monitoring results is attached at the bottom of this advisory.

"The report is a searing indictment of the Schwarzenegger Administration's failure to regulate polluted discharges from irrigated agriculture," said Bill Jennings, Executive Director of the California Sportfishing Protection Alliance (CSPA). "Allowing farmers to dispose of toxic wastes in our waterways without effective regulation has destroyed the biological integrity of streams, rivers and the Delta," he said adding, "Collapsing fish populations are a direct result of failing to require agriculture to comply with routine pollution control requirements applicable to virtually every other segment society, from municipalities and industry to mom-and-pop businesses."

California's ambient monitoring program and scientists from the University of California at Davis collected data from 53% of the sites. The remaining sites were monitored by agricultural coalitions or individual water agencies, pursuant to the Irrigated Lands Waivers program.

Discharges of agricultural pollutants are allowable under waivers of waste discharge requirements issued by the Regional Board in 2003 and renewed in 2006. Those waivers are being contested in a lawsuit filed by CSPA and Baykeeper against the Regional Board on 18 June 2007.

The waivers require farmers to join coalitions and conduct limited water quality monitoring. However, requirements to implement pollutant control measures are voluntary. Unfortunately, the structure of the waivers precludes the Regional Board from learning the identity of specific dischargers, actual discharge locations, the constituents being discharged, the volume and concentration of discharged pollutants, whether or not BMPs have been implemented or if

implemented BMPs are effective. Consequently, the Regional Board cannot document a single specific source of pollution, the implementation and effectiveness of a single control measure or a single pound of pollution that has actually been prevented from entering waterways.

Since the coalitions are legally fictitious entities shielding actual dischargers, the Regional Board is unable to employ its traditional regulatory enforcement powers against dischargers to compel compliance with the conditions of the waiver. As a result, no enforcement actions have been taken for the failure of the coalition's to comply with the waiver's explicit monitoring and reporting requirements. Regulation of the largest source of pollution to Central Valley waterways has effectively been delegated to the voluntary goodwill of groups of dischargers. Such an approach has never worked in the past and is not likely be successful in the future.

"The report puts to rest the repeated claims by farmers that agricultural pollution is not a problem in the Central Valley," said Jennings, "and it graphically chronicles the bankruptcy of the Regional Board's approach to controlling agricultural wastes." "We cannot begin to restore the Delta and Central Valley waterways until we begin to control the massive discharge of toxic pollutants from agriculture."

CSPA reviewed the draft report and found that it was confusing and understates the consequences of the data. Principle defects were: 1) lack of a unified framework (formats, tables and discussion rationales are different for each zone), 2) comparison of toxicity and specific constituents to total sites monitored, regardless of whether they were monitored at a particular site; 3) failure to address spatial and temporal variability in comparing water quality exceedances to total collected samples, and 4) failure to discuss the ecological and statistical significance of criteria exceedance. Despite these shortcomings, the report is the first attempt to define the extent of agricultural pollution and it presents an appalling picture of the state of Central Valley waterways.

One of the more disturbing findings in the report is the pervasiveness of long-banned pesticides like DDT and it's degradates, DDE and DDD, that are either being remobilized by present farming practices or illegally applied. DDT is still legal in Mexico and a number of individuals have questioned whether DDT is being illegally smuggled into the state. A number of other "prohibited" pesticides were also identified at various monitoring sites.

California Sportfishing Protection Alliance (CSPA)
A Brief Overview of the *Draft 2007 Review of Monitoring Data, Irrigated Lands Conditional Waiver Program, 17 June 2007*
Central Valley Regional Water Quality Control Board

Central Valley Regional Water Quality Control Board staff posted the *Revised Draft of the 2007 Review of Monitoring Data for the Irrigated Lands Conditional Waiver Program* (Report) on 13 July 2007. It is posted on the Regional Board's web site at: http://www.waterboards.ca.gov/centralvalley/programs/irrigated_lands/index.html#Monitoring

The Report divides the Central Valley into four zones:

1. Zone 1 includes the Sacramento River Watershed.
2. Zone 2 includes the Delta Region and portions of the San Joaquin, Stanislaus, Calaveras and Mokelumne watersheds.
3. Zone 3 includes the San Joaquin River Watershed.
4. Zone 4 includes the Tulare Lake Basin.

The Report presents the first region-wide assessment of data collected pursuant to the Irrigated Lands Program since its inception in 2003. Monitoring data collected from some 313 sites is identified in the Report. The irrigated lands agricultural coalitions or individual water agencies enrolled under the waiver monitored 148 sites or 47% of the total. The state's ambient water monitoring program (SWAMP), UC Davis (under contract to the Regional Board) and others monitored the remaining 165 sites.

Monitored constituents included toxicity (fish, zooplankton, phytoplankton and sediment), pesticides (standard suites plus legacy organochlorines), metals (arsenic, boron, copper, lead, nickel and zinc), bacteria/pathogens (*E. coli*), field parameters (dissolved oxygen, pH, total dissolved solids and/or electrical conductivity) and nutrients (phosphorus and nitrogen containing compounds including phosphate, nitrate and ammonia).

Notwithstanding the structural deficiencies, inaccuracies and bias of the Report (discussed below), it is welcome first step toward identifying and quantifying the impacts of discharges from irrigated lands. It presents an astonishing and depressing mosaic of the pervasive water quality problems in the Central Valley caused by irrigated agriculture. It is a searing indictment of the Regional Board's failed policy of exempting irrigated agriculture from water quality regulations applicable to virtually every other segment of society.

The frequency and comprehensiveness of monitoring varied significantly from site to site. Where monitored:

1. Toxicity was identified at 63% of the sites and 50% of the sites experienced toxicity to two or more species.
2. Pesticide criterion was exceeded for one or more pesticides at 54% of the sites.

3. One or more metals exceeded water quality criteria in 66% of the monitored sites.
4. Human health criteria for bacteria were exceeded in 87% of the monitored sites.
5. More than 80% of the monitored sites exceeded water quality criteria for general parameters.

The pervasiveness of identified problems is disheartening. For example, 60 of 61 monitoring sites in the San Joaquin Watershed (Zone 3) exceeded at least one parameter. Many sites reported exceedances in virtually all parameters (toxicity, bacteria, metals, pesticides and general parameters). The single site that reported no exceedances in Zone 3 was only monitored a single time for two parameters.

While the Report is a welcome first step in cataloging water quality problems caused be irrigated agriculture, it is needlessly confusing and contains fundamental structural deficiencies and inaccuracies. These include:

1. Lack of a unified and consistent framework for individual zone summaries. Formats, tables and discussion rationales are unique for each zone making it difficult to compare zones.
2. Inconsistency in reported parameters. For example, Zone 2 and 3 summaries reported general parameter exceedances but general parameters were ignored in the Zone 1 and 4 sections. Again, results for metal sampling was discussed in the Zone 2 and 3 summaries but not for Zones 1 and 4. None of the zone summaries discussed nutrient monitoring results.
3. Improperly comparing toxic occurrences at sites to the total number of sites, regardless of whether toxicity was monitored. For example, the Report states that toxicity to algal species was found at 27% of the sites in Zone 1. However, algal toxicity testing in was only conducted at 59 of the 96 monitoring locations in Zone 1. Toxicity to algae was found at 26 of those sites. Consequently, 44.1% of the monitoring sites experienced toxicity to algae, not the 27% incorrectly reported. Another example is sediment toxicity in Zone 2. The Report states that 23% of the sites exhibited sediment toxicity. However, sediment toxicity was only conducted at 31 sites and toxicity was identified at 12 sites, which is actually 38.7% of the sites where sediment toxicity was measured.
4. Improperly comparing the number of exceedances to the total number of tests for a specific parameter in a zone. For example, Zone 1 includes the entire Sacramento Valley. Sampling for dormant spray insecticides would not be expected to result in detections in areas or during periods where they are not applied. Comparing monitoring results of a specific parameter to the total sampling conducted throughout the Sacramento Valley without incorporating temporal and spatial discussions is simply disingenuous. It biases the results and understates potential problems.
5. Failure to discuss the relative importance of water quality criteria exceedances. Aquatic life criteria are established as a not-to-be-exceeded more than once-in-three year standard. More frequent exceedances can result

in irreparable harm to the environment. Even a single exceedance of aquatic life criteria for a synthetic or toxic constituent can be statistically significant.

6. The Report ignores sublethal and chronic effects to aquatic ecosystems and the impacts of multiple stressors simultaneously occurring.
7. Failure to place the adequacy of monitoring in context. For example, a number of sites were only monitored a single time for one or few parameters. Results from even the most rigorously monitored sites represent only a brief snapshot of actual ambient conditions. Monitoring six or twelve times a year represents 0.07 % and 0.14% of yearly conditions. Statistically speaking, given minimal monitoring, a single identified exceedance of a synthetic or toxic constituent not naturally occurring in the environment virtually guarantees that numerous undiscovered and undocumented water quality exceedances and/or toxic events actually occurred.
8. Absence of a discussion of whether the agricultural coalitions have complied with mandated requirements of the Irrigated Lands Waiver. The lack of such a discussion prevents any assessment of the adequacy of the monitoring program. For example, none of the coalitions have complied with requirements to monitor all of major drainages, 20% of intermediate drainages on a rotating basis and minor drainages when downstream impacts are identified. Nor does the Report discuss the frequent failure of the coalitions to monitor for all required parameters, comply with data collection protocols and conduct follow up monitoring where water quality exceedances are identified.

Despite these shortcomings, the Report clearly establishes that discharges from agricultural lands are a significant, if not the major contributor, to the shredding to the aquatic biological tapestry throughout the Central Valley. Coupled with the inadequacy of coalition management plans, the Report's findings chronicle the bankruptcy of the Regional Board's approach to controlling agricultural pollution. Especially, in light of the fact that the Conditional Waiver precludes the Regional Board from knowing the identity of specific dischargers, actual discharge locations, the constituents being discharged, the volume/concentration of discharged constituents, whether or not BMPs have been implemented or if implemented BMPs are effective. Regulation of the largest source of pollution to Central Valley waterways has been left to the voluntary goodwill of groups of dischargers. Such an approach has never worked in the past and is not likely be successful in the future.

Below is a brief summary of the Report's findings.

Zone 1 (Sacramento River Watershed)

1. Ninety-six (96) total monitoring locations (many were infrequently monitored or monitored for only one or a few constituents or type of toxicity). Agricultural coalitions monitored 43 sites. UC Davis (under contract with the Regional Board) or SWAMP (state's Ambient Monitoring Program) monitored 53 or 55% of locations.
2. Toxicity was monitored at 84 sites (a number of sites only monitored for one species and one sampling event). Toxicity was identified at 45 sites or 53.6%

of sites where toxicity testing was conducted. Toxicity to two or more species was identified at 16 sites or 35.6% of sites where toxicity was identified.

a. Toxicity tests for fish (*Pimephales promelas* - fathead minnow) were conducted at 76 sites (many of those had only one or few tests). Toxicity was identified at 6 sites or 7.9% of sites that were monitored for fish toxicity. *Report incorrectly states only 6% of sites had fish toxicity*.
b. Toxicity tests for zooplankton (*Ceriodaphnia dubia* - water flea) were conducted at 75 sites (a number of sites only monitored 1 – 3 times). Zooplankton toxicity was identified at 20 sites or 26.6% of the sites that monitored for zooplankton toxicity. Of the sites that identified toxicity, 5 or 25% were toxic more than once. Mortality exceeded 50% in 77% of the toxic events. *Report incorrectly states 21% of sites had zooplankton toxicity*.
c. Toxicity tests for algae (*Selenastrum* – algal species) were conducted at 59 sites (number of sites only monitored 2 or 3 times). Algal toxicity was identified at 26 sites or 44.1% of sites that actually monitored for algal toxicity. Of the sites that identified toxicity, 17 or 65.4% were toxic more than once. Mortality was greater than 50% in 29% of the toxic events. *Report incorrectly states 27% of sites had algal toxicity*
d. Sediment toxicity tests (*Hyalella azteca* – sediment amphipod) were conducted at 52 sites (27 monitored once, 14 monitored twice). Sediment toxicity was identified at 13 sites or 25% of sites that monitored sediment toxicity. Of the sites that identified toxicity and conducted more than one test, 37.5% were toxic more than once. *Report incorrectly states 13.5% of sites had sediment toxicity*

3. Bacteria/pathogens (*E. coli*) were monitored at 33 sites (several had only 1, 2 or 4 samples). Public health limits (235 MPN/100 ml) were exceeded at 28 sites or 84.8% of the sites monitored for bacteria.
4. Pesticides were monitored at 57 sites (many with only 1 or 2 samples). Exceedances were identified at 23 sites or 40.4% of the sites that were monitored for pesticides (numerous sites had exceedances for multiple pesticides).
5. Metal (arsenic, boron, cadmium, copper, lead, nickel, selenium and zinc) results were not reported for Zone 1 because coalitions failed to report hardness data.
6. General parameters (dissolved oxygen, pH, total suspended solids and electrical conductivity) were not reported for Zone 1.
7. The Zone 1 summary contains no information on nutrient monitoring.

Zone 2 (Delta Region and portions of San Joaquin, Stanislaus, Calaveras and Mokelumne watersheds)

1. Fifty-eight (58) total monitoring locations (many were infrequently monitored or monitored for only one or a few constituents or type of toxicity). Agricultural coalitions monitored 29 sites and UC Davis or SWAMP monitored the other 29 locations. Twenty-one percent (21%) of the sites had

more than 25 cumulative exceedances of metal, toxicity and general parameter criteria.

2. Toxicity was monitored at 52 sites (a number of sites only monitored for one species and/or one sampling event). Toxicity was identified at 26 sites or 50% of sites where toxicity testing was conducted. Toxicity to two or more species was identified at 14 sites or 53.8%% of sites where toxicity was identified (6 sites or 27% were toxic to 3 or more species).
   a. Toxicity tests for fish were conducted at 47 sites (many had only one or few tests). Toxicity was identified at 9 sites or 19.1% of sites that monitored for fish toxicity. Of the sites that identified toxicity, 3 or 33.3% were toxic more than once. *Report incorrectly states that 17% of sites exhibited toxicity*.
   b. Toxicity tests for zooplankton were conducted at 47 sites (a number of sites were only monitored 3 – 4 times). Zooplankton toxicity was identified at 15 sites or 31.9% of the sites that monitored for zooplankton toxicity. Of the sites that identified toxicity, 6 or 42.9% were toxic more than once. *Report incorrectly states 28.8% of sites exhibited toxicity to water flea*.
   c. Toxicity tests for algae were conducted at 37 sites (a number of sites were only monitored 1, 2 or 4 times). Algal toxicity was identified at 12 sites or 32.4% of sites that actually monitored for algae toxicity. Of the sites that identified toxicity, 7 or 58.3% were toxic more than once. *Report states that 23% of sites exhibited algae toxicity*.
   d. Sediment toxicity tests were conducted at 31 sites. Sediment toxicity was identified at 12 sites or 38.7% of sites that monitored sediment toxicity. Of the sites that identified toxicity, 8 or 66.7% were toxic more than once. *Report incorrectly states sediment toxicity occurred in 23% of sites*.
3. Bacteria/pathogens (*E. coli*) were monitored at 23 sites. Health-based limits (235 MPN/100 ml) were exceeded at 18 sites or 78.3% of the sites monitored for bacteria (of these, 39% were above 1600 MPN/100 mL). Numerous sites exceeded criteria the majority of the time. For example, Grant Line Canal and French Camp Slough both exceeded criteria in 11 of 14 samples and Lone Tree Creek exceeded criteria in 14 of 16 samples.
4. Metals were monitored at 23 sites. One or more metal exceedances were found at 12 sites or 52.2% of the sites monitored for metals. Several sites had multiple exceedances. For example, Pixley Slough exceeded criteria for copper, lead and zinc 8, 20 and 4 times, respectively. Grant Line Canal exceeded arsenic, copper, lead and nickel 2, 3, 3, and 1 time respectively (out of five tests).
5. Pesticides were monitored at least once at 46 sites. Pesticides exceedances were identified at 28 sites or 60.9% of the sites that monitored for pesticides. Several sites had 30 to 40 exceedances and a number of sites had multiple exceedances of multiple pesticides. Pesticides under Basin Plan prohibition (carbofuran, malathion, methyl parathion and thiobencarb) were detected at 9 sites. Dieldrin is illegal in California but was identified at 4 sites. DDT and it's degradates DDE and DDD continue to be identified in Zone 2.

6. General parameters (dissolved oxygen, pH, Total suspended solids, electric conductivity) were monitored at 58 sites. Water quality criteria were exceeded for one or more parameters at 49 sites or 84.5% of the sites monitored for general parameters.
7. The summary contains no information on nutrient monitoring.

Zone 3 (San Joaquin River Watershed)

1. Eighty-three (83) total monitoring locations (many were infrequently monitored or monitored for only one or a few constituents or type of toxicity). Agricultural coalitions monitored 46 sites and UC Davis or SWAMP monitored 37 or 46% of locations.
2. Toxicity was monitored at 62 sites (a number of sites only monitored for one species and one sampling event). Toxicity was identified at 47 sites or 75.8% of sites where toxicity testing was conducted. Toxicity to two or more species was identified at 34 sites or 72.3%% of sites where toxicity was identified (16 sites or 34% toxic to 3 or more species).
   a. Fish toxicity tests were conducted at 58 sites. Toxicity to fish was identified at 11 sites or 19% of sites monitored for toxicity (Coalition only data shows toxicity at 24.4% of sites). Of the sites that identified toxicity, 2 or 18.1% were toxic more than once.
   b. Zooplankton toxicity was analyzed at 58 sites. Toxicity to zooplankton was identified at 34 sites or 59% of the sites monitored for zooplankton toxicity. Complete mortality of 100% was frequent (36 of 61 toxic samples) and the magnitude of toxicity was as high as 22 toxic units. Of the sites that identified toxicity, 15 or 44.1% were toxic more than once.
   c. Algal toxicity testing was conducted at 56 sites. Toxicity to algae was identified at 24 sites or 43% of the sites that monitored algal toxicity. Of the sites that identified toxicity, 10 or 41.7% were toxic more than once.
   d. Sediment toxicity was analyzed at 51 sites. Toxicity in sediment was identified at 29 sites or 57% of sites that monitored sediment toxicity. Of the sites that identified toxicity, 13 or 44.8% were toxic more than once.
3. Bacteria/pathogens (*E. coli*) were analyzed at 45 sites. Health-based limits (235 MPN/100 ml) were exceeded at 42 of 45 or 93% of the sites that monitored for bacteria. Of the sites that identified bacteria exceedances, 36 or 85.7% exceeded criteria multiple times.
4. Metal suites were analyzed at 30 sites. Exceedances of one or more criteria occurred at 23 sites or 77% of the sites that monitored for metals.
5. Pesticide suites were analyzed at 44 sites. Exceedances of one or more pesticides were identified at 32 sites or 72.7% of the sites that monitored pesticide suites. Although banned for more than 30 years, DDT was found to be above criteria in 8% of tests and it's degradates DDE and DDD were identified 14% and 3% of the time, respectively.
6. General Parameters
   a. Dissolved oxygen was monitored at 61 sites. Exceedance of the 7mg/L (cold water) was identified at 49 sites or 80% of the sites monitored for dissolved oxygen.

b. pH was monitored at 61 sites. Exceedance of criteria was identified at 26 sites or 42.6% of the sites monitored for pH.
c. Electrical conductivity (salt) was monitored at 61 sites. Exceedance of the 700 μmhos/cm criteria (agricultural goal) was identified at 30 sites or 49% of sites monitored for electrical conductivity.

7. Nutrients were monitored at 62 sites but collected data is neither reported nor discussed.
8. Note: University of California study found measurable concentrations of DDT, DDD or DDE in 90% of sediment samples.

Zone 4 (Tulare Lakes Basin)

1. Seventy-six (76) total monitoring locations (many were infrequently monitored or monitored for only one or a few constituents or type of toxicity). Agricultural coalitions monitored 30 sites. UC Davis, SWAMP or others monitored forty-six or 61% of locations.
2. Toxicity was monitored at 66 sites (a number of sites only monitored for one species and/or one sampling event). Toxicity was identified at 49 sites or 77.2% of sites where toxicity testing was conducted. Toxicity to two or more species was identified at 20 sites or 40.8%% of sites where toxicity was identified.
   a. Fish toxicity testing conducted at 57 sites. Toxicity to fish identified at 19 sites or 33.3% of sites monitored for fish toxicity. Of the sites that identified toxicity, 3 or 15.8% were toxic more than once.
   b. Zooplankton toxicity testing conducted at 57 sites. Toxicity to zooplankton identified at 8 site or 14% of sites monitored for zooplankton. Of the sites that identified toxicity, 1 or 12.5% were toxic more than once.
   c. Algal toxicity testing was conducted at 57 sites. Algal toxicity was identified at 33 sites or 57.9% of sites monitored for algae toxicity. Of the sites that identified toxicity, 24 or 72.7% were toxic more than once.
   d. Sediment toxicity was analyzed at 39 sites (majority of sites only tested 1 or 2 times). Sediment toxicity was identified at 16 sites or 41% of sites monitored for sediment toxicity. Of the sites that identified toxicity, 3 or 18.8% were toxic more than once.
3. Pesticides were monitored at 30 sites. Exceedances of one or more pesticide criteria were identified at 13 sites or 43% of sites monitored for pesticides. Prohibited pesticides or DDT/degradates were detected above criteria at 7 sites (23% of monitored sites).
4. There is no information in the Report on bacteria/pathogen monitoring.
5. Metals were monitored at 28 sites. However, results for metal testing were not disclosed in the Report.
6. There is no information presented on general parameters other than the observation that electrical conductivity limits were exceeded at 13 locations.
7. The Report contains no information on nutrient monitoring.

Summary: Central Valley

1. There were a total of 313 monitoring sites in the Central Valley. Coalitions monitored 148 locations. UC Davis, SWAMP or others monitored 165 sites or 53% of the total monitored sites.
2. Toxicity was monitored at 264 sites (a number of sites only monitored for one species and/or one sampling event). Toxicity was identified at 167 sites or 63.3% of sites where toxicity testing was conducted. Toxicity to two or more species was identified at 84 sites or 50.3%% of sites where toxicity was identified.
    a. Fish toxicity was identified at 45 of 238 sites or 18.9% of the sites where fish toxicity was monitored.
    b. Toxicity to zooplankton was identified at 54 of 237 sites or 22.8% of the sites where zooplankton toxicity was monitored.
    c. Toxicity to Algae species was identified at 95 of 209 sites or 45.5% of the sites where algal toxicity was monitored.
    d. Sediment toxicity was found at 70 of 173 sites or 40.5% of sites where sediment toxicity was monitored.
3. One or more pesticides exceedances were found at 96 of 177 sites or 54.2% of the sites where pesticide suites were monitored.
4. Metal results were not reported for Zones 1 and 4. Zones 2 and 3 reported metal exceedances at 35 of 53 sites or 66% of the sites where metals were monitored.
5. Exceedance of human health criteria for bacteria/pathogens (*E. coli*) was identified at 88 of 101 sites or 87% of the sites where bacteria was monitored. Most of the sites had numerous violations.
6. General parameters were not reported for Zones 1 and 4. Zones 2 and 3 reported exceedance of one or more general parameters at 84.5% and 88.5% of sites, respectively.
7. There was no reporting or discussion of nutrient data with the exception Table Z3-1 for Zone 3 that reveals that nutrient monitoring was conducted at 62 sites.