

**An Evaluation of the Central Valley Regional Water Quality  
Control Board's Compliance with Federal and State  
Regulations Governing the Issuance of NPDES Permits**



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California's Central Valley Regional Water Quality Control Board has significantly modified its approach for issuing wastewater discharge permits pursuant to the National Discharge Elimination System (NPDES). This modified approach fails to comply with explicit state and federal regulatory requirements.

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## **Executive Summary**

The State and Regional Water Quality Control Boards are tasked with implementing Clean Water Act (CWA) requirements in California to control wastewater discharges to surface water under authority delegated by the United States Environmental Protection Agency. The CWA requires that wastewater discharges be regulated pursuant to the National Pollution Discharge Elimination System (NPDES). The California Sportfishing Protection Alliance (CSPA) routinely reviews and comments on most major NPDES issued by the Central Valley Regional Water Quality Control Board (Regional Board).

Over the past seven or eight years, the Regional Board has, under relentless political pressure and pressure from the regulated community, significantly modified its approach to issuing NPDES permits for municipal and industrial discharges of wastewater. Richard McHenry and Bill Jennings<sup>1</sup> review this modified approach and find that the Regional Board has developed and implemented policy and procedures for the regulation of wastewater discharges contrary to legal and regulatory requirements, while ignoring technical guidance and recommendations from other agencies. These new procedures were never circulated and adopted pursuant to mandated rule making requirements and essentially constitute underground regulations.

The result is the Regional Board is issuing wastewater permits that have steadily reduced the protection provided to water quality and the critical beneficial uses of water in the Central Valley. This report discusses twenty examples where Regional Board issued permits that fail to comply with explicit regulatory requirements.

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**1. The Permits issued by the Central Valley Regional Board establish Effluent Limitations for metals based on the hardness of the effluent as opposed to the ambient instream receiving water hardness and fail to use the mandated equations as required by Federal Regulations, the California Toxics Rule (CTR, 40 CFR 131.38(c)(4)).**

Failure to comply with the regulatory requirements for hardness dependant metals has led to fewer limitations for these metals in permits and, where included, limitations that exceed the level US EPA recommends as necessary to prevent toxicity to aquatic life. The Regional Board also utilizes assimilative capacity, or dilution, within the receiving stream in calculating limits for hardness dependant metals, but fails to undertake mandated mixing zone studies and analyses.

### **Introduction**

Several toxic metals are currently regulated in the California Toxics Rule (CTR) based on the hardness of the water column. This regulation is based on the fact that these metals exhibit greater toxicity to aquatic life in lower hardness waters. To reflect the hardness/toxicity relationship, US EPA developed an equation for metals limitations using hardness as a variable. Use of the CTR equation with the lowest observed hardness will result in the most protective limitation for hardness dependant toxic metals. In most instances, the upstream surface water hardness is lower than the effluent hardness. Hence, US EPA, in writing the CTR (40 CFR 131.38(c)(4), stated that: *“For purposes of calculating freshwater aquatic life criteria for metals from the equations in paragraph (b)(2) of this section, for waters with a hardness of 400 mg/l or less as calcium carbonate, the actual ambient hardness of the surface water shall be used in those equations.”* Clearly, by stating that the ambient hardness of the surface water shall be used in the equations to develop metals limitations; the CTR prohibits the use of the effluent hardness in developing effluent limits for metals.

Confirming that US EPA requires use of the upstream (ambient) hardness the Federal Register, Volume 65, No. 97/Thursday, May 18<sup>th</sup> 2000 (31692), adopting the California Toxics Rule states that: *“If it appears that an effluent causes hardness to be inconsistent with alkalinity and/or pH the intended level of protection will usually be maintained or exceeded if either (1) data are available to demonstrate that alkalinity and/or pH do not affect the toxicity of the metal, or (2) the hardness used in the hardness equation is the hardness of upstream water that does not include the effluent.”*

In their biological opinion of the CTR the US Fish and Wildlife Service (Service) and the National Marine Fisheries Service (NMFS) concluded that: *“The CTR should clearly state that to obtain a site hardness value, samples should be collected upstream of the effluent source(s).”*

Following adoption of the CTR, a local consulting engineer, Dr. Robert Emerick, worrying whether his newly designed and constructed treatment plant at Lincoln would

be able to comply with stringent metals limitations developed a technical paper evaluating the metal toxicity/hardness relationship. The “Emerick” paper concluded that hardness values other than the most restrictive surface water values could be used with modified equations to establish less restrictive metals limitations. The “Emerick” paper concluded that the metals limitations could be less restrictive while protecting aquatic life and the method eliminated the development of overly protective limitations.

Further reading of the Service’s and NMFS biological however shows that the lower limits obtained using the lowest observed hardness were not “overly protective: *“The CTR should clearly state that to obtain a site hardness value, samples should be collected upstream of the effluent source(s). Clearly stating this requirement in the CTR would avoid the computation of greater-than-intended site criteria in cases where samples were collected downstream of effluents that raise ambient hardness, but not other important water qualities that affect metal toxicity (e.g., pH, alkalinity, dissolved organic carbon, calcium, sodium, chloride, etc.). Clearly, it is inappropriate to use downstream site water quality variables for input into criteria formulas because they may be greatly altered by the effluent under regulation.”*

Using the latest available science to develop new copper criteria; US EPA concluded that the use of the hardness alone often resulted in limitations that were not fully protective of aquatic life even using the most restrictive hardness and that one could not predict whether the hardness based equations would result in limitations that were overly or under restrictive. U.S. EPA’s latest ambient criteria for copper (*Aquatic Life Ambient Freshwater Quality Criteria—Copper 2007 Revision*), utilizes the other constituents that affect metal toxicity. Since EPA published the hardness-based recommendation for copper criteria in 1984, new data have become available on copper toxicity and its effects on aquatic life. The Biotic Ligand Model (BLM) – a metal bioavailability model that uses receiving water body characteristics to develop site-specific water quality criteria – utilizes the best available science and serves as the basis for the new national recommended criteria. The BLM requires ten input parameters to calculate a freshwater copper criterion (a saltwater BLM is not yet available): temperature, pH, dissolved organic carbon (DOC), calcium, magnesium, sodium, potassium, sulfate, chloride, and alkalinity. The BLM is used to derive the criteria rather than as a post-derivation adjustment as was the case with the hardness-based criteria. This allows the BLM-based criteria to be customized to the particular water under consideration. EPA states in the Federal Register (Federal Register / Vol. 72, No. 35 / Thursday, February 22, 2007 / Notices, 7985) that: *“Unlike the empirically derived hardness-dependent criteria, the BLM explicitly accounts for individual water quality variables and addresses variables that EPA had not previously factored into the hardness relationship. Where the previous freshwater aquatic life criteria were hardness-dependent, these revised criteria are dependent on a number of water quality parameters (e.g., calcium, magnesium, dissolved organic carbon) described in the document. BLM-based criteria can be more stringent than the current hardness-based copper criteria and in certain cases the current hardness-based copper criteria may be overly stringent for particular water bodies”*.

The water quality standard and aquatic toxicity specialists from the Service, NMFS and US EPA determined that the metals limitations based solely on hardness could not be shown to be overly protective. This conclusion is contrary to the central premise of the “Emerick” paper which relies solely on hardness. Hardness based toxic metal limitations cannot be shown to be overly protective without evaluating the discharge specific impacts of temperature, pH, dissolved organic carbon (DOC), calcium, magnesium, sodium, potassium, sulfate, chloride, and alkalinity. The Regional Board has relied on the “Emerick” methodology to develop limitations for hardness dependent toxic metals in NPDES permits citing that use of the lowest observed hardness and use of the CTR equation would result in overly protective limitations. The Regional Board has commented that the Services’ and NMFS comments were directed at CTR development and have ignored the science. The Regional Board has also refused to use US EPA’s new criteria for copper (a CTR toxic metal) that utilizes all the parameters that can impact the toxicity of a metal. The “Emerick” method and the Regional Board’s adherence to that method does not eliminate “overly protective” limitations but instead develops limits that are less restrictive than prescribed by the CTR and are in most instances not protective of aquatic life.

The Regional Board rarely requires NPDES wastewater Dischargers to sample for dissolved organic carbon (DOC), calcium, magnesium, sodium, potassium, sulfate or chloride. Each of these parameters can be significantly altered in the receiving stream by wastewater discharges. Therefore, based on the latest science and advice from the water quality standards and toxicity experts they could not even make an intelligent guess whether limitations for toxic hardness dependant metals are overly protective. This complete lack of data also precludes the Regional Board from using US EPA’s latest ambient criteria for copper, a hardness dependant toxic metal. The Regional Board’s dependence on a single study (Emerick) that only evaluates hardness with regard to metals toxicity to reach a conclusion that using the lowest observed hardness and the CTR equations is overly protective is without merit and is not supported by the latest available science.

The “Emerick” paper, page 4, states that: *“As depicted, because of the concave downward relationship between the copper water quality objective and hardness, assimilative capacity is always produced when two waters of differing hardness are mixed. Therefore, it is appropriate and protective to assign copper (and any other contaminant exhibiting a concave downward relationship) water quality objectives based on the hardness of the effluent.”* As is detailed by the US Fish and Wildlife Service, the National Marine Fisheries and US EPA in their updated copper criteria, using hardness alone one cannot state that the hardness based metals limitations are sufficiently stringent, let alone to conclude that there is “assimilative capacity” within the receiving stream. Since the “Emerick” paper is solely based on hardness and does not evaluate all the other parameters that can impact toxicity, the conclusions that metals limitations are overly stringent and there is assimilative capacity for metals is simply wrong. The Regional Board has no knowledge that hardness based limitations are overly restrictive when using the CTR equations and the lowest observed hardness to develop discharge limitations for metals. The single and sole reason for using the “Emerick” method is to relax discharge limitations for toxic metals.

## **Hardness The Court's Ruling**

The California Toxics Rule (CTR) Federal Regulation 40 CFR 131.38(c)(4) states that: "For purposes of calculating freshwater aquatic life criteria for metals from the equations in paragraph (b)(2) of this section, for waters with a hardness of 400 mg/l or less as calcium carbonate, the actual ambient hardness of the surface water shall be used in those equations." (Emphasis added).

As is stated in the proposed Permit, the permit is being amended based on a ruling of the Superior Court of California (Case number 34-2009-80000309) (County of Sacramento, Judge Timothy M. Frawley, 26 January 2011). With regard to the development of effluent limitations for hardness dependant metals and an objection by the Regional Board the court found that:

*"Ruling. Respondent Board's objection is denied The Court finds no ambiguity in the footnote. If the Board calculates the fresh aquatic life criteria for hardness-dependent metals based on the hardness value of the downstream receiving water, it must use the actual ambient hardness of the surface water after the effluent and receiving water have fully mixed It cannot use the hardness values of the receiving water "at or immediately downstream of the discharge outfall," since this is (for all intents and purposes) the same as using the hardness values of the effluent, which is prohibited."*

With regard to hardness dependant metals the Court ruling, in part, also contains the following:

*On balance, the Court is persuaded that the term "ambient," as applied in the CTR, refers to the surface water surrounding the aquatic life In light of the purpose of the CTR, it would be unreasonable to interpret the regulation as requiring States to ignore the effect of the effluent on the hardness (and consequent toxicity) of the downstream receiving water. The most reasonable interpretation of the regulation, therefore, is that the metal criteria should be calculated based on the actual ambient hardness of the surface water after the effluent and receiving water mix.<sup>7</sup> Stated differently, the criteria should be based on the upstream receiving water hardness, adjusted, as necessary, for the effects of the effluent. (Footnote No. 7 on page 14 of the final court order states that: "This means after the effluent and receiving water fully mix")*

*For the determination of the CTR hardness-dependent metals criteria, the Board has the discretion to use either the upstream receiving water hardness values or the hardness values of the downstream mixture of the effluent and the receiving water, whichever is most protective.*

The final court ruling is quite clear that when developing effluent limitations for hardness dependant metals that:

- (1) The hardness of the surface water must be used;
- (2) Use of the effluent hardness is prohibited; and
- (3) The term ambient means that the hardness must be taken from outside the area where the effluent mixes with the receiving stream.
- (4) Either the upstream surface water hardness or the downstream surface water hardness (following complete mixing with the effluent) may be used to develop effluent limitations for hardness dependant metals, whichever is most protective.

### **The Effluent Hardness is Used in the most Region 5 Permits**

For example the permit for El Dorado Irrigation District's Deer Creek WWTP states on page F-23 that:

*“For both copper and zinc, using the “fully mixed” hardness value results in criteria that are higher (less stringent) than using the effluent-dominated (100% effluent) condition in the receiving water. Effluent limitations based on the less stringent criteria would allow the effluent to cause receiving water toxicity during low-flow conditions. Even assuming that would be a correct interpretation of the CTR and SIP or the EID Court Order, a more stringent effluent limitation would be required to comply with the Basin Plan’s narrative toxicity objective unless the Board approves a mixing zone.<sup>14</sup> Accordingly, this Order sets effluent limitations for copper and zinc based on low-flow conditions as shown in the above tables.”*  
(Emphasis added)

The “above tables” referred to in the permit are Tables F-4 and F-5 on pages F-21 and F-22. The “low flow conditions” described in the text can be observed in Tables F-4 and F-5 in the far left hand lower column of the tables. The “low flow condition” in the tables represents “100% effluent” with a recorded effluent hardness value of 42 mg/l.

Throughout the text in the Deer Creek Permit, pages F-16 through F-26, discussing the development of effluent limitations for hardness dependant metals, the discussion is limited to the effluent and upstream ambient hardness. The downstream surface water ambient hardness, as defined by the court; following complete mixing is not discussed or numerically cited.

On page F-20 of the Deer Creek Permit, the discussion, equation 3 and the following Table F-4 are all based on the lowest observed effluent hardness of 42 mg/l. Again, based on the total absence of discussion of any downstream surface water sampling for hardness, the Regional Board’s decision process is based on the effluent hardness, which was confirmed by the Superior Court is prohibited.

The Deer Creek Permit discussion beginning on page F-23 again focuses on the effluent hardness. This can be observed by evaluation of equation 4 (page F-23) where the input



value  $H_e$  represents the lowest observed effluent value. The data in Table F-5 are based on equation 4 and is therefore also based on the effluent hardness.

The development of effluent limitations for hardness dependant metals in the Deer Creek Permit is based on the effluent hardness or a combination of the effluent and upstream hardnesses. The use of the effluent hardness rather than the CTR prescribed “actual ambient hardness of the surface water” is contrary to the requirements of the CTR and directly violates the mandate of the Superior Court’s Order. As cited above the Superior Court clearly stated that use of the effluent hardness is prohibited.

The cited Deer Creek permit is only an example of the Region 5 permits. Review of almost any of the NPDES permits issued by the central Valley Regional Board uses the effluent hardness to develop metals limitations in accordance with the “Emerick” method.

### **The Wrong Equations Were Used**

The California Toxics Rule (CTR) Federal Regulation 40 CFR 131.38(c)(4) states that: “For purposes of calculating freshwater aquatic life criteria for metals from the equations in paragraph (b)(2) of this section, for waters with a hardness of 400 mg/l or less as calcium carbonate, the actual ambient hardness of the surface water shall be used in those equations.” (Emphasis added).

The CTR requires the use of the equations presented in paragraph (b)(2) of 40 CFR 131.38 for the development of effluent limitations for hardness dependant metals. The required CTR equation is:

$$\text{CTR Criterion} = \text{WER} \times (\exp(m[\ln(H)]+b))$$

where: H = hardness (mg/L as CaCO<sub>3</sub>), WER = water-effect ratio (with a default value of 1) and m, b = metal and criterion specific constants.

The CTR equation is cited as “equation 1” in the Deer Creek Permit (page F-18). The Deer Creek Permit cites a 2006 technical paper prepared by Robert Emerick (see footnote 7 on page F-18) as the source of the equations used by the Regional Board in developing the Permit effluent limitations for some hardness dependant metals (see Table F-6 footnote 2). Dr. Emerick’s equation 4 is presented on page F-23 of the Deer Creek Permit. Equation 4 is not the same as equation 1 which is prescribed by the CTR.

The use of equations other than those prescribed by the CTR for development of effluent limitations for hardness dependant metals is contrary to the requirements of the CTR.

### **The “ambient” hardness was not used**

Federal Regulation 40 CFR 131.38(c)(4) states that: “For purposes of calculating freshwater aquatic life criteria for metals from the equations in paragraph (b)(2) of this section, for waters with a hardness of 400 mg/l or less as calcium carbonate, the actual

ambient hardness of the surface water shall be used in those equations.” (Emphasis added).

The common dictionary definition of *ambient* is “in the surrounding area”, “encompassing on all sides”.

In petitioning the Deer Creek permit, CSPA argued that the common definition of ambient of surrounding would eliminate any areas that included the wastewater effluent in consideration of the hardness used in determining criteria for hardness dependant metals. It is reasonable to assume, after considering the definition of ambient, that EPA is referring to the hardness of the receiving stream before it is potentially impacted by an effluent discharge. It is also reasonable to make this assumption based on past interpretations and since EPA, in permit writers’ guidance and other reference documents, generally assumes receiving streams have dilution, which would ultimately “encompass” the discharge. Ambient conditions are in-stream conditions unimpacted by the discharge. Confirming this definition, the SIP Sections 1.4.3.1 *Ambient Background Concentration as an Observed Maximum* and 1.4.3.2 state in part that: “If possible, preference should be given to ambient water column concentrations measured immediately upstream or near the discharge, but not within an allowed mixing zone for the discharge. The RWQCB shall have discretion to consider if any samples are invalid for use as applicable data due to evidence that the sample has been erroneously reported or the sample is not representative of the ambient receiving water column that will mix with the discharge.”

CSPA’s view regarding the term ambient is also supported by a biological opinion issued by the US Fish and Wildlife Service (Service) and the National Marine Fisheries Service (NMFS) on March 24<sup>th</sup> 2000. On March 24, 2000 the US Fish and Wildlife Service (Service) and the National Marine Fisheries Service (NMFS) issued a biological opinion on the effects of the final promulgation of the CTR on listed species and critical habitats in California in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.; Act). The biological opinion was issued to the U.S. Environmental Protection Agency, Region 9, with regard to the “Final Rule for the Promulgation of Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California” (CTR)”. The document represented the Services’ final biological opinion on the effects of the final promulgation of the CTR on listed species and critical habitats in California in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.; Act). The biological opinion contains the following discussion, beginning on page 205, regarding the use of hardness in developing limitations for toxic metals:

“The CTR should more clearly identify what is actually to be measured in a site water to determine a site-specific hardness value. Is the measure of hardness referred to in the CTR equations a measure of the water hardness due to calcium and magnesium ions only? If hardness computations were specified to be derived from data obtained in site water calcium and magnesium determinations alone, confusion could be avoided and more accurate results obtained (APHA 1985).

Site hardness values would thus not include contributions from other multivalent cations (e.g., iron, aluminum, manganese), would not rise above calcium + magnesium hardness values, or result in greater-than-intended site criteria when used in formulas. In this Biological opinion, what the Services refer to as hardness is the water hardness due to calcium + magnesium ions only.

The CTR should clearly state that to obtain a site hardness value, samples should be collected upstream of the effluent source(s). Clearly stating this requirement in the CTR would avoid the computation of greater-than-intended site criteria in cases where samples were collected downstream of effluents that raise ambient hardness, but not other important water qualities that affect metal toxicity (e.g., pH, alkalinity, dissolved organic carbon, calcium, sodium, chloride, etc.). Clearly, it is inappropriate to use downstream site water quality variables for input into criteria formulas because they may be greatly altered by the effluent under regulation. Alterations in receiving water chemistry by a discharger (e.g., abrupt elevation of hardness, changes in pH, exhaustion of alkalinity, abrupt increases in organic matter etc.) should not result, through application of hardness in criteria formulas, in increased allowable discharges of toxic metals. If the use of downstream site water quality variables were allowed, discharges that alter the existing, naturally-occurring water composition would be encouraged rather than discouraged. Discharges should not change water chemistry even if the alterations do not result in toxicity, because the aquatic communities present in a water body may prefer the unaltered environment over the discharge-affected environment. Biological criteria may be necessary to detect adverse ecological effects downstream of discharges, whether or not toxicity is expressed.”

The Regional Board has argued however that they had discretion to redefine “ambient” and were not constrained by common dictionary definitions. The Regional Board’s definition of “ambient” included the wastewater effluent.

The Superior Court (Superior Court of California (Case number 34-2009-80000309) (County of Sacramento, Judge Timothy M. Frawley, 26 January 2011) ruled that the common dictionary definition of ambient was applicable, but that “ambient” also included the downstream waters after complete mix with the wastewater effluent had occurred.

The Regional Board continues to use the effluent as “ambient” in their calculation of criteria for hardness dependant metals contrary to common definition, the language in the SIP, guidance from the US Fish and Wildlife Service and the National Marine Fisheries Service and a ruling by the Superior Court.

### **Use of the “Surface Water Hardness”**

Federal Regulation 40 CFR 131.38(c)(4) states that: “For purposes of calculating freshwater aquatic life criteria for metals from the equations in paragraph (b)(2) of this

section, for waters with a hardness of 400 mg/l or less as calcium carbonate, the actual ambient hardness of the surface water shall be used in those equations.” (Emphasis added).

As is stated above, the Regional Board’s Permits continue to utilize the wastewater effluent hardness when establishing criteria for hardness dependant metals. The wastewater effluent is not “surface water”. The Regional Board has not argued this point but has steadfastly refused to acknowledge or discuss the CTR requirement that the hardness of the surface water be used in calculating the criteria for hardness dependant metals. The proposed Permit is again based on the hardness of the effluent, not surface water, for hardness dependant metals.

### **The “Emerick” Paper cannot be used**

The Region 5 Permits rely on the “Emerick” paper in developing effluent limitations for hardness dependant metals. The “Emerick” paper is inappropriate for use based on the following:

- The “Emerick” paper does not utilize the hardness of the surface water but also heavily relies on the effluent hardness. Recall that 40 CFR 131.38 requires use of the actual ambient hardness of the surface water.
- The “Emerick” paper does not solely use the equations specified in 40 CFR 131.38(c)(4).
- The “Emerick” paper does not utilize the ambient hardness also heavily relies on the effluent hardness.
- The “Emerick” paper ignores the other important water qualities that affect metal toxicity (e.g., pH, alkalinity, dissolved organic carbon, calcium, sodium, chloride, etc.) and focuses solely on hardness. As can be seen the U.S. EPA’s latest ambient criteria for copper (*Aquatic Life Ambient Freshwater Quality Criteria—Copper 2007 Revision*), the latest science utilizes these other quality that affect metal toxicity. Since EPA published the hardness-based recommendation for copper criteria in 1984, new data have become available on copper toxicity and its effects on aquatic life. The Biotic Ligand Model (BLM) – a metal bioavailability model that uses receiving water body characteristics to develop site-specific water quality criteria – utilizes the best available science and serves as the basis for the new national recommended criteria. The BLM requires ten input parameters to calculate a freshwater copper criterion (a saltwater BLM is not yet available): temperature, pH, dissolved organic carbon (DOC), calcium, magnesium, sodium, potassium, sulfate, chloride, and alkalinity. The BLM is used to derive the criteria rather than as a post-derivation adjustment as was the case with the hardness-based criteria. This allows the BLM-based criteria to be customized to the particular water under consideration. The Regional Board failed to utilize the latest science in developing the proposed Permit.
- Underground regulation....

### **Establishing a protective limitation**

For the great majority of wastewater discharges to surface waters the hardness of the effluent is much greater than the hardness of the upstream surface water. In such cases, use of the higher hardness of the effluent to calculate discharge limitations for hardness dependant metals results in significantly less stringent discharge limitations. The “Emerick” method uses the higher effluent hardness to determine criteria as the effluent mixes with surface water. The Regional Board has used the “Emerick” method to generate these less stringent limitations stating that the methodology only eliminates what would have otherwise been overly protective limitations<sup>2</sup>. Adherence to the required CTR methodology using the lower surface water hardness would, under these circumstances, produce more stringent criteria. In reviewing the Central Valley Regional Board’s NPDES permits it can be seen that use of the “Emerick” method is used by default, ignoring the mandated CTR method of calculating criteria for hardness dependant metals. It has been questioned whether the Regional Board’s default use of the “Emerick” method constitutes an underground regulation. "Regulation" means every rule, regulation, order, or standard of general application or the amendment, supplement, or revision of any rule, regulation, order or standard adopted by any state agency to implement, interpret, or make specific the law enforced or administered by it, or to govern its procedure.” (Government Code section 11342.600).

The Regional Board cannot produce a technical defense that use of the CTR prescribed methods is overly protective. To the contrary, the US Fish and Wildlife Service and the National Marine Fisheries Service in their biological opinion and U.S. EPA in developing new ambient criteria for copper, all state that the use of hardness alone, ignoring temperature, pH, dissolved organic carbon (DOC), calcium, magnesium, sodium, potassium, sulfate, chloride, and alkalinity, may not be protective of water quality. The agencies, in their biological opinion, state that only the lower upstream hardness should be used to account for the inaccuracies of using hardness alone. The Regional Board does not present any technical information to rebut the technical fisheries and water quality standards development experts at US Fish and Wildlife Service, the National Marine Fisheries Service or U.S. EPA. The Regional Board has refused to discuss the technical merits of the opinions given by the US Fish and Wildlife Service, the National Marine Fisheries Service and U.S. EPA, stating only that the opinions address the CTR and are not applicable to individual permitting actions.

There are a few unique circumstances when a wastewater discharge occurs at the headwaters of a stream or where the natural upstream surface water hardness is higher

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<sup>2</sup> See permits for Sacramento Regional ([http://www.swrcb.ca.gov/centralvalley/board\\_decisions/adopted\\_orders/sacramento/r5-2010-0114\\_npdes.pdf](http://www.swrcb.ca.gov/centralvalley/board_decisions/adopted_orders/sacramento/r5-2010-0114_npdes.pdf), at pages F-22 and 23), The City of Auburn ([http://www.swrcb.ca.gov/centralvalley/board\\_decisions/adopted\\_orders/placer/r5-2010-0090-01.pdf](http://www.swrcb.ca.gov/centralvalley/board_decisions/adopted_orders/placer/r5-2010-0090-01.pdf), page F-23 “An ECA based on a lower hardness (e.g., lowest upstream receiving water hardness) would also be protective, but would result in unreasonably stringent effluent limits considering the known conditions.”), Placer County SMD-1 ([http://www.swrcb.ca.gov/centralvalley/board\\_decisions/adopted\\_orders/placer/r5-2010-0092.pdf](http://www.swrcb.ca.gov/centralvalley/board_decisions/adopted_orders/placer/r5-2010-0092.pdf), page F-26, “Use of a lower ECA (e.g., calculated based solely on the lowest upstream receiving water hardness) is also protective, but would lead to unreasonably stringent effluent limits considering the known conditions.”)

than the effluent hardness. Under the first circumstance there is no upstream surface water hardness. Under the circumstance where the upstream hardness is higher than the effluent hardness; use of the upstream surface water hardness will produce criteria that are not sufficiently protective of water quality. This is the condition observed at Deer Creek. The unique circumstances do not nullify the regulatory requirements to use the ambient surface water hardness or to use the CTR prescribed equations when calculating criteria for hardness dependant metals. There is however a legal and technically correct way to properly address these situations. The methodology to protect water quality in these rare events is prescribed in the federal regulations: the CTR method must be followed to show that the developed criteria are not protective of water quality; 40 CFR 122.44 (d)(1) should be cited as requiring the development of limitations more stringent than the promulgated effluent limitations, and; use of the CTR prescribed method using the lower hardness used to develop the more protective limitations. The Regional Board's consistent use of the "Emerick" method, and the Regional Board's assessment that use of the CTR prescribed methodology using the lowest observed hardness is overly protective, are without technical or legal merit.

**2. The Region 5 Permits rarely contain an adequate antidegradation analysis that complies with the requirements of Section 101(a) of the Clean Water Act, Federal Regulations 40 CFR § 131.12, the State Board's Antidegradation Policy (Resolution 68-16) and California Water Code (CWC) Sections 13146 and 13247.**

Federal and state laws and regulations require studies and assessments of water quality impacts, whether adequate treatment is being provided and whether the activity is in the best interest of the people of California before a wastewater facility can be expanded or whenever a permit is renewed. The Regional Board has routinely failed to undertake any such studies in a vast majority of their permits.

The Region 5 Permits contain canned (boilerplate) Findings stating that the permit complies with the Antidegradation Policy and that compliance with the permit will result in best practicable treatment and control (BPTC) of the discharge. It is the exception that any antidegradation analysis is conducted.

CWC Sections 13146 and 13247 require that the Board in carrying out activities which affect water quality shall comply with state policy for water quality control unless otherwise directed by statute, in which case they shall indicate to the State Board in writing their authority for not complying with such policy. The State Board has adopted the Antidegradation Policy (Resolution 68-16), which the Regional Board has incorporated into its Basin Plan. Therefore, the Regional Board is required by the CWC to comply with the Antidegradation Policy.

Section 101(a) of the Clean Water Act (CWA), the basis for the antidegradation policy, states that the objective of the Act is to "restore and maintain the chemical, biological and physical integrity of the nation's waters." Section 303(d)(4) of the CWA carries this

further, referring explicitly to the need for states to satisfy the antidegradation regulations at 40 CFR § 131.12 before taking action to lower water quality. These regulations (40 CFR § 131.12(a)) describe the federal antidegradation policy and dictate that states must adopt both a policy at least as stringent as the federal policy as well as implementing procedures.

California's antidegradation policy is composed of both the federal antidegradation policy and the State Board's Resolution 68-16 (State Water Resources Control Board, Water Quality Order 86-17, p. 20 (1986) ("Order 86-17"); Memorandum from Chief Counsel William Attwater, SWRCB to Regional Board Executive Officers, "federal Antidegradation Policy," pp. 2, 18 (Oct. 7, 1987) ("State Antidegradation Guidance")). As a state policy, with inclusion in the Water Quality Control Plan (Basin Plan), the antidegradation policy is binding on all of the Regional Boards (Water Quality Order 86-17, pp. 17-18).

Implementation of the state's antidegradation policy is guided by the State Antidegradation Guidance, SWRCB Administrative Procedures Update 90-004, 2 July 1990 ("APU 90-004") and USEPA Region IX, "Guidance on Implementing the Antidegradation Provisions of 40 CFR 131.12" (3 June 1987) ("Region IX Guidance"), as well as Water Quality Order 86-17.

The Regional Board must apply the antidegradation policy whenever it takes an action that will lower water quality (State Antidegradation Guidance, pp. 3, 5, 18, and Region IX Guidance, p. 1). Application of the policy does not depend on whether the action will actually impair beneficial uses (State Antidegradation Guidance, p. 6). Actions that trigger use of the antidegradation policy include issuance, re-issuance, and modification of NPDES and Section 404 permits and waste discharge requirements, waiver of waste discharge requirements, issuance of variances, relocation of discharges, issuance of cleanup and abatement orders, increases in discharges due to industrial production and/or municipal growth and/or other sources, exceptions from otherwise applicable water quality objectives, etc. (State Antidegradation Guidance, pp. 7-10, Region IX Guidance, pp. 2-3). Both the state and federal policies apply to point and nonpoint source pollution (State Antidegradation Guidance p. 6, Region IX Guidance, p. 4).

The State Board's APU 90-004 specifies guidance to the Regional Boards for implementing the state and federal antidegradation policies and guidance. The guidance establishes a two-tiered process for addressing these policies and sets forth two levels of analysis: a simple analysis and a complete analysis. A simple analysis may be employed where a Regional Board determines that: 1) a reduction in water quality will be spatially localized or limited with respect to the waterbody, e.g. confined to the mixing zone; 2) a reduction in water quality is temporally limited; 3) a proposed action will produce minor effects which will not result in a significant reduction of water quality; and 4) a proposed activity has been approved in a General Plan and has been adequately subjected to the environmental and economic analysis required in an EIR. A complete antidegradation analysis is required if discharges would result in: 1) a substantial increase in mass emissions of a constituent; or 2) significant mortality, growth impairment, or

reproductive impairment of resident species. Regional Boards are advised to apply stricter scrutiny to non-threshold constituents, i.e., carcinogens and other constituents that are deemed to present a risk of source magnitude at all non-zero concentrations. If a Regional Board cannot find that the above determinations can be reached, a complete analysis is required.

Even a minimal antidegradation analysis would require an examination of: 1) existing applicable water quality standards; 2) ambient conditions in receiving waters compared to standards; 3) incremental changes in constituent loading, both concentration and mass; 4) treatability; 5) best practicable treatment and control (BPTC); 6) comparison of the proposed increased loadings relative to other sources; 7) an assessment of the significance of changes in ambient water quality and 8) whether the waterbody was a ONRW. A minimal antidegradation analysis must also analyze whether: 1) such degradation is consistent with the maximum benefit to the people of the state; 2) the activity is necessary to accommodate important economic or social development in the area; 3) the highest statutory and regulatory requirements and best management practices for pollution control are achieved; and 4) resulting water quality is adequate to protect and maintain existing beneficial uses. A BPTC technology analysis must be done on an individual constituent basis; while tertiary treatment may provide BPTC for pathogens, dissolved metals may simply pass through.

There is rarely an economic or socioeconomic analysis in the Region 5 Permits. The few economic evaluations have contained no comparative costs, simply the cost to the Discharger. The costs to the Discharger are rarely detailed, occasionally contain no numeric figures, and generally result in a conclusion that any improvements to the treatment system are too expensive. As a rule-of-thumb, USEPA recommends that the cost of compliance should not be considered excessive until it consumes more than 2% of disposable household income in the region. This threshold is meant to suggest more of a floor than a ceiling when evaluating economic impact. In the Water Quality Standards Handbook, USEPA interprets the phrase “necessary to accommodate important economic or social development” with the phrase “substantial and widespread economic and social impact.” Any industrial facility which produces job is automatically stated by the Regional Board to be in the best interest of the people of the state without any supporting analysis.

Each Permit issued by the Central Valley Region states that the Discharger applies best practicable treatment and control (BPTC) of the discharge despite whether; the Discharger is in significant non-compliance with discharge limitations, cannot comply with new limitations or is issued compliance time schedules. In most instances there is no Antidegradation Policy assessment in the permits. There is generally nothing in the Region 5 Permits resembling an analysis that ensures that existing beneficial uses are protected. While the Permits may identify constituents that are included on the 303(d) list as impairing receiving waters, they fail to discuss how and to what degree the identified beneficial uses will be additionally impacted by the discharge. Nor does the Permit analyze the incremental and cumulative impact of increased loading of non-impairing pollutants on beneficial uses. In fact, there is almost never information or



discussion on the composition and health of the identified beneficial uses. Any reasonably adequate antidegradation analysis must discuss the affected beneficial uses (i.e., numbers and health of the aquatic ecosystem; extent, composition and viability of agricultural production; people depending upon these waters for water supply; extent of recreational activity; etc.) and the probable effect the discharge will have on these uses.

The antidegradation analyses in the Region 5 Permits are typically not simply deficient, they are usually nonexistent. The brief discussion of antidegradation requirements, in the Findings and Fact Sheet, typically consist only of skeletal, unsupported, undocumented conclusory statements totally lacking in factual analysis. A complete Antidegradation Policy analysis would be of great assistance to the permit writer in preparing protective permits.

US EPA recently issued a draft paper *U.S. EPA Region 9 Antidegradation Policy Implementation Review (May 10, 2011)* that is highly critical of California's implementation of the federal antidegradation regulations. CSPA believes that the US EPA analysis closely coincides with comments that we have submitted on numerous permits with regard to antidegradation. US EPA's recommendations for California are as follows:

#### Recommendations

1. Although SWRCB Water Quality Order No. 86-17 requires California to consider the federal antidegradation requirements described in 40 CFR 131.12 in addition to California's policy, California should update its policy to include all federal antidegradation requirements, including those for tier 3 waters and thermal discharges.
2. California should update its implementation methods to include Mono Lake as an ONRW.
3. California's implementation methods state that potential beneficial uses are protected by the State policy, but not the federal requirements. This is incorrect and should be updated, as EPA approves potential uses as designated uses, and thus, potential uses are then protected by the federal antidegradation requirements.
4. California should update its implementation methods to include guidance for performing antidegradation reviews for permitted stormwater discharges, including specific examples of when permitted stormwater discharges may degrade water quality, such as development or redevelopment of an area.
5. California should update its implementation methods to provide guidance for performing antidegradation reviews for general permits, specifically whether antidegradation review shall be performed for issuance and reissuance of the general permit, or for each Notice of Intent (NOI) to be covered under the general permit. If California decides to perform antidegradation reviews for each NOI, we recommend updating the information required to be submitted with the NOI to include antidegradation information to expedite processing.
6. California should provide permit writers further training on implementation of the policy and methods, specifically:

- a. The permitting actions (such as changes to the discharge, facility, or permit requirements) that may further degrade water quality and therefore require antidegradation review. Based on California's implementation methods, all permit actions require antidegradation review; however, California should identify permitting actions other than new discharges and increased flow that may trigger antidegradation concerns, such as those discussed in Section C.1 of this document, to provide clearer guidance to permit writers. Also, California may want to incorporate these additional situations into the criteria for a simple or complete analysis.
- b. The elements of an antidegradation review that need to be documented in permit fact sheets. Regardless of how complex the review, a description of how the permit action meets the State policy should be documented in the fact sheet, including:
  - i. The classification of the receiving water by antidegradation tier,
  - ii. A determination of whether the permit action will lower water quality,
  - iii. A determination of whether the permit action meets the State antidegradation policy, and
  - iv. A statement of whether an antidegradation analysis was conducted, and if so, whether it was a simple or complete analysis, who conducted the analysis, and the following findings:
    - The pollutants that will lower water quality,
    - The socioeconomic and public benefits that result from lowered water quality,
    - The affected beneficial uses and the extent of the impact,
    - The scientific rationale for determining that the proposed action will or will not lower water quality,
    - A description of the alternatives considered,
    - A determination of any cumulative impacts,
    - The rationale for determining that the proposed action is or is not justified by socioeconomic considerations,
    - A description of the intergovernmental coordination, and
    - If allowing degradation, how the permit requires the highest statutory and regulatory requirements and best treatment.

**3. The Regional Board has been making significant and substantial changes to proposed Permits after close of the public comment period without recirculation and prohibiting submittal of written comments based on the changes.**

The Regional Board's routinely makes substantial changes to permits following public review, which eliminates the public's ability to provide reasonable comments on wastewater impacts.

Federal Regulation, 40 CFR 124.6 (e)(*Applicable to State Programs*), requires that all draft permits shall be accompanied by a statement of basis, shall be based on the administrative record, shall be publically noticed and made available for public comment. Federal Regulations 40 CFR 124.10 (*Applicable to State Programs*) requires notification that a draft permit has been prepared and that at least 30 days are allowed for public comment. Federal Regulations 40 CFR 124.14 contains requirements for reopening the public comment period including reissuance of a draft permit. Failure to include the *Statement of Basis* places the public at a disadvantage to argue the merits of specific points and authorities. Modifying the permit and failing to allow submittal of written comments disallows inclusion of the arguments into the public record.

For example; at the December 2008 Board Hearing significant changes had been made to a proposed Permit after closure of the public comment period. The changes had not been made available for public comment and a new draft permit was not reissued.

Specifically:

1. Effluent Limitations for cyanide were removed from the proposed Permit.
2. The Effluent Limitations for ammonia were relaxed.
3. The Effluent Limitation for pH was altered.
4. The Effluent Limitation for chronic toxicity was modified and a *Compliance Determination* was added which unreasonably limits any finding of violation against the discharge of chronically toxic substances.
5. An averaging period for pH shift was added to the Receiving Water Limitation.
6. Monitoring requirements for turbidity, BOD, total suspended solids, and total coliform organisms were relaxed. The effluent dissolved oxygen monitoring was removed altogether and a receiving water monitoring station with the associated monitoring was deleted; and
7. The fact sheet basis for salinity limitations was completely replaced and each salinity constituent discussion significantly altered.

Having the opportunity we would have had presented written comments on each of these items, therefore we requested that the Draft Order be recirculated for public comment. The Regional Board's attorney stated during the hearing that the cited Federal Regulations were not applicable to state programs.

**4. The Region 5 Permits fail to contain Effluent Limitations for bis(2-ethylhexyl)phthalate despite clear reasonable potential to exceed water quality standards in violation of Federal Regulations 40 CFR 122.44.**

Bis(2-ethylhexyl)phthalate is a significant threat to human health and aquatic life and is endemic in the environment. On 30 December 2009 the US Environmental Protection Agency a press release announcing an *Action Plan* (a series of actions) on four chemicals raising serious health or environmental concerns, including phthalates. Even though the water quality standard for bis(2-ethylhexyl)phthalate was originally adopted in 1992; in

reviewing the Regional Board's permits it is clear in some cases that no priority pollutant sampling had been conducted. In other cases it was evident that the sampling was "insufficient" to conduct a reasonable potential analysis. In a significant number of cases the Regional Board contended that limitations were not included in permits because bis(2-ethylhexyl)phthalate is used extensively in plastics and is therefore subject to laboratory error. Environmental laboratories conduct extensive quality control and assurance programs to detect and quantify any laboratory error. In routinely citing "laboratory error" as their reason for failing to regulate bis(2-ethylhexyl)phthalate, the Regional Board rarely cited laboratories quality control and assurance results.

The Region 5 Permits state that sampling data for bis(2-ethylhexyl)phthalate is subject to error and is discarded without any supporting documentation from the laboratory quality assurance/quality control (QA/QC) documents. Bis(2-ethylhexyl)phthalate is used in the formation of plastics and has been documented in the available literature to be present in plastic pipes, bottles, bags and widely distributed throughout the environment. The Regional Board total disregards scientific methods, specifically sampling and laboratory QA/QC methodologies, in throwing out data points that would lead to a reasonable potential for a pollutant to exceed water quality standards when the burden should properly be placed on wastewater Dischargers to conduct proper sampling and analysis. The California Water Code (CWC), Section 13377 states in part that: "...the state board or the regional boards shall...issue waste discharge requirements...which apply and ensure compliance with...water quality control plans, or for the protection of beneficial uses..." Section 122.44(d) of 40 CFR requires that permits include water quality-based effluent limitations (WQBELs) to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water. Failure to include an effluent limitation for bis(2-ethylhexyl)phthalate in the Region 5 Permits violates 40 CFR 122.44 and CWC 13377.

The Central Valley Regional Board has begun using the following language in this and each NPDES permit recently issued and has failed to find reasonable potential for bis(2-ethylhexyl)phthalate to exceed water quality standards regardless of the dataset or the laboratory quality assurance/quality control (QA/QC) provided by the laboratory. The CTR was adopted in May of 2000 and priority pollutants were previously regulated for a short time by the ISWP. Sampling for bis(2-ethylhexyl)phthalate has been conducted for over a decade and the Regional Board staff, despite clean QA/QC results, find the following:

"Since bis(2-ethylhexyl)phthalate is a common contaminant of sample containers, sampling apparatus, and analytical equipment, and sources of the detected bis(2-ethylhexyl)phthalate may be from plastics used for sampling or analytical equipment, the Regional Water Board has determined there is uncertainty in the available data. Consequently, there is insufficient information to complete a reasonable potential analysis at this time. In accordance with Section 1.2 of the SIP Regional Water Board staff shall have discretion to consider if any data are inappropriate or insufficient for use in implementing the policy. Where Regional Water Board staff have found the data are insufficient to determine reasonable

potential. Section 1.3 of the SIP allows the Board to implement monitoring for the parameter of concern. Therefore, additional monitoring has been established for bis(2-ethylhexyl)phthalate. Should monitoring results indicate that the discharge has the reasonable potential to cause or contribute to an exceedance of a water quality standard, then this Order may be reopened and modified by adding an appropriate effluent limitation.”

It has become the Central Valley Regional Board’s policy to not regulate bis(2-ethylhexyl)phthalate despite clear requirements in the SIP and the CTR. The Regional Board total disregards scientific methods, specifically sampling and laboratory QA/QC methodologies, in throwing out data points that would lead to a reasonable potential for a pollutant to exceed water quality standards when the burden should properly be placed on wastewater Dischargers to conduct proper sampling and analysis. Despite the claims, the Regional Board’s permits do not contain any additional language requiring any special assessment or clean sampling and analysis techniques be implemented for bis(2-ethylhexyl)phthalate. Surely it would violate CWC 13267 requirements to justify the need for technical reports and sampling if the Regional Board has no intent on using the data or believes it to be unreliable even before review. Federal Regulations, 40 CFR 122.44(d), requires that limits must be included in permits where pollutants will cause, have reasonable potential to cause, or contribute to an exceedance of the State’s water quality standards. US EPA has interpreted 40 CFR 122.44(d) in *Central Tenets of the National Pollutant Discharge Elimination System (NPDES) Permitting Program* (Factsheets and Outreach Materials, 08/16/2002) that although States will likely have unique implementation policies there are certain tenets that may not be waived by State procedures. These tenets include that “where the preponderance of evidence clearly indicates the potential to cause or contribute to an exceedance of State water quality standards (even though the data may be sparse or absent) a limit MUST be included in the permit.” The proposed Permit fails to comply with 40 CFR 122.44 by failing to contain an Effluent Limitation for bis(2-ethylhexyl)phthalate.

**5. The Region 5 Permits fails to contain an Effluent Limitation for aluminum in accordance with Federal Regulations 40 CFR 122.44, US EPA’s interpretation of the regulation, and California Water Code, Section 13377.**

Aluminum, at US EPA specified concentrations, can be toxic to aquatic life. The Regional Board has routinely failed to utilize US EPA’s recommended chronic toxicity criteria to protect aquatic life.

Federal Regulations, 40 CFR 122.44 (d)(i), requires that; “Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.” The Basin Plan contains a narrative water quality objective for toxicity that states in part that “[a]ll waters shall be maintained free of toxic substances in concentrations that produce

*detrimental physiological responses in human, plant, animal, or aquatic life*” (narrative toxicity objective). Where numeric water quality objectives have not been established, 40 CFR §122.44(d) specifies that WQBELs may be established using USEPA criteria guidance under CWA section 304(a), proposed State criteria or a State policy interpreting narrative criteria supplemented with other relevant information, or an indicator parameter. U.S. EPA developed National Recommended Ambient Water Quality Criteria for protection of freshwater aquatic life for aluminum to prevent toxicity to freshwater aquatic life. The recommended ambient criteria four-day average (chronic) and one-hour average (acute) criteria for aluminum are 87 mg/l and 750 mg/l, respectively.

Region 5 permits consistently do not contain Effluent Limitations based on preventing chronic toxicity. US EPA’s 87 ug/l chronic criterion was developed using low pH and hardness testing. California Central Valley waters, the Sacramento River, at the Valley floor, have been sampled to have hardnesses as low as 39 mg/l CaCO<sub>3</sub> by the USGS in February 1996 for the *National Water Quality Assessment Program*. Contributory streams, especially foothill streams, have also been sampled and shown to contain even lower hardness levels. US EPA recognized in their ambient criteria development document, (Ambient Water Quality Criteria for Aluminum, EPA 440/5-86-008) that the pH was in the range 6.5 to 6.6 and that the hardness was below 20 mg/l. Typical values for pH and hardness in the Central Valley alone warrant use of the chronic ambient criteria for aluminum. Despite the hardness and pH values used in the development of the criteria; U.S. EPA’s conclusions in their Ambient Criteria for the Protection of Freshwater Aquatic Life recommends that application of the ambient criteria as necessary to be protective of the aquatic beneficial uses of receiving waters in lieu of site-specific criteria.

The drinking water maximum contaminant level (MCL), which is included as a Basin Plan Water Quality Chemical Constituents Objective, for aluminum is 1,000 as a primary MCL and 200 µg/l as a secondary MCL.

Federal Regulations, 40 CFR 122.44 (d)(i), requires that; “Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.” US EPA has interpreted 40 CFR 122.44(d) in *Central Tenets of the National Pollutant Discharge Elimination System (NPDES) Permitting Program* (Factsheets and Outreach Materials, 08/16/2002) that although States will likely have unique implementation policies there are certain tenets that may not be waived by State procedures. These tenets include that “where valid, reliable, and representative effluent data or instream background data are available they MUST be used in applicable reasonable potential and limits derivation calculations. Data may not be arbitrarily discarded or ignored.” The California Water Code (CWC), Section 13377 states in part that: “...the state board or the regional boards shall...issue waste discharge requirements... which apply and ensure compliance with ...water quality control plans, or for the protection of beneficial uses...” Section 122.44(d) of 40 CFR requires that permits include water quality-based effluent

limitations (WQBELs) to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water. Failure to include an effluent limitation based on preventing chronic toxicity for aluminum in the Region 5 Permits violates 40 CFR 122.44 and CWC 13377.

Most recently Region 5 has cited site-specific water effects ratios (WERs) at various locations to defend their relaxation of the criteria developed by US EPA for chronic aluminum. Region 5 has failed to note that aluminum is not a priority pollutant and is while WERs for CTR priority pollutants can be established in a permit, WERs for non-priority pollutants must be developed through the Basin Planning process.

US EPA's Interim Guidance on Determination and Use of Water-Effect Ratios for Metals (EPA-823-8-94-001, February 1994) states in part that:

“There are two purposes for this memorandum.

The first is to transmit the Interim Guidance on the Determination and Use of Water-Effect Ratios for Metals. EPA committed to developing this guidance to support implementation of federal standards for those States included in the National Toxics Rule.

The second is to provide policy guidance on whether a State's application of a water-effect ratio is a site-specific criterion adjustment subject to EPA review and approval/disapproval.

A central question concerning WERs is whether their use by a State results in a site-specific criterion subject to EPA review and approval under Section 303(c) of the Clean Water Act?

Derivation of a water-effect ratio by a State is a site-specific criterion adjustment subject to EPA review and approval/disapproval under Section 303(c). There are two options by which this review can be accomplished.

Option 1: A State may derive and submit each individual water-effect ratio determination to EPA for review and approval. This would be accomplished through the normal review and revision process used by a State.

Option 2: A State can amend its water quality standards to provide a formal procedure, which includes derivation of water-effect ratios, appropriate definition of sites and enforceable monitoring provisions to assure that designated uses are protected. Both this procedure and the resulting criteria would be subject to full public participation requirements. Public review of a site-specific criterion could be accomplished in conjunction with the public review required for permit issuance. EPA would review and approve/disapprove this protocol as a revised standard once. For public information, we recommend that once a year the State publish a list of site-specific criteria.

An exception to this policy applies to the waters of the jurisdictions included in the National Toxics Rule. The EPA review is not required for the jurisdictions included in the National Toxics Rule where EPA established the procedure for the State for application to the criteria promulgated. The National Toxics Rule was a formal rulemaking process with notice and comment by which EPA pre-authorized the use of a correctly applied water-effect ratio. That same process has not yet taken place in States not included in the National Toxics Rule.

As described in Section 131.36(b)(iii) of the water quality standards regulation (the official regulatory reference to the National Toxics Rule), the water-effect ratio is a site-specific calculation. As indicated on page 60866 of the preamble to the National Toxics Rule, the rule was constructed as a rebuttable presumption. The water-effect ratio is assigned a value of 1.0 until a different water-effect ratio is derived from suitable tests representative of conditions in the affected waterbody. It is the responsibility of the State to determine whether to rebut the assumed value of 1.0 in the National Toxics Rule and apply another value of the water-effect ratio in order to establish a site-specific criterion. The site-specific criterion is then used to develop appropriate NPDES permit limits. The rule thus provides a State with the flexibility to derive an appropriate site-specific criterion for specific waterbodies.”

*California’s Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (SIP) allows for WERs in Section 1.2 (Data Requirements and Adjustments). SIP Section 1.2 states that:

“The RWQCB may adjust the criteria/objective for metals with \*discharger-specific Water Effect Ratios established in accordance with U.S. EPA guidance – Interim Guidance on Determination and Use of Water Effect Ratios for Metals (EPA-823-B-94-001) or Streamlined Water-Effect Ratio Procedure for Discharges of Copper (EPA-822-R-01-005), if appropriate.”

On 24 March 2000 the Fish and Wildlife Service National Marine Fisheries Service issued a final biological opinion on the effects of the final promulgation of the CTR on listed species and critical habitats in California in accordance with section 7 of the Endangered Species Act of 1973. The biological opinion is binding and required certain actions by EPA. Section V, B of the opinion required with regard to water effect ratios (WERs) that:

*“EPA, in cooperation with the Services, will issue a clarification to the Interim Guidance on the Determination and Use of Water-Effect Ratios for Metals (EPA 1994) concerning the use of calcium-to-magnesium ratios in laboratory water, which can result in inaccurate and under-protective criteria values for federally listed species considered in the Services’ opinion. EPA, in cooperation with the Services, will also issue a clarification to the Interim Guidance addressing the*



proper acclimation of test organisms prior to testing in applying water-effect ratios (WERs).”

The WER requirement is based on the following discussion contained in the 24 March 2000 biological opinion:

*“Water Effect Ratios*

Except in waters that are extremely effluent-dominated, WERs are > 1 and result in higher numeric criteria. Note that, in the examples above, use of a site-specific WER for copper raised the criterion concentration allowed at the site from 4.1 µg/L to 6.2 µg/L, an increase of 50 percent. A WER may be more important than site water hardness or metal-specific conversion factors and translators in determining a criterion and hence the metal loading allowed (see hardness and adding discussions below).

EPA has published guidelines for determining a site-specific WER, which outline procedures for water sampling, toxicity testing, acclimating test organisms, etc. (USEPA 1994). When site water toxicity is lower than laboratory water toxicity, criteria may be raised because: 1) differences in calcium to magnesium ratios in hardness between laboratory water and site water can significantly alter the WER; 2) toxicity testing for WER development is not required across the same range of test organisms used in criteria development; and 3) the inherent variabilities associated with living organisms used in toxicity testing can be magnified when used in a ratio.

EPA guidelines for WER determinations (USEPA 1994) instruct users to reconstitute laboratory waters according to protocols that result in a calcium-to-magnesium ratio of ~0.7 across the range of hardness values (USEPA 1989, 1991). This proportion (~0.7) of calcium to magnesium is far less than the ratio found in most natural waters (Welsh *et al.* 1997). The Services agree with Welsh *et al.* (1997) that imbalances in Ca-to-Mg ratios between site waters and dilution waters may result in WERs which are overestimated because calcium ions are more protective of metals toxicity than are magnesium ions. The EPA has noted this problem with determining WERs but limits the suggested correction of matching the laboratory Ca-to-Mg ratio and the site ratio to a single sentence at the end of the proposed rule. Thus, the significance and correction of this problem is not adequately addressed.

EPA metal criteria are based on over 900 records of laboratory toxicity tests (USEPA 1992) using hundreds of thousands of individual test organisms, including dozens of species across many genera, trophic levels, and sensitivities to provide protection to an estimated 95 percent of the genera most of the time (USEPA 1985f). The use of a ratio based WER determined with 2 or 3 test species limits the reliability of the resultant site-specific criteria and calls into question the level of protection provided for families or genera not represented in the WER testing

The inherent variability of toxicity testing can also have a significant effect on the final WER determination, especially because it is used in a ratio. As discussed above, the EPA has developed its criteria based on a relatively large database. However, even with such a large database variability in test results can still cause difficulty in determining a criteria value. For example, Cd data were so variable that EPA abandoned the acute to chronic ratio method of determining the chronic criterion (USEPA 1985b). Instead, EPA applied the acute method to derive a chronic value. The EPA criteria document for Cd (USEPA 1985b) notes a chronic value for chinook salmon of 1.563 µg/L with a range of 1.3 to 1.88 µg/L. This is a variability of 17 percent in either direction, which is rather good (inter and intra laboratory variability higher than 17 percent is not unusual). Therefore, if this data is used in a ratio such as a WER, the variability alone could result in a 34 percent difference in the values used. A potential WER using such data could range from 0.7 to 1.4. Thus, a site-specific criteria could increase by 40 percent due to natural variability in the toxicity testing alone. In development of a site-specific WER, fewer tests are conducted and with fewer species, increasing the likelihood that natural variation in toxicity test results could affect the outcome. Care should also be taken to make sure that test results between lab and site water are significantly different. If 95 percent confidence intervals for the tests overlap then they are likely not significantly different and should not be used to determine a WER. Thus, toxicity tests should be conducted and carefully evaluated to minimize experimental variance when collecting data to calculate WERs.

Zooplankton such as cladocerans (*Daphnia sp.*) are commonly used in bioassays to determine national and site-specific criteria or develop WERs and translation factors. As sensitive as cladocerans seem to be it is possible that the life stage of cladocerans being used in most bioassays are not the most sensitive. Shurin and Dodson (1997) found that sexual reproduction in cladocerans is more sensitive to toxicants than the asexual reproductive stage and that most bioassays utilize daphnia during the asexual phase because they are well fed and cultured under low stress situations. Under stress (low temperature, drought, low food supply) cladocerans and other zooplankton use sexual reproduction to produce resting eggs that can remain dormant for months to years until more favorable conditions return. The loss or a decrease in the production of resting eggs can have a significant long-term effect on the populations of these species. Snell and Carmona (1995) found that for a rotifer zooplankton, sexual reproduction was more strongly affected by several toxicants, including cadmium, than asexual reproduction. The authors concluded that the “level of toxicants presently allowable in surface waters . . . may expose zooplankton populations to greater ecological risks than is currently believed.” Other metals may also be more toxic to the sexual stage of zooplankton adding additional doubt to the protectiveness of some criteria and WERs.

Procedures for acclimation of test organisms prior to toxicity testing may also be inadequate to assure meaningful comparisons between site and laboratory waters.

For the reasons stated above, the Services believe that the EPA procedures for determining WERs for metals may result in criteria that are not protective of threatened or endangered aquatic species. Thus, WERs of three (3) or less are unacceptable because they are likely within the variance of the toxicity tests. WERs over three must be carefully developed and evaluated to ensure that listed species will be protected.”

Region 5 has also begun using the “Arid West” report to defend its lack of a chronically protective limitation for aluminum. The Arid West Report is not applicable to the Region 5 wastewater discharges.

1. The Arid West Report clearly states this is the case by presenting the map on page 3-1. The map clearly shows that the central valley is excluded from the report.
2. Page 3-2 characterizes the applicable water bodies for which the report is developed. Deer Creek does not meet either case.

“The hydrology of arid west streams can affect the application of water quality standards, especially for ephemeral and effluent-dependent waters. For example:

*Flashy nature of flow in ephemeral streams means that they are dry for significant lengths of time and then temporarily filled with water. Accordingly, the exposure duration assumptions inherent in federally recommended criteria may not be appropriate, and as such could be modified.* Deer Creek flows year round. The Deer Creek Wastewater treatment plant is mandated by the State Board, division of water rights to discharge a minimum flow year round. This is supported by the California Department of Fish and Game in stating that if a habitat is created it must be maintained.

*Effluent-dependent streams are artificially created habitats where the ecological community present is, by definition, adapted to the flow regime, i.e., the existing aquatic life use is dependent on the nature of the waterbody created. The extent to which aquatic life becomes established in an effluent-dependent stream will be influenced by the duration and frequency of the effluent discharge. For example, some wastewater facilities are designed primarily to provide reclaimed water for reuse. However, occasionally these facilities may have to discharge to an ephemeral waterbody for a few days or weeks. The expectations for the aquatic community that develops downstream of these intermittently discharging facilities systems will be quite different from the community that develops in a waterbody that receives effluent all of the time.*

Deer Creek is a natural waterbody; there is no artificially created habitat. Deer Creek contains flow year round. There is no similarity between Deer Creek and the waterbodies addressed in the Arid West Report. Deer Creek does not appear to be an effluent dominated waterbody except for very limited periods during the year when flows from upstream are absent. Deer Creek is unlike the waterbodies

described in the Arid West Report which are dominated by effluent most of the year.

The Arid West report states on page 3-4 that: "*Effluent-dependent streams support valuable riparian communities with high biodiversity of terrestrial plants and animals. In arid west waters, the differences between terrestrial vegetation upstream and downstream of a discharge can be striking, especially where the water is effluent-dependent.*" Again, this is not the case at Deer Creek; the terrestrial vegetation cannot be distinguished upstream from downstream.

The Arid West Report states on page 4-13 that: "*Although AWQC are designed to protect most species nationwide, criteria are derived from toxicity tests primarily with surrogate laboratory organisms. These surrogates are usually those species encountered in perennial streams in mesic environments, e.g., the eastern U.S., the Pacific Northwest, and the intermountain Rocky Mountains, such as rainbow trout. A much smaller body of toxicological knowledge exists for stream biota characteristic of the arid parts of the West. The responses of species adapted to effluent-dependent waters to discharged pollutants are even less well understood. EPA regulations and guidance documents provide a procedure to recalculate site-specific water quality criteria that reflect local, unique conditions, or exposed populations.*" Deer Creek support a population of rainbow trout unlike the waterbodies described in the Arid West Report.

The Arid West Report conclusion is a recalculation procedure to modify the ambient criteria resulting in site-specific objectives. The Arid West Report states that: "***Recalculation Procedure User's Guide*** To assist in the possible application of these methods, a User's Guide was prepared for the Recalculation Procedure to aid dischargers and permit holders in applying a Recalculation Procedure given the unique biological conditions often present in effluent-dependent waters. This document includes a discussion of the derivation of national AWQC and evaluation of the use of the WER method versus the Recalculation Procedure and Resident Species Procedure in effluent-dependent waters. In addition, the User's Guide includes a discussion on the role AWQC in regulating water quality via the NPDES program of the Clean Water Act. A rough cost-benefit analysis for the resulting modified criterion is also provided." The Regional Board does not follow the Arid West Report in attempting to revise the criteria based on a scientific study, but attempts to avoid the regulatory requirements by simply using the Arid West Report conclusions as gospel and using the recommended numbers as illegal criteria. Pages 4-19 and 4-20 of the Arid West Report clearly spell out that the goal of the Report is to provide information to modify and develop water quality standards; again the Regional Board is developing illegal water quality standards by implementing the data from the Arid West Report without going through the procedures for developing standards or objectives.

The Regional Board has cited *Evaluation of the EPA Recalculation Procedure in the Arid West Technical Report* (May 2006). The title of the document infers recalculation of water quality criteria with the intent of developing site specific water quality criteria. This is confirmed in the *Forward* of the report presented on page ii which states that:

“The purpose of this fifth report, *Evaluation of EPA Recalculation Procedure in Arid West Effluent Dependent Waters*, (“Recalculation Procedure Study”) was to evaluate use of the Recalculation Procedure on selected water quality criteria with different modes of toxicity in specific arid West waters. In addition, based on the findings from this evaluation, a *User’s Guide for Development of Site-Specific Water Quality Standards in Arid West Effluent-dependent Streams Using USEPA’s Recalculation Procedure* was also prepared as a practical guide for water quality standards practitioners regarding use of the Recalculation Procedure for developing site-specific water quality standards.”

The Regional Board has not however recalculated the criteria and begun the legally required process of modifying the water quality criteria. The Regional Board has circumvented the legal water quality standards development process and applied the recommended water quality levels for Arid West waterbodies in NPDES permits. This is not only contrary to the stated intent of the report but conflicts with federal and state requirements for developing water quality standards, including site-specific standards. The Regional Board has failed to follow the legally required procedures for developing water quality standards, 40 CFR Part 131. The Regional Board has also failed to comply with the California Water Code, Porter Cologne Section 13241.

**6. The Region 5 Permits do not contain Effluent Limitations for oil and grease in violation of Federal Regulations 40 CFR 122.44 and California Water Code, Section 13377**

The Region 5 Permits for a domestic wastewater treatment plant, which, by their nature, receive oil and grease in concentrations from home cooking and restaurants present a reasonable potential to exceed the Basin Plan water quality objective for oil and grease (Basin Plan III-5.00). Confirmation sampling is not necessary to establish that domestic wastewater treatment systems contain oil and grease in concentrations that present a reasonable potential to exceed the water quality objective.

The Region 5 permits cite the State Board’s general Order for collection systems as requiring a fats oil and grease program (FOG). The State Board’s general Order however allows most communities to opt out of the FOG program and there is no oversight of any program effectiveness.

It is not unusual for sewerage systems to allow groundwater cleanup systems, such as from leaking underground tanks, to discharge into the sanitary sewer. Groundwater polluted with petroleum hydrocarbons can also infiltrate into the collection system as easily as sewage exfiltrates. The Central Valley Regional Board has a long established history of including oil and grease limitations in NPDES permits at 15 mg/l as a daily maximum and 10 mg/l as a monthly average, which has established BPTC for POTWs.

Notwithstanding the fact that the Regional Board has an established history of including

oil and grease limitations in NPDES permits at 15 mg/l as a daily maximum and 10 mg/l as a monthly average, we believe these limitations are not necessarily protective. The only guidance we were able to find supporting the 15/10 mg/l limit is an old 1974 EPA memo discussing technological-based limits for stormwater runoff from petroleum refineries and marketing terminals. The 15/10 mg/l standard is clearly inadequate in situations where reasonable potential analyses mandate a water quality-based limitation.

Oil and grease is highly toxic to aquatic life: toxic at concentrations as low as 0.1 mg/L and sublethal toxicities are reported at 10-100 µg/L. In fact, it has been shown that petroleum products can harm aquatic life at concentrations as low as 1 µg/l. Oil and grease is also persistent, bioaccumulative and highly toxic in sediment. The US EPA's water quality standard for oil and grease is stated as: "a) 0.01 of the lowest continuous flow 96-hour LC50 to several important freshwater and marine species, each having a demonstrated high susceptibility to oils and petrochemicals, b) Levels of oils or petrochemicals in the sediment which cause deleterious effects to the biota should not be allowed and c) surface waters shall be virtually free from floating nonpetroleum oils of vegetable or animal origin, as well as petroleum-derived oils" Goldbook, 1986, Quality Criteria for Water, EPA 440/5-86-001. A table summarizing lethal toxicities of various petroleum products to aquatic life can be found in EPA's 1976 Quality Criteria for Water (Redbook, pp 210-215). The Basin Plan's narrative limit for oil and grease is stated as "[w]aters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses" Basin Plan, III-5.00.

**7. The Region 5 Permits contain no Effluent Limitations for settleable solids (SS) which were present in the existing NPDES Permit contrary to the Antibacksliding requirements of the Clean Water Act and Federal Regulations, 40 CFR 122.44 (l)(1).**

The existing NPDES permits for domestic facilities contain Effluent Limitations for settleable solids (SS). The most important physical characteristic of wastewater is its total solids content. SS are an approximate measure of the quantity of sludge that will be removed by sedimentation. Low, medium and high strength wastewaters will generally contain 5 ml/l, 10 ml/l and 20 ml/l of SS, respectively. Knowledge of SS parameters is critical for proper wastewater treatment plant design, evaluating sludge quantities, operation and troubleshooting. Excessive SS in the effluent discharge are typically indicative of process upset or overloading of the system. Failure to limit and monitor for SS limits the regulators ability to assess facility operations and determine compliance. Settleable matter is a water quality objective in the Basin Plan. Failure to include an Effluent Limitations for SS threatens to allow violation of the settleable matter receiving water limitation. We applaud the operators if indeed they did not violate the SS limitation during the life of the existing permit; this does not however remove the reasonable potential to cause exceedances in the future during system upsets or overloading; this also does not constitute "new" information as is required under the antibacksliding regulations.

**8. The Region 5 Permits replace Effluent Limitations for turbidity which were present in the existing permit; contrary to the Antibacksliding requirements of the Clean Water Act and Federal Regulations, 40 CFR 122.44 (l)(1).**

Under the Clean Water Act (CWA), point source dischargers are required to obtain federal discharge (NPDES) permits and to comply with water quality based effluent limits (WQBELs) in NPDES permits sufficient to make progress toward the achievement of water quality standards or goals. The antibacksliding and antidegradation rules clearly spell out the interest of Congress in achieving the CWA's goal of continued progress toward eliminating all pollutant discharges. Congress clearly chose an overriding environmental interest in clean water through discharge reduction, imposition of technological controls, and adoption of a rule against relaxation of limitations once they are established.

The Region 5 Permit Fact Sheets discuss Pathogens and states that the previous Order established Effluent Limitations for turbidity. Turbidity limitations are maintained in the Region 5 Permits but have been moved to "Special Provisions", they are no longer Effluent Limitations. The Fact Sheet Pathogen discussion states that infectious agents in sewage are bacteria, parasites and viruses and that tertiary treatment is necessary to effectively remove these agents. This discussion also states that turbidity limitations were originally established: "...to ensure that the treatment system was functioning properly and could meet the limits for total coliform organisms. This discussion is incorrect. First; coliform organism limitations are also an indicator parameter of the effectiveness of tertiary treatment. The coliform limitations in the proposed and past Permit are significantly lower than the Basin Plan Water Quality Objective and are based on the level of treatment recommended by the California Department of Public Health (DPH). Second; both the coliform limitations and turbidity are recommended by DPH as necessary to protect recreational and irrigated agricultural beneficial uses of the receiving water. Turbidity has no lesser standing than coliform organisms in the DPH recommendation. Section 122.44(d) of 40 CFR requires that permits include water quality-based effluent limitations (WQBELs) to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water. There are no limitations for viruses and parasites in the Region 5 Permits which the Regional Board has indicated are necessary to protect the contact recreation and irrigated agricultural uses of the receiving water. Both coliform and turbidity limitations are treatment effectiveness indicators that the levels of bacteria viruses and parasites are adequately removed to protect the beneficial uses. Special Provisions are not Effluent Limitations as required by the Federal Regulations. The turbidity Effluent Limitations must be restored in accordance with the Clean Water Act and Federal regulations 40 CFR 122.44 (l)(1).

In discussing and analyzing turbidity, the Regional Board has consistently ignored the secondary maximum contaminant level (MCL) for drinking water. The Basin Plan, at Water Quality Objectives for Inland Surface Waters, Chemical Constituents (p. III-3.00),

requires that “[a]t a minimum, water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs) specified in the following Provisions of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, and Tables 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of Section 64449.” Municipal and domestic supply is an existing beneficial use of the surface water which carries a Secondary MCL for turbidity of 5 NTU. An Effluent Limitation for turbidity is required based on the drinking water quality standard..

The only rationale that can explain moving the turbidity from Effluent Limitations to Provisions is to protect Dischargers from mandatory minimum penalties as prescribed by the California Water Code, Section 13385. It is doubtful that it was intent of the legislature in adopting the mandatory penalty provisions to have the Regional Boards delete Effluent Limitations from permit to avoid penalties.

**9. Frequently Region 5 Permits fail to include Effluent Limitations for constituents and instead includes a requirement to conduct further studies contrary to US EPA’s interpretation of Federal Regulation, 40 CFR 122.44(d).**

Federal Regulations, 40 CFR 122.44(d), requires that limits must be included in permits where pollutants will cause, have reasonable potential to cause, or contribute to an exceedance of the State’s water quality standards. US EPA has interpreted 40 CFR 122.44(d) in *Central Tenets of the National Pollutant Discharge Elimination System (NPDES) Permitting Program* (Factsheets and Outreach Materials, 08/16/2002) that although States will likely have unique implementation policies there are certain tenets that may not be waived by State procedures. These tenets include that “where calculations indicate reasonable potential, a specific numeric limit MUST be included in the permit. Additional “studies” or data collection efforts may not be substituted for enforceable permit limits where “reasonable potential” has been determined.”

**10. The Region 5 Permits fail to contain mass-based effluent limits as required by Federal Regulations 40 CFR 122.45(b).**

Mass limitations for pollutants are necessary as the basis for the Antidegradation Policy and because treatment system design is based on mass.

Federal Regulation, 40 CFR 122.45 (b) requires that in the case of POTWs, permit Effluent Limitations, standards, or prohibitions shall be based on design flow. Concentration is not a basis for design flow. Mass limitations are concentration multiplied by the design flow and therefore meet the regulatory requirement.



Section 5.7.1 of U.S. EPA's *Technical Support Document for Water Quality Based Toxics Control* (TSD, EPA/505/2-90-001) states with regard to mass-based Effluent Limits:

“Mass-based effluent limits are required by NPDES regulations at 40 CFR 122.45(f). The regulation requires that all pollutants limited in NPDES permits have limits, standards, or prohibitions expressed in terms of mass with three exceptions, including one for pollutants that cannot be expressed appropriately by mass. Examples of such pollutants are pH, temperature, radiation, and whole effluent toxicity. Mass limitations in terms of pounds per day or kilograms per day can be calculated for all chemical-specific toxics such as chlorine or chromium. Mass-based limits should be calculated using concentration limits at critical flows. For example, a permit limit of 10 mg/l of cadmium discharged at an average rate of 1 million gallons per day also would contain a limit of 38 kilograms/day of cadmium.

Mass based limits are particularly important for control of bioconcentratable pollutants. Concentration based limits will not adequately control discharges of these pollutants if the effluent concentrations are below detection levels. For these pollutants, controlling mass loadings to the receiving water is critical for preventing adverse environmental impacts.

However, mass-based effluent limits alone may not assure attainment of water quality standards in waters with low dilution. In these waters, the quantity of effluent discharged has a strong effect on the instream dilution and therefore upon the RWC. At the extreme case of a stream that is 100 percent effluent, it is the effluent concentration rather than the mass discharge that dictates the instream concentration. Therefore, EPA recommends that permit limits on both mass and concentration be specified for effluents discharging into waters with less than 100 fold dilution to ensure attainment of water quality standards.”

Federal Regulations, 40 CFR 122.45 (f), states the following with regard to mass limitations:

- “(1) all pollutants limited in permits shall have limitations, standards, or prohibitions expressed in terms of mass except:
  - (i) For pH, temperature, radiation or other pollutants which cannot be expressed by mass;
  - (ii) When applicable standards and limitations are expressed in terms of other units of measurement; or
  - (iii) If in establishing permit limitations on a case-by-case basis under 125.3, limitations expressed in terms of mass are infeasible because the mass of the pollutant discharged cannot be related to a measure of operation (for example, discharges of TSS from certain mining operations), and permit conditions ensure that dilution will not be used as a substitute for

treatment.

(2) Pollutants limited in terms of mass additionally may be limited in terms of other units of measurement, and the permit shall require the permittee to comply with both limitations.”

Federal Regulations, 40 CFR 122.45 (B)(1), states the following: “In the case of POTWs, permit effluent limitations, standards, or prohibitions shall be calculated based on design flow.”

Traditional wastewater treatment plant design utilizes average dry weather flow rates for organic, individual constituent, loading rates and peak wet weather flow rates for hydraulic design of pipes, weir overflow rates, and pumps.

Increased wet weather flow rates are typically caused by inflow and infiltration (I/I) into the sewer collection system that dilutes constituent loading rates and does not add to the mass of wastewater constituents.

For POTWs priority pollutants, such as metals, have traditionally been reduced by the reduction of solids from the wastestream, incidental to treatment for organic material. Following adoption of the CTR, compliance with priority pollutants is of critical importance and systems will need to begin utilizing loading rates of individual constituents in the WWTP design process. It is highly likely that the principal design parameters for individual priority pollutant removal will be based on mass, making mass based Effluent Limitations critically important to compliance. The inclusion of mass limitations will be of increasing importance to achieving compliance with requirements for individual pollutants.

As systems begin to design to comply with priority pollutants, the design systems for POTWs will be more sensitive to similar restrictions as industrial dischargers currently face where production rates (mass loadings) are critical components of treatment system design and compliance. Currently, Industrial Pretreatment Program local limits are frequently based on mass. Failure to include mass limitations would allow industries to discharge mass loads of individual pollutants during periods of wet weather when a dilute concentration was otherwise observed, upsetting treatment processes, causing effluent limitation processes, sludge disposal issues, or problems in the collection system.

TMDLs represent a mass loading that may occur over a given time period to attain and maintain water quality standards. Mass loadings from WWTPs are critical to determining individual discharger allocations once a TMDL has been completed.

Mixing zone allowances will increase the mass loadings of a pollutant to a waterbody and decrease treatment requirements. Accurate mass loadings are critical to mixing zone determinations.

Once toxicity numeric limitations (TUs) have been established, it is necessary to convert toxicity units that can be directly related to mass.

In addition to the above citations, on June 26<sup>th</sup> 2006 U.S. EPA, Mr. Douglas Eberhardt, Chief of the CWA Standards and Permits Office, sent a letter to Dave Carlson at the Central Valley Regional Water Quality Control Board strongly recommending that NPDES permit effluent limitations be expressed in terms of mass as well as concentration.

**11. The Region 5 Permits contain an allowance for a mixing zone that frequently does not comply with the requirements of the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (SIP) or the Basin Plan.**

Mixing zones allow wastewater dischargers to dilute their waste in the receiving stream rather than provide treatment capable of meeting “end of pipe” limits.

“A mixing zone is an area where an effluent discharge undergoes initial dilution and is extended to cover the secondary mixing in the ambient waterbody. A mixing zone is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented” according to EPA’s *Technical Support Document for Water Quality-based Toxics Control* (TSD) (USEPA, 1991), (Water quality criteria must be met at the edge of a mixing zone.) Mixing zones are regions within public waters adjacent to point source discharges where pollutants are diluted and dispersed at concentrations that routinely exceed human health and aquatic life water quality standards (the maximum levels of pollutants that can be tolerated without endangering people, aquatic life, and wildlife.) Mixing zone policies allow a discharger’s point of compliance with state and federal water quality standards to be moved from the “end of the pipe” to the outer boundaries of a dilution zone. The CWA was adopted to minimize and eventually eliminate the release of pollutants into public waters because fish were dying and people were getting sick. The CWA requires water quality standards (WQS) be met in all waters to prohibit concentrations of pollutants at levels assumed to cause harm. Since WQS criteria are routinely exceeded in mixing zones it is likely that in some locations harm is occurring. The general public is rarely aware that local waters are being degraded within these mixing zones, the location of mixing zones within a waterbody, the nature and quantities of pollutants being diluted, the effects the pollutants might be having on human health or aquatic life, or the uses that may be harmed or eliminated by the discharge. Standing waist deep at a favorite fishing hole, a fisherman has no idea that he is in the middle of a mixing zone for pathogens for a sewage discharger that has not been required to adequately treat their waste.

In 1972, backed by overwhelming public support, Congress overrode President Nixon’s veto and passed the Clean Water Act. Under the CWA, states are required to classify surface waters by *uses* – the beneficial purposes provided by the waterbody. For example, a waterbody may be designated as a drinking water source, or for supporting the

growth and propagation of aquatic life, or for allowing contact recreation, or as a water source for industrial activities, or all of the above. States must then adopt *criteria* – numeric and narrative limits on pollution, sufficient to protect the uses assigned to the waterbody. *Uses + Criteria = Water Quality Standards (WQS)*. WQS are regulations adopted by each state to protect the waters under their jurisdiction. If a waterbody is classified for more than one use, the applicable WQS are the criteria that would protect the most sensitive use.

All wastewater dischargers to surface waters must apply for and receive a permit to discharge pollutants under the National Pollutant Discharge Elimination System (NPDES.) Every NPDES permit is required to list every pollutant the discharger anticipates will be released, and establish effluent limits for these pollutants to ensure the discharger will achieve WQS. NPDES permits also delineate relevant control measures, waste management procedures, and monitoring and reporting schedules.

It is during the process of assigning effluent limits in NPDES permits that variances such as mixing zones alter the permit limits for pollutants by multiplying the scientifically derived water quality criteria by dilution factors. The question of whether mixing zones are legal has never been argued in federal court.

Mixing zones are never mentioned or sanctioned in the CWA. To the contrary, the CWA appears to speak against such a notion:

“whenever...the discharges of pollutants from a point source...would interfere with the attainment or maintenance of that water quality...which shall assure protection of public health, public water supplies, agricultural and industrial uses, and the protection and propagation of a balanced population of shellfish, fish and wildlife, and allow recreational activities in and on the water, effluent limitations...shall be established which can reasonably be expected to contribute to the attainment or maintenance of such water quality.”

A plain reading of the above paragraph calls for the application of effluent limitations whenever necessary to assure that *WQS will be met in all waters*. Despite the language of the Clean Water Act; US EPA adopted 40 CFR 131.13, General policies, that allows States to, at their discretion, include in their State standards, policies generally affecting their application and implementation, such as mixing zones, low flows and variances. According to EPA; (EPA, Policy and Guidance on Mixing Zones, 63 Fed Reg. 36,788 (July 7, 1998)) as long as mixing zones do not eliminate beneficial uses in the whole waterbody, they do not violate federal regulation or law. California has mixing zone policies included in individual Water Quality Control Plans (Basin Plans) and the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (2005) permitting pollutants to be diluted before being measured for compliance with the state’s WQS.

Federal Antidegradation regulations at 40 CFR 131.12 require that states protect waters at their present level of quality and that all beneficial uses remain protected. The

corresponding State Antidegradation Policy, Resolution 68-16, requires that any degradation of water quality not unreasonably affect present and anticipated beneficial uses. Resolution 68-16 further requires that: “Any activity which produces or may produce or increase volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with the maximum benefit to the people of the State will be maintained.”

- Pollution is defined in the California Water Code as an alteration of water quality to a degree which unreasonably affects beneficial uses. In California, Water Quality Control Plans (Basin Plans) contain water quality standards and objectives which are necessary to protect beneficial uses. The Basin Plan for California’s Central Valley Regional Water Board states that: “According to Section 13050 of the California Water Code, Basin Plans consist of a designation or establishment for the waters within a specified area of beneficial uses to be protected, water quality objectives to protect those uses, and a program of implementation needed for achieving the objectives. State law also requires that Basin Plans conform to the policies set forth in the Water Code beginning with Section 13000 and any state policy for water quality control. Since beneficial uses, together with their corresponding water quality objectives, can be defined per federal regulations as water quality standards, the Basin Plans are regulatory references for meeting the state and federal requirements for water quality control (40 CFR 131.20).”
- Nuisance is defined in the California Water Code as anything which is injurious to health, indecent, offensive or an obstruction of the free use of property which affects an entire community and occurs as a result of the treatment or disposal of waste.

The Antidegradation Policy (Resolution 68-16) allows water quality to be lowered as long as beneficial uses are protected (pollution or nuisance will not occur), best practicable treatment and control (BPTC) of the discharge is provided, and the degradation is in the best interest of the people of California. Water quality objectives were developed as the maximum concentration of a pollutant necessary to protect beneficial uses and levels above this concentration would be considered pollution. The Antidegradation Policy does not allow water quality standards and objectives to be exceeded. Mixing zone are regions within public waters adjacent to point source discharges where pollutants are diluted and dispersed at concentrations that routinely exceed water quality standards.

The Antidegradation Policy (Resolution 68-16) requires that best practicable treatment or control (BPTC) of the discharge be provided. Mixing zones have been allowed in lieu of treatment to meet water quality standards at the end-of-the-pipe prior to discharge. To comply with the Antidegradation Policy, the trade of receiving water beneficial uses for

lower utility rates must be in the best interest of the people of the state and must also pass the test that the Discharger is providing BPTC. By routinely permitting excessive levels of pollutants to be legally discharged, mixing zones act as an economic disincentive to Dischargers who might otherwise have to design and implement better treatment mechanisms. Although the use of mixing zones may lead to individual, short-term cost savings for the discharger, significant long-term health and economic costs may be placed on the rest of society. An assessment of BPTC, and therefore compliance with the Antidegradation Policy, must assess whether treatment of the wastestream can be accomplished, is feasible, and not simply the additional costs of compliance with water quality standards. A BPTC case can be made for the benefits of prohibiting mixing zones and requiring technologies that provide superior waste treatment and reuse of the wastestream.

EPA's Water Quality Standards Handbook states that: "It is not always necessary to meet all water quality criteria within the discharge pipe to protect the integrity of the waterbody as a whole." The primary mixing area is commonly referred to as the zone of initial dilution, or ZID. Within the ZID acute aquatic life criteria are exceeded. To satisfy the CWA prohibition against the discharge of toxic pollutants in toxic amounts, regulators assume that if the ZID is small, significant numbers of aquatic organisms will not be present in the ZID long enough to encounter acutely toxic conditions. EPA recommends that a ZID not be located in an area populated by non-motile or sessile organisms, which presumably would be unable to leave the primary mixing area in time to avoid serious contamination.

Determining the impacts and risks to an ecosystem from mixing pollutants with receiving waters at levels that exceed WQS is extremely complex. The range of effects pollutants have on different organisms and the influence those organisms have on each other further compromises the ability of regulators to assess or ensure "acceptable" short and long-term impacts from the use of mixing zones. Few if any mixing zones are examined prior to the onset of discharging for the potential effects on impacted biota (as opposed to the physical and chemical fate of pollutants in the water column). Biological modeling is especially challenging – while severely toxic discharges may produce immediately observable effects, long-term impacts to the ecosystem can be far more difficult to ascertain. The effects of a mixing zone can be insidious; impacts to species diversity and abundance may be impossible to detect until it is too late for reversal or mitigation.

The *CALIFORNIA CONSTITUTION, ARTICLE 10, WATER, SEC. 2* states that: "It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare. The right to water or to the use or flow of water in or from any natural stream or water course in this State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or

unreasonable method of diversion of water. Riparian rights in a stream or water course attach to, but to no more than so much of the flow thereof as may be required or used consistently with this section, for the purposes for which such lands are, or may be made adaptable, in view of such reasonable and beneficial uses; provided, however, that nothing herein contained shall be construed as depriving any riparian owner of the reasonable use of water of the stream to which the owner's land is riparian under reasonable methods of diversion and use, or as depriving any appropriator of water to which the appropriator is lawfully entitled. This section shall be self-executing, and the Legislature may also enact laws in the furtherance of the policy in this section contained.” The granting of a mixing zone is an unreasonable use of water when proper treatment of the wastestream can be accomplished to meet end-of-pipe limitations. Also contrary to the California Constitution, a mixing zone does not *serve the beneficial use*; to the contrary, beneficial uses are degraded within the mixing zone.

The Central Valley Regional Water Quality Control Board’s Basin Plan, page IV-16.00, requires the Regional Board use EPA’s *Technical Support Document for Water Quality Based Toxics Control (TSD)* in assessing mixing zones. The TSD, page 70, defines a first stage of mixing, close to the point of discharge, where complete mixing is determined by the momentum and buoyancy of the discharge. The second stage is defined by the TSD where the initial momentum and buoyancy of the discharge are diminished and waste is mixed by ambient turbulence. The TSD goes on to state that in large rivers this second stage mixing may extend for miles. There are drinking water intakes, and proposed intakes, downstream of the wastewater discharge which could be impacted prior to the pollutants from the discharge are completely mixed. The TSD, Section 4.4, requires that if complete mix does not occur in a short distance mixing zone monitoring and modeling must be undertaken.

The State’s *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California (SIP)*, Section 1.4.2.2, contains requirements for a mixing zone study which must be analyzed before a mixing zone is allowed for a wastewater discharge. Properly adopted state Policy requirements are not optional. The proposed Effluent Limitations in the Region 5 Permits are not supported by the scientific investigation that is required by the SIP and the Basin Plan.

SIP Section 1.4.2.2 requires that a mixing zone shall not:

1. Compromise the integrity of the entire waterbody.
2. Cause acutely toxic conditions to aquatic life.
3. Restrict the passage of aquatic life.
4. Adversely impact biologically sensitive habitats.
5. Produce undesirable aquatic life.
6. Result in floating debris.
7. Produce objectionable color, odor, taste or turbidity.
8. Cause objectionable bottom deposits.
9. Cause Nuisance.
10. Dominate the receiving water body or overlap a different mixing zone.
11. Be allowed at or near any drinking water intake.

The Region 5 Permits' mixing zones have routinely not addressed a single required item of the SIP. A very clear requirement (SIP Section 1.4.2.2) for mixing zones is that the point(s) in the receiving stream where the applicable criteria must be met shall be specified is not in the Region 5 Permits. The "edge of the mixing zone" is not generally defined.

The Central Valley Regional Board routinely grants mixing zones absent any mixing zone analysis for human health criteria despite any knowledge of whether the discharge is "completely mixed" as is required by the SIP (1.4.2.1). Complete mixing must occur within two stream widths of the discharge point (SIP definitions). The Regional Board's permits state that "There are no known drinking water intakes in the vicinity of the discharge. For constituents where water quality criteria are based on human health objectives, critical environmental impacts are expected to occur far downstream from the source such that complete mixing is a valid assumption." There is no knowledge of whether the discharge is completely mixed within two stream widths, yet a mixing zone is granted without any analysis.

Federal regulation 40 CFR Section 131.12 (a)(1) the Antidegradation Policy requires that: "Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected." The Central Valley Regional Board routinely grants mixing zones above the drinking water maximum contaminant level (MCL) for human health criteria despite that municipal and domestic supply is a designated beneficial use of the receiving stream. The designated beneficial use of drinking water is not protected within the reach of the stream, which is often established as some unknown length, contrary to 40 CFR 131.12.

Few mixing zones are adequately evaluated to determine whether the modeling exercise was in fact relevant or accurate, or monitored over time to assess the impacts of the mixing zone on the aquatic environment. The sampling of receiving waters often consists of analyzing one or two points where the mixing zone boundary is supposed to be – finding no pollution at the mixing zone boundary is often considered proof that mixing has been "successful" when in fact the sampling protocol might have missed the plume

**12. The Region 5 Permits do not comply with the requirements of California Code of Regulations (CCR) Title 27 for the disposal of sludge which have degraded groundwater quality contrary to the Antidegradation Policy, Resolution 68-16.**

California Code of Regulations Title 27 were adopted to assure the protection of groundwater quality. Liquid waste can percolate and degrade and pollute groundwater if not properly contained or treated.

Many Region 5 Permits state that sludge is discharged to unlined drying beds and "...historical sludge handling practices unreasonably degraded groundwater." While



domestic wastewater may be exempted from CCR Title 27, under certain circumstances, sludge is not exempt. CCR Title 27, Table 2.1, requires undewatered sewage sludge to be disposed at a Class II surface impoundment and dewatered sludge to be disposed at a Class III landfill. Obviously, unlined drying beds, where groundwater has been degraded by these practices, do not meet the requirements of Title 27. The Board's Antidegradation Policy, Resolution 68-16, requires the application of best practicable treatment and control (BPTC) of the discharge. The disposal and storage of sludge to unlined drying beds has degraded groundwater. The wastewater industry standard is to mechanically dewater sludge with immediate removal to a proper disposal area, typically a landfill. Dewatering sludge with removal to a landfill is BPTC.

**13. The Region 5 waste discharge requirements (WDRs) do not comply with California Code of Regulations (CCR) Title 27, as the discharge is not in compliance with the applicable water quality control plan (Basin Plan).**

Discharges of wastewater may be exempted from CCR Title 27 requirements only if: waste discharge requirements have been issued; the discharge is in compliance with the applicable Basin Plan, and; the wastewater is not hazardous (Section 20090). The Basin Plan contains water quality objectives for groundwater. The Basin Plan *Water Quality Objectives for Groundwater* requires groundwater not exceed: 2.2 MPN/100 ml for coliform organisms; the maximum contaminant levels (MCLs) from CCR Title 22 for drinking water; taste or odor producing substances that cause nuisance or adversely affect beneficial uses, and; toxic substances that produce detrimental physiological responses in human, plant, animal or aquatic life associated with designated beneficial uses. The Basin Plan also includes the State and Regional Board Antidegradation Policy (Resolution 68-16). The Antidegradation Policy requires the maintenance of high quality waters. In accordance with the Antidegradation Policy changes in water quality are allowed only if the change is consistent with maximum benefit to the people of the state; does not unreasonable affect present and anticipated beneficial uses; does not result in water quality that exceeds water quality objectives, and; best practicable treatment and control of the discharge is provided.

Many discharges have caused or at a minimum contributed to exceedance of Basin Plan water quality objectives and therefore do not meet the test of being in compliance with requirements of the Basin Plan. These discharges have also not been shown to be in compliance with the Basin Plan incorporated Antidegradation Policy (68-16). The Antidegradation Policy requires that an allowance for any degradation must be shown to be in the interest of the people of the state, must not exceed water quality standards and that the discharge must provide best practicable treatment and control (BPTC) of the discharge. Typically none of the tests of the Antidegradation Policy have been met.

**14. The Region 5 Permits frequently fail to include an Effluent Limitation despite clear reasonable potential to exceed water quality standards as required by Federal Regulations 40 CFR 122.44 and the permit should not be adopted in accordance with California Water Code Section 13377.**

Federal Regulations, 40 CFR 122.44 (d)(i), requires that; “Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.” Even in cases where the discharge clearly exceeds the water quality objective Region 5 fails to include Effluent Limitations. California Water Code, section 13377, requires that: “Notwithstanding any other provision of this division, the state board and the regional boards shall, as required or authorized by the Federal Water Pollution Control Act, as amended, issue waste discharge and dredged or fill material permits which apply and ensure compliance with all applicable provisions of the act and acts amendatory thereof or supplementary, thereto, together with any more stringent effluent standards or limitations necessary to implement water quality control plans, or for the protection of beneficial uses, or to prevent nuisance.”

**15. Effluent Limitations for secondary drinking water MCLs are improperly regulated as an annual average contrary to Federal Regulations 40 CFR 122.45 (d)(2) and common sense.**

Federal Regulation 40 CFR 122.45 (d)(2) requires that permit for POTWs establish Effluent Limitations as average weekly and average monthly unless impracticable. The Region 5 Permits establish Effluent Limitations for secondary drinking water MCLs, such as EC, iron and manganese, as an annual average contrary to the cited Federal Regulation. These secondary standards are based on discoloration and taste and odor; conditions which occur instantaneously. Averaging over a year allows for peak shorter duration concentrations which can exceed the maximum concentration degrading the drinking water beneficial use. Establishing Effluent Limitations for EC, iron and manganese in accordance with the Federal Regulation is not impracticable, to the contrary the Central Valley Regional Board has a long history of having done so. Proof of impracticability is properly a steep slope and the Regional Board has not presented any evidence that properly and legally limiting EC, iron and manganese is impracticable.

**16. The Region 5 Permits contain Effluent Limitations less stringent than the existing permit contrary to the Antidegradation requirements of the Clean Water Act and Federal Regulations, 40 CFR 122.44 (l)(1).**

Region 5 permits routinely remove Effluent Limitations which were present in the existing NPDES permit. The typical reason is based on recent and limited sampling data which the Region states there is no longer a reasonable potential to exceed water quality standards. There is typically no attempt to analyze or provide any explanation why the original data, used to determine reasonable potential, is no longer valid. Such explanation, such as improved treatment capability or elimination of an industrial discharge, is a requirement of the federal antidegradation regulation.

Under the Clean Water Act (CWA), point source dischargers are required to obtain federal discharge (NPDES) permits and to comply with water quality based effluent limits (WQBELs) in NPDES permits sufficient to make progress toward the achievement of water quality standards or goals. The antibacksliding and antidegradation rules clearly spell out the interest of Congress in achieving the CWA's goal of continued progress toward eliminating all pollutant discharges. Congress clearly chose an overriding environmental interest in clean water through discharge reduction, imposition of technological controls, and adoption of a rule against relaxation of limitations once they are established.

Upon permit reissuance, modification, or renewal, a discharger may seek a relaxation of permit limitations. However, according to the CWA, relaxation of a WQBEL is permissible only if the requirements of the antibacksliding rule are met. The antibacksliding regulations prohibit EPA from reissuing NPDES permits containing interim effluent limitations, standards or conditions less stringent than the final limits contained in the previous permit, with limited exceptions. These regulations also prohibit, with some exceptions, the reissuance of permits originally based on best professional judgment (BPJ) to incorporate the effluent guidelines promulgated under CWA §304(b), which would result in limits less stringent than those in the previous BPJ-based permit. Congress statutorily ratified the general prohibition against backsliding by enacting §§402(o) and 303(d)(4) under the 1987 Amendments to the CWA. The amendments preserve present pollution control levels achieved by dischargers by prohibiting the adoption of less stringent effluent limitations than those already contained in their discharge permits, except in certain narrowly defined circumstances.

When attempting to backslide from WQBELs under either the antidegradation rule or an exception to the antibacksliding rule, relaxed permit limits must not result in a violation of applicable water quality standards. The general prohibition against backsliding found in §402(o)(1) of the Act contains several exceptions. Specifically, under §402(o)(2), a permit may be renewed, reissued, or modified to contain a less stringent effluent limitation applicable to a pollutant *if*: (A) material and substantial alterations or additions to the permitted facility occurred after permit issuance which justify the application of a less stringent effluent limitation; (B)(i) information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance; or (ii) the Administrator determines that technical mistakes or mistaken interpretations of law were made in issuing the permit under subsection (a)(1)(B) of this section; (C) a less stringent effluent limitation is necessary because of events over which the permittee has no control and for which there is no reasonably available remedy [(e.g., Acts of God)]; (D) the permittee has received a permit modification under section 1311(c), 1311(g), 1311(h), 1311(i), 1311(k), 1311(n), or 1326(a) of this title; or (E) the permittee has installed the treatment facilities required to meet the effluent limitations in the previous permit, and has properly operated and maintained the facilities, but has nevertheless been unable to achieve the previous effluent limitations, in which case the limitations in the reviewed, reissued, or modified

permit may reflect the level of pollutant control actually achieved (but shall not be less stringent than required by effluent guidelines in effect at the time of permit renewal, reissuance, or modification).

Even if a discharger can meet either the requirements of the antidegradation rule under §303(d)(4) or one of the statutory exceptions listed in §402(o)(2), there are still limitations as to how far a permit may be allowed to backslide. Section 402(o)(3) acts as a floor to restrict the extent to which BPJ and water quality-based permit limitations may be relaxed under the antibacksliding rule. Under this subsection, even if EPA allows a permit to backslide from its previous permit requirements, EPA may never allow the reissued permit to contain effluent limitations which are less stringent than the current effluent limitation guidelines for that pollutant, or which would cause the receiving waters to violate the applicable state water quality standard adopted under the authority of §303.49.

Federal regulations 40 CFR 122.44 (l)(1) have been adopted to implement the antibacksliding requirements of the CWA:

- (l) Reissued permits. (1) Except as provided in paragraph (l)(2) of this section when a permit is renewed or reissued, interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit (unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued and would constitute cause for permit modification or revocation and reissuance under Sec. 122.62.)
- (2) In the case of effluent limitations established on the basis of Section 402(a)(1)(B) of the CWA, a permit may not be renewed, reissued, or modified on the basis of effluent guidelines promulgated under section 304(b) subsequent to the original issuance of such permit, to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit.
  - (i) Exceptions--A permit with respect to which paragraph (l)(2) of this section applies may be renewed, reissued, or modified to contain a less stringent effluent limitation applicable to a pollutant, if:
    - (A) Material and substantial alterations or additions to the permitted facility occurred after permit issuance which justify the application of a less stringent effluent limitation;
    - (B)(1) Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance; or (2) The Administrator determines that technical mistakes or mistaken interpretations of law were made in issuing the permit under section 402(a)(1)(b);

(C) A less stringent effluent limitation is necessary because of events over which the permittee has no control and for which there is no reasonably available remedy;

(D) The permittee has received a permit modification under section 301(c), 301(g), 301(h), 301(i), 301(k), 301(n), or 316(a); or

(E) The permittee has installed the treatment facilities required to meet the effluent limitations in the previous permit and has properly operated and maintained the facilities but has nevertheless been unable to achieve the previous effluent limitations, in which case the limitations in the reviewed, reissued, or modified permit may reflect the level of pollutant control actually achieved (but shall not be less stringent than required by effluent guidelines in effect at the time of permit renewal, reissuance, or modification).

(ii) Limitations. In no event may a permit with respect to which paragraph (1)(2) of this section applies be renewed, reissued, or modified to contain an effluent limitation which is less stringent than required by effluent guidelines in effect at the time the permit is renewed, reissued, or modified. In no event may such a permit to discharge into waters be renewed, issued, or modified to contain a less stringent effluent limitation if the implementation of such limitation would result in a violation of a water quality standard under section 303 applicable to such waters.

Region 5 has routinely removed Effluent Limitations without meeting any of the regulatory exceptions to the Antibacksliding regulations.

**17. The Region 5 Permits do not contain enforceable Effluent Limitations for chronic toxicity and therefore do not comply with the Basin Plan, Federal Regulations, at 40 CFR 122.44 (d)(1)(i) and the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (SIP).**

Region 5 has generally begun to include narrative chronic toxicity Effluent Limitations in their NPDES permits. Those permits however also contain compliance language which makes the Effluent Limitation unenforceable.

The State Implementation Policy states that: “On March 2, 2000, the State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP). The SIP became effective on April 28, 2000 with respect to the priority pollutant criteria promulgated for California by the USEPA through the NTR and to the priority pollutant objectives established by the Regional Water Board in the Basin Plan. The SIP became effective on May 18, 2000 with respect to the priority pollutant criteria promulgated by the USEPA through the CTR. The State Water Board adopted amendments to the SIP on February 24, 2005 that became effective on July 13, 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control. Requirements of this Order implement the SIP.”

The SIP, Section 4, Toxicity Control Provisions, Water Quality-Based Toxicity Control, states that: “A chronic toxicity effluent limitation is required in permits for all dischargers that will cause, have a reasonable potential to cause, or contribute to chronic toxicity in receiving waters.” The SIP is a state *Policy* and CWC Sections 13146 and 13247 require that the Board in carrying out activities which affect water quality shall comply with state policy for water quality control unless otherwise directed by statute, in which case they shall indicate to the State Board in writing their authority for not complying with such policy.

Federal regulations, at 40 CFR 122.44 (d)(1)(i), require that limitations must control all pollutants or pollutant parameters which the Director determines are or may be discharged at a level which will cause, or contribute to an excursion above any State water quality standard, including state narrative criteria for water quality. There has been no argument that domestic sewage contains toxic substances and presents a reasonable potential to cause toxicity if not properly treated and discharged. The Water Quality Control Plan for the Sacramento/ San Joaquin River Basins (Basin Plan), Water Quality Objectives (Page III-8.00) for Toxicity is a narrative criteria which states that all waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. The Proposed Permit contains a narrative Effluent Limitation prohibiting the discharge of chronically toxic substances: however a *Compliance Determination* has been added to the proposed Permit: “Compliance with the accelerated monitoring and TRE/TIE provisions of Provision VI.C.2.a shall constitute compliance with effluent limitations contained in sections IV.A.1.d and IV.B.1.d of this Order for chronic whole effluent toxicity “. The *Compliance Determination* nullifies the Effluent Limitation and makes toxic discharges unenforceable.

The proposed Permit includes the following: “I. Chronic Whole Effluent Toxicity Effluent Limitation. Compliance with the accelerated monitoring and TRE/TIE provisions of Provision VI.C.2.a shall constitute compliance with effluent limitations IV.A.1.g and IV.A.2.g for chronic whole effluent toxicity.”

The Basin Plan narrative Toxicity Objective states that: “All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, or aquatic life. This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances. Compliance with this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, and biotoxicity tests of appropriate duration or other methods as specified by the Regional Board.”

According to the Basin Plan toxicity sampling is required to determine compliance with the requirement that all waters be maintained free of toxic substances. Sampling does not equate with or ensure that waters are free of toxic substances. The Tentative Permit requires the Discharger to conduct an investigation of the possible sources of toxicity if a threshold is exceeded. This language is not a limitation and essentially eviscerates the

Regional Board's authority, and the authority granted to third parties under the Clean Water Act, to find the Discharger in violation for discharging chronically toxic constituents. An enforceable effluent limitation for chronic toxicity must be included in the Order.

- 18. The Region 5 Permits is based on an incomplete Report of Waste Discharge (RWD) and in accordance with Federal Regulations 40 CFR 122.21(e) and (h) and 124.3 (a)(2) the State's Policy for Implementation of Toxics standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP) and California Water Code Section 13377 the permit should not be issued until the discharge is fully characterized and a protective permit can be written.**

Frequently there is no information in the Region 5 Permits to indicate that the wastewater discharge has been characterized for California Toxics Rule (CTR), National Toxics Rule (NTR), drinking water MCLs and other pollutants which could degrade the beneficial uses of the receiving stream and exceed water quality standards and objectives. For the last several years the Regional Board's NPDES permits have contained a spreadsheet detailing the priority pollutant sampling which has, or has not, been monitored. Absent this spreadsheet, one can only conclude that the required priority pollutant sampling, which is necessary to characterize the discharge, has not been conducted. The absence of data is contrary to precedential Water Quality Order WQO 2004-0013 for the City of Yuba City, "The findings or Fact Sheet should cite the specific data on which it relied in its calculations."

EPA established the CTR in May of 2000 (Federal Register / Vol. 65, No. 97 / Thursday, May 18, 2000 / Rules and Regulations, Environmental Protection Agency 40 CFR Part 131, Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California) which promulgates: numeric aquatic life criteria for 23 priority toxic pollutants; numeric human health criteria for 57 priority toxic pollutants; and a compliance schedule provision which authorizes the State to issue schedules of compliance for new or revised National Pollutant Discharge Elimination System permit limits based on the federal criteria when certain conditions are met. Section 3, *Implementation*, requires that once the applicable designated uses and water quality criteria for a water body are determined, under the National Pollutant Discharge Elimination System (NPDES) program discharges to the water body must be characterized and the permitting authority must determine the need for permit limits. If a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criteria, the permitting authority must develop permit limits as necessary to meet water quality standards. These permit limits are water quality-based effluent limitations or WQBELs. The terms "cause," "reasonable potential to cause," and "contribute to" are the terms in the NPDES regulations for conditions under which water quality based permit limits are required (See 40 CFR 122.44(d)(1)).

The SWRCB adopted the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP) to implement the CTR. Section 1.2 Data Requirements and Adjustments, of the SIP requires that it is the discharger's responsibility to provide all data and other information requested by the RWQCB before the issuance, reissuance, or modification of a permit to the extent feasible. When implementing the provisions of this Policy, the RWQCB shall use all available, valid, relevant, representative data and information, as determined by the RWQCB.

The SIP required the Regional Board's to require dischargers to characterize their discharges for priority pollutants. On 10 September 2001, the Regional Board mailed out a California Water Code Section 13267 letter to dischargers requiring a minimum of quarterly sampling for priority pollutants, pesticides, drinking water constituents, and other pollutants. The Regional Board's 13267 letter cited SIP Section 1.2 as directing the Board to issue the letter requiring sampling sufficient to determine reasonable potential for priority pollutants and to calculate Effluent Limitations. The Regional Board's 13267 letter went beyond requiring sampling for CTR and NTR constituents and required a complete assessment for pesticides, drinking water constituents, temperature, hardness and pH and receiving water flow. There is no indication that any this data was ever received or that it was utilized in preparing the Region 5 Permits.

SIP Section 1.3 requires that the Regional Board conduct a reasonable potential analysis for each priority pollutant to determine if a water quality-based Effluent Limitation is required in the permit. Absent the data, the Regional Board cannot possibly comply with SIP requirement of Section 1.3. There is no analysis or discussion in the Region 5 Permits which indicates the Regional Board complied with the requirements of SIP Section 1.3. Failure to include this information, if received, would be in violation of Federal Regulation 40 CFR 124.8 (A)(2), which requires Fact Sheets contain an assessment of the wastes being discharged.

**3 years of data only:** There are also several instances where the Region 5 Permits is based on an incomplete record of the discharge quality. Specifically, for the removal of limitations for several previously limited pollutants (Antibacksliding discussion) and to justify the reduction of toxicity monitoring. Each of these instances utilizes only 3-years of data. The absence of data is contrary to the SIP, Section 1.2 requirement that the Regional Board use all valid, relevant and representative data. There does not appear to have been any changes in the treatment processes or the quality of the influent which would invalidate this data.

Federal Regulation, 40 CFR 122.21(e) states in part that: "The Director shall not issue a permit before receiving a complete application for a permit except for NPDES general permits. In accordance with 40 CFR 122.21 (e) and (h) and 124.3 (a)(2) the Regional Board shall not adopt the Region 5 Permits without first a complete application, in this case for industrial landfill, for which the permit application requirements are extensive. An application for a permit is complete when the Director receives an application form and any supplemental information which are completed to his or her satisfaction. The



completeness of any application for a permit shall be judged independently of the status of any other permit application or permit for the same facility or activity.”

State Report of Waste Discharge form 200 is required as a part of a complete Report of Waste Discharge. Form 200, part VI states that: “To be approved, your application must include a complete characterization of the discharge.” The Federal Report of Waste Discharge forms also require a significant characterization of a wastewater discharge. Federal Application Form 2A, which is required for completion of a Report of Waste Discharge for municipalities, Section B.6, requires that Dischargers whose flow is greater than 0.1 mgd, must submit sampling data for ammonia, chlorine residual, dissolved oxygen, total kjeldahl nitrogen, nitrate plus nitrite nitrogen, oil and grease, phosphorus and TDS. Federal Application Form 2A, Section D, requires that Discharger’s whose flow is greater than 1.0 mgd, conduct priority pollutant sampling. Federal Regulation, 40 CFR 122.21(g)(7) requires for existing manufacturing, commercial or mining facilities that a significant list of priority pollutants be sampled to characterize the effluent discharge. This has apparently not been completed.

As the Region 5 Permits states; the California Toxics Rule (CTR)(40 CFR 131, Water Quality Standards) contains water quality standards applicable to this wastewater discharge. The final due date for compliance with CTR water quality standards for all wastewater dischargers in California is May 2010. The State’s *Policy for Implementation of Toxics standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (SIP), Section 1.2, requires wastewater dischargers to provide all data and other information requested by the Regional Board before the issuance, reissuance, or modification of a permit to the extent feasible.

Federal Regulation, 40 CFR 122.21(e) states in part that: “The Director shall not issue a permit before receiving a complete application for a permit except for NPDES general permits.

California Water Code, section 13377, requires that: “Notwithstanding any other provision of this division, the state board and the regional boards shall, as required or authorized by the Federal Water Pollution Control Act, as amended, issue waste discharge and dredged or fill material permits which apply and ensure compliance with all applicable provisions of the act and acts amendatory thereof or supplementary, thereto, together with any more stringent effluent standards or limitations necessary to implement water quality control plans, or for the protection of beneficial uses, or to prevent nuisance.”

- 19. The Region 5 Permits fails to contain Effluent Limitations for salinity (EC and/or TDS) that are protective of the beneficial uses of the receiving stream and fail to provide adequate treatment in order to achieve water quality objectives and protect beneficial uses of the receiving stream contrary to Federal Regulations, CCR Title 27, the Basin Plan, the SIP, the**

### **Antidegradation Policy, the Controllable Factors Policy and the California Water Code.**

The Region 5 Permits rarely contained Effluent Limitation for salts (EC or total dissolved solids (TDS)). For expiring or renewed Permits which have salt limitations, they are generally removed and a study requirement is their place. The Region has recently however begun to include salinity based limitations for discharges into the Delta. When salinity based limitations have been included in permits they have had compliance schedules typically exceeding the 10 year maximum allowed by the Basin Plan.

Federal Regulations, 40 CFR 122.44(d), requires that limits must be included in permits where pollutants will cause, have reasonable potential to cause, or contribute to an exceedance of the State's water quality standards. US EPA has interpreted 40 CFR 122.44(d) in *Central Tenets of the National Pollutant Discharge Elimination System (NPDES) Permitting Program* (Factsheets and Outreach Materials, 08/16/2002) that although States will likely have unique implementation policies there are certain tenets that may not be waived by State procedures. These tenets include that "where calculations indicate reasonable potential, a specific numeric limit MUST be included in the permit. Additional "studies" or data collection efforts may not be substituted for enforceable permit limits where "reasonable potential" has been determined." Inclusion of the proposed limitation for TDS while requiring a mixing zone and dilution study, rather than adopting a fully protective TDS Effluent Limitation violates 40 CFR 122.44(d).

The beneficial uses of most receiving streams in the Central Valley include municipal and domestic supply (MUN), agricultural supply (AGR), industrial supply (IND), warm freshwater habitat (WARM), cold freshwater aquatic habitat (COLD) migration of both warm and cold water aquatic organisms (MIGR) and spawning, reproduction, and/or early development (SPWN).

The discharge of EC or TDS may exceed water quality objectives for each designated beneficial use:

MUN: The Drinking Water maximum contaminant levels (MCLs) are water quality objectives incorporated into the Basin Plan Chemical Constituents by reference. The MCL for TDS is 500 mg/l as the recommended level, 1,000 mg/l as an upper level and 1,500 mg/l as a short term maximum. *McKee and Wolf* (1971 Water Quality Criteria) cites that waters above 4,000 mg/l TDS are generally unfit for human use.

AGR: The Basin Plan states, on Page III-3.00 Chemical Constituents, that "Waters shall not contain constituents in concentrations that adversely affect beneficial uses." The Basin Plan's "Policy for Application of Water Quality Objectives" provides that in implementing narrative water quality objectives, the Regional Board

will consider numerical criteria and guidelines developed by other agencies and organizations. This application of the Basin Plan is consistent with Federal Regulations, 40CFR 122.44(d). For EC, *Ayers R.S. and D.W. Westcott, Water Quality for Agriculture, Food and Agriculture Organization of the United Nations – Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985)*, levels above 700  $\mu\text{mhos/cm}$  will reduce crop yield for sensitive plants. The State Water Resources Control Board's *Irrigation with Reclaimed Municipal Waste (July 1984)* and *McKee and Wolf (1971 Water Quality Criteria)*, state that waters with TDS above 2,100 mg/l are unsuitable for any irrigation under most conditions.

IND: *McKee and Wolf (1971 Water Quality Criteria)* lists the limiting TDS concentrations for numerous industrial uses in mg/l; boiler feed water 50-3000, brewing 500-1000, canning 850, general food processing 850 and paper manufacturing 80-500.

COLD/MIGR/SPWN: In a *Biological Significance* document sent to the Regional Board regarding the Musco Olive facility, dated November 1<sup>st</sup> 2006, James M. Harrington, Staff Water Quality Biologist with the California Department of Fish and Game, citing *McKee and Wolf (1971 Water Quality Criteria)* wrote that: "Surveys of inland fresh waters indicates that good mixes of fish fauna are found where conductivity values range between 150 and 500  $\mu\text{mhos/cm}$ . Even in the most alkaline waters, the upper tolerance limit for aquatic life is approximately 2000  $\mu\text{mhos/cm}$ ."

The beneficial uses of receiving streams may be degraded by salt concentrations in wastewater discharges and Federal Regulation, 40 CFR 122.4 (a), (d) and (g) require that no permit may be issued when the conditions of the permit do not provide for compliance with the applicable requirements of the CWA, or regulations promulgated under the CWA, when imposition of conditions cannot ensure compliance with applicable water quality requirements and for any discharge inconsistent with a plan or plan amendment approved under Section 208(b) of the CWA. California Water Code, section 13377, requires that: "Notwithstanding any other provision of this division, the state board and the regional boards shall, as required or authorized by the Federal Water Pollution Control Act, as amended, issue waste discharge and dredged or fill material permits which apply and ensure compliance with all applicable provisions of the act and acts amendatory thereof or supplementary, thereto, together with any more stringent effluent standards or limitations necessary to implement water quality control plans, or for the protection of beneficial uses, or to prevent nuisance." The Region 5 Permits does not protect the beneficial uses of the receiving stream, the Sacramento River, and therefore does not comply with the requirements of Federal Regulations and the California Water Code.

The Central Valley Basin Plan, page IV-15.00, contains a *Controllable Factors Policy* which states that: “Controllable water quality factors are not allowed to cause further degradation of water quality in instances where other factors have already resulted in water quality objectives being exceeded. Controllable water quality factors are those actions, conditions, or circumstances resulting from human activities that may influence the quality of the waters of the State, that are subject to the authority of the State Water or Regional Water Board, and that may be reasonably controlled.”

The discharge of salt (EC or TDS) may be a designated waste as defined by the CWC, Section 13173(b) as nonhazardous waste that contains pollutants that could be released in concentrations exceeding applicable water quality objectives; which must be regulated in accordance with Title CCR 27. The discharge of salt may exceed the Toxicity and Chemical Constituents (drinking water MCL and at concentrations that adversely affect the industrial and agricultural beneficial uses) water quality objectives. CCR, Title 27, Section 20210, requires that designated wastes shall only be discharged at Class I or Class II waste management units. Designated waste must be kept out of the receiving stream. The Region 5 Permits consistently allow the discharge of a designated waste to surface water in violation of CCR Title 27.

For EC, *Ayers R.S. and D.W. Westcott, Water Quality for Agriculture, Food and Agriculture Organization of the United Nations – Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985)*, levels above 700  $\mu\text{mhos/cm}$  will reduce crop yield for sensitive plants. The University of California, Davis Campus, Agricultural Extension Service, published a paper, dated 7 January 1974, stating that there will not be problems to crops associated with salt if the EC remains below 750  $\mu\text{mhos/cm}$ .

**20. Regional Board permits fail to assess compliance and require compliance with and the Receiving Water Limitation for Toxicity, which is based on the Basin Plan narrative toxicity water quality objective.**

Region 5 Permits contain Receiving Water Limitation No. 16 which requires that the wastewater discharge not cause: “Toxic substances to be present, individually or in combination, in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.”

Threatened violation:

The increasing production and use of pharmaceuticals and personal care products (PPCPs) – some of which may be endocrine disrupting compounds (EDCs) – have led to a growing concern about the occurrence of these compounds in the environment. Recent studies have reported the occurrence worldwide of EDCs, PPCPs, and other organic wastewater contaminants (OWCs) – collectively referred to as “constituents of emerging concern” (CECs) or “emerging constituents” (ECs) – in wastewater treatment plant (WWTP) effluents, surface

waters used as drinking water supplies, and in some cases, finished drinking waters. Of the 126 samples analyzed for the project, one sample (American River at Fairbairn drinking water treatment plant [DWTP] intake collected in April 2008) had no detectable levels of any EDCs, PPCPs, or OWCs. All other samples had one or more analytes detected at or above the corresponding MRLs. The five most frequently detected PPCPs were caffeine, carbamazepine, primidone, sulfamethoxazole, and tris(2-chloroethyl) phosphate (TCEP). At the sample sites upstream of WWTP discharges in all three watersheds, the concentrations of selected PPCPs, except for caffeine, were low (i.e.,  $\leq 13$  ng/L), pointing to WWTP discharges as the main source of most PPCPs and OWCs in the environment. (Source, Fate, and Transport of Endocrine disruptors, Pharmaceuticals, and Personal Care Products in Drinking Water Sources in California, National Water Research Institute Fountain Valley, California, May 2010)

Over the last 10 years, reports of feminized wildlife have fueled chilling headlines. Most of these reports have focused on the many ways that estrogen in sewage effluent can distort normal male development. Now a new study reveals one way that the hormone pollutant can affect females: Too much estrogen causes subtle changes in female fish's courting behavior, which could alter a population's genetic makeup (Environ. Sci. Technol., DOI: [10.1021/es101185b](https://doi.org/10.1021/es101185b)).

Increase in intersex fish downstream from WWTP possibly associated with endocrine-active contaminants. (Boulder Colorado, Colorado University, 2008)

Skewed sex ratio downstream from WWTP possibly associated with endocrine-active contaminants. (Boulder Colorado, Colorado University, 2006)

Fluoxetine (FLX), Sertraline (SER) and their degradates NFLX, and NSER were the primary antidepressants in brain tissue samples. Little or no venlafaxine (VEN), the dominant antidepressant in both water and bed sediment, was present. Degradates were measured at higher concentrations in brain samples than parent compounds. (Boulder Creek, Colorado & Fourmile Creek, Iowa, the College of Wooster, 2010)

SAR sites (with WWTP or urban runoff influent) males had significantly lower Testosterone (T) than the reference site males. Males from SAR sites had significantly higher 17 $\beta$ -estradiol (E2) than reference site. Females from SAR sites had significantly lower E2 than the reference site females. (USGS, Santa Ana River (SAR) SAR sites, 2009)

“Several recent studies have documented endocrine disruption in Delta fish. One of the biomarkers of EDCs is intersex fish, fish with both male and female reproductive organs. A recent histopathological evaluation of delta smelt for the Pelagic Organism Decline found 9 of 144 maturing delta smelt (6%) collected in the fall were intersex males. This study provides evidence that delta smelt are

being exposed to EDCs. Brander and Cherr (2008) observed choriogenin induction in male silversides from Suisun Marsh. Riordan and Adam (2008) reported endocrine disruption in male fathead minnows following in-situ exposures below the Sacramento Regional Treatment Plant. Lavado, et al. (in press) conducted studies in 2006 and 2007 to evaluate the occurrence and potential sources of EDCs in Central Valley waterways. In their study, estrogenic activity was repeatedly observed at 6 of 16 locations in the Bay-Delta watershed, including in water from the Lower Napa River and Lower Sacramento River in the Delta. Further studies are needed to identify the compounds responsible for the observed estrogenic activity and their sources.” (Alameda County Water District, Alameda County Flood Control and Water Conservation District, Zone 7, Metropolitan Water District of Southern California, San Luis & Delta-Mendota Water Authority, Santa Clara Valley Water District, State Water Contractors, June 1, 2010)

A recent study by the Toxic Substances Hydrology Program of the U.S. Geological Survey (USGS) shows that a broad range of chemicals found in residential, industrial, and agricultural wastewaters commonly occurs in mixtures at low concentrations downstream from areas of intense urbanization and animal production. The chemicals include human and veterinary drugs (including antibiotics), natural and synthetic hormones, detergent metabolites, plasticizers, insecticides, and fire retardants. One or more of these chemicals were found in 80 percent of the streams sampled. Half of the streams contained 7 or more of these chemicals, and about one-third of the streams contained 10 or more of these chemicals. This study is the first national-scale examination of these organic wastewater contaminants in streams and supports the USGS mission to assess the quantity and quality of the Nation's water resources. A more complete analysis of these and other emerging water-quality issues is ongoing. Knowledge of the potential human and environmental health effects of these 95 chemicals is highly varied; drinking-water standards or other human or ecological health criteria have been established for 14. Measured concentrations rarely exceeded any of the standards or criteria. Thirty-three are known or suspected to be hormonally active; 46 are pharmaceutically active. Little is known about the potential health effects to humans or aquatic organisms exposed to the low levels of most of these chemicals or the mixtures commonly found in this study. ("Pharmaceuticals, hormones, and other organic wastewater contaminants in U.S. streams, 1999-2000: A national reconnaissance," an article published in the March 15, 2002 issue of *Environmental Science & Technology*, v. 36, no. 6, pages 1202-1211. Data are presented in a companion USGS report, "Water-quality data for pharmaceuticals, hormones, and other organic wastewater contaminants in U.S. streams, 1999-2000" (USGS Open-File Report 02-94). These and other reports, data, and maps can be accessed on the Internet at <http://toxics.usgs.gov>.)

PPCPs are found where people or animals are treated with drugs and people use personal care products. PPCPs are found in any water body influenced by raw or treated sewage, including rivers, streams, ground water, coastal marine

environments, and many drinking water sources. PPCPs have been identified in most places sampled. The U.S. Geological Survey (USGS) implemented a national reconnaissance to provide baseline information on the environmental occurrence of PPCPs in water resources. You can find more information about this project from the USGS's [What's in Our Wastewaters and Where Does it Go?](http://www.usgs.gov/what-in-our-wastewaters-and-where-does-it-go/) site. PPCPs in the environment are frequently found in aquatic environments because PPCPs dissolve easily and don't evaporate at normal temperature and pressures. Practices such as the use of sewage sludge ("biosolids") and reclaimed water for irrigation brings PPCPs into contact with the soil.  
(<http://www.epa.gov/ppcp/faq.html#ifthereareindeed>)

From the recent scientific investigations and literature it is reasonable to conclude that “constituents of emerging concern” (CECs) are present in the wastewater discharge from the local domestic wastewater treatment plants. It is also reasonable to conclude that the wastewater discharge contains CECs in concentrations that at a minimum threaten to violate the Receiving Water Limitation for toxicity which prohibits toxic substances to be present in concentrations that produce detrimental physiological responses in human or aquatic life. The Region 5 permits are silent with regard to CECs except to state that requiring filtration may reduce their quantity in the wastewater discharge. Monitoring for CECs in the wastewater discharge and in the receiving stream or in downstream diversions would be minimal to determine the impacts of the wastewater discharge. It is undoubted that the Regional Board’s response will be that the individual chemical pollutants do not have promulgated water quality standards and monitoring for CECs would therefore be unproductive. However, the Regional Board has an obligation to require an investigation of the potential violation of the Receiving Water Limitation for Toxicity. The Discharger is also required to assess compliance with all limitations and report any instances of non-compliance with limitations, including Receiving Water Limitations. The Regional Board is also, by 40 CFR 122.44, required to develop Effluent Limitations if the discharge presents a reasonable potential to exceed a water quality standard, including the narrative toxicity objective.

US EPA has compiled a database; *Treating Contaminants of Emerging Concern A Literature Review Database* (August 2010). Local wastewater treatment system design Engineers, such as Dr. Robert Emerick, have also been testing treatment system capabilities for removing CECs. There appear to be treatment technologies that are capable of removing significant levels of CECs.

At a minimum, the Region 5 Permits should include a requirement for a study of the presence of CECs in the wastewater discharge, the receiving stream and the effectiveness of different treatment technologies to remove CECs. The report should be made available to the public.