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May 15, 2009

VIA EMAIL - BAY-DELTA@WATERBOARDS.CA.GOV

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

Re: **City of Tracy's Comment Letter on Modeling Alternatives – Southern Delta Salinity/San Joaquin River Flows WQCP Workshop**
Client-Matter No. 07547.00004

Dear Mr. Carr:

On behalf of the City of Tracy, we hereby submit comments on the modeling alternatives related to the salinity objectives in the Southern Delta region and the implementation plan for the same as requested in the second revised April 17, 2009 workshop notice.

The City of Tracy is keenly interested in the salinity issue in the Southern Delta due to the City's location within the Southern Delta. Delta water is transported via the Delta-Mendota Canal and supplies a portion of the City's municipal drinking water supply. Once used by the City's businesses and residents, this Delta water flows to the City's wastewater treatment plant and ultimately discharges into Old River. In addition, the City owns two square mile of irrigated farmland in the Southern Delta. Thus, the City is interested not only as a wastewater discharger, but also as a beneficial user of Delta water.

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Because Tracy's main source of drinking water includes water from the Southern Delta, Tracy's municipal drinking water supply approaches or exceeds the current Delta salinity standards whenever the Delta approaches or exceeds the salinity standards. After the community uses the water for residential and industrial purposes the salinity is increased by a certain increment before being discharged into Old River. Because Delta salinity is a significant portion of the salinity in Tracy's wastewater discharge, there is no easy solution to this problem. High salinity source water is one of the reasons that some regional boards have adopted salinity objectives applicable to wastewater that adds an increment of salinity to the source water to ensure that compliance by wastewater dischargers need not treat to cleaner than source water standards. This is also the concept behind USEPA regulations on intake water credits. This concept should be incorporated into the Bay-Delta Plan.

The Bay-Delta Salinity objectives should be more specific and targeted to the designated beneficial uses being protected.

As stated in our previous comments and discussed at the last workshop, electrical conductivity ("EC") is not a pollutant, but merely represents the ability of a material to carry electrical current. In water, EC is generally used as a measure of the mineral or other ionic concentration. Conductivity is a measure of the concentration of ionized chemicals in water. However, conductivity is only a quantitative measurement and cannot distinguish particular conductive materials in the presence of others.

As seen in the table below, many ions contribute to EC, but most are not problematic for and may even be a necessity for irrigated agriculture. Many of these ions highlighted in the table are commonly found in potable and irrigation water throughout the state, and do not necessarily mean that the water is impaired.

Instead of having a non-specific objective for EC, experts should be polled as to the constituent(s) of EC that are of concern for irrigated agriculture, and the Bay-Delta Plan should be modified to remove EC objectives and include objectives only for those problematic constituents of EC.

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CONSTITUENTS OF ELECTRICAL CONDUCTIVITY

EC Contribution	Name	EC Contribution	Name
$5.0E^{-24}$ 10^6/cm Ω	Sulfur	0.0481 10^6/cm Ω	Lead
$1.0E^{-17}$ 10^6/cm Ω	Phosphorus	0.0489 10^6/cm Ω	Cesium
$8.0E^{-16}$ 10^6/cm Ω	Iodine	0.0489 10^6/cm Ω	Vanadium
$1.0E^{-12}$ 10^6/cm Ω	Boron	0.0529 10^6/cm Ω	Protactinium
$1.0E^{-12}$ 10^6/cm Ω	Selenium	0.0542 10^6/cm Ω	Rhenium
$2.52E^{-12}$ 10^6/cm Ω	Silicon	0.0617 10^6/cm Ω	Thallium
$1.45E^{-8}$ 10^6/cm Ω	Germanium	0.0653 10^6/cm Ω	Thorium
$2.0E^{-6}$ 10^6/cm Ω	Tellurium	0.067 10^6/cm Ω	Technetium
0.00061 10^6/cm Ω	Carbon	0.0678 10^6/cm Ω	Gallium
0.00666 10^6/cm Ω	Plutonium	0.0693 10^6/cm Ω	Niobium
0.00695 10^6/cm Ω	Manganese	0.0761 10^6/cm Ω	Tantalum
0.00736 10^6/cm Ω	Gadolinium	0.0762 10^6/cm Ω	Strontium
0.00822 10^6/cm Ω	Neptunium	0.0774 10^6/cm Ω	Chromium
0.00867 10^6/cm Ω	Bismuth	0.0779 10^6/cm Ω	Rubidium
0.00889 10^6/cm Ω	Terbium	0.0917 10^6/cm Ω	Tin
0.00956 10^6/cm Ω	Samarium	0.095 10^6/cm Ω	Palladium
0.0104 10^6/cm Ω	Mercury	0.0966 10^6/cm Ω	Platinum
0.0108 10^6/cm Ω	Dysprosium	0.0993 10^6/cm Ω	Iron
0.0112 10^6/cm Ω	Europium	0.108 10^6/cm Ω	Lithium
0.0115 10^6/cm Ω	Cerium	0.109 10^6/cm Ω	Osmium
0.0117 10^6/cm Ω	Erbium	0.116 10^6/cm Ω	Indium
0.0124 10^6/cm Ω	Holmium	0.137 10^6/cm Ω	Ruthenium
0.0126 10^6/cm Ω	Lanthanum	0.138 10^6/cm Ω	Cadmium
0.0148 10^6/cm Ω	Praseodymium	0.139 10^6/cm Ω	Potassium
0.015 10^6/cm Ω	Thulium	0.143 10^6/cm Ω	Nickel
0.0157 10^6/cm Ω	Neodymium	0.166 10^6/cm Ω	Zinc
0.0166 10^6/cm Ω	Yttrium	0.172 10^6/cm Ω	Cobalt
0.0177 10^6/cm Ω	Scandium	0.187 10^6/cm Ω	Molybdenum
0.0185 10^6/cm Ω	Lutetium	0.189 10^6/cm Ω	Tungsten
0.0219 10^6/cm Ω	Polonium	0.197 10^6/cm Ω	Iridium
0.022 10^6/cm Ω	Americium	0.21 10^6/cm Ω	Sodium
0.0234 10^6/cm Ω	Titanium	0.211 10^6/cm Ω	Rhodium
0.0236 10^6/cm Ω	Zirconium	0.226 10^6/cm Ω	Magnesium
0.0288 10^6/cm Ω	Antimony	0.298 10^6/cm Ω	Calcium
0.03 10^6/cm Ω	Francium	0.313 10^6/cm Ω	Beryllium
0.03 10^6/cm Ω	Barium	0.377 10^6/cm Ω	Aluminum
0.0312 10^6/cm Ω	Hafnium	0.452 10^6/cm Ω	Gold
0.0345 10^6/cm Ω	Arsenic	0.596 10^6/cm Ω	Copper
0.0351 10^6/cm Ω	Ytterbium	0.63 10^6/cm Ω	Silver
0.038 10^6/cm Ω	Uranium	http://environmentalchemistry.com/yogi/periodic/electrical.html	

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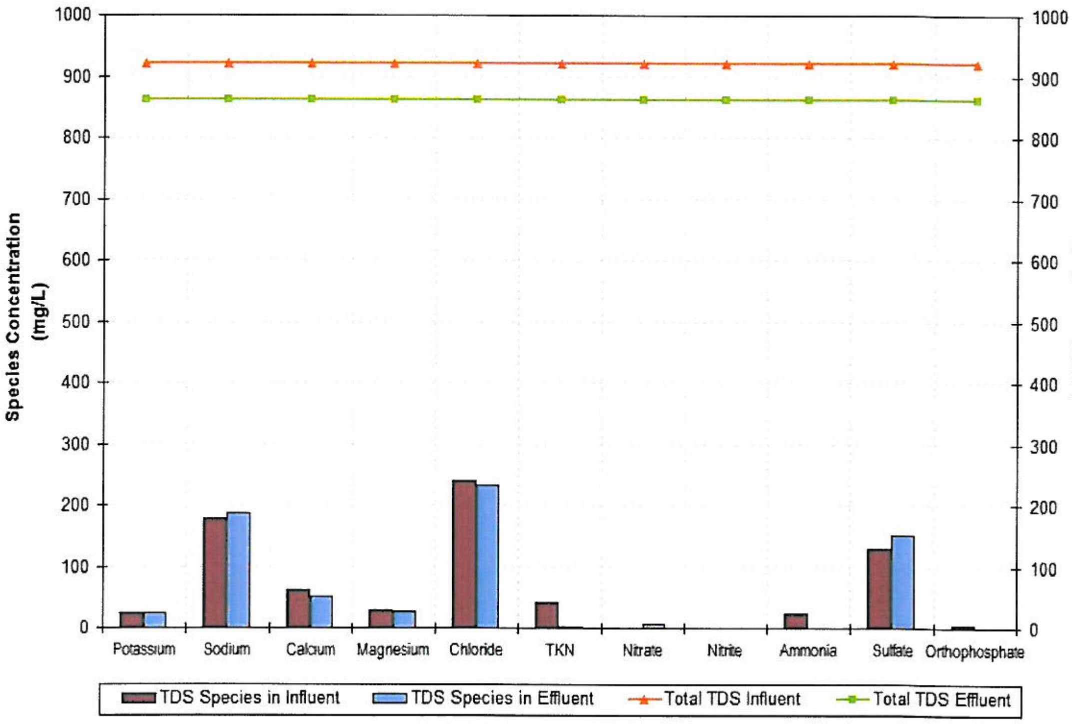
EC measurement is not the best approach to the salinity problem.

The City of Tracy is in the process of doing salinity studies on its wastewater discharge to Old River and has done a speciation of the salts in order to identify the significant contributors to EC and TDS by individual ion contribution. As expected, a significant portion of the EC/TDS contribution is related to the sodium and chloride ion concentrations.



Sodium is harmful to soils as it creates an interaction with the soil chemistry resulting in the dispersion of the soil structure and ultimately retarding the movement of water through the soil profile. Chloride is an ion associated with almost all applied dry and liquid fertilizers and is generally only harmful to plants when applied to the leaves in high concentrations. The Southern Delta uses row and furrow planting, and sprinkler systems are uncommon. Therefore, the impact of the relatively low concentrations of chloride in the Delta and in wastewater effluent is minimal.

Other EC ions are present in wastewater effluent, such as calcium. Calcium has a higher EC fraction on a pound for pound basis than sodium (see above table), but is a mineral commonly applied directly to farm fields in the valley in the form of gypsum. We believe the complexity of the water use and the overly simplified characterization of

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water quality when based on EC alone begs for further analysis of the constituents of the water and their relative effects on water use.

Because sodium causes the harm to agriculture in the Southern Delta, this should be the primary constituent that should be analyzed. Perhaps sodium adsorption ratios should be used as the appropriate objective to protect irrigated agriculture instead of EC.

Municipalities should be allowed to utilize measurements other than EC to comply with salinity standards.

Unlike sodium, potassium has not been demonstrated to cause harm to agriculture because the potassium ion is not tightly bound to the soils and is readily available for plant uptake. Moreover, potassium is a plant nutrient included in many fertilizers.

The City of Tracy could work with its local cheese manufacturer and water softener companies to switch as much of the community as possible from sodium chloride to potassium chloride. However, doing so may raise a complicating factor under the current regulatory regime because a switch to potassium processes in water treatment and by the cheese manufacturer may actually cause the EC of Tracy's wastewater to increase slightly. This is due to a slightly higher use requirement for potassium in water softeners in order to soften an equal amount of water versus use of products containing predominantly the sodium ion. This phenomenon is also true in the industrial cleaning arena where sodium-based cleaners are slightly (about 15%) more efficient than potassium cleaners thereby leading to a slightly higher use of potassium for the same cleaning result.

Although taking action to switch to potassium chloride would reduce Tracy's potential impact to agriculture in the South Delta by discharging less sodium and could minimize regulations placed on the water softener companies and customers using water softeners, such action would place the City in regulatory jeopardy by discharging higher levels of EC. Such a result is unfathomable particularly when Tracy's wastewater discharge is just a very small fraction of the water in the Southern Delta and switching to potassium chloride would only have a *de minimus* effect on Delta water quality.

For these reasons, the City of Tracy requests that the State Water Board act expeditiously to adopt alternative standards to EC that would allow municipalities to comply with salinity objectives in the Southern Delta without the need for installing costly and energy-wasting advanced treatment such as reverse osmosis.

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Respectfully submitted,

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