

Increased toxic algae in the Delta

1. Local Agencies of the North Delta (LAND)

2015 comments on the BDCP/WaterFix

Complete document here:

<http://restorethedelta.org/wp-content/uploads/2015/11/LAND-WaterFix-Alt.-4A-Cmnt-Ltr-10.30.15.pdf>

RDEIR/S Section 4.3.4/RDEIR/S Chapter 8 - **Water Quality**

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Microcystis - Blue Green Algae

The project fails to fully analyze or even articulate the full range of impacts to human health and the environment from the reduction in flow as it relates to blue-green algae (cyanobacteria). Ostensibly, the Sacramento Regional Wastewater Plant was required to reduce its loading of ammonia (and associated forms), nitrogen and phosphorous by implementing new, advanced treatment for its waste discharged to the Sacramento River at Freeport. One of the stated reasons provided by the Tunnel proponents, the SWP/CVP Contractors, for these requirements was to reduce the potential of algal blooms in the Delta. (Alameda, 2010.)

First identified in the Sacramento-San Joaquin River Delta in 1999, blooms of blue-green algae (cyanobacteria) have spread for miles throughout the Delta as a result of warmer temperatures and low flows (Berg and Sutula, 2015). This threat appears to increase as the drought goes on (Berg and Sutula, 2015). The proposed project will create essentially permanent drought conditions in the Delta, defeating the significant reductions in effluent by the new treatment facility completed at great cost to the taxpayers, by withdrawing up to half of the water from the Sacramento River. Granted some of that waste water and its nutrients will be exported, as it is currently, but the beneficial dilution effects and significant mixing zones that existed from Freeport to the South Delta would no longer occur because up to half of that flow will be missing.

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The current, and likely exacerbated by the project, spread of cyanobacteria presents public health issues because potent toxins found in many strains of cyanobacteria cause symptoms in both animals and humans, ranging from vomiting, rashes, headaches, and diarrhea to liver failure and even death. (Office of Environmental Health Hazard Assessment, 2009; U.S. EPA, 2015.) The International Agency for Lead Agencies LAND Comments October 30, 2015 Page 16 of 33 Research on Cancer lists the toxin found in cyanobacteria as possibly carcinogenic to humans. (Cogliano, 2010.) Similar to mercury and other bioaccumulative toxins, cyanobacteria toxins are known to build up in the bodies of fish and shellfish; it also can contaminate food crops when present in irrigation water. (Cogliano, 2010, p. 357-358.) The project

appears likely to create the perfect storm of aquatic toxicity – algal blooms and elevated mercury, which when combined, contaminates drinking water and fish. Particularly concerning, is the fact that the presence of cyanobacteria toxins, notably microcystins, can shut down drinking water supplies. Toledo residents received a “do not drink or boil” advisory for their water (boiling water infused with microcystins will not render the contaminant harmless) when a cyanobacterial bloom near Toledo’s drinking water intake on Lake Erie caused microcystin spikes in 2014. (U.S. EPA, 2015, p. 14.) A species related to the cyanobacteria that contaminated Ohio drinking water has been detected in the Delta, *Microcystis aeruginosa*. (Kurobe, 2013.) Traditional methods of killing algae, such as algacide, can actually increase the presence of the cyanobacteria toxin, which releases upon the death of the organism. (U.S. EPA, 2015, p. 41.) Conventional water treatment systems do not remove the toxins; therefore, U.S. EPA recommends that drinking water systems affected by a cyanobacteria bloom change the location of their intakes, purchase water from a neighbor, or add expensive additional treatments such as reverse osmosis. (U.S. EPA, 2015, pp. 41-43.) The degree of impact on human health and drinking water supplies from the project’s impacts on blue-green algae is not adequately assessed or mitigated in the RDEIR/S.

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As most Delta agriculture is reliant on pumping directly from rivers and sloughs, toxic and non-toxic aquatic plants can lead to many potential problems as a result of direct and indirect environmental conditions exacerbated or created by the project both in the near term and cumulatively. Removing up to half of the flow of the Sacramento river and concentrating that effect in a narrow corridor profoundly changes the lower channel flow (velocity), as well as the dilution and the mixing of nutrients. These project-caused conditions either amplify natural conditions that are suitable for toxic and non-toxic aquatic plants or creates the tipping point for bloom expression. As a result, in-Delta Water supply intakes downstream of the proposed Tunnels are likelier to have reduced efficiency or be clogged by filamentous algae and hyacinth (*Eichhornia crassipes*), which flourish in lower flow conditions, can contain off-flavors that could affect wine grape and other specialized crops, can contain the toxins that would harm or kill livestock, and potentially harm crop economic values, regardless of its actual toxicity.^{11 12} (Lopez et al. (2008), p. 13-17.) These potential impacts to agriculture must be analyzed.

2. Tim Stroshane, Policy Analyst, Restore the Delta

Water Quality Impacts of the Delta Tunnels Project

Complete document here:

<http://restorethedelta.org/wp-content/uploads/2015/08/Water-Quality-with-Tunnels-Report-Stroshane.pdf>

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Harmful Algal Blooms

Algae occur naturally in all fresh and marine water environments. Most species are harmless under normal circumstances, but some “cyanobacteria” (also known as “blue - green algae”) which use photosynthesis can “bloom” or undergo a rapid population boom during periods of slack flow and rising temperatures. Their sheer biomass can cause, according to the USEPA, a dramatic reduction or complete consumption of all dissolved oxygen in the water, suffocating oxygen - respiring organisms like fish, and can produce “cyanotoxins” that pose a significant potential threat to human and ecological health and affect taste, odor and safety of drinking water. They can degrade water ways used for recreation and as drinking water supplies. They thrive not only in warm temperatures and stagnant water, but they consume large nutrient inputs of nitrogen and phosphorous, which are key fertilizer inputs for agricultural land uses that, in excess, can drain to water ways.

When these conditions combine, harmful algal blooms can result. These conditions are ripest in August and September in the Estuary, but drought can increase harmful algal bloom activity. The most common blue - green algae species in the Bay - Delta Estuary is called *Microcystis*, and in 2014 DWR scientists reported *Microcystis* algal blooms running beyond October into December — water residence time was that long. Their toxin is deadly to wildlife, dogs, and human beings, and exposure can cause liver cancer in humans. It is a dangerous ecological and public health threat.

The Delta Tunnels are likely to increase residence times and slow flows in the western and central Delta. Its recirculated Draft EIR/S this year acknowledges that “it is possible that increases in the frequency, magnitude, and geographic extent of *Microcystis* blooms in the Delta would occur relative to Existing Conditions” as well as compared with the “no action alternative” (or the future condition of the Delta without Tunnels).

3. North Delta CARES

Toxic algae blooms

- Exposure to neurotoxins from blue-green algae that has human health effects and is deadly to animals, particularly dogs, as a result of warmer, slower moving water in Delta sloughs due to removal of up to 15,000 cfs from the Sacramento River (6,000 cfs at Fremont Weir and 9,000 cfs at three new WaterFix intakes in North Delta).