# Comments on the City of Stockton's March 26, 2004, Dissolved Oxygen Work Plan Prepared by Condor Earth Technologies, Inc.

Comments Submitted by
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May 21, 2004

I have reviewed the city of Stockton's Dissolved Oxygen Work Plan prepared by Condor Earth Technologies, Inc., dated March 26, 2004. I find this "Work Plan" significantly deficient in developing a plan of activities that will determine the cause of the low-DO problem in the city of Stockton sloughs that occurs after stormwater runoff events and the sources of constituents responsible for the DO problem. The Work Plan also fails to provide a framework for action to control the low-DO problem. Basically, this Work Plan needs to be redeveloped by individuals who are familiar with the issues pertinent to dissolved oxygen concentrations in the City sloughs below the water quality objective.

My comments are based on over 40 years of studies on DO depletion situations in a variety of waterbodies, including the Deep Water Ship Channel adjacent to the city of Stockton, into which the City's sloughs, creeks and rivers discharge. Further, I have reviewed the information on DO depletion in the city of Stockton's sloughs in light of the professional literature on the factors that control dissolved oxygen concentrations in waterbodies. I have published several reports on these topics, including the following:

> Lee, G. F. and Jones-Lee, A., "Issues in Developing the San Joaquin River Deep Water Ship Channel DO TMDL," Report to Central Valley Regional Water Quality Board, Sacramento, CA, August (2000). http://www.gfredlee.com/sjrpt081600.pdf
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> Lee, G. F. and Jones-Lee, A., "Synthesis and Discussion of Findings on the Causes and Factors Influencing Low DO in the San Joaquin River Deep Water Ship Channel Near Stockton, CA: Including 2002 Data," Report Submitted to SJR DO TMDL Steering Committee and CALFED Bay-Delta Program, G. Fred Lee & Associates, El Macero, CA, March (2003). http://www.gfredlee.com/SynthesisRpt3-21-03.pdf

The Condor report cites eight of my papers and reports on these issues. However, it appears to me that the authors of the Condor report do not understand the basic aquatic chemistry and related issues that are the major cause of low-DO in the city of Stockton's sloughs following a stormwater runoff event. While considerable parts of the report review factors influencing DO concentrations in waterbodies, these discussions are not tied to the situations that exist in city of Stockton sloughs that lead to low-DO concentrations.

This report contains extensive discussions about issues which have limited relevance to the low-DO problem in Stockton's sloughs. The discussions on the Deep Water Ship Channel situation, which are largely extracted from my reports, are not particularly relevant to the DO depletion problem in the sloughs.

The proposed monitoring program on Mosher Slough and Smith Canal will provide little in the way of reliable information to identify the cause of the low-DO situations that occur in the sloughs. A much more comprehensive monitoring/study program specifically designed to investigate conditions prior to, during and following runoff events on several of the City's sloughs needs to be developed by someone who understands the hydraulics, hydrology and aquatic chemistry of the factors that influence dissolved oxygen concentrations in each of the city of Stockton sloughs where low DO has been experienced.

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# Comments on the City of Stockton's April 1, 2004, Pesticide Plan Prepared by Larry Walker Associates

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May 21, 2004

I have reviewed the city of Stockton's "Pesticide Plan" and find that it is deficient in providing adequate information on a reliable approach for managing the aquatic life toxicity caused by pesticides used on residential and commercial properties in the City. The primary deficiencies relate to the lack of information on the proposed monitoring program. Considerable additional detail is needed to assure that the City conducts a meaningful, reliable monitoring program as part of formulating a management plan to eliminate aquatic life toxicity in the waters of the State located within the City of Stockton that is caused by urban and commercial area stormwater runoff and fugitive water discharges.

My background, which serves as the basis for these comments, is that after obtaining a PhD in environmental engineering and environmental sciences focusing on aquatic chemistry issues from Harvard University in 1960, I taught graduate-level environmental engineering and environmental sciences for a period of 30 years at several major US universities. One of the topics in which I have been active in research and serving as an advisor to professional organizations and others is the development and evaluation of analytical methods for water and wastewater analysis. I have been an active participant in the APHA, et al., Standard Methods committee for over 40 years. I began work on pesticide fate, transport and impacts in the early 1960s, while I was Professor of Water Chemistry and Director of the Water Chemistry Program at the University of Wisconsin, Madison. I have been active in this topic area throughout my over-40-year professional career.

Beginning in the mid-1990s I designed and supervised a roughly half-million-dollar four-year study on pesticide toxicity in the Upper Newport Bay watershed in Orange County, California. Further, in the late 1990s, at the request of the Central Valley Regional Water Quality Control Board staff (Dr. Val Connor) and the DeltaKeeper (Bill Jennings), I analyzed the data that had been collected by the CVRWQCB and the DeltaKeeper on aquatic life toxicity and its cause in stormwater runoff in the city of Stockton during the period 1994 through 1999. It is somewhat surprising that Larry Walker Associates' Pesticide Plan for the city of Stockton does not mention the comprehensive report that was developed by Dr. Jones-Lee and me on pesticide-caused aquatic life toxicity in the city of Stockton's sloughs:

> Lee, G. F. and Jones-Lee, A., "Review of the City of Stockton Urban Stormwater Runoff Aquatic Life Toxicity Studies Conducted by the CVRWQCB, DeltaKeeper and the University of California, Davis, Aquatic Toxicology Laboratory between 1994 and

2000," Report to the Central Valley Regional Water Quality Control Board, G. Fred Lee & Associates, El Macero, CA, October (2001).
http://www.gfredlee.com/stockton-txt_0401.pdf

Further, the CVRWQCB staff asked us to develop a TMDL framework for controlling aquatic life toxicity in city of Stockton stormwater runoff:

Lee, G. F. and Jones-Lee, A., "City of Stockton Mosher Slough and Five Mile Slough Diazinon and Chlorpyrifos Aquatic Life Toxicity Management Report," California Water Institute Report TP 02-08 to the California State Water Resources Control Board/Central Valley Regional Water Quality Control Board, 44 pp, California State University Fresno, Fresno, CA, December (2002). http://www.gfredlee.com/StockDiaTMDL12-14-02.pdf

In both reports, Dr. Jones-Lee and I have stressed the importance of conducting a reliable water quality monitoring program as part of developing a meaningful pesticide-caused aquatic life toxicity management program for the city of Stockton sloughs. Our discussions provide a framework for the City to develop an appropriate monitoring program. Since neither report is referenced, and the key information needed to develop a meaningful monitoring program is not included in the Larry Walker Associates report for the City, it appears that Larry Walker Associates either was not aware of our work or chose to ignore it. In either case, the Larry Walker Associates report is significantly deficient because of this situation. The city of Stockton staff responsible for the stormwater program is aware of this work, since copies of our reports have been provided to them. In connection with developing the TMDL report, I asked the City for certain information on the characteristics of several of the watersheds that need to be monitored. The City staff (Murdoch) did not respond.

One of the issues of concern with respect to the City's conducting studies on this issue is that some of the work that has been done by consultants for the City in their stormwater monitoring program has been of limited quality, where funds have been spent on studies that would obviously provide no useful information. It will be important that a mechanism be established that will insure to a high degree that funds spent by the City in this effort are directed to obtaining the necessary data to begin to control the problem.

In connection with my work on urban pesticide stormwater runoff water quality evaluation and management issues, I developed guidance on the approach that should be used to monitor stormwater runoff for pesticide-caused aquatic life toxicity. This guidance,

Lee, G.F., "Recommended Aquatic Life Toxicity Testing Program for Urban Stormwater Runoff," Comments submitted to E. Bromley, US EPA Region IX, San Francisco, CA, February (1999). http://www.gfredlee.com/recaqtox.pdf

provides information on the types of monitoring that should be done for the OP pesticides. Since some, but not all, of the OP pesticides are being phased out of urban use, it will be important to continue to monitor for the OP pesticides using this guidance and to expand the monitoring for pyrethroid-based pesticides, which are now available for residential and commercial use in Stockton. The City should assess the most common pesticides being sold over the counter within

the City, and monitor for these pesticides in stormwater runoff at several locations within the City and within the receiving water sediments. The sediment monitoring should include sediment toxicity assessment using US EPA (2000):

> US EPA, "Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates," Second Edition, US Environmental Protection Agency, EPA/600/R-99/064, Washington, D.C. (2000).

Overall, the city of Stockton needs to develop a proactive approach of the type described by Jones-Lee and Lee (2000) and Lee (2001),

> Jones-Lee, A. and Lee, G. F. , "Proactive Approach for Managing Pesticide-Caused Aquatic Life Toxicity," Report of G. Fred Lee & Associates, El Macero, CA, October (2000). http://www.gfredlee.com/proactivepest_1000.pdf
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> Lee, G. F., "Pro-Active Approach for Managing Pesticide-Caused Aquatic Life Toxicity," PowerPoint slides, Report of G. Fred Lee & Associates, El Macero, CA (2001). http://www.gfredlee.com/ProActivePest.pdf

in which the City would follow closely the sale of pesticides within the City for residential and commercial use. As new pesticides are introduced into the marketplace, the City should expand the monitoring program to determine if the new pesticides, either alone or in combination with other pesticides or chemicals, are causing aquatic life toxicity in stormwater runoff and in the receiving water water column and sediments.

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# Comments on the City of Stockton's April 1, 2004, Pathogen Plan Prepared by Larry Walker Associates

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May 24, 2004

I have reviewed the city of Stockton's proposed "Pathogen Plan" dated April 1, 2004, prepared by Larry Walker Associates, and find that it presents a good discussion of the issues that need to be considered in evaluating the potential for controlling human pathogens in Stockton's stormwater runoff. The major problem with this Plan is that the duration of the schedule for waterbody monitoring and analysis extends for an excessive period of time. It is inappropriate for the City to delay initiation of studies on Mosher Slough and Five Mile Slough until July 1, 2007, and on Lower Calaveras River and Walker Slough until July 1, 2010. All of these studies should be initiated July 1, 2004.

The contact recreation public health threat posed by human pathogens in Stockton's canals, sloughs and rivers is sufficient to justify Stockton's immediately beginning to define the sources of human pathogens in the City's waters that are derived from activities that are conducted within the City. Where human pathogen sources are defined, the City needs to immediately develop an effective control program for these sources.

My findings and recommendations are based on my academic degrees in public health from San Jose State College in 1955 (BA) and the University of North Carolina in 1957 (MSPH). The academic coursework included several courses in bacteriology/microbiology, waterborne diseases and epidemiology. Following my obtaining a PhD in environmental engineering from Harvard University in 1960, which included a minor in public health, I taught graduate-level environmental engineering and environmental science courses at several major US universities for 30 years. During this time I conducted research and served as an adviser to governmental agencies on sanitary quality of water associated with contact recreation, including advising the state of New Jersey Medical Society on the New Jersey beach sanitary quality contact recreation studies and the city of Lubbock (Texas) Park Department on contact recreation in the City's chain of lakes.

In 1993, I was a member of the OEHHA California Comparative Risk Project team that developed the report,

> California Comparative Risk Project, "Toward the 21ast Century: Planning for the Protection of California's Environment," California Office of Environmental Health Hazard Assessment, Berkeley, CA (1994).

In connection with this effort, Dr. Anne Jones-Lee and I prepared a background report,

> Lee, G. F. and Jones-Lee, A., "Public Health Significance of Waterborne Pathogens in Domestic Water Supplies and Reclaimed Water," Report to State of California Environmental Protection Agency Comparative Risk Project, Berkeley, CA, 27pp., December (1993), http://www.gfredlee.com/path-2.htm

in which we discussed the potential public health significance of acquiring diseases from human pathogens through contact recreation in California waters. As discussed, this is a significant threat to human health for those who contact recreate in waters containing human pathogens, which deserves a high priority for management.

The city of Stockton should accelerate its proposed Pathogen Plan so that all waterbodies are being investigated by July 1, 2004.

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