

# **Stormwater Runoff Science/Engineering Newsletter**

## **Devoted to Stormwater-Runoff Water Quality Issues**

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### **Introducing the Stormwater Science/Engineering Newsletter**

This professional outreach Newsletter is intended to provide technical information to improve the quality of science and engineering input

- for evaluating the water quality/beneficial-use impacts of chemical constituents and pathogen-indicator organisms in urban area and highway stormwater runoff, and
- needed for managing the significant water quality/beneficial-use impairments caused by stormwater runoff-associated constituents through the selection, design, operation, and maintenance of appropriate BMPs.

The creation of this Newsletter was prompted by the recognition of information needs of stormwater runoff water quality managers, regulatory agencies, and others in the implementation of the BMP "ratcheting down" process to ultimately achieve water quality standard/objectives in the runoff. To meet these objectives, the editors will periodically provide, in this Newsletter format, discussions of technical issues pertaining to stormwater runoff water quality management. Particular attention will be given to those issues needing improved science and/or engineering input for the development of technically valid, cost-effective water quality management programs for urban-area and highway stormwater runoff that will protect the beneficial uses of a waterbody without significant unnecessary expenditures for water quality management. Much of the discussion will also have applicability to water quality management of rural non-point sources, as well as traditional point sources such as domestic and industrial wastewaters.

Readers are encouraged to comment and/or raise questions on information presented, submit contributions, suggest topics for future issues, and make other suggestions regarding this Newsletter. In the event that there is disagreement on technical issues, the editors will attempt to conduct an interactive, public, peer review of the issue in contention.

Distribution of this Newsletter will be via e-mail to anyone interested. The Newsletter will be an attached file to an e-mail formatted in Corel WordPerfect 6/7/8. Files containing additional information on the topics discussed in the Newsletter will be appended to the e-mailed Newsletter in Corel WordPerfect 6/7/8 as a supplemental attachment. Upon request, the Newsletter can be made available in Word 6/7, or provided in the e-mail body rather than as an attachment. Anyone who does not wish to continue to receive the Newsletter can be removed from the e-mail list by contacting the editor. Past issues of the Newsletter will be made available

for review on the editor's website <http://www.gfredlee.com>. Also available at that website are many of the papers and reports that the editor/contributor have developed on evaluating and managing urban-area and highway stormwater runoff water quality.

### Relationship to the State Stormwater Quality Task Force

While in some issues the objectives of this Newsletter parallel those of the State Stormwater Quality Task Force Stormwater Science Workgroup, the development and publication of this Newsletter are not Task Force activities. The materials presented in the Newsletter represent the findings and views of the editors and contributors and do not necessarily reflect the views of the Task Force or any of its committees or work groups. However, as they feel appropriate, the editors intend to include in the Newsletter discussion of issues raised at Task Force meetings. For example, at the last Task Force meeting there were several presentations devoted to TMDL issues. However, there was insufficient time available to discuss some of the significant technical problems associated with how TMDLs are being developed and applied to urban-area and highway stormwater runoff-associated constituents. It is the intent of the editors to provide discussion of these issues in a future edition of the Newsletter.

### Background of the Editor and Contributor

Drs. Anne Jones-Lee and G. Fred Lee are, respectively, Vice President and President of G. Fred Lee & Associates, a specialty environmental consulting firm located in El Macero, CA. Dr. Anne Jones-Lee received her Bachelor of Science degree in biology from Southern Methodist University, and MS and PhD degrees in environmental sciences from the University of Texas, Dallas. For 11 years she held faculty teaching and research positions in university graduate degree programs in environmental engineering and environmental science. In 1989 she assumed the full-time position of Vice President of G. Fred Lee & Associates. Her areas of specialization are aquatic toxicology/biology and water quality evaluation and management.

Dr. G. Fred Lee obtained a bachelors degree in environmental health sciences from San Jose State University, a Master of Science in Public Health from the University of North Carolina, and a PhD from Harvard University in environmental engineering. His areas of specialization are environmental engineering, aquatic chemistry, public health, and water quality impact evaluation and management. For 30 years he held faculty teaching and research positions in graduate degree programs in environmental engineering and environmental science at several major universities. During his university teaching and research career, Dr. Lee conducted over \$5million in research and published over 500 professional papers and reports on his work.

Dr. Lee's work in the evaluation and management of water quality impacts of urban-area and highway stormwater runoff began in the 1960s, when, as part of the International Biological Program, he and his graduate students at the University of Wisconsin, Madison conducted some of the pioneering work on the water quality impacts of urban-area and highway stormwater runoff. During in the 1970s, with Dr. Anne Jones and their associates, he conducted several studies on impacts of urban and rural-area stormwater runoff water quality in the Dallas, Texas, and Colorado Front Range areas. They conducted similar studies in the 1980s in the New York City/Northern New Jersey area.

In 1989, Dr. Lee retired from his university faculty position to expand his part-time consulting to a full-time endeavor. Since then, he and Dr. Jones-Lee have continued work in a variety of projects concerned with evaluation and management of water quality impacts of urban-area and highway stormwater runoff. They have published extensively on their findings in this area; many of the recent papers and reports are available from their website, and a complete list of their publications in this and related areas is available upon request. This Newsletter represents professional outreach proceeding from their university teaching and research activities, devoted to improving the quality of science and engineering in the definition and management of real, significant, water quality/use impairments caused by urban-area and highway stormwater runoff-associated constituents.

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#### .303(d) List of Impaired Waterbodies and TMDLs

In mid May, 1998, G. Fred Lee attended the State Water Resources Control Board's (SWRCB) workshop devoted to the 303(d) listing of impaired waterbodies. The situation associated with 303(d) listing of impaired waterbodies has dramatically changed during the past year. Two years ago, the 303(d) listing developed by the Regional Water Quality Control Boards' staffs was somewhat less important than it is today. Then, the list was developed and, in many areas, largely forgotten. Today, as a result of environmental group-initiated litigation against the US EPA, the provisions of the Clean Water Act requiring the implementation of Total Maximum Daily Loads (TMDLs) within a fixed time period after listing are now being fully enforced. As a

result, the Regional Boards know that they must develop TMDLs for any listed waterbody within a certain time period or have the US EPA Region 9 develop the TMDLs.

At the recent SWRCB 303(d) workshop, mention was made that there are 1,379 303(d)-listed constituents/waterbodies for which TMDLs will have to be developed in California over the next 13 years. The Regional Boards ranked their listed waterbodies as High, Medium and Low priority. A High priority listing means that a TMDL must be completed within two years. All TMDLs must be completed within 13 years. Many of the Regional Boards do not have the staff or resources to carry out this responsibility in an appropriate manner. There is concern that this will lead to inappropriate listing and TMDL development.

**TMDL Development for Urban Stormwater Runoff.** The current 303(d) listing of impaired waterbodies situation is of considerable importance to urban-area stormwater runoff water quality managers in formulating their water quality management strategies for stormwater runoff. NPDES stormwater permits will be subject to modifications based on 303(d) listings. Through the typical TMDL, urban stormwater dischargers will be faced with having to remove some arbitrarily developed fraction of the load of a constituent that has been identified as a cause of a 303(d) listing. Therefore, not only will urban stormwater discharge managers ultimately have to meet water quality standards in the runoff waters, but also they will have to reduce discharge concentrations of certain constituents by some arbitrary fraction of the current load in a phased implementation of a TMDL.

This situation is already beginning to be faced by the Orange County, CA stormwater management agency as a result of the recently adopted TMDL for nutrients (N and P compounds) in urban stormwater discharged to Upper Newport Bay and its tributaries. It will soon have to be faced by urban stormwater NPDES-permitted dischargers in essentially all parts of the state. Urban stormwater runoff water quality managers and regulatory agencies must incorporate mid-1990-level aquatic chemistry/aquatic toxicology/biology and water quality information into the formulation and implementation of TMDLs for constituents in urban-area and highway stormwater runoff or they will find that the public will be paying far more for water quality management associated with urban area and highway stormwater runoff than is necessary to protect the designated beneficial uses of the receiving waterbody. This issue will be discussed in a future Newsletter devoted to the technical aspects of developing technically valid, cost-effective TMDLs.

**Vulnerability of Stormwater Management Agencies.** When the characteristics of stormwater runoff from urban areas are examined relative to the proposed 303(d) listing distributed by the State Board at its recent workshop, it is found that urban-area NPDES-permitted stormwater discharges are potentially vulnerable for inclusion in many TMDLs. The constituents of greatest concern are the heavy metals - lead, copper, zinc, and cadmium; nutrients - nitrogen and phosphorus compounds; sediments; PAHs; unknown caused toxicity; and coliforms-pathogens. The metals are of concern, not only because of their concentrations in the watercolumn which frequently exceed US EPA worst-case-based water quality criteria/standards in the urban area and highway stormwater runoff, but also because of their accumulation in the receiving water sediments. Several of the Regional Boards have used elevated concentrations of metals in sediments as a basis for 303(d) listing. It is not clear whether some of the other metals listed by

the Regional Boards as a basis for a 303(d) listing, such as mercury, nickel, selenium, and chromium, are constituents that could involve urban area stormwater runoff in a TMDL. As indicated above, the issue is no longer meeting water quality standards in the runoff water; the allowed concentrations in stormwater runoff may have to be decreased below water quality standards as part of the implementation of the TMDL process.

Dioxins. The San Francisco BayKeeper has petitioned the State Water Board to include dioxins in the Bay region as a constituent impairing use. This inclusion would cause the Bay to be placed on the 303(d) list because of dioxin bioaccumulation in edible fish tissue above concentrations that are considered acceptable for human consumption. The San Francisco Regional Board tried to avoid the 303(d) listing of the Bay based on dioxin bioaccumulation by claiming that there are no well-defined sources for dioxins. However, since the fish in San Francisco Bay have higher concentrations of dioxins than those considered acceptable for human consumption, dioxins could be added to the 303(d) list for the Bay region, and possibly at other locations in the state where dioxins are found in edible fish tissue above US EPA guideline values. Justification for this approach stems from the fact that the bioaccumulation of dioxins in fish tissue to hazardous levels represents a real impairment of the beneficial uses of the waterbody in which it occurs. If San Francisco Bay is listed as a 303(d)-impaired waterbody because of excessive dioxins in edible fish, the San Francisco area municipalities/stormwater management agencies will likely become vulnerable to having to control dioxins in the urban-area and highway stormwater runoff.

It is estimated that about 80% of the dioxins that enter San Francisco Bay are from urban-area street and highway stormwater runoff. Urban-area stormwater dischargers could find that they need to determine the dioxin content of their urban-area street and highway stormwater runoff. Based on the February 1997 San Francisco Bay Regional Water Quality Control Board study report entitled, "Survey of Storm Water Runoff for Dioxins in the San Francisco Bay Area," that source could be sufficient to represent a source of dioxins leading to the excessive bioaccumulation in Bay fish.

At the State Water Board 303(d)-listing workshop, several environmental groups in the San Francisco Bay area indicated that they are going to pursue the control of input of dioxins and PCBs to the Bay as an "environmental justice" - civil rights issue. Their position is that it is the caucasians who control the regulation of PCBs and dioxins, yet it is the people of color who are primarily impacted by the inadequate regulation/control of their input to the Bay since they are the primary users of Bay fish as food.

On May 27, 1998, the State Water Board took formal action on the proposed 303(d) list; dioxins were not added to the list for the San Francisco Bay area. It appears that the primary reason dioxins were not added was that the California Office of Environmental Health Hazard Assessment (OEHHA) had indicated in a recent letter sent to the Board that it did not plan to continue the fish advisory for San Francisco Bay based on excessive levels of dioxins in edible fish tissue. There is considerable controversy about what constitutes a hazardous level of dioxins to humans. Evidently, OEHHA has concluded that dioxins are not as hazardous as it had thought they were several years ago when it developed a fish advisory for dioxins in certain San Francisco Bay fish. This now leaves it up to the US EPA, which must ultimately approve the

303(d) list, to either support the State Water Board and OEHHA by not listing San Francisco Bay as a 303(d)-limited waterbody based on bioaccumulation of dioxins in fish tissue, or support the position of the environmental groups that testified at the workshop - that San Francisco Bay should be listed as a waterbody in which water quality is impaired by dioxins. It appears possible that this matter will be ultimately taken to the Courts for resolution.

Organophosphate Pesticide Toxicity. One of the more controversial areas at the 303(d) workshop was the regulation of pesticides in urban creeks and the Sacramento and San Joaquin River Delta. A disagreement has developed between the Department of Pesticide Regulation (DPR) and several of the Regional Water Boards over the regulation of aquatic life toxicity caused by organophosphate pesticides (diazinon and chlorpyrifos). In accord with several Regional Boards' Basin Plan objectives covering the control of aquatic life toxicity through the narrative standard of "no toxicity," the Boards have listed the Delta and several urban creeks as impaired waterbodies due to these pesticides. Several years ago the State Water Board and DPR signed a Management Authority Agreement (MAA) which indicates that DPR has five years to work with agricultural interests to develop voluntary control of organophosphate (OP) pesticide aquatic life toxicity associated with the use of these pesticides as dormant sprays in orchards in the Delta watershed. The listing of the Delta and urban creeks where this toxicity is present as impaired waterbodies means that TMDLs for the control of this toxicity could have to be completed within several years. Agricultural interests, pesticide manufacturers, and DPR are attempting to cause the State Board to disapprove the listing of the Delta and several urban creeks in Sacramento and the San Francisco Bay region as impaired waterbodies. It is the DPR et al. position that instead of implementing the TMDL process for the control of pesticide-caused toxicity, the control of this toxicity should be the responsibility of DPR.

This situation is of importance to urban-area stormwater runoff managers since such runoff often contains OP pesticides that causes the runoff to be toxic to some forms of aquatic life. Further, how this matter is finally resolved will significantly influence how the state of California will begin to control aquatic life toxicity in urban-area and highway stormwater runoff.

The State Water Board did not take action at the May 27, 1998 meeting on the 303(d) listing of waterbodies related to the environmental group's request to place urban creeks in the San Francisco Bay area on the 303(d) list because of the presence of OP pesticide-caused toxicity to Ceriodaphnia in the creek waters. Further, the State Board did not take action on the request of OP pesticide registrants and DPR to take urban creeks in the Sacramento area that were listed because of OP pesticide toxicity off the 303(d) list. It is my understanding that the US EPA Region 9 may support the environmental group's request to list the San Francisco Bay urban creeks as 303(d)-listed waterbodies because of OP pesticide toxicity. If they do not, this matter could be subject to litigation because of Basin Plan violations of the presence of toxicity in ambient waters. The situation in the Central Valley Sacramento area is also one that could be subject to litigation, this time by the pesticide registrants for listing waterbodies as 303(d)-limited based on OP pesticide toxicity, where the control of this toxicity could be addressed through the Water Resources Control Board - Department of Pesticide Regulation MAA.

Recently, the Urban Pesticide Committee Regulatory Subcommittee held several meetings devoted to the review of regulations governing OP pesticide toxicity. It has become clear that

there is a significant dichotomy in the regulatory approaches between Clean Water Act requirements of no ambient water toxicity, and requirements governing pesticide impacts associated with their registration which requires the control of significant adverse impacts. As currently being implemented, the Clean Water Act-based requirements are far more protective of ambient-water aquatic life than pesticide registration requirements. However, as part of its proposed approach for implementing the California Toxics Rule, the State Water Board has proposed to regulate ambient water toxicity in a manner that allows for aquatic life toxicity that does not represent a significant adverse impact to aquatic life and other beneficial uses by the toxicity.

There will be considerable discussion, and possible confrontation, between the various regulatory agencies and other interested parties on the OP pesticide toxicity issue. With few exceptions, urban-area stormwater runoff is toxic to Ceriodaphnia. The key issue that must be resolved is whether this toxicity is significantly adverse to the beneficial uses of the waterbody receiving the stormwater runoff. For most urban stormwater runoff-associated OP pesticide-caused toxicity, the link between the observed toxicity and adverse impacts on beneficial uses is not well-defined; the toxicity is apparently limited to a limited number of organism types that are potential food for larval fish, rather than to fish directly. These issues will be discussed further in future Newsletters.

Importance of 303(d) List. The State Board's 303(d) list has important implications for developing both near-term and long-range stormwater runoff water quality management strategies. It is suggested that urban stormwater runoff water quality managers review this matter and develop an approach for obtaining the information needed to evaluate the water quality/public interest significance of the constituents of concern in urban-area and highway stormwater runoff that have been listed by Regional Boards as a cause of a use-impairment of sufficient magnitude to result in the 303(d) listing and the development of a TMDL for waterbodies receiving urban area and highway stormwater runoff in their area of responsibility. An area of particular concern is the revision of stormwater runoff monitoring programs to develop the data needed to determine what, if any, real water quality/use-impairments are occurring in receiving waters for urban-area and highway stormwater runoff in those areas where NPDES-permitted stormwater is contributing 303(d)-listed constituents cited as a cause of the waterbody impairment.

Attached are comments that Drs. Lee and Jones-Lee submitted to the State Water Board on technical deficiencies in the 303(d) listing process, including some of the problems with the approaches used by the Regional Board staffs in developing the 303(d) list of impaired waterbodies. A key aspect of these comments is to inform those responsible for regulating and managing urban stormwater runoff water quality that the total concentration of a chemical constituent(s) in water or sediment is not a valid basis for a 303(d) listing. This listing should not be based on chemical concentrations or loads, but on chemical impacts which adequately and reliably consider concentrations/loads of toxic/available forms of constituents and durations of exposure that receiving water aquatic life can experience associated with a stormwater runoff event.

USC Stormwater Management Conference

Recently, the University of Southern California (USC) organized a stormwater management conference, "Searching for Solutions to Controlling Storm Water Pollution in Southern California," at the USC facilities on Catalina Island. The conference covered an introduction to many of the important aspects of urban-area stormwater runoff water quality management. From discussions with regulatory agency management personnel, Dr. Lee learned that there is a general understanding of the over-regulation associated with the current approach of requiring that urban stormwater discharges meet current water quality standards through the BMP ratcheting down process.

In her presentation at the conference, Felicia Marcus, US EPA Region 9 Administrator, stressed the importance of defining real, significant, water quality/use- impairments in receiving waters for stormwater runoff first, and then developing control programs that will eliminate the use-impairments in a cost effective manner through a watershed-based, stakeholder-participant, managed approach. At the conference Dr. Lee briefly commented on work that is being done through the State Stormwater Quality Task Force Stormwater Science Work Group. He indicated that the objective of this Work Group is the development of appropriate urban-area stormwater discharge standards that would protect the beneficial uses of the waters receiving urban-area and highway stormwater runoff without wasting public funds for unnecessary treatment. A representative of an environmental activist group commented that it was inappropriate to adjust the standards to limit the over-protection that now occurs through the use of US EPA worst case based water quality criteria as state standards that ultimately will have to be achieved through the BMP ratcheting down process in urban area and highway stormwater runoff.

Dr. Lee offered his recommendation to the conference attendees that the approach that should be followed is to use all of the provisions allowed by the US EPA and the state of California to adjust the water quality standards (discharge limits), including site-specific adjustments based on toxic/available forms, use-attainability, variances, etc., to protect receiving-water beneficial uses without requiring significant unnecessary expenditures for control of constituents associated with stormwater runoff. Then, if it is found that those appropriately adjusted water quality standards cannot be met in the urban-area and highway stormwater runoff, the US EPA and the state of California Porter-Cologne provisions for incorporation of economic issues should be evaluated in developing a regulatory program for urban area and highway stormwater runoff water quality management.

#### State Stormwater Quality Task Force Stormwater Science Work Group Activities

At the last State Stormwater Quality Task Force meeting, May 8, 1998, there was agreement that the approaches that were outlined in the April 10, 1998 proposed program for Stormwater Science Work Group activities were appropriate. As planned now and as time and resources permit, the Work Group Chairman, Dr. G. Fred Lee, will develop draft discussions of how water quality standards can and should be adjusted to make them appropriate for urban-area and highway stormwater runoff and protective of beneficial uses of receiving waters. The Work Group Chair welcomes any input into that discussion.

Total vs Dissolved Metals Criteria.

The US Department of Interior Fish and Wildlife Service and the US Department of Commerce National Marine Fisheries Service have recently issued a draft biological conference opinion on the Environmental Protection Agency's "Proposed Rule for the Promulgation of Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California." The opinion was rendered in connection with those agencies' responsibilities for administering the Endangered Species Act. In the draft opinion, concern was expressed about the US EPA's proposed use of dissolved metals as a basis for implementation of water quality standards for the California Toxics Rule (CTR). Almost 300 pages of data and discussion were presented to demonstrate why the US EPA's dissolved metal criteria may not be protective of fish, birds, reptiles, and amphibians. The metals of concern are As, Ni, Cd, Cu, Pb, Cr III, Cr VI, and Zn. Concern was also expressed about the proposed CTR criteria for Hg, Se, and pentachlorophenol. The waterbodies of concern were San Francisco Bay and all of its tributaries including the Delta and the Sacramento/San Joaquin River watersheds.

This situation could be significant to several, and possibly all, urban stormwater dischargers in the state since, if the regulation were to be based on total recoverable rather than dissolved metals, all NPDES stormwater permittees may have to install detention basins and/or filters in order to remove particulate heavy metals from the stormwater runoff. It is unlikely that US EPA would promulgate water quality criteria based on dissolved metals for one part of the state and total recoverable metals for the other. It is unclear how this matter is going to be resolved.

#### US EPA Contaminated Sediment Inventory

The US EPA has announced the availability of a three-volume report entitled, "National Contaminated Sediment Inventory," that presents information on the contamination of aquatic sediments by chemical constituents in many parts of the US. This report is available at no cost from the US Environmental Protection Agency, National Center for Environmental Publications and Information, 11029 Kenwood Road, Bldg. 5, Cincinnati, OH 45242 (fax: 513-489-8695; e-mail: [waterpubs@epamain.epa.gov](mailto:waterpubs@epamain.epa.gov)). Report numbers are EPA 82304-97-006, EPA 823-R-97-007, and EPA 823-R-97-008.

The US EPA has also recently released its report on contaminated sediment management strategy (US EPA, "EPA's Contaminated Sediment Management Strategy," EPA-823-98-004, US EPA Office of Water, April 1998). A fact sheet covering this publication can be downloaded from the US EPA's web site (<http://www.epa.gov/ostwater/cs/stratefs.html>). According to that fact sheet, the strategy document may be ordered from the US EPA National Center for Environmental Publications and Information, P.O. Box 42419, Cincinnati, OH, 45242; by phone 800-490-9198; by fax 513-489-8695; or through the US EPA's web site.

There is considerable controversy about the approach used by the US EPA to develop its national sediment quality inventory and the agency's proposed national sediment management strategy. Several national organizations and many individuals who have reviewed the draft inventory and strategy have concluded that the US EPA's approach has highly significant technical deficiencies. These issues, as they relate to regulating particulate constituents in urban-area and highway stormwater runoff, will be discussed in future Newsletters.

## OEHHA Ecological Risk Assessment Guidelines

The OEHHA has announced the availability of its "Guidelines for Assessing Ecological Risks Posed by Chemicals - Developmental Plan" "to describe the conceptual approach for the development of Cal/EPA Ecological Risk Assessment Guidelines and to introduce the specific topics for which guidance will be initially developed." According to the OEHHA announcement, copies of the Plan can be obtained via the internet at the OEHHA web site (<http://www.calepa.cahwnet.gov/oehha>) or from Dr. James M. Donald, Office of Environmental Health Hazard Assessment, 301 Capitol Mall, Room 205, Sacramento, CA 95814, phone: 916-327-1099, fax: 916-327-7340.

Comments on these issues are welcome. Address comments to G. Fred Lee at [gfredlee33@gmail.com](mailto:gfredlee33@gmail.com).

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### Inappropriate 303(d) Listing of Impaired Waterbodies

May 27, 1998

Mary Jane Forster  
State Water Resources Control Board  
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Sacramento, CA 95801

Dear Ms. Forster and Members of the Board:

I attended the 303(d) listing workshop that the State Board held yesterday for the purpose of gaining insight into the approach that the Regional Boards are now using to designate "impaired" waterbodies. This has been a topic of concern to me for a number of years, since I have repeatedly found that waterbodies are being listed as impaired without having developed a reliable database for such a designation. While I did not testify at yesterday's workshop, I did submit comments to each of the Regional Boards, in the form of a letter dated December 30, 1997, under the title of "Development of Impaired Waterbodies List." Several of the Regional Boards included my statement on this issue in their 303(d) listing public comments.

Previously, I have submitted two sets of comments on the technical deficiencies with the State Board staff proposed approach for designating and ranking toxic hot spots as part of reviewing the "Proposed Water Quality Control Policy for Guidance on the Development of Regional Toxic Hot Spot Cleanup Plans." My comments focused on the inappropriate approaches that are advocated for assessing a water quality use impairment based on the sediment quality triad weight-of-evidence approach, where the total chemical concentration is used rather than toxic/available concentrations of the constituent of concern. I pointed out that the co-occurrence approach advocated by the State Board staff can readily lead to an inappropriate assessment of the significance of a chemical constituent as a cause of a water quality use impairment, such as aquatic life toxicity, or serving as a source of a hazardous chemical that bioaccumulates to excessive levels in edible aquatic life. I am raising this issue again, since the Board's workshop on the 303(d) listing of impaired waterbodies that was held yesterday included several examples of an inappropriate approach for designating an impaired waterbody. Based on the testimony presented yesterday by one of the Regional Board staff, as well as my review of the proposed 303(d) listed waterbodies that was made available yesterday, I find that inappropriate approaches are being used by some Regional Boards to designate impaired waterbodies.

While the US EPA requires that the states list as an impaired waterbody any waterbody in which there is a violation of a water quality standard, the agency does not require, and in fact is inappropriate for the Regional Board staff to use total concentrations of a chemical constituent in sediments or aquatic life as a basis for designating an impaired waterbody. Based on the materials made available yesterday, several of the Regional Boards are using this approach. For example, the LA Regional Board lists LA Harbor Main Channel as a reason for listing a particular waterbody as impaired due to a particular "Pollutant/Stressor" Lead where it is stated as a reason for the listing "Elevated levels of lead in tissue and sediment." Similar listings occur for other constituents such as copper, zinc, or PAHs for various Region 4 waterbodies. While many of these types of listings are given a low priority, a number of them are given medium priority with the same rank as beach closures and sediment toxicity. Beach closures represent a real use impairment that impacts the public. With respect to the elevated tissue concentrations, this region also lists fish consumption advisory for some constituents, such as DDT and PCBs. The elevated lead and zinc in tissue listing is not associated with a fish consumption advisory for those chemicals.

The listing of a waterbody as impaired due to a particular constituent, such as an elevated concentration of lead, zinc, copper, etc., in sediments or aquatic organism tissue initiates the TMDL process where substantial resources could have to be devoted to either delisting or remediation of the area and/or control of the inputs of the constituent to the waterbody. As you heard, the LA region has the largest number of TMDLs to develop of all the regions. It is apparent that part of the reason for this is the approach that was used by the LA Regional Board to designate an impaired waterbody based on using total concentrations of chemical constituents in sediments or organism tissue because the chemicals are present at elevated levels. This approach is a prime example of an inappropriate approach for using chemical information in designating an impaired waterbody. It has been well known since the 1960s that that approach is technically invalid. There is no relationship between a total concentration of a constituent in sediments and its impact on aquatic life. Site specific investigations must be conducted to determine whether the presence of an elevated concentration of a chemical constituent represents

a use impairment for which the public or private interests should be spending funds for control under conditions where there is limited funding available for water pollution control.

I wish to suggest that the State Board critically examine whether it is appropriate for some of the Regional Boards to list a waterbody as being impaired due to a particular chemical constituent because it occurs at an elevated concentration in sediments or aquatic organism tissue. Obviously, if edible aquatic organisms in an area are judged to be a health hazard to those who use them as food, i.e. a consumption advisory has been issued, then the waterbody should be listed as "use impaired" for the chemical causing the advisory. However, to list as impaired all waterbodies where the tissue concentrations are elevated is not technically valid and contrary to the public interest.

At yesterday's workshop, the San Diego Regional Board staff member indicated that the BPTCP sediment co-occurrence-based values were used as the basis for listing part of a waterbody as impaired. This is technically invalid and should not be the basis for initiating the TMDL process. As discussed in my previous comments on the technical deficiencies in the proposed BPTCP Policies, Long and Morgan or MacDonald values are not reliable for relating the chemical composition of sediments to water quality impacts that initiates a major regulatory program that can cost the public or private interests many millions of dollars in the WRCBs Aquafund. With respect to constituents that are of concern because of potential toxicity to aquatic life, a sediment should only be listed as "use impaired" if the sediment is in fact toxic to a suite of sensitive organisms and the organism assemblages are significantly altered from what would be expected based on the characteristics of the sediments. Elevated concentrations of chemical constituents should only be used as an initial guide in conducting the TIEs to determine which chemical(s) is responsible for the toxicity.

The Board may wish to critically examine the appropriateness of the San Diego Regional Board, and for that matter any of the Regional Boards, who used elevated concentrations of chemical constituents in sediments, including exceedance of the Long and Morgan and/or MacDonald values as a basis for a 303(d) listing. As discussed in my previous correspondence, such values are technically invalid for predicting cause and effect between a chemical constituent in the sediments and aquatic life toxicity.

If there are questions on these comments, please contact me. If I can be of help to properly incorporating chemical information into the 303(d) listing, and/or the BPTCP designation and ranking of toxic hot spots, please let me know.

Sincerely yours,

G. Fred Lee

G. Fred Lee, PhD, DEE

Copy to: Members of the Board

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