

Santa Monica Bay Stormwater Runoff Water Quality Impact Research Needs  
February 1999

Comments on "The Santa Monica Bay Restoration Plan, September, 1994" for Stormwater  
Runoff Water Quality Management

Comments on "The Santa Monica Bay Restoration Plan, April 1994"

Comments on "Proposed Authorization to Negotiate and Execute Contracts or Interagency  
Agreements for Assessing Loading and Biological Impacts of Nonpoint Source Contaminants in  
Santa Monica Bay," May 1994

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Dear John:

I note that you are chairing a session of the Santa Monica Bay Restoration Project Technical Advisory Committee meeting, in which one of the topics for discussion is "Potential Research Projects for FY 98/99." As you know I have been concerned for many years about the technically invalid approaches that were used to establish the Santa Monica Bay Restoration Project Implementation Plan that were adopted in 1994. As part of reviewing the then proposed Plan for this restoration project, in connection with a request for public comments on the draft plan, I provided detailed comments on the highly significant technical deficiencies in the proposed approach for implementation of the Plan which called for the people in the Los Angeles area to spend over \$40 million over the next five years primarily devoted to controlling heavy metals and other chemical constituents in the Santa Monica Bay watershed urban area and highway stormwater runoff as they may impact Santa Monica Bay water quality. As I pointed out in my comments, and as is well known by those familiar with the basic principles of aquatic chemistry, aquatic toxicology, and water quality, the mass emission control strategy for heavy metals and other chemical constituents that was adopted by the Santa Monica Bay Restoration Project, while protective for the constituents considered, can readily lead to massive unnecessary expenditure of public and private funds in controlling chemical constituents in runoff from urban area streets and highways.

Under the situation that exists today, where there is significant need for public funding for a variety of social problems, it is important that the funds spent for all areas, including water pollution control, be directed towards solving real significant problems. As discussed in my previous correspondence and reports, those responsible for providing technical advice to the Santa Monica Bay Restoration Project ignored what has been well known for over 20 years, that the total concentration of heavy metals and many other constituents is a poor measure of toxic/available forms. Technically valid cost effective stormwater runoff water quality management programs must, if they are to use the public's funds wisely, focus on controlling the

constituents in the urban area stormwater runoff that are responsible for real water quality use impairments in the receiving waters for the runoff.

Many of my previous comments on the significant technical deficiencies in the Santa Monica Bay Restoration Plan that were submitted prior to the adoption of the plan in September, 1994 are available from me upon request, and will soon be available on my website, <http://www.gfredlee.com>, in the Water Quality Stormwater section. I have attached my February, 1995 comments on the final Plan. This spring I reviewed the information available on the current state of defining real significant water quality problems associated with Santa Monica Bay watershed stormwater runoff derived "constituents of concern" as defined in the Restoration Plan, including discussions with Los Angeles Regional Board staff, scientists to whom I was referred to by the staff who have been doing work on Santa Monica Bay water quality issues, and the State of the Bay 1998 Draft Report, as well as attending the USC Stormwater Management Conference that was recently held on Catalina Island, and find that the deficiencies that I discussed in 1994/95 still exist today with respect to the Restoration Plan still focusing on a mass emission reduction approach as opposed to a technically valid approach of defining those constituents in Santa Monica Bay watershed stormwater runoff that are significantly impacting the beneficial uses of Santa Monica Bay.

In 1994 those responsible for developing the Santa Monica Bay Project Restoration Plan attempted to justify the use of the mass emission approach based on elevated concentrations of lead in Santa Monica Bay sediments relative to some Long and Morgan co-occurrence based approaches for defining the potential water quality significance of chemical constituents in aquatic sediments. Co-occurrence based approaches are fundamentally flawed in developing a valid relationship between the concentrations of constituents in water and/or sediments, and their impact on the beneficial uses of the waterbody of concern. It has been documented by NOAA and the US EPA staff, that the Long and Morgan co-occurrence based approach is less reliable in predicting toxicity of sediments than flipping a coin. The fundamentally flawed nature of co-occurrence based approaches is well recognized in the sediment quality field. While these approaches are used by those who have limited understanding of aquatic chemistry, aquatic toxicology, and water quality, because they enable assessment of a so-called impact of a total concentration of a constituent in sediments they are obviously technically invalid. Dr Jones-Lee and I have published several papers on this topic which are available from our web site in the Contaminated Sediments - Aquafund section.

Our most recent discussion of these issues is presented in Dr. Jones-Lee and my "Comments on 'Draft Functional Equivalent Document Water Quality Control Policy for Guidance on the Development of Regional Toxic Hot Spot Cleanup Plans' Developed by Division of Water Quality State Water Resources Control Board dated March 1998," submitted to the State Water Resources Control Board on May 11, 1998. A copy of those comments are available from me, and will soon be on our web site in the Water Quality Waste Water section [[http://www.gfredlee.com/Sediment/toxic\\_hotspot\\_FEQ.pdf](http://www.gfredlee.com/Sediment/toxic_hotspot_FEQ.pdf)].

Last spring I was appointed Chair of the State Stormwater Quality Task Force Stormwater Science Work Group Activities: A Proposed Program. As discussed in the Work Group Plan of Activities, dated April 10, 1998, the focus of the Work Group will be on developing guidance

that can be used by stormwater runoff water quality managers and regulatory agencies to determine the real significant water quality use impairments that are occurring in a waterbody that are caused by urban area and highway stormwater runoff associated constituents. Once real significant water quality problems have been defined, then, in conjunction with information provided by the Task Force BMP Work Group, technically valid cost effective control programs can be formulated that will protect the beneficial uses of a waterbody without significant unnecessary expenditures for chemical constituent control. Techniques for implementation of this approach are well established.

About four years ago I began work in the Upper Newport Bay, Orange County, CA watershed to develop and implement the Evaluation Monitoring Approach. We have published extensively on this approach. Our publications are on our web site in the Stormwater section. Evaluation Monitoring is a watershed based technical stakeholder developed consensus on the real water quality problems that exist in a waterbody, the cause of these problems, and the source of the constituents responsible for them. This is the approach that should have been, and still must be adopted in the Santa Monica Bay Restoration Project to get this project to focus its resources available on controlling real significant water quality use impairments.

In connection with defining potential Santa Monica Bay Restoration research projects for FY 98/99, those responsible for developing a prioritized list of these projects should critically examine the "constituents of concern" that was formulated in 1994 as the focus of the mass emission control program to determine which of those constituents are causing real significant water quality use impairments in Santa Monica Bay and its tributaries. By use impairment for aquatic life related uses, that would justify the implementation of a control program for urban area and highway stormwater runoff, there should be reasonable demonstration that a potentially toxic constituent, such as lead or other heavy metals, present in Santa Monica Bay water or sediments that is derived from urban area and highway stormwater runoff is in a toxic/available form and that the toxicity caused by this constituent is significantly adverse to the beneficial uses of Santa Monica Bay.

While there are real significant water quality use impairments associated with constituents present in urban area and highway stormwater runoff to Santa Monica Bay, such as fecal indicator organisms that impair the sanitary quality of the beaches and litter that impairs the aesthetic quality of the beaches, based on my review of the information available, there has been no demonstration that the majority of the chemical "constituents of concern" established during the Santa Monica Bay Restoration Project Plan development are causing real significant water quality problems - use impairments in Santa Monica Bay that should cause the people of the region to spend funds controlling their input to the Bay.

For each of the "constituents of concern" established in the Plan, a research program should be developed to determine whether the constituent is in fact adverse to the beneficial uses of the Bay. For potentially toxic heavy metals and organics, the focus of the 1998/99 research should be on determining, using a suite of sensitive test organisms, whether stormwater runoff to Santa Monica Bay is sufficiently toxic to cause significant adverse impacts on desirable forms of aquatic life within the Bay water and/or sediments. While there have been some toxicity measurements, the work done so far falls short of that needed to define the magnitude and extent

of toxicity entering the Bay associated with stormwater runoff events, and especially its persistence in the Bay. It is through this persistence that the toxicity due to chemical constituents in the stormwater runoff will be manifested as an adverse impact to the beneficial uses of the Bay. Toxicity at the point of discharge of stormwater to the Bay could be of such limited extent and duration within the Bay to not be significantly adverse to the desirable forms of aquatic life within the Bay.

For constituents such as heavy metals that accumulate in Bay sediments, sediment toxicity testing should be done using a suite of sensitive organisms and appropriate reference sites to determine if the Santa Monica Bay sediments are toxic. Where toxicity is found its cause and water quality significance should be assessed. A sediment quality triad, using aquatic life toxicity, aquatic organism assemblage information, and appropriate chemical information, should be used to define real significant water quality use impairments. The Long and Morgan co-occurrence based values should not be used for any purpose in connection with this assessment because of their unreliability. As discussed in our comments on significant technical deficiencies in the FED covering the toxic hot spot cleanup plans, the State Board staff proposed designation of toxic hot spots, the chemistry component of the triad must be based on integrated use of chemical information and toxicity tests through properly conducted toxicity investigation evaluation (TIEs).

Where a real water quality use impairment is found associated with toxicity in the water column or sediments then the specific cause and the source of this toxicity should be evaluated. The research effort that must be undertaken as one of the subsequent phases of a more appropriately formulated management plan for the Santa Monica Bay watershed stormwater runoff should involve forensic studies to define the specific sources of the chemical constituents responsible for the toxicity in water column or sediments that has been found to be significantly adverse to the beneficial uses of the Santa Monica Bay. It should not be assumed that all lead, copper, zinc, cadmium, etc., entering the Bay from all sources have the same potential to cause toxicity in Bay waters or sediments. A carefully conducted forensic study to trace to the origin the constituents responsible for the toxicity should be conducted. It is through this approach that it would be possible to reliably determine whether there is need to initiate a BMP to control the chemical constituents in urban area and highway stormwater runoff from the Santa Monica Bay watershed in order to protect the designated beneficial uses of Santa Monica Bay.

Similar types of programs should be developed for those "chemicals of concern" because of the potential for excessive bioaccumulation, such as mercury and the chlorinated hydrocarbon pesticides, PCBs, and dioxins, where a water quality problem is defined based on excessive edible tissue residues rather than concentrations in water and/or sediments. For aquatic life nutrients, such as nitrogen and phosphorus compounds, the focus should be on first finding excessive fertilization related water quality use impairments in Santa Monica Bay and the sources of the available forms of the nutrient(s) that is controlling aquatic plant growth. Additional information on the Evaluation Monitoring approach and its implementation will soon be published as a paper, "Evaluation Monitoring as an Alternative to Conventional Water Quality Monitoring for Assessing the Water Quality Characteristics of a Waterbody," that will be presented at the National Monitoring Conference that will be held in July, 1998 in Reno, NV. A

preprint of this paper will soon be published on our web site  
[[http://www.gfredlee.com/Runoff/Stormwater\\_Focus\\_Condensed\\_P307.pdf](http://www.gfredlee.com/Runoff/Stormwater_Focus_Condensed_P307.pdf)].

The efforts to define real water quality use impairments in Santa Monica Bay, associated with chemical constituents in urban area and highway stormwater runoff, have become even more significant through the State Water Board having recently adopted a new 303 (d) list of impaired waterbodies. The Los Angeles Regional Water Quality Control Board has listed Santa Monica Bay Offshore and Nearshore as an impaired waterbody for cadmium, chlordanes, copper, DDT, debris, fish consumption advisory, lead, mercury, nickel, PAHs, PCBs, sediment toxicity, silver, and zinc. With the exception of silver, all of these listings are based on some arbitrarily developed approach for determining a concentration of constituent in sediments that caused those who developed the list to conclude that the constituent was present in the sediments in sufficient concentrations of toxic/available forms to cause a significant impairment of the beneficial uses of the Santa Monica Bay to cause the public in the Los Angeles area to spend the funds necessary to develop and implement a total maximum daily load (TMDL) to control the input of the constituent to the Bay. The focus of this control program will be on urban area and highway stormwater runoff associated constituents.

There is an urgent need for the Santa Monica Bay Restoration Program to reliably define what, if any, real water quality use impairments are occurring in Santa Monica Bay associated with the constituents that the Los Angeles Regional Board has listed as causing the Bay to be a 303 (d) listed water quality limited waterbody for which TMDLs have to be developed. Failure to address this issue could cause the people of the Los Angeles area to spend billions of dollars treating urban area and highway stormwater runoff that will have little or no impact on the beneficial uses of Santa Monica Bay. I have discussed the inappropriate approaches that some regional boards, such as the Los Angeles Regional Board staff, used in developing the 303 (d) list in Dr. Anne Jones-Lee and my Stormwater Runoff Science/Engineering Newsletter. This Newsletter is available from our web site.

If you or others have questions or comments on these comments, please contact me. If there is any way I can be of assistance in helping to formulate a more appropriate research program for Santa Monica Bay water quality management than has been conducted so far, please let me know.

Lee, G. F., "Comments on 'The Santa Monica Bay Restoration Plan, April 1994' for Stormwater Runoff Water Quality Management," Report of G. Fred Lee & Associates, El Macero, CA, June (1994). [<http://www.gfredlee.com/Runoff/smbay.pdf>]

Sincerely yours,

Fred

G. Fred Lee, PhD, DEE

GFL:jk  
Enclosures



Comments on  
"The Santa Monica Bay Restoration Plan, September, 1994"  
for Stormwater Runoff Water Quality Management

Submitted by

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In September, 1994 the Santa Monica Bay Management Committee approved a Santa Monica Bay Restoration Plan. This Committee was co-chaired by the Chairman of the State Water Resources Control Board, the Director of Water Management Division US EPA Region IX, and the Vice-Chair of the California Regional Water Quality Control Board, Los Angeles Region. This Plan included a proposed expenditure of about \$40 million devoted principally to the development of structural BMPs for the control of heavy metals and a few other chemical constituents in urban area and highway stormwater runoff from the Santa Monica Bay watershed. A review of the technical validity of the basis for development of this part of the Bay Restoration Plan shows that it is not based on a reliable assessment of the water quality problems caused by current discharges of heavy metals to Santa Monica Bay derived from urban street and highway runoff in the Santa Monica Bay watershed. Comments on the serious technical deficiencies of the final Santa Monica Bay Restoration Plan components devoted to the proposed approach for management of urban runoff heavy metals are presented below.

#### Background to these Comments

In the spring of 1994, C. Tyrrell, Director of the Santa Monica Bay Restoration Project, made a presentation to the California State Stormwater Quality Task Force in which she discussed the approaches that were being used to develop the Santa Monica Bay Restoration Plan components devoted to stormwater runoff quality management. The author of these comments was present during that presentation and indicated to Ms. Tyrrell, after the presentation, that based on his over-30 years of experience in evaluating the impacts of and managing chemical constituents in stormwater runoff that the approaches being used to identify real water quality problems associated with current stormwater runoff from the Santa Monica Bay watershed were technically invalid. The author offered to Ms. Tyrrell to critically review this issue and provide comments on any technical deficiencies found in the approach that was being followed. In May, 1994 a copy of a public review draft for "The Santa Monica Bay Restoration Plan - Actions for Bay Restoration," dated April, 1994, was received by the author of these comments. In June, 1994, prior to the deadline for receipt of comments on this draft, a detailed set of comments (16 pages) was provided to Ms. Tyrrell principally on the inappropriate technical approaches that were used. Those comments included not only review of the draft Restoration Plan, but also of the back-up documents upon which the Plan was said to be developed.

In August 1994 a set of responses was provided to the author of these comments. A review of these responses, however, on the key areas of concern about the technical validity of the approaches used to justify the expenditure of approximately \$40 million over the next five years for the development of structural BMPs to control heavy metal inputs to Santa Monica Bay from urban stormwater runoff, showed that the responses were highly superficial and did not appropriately address the key issues of concern. In September, 1994 comments on the inappropriate responses were provided to Ms. Tyrrell, reiterating the importance of not adopting those components of the Restoration Plan devoted to control of heavy metals in stormwater runoff until a real water quality problem - use impairment of Santa Monica Bay waters was found that could be attributed to the current inputs of heavy metals from streets, highways and other urban areas in the Santa Monica Bay watershed. The supplemental comments provided by the author in September cover the same issues as those provided in June. Subsequently, in December it was learned that the Santa Monica Bay Restoration Project Plan had been adopted by the Management Committee in September 1994. Ms. Tyrrell did not provide the author of these comments with a copy of this Plan or with other information pertinent to the finalization of this Plan.

## The Problem

As discussed in the June, 1994 comments, the stormwater urban runoff components of the draft Plan incorrectly assumed that because copper, zinc, lead, nickel, cadmium, silver, and chromium from other sources such as mining or plating wastes had caused water quality problems in some waterbody (not Santa Monica Bay) that these same metals in urban stormwater runoff from streets and highways in the Santa Monica Bay watershed would be significantly adverse to the designated beneficial uses of Santa Monica Bay waters. Those familiar with the elements of aquatic chemistry and aquatic toxicology as they relate to the development of technically valid, cost-effective approaches for management of real water quality problems know as is well-documented in the literature that it is highly inappropriate to assume that all lead, zinc, cadmium, silver, chromium, nickel, copper, etc. from any source is always significantly adverse to the beneficial uses of any waterbody into which these metals enter. One of the fundamental tenets of aquatic chemistry and aquatic toxicology is that chemical constituents such as heavy metals exist in aquatic systems in a variety of chemical forms, only some of which are toxic/available to adversely affect aquatic life. This tenet was ignored in the conduct of the Santa Monica Bay Restoration Project Restoration Plan development.

Information that shows it is inappropriate to use total chemical constituents concentrations as a basis for developing control programs is not new. The National Academies of Science and Engineering in 1972, as part of developing the "Blue Book of Water Quality Criteria," discussed these issues and adopted a recommended approach for regulating heavy metals based on toxicity measurements. It was well-known then that measurements of chemical concentrations of heavy metals were not a reliable approach for regulating heavy metals from any source. In the mid 1980s the US EPA acknowledged the same problem in developing the "Gold Book" water quality criteria for heavy metals where the Agency stated for each of the heavy metals of concern that the total heavy metal was not a reliable basis for regulating the heavy metal and that regulating based on total heavy metals could result in over-regulation. In October, 1993 the US

EPA finally adopted dissolved heavy metals as the basis for regulating heavy metal impacts in ambient waters.

There have been numerous studies conducted across the US and in other countries that show that heavy metals in urban stormwater runoff from residential and commercial areas are not in toxic /available forms. They are principally in particulate forms, which are inert. This information was ignored by the Santa Monica Bay Restoration Project Management Committee.

As discussed in the authors comments on the draft Proposed Plan for Action, the assumption that heavy metals in urban stormwater runoff must be controlled by structural BMPs, at considerable expense to the public, because these heavy metals persist in Santa Monica Bay sediments is obviously technically invalid to those who understand the aqueous environmental chemistry of heavy metals and their toxicity to aquatic life. As pointed out in the original comments on the draft report, the author of them had worked for over 30 years on sediment quality issues where he had supervised over \$2 million in research devoted to evaluating the water quality significance of heavy metals and other chemical constituents in aquatic sediments as they may impact the designated beneficial uses of the waters in which the sediments are located. In the 1970s he conducted over \$1 million of research specifically devoted to developing sediment quality criteria that could be used to regulate heavy metals and other constituents in contaminated sediments that were to be dredged as part of navigational channel maintenance in US waterways. The work that he and others did in the 1970s confirmed what was already well-known then, that it is unreliable to try to use total concentrations of heavy metals in sediments as a basis for judging potential impacts on water quality. This arises from the well-known fact that the number of components in a sediment matrix interact with heavy metals and other constituents to detoxify them.

In the 1970s the US Army Corps of Engineers and the US EPA found that chemical measurements of heavy metals in sediments was an unreliable approach for evaluating potential toxicity to aquatic life. At that time it was decided that the only reliable approach to evaluate the toxicity of heavy metals in sediments was to measure toxicity directly. This is the approach that has been used over the last approximately 20 years for regulating contaminated dredged sediments.

When the author reviewed the back-up documents to the April, 1994 draft Restoration Plan for Santa Monica Bay, it was found that the Management Committee for this Project had used Long and Morgan co-occurrence based values for concentrations of heavy metals in sediments of Santa Monica Bay as justification for spending large amounts of public funds for the control of heavy metals in urban stormwater runoff from the Santa Monica Bay watershed. The co-occurrence-based approaches rely on total heavy metals and other constituents. They do not use the toxic/available forms as the basis for regulation. This approach, therefore, is obviously technically invalid. The US EPA as part of their attempts to develop water quality criteria for heavy metals did not adopt that approach because of its well-known unreliability. However, even after having this unreliability pointed out to the Management Committee of the Santa Monica Bay Restoration Project in June 1994, this Committee persisted with the draft recommendations of control of heavy metals in urban stormwater runoff from the Santa Monica Bay watershed based on the fact that heavy metals were present in Santa Monica Bay sediments above some

highly arbitrary co-occurrence-based values. These values were used to justify that these heavy metals were toxic in the sediments and therefore had to be controlled in stormwater runoff. No measurements were made in the 4-year period that the Santa Monica Bay Restoration Project had been active prior to the development of the Restoration Plan of sediment toxicity and where toxicity occurred, whether this toxicity was due to heavy metals present in urban stormwater runoff that was entering the Bay at this time.

Recently the State Water Resources Control Boards staff have released a draft functional equivalent document covering the implementation of the Bay Protection and Toxic Hot Spot regulations. While in 1991 this staff proposed to utilize several co-occurrence-based approaches, similar to the Long and Morgan approach, as a basis for developing sediment quality objectives for the state, in the recently released draft that approach has been abandoned in favor of a narrative approach for developing sediment quality objectives. While the details of what the narrative approach will be, certainly any valid narrative approach that addresses sediment toxicity will have to include toxicity measurements. The State Board staffs recent action in abandoning co-occurrence-based approaches for developing sediment quality objectives is one more example of the lack of technical validity of the co-occurrence-based approaches that were used in the Santa Monica Bay Restoration Project as a technical basis for developing a proposed plan. Even the authors of the Long and Morgan co-occurrence-based approach (Ed Long) would not approve use of the values developed from his work as the Santa Monica Bay Restoration Project has done where based solely on the exceedance of certain numeric values an approximately \$40 million program is to be implemented controlling input of heavy metals from stormwater runoff.

For the Santa Monica Bay Restoration Project Management Committee to adopt a mass emission strategy for control of heavy metals in the stormwater runoff in 1994 shows either a complete lack of knowledge of basic issues pertinent to developing technically valid approaches for evaluating and managing water quality in stormwater runoff or a total disregard of the substantial literature that exists that should have been reviewed as part of formulating the urban stormwater runoff management components of the Restoration Plan.

#### Mismanagement of the Technical Components of the Project

It is clear that the use of technical information in developing the Restoration Plan for the urban stormwater runoff components was badly mismanaged. A few individuals who chose to ignore the vast technical literature on water quality impacts of heavy metals in urban stormwater runoff and in sediments controlled the information that was available to the Management Committee. The Management Committee, on the other hand, chose to ignore reviewers comments which included substantial references to the literature that should have been reviewed as part of developing a technical base for formulating the Restoration Plan components devoted to urban stormwater runoff. The way the Santa Monica Bay Project Final Plan was adopted did not include the opportunity for input, including peer review of the technical approaches used in developing the Plan. Further, the managers of the Project did not even inform all of the reviewers when the Management Committee was meeting to consider the adoption of the Plan. In addition, the development of this Restoration Plan was conducted outside of the normal State Water Resources Control Board public review process.

## Recommended Approach

It is very important that no public funds be spent developing structural BMPs for control of urban stormwater runoff of heavy metals in the Santa Monica Bay watershed until a real water quality problem - use impairment of Santa Monica Bay waters has been found due to the current heavy metal inputs. As outlined in the original comments made by the author on the draft Plan, the first thing that should be done is to determine whether the sediments in Santa Monica Bay are, in fact, toxic to aquatic life. Second, since many sediments are toxic from natural and other causes, it is important to determine whether any sediment toxicity found is, in fact, of significance to the designated beneficial uses of Santa Monica Bay waters.

If there is significant sediment toxicity that is impairing the designated beneficial uses of Santa Monica Bay waters, then studies should be conducted to determine the cause of this toxicity. If the cause of this toxicity is heavy metals, then studies should be conducted to determine the source of the heavy metals that lead to toxic heavy metals in Santa Monica Bay sediments. If the source is found to be urban and highway runoff which is very unlikely based on the large number of studies that have been conducted, then studies should be conducted to determine if the toxic heavy metals in highway and street runoff can be controlled at the source. With the above information, it will then be possible to determine that there is, in fact, a real water quality problem associated with heavy metals in Santa Monica Bay sediments that are derived from current stormwater runoff from the Santa Monica Bay watershed.

Only after proper definition of a real water quality problem that is attributable to heavy metal runoff from streets and highways in the Santa Monica Bay watershed that cannot be controlled at the source should a management plan be developed that incorporates structural BMPs for control of heavy metals. As discussed in the enclosed recently published papers, preprints of which were made available to the Santa Monica Bay Restoration Project Management Committee, the conventional structural BMPs of the type discussed in the Restoration Plan will not likely be effective in removing heavy metals in urban stormwater runoff that are toxic - available. Structural BMPs such as detention basins remove particulate forms of heavy metals which are well-known to be non-toxic. The structural BMPs that would have to be used to control toxic - available forms of heavy metals in urban street and highway runoff will likely be significantly different than those proposed in the final Santa Monica Bay Restoration Plan.

## Specific Comments

Chapter 3 of the September 1994 Action for Bay Restoration presents a discussion of stormwater/urban runoff issues. In the box on the first page, it is stated,

*"A Best Management Practice is any method, activity, maintenance procedure, or other management practice for reducing the amount of pollution entering a water".*

The issue is not the amount of pollution entering a water; it is the amount of pollutant entering a water that remains a pollutant within the waterbody. Also of concern are non-pollutants that become pollutants in the waterbody. One of the fundamental problems with the Santa Monica

Bay Project is that those responsible for conducting the Project do not understand the meaning of "pollution" and "pollutant." These terms are used inappropriately at many locations in this final report.

For example, the first sentence of the summary of Chapter 3, page 3-1, states that stormwater and urban runoff is the most significant source of non-point pollution to Santa Monica Bay. Stormwater runoff from urban residential areas is a problem with respect to trash, debris and waterborne pathogen indicator organisms, all of which impair the designated beneficial uses of Santa Monica Bay waters. There is no evidence that the five heavy metals singled out for structural BMP control from street and highway runoff in the Project are causing any pollution to Santa Monica Bay waters at this time.

Mention is made on page 3-3 about an SMBRP study in 1990 that allegedly found that stormwater/urban runoff resulted in significant loadings of many categories of pollutants. The author has examined the report from that study and found that that report improperly defined "pollutants." The so-called "loads of pollutants" are loads of chemical constituents without regard to whether they are in available or toxic forms and whether they cause an impairment of the designated beneficial uses of Santa Monica Bay waters. The labeling of chemical constituents in- urban stormwater runoff as pollutants without a proper evaluation of whether they cause pollution in Santa Monica Bay is highly inappropriate.

Pollution is clearly defined in federal and state regulations as the impairment of the designated beneficial uses of waterbodies. The current discharges of trash, debris, and waterborne pathogenic indicator organisms to the Bay from the Santa Monica Bay watershed is impairing the use of the Bay waters and therefore causing pollution. However, to label heavy metals in urban stormwater runoff as pollutants because they accumulate in sediments as was done in this project is technically invalid. For these heavy metals to be pollutants they must significantly impair the designated beneficial uses of the Bay through toxicity in the sediments or through bioaccumulation that is adverse to higher trophic level organisms.

The approach outlined on page 3-24 through 3-28 for implementation of BMPs is not technically valid. As discussed in the appended papers, in order to develop technically valid, cost-effective BMPs for stormwater runoff, first there has to be a real water quality problem found that the BMP is addressing. With the problems identified, as discussed above, it is then possible through logical, appropriate testing and evaluation to determine the cause of the problem and then design a BMP that is appropriate to control the cause. Following the approach adopted in the Santa Monica Bay proposed Restoration Plan could result in massive waste of public and private funds and have little or no impact on the designated beneficial uses of Santa Monica Bay waters. Before any funds are spent even in pilot studies of BMPs, it will be necessary to define real water quality problems - use impairments of Santa Monica Bay that are to be addressed by the BMPs. These problems are not simply the presence of heavy metals in sediments as is currently been done by the Project management.

Page 3-38 in Table 3-3, mentions "filter media devices for pollutant removal from transportation drainage systems". Since these filtering media devices are to remove oil and grease and heavy

metals, it appears that the authors of that section have ignored the well-known fact that particulate heavy metals are not pollutants.

In Table C-1 in the Appendix, Menu B Candidate BMPs which include in 4.b. under "Comprehensive Treatment Based Controls" detention/retention/infiltration basins. While such basins may be effective in controlling suspended solids which would affect the rate of siltation of Santa Monica Bay, they are not likely to be very effective in controlling the heavy metals and many other constituents that could be adverse to Bay waters.

Appendix B presents a hypothetical "Application of Mass Emissions Approach to Management of Lead." In the second paragraph of this discussion mention is made that the lead in some of the sediments of Santa Monica Bay exceed the ER-M value of 110 ppm dry weight. The authors of that section did not understand the lack of technical validity of the ER-M values in judging potential water quality problems. No one knowledgeable in aquatic chemistry or aquatic toxicology and water quality would ever try to use ER-M or ER-L values as a basis for defining a water quality problem. These values are based on total concentrations and an inappropriately assessed co-occurrence with alleged problems.

The statement in the third paragraph about "Current levels of emissions from nonpoint sources still occasionally exceed Ocean Plan objectives...". The Ocean Plan objectives were not developed in an appropriate manner to define real water quality problems whenever an exceedance occurs.

The statement made in the fourth paragraph on page 1 of this discussion about the principal source of lead being aerial fallout from automobile exhaust was true when there was widespread use of leaded gasoline. Since leaded gasoline is no longer used, there are significant questions as to the principal sources of lead today.

In the fifth paragraph on page 1 of this write-up, is a discussion of "Establishment of Initial Mass Loading Discharge Performance Goals for Lead." Those responsible for managing the project report development evidently did not understand that lead exists in the environment in a variety of forms, only some of which are toxic - available to adversely impact water quality and humans. Through the work that the author has been doing over the past five years, first with the Sacramento City Council and now for the Northern California Legal Services who are concerned about protection of low-income housing children from exposure to excessive lead in redeveloped Superfund sites, the author is well aware of the current state of information on the impacts of lead on public health and the environment. It has been known since the 1960s that total lead is a very poor measure of toxic - available forms for aquatic life as well as for human uptake via ingestion of lead-containing material. The author has published in refereed journals and conference proceedings several papers that address the problems of trying to regulate total lead.

A peer review of the appropriateness of developing a mass loading discharge performance goal based on total lead would show that such an approach would be generally perceived as being highly wasteful of public funds. What should be done is to find a real problem caused by lead in Santa Monica Bay waters and determine the sources of lead that are responsible for the problem.

To mechanically attack all sources of lead independent of whether lead is toxic or available is inappropriate.

Near the bottom of page 2 of this discussion are some recommendations of approaches that should be adopted to refine the performance goal. This proposed approach is highly deficient since no effort is proposed to address whether the current discharges of lead to Santa Monica Bay waters from the Santa Monica Bay watershed are adversely affecting the designated beneficial uses of the Bay waters. That should be the first step of the implementation of any management plan for Santa Monica Bay lead-related issues.

The top of page 3 under item 4 mentions, "Verify the sources of lead other than leaded gasoline." It is not clear that those responsible for writing this section know that leaded gasoline has not been sold to any significant extent for many years in the US as well in the Santa Monica Bay watershed.

On page 3 is a discussion of the establishment of sediment quality objectives for lead in the receiving waters. It will be very difficult if not impossible to develop sediment quality objectives for lead as proposed. These objectives must be based on impacts, not chemical concentrations.

Examination of the glossary of terms at the end of the report, for "Pollutant load" on page 10 states, "See 'mass emission.'" Under "Mass emission" on page 8 is defined as

*"The total amount of a contaminant that reaches the Bay. Mass emissions are calculated by multiplying the concentration of the contaminant by the volume or flow discharged."*

That is a technically invalid approach. A "pollutant" should have been defined as a material that impairs the designated beneficial uses as prescribed by federal and state regulations. It is not possible to reliably evaluate pollutant loads through multiplying the total concentrations of constituents by the flow or discharge.

On page 18-9, Figure 18-1 shows a Cost Comparison - Priority Action areas. Urban runoff is listed at \$40 million which is about eight times higher than any other category. As discussed herein and is obvious when critically reviewed in light of what is known about the impact of chemical constituents in urban runoff on beneficial uses of waterbodies, it is essential that before any significant part of that \$40 million is spent to control urban stormwater runoff associated chemical constituents, that real water quality problems be found in Santa Monica Bay associated with the runoff which are attributable to chemical constituents.

Basically, what needs to be done is to start over on the Santa Monica Bay Project and do what should have been done during the first five years of the Project--focus on finding real water quality problems in the Bay that are of sufficient significance to the public to cause the expenditure of funds for their control. Once these water quality problems - use impairments have been identified, then follow the common-sense approach of defining their cause and the specific source of constituents added to the Bay today that are contributing to their continued significance.

Rather than spending funds for controlling the five heavy metals that were selected for control as part of the Project from urban and highway runoff using detention basins, "filtering media," etc., a clear definition of what is to be expected in the way of improved water quality as a result of an expenditure for these structures should be available so the public knows what it is getting for its money. As discussed in the original comments on the draft Plan, there are some real water quality problems associated with Santa Monica Bay from urban runoff. These are beach closures and aesthetically displeasing situations associated with trash and debris on the beaches. It may be far more cost-effective and beneficial to the public to devote funds available to addressing these issues rather than spending large amounts of money in controlling particulate forms of heavy metals by detention basins, filtering media, etc.

If heavy metals in stormwater runoff are, in fact, having a significant adverse impact on the designated beneficial uses of Santa Monica Bay waters, then the \$30 million prescribed in this Plan would be a small part of the total cost that will be needed to control these impacts. The BMPs that are typically prescribed today as set forth in this Plan will not be effective in controlling the heavy metal adverse impacts, if there are any.

Overall, the Project needs to start over with respect to defining a Restoration Plan associated with heavy metals and other chemical constituents in urban stormwater runoff. The approach that has been used is typically invalid and can readily result in massive waste of public funds being mis-directed towards control of chemical constituents that are not significantly impairing the uses of Santa Monica Bay waters.

The days of simply throwing money at environmental problems without regard to the technical validity and cost-effectiveness have come to an end in many areas and should come to an end in the Santa Monica Bay watershed. As it stands now, the urban stormwater component of the Santa Monica Bay Restoration Plan is already becoming recognized as having been conducted in a highly inappropriate manner. It will, if those responsible for implementation of the Santa Monica Bay Restoration Plan pursue implementation of this Plan as adopted in September 1994, be recognized as one of the most technically invalid and inappropriately developed restoration plans devoted to evaluating the significance of chemical constituents in sediments and for the control of chemical constituents in urban stormwater runoff. A longstanding, common-sense principle of water quality management was violated in the Santa Monica Bay Restoration Project by failing to define a real water quality problem before developing a Restoration Plan.

#### List of Enclosures

Lee, G.F. and Jones-Lee, A., "Stormwater Runoff Quality Evaluation and Management - Need for a Different Approach Part I: The Problem, Part II: Implementation of Urban Stormwater Runoff Quality Management Regulations, Part III: Issues in Managing Urban Stormwater Runoff Quality," accepted for publication *Water Engineering and Management*, (1995).

Lee, G.F. and Jones-Lee, A., "Stormwater Runoff Management: Are Real Water Quality Problems Being Addressed by Current Structural Best Management Practices? Part One," *Public Works* 125:53-57, 70-72 (1994) Part Two 126:54-56 (1995).

Lee, G.F. and Jones-Lee, A., "Deficiencies in Stormwater Quality Monitoring," Stormwater NPDES Related Monitoring Needs, proceedings of an Engineering Foundation Conference, American Society of Civil Engineers, pp. 651-662, New York (1994).

Lee, G. F. and Jones-Lee, A., "Independent Applicability of Chemical and Biological Criteria/Standards and Effluent Toxicity Testing," published in The National Environmental Journal, January/February (1995).

Urban Stormwater Quality Evaluation and Management Publications Drs. G. Fred Lee and Anne Jones-Lee

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May 15, 1998

Catherine Tyrrell, Director  
Santa Monica Bay Restoration Project  
101 Centre Plaza Drive  
Monterey Park, CA 91754

Dear Ms. Tyrrell:

Please find enclosed our comments on the Santa Monica Bay Restoration Plan Public Review Draft, "Action for Bay Restoration," April 1994. As discussed herein, we find that the Santa Monica Bay Restoration Project Proposed Plan of Action with the control of stormwater-associated chemical contaminants is not based on a technically valid assessment of the water quality problems caused by current stormwater-associated chemical contaminant inputs to Santa Monica Bay. This Project thus far has failed to properly define the real water quality problems-use impairments that are occurring today that would justify the public and private interests spending over \$42 million during the next five years to develop control programs for many of these so-called "Pollutants of Concern" in stormwater runoff identified in the Project.

The Project plans of action are far ahead of proper water quality problem definition and can, if adopted, lead to massive waste of public and private funds controlling contaminant inputs to the Bay in stormwater runoff that are having little or no impact on the designated beneficial uses of Santa Monica Bay waters of concern to the public.

We urge that all aspects of the proposed Plan of Action concerned with controlling chemical inputs to Santa Monica Bay from stormwater sources not be adopted until it has been shown that there is a reasonable expectation that the expenditure of funds for control of stormwater-associated chemical contaminant inputs to the Bay will result in a significant enhancement of the designated beneficial uses of Santa Monica Bay waters.

Please contact me if you or others associated with the Project have any questions on these comments. Please let us know if we can be of further assistance.

Sincerely yours,

G. Fred Lee, PhD, DEE

Copy to: J. Caffrey and other members of the SWRCB

GFL:oh  
Enclosures

Comments on "The Santa Monica Bay Restoration Plan, April 1994"

G. Fred Lee, Ph.D., D.E.E and Anne Jones-Lee, Ph.D.  
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June 1994

Abstract

Recently the Santa Monica Bay Restoration Project has made available for public review "The Santa Monica Restoration Plan, Action for Bay Restoration - Draft" April 1994 which presents actions for proposed Bay restoration. This plan calls for the expenditure of \$42 million over the next five years to control chemical contaminants in stormwater runoff to Santa Monica Bay. A review of the technical basis for the justification for this expenditure shows, however, that it is not based on a finding that the current chemical contaminants present in stormwater runoff to Santa Monica Bay are having a significant adverse impact on the designated beneficial uses of Santa Monica Bay waters. Instead, it is based on perceived impairment of Santa Monica Bay waters by contaminant inputs and inappropriate analysis of the water quality significance of chemical contaminants in Santa Monica Bay sediments on the designated beneficial uses of Santa Monica Bay waters.

The implementation of the proposed plan for control of chemical contaminants in stormwater runoff could result in the massive waste of public and private funds controlling stormwater-associated chemicals which will have little or no impact on the designated beneficial uses of Santa Monica Bay waters of concern to the public who must pay for the implementation of the proposed plan. While a number of components of the proposed plan such as those concerned with improving the sanitary and aesthetic quality of the nearshore Bay waters can and should be implemented, no program for implementation for stormwater-associated chemical contaminants should be adopted at this time. Instead, a substantial research program should be developed and implemented which properly defines

- the real water quality-use impairments of Santa Monica Bay waters that are occurring today that are being caused by current discharges of stormwater-associated contaminants to Santa Monica Bay,
- the specific chemical forms and their respective sources that are responsible for the water quality use impairments that are occurring in Santa Monica Bay waters that would justify the public spending millions of dollars for their control.

It will take several years of a highly directed, substantial research effort to develop the information needed to properly formulate a technically valid, cost-effective approach for developing a program of action for addressing stormwater-associated chemical contaminant caused water quality problems in Santa Monica Bay.

## Introduction

Recently the Santa Monica Bay Restoration Project has made available for public review "The Santa Monica Restoration Plan, Action for Bay Restoration - Draft" April 1994 which presents actions for proposed Bay restoration. Presented herein are comments on the proposed plan of action for control of stormwater-associated contaminants entering Santa Monica Bay. These comments are based on a review of,

*"Characterization Study of the Santa Monica Bay Restoration Plan January 1994"*

*"Santa Monica Bay Restoration Plan April 1994."*

It is our understanding that the proposed plan of action set forth in the April 1994 draft plan is submitted for public review prior to its adoption by the Santa Monica Bay Management Committee and various regulatory agencies. Upon review of these documents, we find that it is proposed that over \$42 million be spent over the next five years on stormwater chemical contaminant control.

As part of the International Biological Program that was conducted in the 1960's, I (Dr. G. F. Lee) and my graduate students were among the first to undertake urban stormwater quality impact evaluation studies. This work was done while I was teaching at the University of Wisconsin, Madison. My graduate students and I confirmed that urban stormwaters contain large amounts of a variety of conventional chemical contaminants. We also found, and we were the first to do this, that substantial parts of the chemicals in urban stormwaters are in non-toxic non-available forms and therefore do not adversely impact the designated beneficial uses of the receiving waters for the stormwater runoff.

Since the 1960's, I have been involved in a number of studies devoted to urban stormwater quality evaluation and management at various locations in the US. Further, together with Dr. Anne Jones-Lee, we have published extensively on urban stormwater runoff evaluation and management. Copies of some of our recent papers are appended to these comments. They reference earlier work on this topic. They have direct relevance to the significant problems that we have found in the way that the Santa Monica Bay Restoration Project has been conducted with respect to defining the water quality problems that are arising from current stormwater-associated contaminants entering Santa Monica Bay.

Based on the above-listed January 1994 and April 1994 reports, this project has been conducted with limited consideration of the significance of aquatic chemistry in controlling the impacts of contaminants in urban stormwater drainage on the designated beneficial uses of Santa Monica Bay. At this time, there is no technical justification to cause public and private interests in the Santa Monica Bay watershed to spend \$42 million implementing best management practices for chemical contaminants present in urban stormwater runoff that enter the Bay.

Enclosed is a set of comments dated May 30, 1994 that we sent to J. Caffrey, Chairman of the State Water Resources Control Board (SWRCB), that are pertinent to the review of the Santa Monica Bay Restoration proposed plan of action dated April 1994. In summary, it is of concern

to us that the Santa Monica Bay Restoration Project is now entering its fifth year and, as of yet, appropriate studies have not been conducted on the impacts of current stormwater-associated contaminants on Santa Monica Bay water quality-designated beneficial uses. Studies of this type should have been started no later than the second year of this project.

It is our finding that the State Water Resources Control Board staff's proposed studies on the impacts of chemical contaminants in stormwater runoff to Santa Monica Bay as presented in the SWRCB staff report dated May 2, 1994 that accompanied item 4 for the SWRCB June 1-2, 1994 Workshop will not provide an adequate technical base of information upon which a technically valid, cost-effective approach for developing a plan of action for control of stormwater-associated chemical contaminants that can be implemented/accomplished within the five-year timeframe set forth in the April 1994 proposed plan. It will take far more time and funding than that proposed by the SWRCB staff to provide the information needed to reliably determine whether the contaminants currently designated for control in stormwater runoff in the April 1994 proposed plan of action should, in fact, be controlled because of their significant adverse impacts on the designated beneficial uses of Santa Monica Bay.

Proceeding with the proposed plan of action with the current technical database, including the results from the State Board staff's May 2, 1994 proposed studies in which many millions of dollars are scheduled to be spent on stormwater contaminant control, will almost certainly represent a significant waste of public and private funds in controlling chemical contaminants that are having little or no impact on the beneficial uses of Santa Monica Bay waters.

#### Approach that Should Be Followed in Developing the Santa Monica Bay Restoration Plan of Action

The technically valid scientific and engineering approach for water quality problem definition, evaluation and management for Santa Monica Bay should involve the following steps:

- Definition of current water quality designated beneficial use impairments that exists today in Santa Monica Bay,
- Evaluation of the specific causes of the use impairments, including determining the specific chemicals and chemical forms that are responsible for the use impairments,
- Determination of the specific sources of the specific forms of the chemical contaminants that are responsible for the use impairments,
- Development of management approaches to control at the source and, where this is not possible, in the stormwater runoff the specific forms of chemical contaminants that are responsible for the use impairments that have been found in Santa Monica Bay,
- Develop the funding mechanism regulations to fund and implement the needed control programs.

The above outlined approach has not been followed in developing the water quality management plan of action for restoration of Santa Monica Bay. Basically, the "State of the Bay 1993" report is largely a historical discussion of some of the use impairments that have been documented or are believed to exist in the Bay. There is very little recent information on current use impairments. While there have been a wide variety of problems with Santa Monica Bay water

quality and uses over the years, many of those problems have been addressed and are being solved. Before the Santa Monica Bay Project proceeds further in its current direction for stormwater chemical contaminant control, there is need to develop a specific list of current specific use impairments in Santa Monica Bay with a factual discussion of how well the use impairments are known today. Second, the specific causes of the use impairments must be delineated. This information is not provided in the current reports. Instead, the authors of the reports have made the assumptions that some of the 19 "Pollutants of Concern" or types of chemicals are responsible for some largely undefined use impairments in the Bay. Since many of these chemicals are present in stormwater runoff, it has been arbitrarily decided that \$42 million should be spent trying to manage chemical inputs associated with stormwater runoff to the Bay.

### Importance of Aquatic Chemistry in Developing Chemical Contaminant Control Programs

While there is mention in several places in the report that the presence of a chemical in a water does not mean that that chemical is adverse to the beneficial uses of the Bay waters, inadequate attention has been given to the definition of those chemical contaminants in stormwater runoff that are, in fact, having a significant adverse impact on the designated beneficial uses of the Santa Monica Bay waters. There is, however, inadequate recognition set forth in the proposed plan of action of the basic fundamental principles of aquatic chemistry that chemical contaminants exist in stormwaters and in aquatic systems in a variety of chemical forms only some of which are toxic-available to adversely impact the beneficial uses of the waterbody. Developing proposed control programs for non-toxic non-available forms of contaminants entering Santa Monica Bay can readily result in massive waste of public and private funds with limited designated use improvement of the Bay waters.

There are not unlimited funds to devote to stormwater contaminant control. The allocation of funds for stormwater contaminant control should be based on good scientific and engineering principles, one of which is cost effectiveness of the control program. One of the most glaring omissions from the Santa Monica Bay Restoration Project reports is any consideration of what the public will gain in the way of improved designated beneficial uses of Santa Monica Bay as a result of spending \$42 million to implement BMP's for stormwater-associated contaminants. The public is entitled to know this information before they are asked to provide these funds.

### Water Quality Problems in Santa Monica Bay Sediments

The Santa Monica Bay Restoration Project has apparently received inappropriate advice on the significance of chemical contaminants in Bay sediments. I (Dr. G. F. Lee) have worked throughout my over 30 year professional career on developing approaches for evaluating the water quality significance of contaminants in aquatic sediments. This has included in excess of \$2 million in university research on this topic. It is well known by those who understand aquatic chemistry that the Long and Morgan co-occurrence approach, as well as the AET approach, used in the Santa Monica Bay studies thus far to designate potential problems associated with sediments are technically invalid since they have as one of their basic components a bulk composition of the sediments for various chemical parameters. A discussion covering the lack of

technical validity of this approach is appended to these comments, and additional discussion is presented below.

Before funds are spent in implementing BMP's for stormwater- associated contaminants designed to control the input of contaminants to Santa Monica Bay sediments because the sediments could be toxic to some forms of aquatic life living in or on them, direct measurements of sediment toxicity should be conducted. In the studies that my associates and I (Dr. G. F. Lee) did on Los Angeles Harbor sediments in the 1970's, we found that the sediments were toxic to the test organisms that we used. We found essentially the same thing at every other of the approximately 100 sites that we investigated across the US. While it is totally inappropriate to infer through Long and Morgan and AET approaches that a specific chemical in a sediment is responsible for toxicity, it is highly likely that at least some and possibly a substantial part of the Santa Monica Bay sediments are toxic to some forms of aquatic life. The finding of toxicity to certain forms of aquatic life in Santa Monica Bay sediments should not cause the regulatory agencies for the Santa Monica Bay area to conclude that the toxicity in the sediments is in any way influenced by stormwater runoff-associated contaminants that have been designated for control in the proposed plan of action. At this time, the magnitude of toxicity and its cause is not known.

The finding of a chemical in sediments at elevated concentrations is highly unreliable in evaluating the potential significance to aquatic life and other designated beneficial uses of a waterbody. Aqueous environmental chemistry of aquatic sediments is such that sediments have a wide variety of detoxification reactions that convert toxic forms of contaminants into non-toxic forms. There is no way at this time, nor is there likely to be in the near-term, to examine the chemical characteristic of a sediment and reliably predict whether a particular component of a sediment will be toxic.

For those sediments in the Santa Monica Bay that are found to be toxic to several appropriate test organisms, studies should be initiated to determine the specific cause of the toxicity. Once the cause has been identified, then studies should be initiated to determine the sources of the specific cause. These studies should not assume, for example, that all forms and all sources of copper, which is one of the 19 "Pollutants of Concern" slated for control in stormwater runoff, that enter Santa Monica Bay are toxic to aquatic life in Santa Monica Bay sediments. Whether the copper is derived from automobile brake pads as metallic copper or copper used to control algae in a water supply reservoir or to kill roots in a sewer or as an anti-foulant on ship or boat hulls or a piece of copper metal, such as a penny, can make a significant difference in the potential toxicity of the copper. Thus far, the Santa Monica Bay Restoration Project has ignored such fundamental aquatic chemistry issues and instead is taking a brute force non-technical approach of proposing to throw money at all forms of copper, irrespective of whether any or all of them have an impact on the beneficial uses of Santa Monica Bay. It is important to note that several studies in the San Francisco Bay region have found that urban stormwater runoff has large amounts of copper in it. They have also found, however, that the copper and all other metals in this runoff are non-toxic to aquatic life. There is toxicity associated with urban stormwater runoff. It appears, however, to be related to home use of pesticides such as diazinon. This and other pesticides used in the home are being found at many locations to be a cause of toxicity in urban stormwater runoff.

A properly conducted study of the stormwater entering Santa Monica Bay could show that there is no need to control the majority of the 19 "Pollutants of Concern" that were selected for control by the Santa Monica Bay project in stormwater runoff. A chemical such as diazinon, which is not included in that list, may be having an adverse impact on aquatic life-related beneficial uses of Santa Monica Bay through pulses of toxic waters entering the Bay and causing toxicity to sensitive significant forms of aquatic life. Rather than spending \$42 million controlling stormwater-associated contaminants that are having little or no impact on the Bay's beneficial uses, directing a control program to either eliminate or control diazinon or other contaminants that are having a real adverse impact on the beneficial uses of Santa Monica Bay could potentially be done for very little money.

Those familiar with the hazard that chemicals represent to aquatic life know that this hazard is made up of two principal components: aquatic chemistry and aquatic toxicology. Within toxicology is the issue of the duration of exposure to available forms to be adverse to aquatic organisms. The aquatic chemistry component focuses on the chemical forms, their transformation and their availability-toxicity. It is technically invalid, as has been done in the Santa Monica Bay Restoration Project thus far, to ignore aquatic chemistry in developing management approaches for stormwater-associated contaminants. While it is certainly protective to control all chemical inputs to Santa Monica Bay, it will be tremendously wasteful of public and private funds and may have little or no impact on the designated beneficial uses of Santa Monica Bay waters.

#### Contamination Versus Pollution

One of the most significant deficiencies of the studies conducted thus far in the Santa Monica Bay Restoration Project is the failure to recognize the difference between contamination and pollution. These terms are not used consistently in the Characterization Study of the Santa Monica Bay Restoration Plan as well as in the April 1994 Plan of Action. In 1972, the federal Congress established as a goal zero pollutant discharge to the nation's surface waters. The focus of the Clean Water Act is protection of designated beneficial uses of these waters. A chemical pollutant, therefore, is a material that is present in sufficient concentrations and chemical forms and for a sufficient duration to be adverse to the beneficial uses of the waters. At several locations in the report, the contamination of sediment for heavy metals is implied to be adverse to the beneficial uses of the Bay. Such an approach is not technically valid. There is massive literature which shows that potentially highly toxic contaminants can be present in sediments and not impair the designated beneficial uses of the waters in contact with the sediments that should cause the public to spend money to control the input of the chemicals. It is very important that the restoration plan for Santa Monica Bay focus on solving real water quality problems in which the limited funds available are used to the maximum extent possible to control those sources of contaminants that are specifically responsible for water quality problems-impaired uses of the Bay.

#### Watershed Approach

The current draft management plan for the Bay focuses on the watershed approach in developing a mass emissions strategy for controlling contaminant inputs to the Bay. While these terms and

approaches may sound appropriate to a lay person who does not understand the technical issues, the watershed approach must focus on all sources of those forms of contaminants that adversely affect beneficial uses of Bay waters. This is significantly different from all sources of contaminants irrespective of impact which seems to be the approach that is advocated in the draft plan of action. The mass emissions strategy can become a brute force approach that ignores basic principles of aquatic chemistry and aquatic toxicology and, most importantly, the cost-effective use of public funds in developing water quality control programs.

An example of a watershed mass emissions strategy approach that has gone awry is occurring in San Francisco Bay in the Regional Water Quality Control Board's efforts to control copper inputs into the Bay. The enclosed letter dated May 22, 1994 to J. Caffrey, Chairman State Water Resources Control Board, summarizes the key issues of the overregulation of copper in San Francisco Bay that is occurring under the mass emissions strategy that has been developed by the San Francisco Bay Regional Water Quality Control Board.

Copper has been found in San Francisco Bay waters above the US EPA water quality objective of 2.9 µg/L. According to US EPA regulations, this requires either the development of a site-specific objective or the development of control programs to limit the copper input to the Bay so that the concentrations of copper in Bay waters do not exceed the objective for more than one hour once in three years. The Regional Water Quality Control Board staff and Board assumed that any exceedance of a water quality objective represented an impairment of designated beneficial uses that required reduction of the copper loads to the Bay. However, it is well understood by those knowledgeable in aquatic chemistry and aquatic toxicology and the approach used to develop the US EPA water quality criteria upon which the water quality standards-objectives are based, that that approach can readily lead to gross over-regulation, especially when applied to a wasteload allocation and total maximum daily load that evolved out of a mass emission strategy designed to achieve the water quality objective.

The Regional Water Quality Control Board following US EPA guidance, attempted to develop site-specific water quality objectives for copper in San Francisco Bay. This effort resulted in increasing the objective from 2.9 µg/L to 4.9 µg/L. The US EPA guidance, however, does not take into account that the forms of copper used in developing the site-specific objective are not necessarily the same forms of copper that are added to the Bay from point and non-point sources. The site-specific objective developed by following US EPA guidance is highly overprotective of the beneficial uses of San Francisco Bay waters.

The overprotective nature of the 4.9 µg/L copper objective is demonstrated by the repeated findings that San Francisco Bay waters are non-toxic to a variety of highly sensitive aquatic organisms, even though the copper in the Bay waters frequently exceeds the water quality objective by two to three times. As asked in the enclosed letter to SWRCB Chairman Caffrey, where is the copper-caused water quality problem that justifies the public spending ultimately \$1 billion to control copper in stormwater discharges to San Francisco Bay?

The reason copper is of concern in San Francisco Bay waters is that it is potentially toxic to some forms of aquatic life. However, when the same forms of aquatic life that were used to develop the US EPA water quality criterion were used to test the toxicity of San Francisco Bay waters, it

was found that the waters were non-toxic even though the copper concentrations greatly exceeded the original US EPA water quality criterion and the site-specific water quality objective for copper in Bay waters.

With respect to the San Monica Bay proposed plan of action which calls for controlling copper inputs to the Bay from stormwater inputs, where is the problem caused by the copper in the current stormwater discharges to the Bay that cause copper to be included as one of the "Pollutants of Concern?" No water quality problems have been found that are identified as being caused by the current copper discharges to the Bay. What justification exists for controlling copper in the stormwater discharges to the Bay? There is no linkage established between impairment of designated beneficial uses of Bay waters and copper and, for that matter, many other chemical contaminants derived from stormwater runoff. Without such linkage, funds spent in the name of Bay restoration may be wasted in failing to address real use impairment problems.

At this time it appears that copper is proposed for control in stormwater runoff because it is present in stormwaters rather than because it has been found to cause a real water quality problem in Bay waters. Such an approach is technically invalid and highly inappropriate in a situation, such as for the communities in the Santa Monica Bay watershed, where there are not unlimited funds for water pollution control.

There may be some who attempt to justify controlling copper and other contaminants in Santa Monica Bay watershed stormwaters based on potential yet unidentified problems that could be caused by copper in the Bay water or sediments. The copper and many of the other constituents present in Santa Monica Bay watershed stormwater runoff to the Bay ultimately become deposited in Santa Monica Bay sediments. The Characterization of Santa Monica Bay Restoration Plan January 1994 Section 9, "Impacts-Marine Invertebrates," uses the Long and Morgan and several other co-occurrence-based approaches to identify adverse impacts of chemical contaminants in Santa Monica Bay and Marina Del Rey sediments. These approaches are widely recognized as being technically invalid approaches for assessing impacts of sediment-associated contaminants.

Table 9-1 and 9-2 provide highly misleading results in the so-called "effects levels" for various metals and other constituents. Those familiar with aquatic chemistry and aquatic toxicology and the impact of contaminants in sediments on beneficial uses of waters, as well as how the Long and Morgan and AET co-occurrence-based approaches were developed, know that these approaches should not be used as they are being used in the Santa Monica Bay study to attempt to justify the initiation of a five-year plan of action that will result in the expenditure of over \$42 million in stormwater contaminant control from the Santa Monica Bay watershed.

Those knowledgeable in the literature on these topics know that the so-called "effects" reported by Long and Morgan bear no relationship to the concentrations of the contaminants listed in the Long and Morgan tables. As discussed by Lee and Jones (1992) (see attached report, "Co-Occurrence' in Sediment Quality Assessment"), Long and Morgan in developing their contaminant concentration-effects levels used total concentrations of contaminants rather than toxic-available forms. It has been well known for over 20 years that there is no relationship between a total concentration of a contaminant in sediments and its impact on the designated

beneficial uses of a waterbody. Further, Long and Morgan made extensive use of the data set that had been developed by my (Dr. G. F. Lee) co-workers and us in the 1970's in studying sediment concentrations and toxicity at about 100 sites located across the US in developing their database. They chose, however, to ignore the data that we had developed on ammonia and sulfides in these sediments. We have previously pointed out (see attached reviews) and it is now widely recognized that ammonia, hydrogen sulfide and low dissolved oxygen are the three most common causes of toxicity in aquatic sediments. Many of the so-called toxic effects that Long and Morgan list could be due to these contaminants and have nothing to do with the parameters that Long and Morgan arbitrarily chose to include in their database. Further, the fact that Long and Morgan used total contaminant rather than available-toxic forms in developing the correlation between contaminant concentrations and "effects" causes this approach to lack any technical validity. It should also be noted that some of the so-called "effects" that Long and Morgan used were not reliably assessed.

Examination of Table 9-1 shows that copper is reported as having adverse impacts at 70 to 300 ppm in sediments. Those familiar with the literature on copper in marine sediments know that copper concentrations well above these levels in sediments are routinely found to have no impact (are non-toxic) on sensitive forms of aquatic life living on or within the sediments. Several years ago we conducted a study on behalf of the Port of San Diego on the significance of copper in San Diego Bay sediments on water quality in San Diego Bay. The results of this study were recently presented at the American Chemical Society national meeting "Sediment Quality Symposium" that was held in March 1994 in San Diego. Extended abstracts of the papers that were presented by us at that conference are enclosed. It was found that the copper in San Diego Bay sediments which included copper from urban stormwater runoff, copper used as an anti-foulant on boat hulls, and copper ore spilled into the harbor, as well as all other constituents present in the San Diego Bay sediments that were tested, were non-toxic to nine different test organisms, a number of which are well known to be highly sensitive to copper and other contaminants.

The total copper in some of the tested sediments exceeded 18,000 ppm. These results are not atypical of what has been found at location after location where properly conducted studies are used to investigate the water quality significance of copper and, for that matter, many other constituents present in urban stormwater runoff that accumulate in bay sediments near the point where the runoff enters the bay. The enclosed paper on the lack of technical validity of co-occurrence-based approaches provides additional information on the highly inappropriate approach followed in developing Chapter 9, "Impacts-Marine Invertebrates," for the Santa Monica Bay Restoration Plan January 1994.

Tables 9-1 and 9-2 list a column of NRC "Effects Levels" where the reference is given to the National Research Council EPA Threshold Toxic Levels (NRC 1989). A review of that reference shows that this column of so-called effects levels are from a paper by Zarba in which these values are listed in Table 1 of the paper. It is totally inappropriate to reference this paper which appeared in an NRC workshop proceedings as an NRC set of effects levels. The proper reference for these effects levels would have been Zarba (1989). The NRC, nor for that matter the US EPA, has not adopted through appropriate regulatory processes these toxic effects levels. A review of these so-called effects levels shows that they suffer from the same kinds of problems as the Long and Morgan and AET values which are also listed in Tables 9-1 and 9-2. They are

not technically valid and should not have been used in the Santa Monica Bay Restoration Project as critical concentrations in sediments of Santa Monica Bay that would justify expenditures for stormwater contaminant control.

It appears at this time that there is no reliable data available on the water quality significance of the various chemical contaminants that are present in current urban stormwater runoff to Santa Monica Bay on the impact of these contaminants on the designated beneficial uses of Bay waters. Therefore, at this time the Santa Monica Bay Restoration Project has not properly defined the water quality problems that will be solved by spending over \$42 million in controlling chemical contaminants in urban stormwater runoff to the Bay. It is certainly more appropriate public policy and best use of the limited funds available to postpone any initiation of a proposed plan of action for control of copper and many other chemical contaminants in Santa Monica Bay stormwater runoff until a real water quality problem has been found with the current stormwater discharges to the Bay. Meanwhile, an intensive effort should be conducted to try to find real water quality problems due to the current discharges. If a real water quality problem is found for any of the 19 "Pollutants of Concern" or the other thousands of chemicals that could be present in stormwater discharges which are not now regulated, then, as discussed above, appropriate action plans can and should be developed. This is the technically valid, cost-effective approach for restoration of Santa Monica Bay water quality associated with stormwater-derived chemical contaminants.

#### Comments on Specific Program for Santa Monica Bay Restoration Proposed Plan of Action

Beginning on page ES-1 the Executive Summary sets forth the goals of the Santa Monica Bay Restoration Project. These goals are,

*"Reduce pollutant loadings to the Bay from point and nonpoint sources in order to prevent degradation of the marine ecosystems, protect beaches and minimize risks to human health.*

*Manage and control various pollutant sources in an integrated and comprehensive manner, taking into consideration impacts to all environmental media--water, air and land."*

A very important component of these goals that is not included is to achieve the goals in a technically valid, cost-effective manner. It is trivial to develop grossly overprotective contaminant control programs which, while protecting the designated beneficial uses of Santa Monica Bay, result in massive waste of public and private funds controlling contaminants that have no impact on the designated beneficial uses of Santa Monica Bay. It is very important that those responsible for developing the plan of action for Santa Monica Bay define real water quality problems that exist in the Bay today, then define the causes of these problems, and where these causes are related to current inputs of contaminants, develop technically valid, cost-effective approaches for their control. At this point there is very little recognition of cost-effectiveness and technical validity of approaches in the Santa Monica Bay Restoration Plan proposed actions.

The recent court action on the State Water Resources Control Board's failure to consider economic issues in developing the April 1991 Water Quality Objectives in Inland Waters, Enclosed Bays and Estuaries reflects the increasing attention that cost-effectiveness and technical validity will play in the development of contaminant control programs in California. The days of simply throwing money at a problem as a result of adopting grossly overly protective approaches for water pollution control are rapidly coming to an end. It will be essential that cost-effectiveness of proposed programs be carefully documented so that the public will understand the benefits of spending funds for a particular contaminant control program, such as \$42 million for the control of stormwater-associated chemical contaminants entering Santa Monica Bay, in improving real water quality problems that exist in the Bay.

Beginning at the top of page ES-2 an outline of the key components of the Santa Monica Bay Water Pollution Control Management Program is presented. The first of these places emphasis on pollution prevention. While obviously pollution prevention is the approach that should be taken, it is very important that for each so-called pollution prevention effort, a clear understanding and recognition of what pollution is being prevented be achieved, and that the pollution prevention effort be based on a technically valid assessment of specific impacts of pollutants on beneficial uses of Santa Monica Bay. Far too often today, so-called pollution prevention efforts are not directed at real pollution problems. This has and continues to waste public and private funds in the name of pollution prevention without any significant impact on environmental quality.

The second item in "Approach" for Bay pollution management focusses on what are called 19 "Pollutants of Concern." Examination of this group of 19 "Pollutants of Concern" shows that they are largely conventional contaminants, a number of which are likely to have no impact on designated beneficial uses of Santa Monica Bay. Those responsible for developing the "Pollutants of Concern" list should specifically delineate what specific water quality problems are caused by these contaminants in Santa Monica Bay. Further, they should be required to delineate how well is it known that Santa Monica Bay is impacted by these "Pollutants of Concern?" Are there specific components of a "Pollutant of Concern" that are important while most of the components of a "Pollutant of Concern," such as a heavy metal, have little or no impact on the designated beneficial uses of Santa Monica Bay, etc.? From our experience, the "Pollutants of Concern" list can readily result in massive waste of public and private funds controlling these contaminants, yet achieve very little in the way of improvement of the designated beneficial uses of Santa Monica Bay waters.

The third item under "Approach" focuses on pollutant sources. Such an approach is appropriate. However, it is important that those who are responsible for development and administration of the Santa Monica Bay Restoration Program do not make the mistake that is commonly made of failing to recognize that each contaminant source contributes pollutants, i.e. those chemicals that impact designated beneficial uses of a waterbody, to a significantly different degree. It is also important not to make the mistake frequently made by those who do not understand aquatic chemistry and the chemical characteristics of various pollutant sources to assume that all sources of a particular contaminant are equally available-toxic in impacting the designated beneficial uses of waterbodies. It is well known that different sources of copper can have markedly

different impacts on water quality in various types of waters. If recognition is not given to these differences, waste of public and private funds will occur.

The fifth item states, "Manage pollutants of concern that accumulate in the marine environment differently from those that dissipate." This approach item states that, "The BRP establishes a mass emissions approach for those pollutants that accumulate in the marine environment and for which there are currently detectable inputs to the Bay." This is a very dangerous approach that can readily result in massive waste of public and private funds. While this approach may be appropriate in those societies where there are no financial constraints on implementation of pollution control programs, certainly in California overall, and southern California in particular, it is very important that the funds spent for contaminant control be used to address real water quality problems and not those perceived by those not knowledgeable in the topic area to be of significance. The funds available for pollution control in Santa Monica Bay should be used in the most technically valid, cost-effective manner to solve the greatest water quality problems in Santa Monica Bay first.

It is important not to try to solve all possible perceived water quality problems of Santa Monica Bay within the next five years. The funds available now, or potentially available now, should be used to address those water quality problems that are well-defined and that are of greatest significance to the public in terms of impairment of the beneficial uses of Santa Monica Bay.

The sixth "Approach" item focuses on public education. This can be an important component of a program devoted to restoration of a particular waterbody. It is important, however, that those doing the educating are provided with and use reliable information which is passed on to the public. Far too often those involved in public education in environmental matters develop their own assessment of pollutant sources and appropriate control programs that have little relevance to real world situations. It has been found that some of those involved in stormwater quality public education provide the public with considerable unreliable information on the potential benefits of various types of activities that the public can participate in which will have little impact in improving water quality in the receiving waters for the stormwater discharges to a particular waterbody.

The last item under "Approach" is devoted to monitoring pollutant sources and the health of the marine environment. This is extremely important. Again, however, those who design the monitoring program must have a highly sophisticated understanding of how the monitored parameters relate to water quality concerns of the public. This is not a trivial relationship. Far too often, monitoring programs are established that provide little in the way of meaningful information on the changes in designated beneficial uses of the waterbody in relation to contaminant control programs.

On the bottom of page ES-2 is a listing of 33 Priority Actions that according to this write-up *"have been identified by the SMBRP Management Committee to address pollutant loading in the Bay."* Comments on these items are presented below.

Proposed Actions PM-1.2, PM-2.1, PM-3.1, PM-3.2a, UR-1.1, UR-1.3a, UR-1.3b, UR-1.4, UR-1.5, UR-1.5b, UR-2.1e, UR-2.2a, UR-2.2b, UR-4.1a, and UR-4.1c all deal with stormwater-

associated chemical contaminant management programs. The implementation of these actions should be put on hold until a proper definition of the water quality problems that are caused by chemical contaminants in stormwater runoff to Santa Monica Bay has been developed. Once the problems have been reliably identified, then the specific components of stormwater-associated discharges need to be determined. Once the specific components of the stormwater runoff that are responsible for the impaired uses of Santa Monica Bay waters have been identified, then studies need to be done to determine the specific sources of the specific components of stormwater-associated chemical contaminants that are adverse to Bay waters. At this point, which will be several years hence depending on the funding levels available and the efficacy of utilization of these funds in developing this information, it will be possible to start to activate in a meaningful way the above-listed Proposed Actions. It will be highly inappropriate to spend public funds on many of the above-listed Proposed Actions until a reliable technical database has been developed on the issues listed above.

Some of the items in the 33 Priority Actions, such as PP-1.1, PP-1.2, PP-1.3, and PP-2.1, concerned with household and commercial toxic chemicals are of little relevance to Santa Monica Bay water quality problems. The household hazardous waste and hazardous chemical management programs that are typically conducted are primarily directed toward municipal solid waste management issues as they pertain to disposal of the household hazardous chemicals in a municipal landfill and have limited, and in some cases, no relevance to surface water quality issues. With few exceptions, these programs are directed to groundwater quality protection and/or landfill worker safety. While there are some individuals who will dispose of motor oil in a storm drain, it is highly unlikely that these individuals will respond in a meaningful way to household hazardous chemical management programs. It is important to not mislead the public into believing that the household hazardous chemical program will have any significant impact on Santa Monica Bay water quality.

Priority Actions such as PP-5.2, PP-6.2, and PP-6.3 are all areas that should be implemented with a high priority. Priority Action UR-4.1b should be implemented, although we question whether in excess of \$3 million is needed for this program.

On page ES-7, under Chapter 3 "Stormwater/Urban Runoff," mention is made of the use of NPDES permits for control of stormwater-associated chemical contaminants. It is very important that considerably greater flexibility be developed into the NPDES program being carried out by the Los Angeles Regional Water Quality Control Board than is now being implemented. At this time, that Board is in some instances grossly over-regulating stormwater runoff from properties.

Page ES-9, mentions that Chapter 6 is devoted to "Contaminated Sediments." Under "Chapter Strategy," mention is made of identifying the most contaminated hot spots for clean-up and remediation as well as development of sediment quality objectives and site-specific clean-up criteria for contaminated sites. While these components of the strategy are important, it will likely be 5 to 10 years from now before an adequate, reliable information database is available upon which these components of the strategy can be developed in a meaningful way.

The component of the strategy that focuses on minimizing the contaminants from point and non-point sources can readily lead to tremendous waste of public and private funds devoted to

controlling contaminants that have little or no impact on the beneficial uses of Santa Monica Bay. This component of the strategy should be changed to controlling the input of pollutants to Santa Monica Bay that have significant adverse impacts on the designated beneficial uses of the Bay.

Chapter 8 is concerned with swimming and focuses on protection of public health from pathogens associated with fecal matter. A significant part of the Santa Monica Bay Restoration proposed plan of action that should and can be implemented now is devoted to reduction of the fecal contamination of the nearshore waters of Santa Monica Bay. We have extensive experience in work on sanitary quality of non-contact and contact recreation and know that it will not be possible to reliably quantify the public health benefits that will accrue from such efforts. They are, however, in the direction of improved aesthetic quality of the nearshore waters and therefore are justifiable.

Page 2-2 presents the Timeline for Priority Actions. For many of the Proposed Actions mentioned above, this timeline is inappropriate since adequate information has not been developed during the first four years of the Santa Monica Bay Restoration Project to properly define the real water quality problems that are occurring in Santa Monica Bay as a result of current chemical contaminant inputs. It is certainly highly inappropriate to start to implement very costly control programs for chemical contaminants in various point and non-point sources when an adequate reliable database does not exist on the problems caused by the current discharges. The development of management programs associated with many aspects of the Santa Monica Bay Restoration Project have gotten far out in front of the proper definition of water quality problems from current discharges. This is a significant problem in how the Santa Monica Bay Restoration Project has been conducted. Inadequate attention was given in the planning of the Project to proper definition of impacts of current chemical discharges with the result that the implementation of Action Plans to address these discharges will now have to wait a number of years until the information that should have been developed early in the Project has been developed.

### Overall Recommendations

Those responsible for the development of a Santa Monica Bay Restoration Plan of Action should put on hold all efforts that are designed to further control chemical contaminants entering Santa Monica Bay from point and non-point sources. A technical advisory committee should be appointed consisting of individuals who understand aquatic chemistry, aquatic toxicology and water quality as they relate to the development of technically valid, cost-effective approaches for evaluating and managing the impacts of chemical contaminants on the designated beneficial uses of Santa Monica Bay waters. This technical advisory committee should design a research program that will provide the necessary information upon which to develop an appropriate Santa Monica Bay Restoration Plan of Action. It should be understood that it will likely take a 3 to 5 year effort with substantial associated funding in the amount of hundreds of thousands of dollars per year devoted to highly directed research determining what real current chemical input associated water quality problems now exist in Santa Monica Bay and the sources of those specific contaminants that are responsible for these problems.

There are some components of the proposed Plan of Action, however, that can and should proceed. The work on the sanitary quality (public health/aesthetic) impacts of stormwater-associated potential enteric pathogen inputs can and should proceed. While the same kinds of problems exist in defining public health impacts of pollution of beach waters by fecal-derived organisms, efforts should be made to control these organisms to the maximum extent practicable from stormwater and other inputs.

Obviously a plan of action devoted to controlling debris, litter and other aesthetically objectionable materials that enter Santa Monica Bay nearshore waters should be aggressively implemented. This should include the development of pollution prevention programs, not necessarily because they will be effective in addressing water quality impairment caused by potentially toxic chemicals, but because they impact the aesthetic quality of Santa Monica Bay nearshore waters.

If there are any questions on these comments, please contact me. If anyone claims that these comments are in some way technically invalid or inappropriate, please request that they present their claims in writing with appropriate documentation of their contention so that the claims may be reviewed in a properly conducted peer review of the issues.

#### List of Enclosures

Lee, G. F. and Jones-Lee, A., "Comments on 'Proposed Authorization to Negotiate and Execute Contracts or Interagency Agreements for Assessing Loading and Biological Impacts of Nonpoint Source Contaminants in Santa Monica Bay'," Submitted to J. Caffrey, State Water Resources Control Board, by G. Fred Lee & Associates, El Macero, CA, 11pp, May (1994).

Lee, G. F., and Jones-Lee, A., "Water Quality Impacts of Stormwater-Associated Contaminants: Focus on Real Problems - Condensed Version," IN: Proceedings of First International IAWG Specialized Conference on Diffuse Pollution: Sources, Prevention, Impact and Abatement, Chicago, IL, pp. 231-240, September (1993).

Lee, G. F., and Jones, R. A., "Suggested Approach for Assessing Water Quality Impacts of Urban Stormwater Drainage," IN: Symposium Proceedings on Urban Hydrology, American Water Resources Association Symposium, November 1990, AWRA Technical Publication Series TPS-91-4, AWRA, Bethesda, MD, pp. 139-151 (1991).

Lee, G. F., and Jones-Lee, A., "Urban Stormwater Runoff Water Quality and Associated Sediment Quality Issues: An Overview," Report of G. Fred Lee and Associates, El Macero, CA, 18pp, March (1994).

Jones-Lee, A., and Lee, G. F., "Achieving Adequate BMP's for Stormwater Quality Management," Proceedings "Critical Issues in Water and Wastewater," ASCE National Conference on Environmental Engineering, New York, NY, July (1994).

Lee, G. F. and Jones-Lee, A, "Copper in San Francisco Bay: Where's the Problem?" Letter submitted to J. Caffrey, State Water Resources Control Board, by G. Fred Lee & Associates, El Macero, CA, 4pp, May (1994)

Lee, G. F. and Jones-Lee, A., "Sediment Quality Criteria: Numeric Chemical- vs. Biological-Effects-Based Approaches," Proc. WEF Natl. Conf. Surface Water Quality & Ecology, pp. 389-400 (1993).

Lee, G. F. and Jones-Lee, A., "'Co-Occurrence' in Sediment Quality Assessment," Report of G. Fred Lee & Associates, El Macero, CA, April (1993).

Lee, G. F., and Jones-Lee, A., "Comments on 'Development of an Approach to the Assessment of Sediment Quality in Florida Costal Waters,' D.D. MacDonald, Canada, Dated May 31, 1992," Report of G. Fred Lee & Associates, El Macero, CA, Submitted to Mobile District, US ACE (1992).

Lee, G. F., and Jones, R. A., "Sediment Quality Criteria Development: Technical Difficulties with Current Approaches and Suggested Alternatives," Condensed version published as Lee, G. F., and Jones, R. A., "Sediment Quality Criteria Development: Technical Difficulties with Current Approaches (Condensed Version)," IN: Proc. HMCRI R&D 92 Conference on the Control of Hazardous Materials, HMCRI, Greenbelt, MD, pp. 204-211 (1992).

Jones-Lee, A., and Lee, G. F., "Evaluation of the Water Quality Significance of Copper in San Diego Bay Sediments," Division Environmental Chemistry, American Chemical Society meeting, preprint extended abstract, Washington, DC, pp. 107-108, March (1994).

A copy of any of these enclosures as well as other materials which serve as back-up to these comments is available upon request from:

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May 30, 1994

John Caffrey, Chairman  
State Water Resources Control Board  
PO Box 100  
Sacramento, CA 95812

Dear Chairman Caffrey:

Please find presented below comments that Dr. Jones-Lee and I wish to provide to the Board on agenda item 4 "Proposed Authorization to Negotiate and Execute Contracts or Interagency Agreements for Assessing Loading and Biological Impacts of Nonpoint Source Contaminants in Santa Monica Bay," that is scheduled to be considered at the June 1, 1994 WRCB Workshop. While this item appears to be innocuous and another of the numerous items of this type that are passed by the Board with limited review by the public, these comments are designed to provide an expression of our concern about the Santa Monica Bay Restoration Project and most importantly the approaches that are being developed in that project under State Board supervision devoted to, as programmed now, the expenditure of over \$42 million for implementation of contaminant control programs in stormwaters discharged to Santa Monica Bay.

These comments are based on about 30 years of work, including extensive research and practical experience at numerous locations on evaluation of the impact and management of stormwater runoff associated contaminants. As discussed below, we find that the Santa Monica Bay Restoration Project proposed plan of action, as presented in April 1994, which calls for the expenditure of \$42 million for control of stormwater associated contaminants in the Santa Monica Bay watershed, is far ahead of a properly developed reliable technical base of information that would justify such an expenditure. Further, we find that the State Board staff's proposed approach, as presented as an attachment to item 4 for the June 1 State Board Workshop, will not provide the reliable technical base of information needed for the Santa Monica Bay Restoration Project to proceed with a plan of action in accord with the timetable set forth in the April 1994 proposed plan of action.

According to its April 1994 draft report that was recently released to the public for comment, the Santa Monica Bay Restoration Project (SMBRP) has apparently had extensive involvement of the State Board and its staff. Craig Wilson of the staff is listed as having chaired the Technical Advisory Committee for the SMBRP; you are listed as chair of the Management Committee of the SMBRP. Review of the SMBRP's April 1994 draft report entitled, "The Santa Monica Bay Restoration Plan Public Review Draft," the "Characterization Study of the Santa Monica Bay Restoration Plan January 1994," and the State Board staff's May 2, 1994 report entitled, "Santa Monica Bay Restoration Project: Proposed Authorization to Negotiate and Execute Contracts to Implement the Study Titled: 'Assessment of Loading and Biological Impacts of Nonpoint Source

Contaminants in Santa Monica Bay" appended to the May 23, 1994 description of agenda item 4 for the June 1 WRCB workshop, shows that there are significant deficiencies and inconsistencies between the proposed plan and the proposed research. As discussed below, this raises significant questions about the appropriateness of the proposed Santa Monica Bay Restoration Project plan relative to the proposed research on stormwater water quality impacts on Santa Monica Bay.

#### Adequate Time for Public Review

A point of concern is the amount of time allowed for public review of the proposal for funding outlined in agenda item 4. When I received the announcement of the June 1-2, 1994 Board Workshop and Meeting agenda, I noted with interest agenda item 4. As you know, I have had a long-standing interest in, and have conducted extensive research on, the evaluation and control of nonpoint source pollution. I called Maureen Marche to obtain whatever backup information that was available on that agenda item. She informed me that as of that time the backup information had not been provided to her. Subsequently, she sent me a copy of the backup information; that information arrived on May 26, 1994. This means that only two working days were available between when the information was made available to the public and when the Board is to review it.

The lack of adequate time for public review of potentially highly significant items has been a recurring problem. In this case insufficient time has been allowed for public review of substantial expenditures of public funds by the Board staff in areas that will influence the establishment of State policy governing the ultimate expenditure of hundreds of millions of dollars in pollution control programs. It is very important therefore that the public be allowed the opportunity for in-depth comprehensive review of proposed WRCB research funding which is supposed to serve as the basis for developing public policy for formulating and implementing pollutant control programs. The approaches that are adopted in the Santa Monica Bay Restoration Project for control of chemical contaminants in stormwater drainage, while of great significance to those in the Santa Monica Bay watershed and those who utilize Santa Monica Bay, could also set a precedent for urban stormwater contaminant control programs in other areas. It is important that the public be provided with more than two working days time to review and comment on the appropriateness of the approaches being followed in addressing the inputs of stormwater-associated contaminants and their impacts on Santa Monica Bay.

#### Comments on Technical Validity of Proposed Research

The discussion section of the May 23, 1994 description of agenda item 4 states,

"U.S. EPA awarded \$905,000 to the State of California in July of 1993 for the purpose of implementing the fifth-year workplan of the SMBRP. Authorization of the State Water Resources Control Board (SWRCB) is needed to execute one large contract that focuses on assessment of loading and biological impacts of nonpoint source contaminants in Santa Monica Bay."

In the Introduction of the 3.5-page staff report entitled, "Assessment of Loading and Biological Impacts of Nonpoint Source Contaminants in Santa Monica Bay," dated May 2, 1994, included as part of the backup material, it is stated,

"This staff report presents preliminary scope of work for the interagency agreement for the study titled: 'Assessment of Loading and Biological Impacts of Nonpoint Source Contaminants in Santa Monica Bay.'"

The Background section of the May 2, 1994 staff report states,

"The Bay also receives pollutants from dozens of unregulated storm drains. Even though many of the biggest dischargers have improved the quality of their effluent, significant problems remain from past discharge practices (e.g., sediment contamination) and the lack of adequate control of stormwater discharges (e.g., bacterial and chemical contamination from storm drain discharge). These problems have had an actual or perceived impact on the Bay's marine ecosystem and the human use of those resources."

The chemical contamination from storm drain discharges and their "perceived impacts" should not be used as the basis for Santa Monica Bay "Actions for Bay Restoration" described in the draft that includes a proposed expenditure of \$42 million for control of chemical contaminants in stormwater drainage. As noted above, this proposed plan of action is being circulated prior to formal adoption. As discussed in the enclosed papers, in developing water pollution control programs, especially for stormwater associated chemical contaminants, it is very important to clearly distinguish between contamination of Santa Monica Bay and pollution of Santa Monica Bay. It is not clear from the April 1994 Draft Report covering the proposed plan of action as well as the January 1994 "Characterization Study of the Santa Monica Bay Restoration Plan" and the State Board staff May 2, 1994 report entitled "Assessment of Loading and Biological Impacts of Nonpoint Source Contaminants in Santa Monica Bay" whether those responsible for developing these reports recognize and have taken a proper account of the difference between contaminating the Bay and polluting the Bay.

The requirements of the Federal Clean Water Act focus on controlling chemicals and organisms to protect designated beneficial uses of waters. The goal of the Clean Water Act is zero pollutant discharge where pollutants include chemicals in discharges and runoff that are present in sufficient concentrations of available - toxic forms to impair the designated beneficial uses of a waterbody. It is important to note that this goal is not zero discharge of chemicals. It is not the goal of the Clean Water Act to require all waste water and stormwater discharges to be high purity distilled water. The Clean Water Act clearly recognizes the difference between pollution and contamination. In the framework of the Act, contamination is the addition of a chemical to a waterbody irrespective of whether it has an adverse impact. Pollution is the addition of contaminants that have adverse impacts.

Those familiar with aquatic chemistry and aquatic toxicology as they relate to water quality - impairment of designated beneficial uses of waterbodies know that chemical contaminants exist in a wide variety of chemical forms only some of which are adverse to water quality (i.e., are pollutants). Further, it is known that there are a wide variety of physical, chemical, biological,

and temporal factors that cause chemicals in water to act as contaminants rather than pollutants. This is especially true for stormwater associated contaminants.

There are significant inconsistencies and deficiencies between the May 2, 1994 State Board Staff Report on Santa Monica Bay and the April 1994 Draft Santa Monica Bay Restoration Project plan. In the Plan, \$42 million is designated for control of chemical contaminants in stormwater runoff to the Bay. In the May 2, 1994 report, WRCB staff are now asking for approval to spend several hundred thousand dollars to determine impacts of stormwater runoff associated chemicals on Bay waters. A review of Santa Monica Bay Restoration Project Characterization Report of January 1994 shows that no data is presented which demonstrates that stormwater runoff associated chemicals are impairing the use of Santa Monica Bay waters. It appears that the proposed plan of action for Santa Monica Bay which includes the expenditure of over \$42 million for control of chemicals in stormwater runoff to the Bay is based on "perceived impacts" and not on data which shows real impacts.

Before any plan of action is adopted for restoration of Santa Monica Bay that calls for the expenditure of \$42 million in a Bay Restoration Plan devoted to control of chemical contaminants in stormwater runoff, real water quality problems - beneficial use impairment should have been reliably documented and most importantly the public should be reliably informed on the benefits in terms of improved designated beneficial uses of Santa Monica Bay waters that will accrue as a result of this expenditure. They should not be in the position of being asked to spend that much money based on "perceived impacts." Real impacts should have been defined. Further and most importantly, the Porter-Cologne Act mandates that the cost effectiveness of proposed restoration plans be reliably evaluated and presented. It is certainly inappropriate to develop a Santa Monica Bay restoration plan of action in which one of the primary expenditures arising out of this plan is the control of chemical contaminants in stormwater runoff when it is still necessary according to State Board staff to spend several hundred thousand dollars in research to define impacts of stormwater associated contaminants.

It appears that the State Board through its member and staff advisory roles through the Santa Monica Bay Restoration Plan is stating that there is technical justification to spend \$42 million controlling the impacts of stormwater associated contaminants to Santa Monica Bay yet at the same time is requesting several hundred thousand dollars to evaluate these impacts. Clearly, this inconsistency in approach needs to be addressed before the proposed Santa Monica Bay Restoration Plan is adopted and before several hundred thousand dollars are approved for studying impacts of contaminants entering the Bay.

While those responsible for developing the proposed plan of action and the proposed research may try to claim that the proposed research will provide the necessary information to justify the proposed plan of action and its associated expenditures for stormwater contaminant control, such an approach is very dangerous since there will be significant tendencies by those responsible for conducting the research to develop results which justify the previously adopted, if the April 1994 plan of action is adopted, plan. The Santa Monica Bay Restoration Project has been conducted with significant technical deficiencies. It is disturbing to find that the Santa Monica Bay Restoration Project is now entering its fifth year of operation without information on the water quality impacts of stormwater associated contaminants discharged to Santa Monica Bay. Further,

as discussed below, based on our many years of experience in conducting research of this type, there is no possibility that the State Board staff's May 2, 1994 proposed research will provide an adequate reliable technical base of information to enable the Santa Monica Bay Restoration Project to develop and implement a plan of action for addressing the control of stormwater associated contaminants within the timeframe set forth for the implementation of the proposed April 1994 plan.

Page 2 and the first half of page 3 of the staff May 2, 1994 report outline in a very general way the studies proposed to be supported by the staff's recommendation for expenditure of funds. Basically, these include apparently for the first time doing toxicity testing of stormwater runoff from two storm sewers that discharge to Santa Monica Bay. The toxicity testing will include testing of three different unidentified organisms during two different storm runoff events. While a few chemical parameters are listed for study, the detailed information on the measurements that will be made on the stormwater samples are not defined. It is further stated that the identity of the toxic components in the water and sediments in the stormwater runoff will be achieved. In addition, some unidentified biomarkers and anthropogenic markers on suspended solids and sediment associated with the storm drains will be evaluated. No information is provided on the details of the proposed studies, including who will be conducting the studies, their qualification, experience, including past research records in conducting such studies, proposed allocation of budget, etc. This is another of WRCB staff essentially blank check requests which have been going on year after year without any accountability to the public. It is prudent use of public funds to require that before any further money is allocated to the Santa Monica Bay Restoration Project as well as other research that has been conducted since 1991 as part of the Bay Protection and Toxic Clean Up Program (BPTCP), that the detailed results including full comprehensive reports of the past studies that are pertinent to the proposed research be available for public review. There have been substantial research amounting to many hundreds of thousands of dollars conducted by the State Board staff since 1991 for which thus far there has been no accountability that have direct pertinence to the staff's proposed funding of the impact of stormwater associated chemicals on Santa Monica Bay water quality. This issue is discussed below. Further, the inconsistency that exists within the State Board and between the State Board and the Santa Monica Bay Project between proposed plans of action for control of stormwater associated contaminants and the proposed plan of study to for the first time define the impacts of stormwater associated chemical contaminants on Santa Monica Bay waters must be resolved. Certainly, it is inappropriate to adopt a plan of action to solve a problem when the problem has not yet been defined.

The inappropriateness of the proposed plan of action for Restoration of Santa Monica Bay can be understood by examining what is know about the cause of toxicity in stormwater runoff from many urban areas. The home use pesticide diazinon is being found to be one of the if not the primary cause of toxicity in urban stormwater runoff. The heavy metals and other constituents in stormwater runoff in study after study are being found in non-toxic non-available forms. Rather than spending \$42 million to implement best management practices for heavy metals and other conventional pollutants as currently called for in the proposed Bay Restoration Plan of April 1994 it could turn out that restriction of the use of diazinon at homes in the Santa Monica Bay watershed could eliminate the toxicity associated with urban stormwater runoff to the Bay. This can be done with little or no expenditures of public funds.

It is not clear, however, that those responsible for developing the May 1992 proposed research program recognize that heavy metals and many of the conventional contaminants of stormwater drainage are not responsible for adversely impacting designated beneficial uses of waterbodies receiving stormwater runoff. If those responsible for the proposed research program (no one is identified in item 4 as the leader for the proposed research program) are aware and recognize what is being found in study after study across the country on stormwater quality impacts, it is clear that this recognition has not been communicated to Craig Wilson, Chair of the Santa Monica Bay Technical Advisory Committee, and to the Santa Monica Bay Project. The SMBRP 1994 publications appear to have been developed by individuals with a pre-mid-1990 understanding of the literature on stormwater quality impacts on water quality. There is very limited recognition presented in these reports on the significance of aquatic chemistry and aquatic toxicology in influencing the water quality impacts of stormwater associated chemical contaminants.

It is important to properly evaluate whether toxicity as measured in standard toxicity tests of stormwaters is in fact manifested as toxicity in the receiving waters for this runoff that significantly impairs designated beneficial uses. As discussed by Lee (1994a) in a letter to the State Board, the toxicity tests that are used in stormwater runoff typically greatly over estimate the toxicity that will actually occur in the receiving waters for this runoff. This situation must be properly evaluated as part of any proposed research on defining water quality impacts of stormwater associated contaminants.

Those responsible for developing the Santa Monica Bay Restoration Project proposed plan of action should not make the same error that was made by the San Francisco Regional Water Quality Control Board in developing a wasteload allocation and total maximum daily loads for copper to San Francisco Bay. The water quality limited situation for San Francisco Bay arose out of the fact that total recoverable copper was used by the San Francisco Regional Water Quality Control Board in the establishment of water quality objectives for San Francisco Bay. The Regional Board followed the guidance of the State Board in this regard. This guidance, as predicted prior to its adoption in April 1991, led to administrative exceedances of the water quality objective for which there were no real water quality impairments found associated with these exceedances.

The reason that copper required further reductions in the loads to San Francisco Bay, including for the first time reduction of the copper inputs from stormwater associated sources, was that copper is potentially toxic to aquatic life. It is now very clear, especially after the recently released results from the Environmental Monitoring Program for San Francisco Bay conducted in 1993, that there is no toxicity to aquatic life in the water column due to copper and all other constituents in San Francisco Bay waters. That monitoring program included using the same organisms as were used originally to develop the copper criterion which became the basis for the water quality objective for the Bay. As it stands now, unless the Regional Board, either on its own or through the courts backs off from its current approach of limiting copper loads to San Francisco Bay, over \$1 billion of public funds will ultimately be wasted controlling copper from stormwater inputs to San Francisco Bay that will have no impact on the designated beneficial uses of San Francisco Bay waters. This matter is discussed further in a series of correspondence

with the State Board by Lee (1994b). The way that the Santa Monica Bay Restoration Project proposed plan of action has been developed could readily lead to exactly the same kind of inappropriate regulatory approaches for Santa Monica Bay as has been adopted for San Francisco Bay. There has already been a substantial waste of public and private funds in addressing what are simply inappropriate regulatory approaches adopted by the State and Regional Boards for San Francisco Bay.

The May 2, 1994 staff report mentions the use of biomarkers to evaluate the impact of stormwater associated contaminants in San Diego Bay waters. In September 1991 the State Board staff proposed approval of the State Board to spend \$335,000 for the first year of a three year study which included developing a California AET (Apparent Effect Threshold) and work on the use of so-called "biomarkers." A significant part of this effort was to be devoted to southern California coastal bays and harbors. At this time no results from these studies have yet been made public. The State Board staff, however, are now proposing to the State Board to use biomarkers to evaluate the potential impacts of stormwater associated contaminants on Santa Monica Bay water quality. This is highly inappropriate. Lee and Jones (1992) developed comments on the highly questionable use of biomarkers as a regulatory tool for toxic hot spot evaluation. As discussed such approaches have not yet been found to be reliable regulatory tools. The State of California Water Resources Control Board staff are not the first to work on this topic. It has been investigated by a number of competent experienced scientists. While biomarker responses have been found associated with water and sediment, the cause of the responses is usually unknown. Further, frequently so-called "clean" water and sediment provide the same response as contaminated sediments and there has been no translation of what a biomarker response means to the designated beneficial uses of the waterbody associated with the response. It is for these reasons that biomarkers are not being used as regulatory tools today yet the State Board staff propose in their May 2, 1994 report to use biomarkers on suspended and deposited sediments from storm drains entering Santa Monica Bay to evaluate the impacts of storm drain associated contaminants.

If the State Board staff have achieved a remarkable breakthrough that has not been possible by all other investigators on the use of biomarkers as reliable regulatory tools which would justify this approach then before any funding involving the use of this approach is approved to assess impacts of stormwater associated contaminants on Santa Monica Bay beneficial uses, a report covering the details of this breakthrough should be available for public review. If, however, which is more likely the case, the funds that the State Board staff have spent on this topic on southern California bays and harbors have failed to provide any definitive information that would change the situation of one where biomarkers are an interesting curiosity to one where they are a reliable regulatory tool which should cause the people in the Santa Monica Bay watershed to spend \$42 million to control chemical contaminants in stormwater runoff, then their use in the proposed program should not be made. Instead, these funds should be devoted to assessment tools that have been found to provide reliable information on the potential impacts of stormwater associated contaminants on receiving water water quality. Work on Santa Monica Bay stormwater impacts cannot afford to be devoted to interesting curiosities; the limited funds available must be focused on providing reliable assessment of impacts and the improvement in the designated beneficial uses that will accrue as a result of expenditures of funds to control chemical contaminants in stormwater runoff discharge to the Bay.

In the July 1991 State Board staff proposal to the Board for the funding of the "California Water Resources Control Board (WRCB), 'Measures of Bioeffects Associated with Toxicants in Southern California, Proposal for Cooperative Agreement,' NOAA and WRCB, July 10 (1991)" the staff list a number of benefits that will accrue from the proposed funding. Dr. Jones-Lee and I commented on the likelihood of the staff being able to accomplish many of the so stated benefits. It will be very important before any further funding be available to the State Board staff for the Bay Protection Toxic Clean Up Program and the Santa Monica Bay Restoration Project to examine how well the State Board staff actually accomplish the projected accomplishments for the July 1991 proposed funding with the hundreds of thousands of dollars that they have spent without any accountability thus far in this program. As discussed in our comments the program as originally developed by the staff and approved by the Board was not adequately planned and there was insufficient opportunity for the public to comment on the inappropriateness of the proposed approaches. Basically, the staff had essentially a blank check. The continuing issuing of blank checks by the State Board for the staff to investigate interesting curiosities which experienced professionals in the topic area predict to have little or no possibility of being successful in developing reliable regulatory tools should come to an immediate halt. The State Board should appoint an independent technically competent review panel who can review a priori in a peer review public arena proposed plans and associated budget before adoption by the State Board. If the State Board will not adopt an open policy of its operations in its water quality programs then it may be necessary for the regulated community and the public to go to the legislature and/or the courts to force the operations of the Board into a full public review. I know that the regulated community is becoming increasingly concerned about the lack of opportunity to work with the regional and state board in developing and implementing policies that will protect and where degraded enhance the beneficial uses of the state's waters without significant unnecessary expenditures for contaminant control. The days when the Board will continue to adopt grossly overprotective approaches which can lead to massive waste of public and private funds are finally coming to an end.

Item 3, page 3 of the staff report indicates that funds are going to be used in the proposed project to "evaluate the feasibility of developing numerical water quality effluent limitation for storm water discharge." As with other parts of this report, insufficient information is provided to enable the public to judge the potential technical feasibility of this proposed effort. Further, no information has been provided on the magnitude of the funding of the proposed effort. As an individual who is highly familiar with and who has published extensively on the issues pertinent to properly evaluating and managing contaminants in urban and rural stormwater runoff, I know the great difficulties in trying to accomplish this proposed activity. While it is easy to develop numeric limitation on chemical contaminants for stormwater discharges which grossly over-regulate chemical contaminant discharges and therefore, waste large amounts of private and public funds in the construction of treatment works, it is very difficult to develop technically cost effective numeric discharge limitations that limit the concentrations of chemical contaminants in stormwater runoff without significant unnecessary limitations.

As I discussed in the California Stormwater Quality presentation that I made on water quality aspects of stormwater quality evaluation and management, the development of numeric chemically based limitations cannot be done today because of a lack of reliable data base upon

which to develop water quality standards and objectives that properly reflect how stormwater associated chemical contaminants impact beneficial uses of waters receiving such discharges. The California Stormwater Quality Task Force recognizes this issue and as a group has called for amendments to the Clean Water Act that require that the US EPA develop wet weather criteria/standards. This development is programmed to take place over a five year period and will represent a substantial research effort by the Agency.

There is no possibility that item 3 of the staff's May 1994 report involving the development of technically valid cost effective numeric chemical limitations for stormwater discharges can be accomplished under this contract. The staff's suggesting this can be done in the staff report reflects a lack of understanding of stormwater quality issues.

One of the most significant deficiencies with the information provided by the staff in item 4 is the lack of detailed budget breakdown for the allegation of the several hundred thousand dollars that the staff proposes to spend in evaluating stormwater associated chemical impacts in Santa Monica Bay waters. In 1991, as part of the above mentioned proposed research on southern California bays and harbors, the staff did provide a proposed budget breakdown so that the public had the opportunity to examine how the staff proposed to use the funds that it was requesting. It appears now that the staff is no longer providing such information to the public. At the May 25, 1994 meeting of the BPTCP Advisory Committee when a member of the Committee asked about detailed budgets for the expenditures that have been and are being made in this program, Mr. Craig Wilson responded to the Committee that it was the policy of his supervisors not to make detailed budget information available to the public. Many members of the Committee and the observers were shocked at such a statement. An observer at the Committee meeting commented that such a policy was highly inappropriate since these were public funds. Mr. J. Diaz was present during these discussions and did not comment on this issue. It is not clear whether this is his policy or the policy of the Board. In any event, it is clearly an inappropriate policy that should be changed for all Board activities.

#### Overall Assessment

Overall, there are highly significant problems in both the proposed Santa Monica Bay Restoration Plan dated April 1994 as well as the WRCB staff's May 2, 1994 proposed program "Assessment of Loading and Biological Impacts of Nonpoint Source Contaminants in Santa Monica Bay." There is an urgent need for a full public review of the details of the State Board staff's activities in the Santa Monica Bay Restoration Plan and in the Bay Protection and Toxic Clean Up Program activities that have been conducted on southern California bays and harbors as well as elsewhere in the state. Before any further work is done by the State Board staff in these areas, a full detailed accounting of research results including funding that has occurred since 1991 in this program must be made available so that there is a proper information base upon which to determine whether any further funds should be spent by the State Board along the direction set forth in the staff's May 2, 1994 proposal. It is essential that the State Board staff's effort in these regards be properly reviewed and then based on this review an appropriate plan for the expenditure of the \$264,000 for evaluation of the impacts of stormwater associated chemical contaminants on Santa Monica Bay designated beneficial uses.

The Santa Monica Bay Restoration Project proposed plan of action dated April 1994 is not based on a proper evaluation of water quality impact of stormwater associated chemical contaminants. It appears to be based on perceived impacts and inappropriately based information on sediment quality. All efforts associated with adoption of the proposed actions for Bay Restoration that involve the management of chemical contaminants in stormwater runoff to the Bay should be withdrawn until a proper definition of the real water quality problems caused by chemical contaminants in stormwater runoff to the Bay has been developed.

If you, other members of the Board or others have questions on our comments, please contact me. Please contact me if there is any way we can be of assistance to the Board in addressing this or other issues.

Sincerely yours,

G. Fred Lee, PhD, DEE

GFL:  
Enclosure

#### REFERENCES

Lee, G. F., "Comments on the Water Quality Significance of Diazinon as a Cause of Surface Water Toxicity," Submitted to California Water Resources Control Board, Sacramento, CA, May (1994a).

Lee, G. F., "Comments on the Water Quality Significance of Copper in San Francisco Bay," Submitted to California Water Resources Control Board, Sacramento, CA, May (1994b).

Lee, G. F. and Jones, R. A., "Comments on California Water Resources Control Board (WRCB), 'Measures of Bioeffects Associated with Toxicants in Southern California, Proposal for Cooperative Agreement,' NOAA and WRCB, July 10 (1991)," Appendix C in "Sediment Quality Criteria Development: Problems with Current Approaches," Workshop notes, 1992 National R&D Conference on the Control of Hazardous Materials, Hazardous Materials Control Research Institute, Greenbelt, MD, 120 pp, February (1992)