

G. Fred Lee & Associates

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June 6, 2000

Arthur G. Baggett, Jr., Acting Chair
State Water Resources Control Board
901 AP@Street
Sacramento, California 95814

Dear Chairman Baggett and Board Members:

I wish to provide comments on the Petitions of the Cities of Bellflower, *et al.*, the City of Arcadia, and Western States Petroleum Association (Review of January 26, 2000 Action of the Regional Board, and Actions and Failures to Act by Both the Regional Board and its Executive Officer Pursuant to Order No. 96-054, Permit for Municipal Storm Water and Urban Run-Off Discharges within Los Angeles County). These comments are submitted as part of my ongoing efforts to work toward improving the quality of science and engineering in managing urban area and highway stormwater runoff water quality impacts.

Specifically, I find that the LA Regional Board stormwater regulations:

- \$ Lack technical, scientific/engineering validity;**
- \$ Will require substantial expenditures of public and private money with little or no impact on the beneficial uses of the receiving waters; and**
- \$ Need to incorporate approaches that use current-day science to identify real, significant problems and that provide for the use of BMPs that are designed to control site-specific problems in a cost-effective manner.**

While I cannot attend the June 7/8 public hearing because of a previously scheduled commitment in Texas, I am willing to answer questions on these comments after the public hearing.

Thank you for considering these comments as part of your deliberations on the appeal of the LA Regional Water Quality Control Board's Standard Urban Storm Water Mitigation Plans and Numerical Design Standards for Best Management Practices.

Sincerely yours,

G. Fred Lee, PhD, DEE

GFL:ds
Enclosure

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**Comments on the
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Both the Regional Board and its Executive Officer Pursuant to
Order No. 96-054, Permit for Municipal Storm Water and
Urban Run-Off Discharges within Los Angeles County)**

Comments Submitted by
G. Fred Lee, PhD, DEE
G. Fred Lee & Associates, El Macero, California
Tel: (530)753-9630 – Fax: (530)753-9956 – Email: gfredlee@aol.com
www.gfredlee.com

June 6, 2000

As an interested party in developing technically valid, cost-effective urban area stormwater runoff water quality management programs, I wish to submit comments on the technical validity of the approach that was adopted by the Los Angeles Regional Water Quality Control Board (LARWQCB) and its executive officer in approving and issuing the Standard Urban Storm Water Mitigation Plan (SUSMP).

I find, upon review of the Standard Urban Storm Water Mitigation Plans and Numerical Design Standards for Best Management Practices adopted by the Los Angeles Regional Water Quality Control Board, that the approach adopted by the LA Regional Board lacks technical validity and could readily result in substantial expenditure of funds with little or no impact on the beneficial uses of the receiving waters for the stormwater runoff managed under SUSMP.

This conclusion is based on my over 30 years of work on evaluating and managing urban area stormwater runoff water quality impacts. This work started in the 1960s, where, while I was a Professor of Water Chemistry in the Department of Civil and Environmental Engineering at the University of Wisconsin, Madison, my graduate students and I conducted some of the first work ever done on evaluating the impacts of urban area stormwater runoff on receiving water quality. We demonstrated at that time that urban area stormwater runoff contains a number of constituents that are potential pollutants that could be adverse to the beneficial uses of the receiving waters for the runoff. Our work at that time also demonstrated that finding elevated concentrations of constituents in urban area stormwater runoff does not mean that these constituents are necessarily significantly adverse to the beneficial uses of the receiving waters.

Since the mid-1960s, for a total of 30 years I continued to be active in this field as a university professor, conducting research on this topic in several areas of the US. In 1989 I retired from university graduate level teaching and research and became a full-

time consultant. A substantial part of my consulting activities over the last 11 years has been devoted to developing technically valid approaches for assessing the water quality significance of chemical constituents and pathogen-indicator organisms in urban and highway stormwater runoff. Also, I have devoted considerable time to developing guidance on how to cost-effectively manage real, significant water quality use impairments associated with chemical constituents in urban stormwater runoff. Dr. Anne Jones-Lee and I have published extensively on these topics. Our papers and reports on these issues are available from our website, www.gfredlee.com, in the Stormwater section.

Beginning in the early 1980s with the US EPA's National Urban Runoff Program (NURP), I became concerned about the lack of technical validity that was being followed by the US EPA in conducting the NURP studies. When the US EPA failed to focus these studies on assessing water quality impacts of urban stormwater runoff, I published an article in *Civil Engineering* magazine, entitled,

Lee, G. F. and Jones, R. A., "Will EPA's Nationwide Urban Runoff Study Achieve Useful Results?" *Civil Engineering*, 51:86-87 (1981).

Unfortunately, my concerns about the deficiencies in the US EPA NURP were borne out, where, while the Agency established what was already known, that urban area stormwater runoff contained elevated concentrations of a number of constituents above water quality criteria/standards, no information was provided through the NURP studies on whether the concentrations above criteria/standards in stormwater runoff were adverse to receiving water beneficial uses.

I find that the LA Regional Board's approach toward developing stormwater management programs as set forth in its SUSMP is also significantly deficient in using the information readily available today to develop technically valid, cost-effective urban stormwater runoff water quality management programs.

My concern about the lack of technical validity and cost-effectiveness in controlling real, significant problems through the use of conventional BMPs such as those recommended by the LA Regional Board in the SUSMP has caused Dr. Jones-Lee and me to develop a Stormwater Runoff Water Quality Science/Engineering Newsletter. This Newsletter is an unsponsored email-based Newsletter that is specifically directed toward improving the quality of science/engineering in urban area and highway stormwater runoff water quality management. This Newsletter is distributed periodically at no charge to over 5,000 individuals throughout the US and in other countries. Thus far, 12 issues of this Newsletter have been published. Volume 3, Numbers 1 and 2 of this Newsletter provide information that is directly pertinent to the significant technical and economic problems associated with the LA Regional Board's SUSMP. These two issues are appended to these comments.

Volume 3, Number 1 provides an overview summary of the urban area stormwater runoff water quality management issues/problems. I have discussed in this

issue some of the specific problems that have been occurring and continue to occur in the LA region. As discussed, some of those representing environmental groups in the LA region have chosen to ignore current science and engineering in managing urban area stormwater runoff. The groups that are advocating the SUSMP approach of spending money for construction of conventional BMPs are acting strongly contrary to the public's interest. Basically, having followed stormwater runoff management issues in the LA region for about half a dozen years, I have repeatedly found that the basic principals of aquatic chemistry, aquatic toxicology and water quality are being ignored by some environmental groups and the LA Regional Board in formulating public policy/expenditures for stormwater runoff water quality management.

The SUSMP approach of "treating" the first three-quarters' inch of stormwater runoff with conventional BMPs such as detention basins, grassy swales, inlet filters, etc., ignores the fact that the constituents removed by these BMPs have repeatedly been found in a number of areas to be in nontoxic/unavailable forms. The SUSMP approach also ignores the fact that some of the potentially significant pollutants, such as the organophosphate pesticides, in stormwater runoff are not impacted by conventional BMPs. The Newsletter, Volume 3, Number 2 specifically discusses the expected performance of conventional BMPs of the type that are required by the SUSMP. For some BMPs, such as the inlet filters, the removal of constituents applies to a limited range of flow. At moderate to high flows, these systems are largely ineffective in removing constituents of concern. Further, some of these BMPs require extensive maintenance.

Specific Comments on Technical Deficiencies in LARWQCB Resolution R-00-02 Approving the Standard Urban Storm Water Mitigation Plan for Municipal Storm Water and Urban Runoff Management Programs in Los Angeles County

Page 1, item 5 (and elsewhere): Throughout this resolution the term "pollutant" is used incorrectly. According to the US EPA Clean Water Act and Porter-Cologne, a pollutant is a constituent that impairs the beneficial uses of a waterbody.

The LA Regional Board is using the term "pollutant" to be synonymous with chemical constituents in stormwater runoff. This is a technically invalid approach. The US EPA regulatory requirements for NPDES-permitted urban area and highway stormwater runoff is the control of pollution to the maximum extent practicable (MEP) using best management practices (BMPs). Further, the US EPA has determined that, ultimately, NPDES-permitted urban stormwater runoff must not cause or contribute to violations of water quality standards. The date when this requirement is to be implemented has not yet been established.

The first step in a technically valid, cost-effective stormwater management program should be defining the pollutants in the stormwater runoff – i.e., those that impair the beneficial uses of the receiving waters for the runoff. The LA Regional Board has ignored this fundamental issue by assuming that many of the constituents in stormwater runoff from developed areas are pollutants. This approach can be

tremendously wasteful of public and private funds, chasing ghosts of problems. Techniques are readily available to determine whether a constituent in stormwater runoff is a pollutant in the receiving waters for the runoff.

Page 2, items 7, 8 and 9 indicate that the utilization of the BMPs listed within the SUSMP will reduce the pollutant loadings to waterbodies. A critical review of these BMPs and the constituents of concern as potential pollutants shows that the BMPs listed are primarily directed toward controlling particulate forms of constituents such as heavy metals, which in urban area street and highway stormwater runoff are well-known to be non-pollutants. The US EPA has determined that many of the heavy metals of concern in urban area stormwater runoff should be regulated based on dissolved forms present in ambient waters. The dissolved forms of heavy metals and many other constituents are not removed to any significant extent by conventional BMPs.

Page 2, item 11 establishes the three-quarter inch requirement for “treating” stormwater runoff in new developments. This requirement is based on controlling “first flush” associated constituents. First flush issues are based on total concentrations of constituents, irrespective of whether they are in toxic/available forms. It ignores the fact that many constituents in urban area stormwater runoff are in nontoxic/unavailable forms and that the impact of the toxic/available forms in the runoff is dependent not only on the concentration of these forms but also on the duration of exposure to the toxic/available forms by aquatic life in the receiving waters for the runoff. In establishing the three-quarter inch “treatment” requirement, the LA Regional Board is ignoring the basic principals of how chemical constituents in stormwater runoff impact the beneficial uses of the receiving waters.

Recommendations

The State Water Resources Control Board should support the appeal filed by the Cities of Bellflower, *et al.*, the City of Arcadia, and Western States Petroleum Association and remand Order No. 96-054 back to the LA Regional Water Quality Control Board, with instructions to develop technically valid, cost-effective management of real, significant water quality problems caused by chemical constituents, pathogen-indicator organisms and other pollutants in urban stormwater runoff associated with new developments.

In the early 1990s, Dr. Jones-Lee and I developed what we call the “Evaluation Monitoring” approach for managing urban area and highway stormwater runoff water quality impacts. Various aspects of this approach have been published in a series of professional papers which are on our website. A summary paper covering this approach was published as,

Jones-Lee, A. and Lee, G.F., “Evaluation Monitoring as an Alternative to Conventional Water Quality Monitoring for Water Quality Characterization/Management,” Proc. of the NWQMC National Conference *Monitoring: Critical Foundations to Protect Our Waters*, US Environmental Protection Agency,

Washington, D.C., pp. 499-512, (1998). This paper is available from www.gfredlee.com.

Basically, the Evaluation Monitoring approach shifts the emphasis from focusing stormwater runoff water quality management from chemical concentrations in the runoff to defining water quality impacts of runoff-associated constituents. The LA Regional Water Quality Control Board should stop its mechanical, technically invalid approach of focusing on chemical concentrations in runoff waters and begin to use current-day science and engineering to define the real, significant water quality-use impairment problems associated with urban area and highway stormwater runoff. Where problems of this type are found, then develop appropriate BMPs that are specifically designed to control the problem in a technically valid, cost-effective manner.

The LA Regional Board should work with all interested parties in the following areas.

- Defining the real, significant water quality beneficial use impairment problems caused by constituents in new developments as well as existing residential/commercial areas.

This will require a substantial effort devoted to characterizing urban area stormwater runoff and, most importantly, assessing the beneficial use impairment by the constituents in this runoff of the receiving waters.

- Where significant receiving water beneficial use impairments are found, determine the cause of the impairment and the specific sources of the constituents responsible.

This will require abandoning the “all chemicals in stormwater runoff are bad” approach and adopting current science in determining the cause of a water quality use impairment and, through appropriate forensic studies, the source of the constituents responsible for the use impairment. As discussed in our papers as well as our Newsletters, consideration must be given to the fact that many chemicals of concern in urban stormwater runoff exist in a variety of chemical forms, only some of which are toxic/available. Further, not all sources of a particular constituent are equally significant in causing receiving water beneficial use impairment.

- Once the source(s) of constituents responsible for receiving water beneficial use impairment are identified/quantified as to their significance, then site-specific BMPs should be developed to control the constituents at the source.

In most cases, because of the high cost of treating large volumes of stormwater runoff, these BMPs will not be runoff-based treatment BMPs, but will likely require source control as the BMP. From the information available, there will be few instances where conventional BMPs of the type specified in the SUSMP will be the appropriate BMP for control of the beneficial use impairment.

- The LA Regional Board should become the leader in organizing the stormwater runoff water quality management stakeholders in developing a watershed-based stormwater runoff water quality management program.

It will be important to provide an opportunity for the environmental groups and others with limited financial resources to be active participants in a consensus-developed urban area and highway stormwater runoff water quality management program. This will require that environmental groups are provided sufficient support so that they can be active participants in the technical aspects of urban area and highway stormwater runoff water quality impact assessment and BMP selection and evaluation.

- The LA Regional Board should be a leader in developing a watershed stakeholder-based water quality evaluation program that is designed to determine the real, significant water quality use impairments that are occurring in waterbodies within the Board's jurisdiction.

This should be an ongoing monitoring/evaluation program, where the stakeholders fund the program and participate in its organization, execution and reporting of results.

While the above program is specifically designed as an alternative to the SUSMP technically invalid, uneconomical (in terms of solving real water quality problems) approach for new developments, this approach can and should also be used for existing residential and commercial areas. Adoption of this approach will cause urban area stormwater runoff water quality management programs in the LA Region to become credible programs that deserve the support of all of those who are appealing the action of the Regional Board, and actions and failures to act by both the Regional Board and its Executive Officer pursuant to Order No. 96-054, as well as others.

**Summary of
G. Fred Lee's
Academic Background and Professional Experience**

Dr. G. Fred Lee is President of G. Fred Lee and Associates, which consists of Drs. G. Fred Lee and Anne Jones-Lee as the principals in the firm. They specialize in addressing advanced technical aspects of water supply water quality, water and wastewater treatment, water pollution control, and solid and hazardous waste impact evaluation and management.

After obtaining a bachelor's degree at San Jose State University in 1955, a Master of Science Degree in Public Health from the University of North Carolina in 1957 and a PhD from Harvard University in 1960 in Environmental Engineering and Environmental Sciences, Dr. Lee taught graduate-level university environmental engineering and environmental science courses for 30 years at several major U.S. universities. During this time, he conducted over \$5 million of research and published over 500 papers and reports. Dr. Anne Jones-Lee was a university professor for a period of 11 years in environmental engineering and environmental sciences. Their combined environmental engineering, aquatic chemistry, aquatic biology, toxicology and public health expertise and experience enable them to address complex problem areas in water quality and solid and hazardous waste impact evaluation and management.

Dr. Lee was active as a part-time consultant during his 30-year university teaching and research career. Drs. G.F. Lee and A. Jones-Lee have been full-time consultants since 1989. Dr. Lee has extensive experience in developing approaches that work toward protection of water quality without significant unnecessary expenditures for chemical constituent control. He has been active in developing technically valid, cost-effective approaches for the evaluation and management of chemical constituents in domestic and industrial wastewater discharges and urban stormwater runoff since 1960.

Dr. Lee's work on urban stormwater quality impact evaluation and management began in the late 1960s while he was a professor at the University of Wisconsin, Madison. He and his graduate students did some of the first work done on this topic. He has been active in evaluating and developing management approaches for urban area street and highway stormwater runoff water quality for over 30 years. He and Dr. Jones-Lee have published over 75 papers and reports on the approaches that should be used to develop technically valid, cost-effective best management practices (BMPs) for urban area street and highway stormwater runoff. Many of their recent publications on this topic are available from their website, <http://www.gfredlee.com>.

Dr. Lee's most recent work on stormwater runoff water quality impact evaluation and management has been devoted to the development of the Evaluation Monitoring approach. This approach focuses on finding real water quality use impairment in receiving waters for stormwater runoff and then developing technically valid, cost-effective BMPs to control the water quality impacts to the maximum extent practicable.

Dr. Lee is active in presenting lectures and short courses on urban area stormwater runoff water quality management issues in the US and other countries. He has organized and presented several-day short courses on this topic to Los Angeles County and Orange County NPDES-permitted

stormwater management agencies. He will be presenting a short course on this topic in Hong Kong this fall. Further, he has been an American Chemical Society tour speaker in which he presents invited lectures on urban stormwater management issues to American Chemical Society local sections located throughout the US.

Further information on Dr. Lee's experience and expertise is available at <http://www.gfredlee.com>.

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**Surface and Groundwater Quality Evaluation and Management  
and  
Municipal Solid & Industrial Hazardous Waste Landfills  
<http://www.gfredlee.com>**

Dr. G. Fred Lee and Dr. Anne Jones-Lee have prepared professional papers and reports on the various areas in which they are active in research and consulting including domestic water supply water quality, water and wastewater treatment, water pollution control, and the evaluation and management of the impacts of solid and hazardous wastes. Publications are available in the following areas:

- Landfills and Groundwater Quality Protection
- Water Quality Evaluation and Management for Wastewater Discharges, Stormwater Runoff, Ambient Waters and Pesticide Water Quality Management Issues, TMDL Development, State Stormwater Quality Task Force – Task Force Activities
- Impact of Hazardous Chemicals – Superfund, LEHR Superfund Site Reports
- Contaminated Sediment – Aquafund, BPTCP
- Domestic Water Supply Water Quality
- Excessive Fertilization/Eutrophication
- Reuse of Reclaimed Wastewaters
- Watershed Based Water Quality Management Programs:
  - Sacramento River Watershed Program,
  - Delta – CALFED Program,
  - Upper Newport Bay Watershed Program,
  - San Joaquin River Watershed DO and OP Pesticide TMDL Programs

**Stormwater Runoff Water Quality Science/Engineering Newsletter**

**SUMMARY BIOGRAPHICAL INFORMATION**  
**G. Fred Lee, PhD, PE, DEE**

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|-------------------------|---------------|---------------|
| DATE & PLACE OF BIRTH:  | TELEPHONE:    | FAX:          |
| July 27, 1933           | 530/753-9630  | 530/753/9956  |
| Delano, California, USA | (home/office) | (home/office) |

E-MAIL: gfredlee@aol.com                      WEB PAGE: <http://www.gfredlee.com>

**EDUCATION**

PhD                      Environmental Engineering & Environmental Science, Harvard University,  
Cambridge, MA, 1960

M.S.P.H.                Environmental Science-Environmental Chemistry, School of Public Health,  
University of North Carolina, Chapel Hill, NC, 1957

B.A.                     Environmental Health Science, San Jose State University, San Jose, CA, 1955

**ACADEMIC AND PROFESSIONAL EXPERIENCE**

Current Position:

Consultant, President, G. Fred Lee and Associates

Previous Positions:

Distinguished Professor, Civil and Environmental Engineering,  
New Jersey Institute of Technology, Newark, NJ, 1984-89

Senior Consulting Engineer, EBASCO-Envirosphere, Lyndhurst, NJ (part-time),  
1988-89

Coordinator, Estuarine and Marine Water Quality Management Program,  
NJ Marine Sciences Consortium Sea Grant Program, 1986-1988

Director, Site Assessment and Remedial Action Division, Industry  
Cooperative Center for Research in Hazardous and Toxic Substances,  
New Jersey Institute of Technology, *et al.*, Newark, NJ, 1984-1987

Professor, Department of Civil and Environmental Engineering, Texas Tech  
University, 1982-1984

Professor, Environmental Engineering, Colorado State University, 1978-1982

Professor, Environmental Engineering & Sciences; Director, Center of  
Environmental Studies, University of Texas at Dallas, 1973-1978

Professor of Water Chemistry, Department of Civil & Environmental  
Engineering, University of Wisconsin-Madison, 1961-1973

Registered Professional Engineer, State of Texas, Registration No. 39906

## PUBLICATIONS AND AREAS OF ACTIVITY

Published over 850 professional papers, chapters in books, professional reports, and similar materials. The topics covered include:

Studies on sources, significance, fate and the development of control programs for chemicals in aquatic and terrestrial systems  
Analytical methods for chemical contaminants in fresh and marine waters  
Landfills and groundwater quality protection issues  
Impact of landfills on public health and environment  
Environmental impact and management of various types of wastewater discharges including municipal, mining, electric generating stations, domestic and industrial wastes, paper and steel mill, refinery wastewaters, etc.  
Stormwater runoff water quality evaluation and BMP development for urban areas and highways  
Eutrophication causes and control  
Groundwater quality impact of land disposal of municipal and industrial wastes  
Environmental impact of dredging and dredged material disposal  
Water quality modeling  
Hazard assessment for new and existing chemicals  
Water quality and sediment criteria and standards  
Water supply water quality, assessment of actual environmental impact of chemical contaminants on water quality

## LECTURES

Presented over 750 lectures at professional society meetings, universities, and to professional and public groups.

## GRANTS AND AWARDS

Principal investigator for over six million dollars of contract and grant research in the water quality and solid and hazardous waste management field.

## GRADUATE WORK CONDUCTED UNDER SUPERVISION OF G. FRED LEE

Over 90 M.S. theses and Ph.D. dissertations have been completed under the supervision of Dr. Lee.

## ADVISORY ACTIVITIES

Consultant to numerous international, national and regional governmental agencies and industries. Summary list attached.

## PROFESSIONAL SOCIETIES

Air and Waste Management Association  
American Chemical Society  
American Fisheries Society  
American Microbiology Society  
American Public Works Association  
American Society for Civil Engineers  
American Society for Testing Materials Committee D-19 on Water, D-18 on Soil and Rock, D-34 on Waste Disposal and E-47 on Biological Effects and Environmental Fate, D-35 Geotextiles and Related Materials and D-38 Resource Recovery  
American Water Works Association  
Aquatic Plant Management Society  
Association of Ground Water Scientists and Engineers  
California Environmental Health Association  
California/Nevada Section American Waterworks Association  
California Water Environment Association  
Groundwater Resources Association  
International Water Quality Association  
National Ground Water Association  
NorCal SETAC  
Societas Internationalie Limnologiae  
Society of Environmental Toxicology and Chemistry  
Water Environment Federation  
Member, Editorial Advisory Board, Environmental Science & Technology, published by American Chemical Society, 1966-1970  
Member, American Water Works Association Committees on Organic Contaminants in Water, 1964-1970; Iron, and Manganese, 1965-1970; and Chairman, Quality Control in Reservoirs, 1978-1981  
Reviewer, National Academy of Sciences & Engineering Panel on Water Quality Criteria, 1971  
Member, Water Pollution Control Federation Committee on Biodegradation and Nitrogen-Phosphorus, 1965-1970; Standard Methods Committee, 1972-1982; Sediment Water Quality Task Force, 1992-present; Water Quality Criteria Task Force, 1993-present  
Chairman, ASTM Committee on Environmental Chemistry-Fate Modeling in the Environment, 1977-1979  
Reviewer, American Fisheries Society-US EPA Water Quality Criteria, 1977  
Chairman, Water Pollution Control Federation Standard Methods Subcommittee, "Interpretation and Application of Bioassays," 1979-1988  
Member, Editorial Board Journal, Society for Environmental Toxicology and Chemistry, 1982-1984  
Member, Editorial Board Journal, Ground Water, 1989-1991  
  
Chief and Associate Chief State Examiner, American Academy of Environmental Engineers, New Jersey, 1986-1989  
Member, Hazardous Waste Committee, New Jersey Water Pollution Control Association, 1985-1989  
Member, ASCE Committee on Solid Waste Engineering 1991-1994  
Member, ASCE Committee on Groundwater Recharge 1992-  
Member, Natural Resources Committee, Greater Sacramento Chamber of Commerce, 1990-1993  
Member, Air and Waste Committee and Water Resources Committee CA Chamber of Commerce, 1990-1993  
Chief Examiner of the American Academy of Environmental Engineers, North Central California, 1991-  
Led development of California Groundwater Resources Association, 1992-1993  
Chairman, ACWA Groundwater Quality Subcommittee, 1992-1993  
Chairman, Groundwater Quality Subcommittee of the Source Water Quality Committee of the CA/NV AWWA Section, 1993-1995  
Member, California Environmental Protection Agency Comparative Risk Project Human Health Committee, 1993-1994

Member, WEF Urban Stormwater Quality Task Force, 1994-1997  
Member, California DTSC Committee on Hazardous Waste Classification, 1996-  
Member, Water Environment Federation Research Foundation Subcommittee on Nitrogen Management Protocols for Biosolids Beneficial Use 1996-  
Member, American Water Works Association Source Water Quality Committee, 1999-  
Member, Water Environment Federation Committee on Domestic Wastewater Reuse, 1996-  
Chair, California State Stormwater Quality Task Force Stormwater Science Workgroup, 1998-99  
Chair, San Joaquin River DO TMDL Technical Advisory Committee, 2000-

## HONORS AND AWARDS

Elected member of the following:

Sigma Xi  
Delta Omega, Honorary Public Health Scholastic Society  
Phi Lambda Upsilon, Honorary Chemistry Scholastic Society  
Diplomate, American Academy of Environmental Engineers

Tied for first place for best paper presented at the Fifth Annual ASTM Aquatic Toxicology meeting in Philadelphia, PA, October, 1980

Charles B. Dudley Award - American Society for Testing and Materials award for contribution to Hazardous Solid Waste Testing, "Application of Site-Specific Hazard Assessment Testing to Solid Wastes," published (1984).

J AWWA paper selected by the Resources Division of the AWWA as the best paper published in the Journal during the year, 1984

US Representative, World Federation of Engineering Organizations First World Congress on Engineering and the Environment, Buenos Aires, Argentina, November, 1981

Received Certificate of Appreciation from the Corps of Engineers for work on the Dredged Material Research Program, 1978

Received Certificate of Appreciation from the Lubbock County Water Control and Improvement District No. 1 for work in Water Quality Management of Buffalo Springs Lake, 1982

## **Areas in Which G. Fred Lee has Conducted Studies**

Alabama - Mobile Bay

California - San Francisco Bay; Los Angeles Harbor; State's Ground Waters; Lake Tahoe; San Diego County; Sacramento-San Joaquin Rivers Delta; San Gabriel Valley Basin; Half Moon Bay; Pittsburg; North Coast; Colusa County; Upper Newport Bay; San Diego Bay; Salinas; Orange County; Sacramento River; Davis; El Dorado County; Placer County

Colorado - Numerous rivers and lakes in the Colorado Front Range and Rocky Mountains

Connecticut - Bridgeport and Stamford Harbors; Norwalk River; Lake Lillinonah

Florida - Apalachicola-Intercoastal Waterway; Kissimmee River Basin - Lake Okechobee; Lakeland

Georgia - Sapelo Island

Illinois - Lake Michigan-Waukegan, Zion; City of Chicago; Mississippi River and Illinois Ship Channel, McHenry County; Wayne County; Sauget

Indiana - Indiana and Calumet Harbors; Lakes Monroe and Michigan; other selected lakes and reservoirs; Hammond-Grand Calumet River; Fort Wayne

Iowa - Stream near Cherokee; Mississippi River

Kansas - Olathe

Maryland - Potomac Estuary

Michigan - Menominee River; Menominee County; South Shore of Lake Superior; Lake Erie; Ypsilanti Township

Minnesota - Mississippi River near St. Paul-Minneapolis; Lake Superior - western arm including Duluth Harbor and Silver Bay; North Shore of Lake Superior; selected lakes near Albert Lea; Lake Shetek; Lake Sallie; Wright County

Missouri - St. Louis

New Jersey - Perth Amboy Harbor, Fort Dix, Rockaway Township, Coastal and Estuarine Waters-Hudson/Raritan Estuary and New York Bight

New York - Lake Ontario; Niagara, Genesee, Oswego, and Black Rivers; Bay Ridge Channel; New York Bight; Niagara Falls; Hudson Raritan Estuary

North Carolina - Lumber River

Ohio - Muskingum River; Ashtabula Harbor-Lake Erie, Clermont County

Pennsylvania - Upper Ohio River near Pittsburgh; Delaware Estuary near Philadelphia; Lake Erie

Puerto Rico - Reservoirs and coastal waters, south coast groundwaters

Rhode Island - Atlantic Ocean near Newport; Richmond Township

South Carolina - Spartanburg

South Dakota - Belle Fourche Reservoir

Tennessee - TVA impoundments

Texas - Gulf of Mexico near Galveston, Port Aransas, Port Lavaca and Corpus Christi; Galveston Bay; Texas City and Houston Ship Channels; Trinity River near Dallas; Lake Ray Hubbard near Dallas; Garland; Mineral Wells; Red River, Lubbock, Lake Meredith, South Bend

Vermont - Lake Champlain; state streams and rivers

Virginia - James River and Bailey Creek near Richmond and Hopewell; North Landing River; Intercoastal Waterway

Virgin Islands - St. Thomas

Washington - Duwamish River and Elliott Bay of Puget Sound near Seattle; Hylebos Waterway;

West Virginia - Kanawa River

Wisconsin - Numerous lakes and impoundments in South Central and Northern Wisconsin; Wisconsin, Yahara, and Rock Rivers; Milwaukee River and Harbor; Upper Fox River; Green Bay; Lake Michigan; Black Earth Creek; Mississippi River near Prairie du Chien; Lake Michigan - Point Beach; Milwaukee

Wyoming - Bighorn Lake

Antarctica (Dry Valleys - Lake Vanda), McMurdo Sound

Argentina, Canada (Ontario, Manitoba), Columbia, Dominican Republic, Egypt, Hong Kong, India, Israel, Italy, Japan, Jordan, Korea, Mexico, The Netherlands, New Zealand, Norway, South Africa, Spain, Swaziland, Tunisia, USSR,

**Examples of Governmental Agencies, Consulting Firms,  
Citizens' Groups, and Industries  
for Which G. Fred Lee Has Served as an Advisor**

U.S. Environmental Protection Agency - Various Locations  
Vison, Elkins, Searls, Connally & Smith, Attorneys - Houston, TX  
International Joint Commission for the Great Lakes  
U.S. Public Health Service - Washington, DC  
Attorney General, State of Texas - Austin, TX  
Madison Metropolitan Sewerage District - Madison, WI  
Great Lakes Basin Commission - Windsor, Ontario  
U.S. Army Environmental Hygiene Agency - Edgewood Arsenal, MD  
City of Madison - Madison, WI  
Council on Environmental Quality - Washington, DC  
National Academies of Sciences and Engineering - Washington, DC  
Water Quality Board State of Texas - Austin, TX  
U.S. General Accounting Office - Washington, DC  
U.S. Army Corps of Engineers - Vicksburg, MS  
Tennessee Valley Authority - Various locations in Tennessee Valley



National Oceanic & Atmospheric Administration - Various locations  
Organization for Economic Cooperation & Development - Paris  
Attorney General, State of Illinois - Chicago, IL  
State of Texas Hazardous Waste Legislative Committee - Austin  
State of New Mexico Environmental Improvement Agency - Santa Fe  
New York District Corps of Engineers - New York, NY  
San Francisco District Corps of Engineers - San Francisco, CA  
Wisconsin Electric Power Company - Milwaukee, WI  
WAPORA - Washington, DC  
Reserve Mining Company - Silver Bay, MN  
United Engineers - Philadelphia, PA  
Automated Environmental Systems - Long Island, NY  
Procter & Gamble Company - Cincinnati, OH  
Inland Steel Development Company - Chicago, IL  
Kennecott Copper Corporation - Salt Lake City, UT  
U.S. Steel Corporation - Pittsburgh, PA  
Nekoosa Edwards, Inc. - WI  
Zimpro, Inc. - Rothschild, WI  
FMC Corporation - Philadelphia, PA  
Acme Brick Company - Forth Worth, TX  
Monsanto Chemical Company - St. Louis, MO  
Gould, Inc. - Cleveland, OH  
Illinois Petroleum Council - Chicago, IL  
Inland Steel Corporation - Chicago, IL  
Industrial Biotest Laboratories - Northbrook, IL  
Wisconsin Pulp & Paper Industries - Upper Fox Valley, WI  
Thilmany Pulp & Paper Company - Green Bay, WI  
Chicago Park District - Chicago, IL  
Nalco Chemical Company - Chicago, IL  
Boise Cascade Development Company - Chicago, IL  
Foley & Lardner, Attorneys - Milwaukee, WI  
Timken & Lonsdorf, Attorneys - Wausau, WI  
Strasburger, Price, Kelton, Martin & Unis, Attorneys - Dallas, TX  
Rooks, Pitts, Fullagar & Poust, Attorneys - Chicago, IL  
Jones, Day, Cockley & Reaves, Attorneys - Cleveland, OH  
Sullivan, Hanft, Hastings, Fride & O'Brien, Attorneys - Duluth, MN  
Hinshaw, Culbertson, Molemann, Hoban & Fuller, Attorneys - Chicago, IL  
Colorado Springs - Colorado Springs, CO  
Mayer, Brown & Platt, Attorneys - Chicago, IL  
Pueblo Area Council of Governments - Pueblo, CO  
Platte River Power Authority - Fort Collins, CO  
Linguist & Vennum, Attorneys - Minneapolis, MN  
Norfolk District Corps of Engineers - Norfolk, VA  
Spanish Ministry of Public Works - Madrid, Spain  
The Netherlands - Rijkswaterstaat - Amsterdam, The Netherlands  
U.S. Department of Energy - Various locations in US  
King Industries - Norwalk, CT  
Attorney General, State of Florida - Tallahassee, FL  
State of Colorado Governor's Office - Denver, CO  
Cities of Fort Collins, Longmont, and Loveland - CO  
E.I. DuPont - Wilmington, DE

Allied Chemical Company - Morristown, NJ  
Outboard Marine - Waukegan, IL  
Amoco Oil Company - Denver, CO  
Appalachian Timber Services - Charleston, WV  
Mission Viejo Development - Denver, CO  
Fisher, Brown, Huddleston & Gun, Attorneys - Fort Collins, CO  
Tom Florczak, Attorney - Colorado Springs, CO  
Wastewater Authority - Burlington, VT  
Tad Foster, Attorney - Pueblo, CO  
Holmes, Roberts & Owen, Attorneys - Denver, CO  
Center for Energy and Environment Research - Puerto Rico  
City of Brush - Brush, CO  
Rock Island District Corps of Engineers - Rock Island, IL  
Santo Domingo Water Authority - Dominican Republic  
Ministry of Public Works and Environment - Buenos Aires, Argentina  
Neville Chemical - Pittsburgh, PA  
Fike Chemical Company - Huntington, WV  
Stauffer Chemical Company - Richmond, CA  
Adolph Coors Company - Golden, CO  
Water Research Commission - South Africa  
Grinnell Fire Protection Systems - Lubbock, TX  
City of Lubbock Parks Department - Lubbock, TX  
National Planning Council - Amman, Jordan  
City of Olathe - Olathe, KS  
City of Lubbock - Lubbock, TX  
US AID - Amman, Jordan  
Buffalo Springs Lake Improvement Association - Buffalo Springs, TX  
Union Carbide Company - Charleston, WV  
Canadian River Municipal Water Authority - Lake Meredith, TX  
Mobil Chemical Company - Pasadena, TX  
Unilever Ltd. - Rotterdam, The Netherlands  
Brazos River Authority - Waco, TX  
U.S. Army Construction Engineering Research Laboratory - Champaign, IL  
James Yoho, Attorney - Danville, IL  
Zukowsky, Rogers & Flood, Attorneys - Crystal Lake, IL  
State of California Water Resources Control Board - Sacramento  
Public Service Electric & Gas - Newark, NJ  
Health Officer - Boonton Township, NJ  
Scotland & Robeson Counties - Lumberton, NC  
International Business Machines Corporation - White Plains, NY  
Newark Watershed Conservation & Development Authority - NJ  
State of Vermont Planning Agency - Montpelier, VT  
CDM, Inc. - Edison, NJ  
Attorney General, State of North Carolina - Raleigh, NC  
City of Vernon - Vernon, NJ  
Ebasco Services - Lyndhurst, NJ  
Kraft, Inc. - Northbrook IL, with work in Canada, FL and MN  
USSR Academy of Sciences - Moscow, USSR  
Tillinghast, Collins & Graham, Attorneys - Providence, RI  
City of Richmond, RI  
Idarado Mining Company - Telluride, CO

Levy, Angstreich, Attorneys - Cherry Hill, NJ  
Newport City Development - Jersey City, NJ  
Orbe, Nugent & Collins, Attorneys - Ridgewood, NJ  
Schmeltzer, Aptaker & Shepard, Attorneys - Washington, DC  
CP Chemical - Sewaren, NJ  
Dan Walsh, Attorney - Carson City, NJ  
William Cody Kelly - Lake Tahoe, NV  
NJ Department of Environmental Protection - Trenton, NJ  
Hufstедler, Miller, Kaus & Beardsley, Attorneys - Los Angeles, CA  
Main San Gabriel Basin Watermaster - CA  
Metropolitan Water District of Southern California - Los Angeles, CA  
San Diego Unified Port District - San Diego, CA  
Delta Wetlands - CA  
Simpson Paper Company - Humboldt County, CA  
City of Sacramento - CA  
Northern California Legal Services - Sacramento, CA  
Rocketdyne - Canoga Park, CA  
RR&C Development Co. - City of Industry, CA  
American Dental Association - Chicago, IL  
Emerald Environmental - Phoenix, AZ  
Clayton Chemical Company - Sauget, IL  
Stanford Ranch - Rocklin, CA  
S.P. Manning, Esq. - Spartanburg, SC  
Public Liaison Committee - Kirkland Lake, Ontario  
Miller Brewing Company  
ASARCO Inc., Tacoma, WA  
CALAMCO, Stockton, CA  
Coyote Flats, Del Mar, CA  
Yunkong Gas Company, South Korea  
Sutherlands, Pembroke, Ontario  
Silverado Constructors, Irvine, CA  
Agricultural Interests in Puerto Rico  
City of Winnipeg, Manitoba  
Strain Orchards, Colusa, CA  
Davis South Campus Superfund Oversight Committee, Davis, CA  
Monterrey County, California Housing Authority, Salinas, CA  
Hong Kong Government Environmental Protection Department  
CROWD, Tacoma, WA  
Newport Beach, CA  
SOLVE, Phoenix, AZ  
Sports Fishing Alliance, San Francisco, CA  
Caltrans (California Department of Transportation)  
Citizens Group near St. John's, New Brunswick  
Colonna Shipyards, Norfolk, VA  
Clermont County, OH  
Wright County, MN  
Waikato River Protection Society, New Zealand  
Drobac & Drobac, Attorneys, Santa Cruz, CA  
Phelps Dunbar, L.L.P., Houston, TX  
Walters Williams & Co, New Zealand

## **Attachments**

The attachments for these comments are the Stormwater Runoff Water Quality Science/Engineering Newsletter, Volume 3, Numbers 1 and 2. They are available from [www.gfredlee.com](http://www.gfredlee.com).