

Stormwater Runoff Water Quality Newsletter
Devoted to Urban/Rural Stormwater Runoff
Water Quality Management Issues

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This issue of the Newsletter presents information on:

- US Congress Government Accountability Office's (GAO) review of the US EPA urban stormwater runoff water quality program,
- GAO review of the Implementation of US EPA Beach 2000 Act
- DTSC Symposium on PPCPs
- Nutrient Criteria Development
- US EPA N-Steps (Nutrient) Webcasts
- US EPA Framework for Metals Risk Assessment
- Site-Specific Water Quality Objectives for Copper for San Francisco Bay

Reference is made in this Newsletter to previous Newsletters that provide additional information on the topics discussed. Past Newsletters are available on Drs. G. Fred Lee and Anne Jones-Lee's web site: www.gfredlee.com at, <http://www.gfredlee.com/newsindex.htm>.

What Is GAO?

According to its website, www.GAO.gov,

"The Government Accountability Office (GAO) is an agency that works for Congress and the American people. Congress asks GAO to study the programs and expenditures of the federal government. GAO, commonly called the investigative arm of Congress or the congressional watchdog, is independent and nonpartisan. It studies how the federal government spends taxpayer dollars. GAO advises Congress and the heads of executive agencies (such as Environmental Protection Agency, EPA, Department of Defense, DOD, and Health and Human Services, HHS) about ways to make government more effective and responsive. GAO evaluates federal programs, audits federal expenditures, and issues legal opinions. When GAO reports its findings to Congress, it recommends actions. Its work leads to laws and acts that improve government operations, and save billions of dollars."

GAO occasionally reviews environmental quality management issues. The GAO documents are "available from the "Reports and Testimony" section of GAO's Internet site, <http://www.gao.gov>. Subscribe to this or other E-mail updates about GAO products at the "Subscribe to Updates" section of <http://www.gao.gov>."

GAO Review of US EPA Urban Stormwater Runoff Water Quality Program

In May 2007 the US Congress Government Accountability Office (GAO) released a document entitled, "Further Implementation and Better Cost Data Needed to Determine

Impact of EPA's Storm Water Program on Communities.” The GAO “Highlights” of GAO-07-479, a congressionally requested report, are quoted below. The complete report is available at, www.gao.gov/cgi-bin/getrpt?GAO-07-479.

“Urban storm water runoff is a major contributor to the nation’s degraded waters. Under the Clean Water Act, the Environmental Protection Agency (EPA) established a program requiring communities to obtain permits and implement activities to control storm water pollution. EPA’s Phase I regulations (1990) applied to communities with populations of 100,000 or more, and its Phase II regulations (1999) covered smaller urban communities. Communities must report progress in meeting permit requirements. Some have raised concerns that storm water requirements impose an undue burden. To evaluate storm water program costs, EPA developed estimates for both phases.

GAO was asked to (1) determine the progress in implementing the storm water program, (2) evaluate the extent to which the program burdens communities, (3) examine the accuracy of EPA’s cost estimates, and (4) examine the data available for assessing program burden. GAO collected data for all states and a sample of 130 communities, among other steps.

What GAO Found

Storm water program implementation has been slow for both Phase I and II communities. The federal deadlines for permit applications were years ago—14 years for Phase I and 4 years for Phase II—but almost 11 percent of all communities were not yet permitted as of fall 2006. In addition, litigation, among other reasons, delayed the issuance of some permits for years after the application deadlines. As a result, almost all Phase II and some Phase I communities are still in the early stages of program implementation.

It is too early to determine the storm water program’s overall burden, but several factors influence the extent to which the program burdens a community. In particular, burden varies depending on whether communities (1) can use the flexibility built into EPA’s regulations to implement less expensive measures, or (2) are able to benefit from prior storm water management experience. Some communities may face a greater burden because of more stringent requirements set by EPA or the states, additional efforts required to address litigation over water quality, or because of barriers to obtaining funding for storm water activities. Storm water program burdens could increase in the future because, among other reasons, EPA or the states may reissue permits with more stringent requirements.

Without an estimate of actual storm water program costs—or burden—GAO could not determine the accuracy of EPA’s cost estimates. However, GAO did identify methodological concerns that raise questions about the usefulness of these estimates for measuring the burden communities face. That is, the Phase I analysis was not designed to estimate national program costs, the Phase II analysis was based on survey data of questionable validity and reliability, and neither analysis excluded costs for activities that communities were implementing before the program.

Any assessment of program burden will be hampered because EPA is not collecting complete and consistent data on communities' activities and their costs. For example, only Phase I communities are required to include data on program costs and these data are often limited. Also, communities' inconsistent reporting of activities makes it difficult to evaluate program implementation nationwide. Consequently, EPA will find it challenging to meet its goal to examine Phase II implementation starting in 2012.

What GAO Recommends

GAO recommends that EPA issue guidance and consider regulatory changes so that communities report consistently on their efforts. EPA stated it has already taken some action, but agreed to take additional steps to collect better cost data.'

Previous Newsletters, including 1-5, 2-2, 5-3, 5-5, 7-2, 7-6/7, and 9-6, provide information on the evaluation and appropriate regulation of urban stormwater runoff, as well as on the application of US EPA's worst-case-based water quality criteria/standards for the regulation of urban stormwater runoff. As has been discussed, the current regulatory requirements of the US EPA's program – the prevention of violations of water quality standards in receiving waters – is not achievable for urban stormwater runoff because of the high cost that would have to be borne by stormwater management agencies – the public served by the agency – to collect and treat urban stormwater runoff. It will not be possible – and indeed is not necessary in order to protect water quality – to manage urban stormwater runoff to a sufficient degree to prevent all exceedances of worst-case-based water quality criteria/standards in the discharge waters at the point of discharge. The water quality impacts of urban stormwater runoff cannot be reliably judged by application of US EPA worst-case-based water quality criteria/standards. Further, application of such standards will lead to gross over-regulation of, and significant unnecessary expenditures for, urban stormwater runoff. As discussed in previous Newsletters, this is due to the characteristics of many of the potential pollutants in urban stormwater runoff and the short-term, episodic nature of its discharge to receiving waters. These characteristics diminish the direct applicability of US EPA worst-case-based water quality criteria/standards to this source. There is need to develop water quality standards specifically for urban stormwater runoff that will protect the designated beneficial uses of receiving waters without causing significant unnecessary expenditures for treatment of urban stormwater runoff.

GAO Review of the Implementation of US EPA Beach 2000 Act

On June 27, 2007 the Government Accountability Office (GAO) released testimony entitled, *“Implementation of the Beach Act of 2000: EPA and States Have Made Progress, but Additional Actions Could Improve Public Health Protection.”* That testimony is presented in GAO-07-1043T, June 27 2007 and is available at, <http://www.gao.gov/cgi-bin/getrpt?GAO-07-1043T>. GAO Highlights of that testimony report is available at, <http://www.gao.gov/highlights/d071043thigh.pdf>. A summary of that testimony is presented below.

“Why GAO Did This Study

Waterborne pathogens can contaminate water and sand at beaches and threaten human health. Under the Beaches Environmental Assessment and Coastal Health (BEACH) Act, the Environmental Protection Agency (EPA) provides grants to states to develop water quality monitoring and public notification programs.

This statement summarizes the key findings of GAO’s May 2007 report, “Great Lakes: EPA and the States Have Made Progress in Implementing the BEACH Act, but Additional Actions Could Improve Public Health Protection. In this report GAO assessed (1) the extent to which EPA has implemented the Act’s provisions, (2) concerns about EPA’s BEACH Act grant allocation formula, and (3) described the experiences of the Great Lakes states in developing and implementing beach monitoring and notification programs using their grant funds.

IMPLEMENTATION OF THE BEACH ACT OF 2000

EPA and States Have Made Progress, but Additional Actions Could Improve Public Health Protection

What GAO Found

EPA has taken steps to implement most BEACH Act provisions but has missed statutory deadlines for two critical requirements. While EPA has developed a national list of beaches and improved the uniformity of state water quality standards, it has not (1) completed the pathogen and human health studies required by 2003 or (2) published the new or revised water quality criteria for pathogens required by 2005. EPA stated that the required studies are ongoing, some studies were initiated in the summer of 2005, but the work was interrupted by Hurricane Katrina. EPA subsequently initiated two additional water studies in the summer of 2007. According to EPA, completion of the studies and development of the new criteria may take an additional 4 to 5 years. Further, although EPA has distributed approximately \$51 million in BEACH Act grants from 2001-2006, the formula EPA uses to make the grants does not accurately reflect the monitoring needs of the states. This occurs because the formula emphasizes the length of the beach season more than the other factors in the formula—beach miles and beach use. These other factors vary widely among the states, can greatly influence the amount of monitoring a state needs to undertake, and can increase the public health risk.

Thirty-four of the 35 eligible states have used BEACH Act grants to develop beach monitoring and public notification programs. Alaska is still in the process of developing its program. However, because state programs vary they may not provide consistent levels of public health protection nationwide. GAO found that the states’ monitoring and notification programs varied considerably in the frequency with which beaches were monitored, the monitoring methods used, and how the public was notified of potential health risks. For example, some Great Lakes states monitor their high-priority beaches as little as one or two times per week, while others monitor their high-priority beaches daily. In addition, when local officials review similar water quality results, some may choose to only issue a health advisory while others may choose to close the beach.

According to state and local officials, these inconsistencies are in part due to the lack of adequate funding for their beach monitoring and notification programs.

The frequency of water quality monitoring has increased nationwide since passage of the Act, helping states and localities to identify the scope of contamination. However, in most cases, the underlying causes of contamination remain unknown. Some localities report that they do not have the funds to investigate the source of the contamination or take actions to mitigate the problem, and EPA has concluded that BEACH Act grants generally may not be used for these purposes. For example, local officials at 67 percent of Great Lakes beaches reported that, when results of water quality testing indicated contamination at levels exceeding the applicable standards during the 2006 beach season, they did not know the source of the contamination, and only 14 percent reported that they had taken actions to address the sources of contamination.

What GAO Recommends

In the May 2007 report, GAO recommended that EPA distribute grant funds to better reflect states' monitoring needs and help states improve the consistency of their monitoring and notification activities; and the Congress consider providing more flexibility to allow states to use some BEACH Act funds to investigate and mitigate contamination sources. GAO is not making any additional recommendations in this statement."

Past Newsletters 2-2, 7-5, 7-6/7, and 7-9 provide discussion of issues that need to be considered in managing the sanitary quality of urban stormwater runoff. As discussed, it will be extremely difficult, if not impossible, to achieve full protection of public health associated with contact recreation in waters that receive substantial amounts of urban stormwater runoff.

DTSC Symposium on PPCPs

There is increasing concern about the wide spectrum of unregulated chemicals, including pharmaceuticals and personal care products (PPCPs), that are discharged in domestic and agricultural wastewaters and solid wastes. Background information on PPCPs is available at the US EPA's website, <http://www.epa.gov/esd/chemistry/pharma/index.htm>, entitled, "*Pharmaceuticals and Personal Care Products (PPCPs) as Environmental Pollutants.*" While that website states, "*NOTICE: Updating and maintenance of the PPCPs Web site, which began in April 2000, ceased as of 21 March 2005*", recently the US EPA has indicated that the site is being updated. In August 2005, the US EPA Las Vegas held a multi-day workshop devoted to "*Pharmaceuticals & Personal Care Products as Environmental Pollutants.*" The abstract and PowerPoint slides for the presentations made at that workshop are available at: <http://www.epa.gov/nerlesd1/chemistry/ecb-posters.htm>. Newsletter 8-5 summarized some of the information presented at that workshop.

The State of California Department of Toxic Substances Control (DTSC) held a Pharmaceuticals and Personal Care Products (PPCP) Symposium on May 22, 2007. The

agenda for the DTSC symposium (including links to the speakers' biographies and presentations) is available at,

http://www.dtsc.ca.gov/AssessingRisk/PPCP/index.cfm#Pharmaceuticals_and_Personal_Care_Products_Symposium. Symposium presentations included those by

Dr. Christian Daughton, US EPA Office of Research and Development, "*Pharmaceuticals and Personal Care Products in the Environment: An Overview of the Science;*"

Dr. Daniel Schlenk, University of California Riverside, "*Evaluation of Endocrine Disruption in Benthic Flatfish of Southern California Collected Near A Publicly Owned Treatment Works Outfall;*"

Dr. Mary Buzby, representing the Pharmaceutical Research and Manufacturers of America (PhRMA) PIE Task Force, Merck & Co., Inc. "*Pharmaceuticals in the Environment (PIE) – Pharmaceutical Industry Perspective;*"

Luisa Valiela, Environmental Protection Specialist US EPA, Region 9, "Pharmaceuticals: Emerging Science Issue for EPA."

To some extent their abstracts and Powerpoint presentations updated information provided at the August 2005 US EPA Las Vegas workshop.

Nutrient Criteria Development

The US EPA has been working on nutrient (nitrogen and phosphorus compound) criteria for controlling excessive fertilization of waterbodies. Newsletters 1-2, 1-3, 1-5,4-3/4, 5-1, 6-1,6-2, 7-6/7, 9-1/2, 9-7, 9-8, 9-10, 10-1, 10-2, 10-3, 10-4, 10-5 and 10-6 have provided background information on that effort. As discussed in those newsletters, efforts to control excessive fertilization of lakes began in the 1950s-1960s largely in the US Canadian Great Lakes area. Typically the focus of those programs was on controlling the amount of phosphorus discharged to waterbodies (lakes and reservoirs) by domestic wastewater treatment plants by diversion of the wastewaters around lakes to downstream rivers, and/or treatment of domestic wastewaters for phosphorus removal. Lee and Jones (1988) summarized the approach used in the US to control the phosphorus that was contributing to excessive fertilization of waterbodies.

Early domestic wastewater diversions included the diversion the city of Madison, Wisconsin domestic wastewaters, initially around the upper Madison lakes, and eventually around all the lakes to the Rock River. In the 1960s, Malhotra et al. (1964) conducted studies at the University of Wisconsin, Madison, on the removal of phosphorus from domestic wastewaters using advanced wastewater treatment with alum, iron or lime. Subsequently advanced biological approaches were developed for phosphorus removal from domestic wastewaters. These issues are still under active investigation; the Water Environment Federation and others held a workshop last spring devoted to, "*Nutrient Removal 2007: The State of the Art,*" the program for which is available at,

<http://www.iwahq.org/uploads/events/2007/Nutrient%20Removal%20Draft%20Program%20as%20of%2001-17-07.pdf>. The proceedings of that workshop provide insight into current issues of nutrient (nitrogen and phosphorus) removal from domestic wastewaters and may be ordered from the Water Environment Federation by contacting

nmckinney@wef.org, order Number CD0738, List price \$115.00, Member Price \$75.00, US Shipping \$6.75.

In the 1960s and early 1970s the US EPA and its predecessor organizations supported major research efforts, through the US EPA Corvallis Laboratory, to evaluate and manage excessive fertilization of waterbodies. The US EPA also established a National Eutrophication Center at the University of Wisconsin, Madison. As part of that Center's activities Lee (1973) developed a review of the topic of eutrophication of waterbodies and its effect on water quality.

In the mid-1970s the US EPA essentially abandoned its efforts in the research and management of excessive fertilization of waterbodies and refocused its efforts toward Priority Pollutant issues. This was done despite the fact that excessive fertilization was, and continues to be, ranked by the states and the US EPA as one of the most important causes of water quality impairment in the US. In the late 1980s the US EPA renewed its involvement in nutrient-caused water quality problems and began to try to develop numeric water quality criteria for regulating nutrient discharges from urban and agricultural sources. As discussed in previous Newsletters (1-3, 5-1, 9-1/2, 9-8) the US EPA has stumbled badly in its efforts to develop nutrient criteria. Initially the Agency's nutrient management policy required that all states develop chemical-specific, numeric, nutrient criteria by a certain date or face imposition of nutrient criteria by the US EPA. That deadline has continued to shift to some unspecified future date. The Agency tried to develop generic numeric criteria, but their attempts were obviously technically flawed. The US EPA has established a website devoted to Nutrient Water Quality Criteria, <http://www.epa.gov/waterscience/criteria/nutrient/>.

Recently, Christen (2007) published a review of the current state of developing nutrient criteria, based on interviews with senior US EPA staff. That review, entitled, "*State Progress on Nutrient Criteria Slow but Steady, U.S. EPA Says*," is available online in the February 2007 (Vol. 19, No. 2) edition of Water Environment & Technology, at <http://wef.org/ScienceTechnologyResources/Publications/WET/07Feb/07FebNews.htm>.

According to Christen,

"To date, virtually all states have submitted plans to EPA outlining how they intend to adopt nutrient criteria into their water quality standards, but only a handful have actual numeric standards in place based on EPA's criteria, according to the agency's latest tally. Roughly a third of the states have collected most of the information they need and are getting ready to move forward with some final numbers through a regulatory or legislative process for at least a certain class of waters, said Ephraim King, director of the Office of Science and Technology in EPA's Office of Water. The other two-thirds present a more mixed picture and are at different stages in the process of collecting data and conducting the necessary statistical analyses to determine specific numeric values."

There is growing interest in controlling nutrients from urban and agricultural sources that lead to excessive fertilization of inland and coastal marine waterbodies. An example of this situation is the low DO problem that has developed in the Gulf of Mexico.

Newsletters 9-1/2, 9-10, 10-1 have discussed the situation in the Mississippi River watershed relative to excessive growths of algae in nearshore marine waters that lead to hypoxia (low DO) in the Gulf of Mexico. Additional information on this issue is available at, <http://www.epa.gov/msbasin/>. This situation has stimulated additional interest in attempting to develop nutrient criteria/standards in those, primarily Midwestern, states that are believed to be the primary sources of N and P contributing to the hypoxia in the Gulf of Mexico. As discussed in Newsletter 10-1 there is controversy regarding the need to control particulate phosphorus derived from urban and agricultural stormwater runoff since studies conducted in other areas have demonstrated that particulate phosphorus from such sources is largely unavailable to support algal growth and does not convert to algal-available forms.

The “Ag Waiver” water quality monitoring and management program being conducted by the CA Regional Water Quality Control Boards is developing information on the role of stormwater runoff and tailwater discharges from irrigated agriculture in contributing to violations of water quality standards. Information on the Central Valley Regional Water Quality Control Board’s (CVRWQCB) program to manage water quality problems associated with discharges from irrigated lands (“ag waiver” program) is available at http://www.waterboards.ca.gov/centralvalley/programs/irrigated_lands/index.html. In the spring of 2006 the CVRWQCB required all agricultural interests to monitor runoff/discharges for the suite N and P compounds that could contribute to excessive fertilization of waterbodies. At this time, however, there is no specific regulatory framework by which to evaluate the concentrations found in terms of violation of nutrient-related water quality standards. For many of the monitored parameters there are specific numeric standards – objectives derived from US EPA water quality criteria. However, for nutrients the CVRWQCB Basin Plan has a narrative objective for “Biostimulatory Substances” which reads,

“Biostimulatory Substances

Water shall not contain biostimulatory substances which promote aquatic growths in concentrations that cause nuisance or adversely affect beneficial uses.”

The implementation of that objective into a regulatory limit requires a site-specific evaluation of the impact of nutrients on water quality at the location of monitoring and downstream thereof. Lee and Jones-Lee (2002, 2005, 2006) have discussed the site-specific approach that is needed to properly regulate nutrient discharges to surface waters. It involves a site-specific evaluation of the impairment of beneficial uses of a waterbody caused by excessive growths of aquatic plants and the concentrations/loads of nutrients added to the waterbody that are causing the excessive fertilization. Thus far, neither agricultural interests nor the CVRWQCB has conducted this type of evaluation. Thus the nutrient concentration data collected over the past year in the ag waiver program is largely uninterpretable.

Lee and Jones-Lee (2007) discussed a number of the existing and potential problems with the approach being used by the CVRWQCB to develop a regulatory program for appropriately managing the water quality impacts of stormwater runoff and tailwater

discharges from irrigated agriculture in the Central Valley of California. In addition to problems in the interpretation of nutrient data, there are also significant potential problems in the application of US EPA worst-case-based water quality criteria/standards/objectives to these discharges without appropriate site-specific adjustment. Many of the problems discussed above and in previous newsletters with the direct application of those criteria/standards to urban stormwater runoff are also encountered with their direct application to agricultural runoff.

US EPA “N STEPS” (Nutrient Webcasts)

The US EPA conducts “N-STEPS” Webcasts devoted to presenting information on regulating water quality impacts of aquatic plant nutrients. According to the US EPA, Nutrient Scientific Technical Exchange Partnership & Support (N-STEPS) center is a "One Stop Shop" for national, regional, and local nutrient criteria development. The types of assistance available from N-STEPS include:

- *A technical request system, where staff from States, Tribes and Territories can submit technical questions about nutrient criteria development to a national expert;*
- *Links to analytical and sampling tools;*
- *Publications from federal agencies;*
- *Presentations from State and Tribal staff working on nutrient criteria development;*
- *Upcoming events of interest to those developing nutrient criteria;*
- *Regional news;*
- *Discussion board related to nutrient criteria development;*
- *Searchable bibliography with over 9,000 citations of relevance to nutrient criteria development.*

The next “Webcast” will be held on Wednesday, July 11, 2007 3:00 - 4:30 pm EST and will address “*Statistical Tools for Making Sense of Data.*” The US EPA Session Description states,

“Statistical analysis can appear mysterious and be mind numbing, but it is a crucial tool for developing nutrient criteria. The next N-STEPS webcast will present some of the most relevant statistical tools for developing nutrient criteria, and how non-statisticians can effectively use them. Join us on Wednesday, July 11th from 3-4:30 pm Eastern Time to hear an introduction to regression and trend analysis techniques commonly applied to derive nutrient criteria. You'll also learn what data are needed for each technique, some of their pros and cons, and see examples of how they work!

Registration, You can register for this Webcast at <http://n-steps.tetrattech-ffx.com/NTSChome.cfm>. Click on the title of the webcast, which will bring up a form for you to type in the information necessary to get set up. For more information, please contact Kristen Pavlik, 410-356-8993 or Kristen.Pavlik@tetrattech.com. This webcast will be archived on the N-STEPS website so you'll still be able to see it, even if you're not available on the 11th. Questions, Visit <http://n-steps.tetrattech-ffx.com/NTSChome.cfm>, or call Steve Potts at (202) 566-1121.”

US EPA Framework for Metals Risk Assessment

The Framework for Metals Risk Assessment, released by the US EPA on March 8, 2007, “*outlines key principles about metals and describes how they should be considered in*

conducting human health and ecological risk assessments. The Framework seeks to advance our understanding of the impact of metals in a consistent manner across the Agency's programs since inorganic metals and metal compounds present unique issues for risk assessors. The report is available at, <http://www.epa.gov/osa/metalsframework/>. For a hard copy of the Framework, please contact EPA's National Service Center for Environmental Publications at 1-800-490-9198.

Background

Given the complexity of issues surrounding metals risk assessment, the Framework took several years to develop. Originally, EPA's Risk Assessment Forum sought consultation from EPA's Science Advisory Board (SAB) on the science issues and principles that need to be addressed in the Framework document. EPA identified and commissioned scientific experts to write detailed papers on these issues: environmental chemistry, exposure, human health effects, ecological effects, bioavailability and bioaccumulation.

The draft Framework was then developed and relied heavily on these papers. To ensure broad input on the Framework, the Risk Assessment Forum engaged in extensive consultation with the scientific community, stakeholders, and intended users, including risk assessors in other federal agencies, in different regions, and in the states. Throughout the development process, the Agency has held stakeholder meetings and made the issue papers open for public comment.”

According to the US EPA, “This guidance is not a prescriptive manual on how any particular type of assessment should be conducted within EPA, but rather it outlines the key principles when considering metals and offers advice on how these principles can be considered in metals assessments.

The Framework serves as a single, comprehensive, state-of-the-science reference source from which the different programs within the Agency can evaluate their own methods and practices for assessing metals, and revise or update as appropriate. The Framework also provides a basis from which EPA programs can assess the hazards and risks of metals in a manner that is more consistent with the current state-of-the-science of metals and with each other.

External peer review of the Framework was conducted by EPA's Science Advisory Board (SAB) in February 2005, and their report to the Administrator (PDF) (95 pp, 600K) was finalized in January 2006.”

The primary thrust of this “Framework” is that there is a variety of factors that influence the water quality impacts of many of the heavy metals that justify developing site-specific water quality standards (objectives) for the US EPA national water quality criteria. As discussed in Newsletters 1-1, 1-5, 1-5, 3-4, 6-1, 6-10, 7-5, 7-5, 7-6/7, 8-3, 8-7, 9-9 it has been well-known since the 1960's that the adoption of the US EPA national water quality criteria as discharge limits for urban and rural stormwater runoff, as well as for many other sources, will lead to significant overregulation of heavy metals.

Site Specific Copper Water Quality Objective in San Francisco Bay

The Regional Water Quality Control Board, San Francisco Bay Region, has been developing a site-specific copper objective for part of the San Francisco Bay. The Board staff's report entitled, "*Proposed Basin Plan Amendment and Draft Staff Report*" was made available on June 6, 2007; it is available at, <http://www.swrcb.ca.gov/rwqcb2/Agenda/06-13-07/basinplan/Appendix%20C%20-%20Supporting%20Staff%20Report.pdf>. That report's introduction states,

"This San Francisco Bay Regional Water Quality Control Board (Water Board) staff report provides the technical background and basis for a proposed amendment to the San Francisco Bay Region Water Quality Control Plan (Basin Plan) to replace existing marine water quality objectives for copper, a toxic pollutant, with site-specific objectives (SSOs) for San Francisco Bay segments north of the Dumbarton Bridge and proposes an implementation plan to ensure attainment of the SSOs and protection of water quality and beneficial uses. SSOs were adopted for copper and nickel for South San Francisco Bay in 2002. This proposed amendment builds on the work completed for the 2002 Basin Plan amendment. The proposed implementation plan has been adapted from the existing copper action plan for South San Francisco Bay. Changes are proposed in the existing implementation plan for South San Francisco Bay in order to create an Implementation Plan for copper that is consistent Bay-wide. The proposed Basin Plan amendment includes the adoption of specific translators, a ratio of dissolved to total metal concentrations, which will be used to compute numeric effluent limits for wastewater facilities."

Information on the Board's review and adoption of this WQO on June 13, 2007 is available at, <http://www.swrcb.ca.gov/sanfranciscobay/Agenda/06-13-07/8/Adopted%20Resolution%20No.%20R2-2007-0042.pdf>.

This action is a recognition of the need for site-specific adjustment of US EPA worst-case-based water quality criteria for use as water quality standards/objectives, that incorporate appropriate information on aquatic chemistry and toxicology in the establishment of regulatory limits for heavy metals, and for that matter, other potential pollutants, in urban and agricultural stormwater runoff and wastewater discharges. Adoption of appropriate site-specific objectives can minimize the significant over-regulation of potential pollutants from point and non-point sources. While the development of site-specific objectives is a somewhat expensive process, ultimately the funds spent in their development will be saved many times over in the elimination of much of the over-regulation. This is especially important in developing appropriate discharge limits for urban and agricultural stormwater runoff.

References

Christen, K., "State Progress on Nutrient Criteria Slow but Steady, U.S. EPA Says," Water Environment Federation's *Water Environment & Technology* **19**(2) February (2007).
<http://wef.org/ScienceTechnologyResources/Publications/WET/07Feb/07FebNews.htm>

Lee, G. F., "Eutrophication" (a review originally developed as a publication of the National Eutrophication Center at the University of Wisconsin, Madison also updated and published in *Transactions of the Northeast Fish and Wildlife Conference*, pp 39-60 (1973). Available upon request as EF 014 from gfredlee@aol.com.

Lee, G. F. and Jones, R. A., "The North American Experience in Eutrophication Control through Phosphorus Management," in Proc. Int. Conf. *Phosphate, Water and Quality of Life*, Paris, France, February (1988). (Original in French, English version available.) Available upon request as EF 013 from gfredlee.com.

Lee, G. F. and Jones-Lee, A., "Developing Nutrient Criteria/TMDLs to Manage Excessive Fertilization of Waterbodies," Proc. Water Environment Federation TMDL 2002 Conference, Phoenix, AZ, November (2002).
<http://www.gfredlee.com/WEFN.Criteria.pdf>

Lee, G. F. and Jones-Lee, A., "Interpretation of Nutrient Water Quality Data Associated with Irrigated Agricultural Ag Waiver Monitoring," Submitted to Central Valley Regional Water Quality Control Board, Rancho Cordova, CA, by G. Fred Lee & Associates, El Macero, CA, November (2005).
<http://www.members.aol.com/annejlee/InterprNutrWQData.pdf>

Lee, G. F. and Jones-Lee, A., "Assessing the Water Quality Significance of N & P Compound Concentrations in Agricultural Runoff," Invited presentation to the Agrochemical Division, American Chemical Society national meeting, San Francisco, CA, September (2006). <http://www.members.aol.com/annejlee/N-PRunoffACS.pdf>

Lee, G. F. and Jones-Lee, A., "Comments on 'Working Draft - Draft Monitoring and Reporting Program -Order No. R5-2007-__for Coalition Groups under Amended Order No. R5-2006-0053 Coalition Group Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands' dated March 29, 2007," Report submitted to CVRWQCB, Sacramento, CA by G. Fred Lee & Associates, El Macero, CA, April 13 (2007).
<http://www.members.aol.com/LFandWQ/CommentsWorkingDraftMRP.pdf>

Malhotra, S. K., Lee, G. F. and Rohlich, G. A., "Nutrient Removal from Secondary Effluent by Alum Flocculation and Lime Precipitation," *Air & Water Pollut.* **8**:487-500 (1964). <http://www.members.aol.com/LFandWQ/MalhotraNutrRemAlum.pdf>.

US EPA, "Nutrient Water Quality Criteria,"
<http://www.epa.gov/waterscience/criteria/nutrient/>