

**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 a National Research Council review devoted to “Reducing Stormwater Discharge Contribution to Water Pollution,” US EPA Enhanced Water Quality Standards Information On-Line; the CWEMF Workshop on Watershed and Urban Hydrology Modeling; the UPC presentation on the shift in urban pesticide usage in California and changes in concentrations and associated aquatic life toxicity of pesticides in urban stormwater runoff; and the results of the USGS survey of pesticide concentrations in US streams.

**NRC Study of Urban Stormwater Runoff Water Quality Issues**

The US EPA requested that the National Research Council (NRC) undertake a study of selected urban stormwater runoff water quality issues. Information on that project is available at <http://www8.nationalacademies.org/cp/projectview.aspx?key=48711>. According to information on that website,

***“Project Information***

*Project Title: Reducing Stormwater Discharge Contributions to Water Pollution  
Major Unit: Division on Earth and Life Studies  
Sub Unit: Water Science and Technology Board  
Subject/Focus Area: Environmental Issue*

***Project Scope***

*In order to improve the permitting of stormwater discharges under the Clean Water Act, the EPA has requested the input of the National Research Council. The broad goals of the study will be to better understand the links between stormwater pollutant discharges and ambient water quality, to assess the state of the science of stormwater management and to make associated policy recommendations. Municipal, construction, and industrial stormwater will be considered, with special attention paid to those eight to ten industrial sectors felt to be of highest priority in terms of pollutant discharges. Wherever possible, case studies will be used to illustrate concepts and derive themes that can be broadly applied.*

*More specifically, the study will:*

*(1) Clarify the mechanisms by which pollutants in stormwater discharges affect ambient water quality criteria and define the elements of a protocol to link pollutants in stormwater discharges to ambient water quality criteria.*

*(2) Consider how useful monitoring is for both determining the potential of a discharge to contribute to a water quality standards violation and for determining the adequacy of stormwater pollution prevention plans. What specific parameters should be monitored and when and where? What effluent limits and benchmarks are needed to ensure that the discharge does not cause or contribute to a water quality standards violation?*

*(3) Assess and evaluate the relationship between different levels of stormwater pollution prevention plan implementation and in-stream water quality, considering a broad suite of BMPs.*

*(4) Make recommendations for how to best stipulate provisions in stormwater permits to ensure that discharges will not cause or contribute to exceedances of water quality standards. This should be done in the context of general permits. As a part of this task, the committee will consider currently available information on permit and program compliance.*

*(5) Assess the design of the stormwater permitting program implemented under the Clean Water Act.*

*This project is sponsored by the U.S. Environmental Protection Agency. The approximate start date for the project is 7/21/2006. A report will be issued at the end of the project in approximately 26 months.”*

Minutes from past meetings of the Committee are available at the above website. The next meeting of the Committee - “Reducing Stormwater Discharge Contributions to Water Pollution - Meeting 3” - will be held on August 21-23, 2007 in Seattle, WA. The meetings are open to the public; contact: Ellen de Guzman, edguzman@nas.edu, phone: 202-334-3422 for more information on that Committee and its meetings. There is a listserv for “Friends of the Committee.” Contact Ellen de Guzman, at edguzman@nas.edu if you want to join the listserv.

The US EPA’s request for NRC review focuses on the use of water quality standards to evaluate/regulate urban stormwater runoff water quality impacts. That topic has been extensively discussed in past Newsletters 1-2, 1-3, 1-5, 1-6/7, 2-2, 3-1, 5-4, 6-8, 7-6/7, 6-9, 6-10, 7-2, 7-3, 7-5, 7-6/7, 7-9, 8-4, 8-5, 9-1/2, 9-5, 9-6, 9-8, 10-3. Those Newsletters are available at, <http://www.gfredlee.com/newsindex.htm>. In 2006 the CA State Water Resource Control Board (SWRCB) conducted a review of “The Feasibility of Numeric Effluent Limits Applicable to Storm Water Discharges.” The SWRCB appointed a “Storm Water Panel” to review that matter. Information on that review and the Storm Water Panel report is available at, <http://www.swrcb.ca.gov/stormwtr/numeric.html>.

Newsletter 9-6 provides a discussion of issues that should be considered in attempting to use worst-case based US EPA water quality criteria to regulate urban stormwater runoff. That Newsletter also discusses selected aspects of the Storm Water Panel report.

## **US EPA Enhanced Water Quality Standards Information On-Line**

The US EPA has announced that it has “*upgraded the web site that provides Agency guidance for administering state and tribal water quality standards. Containing EPA's 1994 Water Quality Standards Handbook, the web site has been upgraded to provide over 100 new links to EPA documents and web pages with supporting information. The Handbook has become a very popular Office of Water site in recent years. It provides comprehensive guidance for implementing EPA's water quality standards regulation.*

*You can visit the enhanced site on the Internet at*

*<http://www.epa.gov/waterscience/standards/handbook/>, where you can get direct access to the Handbook and download printable copies. For more information, contact Grace Robiou, Chief of the National Water Quality Standards Branch, at (202) 566-2975.*

*“The Water Quality Standards Handbook: Second Edition provides guidance issued in support of the Water Quality Standards Regulation (40 CFR 131, as amended). This Handbook includes the operative provisions of the first volume of the Handbook issued in 1983 and incorporates subsequent guidance issued since 1983. The 1994 Handbook contains only final guidance previously issued by EPA; it contains no new guidance.*

*In June of 2007, we created a Web version of the Handbook, taking the opportunity to add selected links and resources designed to aid the reader in finding additional information. These links were added only to the Web version. The text of the 1994 Handbook was not edited in any way.*

*We hope that this document will prove valuable by pulling together current program guidance and providing a coherent document as a foundation for state and tribal water quality standards programs. The Handbook also presents some of the evolving program concepts designed to reduce human and ecological risks, such as endangered species protection; criteria to protect wildlife, wetlands, and sediment quality; biological criteria to better define desired biological communities in aquatic ecosystems; and nutrient criteria.*

*This Handbook is intended to serve as a “living document,” subject to future revisions as the water quality standards program moves forward, and to reflect the needs and experiences of EPA and the States.”*

## **Pesticides in US Streams and Groundwater**

Robert J. Gilliom, who directs the US Geological Survey (USGS) Pesticide National Synthesis Project, published an article entitled, “Pesticides in U.S. Streams and Groundwater” in the American Chemical Society journal, Environmental Science and Technology May 15, 2007 Volume 41(10):3408-3414 (2007). That article, available at [http://pubs.acs.org/subscribe/journals/esthag/41/i10/html/051507feature\\_gilliom.html](http://pubs.acs.org/subscribe/journals/esthag/41/i10/html/051507feature_gilliom.html), presents a summary of the USGS National Water-Quality Assessment (NAWQA) Program for monitoring of pesticides in US streams during the period 1992–2001. The “Overview of Findings” reported therein state,

**“Overview of findings,**

- *Pesticides were frequently present in streams and, to a lesser extent, groundwater, particularly in areas with substantial agricultural and/or urban land use.*
- *The geographic and seasonal distribution of pesticide occurrence follows patterns in land use and pesticide use.*
- *Individual pesticides were seldom found at concentrations that exceeded water-quality benchmarks for human health.*
- *Pesticides occurred in many streams at concentrations that exceeded water-quality benchmarks for aquatic life or fish-eating wildlife.*
- *Pesticide compounds with the potential to adversely affect aquatic ecosystems include currently used pesticides as well as organochlorine compounds from historic use of pesticides that were banned years ago.*
- *Pesticides usually occurred as mixtures of multiple pesticide compounds, rather than individually, potentially leading to underestimation of toxicity when assessments are based on individual compounds.”*

Gilliom listed the following as **“Priorities for filling information gaps”**

- *“Improve tracking of pesticide use in agricultural and nonagricultural areas, including amounts, locations, and timing. Reliable information on use is key to efficient and cost-effective water-quality monitoring and assessment, including development of predictive models.*
- *Add assessments of new pesticides and others not yet studied. Regular updates to water-quality assessments are needed to keep findings relevant to present-day use patterns.*
- *Improve assessment of pesticide degradates. Although major degradates are considered as part of registration studies, environmental occurrence and potential adverse effects are not adequately understood.*
- *Evaluate potential effects of mixtures on humans and aquatic life. Mixtures are the most common mode of occurrence, but toxicity has not been assessed for many compounds and has been assessed only for a small proportion of specific combinations.*
- *Evaluate the effects of management practices on concentrations and transport of pesticides. Relatively little information exists on the effects of common management practices such as drainage, buffer strips, and tillage practices on pesticide transport to streams and groundwater.*
- *Improve methods for prediction of pesticide levels. There will never be enough resources to measure all the places, times, and compounds for which information is needed; thus, predictive tools are essential.*
- *Sustain and expand long-term monitoring for trends. Pesticide use is constantly changing over time, including phaseouts of some products and introductions of new ones, making long-term monitoring critical for up-to-date water-quality assessment and evaluation of trends.”*

### **Shift in Urban Pesticide Usage**

On July 17, 2007 the Urban Pesticide Committee (UPC) of the San Francisco Regional Water Quality Control Board organized presentations on the changes that have occurred in pesticide concentrations and associated aquatic life toxicity in selected California urban streams. Information on that meeting is available at [http://www.up3project.org/up3\\_upc.shtml](http://www.up3project.org/up3_upc.shtml)

At that meeting Robert Holmes, of the Central Valley Regional Water Quality Board made the presentation: “Statewide Investigation of the Role of Pyrethroid Pesticides in Sediment Toxicity in California’s Urban Waterways – Preliminary Data” His Powerpoint slides are available at, [http://www.up3project.org/documents/Holmes\\_UPC\\_Mtg.pdf](http://www.up3project.org/documents/Holmes_UPC_Mtg.pdf)

Holmes’ **Summary and Next Steps** slide stated,

- *“Sediment toxicity observed in all Water Board regions assessed*
- *More toxic sediments samples observed at 15 C than 23 C testing*
- *Occurrence of high magnitude (0% Survival) sediment toxicity samples highest in Los Angeles and Central Valley Regions*
- *Do pyrethroids play a role in the toxic sediment samples? sediment chemistry data are not available other compounds may show similar toxicity responses as pyrethroids*
- *Funding for chemistry analyses at 30 sites TIEs underway*

*Final project report expected Spring 2008.”*

The July 17, 2007 UPC meeting also included a presentation by David S. Renfrew, Weston Solutions, Inc entitled, “Shifting Pesticide Use: The decline of diazinon, the emergence of synthetic pyrethroids, and changes in observed toxicity in stormwater runoff.” That presentation focused on urban pesticide data for streams in the San Diego area. His Powerpoint slides are available at, [http://www.up3project.org/documents/Shifting\\_Pesticide\\_Use-UPC-071707.pdf](http://www.up3project.org/documents/Shifting_Pesticide_Use-UPC-071707.pdf)

Renfrew’s **Summary** slide stated,

- *“Diazinon sales, use, detections, and WQO exceedances are declining in San Diego.*
- *Synthetic pyrethroids are most common products used for ant, termite, and other pest control (refer to 2007 TDC Report)*
- *Acute and Chronic Survival Toxicity to C. dubia is declining in the Region (storm water).*
- *Acute toxicity to H. azteca remaining persistent in some urban watersheds and increasing in others*
- *Pyrethroid detections explain toxicity to H. azteca.*
- *Recent data suggests pyrethroid detections do not necessarily mean toxicity to H. azteca will occur.”*

### **CWEMF Workshop on Watershed and Urban Hydrology Modeling,**

California Water and Environment Modeling Forum (CWEMF) is an organization that develops information that can be of assistance in using models in water quality and

environmental evaluation/management including stormwater runoff. On June 22, 2007 the CWEMF held, “Workshop on Watershed and Urban Hydrology Modeling,” in Sacramento, CA. According to the workshop agenda the “*purpose of the workshop is to introduce participants to:*

*(1) watershed and urban hydrology models,*

*(2) the capabilities and data requirements of each model. and*

*(3) how the models are used for specific applications. Watershed and urban hydrology models are typically used to do the following:*

- *Quantify runoff flow rates and water quality impacts at any point in the watershed under various watershed change, urbanization, and management scenarios;*
- *Calculate TMDL load allocations;*
- *Size storm water control facilities, delineating flood plain areas, reservoir spillway design;*
- *Evaluate storage, treatment, and other best management practices for non-point source load reduction in a watershed; and*
- *Compare trade-offs of sewer extensions vs. on-site wastewater systems.”*

The agenda and the PowerPoint presentations for this workshop are available at, <http://www.cwemf.org/workshops/22Jun07Wrkshp/22June07Wrkshp.pdf>.

The focus of the CWEMF workshop was modeling hydrologic aspects of urban stormwater runoff. Some of the presenters inferred that that modeling had some applicability to assessing water quality impacts of urban stormwater runoff. Newsletter 10-9, which will likely be available in about one month, will present a discussion of the difficulty of reliably modeling the water quality impacts of urban stormwater runoff.

### **California Water and Environmental Modeling Forum**

Information on the California Water and Environmental Modeling Forum is available at [www.cwemf.org](http://www.cwemf.org). According to the website,

*“The Forum is a non-profit, non-partisan organization whose mission is to increase the usefulness of models for analyzing California’s water-related problems with emphasis in the San Francisco Bay, Sacramento-San Joaquin Delta, and Central Valley system (Bay-Delta Watershed). The Forum carries out this mission by:*

- *Providing a consensus-building atmosphere on water-related issues;*
- *Maintaining a modeling clearinghouse that provides an open forum for the exchange, improvement, and pooling of models, modeling information, and professional resources;*
- *Assisting in mediating technical disputes involving physical, chemical, biological, and economic modeling;*
- *Conducting impartial peer reviews of models in order to document strengths and weaknesses, suggest improvements, and identify appropriate applications;*
- *Seeking input from California water stakeholders and decision makers about their modeling needs; and*
- *Providing educational opportunities through technical conferences and workshops.*

*The Forum has approximately 80 individual members and over 15 organizational members. In addition, approximately 100 different organizations are represented among*

*the Forum membership. Activities of the Forum are guided by a steering committee composed of five officers elected by the membership, representatives from 11 designated governmental water organizations in California, and 15 members chosen by the membership to represent universities, environmental organizations, private consultants, water user agencies, and the general public. Annual dues are \$2000/\$1000/\$500 for organizations (depending on size), \$50 for individuals and \$10 for students. Half-year (Sept - Feb) individual and student memberships are also available for half price.”*

To be placed on Forum’s email list to receive information on Forum activities contact, [cwemf@cwemf.org](mailto:cwemf@cwemf.org) and review <http://www.cwemf.org/cwemfinfo.htm>. The Forum’s workshops are available to members at no cost. Nonmembers are typically charged \$50 per workshop.