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

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This double issue of the Newsletter provides updates on topics reviewed in previous issues of the Newsletter, including: • more legal actions regarding application of water quality standards to urban stormwater runoff NPDES permits, • impacts of PPCPs on water quality, • Delta water quality, • water quality modeling, • impacts of pesticide mixtures, • water quality standards and goals, • fish consumption guidelines for organochlorine legacy pesticides, PCBs, mercury, and selenium • announcements of several newsletters and conferences. Links are provided to additional information on many of these topics. Past Newsletters referenced herein are available at http://www.gfredlee.com/newsindex.htm.

More on Legal Actions for Regulating Urban Stormwater Runoff Water Quality

Newsletter NL 11-6 provided information on litigation filed by environmental groups to try to get the court to require that some California Regional Water Quality Control Boards require NPDES stormwater permit holders to manage urban stormwater runoff so as to not cause violations of numeric water quality standards/objectives. In a separate action, the OPA Water Boards Public Affairs, Los Angeles Regional Water Quality Control Board, July 18, 2008 released the following statement.

"REGIONAL BOARD RESPONDS TO WRIT OF MANDATE HALTING STORMWATER REGULATIONS

While committing to comply with a judge's orders, the Los Angeles Regional Water Quality Board will seek to limit a Superior Court decision that affects the regulation of stormwater runoff in the Los Angeles Region, largely in Los Angeles and Ventura Counties. The July 2, 2008 court order by Superior Court Judge Thierry Patrick Colaw in the matter of Cities of Arcadia, et al v. State Water Resources Control Board et al, concerns the Board's triennial review of its Basin Plan.

The Basin Plan establishes the region's water quality standards which are the necessary and desired levels of water quality in the region to protect drinking water, beachgoers, fish, wildlife, and the environment.

At a July 10, 2008 meeting of the Los Angeles Regional Water Quality Board, the members met in closed session to consider the writ of mandate. As a result of that meeting and the Court's writ of mandate, the Executive Officer has directed staff to 1) take immediate and necessary measures to comply with the Court order, and 2) proceed with obtaining relief from the court to enable the Board to continue protecting water quality in Los Angeles and Ventura Counties. "The Board respects the law and Court's directive and is looking forward to working collaboratively with all stakeholders so we can resume our basic mission of protecting water quality, public health and the environment from the devastating

effects of polluted storm water runoff," said Fran Diamond, Chair of the Regional Board." She added, "Nonetheless, all the Regional Board members are very concerned about the impact of this decision on water quality and our community."
What Board action has been taken to comply with the Court decision? Effective immediately, staff has been directed to reevaluate the Basin Plan consistent with the Judge's order. These activities will include public notices and hearings.

What Court Ordered Limitations have been placed on Regional Board Activities?
With respect to municipal storm water discharges, construction storm water discharges, and industrial storm water discharges, the Regional Board is prohibited from:
Processing applications for permits required under the Clean Water Act; Considering and adopting requirements (called Total Maximum Daily Loads) to reduce pollution in storm water and improve the quality of the region's most polluted waters; Inspecting facilities to assess their compliance with water quality standards; Prosecuting violations of existing permits' requirements to comply with water quality standards; Referring violations to the Attorney General for civil and criminal prosecution related to violations of existing permits' requirements to comply with water quality standards; And all other "activities relating to the implementation, application and/or enforcement" of water quality standards as applied to storm water.
What does this mean? The potential environmental impact is significant and results in the Regional Board's inability to protect public health and the environment from even basic threats of harm caused by storm water and urban runoff.
The writ does not halt the Regional Board's permitting authority but does prohibit the processing of storm water permits by the Regional Board, since federal law requires most storm water permit to ensure compliance with the Basin Plan's water quality standards.
The writ did not waive requirements to apply for and to receive storm water, construction or industrial permits. The writ did not address any of the Regional Board's groundwater policies and non-storm water programs.
When does the writ go into effect? The writ went into effect July 3, 2008.
What prompted this decision? The decision is the result of a lawsuit filed by the Cities of Arcadia, Bellflower, Carson, Cerritos, Claremont, Commerce, Downey, Duarte, Gardena, Glendora, Hawaiian Gardens, Irwindale, Lawndale, Monterey Park, Paramount, Santa Fe Springs, Signal Hill, Vernon, Walnut, West Covina and Whittier and the Building Industry Legal Defense Foundation.
The lawsuit asserted that the Regional Board was required, but failed to reexamine each of its water quality standards after storm water discharges became subject to the federal Clean Water Act in 1987. The cities contended specifically that, with respect to storm water, the Regional Board was required to examine a variety of factors described in Water Code Sections 13241 and 13000, including whether the standards could be reasonably achieved, the economic effect on the cities, the need for housing, and the competing demands faced by governmental agencies responsible for implementation.
Does this mandate apply to the other eight Regional Boards? No. It applies only to the Los Angeles Regional Water Quality Control Board and the State Water Resources Control Board in the Los Angeles Region

Why is the board pursuing further legal relief? The result of the order is that the Regional Board is prohibited from protecting human health, the environment, and water quality from the effects of storm water and urban runoff pollution, including bacteria, pathogens, heavy metals, chemicals, and other harmful substances. Further relief is necessary to ensure that the Board can protect the public and water quality while its proceeds to implement the Court's directives.
State Water Resources Control Board, Office of Public Affairs, Phone: 916.341.5254, Fax:916.341.5252 Email: info@waterboards.ca.gov.
LA Regional WaterBoard Contact is Stephen Cain Phone: 213.576.6694
Cell: 213.305.2560"
Additional information on this issue is available at,
http://www.waterboards.ca.gov/water_issues/programs/stormwater/

Pharmaceuticals and Personal Care Products (PPCPs)
The February 25, 2008 issue of *Chemical and Engineering News* (C&EN) carried a cover story by Bethany Halford entitled, "Side Effects – *Pharmaceuticals have been finding their way into our environment for a long time, but just what are they doing there?"* That article is available at http://pubs.acs.org/cen/coverstory/86/8608cover.html.

PPCPs are among the many thousands of unmonitored, unregulated chemicals introduced into the environment where they pose a potential threat to water quality and public health. As discussed in previous Newsletters, Dr. C. Daughton of the US EPA has noted that while there are several million chemicals in commerce, many of which have the potential to cause adverse impacts on water quality, only about 100 to 200 chemicals are analyzed for and regulated in water.

Newsletters NL 7-3, 8-5, 10-7 provided an overview of PPCPs as they may impact water quality. As discussed in those newsletters, pharmaceuticals and personal care products are being found in domestic wastewaters as a result of residues' being excreted in urine and fecal matter, from the disposal of surplus/outdated product, and as a consequence of the use of these materials. These chemicals are designed to be biologically effective at low concentrations. This fact, along with their persistence in domestic wastewaters through domestic wastewater treatment processes, has increased concern about their impact on aquatic life in receiving waters, and on humans whose domestic drinking waters are derived from watershed having domestic wastewater inputs.

The Halford article in C&EN, referenced above, reviews many of the issues of concern relative to the occurrence of PPCPs in the environment and the current understanding of their potential impacts on aquatic life. She summarized a study by Karen Kidd of the Canadian Rivers Institute, University of New Brunswick in which 17*a*-ethinyl-estradiol, a synthetic birth control compound, was added to a Canadian experimental lake in concentrations that have reportedly been measured in municipal wastewaters and in river waters downstream of discharges. That study found that male fathead minnows in the lake became feminized and began producing eggs; within three years, fathead minnows had essentially disappeared from the lake. Adverse impacts to other types of fish were also observed. There is an urgent need for more studies to better define the adverse impacts of PPCPs and other unregulated chemicals that are being introduced into the environment.

Water Quality Modeling Workshop in Baltimore, Maryland

The US EPA will convene a water quality modeling workshop entitled, "Water Quality Modeling to Support Management Actions," on September 9 and 10, 2008, at the University of Maryland in Baltimore. The workshop is being coordinated with a Water Environment Federation (WEF) Total Maximum Daily Load (TMDL) conference scheduled for September 11, 2008. Those attending the workshop will obtain an understanding of US EPA-supported models being used to address regulatory and water quality planning objectives. According to the US EPA's workshop promotional material, "*the workshop will focus on tools available to meet multiple objectives like watershed planning, smart growth, trading, TMDL development, and National Pollutant Discharge Elimination System (NPDES) permit development. The workshop will identify objectives that can be addressed within EPA's BASINS environment and provide participants with an opportunity to provide feedback to guide future development of BASINS and other modeling-related tools. (BASINS or "Better Assessment Science Integrating Point & Nonpoint Sources" is a multi-purpose environmental analysis system that integrates a geographical information system (GIS), national watershed data, and environmental assessment and modeling tools.*" More information about the workshop is available at http://www.epa.gov/waterscience/ftp/basins/training/training-200809.html

Modeling of Water Quality Impacts of Stormwater Runoff

Newsletter NL 10-9 discussed issues pertinent to modeling water quality impacts of stormwater runoff. It was stimulated by the finding that stormwater runoff modelers frequently, albeit erroneously, assert that their hydrology-based models that track stormwater runoff during a runoff event can be used to model the water quality impacts of stormwater runoff. As discussed in NL 10-9, such claims are unreliable for essentially all potential pollutants in urban stormwater runoff. Hydrology-based models do not adequately consider the fact that many potential pollutants exist in aquatic systems in a variety of chemical forms only some of which are toxic/available to impact aquatic life and many other aspects of beneficial uses of waterbodies. In order to reliably model the water quality impacts of many chemicals it is necessary to appropriately incorporate aquatic chemistry and toxicology/biology into the models.

Subsequent to our publication of Newsletter NL 10-9, the editor of CE News requested permission to publish a condensed version of that newsletter as a feature article in CE News. That article was published as,

> Jones-Lee, A., and Lee, G. F., "Modeling Water Quality Impacts of Stormwater Runoff – Why Hydrologic Models Aren't Sufficient," CENews.com Feature Article, January 29 (2008). http://www.cenews.com/article.asp?id=2631. It is also available at,
> http://www.members.aol.com/GFLEnviroQual/CENewsStmWaterModeling.pdf

That discussion has also been accepted as an invited contribution, as a chapter in a book entitled, **Modelling of Pollutants in Complex Environmental Systems**, to be published by ILM Publications, UK, in 2009.

ACWA Newsletter

The Association of California Water Agencies (ACWA) publishes its "e-News" at about weekly intervals; it serves as an important source of information on water issues in California. A subscription to ACWA e-News can be obtained no cost, through the Internet at http://www.acwa.com//eNewsletter/index.asp?action=subscribe_new.

Past issues of e-News, from January 2004 through the current issue, are available at http://www.acwa.com/eNewsletter/index.asp?action=previous.

Proposed Approach for Helping to Solve Delta Resource Management Problems

The Sacramento/San Joaquin Delta is one of the most important water and natural resources in the state of California. As discussed in Newsletter NL 10/11, the Delta serves as a source of domestic water supply for approximately 23 million people in the state and of irrigation water for several million acres of farm land. The Delta is also an important area for recreation, fisheries, and other activities. However, it is recognized that the Delta is in a resource management crisis.

The July 23, 2008 issues of the ACWA e-News carried an article entitled, *"Report Calls Peripheral Canal Best Strategy for Delta, Economy,"* which stated,

"A report released last week by the Public Policy Institute of California [PPIC] *says building a peripheral canal to carry water around the Delta is the least expensive and most promising strategy to revive the troubled ecosystem and ensure reliable water supplies for Californian.*

The report, 'Comparing Futures for the Sacramento-San Joaquin Delta,' says the existing system harms fish and is unsustainable in the face of projected sea level rise, deteriorating levees and high earthquake potential. It concludes that a peripheral canal is not only more promising than a 'dual conveyance option,' but is also the best available strategy to balance the two co-equal objectives of improving environmental sustainability and water supply reliability."

The PPIC report is available at http://www.ppic.org/main/pressrelease.asp?p=859. A brief summary of that report was presented to the Delta Vision Blue Ribbon Task Force at its July 17, 2008 meeting. That presentation was web-cast and is archived at http://www.visualwebcaster.com/event.asp?regd=y&id=46190.

One of the issues of concern with respect to diverting high-quality Sacramento River water around the Delta in a peripheral canal as part of improving the quality of water exported from the Delta for domestic water supply use is the impact of that diversion on the quality of water in the Delta. As discussed by Lee and Jones-Lee (2004, 2007a, b), the development of a peripheral canal to divert Sacramento River water around the Delta will result in poorer water quality in the Delta. This is because the Sacramento River water, currently drawn through the Delta to the export pumps, serves to dilute pollutants added to the Delta from the San Joaquin River and in-Delta irrigated agricultural discharges, significantly enhancing water quality in the Delta. This issue will have to be adequately addressed as part of developing the peripheral canal approach for improving water quality in the waters exported to the San Francisco Bay area, and Central and Southern California.

The July23, 2008 issue of ACWA e-News also carried an article entitled, **"Judge Rules Project Operations Could Harm Salmon, Steelhead,"** in which it was stated,
"U.S. District Court Judge Oliver Wanger ruled Friday in Fresno that Central Valley Project operations will likely harm salmon and steelhead populations over the next eight months. The judge rejected four immediate actions requested by plaintiffs, but scheduled a status conference for today to discuss a schedule for considering additional proposed remedies.
Judge Wanger has been hearing evidence since June 6 in the case involving salmon and the adequacy of a biological opinion issued for the State Water Project and the federal CVP in 2005. The judge ruled in April that the opinion did not adequately analyze the status of winter-run and spring-run Chinook salmon and Central Valley steelhead and failed to justify the conclusion that project operations would not jeopardize the species.
Friday's ruling that project operations 'will appreciably increase jeopardy to the three species' means further proceedings are in order to determine what measures must be taken to avoid that risk between now and March 2009, when a new biological opinion is expected to be issued."
The 118-page decision is available at
http://www.acwa.com/issues/wanger2gutierrez_docket367.pdf

References Cited in Section:
Lee, G. F. and Jones-Lee, A., "Overview of Sacramento-San Joaquin River Delta Water Quality Issues," Report of G. Fred Lee & Associates, El Macero, CA, June (2004).
http://www.members.aol.com/apple27298/Delta-WQ-IssuesRpt.pdf

Lee, G. F., and Jones-Lee, A., "Overview—Sacramento/San Joaquin Delta Water Quality," Presented at CA/NV AWWA Fall Conference, Sacramento, CA, PowerPoint Slides, G. Fred Lee & Associates, El Macero, CA, October (2007a).
http://www.members.aol.com/GFLEnviroQual/DeltaWQCANVAWWAOct07.pdf

Lee, G. F., and Jones-Lee, A., "Overview—Sacramento/San Joaquin Delta Water Quality," Presented at CA/NV AWWA Fall Conference, Sacramento, CA, PowerPoint Slides, G. Fred Lee & Associates, El Macero, CA, October (2007b).
http://www.members.aol.com/GFLEnviroQual/DeltaWQCANVAWWAOct07.pdf

Delta Vision Blue Ribbon Task Force
As summarized in Newsletter NL 10-10/11, California Governor A. Schwarzenegger appointed a Delta Vision Blue Ribbon Task Force to develop an approach for addressing the resource management issues of the Delta. In January 2008 the final Task Force report, "Our Vision for the California Delta (Final Report)," was released, setting forth an overall plan for restoration of the Delta. Of particular note is the fact that the Task Force established that **water supply reliability** and **ecosystem management** are to have equal stature in Delta management. This represents a key, fundamental change for water quality management in the Delta. The Task Force report and comments on it are available at
http://deltavision.ca.gov/DeltaVision-DraftTaskForceVision.shtml.

At about monthly intervals the Task Force has held meetings to develop a Draft Strategic Plan for restoration of the Delta fisheries, the development of a dependable water supply

for municipalities and irrigated agriculture, and enhancement of aquatic and other resources of the Delta. That Plan is due to be finalized in October 2008 when it will be submitted to the governor. The July 17 and 18, 2008 Task Force meetings were web cast and are archived at http://www.visualwebcaster.com/event.asp?regd=y&id=46190 and http://www.visualwebcaster.com/event.asp?regd=y&id=46191. All past Delta Vision Task Force meeting reports and archives of meetings are available at http://deltavision.ca.gov/.

California Water Crisis and the Role of Water Reclamation

On September 25, 2008, the American Academy of Environmental Engineers (AAEE) is holding a dinner meeting devoted to "The California Water Crisis" and "The Role of Water Reclamation." Jeffrey Kightlinger, General Manager of the Metropolitan Water District of Southern California (the region's largest wholesale water supplier) and Steve Maguin, Chief Engineer and General Manager of the Sanitation Districts of Los Angeles County (an agency serving 5.3 million people and a leader in water reclamation since the early 1960's), will make the presentations. This dinner meeting will be held at the Joint Administration Office, Sanitation Districts of Los Angeles County (1955 Workman Mill Road, Whittier, CA 90601) and will cost $35.00 per person. CONTACT: Emily Estrada, eestrada@lacsd.org (preferred) 562 - 908 - 4288, ext. 1502. Registration deadline: September 15, 2008. Advance payment appreciated. Make checks payable to Emily Estrada; mail to address above. The announcement of this meeting is available at http://www.aaee.net/Downloads/LASanAnnouncement.pdf

Chesapeake Bay Program Restoration

The Government Accountability Office (GAO) released the following testimony on July 30, 2008: "Chesapeake Bay Program – Recent Actions Are Positive Steps toward More Effectively Guiding the Restoration Effort," – statement of Anu K. Mittal, Director, Natural Resources and Environment, before the Subcommittee on Water Resources and Environment, House Committee on Transportation and Infrastructure. The Testimony is available online at http://www.gao.gov/new.items/d081033t.pdf. Highlights of this testimony are available at http://www.gao.gov/highlights/d081033thigh.pdf

This GAO testimony discusses progress toward restoration of Chesapeake Bay water quality and resources through the Chesapeake Bay Program. At the recent Delta Blue Ribbon Task Force meeting mention was made that that program may provide information that could be of assistance in the development of a restoration program for the Sacramento/San Joaquin Delta. Chesapeake Bay, like the Delta, is experiencing excessive fertilization due to nitrogen and phosphorus discharges by urban and agricultural areas in the watershed. While the Chesapeake Bay Program initiated nutrient control programs about 20 years ago, the excessive fertilization of the Delta has not yet been adequately addressed, and is not being adequately addressed as part of the current program to begin to restore the Delta. Many of the problems that have been encountered in developing nutrient control for Chesapeake Bay will also have to be addressed in the Sacramento/San Joaquin Delta watershed. Newsletter NL 11-2 provided information on costs of nutrient control from urban and agricultural sources.

Delta e-News

The California Department of Water Resources has developed an electronic newsletter, the "Delta e-News" to disseminate information on Delta resource issues. To view the current issue or subscribe to this free newsletter go to http://www.water.ca.gov/deltainit/docs/DeltaEnews072408.pdf. It an important source of information on Delta and other water management issues in California.

CALFED Science Conference 2008

On October 22-24, 2008 the Biennial CALFED Science Conference, focusing on "Global Perspectives and Regional Results: Science and Management in the Bay-Delta System," will be held at the Sacramento Convention Center in Sacramento, CA. That conference will provide a forum for presenting scientific information and ideas relevant to the goals and objectives of the CALFED Bay-Delta Program for the Bay-Delta, its watershed, and the adjacent coastal ocean. Its aim is to make new information – such as results, models, syntheses, analyses – available to the broad community of scientists, engineers, managers and stakeholders working on Bay-Delta issues. The conference program will feature both poster and oral presentations that describe scientific advances in ecosystem restoration and improving levee system integrity, water quality, and water supply reliability.

Drs. G. F. Lee and A. Jones-Lee will make a presentation entitled, "Delta Nutrient Water Quality Problems," in the Watershed Assessment session of the conference, on Friday, October 24, 2008.

Abstract – Delta Nutrient Water Quality Problems:

The Delta experiences highly significant water quality problems that are caused by excessive discharge of nutrients (N and P) from urban and agricultural sources in the Delta watershed and within the Delta. These problems include impairment of the use of Delta water as a domestic water supply source through causing tastes and odors that require additional treatment; excessive growths of invasive plants (hyacinth and egeria) that impair aquatic life habitat and recreational use; and low DO in some Delta channels caused by decomposition of algae that develop in the Delta watershed. While these problems have been well-known for many decades, little attention has been devoted to controlling nutrient discharges that cause them. To provide information on the magnitude and significance of these problems, the authors organized a California Water and Environmental Modeling Forum (CWEMF)-sponsored Delta Nutrient Water Quality Modeling Workshop in March 2008. That one-day workshop provided information on the occurrence, magnitude, and significance of nutrient-related water quality problems in the Delta. It also provided information on the potential impact of controlling phosphorus inputs to the Delta on planktonic algal biomass in the Delta, and described a conceptual model of Delta nutrient sources. Regulatory agency activities regarding nutrient control to address these problems were reviewed. The workshop agenda, PowerPoint presentations, and a synopsis of the workshop is available at http://www.cwemf.org/workshops/NutrientLoadWrkshp.pdf and http://www.members.aol.com/GFLEnviroQual/CWEMF_WS_synopsis.pdf.

Additional information on this conference is posted at http://198.31.87.66/sciconf_08/.

SWRCB "Strategic Workplan for Activities in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary

In July 2008 the State Water Resources Control Board (SWRCB) adopted "Strategic Workplan for Activities in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary," as part of its overall effort to address water and resource management issues in the Delta. A summary of that Workplan was presented by senior SWRCB staff member, Tom Howard, at Delta Vision Task Force's July 17, 2008 meeting. That presentation is archived at

http://www.visualwebcaster.com/VWP/SkinPlayer/Player.asp?e=46190&w=320&h=310&s=True&ch=&sm=True&c=False&c1=False&mc=&qo=False&p=False&i=True&pp=False&cp=False&v=True&mc=False&a=True&sid=82703&aid=84077&pl=&pr=&st=ps&num=9999&y=52323&u=0&pid=1&pt=2&pc=False&cuts=6&t=Delta+Vision+Blue+Ribbon+Task+Force

The key components of the SWRCB Delta Workplan include • Water Quality/ Contaminants Control, • TMDLs, • Drinking Water Policy, • Once-through Cooling Policy, • Sediment Quality Objectives, • Invasive Species Management, • Blue-Green Algae, • Characterization of Delta Island Discharges, • Evaluation/Control Effects of Ammonia, • Selenium Screening Study, and • In-Delta Pesticide Use. Workplan component workplans are being developed. The SWRCB Bay Delta Workplan is available at

http://www.waterrights.ca.gov/baydelta/docs/board_resolutions/final_baydelta_workplan_res2008-0056.pdf.

Sublethal Impacts of Pesticides and Pesticide Mixtures

Past issues of the Newsletter (including NL 1-1, 2-1, 3-5, 3-6, 6-3, 6-4, 7-6/7, 8-1/2, 9-3, 9-4, 9-6. 9-7, 9-8, 10-3, 10-8, 10-12, 11-4) have provided information on the aquatic life toxicity of individual pesticides. Acute lethal toxicity is measured by death of test organisms within a few days. Sublethal impacts, such as adverse impacts on organisms' reproduction, are assessed as "chronic" toxicity. It has been well-established that the acute lethal toxicity of a mixture of pesticides of the same type, such as organophosphorus or pyrethroid-based pesticides, is equivalent to the sum of the acute lethal toxicity of the individual pesticides; i.e., the toxicity is additive within a group. There is increasing evidence that some mixtures of chemicals, especially pesticides, can cause sublethal impacts that are significantly detrimental to aquatic life. The July 1, 2008 issue of Environmental Science and Technology contains an article entitled, "Real-World Pesticide Mixtures Harm Salmon." That article is available at,

http://pubs.acs.org/subscribe/journals/esthag-w/2008/jun/science/ee_salmon.html.

In it, reference is made to the paper:

> Keith B. Tierney, Jessica L. Sampson, Peter S. Ross, Mark A. Sekela, and Christopher J. Kennedy, "Salmon Olfaction is Impaired by an Environmentally Realistic Pesticide Mixture," Environ. Sci. Technol., 42(13):4996–5001 (2008). 10.1021/es800240u
>
> The Abstract of the Tierney et al. paper states:
> "*Many of the salmon-producing waterways of the world contain pesticides known to harm olfactory sensory neurons (OSNs) that are critically important throughout the*

salmon lifecycle. The ability of OSNs to retain functionality after exposure to complex pesticide mixtures remains unknown. Here we show that a 96-h exposure to an environmentally realistic concentration of a mixture made from the ten most frequently occurring pesticides in British Columbia's Nicomekl River reduced the OSN responses of rainbow trout to a behaviorally relevant odorant." "This study demonstrates that environmentally observed pesticide mixtures can injure salmon olfactory tissue, and by extension, contribute to the threatened and endangered status of many salmon stocks.
(http://pubs.acs.org/cgi-bin/abstract.cgi/esthag/2008/42/i13/abs/es800240u.html)

In addition to the concern about potential impacts of chemicals in the Delta on the homing of anadromous fish by adversely impacting olfactory sensory ability, there is concern that water diversions/flow manipulations in the San Joaquin River watershed destroy the home stream signals that Chinook salmon use to find their home streams for reproduction. This issue has been discussed in,

Lee, G. F. and Jones-Lee, A., "SJR Deep Water Ship Channel Water Not SJR Watershed Water below Columbia Cut," Report of G. Fred Lee & Associates, El Macero, CA (2003). http://www.gfredlee.com/IEP-SJR-Delta7-24-03Final.pdf

The South Delta export projects that have changed the flow of Sacramento and San Joaquin River water through the Delta have also changed the transport of the home-stream chemical signal that guides Chinook salmon to their spawning areas. Prior to the export projects, the San Joaquin River tributary home-stream water chemical signal could be transported, during low-flow conditions, to San Francisco Bay, providing a home-stream signal to fall-run Chinook salmon proceeding to their San Joaquin River tributary home stream. The drawing of large amounts of Sacramento River water to the South Delta by export projects has eliminated the San Joaquin River tributary home stream water signals from occurring in the Central and northern Delta, downstream from Columbia Cut. During the summer, fall, and early winter, the water in the San Joaquin River channel downstream of Columbia Cut is Sacramento River water, not San Joaquin River water. This means that when the fall-run Chinook salmon enter the Delta from San Francisco Bay during the fall and winter they have no home-stream water signal to help them migrate through the Delta to their home-stream waters. This increases the "straying" of Chinook salmon from finding their home-stream reproductive areas, which can be detrimental to Chinook salmon reproduction.

The recently published paper by Floyd et al. (2008) provides information on effects of short-term exposure to pyrethroid-based pesticides on fish growth and survival.

Floyd, E., Geist, J., and Werner, I., "Acute, Sublethal Exposure to a Pyrethroid Insecticide Alters Behavior, Growth, and Predation Risk in Larvae of the Fathead Minnow (*Pimephales promelas*)," Environ. Tox. & Chem. 27(8):1780–1787 (2008). http://www.setacjournals.org/perlserv/?request=get-abstract&doi=10.1897%2F07-448.1&ct=1

The Abstract of their paper is reprinted here.

"The present study determined the effects of environmentally relevant, short-term (4-h) exposure to the pyrethroid insecticide esfenvalerate on mortality, food consumption, growth, swimming ability, and predation risk in larvae of the fathead

minnow (Pimephales promelas). Acute effect concentrations were determined, and in subsequent experiments, fish were exposed to the following measured sublethal concentrations: 0.072, 0.455, and 1.142 µg/L of esfenvalerate. To measure growth rates (% dry wt/d), 8-d-old fathead minnows were exposed to esfenvalerate for 4 h, then transferred to control water and held for 7 d. Food consumption and abnormal swimming behavior were recorded daily. Additional behavioral experiments were conducted to evaluate how esfenvalerate affects the optomotor response of the fish. To quantify predation risk, esfenvalerate-exposed fathead minnow larvae were transferred to 9.5-L aquaria, each containing one juvenile threespine stickleback (Gasterosteus aculeatus). Sticklebacks were allowed to feed for 45 min, after which the number of surviving minnows was recorded. No mortality occurred during 4-h exposures to esfenvalerate, even at nominal concentrations of greater than 20 µg/L. Delayed mortality (50%) was observed at 2 µg/L after an additional 20 h in clean water. Fish exposed to 0.455 and 1.142 µg/L of esfenvalerate exhibited impaired swimming and feeding ability as well as reduced growth compared to fish exposed to 0.072 µg/L and controls. Predation risk also was significantly increased for larvae exposed to 0.455 and 1.142 µg/L of esfenvalerate. These results demonstrate that larval fish experiencing acute exposures to sublethal concentrations of this insecticide exhibit significant behavioral impairment, leading to reduced growth and increased susceptibility to predation, with potentially severe consequences for their ecological fitness."

Water Quality Numerical Limits and Goals

The Central Valley Regional Water Quality Control Board has announced the release of updated information regarding water quality numerical limits in its Water Quality Goals web page at,
http://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_standards_limits/water_quality_goals/ under the "Updates" heading, although it is noted that the text of the report is currently under revision. Included is new information on California drinking water Maximum Contaminant Levels, Public Health Goals and Notification Levels, Proposition 65 Safe Harbor Levels, and US EPA Integrated Risk Information System reference doses and cancer potencies. The new document is intended to update the August 2007 edition of "A Compilation of Water Quality Goals." Questions and comments regarding the Water Quality Goals report may be addressed to:
Jon B. Marshack, D.Env., Staff Environmental Scientist California Regional Water Quality Control Board Central Valley Region Rancho Cordova, CA phone: (916) 464-4723, fax: (916) 464-4780 e-mail: jmarshack@waterboards.ca.gov, website:
http://www.waterboards.ca.gov/centralvalley

Stormwater "Articles & Blogs"

The Journal *Stormwater* has expanded its discussion of issues pertinent to managing stormwater runoff water quality through the development of "Article and Blogs." The July 22, 2008 issue of *Stormwater* "Articles and Blogs" published the content of our Newsletter NL 11-6 devoted to "Regulating Water Quality Impacts of Urban and Highway Stormwater Runoff," as a feature article. That issue is available at,
http://www.stormh2o.com/web-articles/urban-highway-runoff.aspx?ht

To subscribe to Stormwater – the Journal of Surface Water Quality Professionals – go to http://www.stormh2o.com/. It is available at no cost from Forester Publications.

EPA's Nonpoint Source News-Notes, Issue #84 (July 2008)
Issue #84 of the US EPA's Nonpoint News-Notes is available online through www.epa.gov/newsnotes (http://www.epa.gov/owow/info/NewsNotes/pdf/84issue.pdf). That issue of the Nonpoint Source News-Notes includes information on:

Agricultural Notes
(1) New Farm Bill Expands Conservation Programs
Special Focus: Web-Based Watershed Tools
(2) New EPA Attains Database Facilitates TMDL, Water Quality Searches
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Organochlorine Legacy Pesticides, PCBs, Methylmercury, and Selenium
The California Office of Environmental Hazard Assessment (OEHHA) has announced the development of fish tissue guidelines for organochlorine "legacy" pesticides, PCBs, Methylmercury, and selenium. The June 2008 OEHHA Fish website, http://www.oehha.org/fish/gtlsv/crnr062708.html, announced that OEHHA has released the report, "Development of Fish Contaminant Goals and Advisory Tissue Levels for Common Contaminants in Sport Fish: Chlordane, DDTs, Dieldrin, Methylmercury, PCBs, Selenium, and Toxaphene," dated June 2008 and developed by Dr. Susan Klasing and Dr. Robert Brodberg, The OEHHA announcement of that report states,

> "*For each chemical, the toxicological literature was reviewed to establish acceptable toxicity values for cancer and non-cancer endpoints. Fish contaminant goals were then developed that can provide a starting point for OEHHA to assist other agencies in their efforts to develop fish tissue-based criteria with a goal toward pollution mitigation or elimination. The scientific literature on the benefits of fish and fish oil consumption was also reviewed. Finally, OEHHA developed advisory tissue levels, which balance risks and benefits and are one component of the complex process of data evaluation and interpretation used by OEHHA in the assessment and communication of fish consumption risks and development of advisories and safe eating guidelines. If you would like to receive further*

information on this announcement, or have questions, please contact Dr. Susan A. Klasing using the information provided below. Dr. Susan A. Klasing, California Environmental Protection Agency Office of Environmental Health Hazard Assessment, Pesticide and Environmental Toxicology Branch, P.O. Box 4010, Sacramento, California 95812-4010" Phone: (916) 323-9667 Fax: (916) 327-7320, e-mail: sklasing@oehha.ca.gov."

Table 1 from that report presents a listing of the fish consumption guidelines that have been developed by OEHHA.

Table 1. Fish Contaminant Goals (FCGs) for Selected Fish Contaminants Based on Cancer and Non-Cancer Risk* Using an 8-Ounce/Week (prior to cooking) Consumption Rate (32 g/day)**

	FCGs (ppb, wet weight)
Contaminant **Cancer Slope Factor** **$(mg/kg/day)^{-1}$**	
Chlordane (1.3)	**5.6**
DDTs (0.34)	**21**
Dieldrin (16)	**0.46**
PCBs (2)	**3.6**
Toxaphene (1.2)	**6.1**
Contaminant Reference Dose **(mg/kg-day)**	
Chlordane ($3.3x10^{-5}$)	100
DDTs ($5x10^{-4}$)	1600
Dieldrin ($5x10^{-5}$)	160
Methylmercury ($1x10^{-4}$) s	**220**
PCBs ($2x10^{-5}$)	63
Selenium ($5x10^{-3}$)	**7400**
Toxaphene ($3.5x10^{-4}$)	1100

*The most health protective Fish Contaminant Goal for each chemical (cancer slope factor- versus reference dose-derived) for each meal category is bolded.

**g/day represents the average amount of fish consumed daily, distributed over a 7-day period, using an 8-ounce serving size, prior to cooking.

s - Fish Contaminant Goal for sensitive populations (i.e., women aged 18 to 45 years and children aged 1 to 17 years.)

Newsletter NL 9-4 was devoted to a review OEHHA's previous, 2006 draft revised guidelines relative to US EPA guidelines and the existing OEHHA guidelines. A comparison of the OEHHA 2008-adopted values with those which had been proposed in 2006 shows that there have been some significant changes. A discussion of these changes and justification for the 2008 values are presented in the Klasing and Brodberg 2008 report.

Lee and Jones-Lee (2002) compiled and discussed the organochlorine legacy pesticide and PCB data that had been collected on Central Valley waterbody fish. Newsletter NL 6-4 presented information on that report. Central Valley fish had been monitored for these chemicals since the late 1970s. As discussed by Lee and Jones-Lee (2002, 2004a, b) many of the types of fish taken from many of the Central Valley waterbodies contained sufficient concentrations of these chemicals to be a threat to the health of those who used those fish as a regular source of food. This assessment was based on a comparison between fish tissue concentrations of those chemicals and the OEHHA and US EPA fish consumption guidelines available in 2002.

In 2005, approximately 400 fish were collected from Central Valley waterbodies by the CVRWQCB and analyzed for organochlorine legacy pesticides and PCBs. Those data were reviewed by Lee and Jones-Lee (2007). A comparison of those fish tissue data with the data collected prior to 2000 showed that fish tissue concentrations of several of the organochlorine pesticides, including DDT, have continued to decrease. However the fish tissue concentrations of PCBs have not decreased and still pose a significant threat to the health of those who frequently eat certain fish from some Central Valley waterbodies.

Recently, Dr. V. deVlaming submitted a report entitled, "Organochlorine Pesticides and Polychlorinated Biphenyls (PCB) Concentrations in Muscle Tissue of Fish Collected from the San Joaquin River and Sacramento River Watersheds and Delta during 2005," to the Central Valley Regional Water Quality Control Board, Rancho Cordova, CA. That report, available at
www.swrcb.ca.gov/rwqcb5/water_issues/water_quality_studies/devlaming_rpt.pdf ,
presented concentrations of a number of organochlorine legacy pesticides including DDT, dieldrin, chlordane, toxaphene, and the non-pesticide, PCBs, found in more than 400 fish collected in 2005 from waterbodies in the Central Valley of California. It compared the fish tissue concentrations found the fish sampled in 2005 with the OEHHA 2006-proposed fish consumption guidelines. Because of the changes that OEHHA has since made in the proposed-2006 fish consumption guidelines, the deVlaming comparison is out-of-date relative to evaluating the potential hazard of consumption of Central Valley fish. There is need to re-examine the 2005 fish tissue data from the Central Valley waterbodies relative to the recently developed OEHHA fish consumption guidelines.

OEHHA has developed fish consumption guidance for fish taken from the Delta and its tributaries. Lee and Jones-Lee (2008) identified a significant problem in how OEHHA developed the guidance for fish taken from some South Delta channels. As they discussed with respect to the fish tissue data for methylmercury, it is inappropriate to assign fish consumption guidance based on data from fish collected off the main flow path for San Joaquin River flow through the South Delta for application to fish taken from the channels that are in the main flow path for the San Joaquin River through the South Delta. The fish

consumption guideline for fish obtained from Old River channel near the Head of Old River should be the same as that for fish obtained from the San Joaquin River near the Head of Old River.

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Lee, G. F., and Jones-Lee, A., "Comments on OEHHA's 'April 2008 Draft Mercury-Based Safe Eating Guidelines for Fish and Shellfish from the Sacramento River and Northern Delta'," Report of G. Fred Lee & Associates, El Macero, CA, May 23 (2008).
http://www.members.aol.com/GFLEnviroQual/HgSafeEatingGuideCom.pdf

DTSC Remediation Technology Symposium

In May 2008 the California Department of Toxic Substances Control (DTSC) held a hazardous chemical site Remediation Technology Symposium. That symposium featured experts in the fields of contaminated soil and water remediation who discussed recent developments in technology for remediation. Videos, along with their associated presentations, as well as a photo slide show are available for viewing at:
http://www.dtsc.ca.gov/HazardousWaste/Remediation.cfm

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