

Southwest HYDROLOGY

The Resource for Semi-Arid Hydrology

Volume 2/Number 6

November/December 2003



PPCPs in
Our Waters

Southwest Hydrology
University of Arizona
P.O. Box 210011
Tucson, AZ
85721-0011
Address Service Requested

Southwest HYDROLOGY

The Resource for Semi-Arid Hydrology

A bimonthly trade magazine for hydrologists, water managers, and other professionals working with water issues.



From the Publisher

We've had a great response to the news of our merger with SAHRA, and with the magazine free of charge once again, we're adding new subscribers every day.

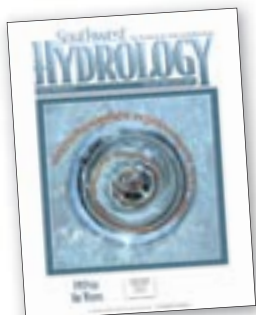
This issue introduces yet another new department: *Around the Globe*. The southwestern United States is clearly not the only semi-arid zone in the world, and our *Around the Globe* department will include news of water issues from other countries, and of trends worldwide.

Our feature articles for this issue focus on pharmaceuticals and other personal care products (PPCPs) that have recently been detected in surface – and other – waters in the United States. Newly developed analytical methods enabled the U.S. Geological Survey to conduct a baseline survey of 95 wastewater-related compounds in U.S. streams in 1999 and 2000. When the results were published in 2002, the long list of detected compounds surprised many people. Now that we have some idea of which compounds are present and at what concentrations, many questions have been raised regarding persistence, toxicity, and treatment methods. While researchers continue to work on the answers, our feature authors shed some light on what we know today.

Future issues will focus on the Colorado River Delta, the value of water, and GIS applications in hydrology. Please contact us if you have ideas about, or would like to contribute to, these or any other topics.

We thank all the contributors to this issue (listed on the opposite page), and as always, encourage your comments and contributions.

Betsy Woodhouse
Publisher



Cover image created by Kyle Carpenter



Inside This Issue

Departments

- 6 On the Ground**
 - Maximizing infiltration efficiency in central California
 - Dye tracers in Las Vegas Wash
 - Riparian restoration in AZ

- 10 Government**
 - Phoenix drinking water project
 - Water projects funded in NM
 - CA water softening bill

- 23 R & D**
 - Automated flow measurements
 - Toxic rainfall in California
 - Perchlorate primer

- 27 Around the Globe**
 - Water banking gains attention

- 28 The Company Line**
 - AMEC in Southern California
 - American Water Systems
 - Turner Laboratories

- 31 Business Directory**
And Job Opportunities

- 32 People**
 - DRI award winner
 - Jacobs joins U of AZ

- 34 Society Pages**
 - WEF and NWRA publications
 - AHS 2003 symposium

- 36 Education**
 - Professional educational initiative

- 37 In Print**
Alternative Futures for Changing Landscapes reviewed by Marv Waterstone

- 38 The Calendar**
Meetings, conferences, training, and short courses



PPCPs in Our Waters

“Pharmaceuticals and personal care products” (PPCPs) and “endocrine-disrupting compounds” (EDCs) are as hard to say as one might think they are to drink. Recent developments in analytical techniques have allowed researchers to detect the presence of dozens of these compounds in wastewater-affected streams and in groundwater, at concentrations in the nanograms per liter range. Now that we have an idea of what compounds are present, there is much to learn about how long they persist, where they go, and what the implications are to ecosystems and human health.

12 Pharmaceuticals and Other Wastewater Products in Our Waters — a New Can of Worms?

Betsy Woodhouse

A national survey of wastewater-related organic compounds in streams revealed widespread detection at very low concentrations. The results raise new questions about the persistence, fate, toxicity, removal, and analysis of these compounds.

14 Endocrine Disruptors as Water Contaminants: Toxicological Implications for Humans and Wildlife

Shane A. Snyder

The effects on human and wildlife endocrine systems of certain naturally occurring and manmade compounds have been studied for decades. However, as we learn of the prevalence of these compounds in our waters, increased focus is being placed on understanding their toxicology.

16 Laboratory Analysis of EDCs and PPCPs in the Environment

Andrew Eaton

Recent advances in analytical techniques allow minute concentrations of a wide variety of wastewater-related compounds to be detected. But what are our current analytical capabilities with respect to standardized methods, cost, sensitivity, and availability?

18 Removal of Endocrine Disruptors, Pharmaceuticals and Personal Care Products During Water Treatment

Paul Westerhoff

Researchers conducted bench-scale studies that simulate wastewater treatment plant processes on waters spiked with EDC and PPCP compounds. Are conventional treatment processes sufficient to remove the compounds, or are advanced processes necessary?

20 The PhATE™ Model: Estimating the Distribution of Pharmaceuticals in the Environment

Virginia L. Cunningham

Researchers in the pharmaceutical industry have developed a spatially explicit model to help estimate the environmental distribution of pharmaceuticals at the watershed scale. This represents a significant improvement over the nationwide estimate of predicted environmental concentration performed under FDA guidance.

22 Pharmaceutical Concentrations Measured in Recycled Water

Darryl Miller

Several pharmaceuticals were measured in samples of water entering the West Basin Municipal Water District’s water recycling facility in Southern California, but none were detected after passing through reverse osmosis treatment.

Publishing Southwest Hydrology furthers SAHRA’s mission of promoting sustainable management of water resources in semi-arid regions.



This material is based upon work supported by SAHRA (Sustainability of semi-Arid Hydrology and Riparian Areas) under the STC Program of the National Science Foundation, Agreement No. EAR-9876800. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of SAHRA or of the National Science Foundation.

Southwest Hydrology

Publisher

Betsy Woodhouse

Technical Editor

Howard Grahn

Editor

Mary Black

Graphic Design

Kyle Carpenter

Brad James

Knowledge Transfer

Gary Woodard

Contributors

Jim Crosswhite

Virginia L. Cunningham

Andrew Eaton

Joseph F. Leising

Darryl Miller

William E. Motzer

Dennis E. Peyton

Shane A. Snyder

Phyllis Stanin

Marv Waterstone

Paul Westerhoff

Gary Woodard

Betsy Woodhouse

Printed in the USA by Arizona Lithographers

Southwest Hydrology is published six times per year by the NSF Center for Sustainability of semi-Arid Hydrology and Riparian Areas (SAHRA), College of Engineering and Mines, The University of Arizona. Copyright 2003 by the Arizona Board of Regents. All rights reserved. Limited copies may be made for internal use only. Credit must be given to the publisher. Otherwise, no part of this publication may be reproduced without prior written permission of the publisher.

Subscriptions

Subscriptions to *Southwest Hydrology* are free. To receive the magazine, contact us as shown below.

Advertising

Advertising rates, sizes, and contracts are available at www.swhydro.arizona.edu. Please direct ad inquiries to us as shown below. Space must be reserved 50 days prior to publication date.

Classified Advertisements

Southwest Hydrology will publish advertisements for job openings in the Classifieds. The first column inch (65 words) for each announcement is free; after that, the charge is \$70/column inch or fraction thereof. To place an ad, contact us as shown below. All classified ads, of any length, will be posted on our Web site for no charge (www.swhydro.arizona.edu).

Editorial Contribution

Southwest Hydrology welcomes letters and contributions of news, project summaries, product announcements, and items for The Calendar. Send submissions by mail or email as shown below. Visit www.swhydro.arizona.edu for additional guidelines for submissions.

Web Sites

Southwest Hydrology - www.swhydro.arizona.edu

Brad James, Webmaster

SAHRA - www.sahra.arizona.edu

CONTACT US

Southwest Hydrology, The University of Arizona, SAHRA

PO Box 210011, Tucson, AZ 85721-0011.

Phone 520-626-1805. Email: mail@swhydro.arizona.edu.