

# Southwest HYDROLOGY

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Riparian  
Restoration

Southwest Hydrology  
P.O. Box 66690  
Tucson, AZ  
85728-5690

Address Service Requested

# Southwest The Complete Hydrologic Resource HYDROLOGY

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



From the Editor

*This issue marks the completion of the first year of **Southwest Hydrology**. The response to the magazine has been extremely positive, and has confirmed that there is indeed an audience for this type of publication. We are excited about the features and articles we have planned for our second year, and want to thank the many readers who have helped us shape its content.*

*Our second year of publication will bring one big change: a switch to paid subscriptions. Our year of free subscriptions allowed us to develop our product and distribute **Southwest Hydrology** widely; however, we can not operate over the long term that way. The nominal \$35/year subscription rate will allow us to continue to provide you with high-quality content at a good value. In order to avoid missing the next issue, featuring desalination issues in the Southwest, we will need to receive your subscription payment by April 11.*

*Our current feature takes us to surface water and the issue of riparian restoration. This topic has gained considerable attention recently, and we wondered if there is any consistency in how restoration actually occurs. As you will read, a variety of methods can be applied, and not surprisingly, no single formula works in all settings. The issue of trying to eradicate non-native (alien) species is addressed in a thought-provoking manner, and we also learn about a local restoration operation on the U.S./Mexico border. We are grateful to all the features authors for their contributions, including photographs, to this issue.*

*We thank all of our contributors listed on the opposite page, and as always, encourage your comments and news. And — don't forget to send in your subscription!*

Betsy Woodhouse  
Editor



*Cover photos: 1 and 2 – San Pedro River, southern Arizona, near Charleston Bridge. Photo 1 – July 1990; Photo 2 – July 1992 after two years of voluntary (by landowner) rest from grazing. (Photos: BLM San Pedro National Riparian Conservation Area). Photo 3 – Incised channel created by erosion following the Cerro Grande fire near Los Alamos, NM, 2000. (Photo: John A. Moody, U.S. Geological Survey) Photo 4 – Volunteers planting rooted cottonwood cuttings, S. fork of Kern River, CA. (photo: Ron Riller). Photo 5 – Overbank flooding along the Bill Williams River, Arizona during a high flood release from Alamo Dam. (Photo: Patrick Shafroth)*



## Inside This Issue

### Departments

6

#### On the Ground

- Sonoran Desert Conservation Plan
- International Center for Water Technology in San Joaquin Valley
- Passive Diffusion Bag samplers

9

#### Government

News from the legislature, agencies, and the courts.

12

#### People

Awards, promotions, and new positions.

13

#### R&D

What's happening in research, education, and technology.

28

#### The Company Line

What's new in the consulting world: project announcements, company news.

30

#### The Society Page

Activities and announcements from associations, NGOs, and non-profit organizations.

32

#### Business Directory

And Job Opportunities

36

#### In Print

"Irrigating India" reviewed by L.G. Wilson, Ph.D.

37

#### Product Announcements and Software Review

STANMOD reviewed.

38

#### The Calendar

Meetings, conferences, training, and short courses.

Publisher and Editor  
Betsy Woodhouse, Ph.D.

Publications and Business Manager  
Howard Grahn

Features Editor  
Alison Bolen

Assistant Editors  
Andrea Aker  
Alex Etheridge

Graphic Design  
Debra Bowles/Sun People Studios

Contributors To This Issue  
Mark Briggs  
M.K. Chew  
Craig E. Divine  
David R. Dreesen, Ph.D.  
Miriam Lara Flores  
S.J. Lite  
Dee O'Neill  
W.R. Osterkamp, Ph.D.  
Hugh J. Rieck  
Patrick B. Shafroth, Ph.D.  
J.C. Stromberg, Ph.D.  
Barbara Tellman  
Lorne Graham Wilson, Ph.D.  
David Zoldoske

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#### Subscriptions

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#### Letters and Other Inquiries

Send Letters to the Editor and all other inquiries to Southwest Hydrology, PO Box 65690, Tucson, AZ 85728, phone (520) 615-2144 or toll-free (866) 615-2144, or send email to [mail@swhydro.com](mailto:mail@swhydro.com).

#### Editorial Contribution

Southwest Hydrology welcomes contributions of news, project summaries, research, product announcements and items for The Calendar. Send submissions to Southwest Hydrology, PO Box 65690, Tucson, AZ 85728; or email to [mail@swhydro.com](mailto:mail@swhydro.com). Visit [www.swhydro.com](http://www.swhydro.com) for additional guidelines for submissions.

Web Site  
[www.swhydro.com](http://www.swhydro.com)  
Sharia Schuller, manager



## When Riparian Systems Decline

An array of natural and human-generated processes can degrade the proper functioning of Southwestern riparian areas. A range of disturbances can affect these desert oases from the sub-alpine headwaters to flowing desert bosques. To manage, protect, or repair riparian systems that are in decline, we need to fully understand the causes and effects of the changes we have made throughout the entire watershed. Several experts share their thoughts on what has gone wrong, and what might be done to reverse the decline of riparian areas.

### 16 Overview of Riparian Restoration in the Southwest

David R. Dreesen, Ph.D.

Properly functioning riparian systems provide many watershed benefits, and the protection and management of these areas has become a primary mission for public and private land managers. Disturbances to riparian areas arise from both man-made and natural activities. Restoration often requires landscape-scale management and will undoubtedly result in struggles over these finite but extraordinary resources.

### 22 Alien Plants and Riparian Ecosystem Restoration: The Tamarix Case

J.C. Stromberg, Ph.D., S.J. Lite, and M.K. Chew

The more we change the abiotic components of an ecosystem, the more we stress the native biotic community and create niches for new species. As we drastically manipulate waters, we have to expect consequent changes in riparian flora and dependent fauna. Salt cedar often gets the blame for loss of ecosystem function when the underlying reason for the loss is the alteration of river processes leading to the absence of cottonwoods and willows or to the loss of habitat diversity.

### 18 Developing Recovery Plans for Riparian Ecosystems

Mark Briggs and W.R. Osterkamp, Ph.D.

To be effective, recovery of a declining riparian ecosystem must be based on a clear understanding of current and past ecological conditions and reasons for the site decline. In addition, a recovery plan must incorporate an approach that addresses both the reasons for degradation and natural regeneration, take a watershed-scale approach, and have strong public involvement.

### 24 Small-scale Restoration in the Colorado River Delta

Miriam Lara Flores and Mark Briggs

The Colorado River Delta once encompassed several hundred thousand hectares of lush intertidal habitat. Dam construction, water diversions, and regulations that neglect environmental considerations have fragmented and reduced the Delta to remnant systems of brackish mudflats dominated by salt cedar. One small-scale restoration effort, supported by community involvement, will benefit both the environment and the people who live and work nearby.

### 20 Natural Flooding and Dams

Patrick Shafroth, Ph.D.

In riparian areas, flooding is a particularly important natural process, strongly influencing the physical environment of river bottomlands by eroding and depositing sediment, destroying and creating fluvial landforms, moistening sediments, flushing salts, and transporting plant propagules. These flood-driven processes largely determine the characteristics of surfaces upon which vegetation grows. Some current dam operations could be modified to allow increased low flows and flooding, more closely simulating natural conditions.

### 26 Important Concepts for Riparian Recovery

Mark Briggs and W.R. Osterkamp, Ph.D.

Formulating a practical recovery plan for riparian systems requires an understanding of hydrologic and geomorphologic terms.