

# Southwest HYDROLOGY

The Resource for Semi-Arid Hydrology

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## Invasive Species

Southwest Hydrology  
University of Arizona - SAHRA  
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# Southwest HYDROLOGY

The Resource for Semi-Arid Hydrology

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



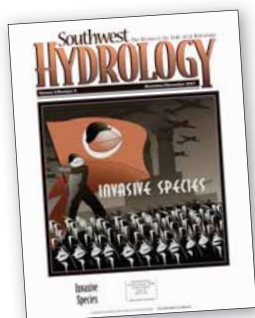
## From the Publisher

*South Americans, Europeans, Southeast Asians, Eurasians, and Ukrainians. Immigration is an issue for more than just the human population. Non-native species—plants and invertebrates—are changing many ecosystems in the Southwest. Some were intentionally imported, initially welcomed for providing benefits such as soil stabilization or control of another invader; while others hitched a ride on the bottom of a ship. In their new environments, away from natural predators, many non-native species have proliferated, becoming invasive and crowding out native populations or otherwise upsetting the ecological balance of their adoptive homes. Invasive species also impact water resources and water quality, and that is the focus of this issue's feature articles.*

*We received many comments both praising and criticizing our last issue, on the water-energy nexus. That was a tough issue to produce due to the myriad of perspectives, obscure and incompatible units, and the mind-boggling intersection of gallons/KWh and KWh/gallon required just to get a drink of water or turn on a light. One reader was critical of including lakes Powell and Mead evaporation in hydroelectric costs, while another thanked us for pointing out what a huge number it is. True enough, the lakes have many uses, and also true is that some costs are often overlooked in our interdependent infrastructure. Many would consider it disingenuous to imply hydroelectricity comes without water costs, but how to calculate those costs?—there's the rub. For these reasons we require authors to be specific about how their determinations are made and the assumptions that go into them. We welcome the discussion and diverse viewpoints; please send us yours.*

*Thanks to the contributors to this issue, and as always, to our advertisers who continue to make this publication possible.*

Betsy Woodhouse, Publisher



*The quaggas are coming...and Arundo and more! Can they be stopped? Check out this issue's feature articles. Cover illustration by Mike Buffington.*

## Southwest Hydrology

**Publisher**  
Betsy Woodhouse

**Technical Editor**  
Howard Grahn

**Editor**  
Mary Black

**Graphic Designers**  
Mike Buffington  
Cindy Grooms

**Software Review Coordinator**  
Eileen Poeter

**SAHRA Knowledge Transfer**  
Gary Woodard

### Contributors

Rory K. Aikens	Ondrea C. Hummel	Peggy A. Roefer
Salim Bawazir	David L. Johnson	Nabil Shafike
Todd Caplan	James F. LaBounty	Juliet C. Stromberg
James Cleverly	Michael P. Masser	Ronald E. Zegers
Robert B. Hardy	Lawrence M. Riley	Richard Zemba

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SAHRA - [www.sahra.arizona.edu](http://www.sahra.arizona.edu)

### CONTACT US

Southwest Hydrology, The University of Arizona, SAHRA  
PO Box 210158-B, Tucson, AZ 85721-0158.  
Phone 520-626-1805. Email [mail@swhydro.arizona.edu](mailto:mail@swhydro.arizona.edu).

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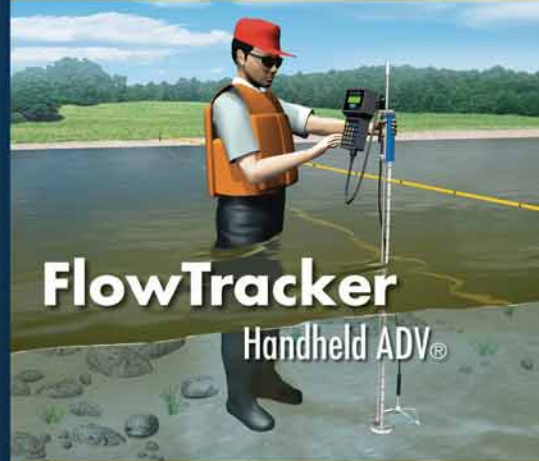
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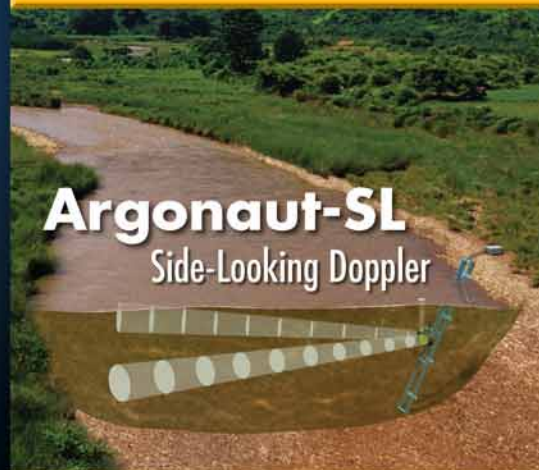
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## Departments

### 8 On the Ground

- AZ town integrates water systems, by Robert B. Hardy
- The dope on dowsing, by Betsy Woodhouse
- Aging water meters, by Gary Woodard

### 14 Government

- AZ mine issued strict WQ permit
- Stockton rejects private water control
- UT debates Scenic River status
- Owens is declared a river
- Record drought in CA, rains in TX
- ADEQ primacy affirmed
- EPA lists compounds for endocrine disruptor screening
- EPA launches tribal portal website

### 16 Hydrofacts

### 34 R&D

- CA peripheral canal idea revived
- WWF weighs in on desal
- Good and bad news on pupfish
- Dust speeds distant snowmelt
- Flushing water waste from prisons
- *Atriplex* helps sequester mine metals
- Truckee River Info Gateway debuts

### 38 Business Directory and Employment Opportunities

### 39 Society Page

- NM water researchers convene
- UCOWR participants urged to buck status quo
- Trying to have it all in the Southwest

### 40 People

- Carlon and Griggs recognized for River Partners accomplishments
- Stobel leaves NV for OR
- Reclamation's Rodgers retires
- Hoffmann leads USGS's AZ Water Center

### 42 Calendar

## Invasive Species

Invasive species invade: therein lies the problem. Floating and submerged plants such as hydrilla, water lettuce, water hyacinth, and giant salvinia form dense mats that literally cover waterways, shutting out light and restricting flow. Giant reed obstructs flood flows, crowds channels, consumes three times the water of native vegetation, and spreads fire. Saltcedar thrives at the expense of native cottonwood and willow in the Southwest, particularly in the many riparian environments that have been affected by human activity. The newest arrival to the area, the quagga mussel, hasn't taken over yet, but wildlife managers and water providers need only look at the problems this mollusk has caused in the Great Lakes region to know what may await them. With all of these invaders, we're not likely to be able to get rid of them. The best we can hope for is to manage our ecosystems to keep the populations of newcomers in line with other species.

### 18 The Quaggas Have Arrived

*Lawrence M. Riley and Rory K. Aikens*

Given that the quaggas are now among us, what are the little beasts all about? Can western water managers and biologists exploit their distinctive characteristics to avoid a scenario like the Great Lakes invasion of zebra mussels?

### 20 Southern Nevada Braces for Quaggas

*Peggy A. Roefer, David L. Johnson, James F. LaBounty, and Ronald E. Zegers*

The recent discovery of quagga mussels in Lake Mead set off a flurry of activity to assess their range and formulate responses. The prolific quaggas could significantly impact Southern Nevada Water Authority's water distribution system if left unchecked.

### 22 Impacts of Invasive Aquatic Plants

*Michael P. Masser*

Invasive aquatic plants pose a threat to surface waters and riparian habitats. Hydrilla, water hyacinth, water lettuce, and giant salvinia are prodigious growers that outcompete other species, impact water quality, and reduce native habitat.

### 24 Chipping Away at Arundo

*Richard Zembal*

An invasion of giant reed in Southern California has obstructed flood flows, impacted water quality, and endangered native species; it consumes three times the water of native vegetation. But the concerted efforts of many are raising hopes that eradication is possible.

### 26 Saltcedar Control and Riparian Restoration—Be Careful With Generalizations

*Ondrea C. Hummel and Todd Caplan*

Saltcedars have invaded extensive areas of riparian habitat in the West. They have been targeted for control or removal based on arguments that they increase groundwater consumption, increase soil salinity, decrease wildlife habitat quality, and proliferate after fires. But is an all-out battle to eradicate them warranted? Perhaps not.

### 28 Native vs. Invasive Plant Water Use in the Middle Rio Grande Basin

*Nabil Shafike, Salim Bawazir, and James Cleverly*

Results of a comparison of evapotranspiration rates of saltcedar-dominated vegetation communities to those of native cottonwood communities in the Middle Rio Grande Basin have implications for salt cedar eradication programs.

### 30 Hydrologic Changes and Riparian Forests: The Saltcedar Story

*Juliet C. Stromberg*

Human alteration of streamflow in the American Southwest seems to give a competitive edge to the non-native newcomer saltcedar. But where rivers remain free-flowing and perennial, native species such as cottonwoods and willows are holding their own.

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



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