

Southwest HYDROLOGY

The Resource for Semi-Arid Hydrology

Volume 7/Number 4

July/August 2008



Endangered
Species Act

Southwest Hydrology
University of Arizona - SAHRA
P.O. Box 210158-B
Tucson, AZ
85721-0158

Address Service Requested

A few thoughts about a good team:



Announcing Some New Principals

Back in 1999, we assembled our new company on one guiding principle: that the value of our services would equal the sum of our staff.

Over the years, our success in growing our small company has been a reflection of this principle—such that the scope and range of what we provide is the result of the integrity of our collective professional capabilities.

So it is with complete confidence that we are promoting **Mike Alter**, **Don Hanson**, and **Tom Suriano** to positions as principal hydrogeologists at Clear Creek Associates, responsible for technical, contractual, and business matters.

So, three new principals; one long-standing principle; and a single priority: to provide quality-focused, very responsive, integrated hydrologic services.

Joining founding partners (from left) Doug Bartlett and Marvin Glotfelty as Principals of Clear Creek Associates in Phoenix are:

Thomas R. Suriano, R.G., joined Clear Creek in 2006, bringing twenty-two years of experience managing environmental and water resources projects.

Donald P. Hanson, R.G., joined Clear Creek in 2000 and has twenty-two years of experience managing environmental and water resources projects.



And in Tucson:

Michael L. Alter, R.G., joined Clear Creek Associates at its inception in 1999 as head of the Tucson office and brings thirteen years of experience consulting on environmental and water resources projects.

in Phoenix:

6155 E. Indian School Rd., Suite 100, Scottsdale, Arizona 85251
(480) 659-7131, (480) 659-7134 fax

in Tucson:

221 N. Court Ave., Suite 101, Tucson, Arizona 85701
(520) 622-3222, (520) 622-4040 fax

www.clearcreekassociates.com

**CLEAR
CREEK
ASSOCIATES**

*Practical Solutions in
Groundwater Science*

Levellogger Proven to be Worth its Weight in Gold



Mandate To Deliver Quality

Since the Levellogger Gold was launched at the beginning of 2006, Solinst has shipped thousands and thousands of units to satisfied customers all over the world.

"Our mandate is to design and deliver high quality products, and back it up with our 3 Year Warranty, demonstrating the Solinst commitment to our customers."

— Sarah Belshaw, President

Dependable Water Level Datalogger

- Maintenance Free Design/Lifetime Calibration
- Backwards Compatible
- 3 Year Warranty
- Real-Time View
- User-selectable Sampling Schedule
- 10 Year Battery (1 reading/minute)
- SCADA Ready (SDI-12)

The Levellogger Gold is a self contained water level datalogger, which is completely designed, developed and manufactured in-house, in the tradition of all Solinst high quality products. The Levellogger Gold uses infra-red data transfer, providing the flexibility of installing by use of a simple wireline or by using a Direct Read Cable to surface. The Levellogger Gold includes a pressure transducer, temperature thermistor, 10 year lithium battery (based on 1 reading per minute), and internal data logger with a capacity of 40,000 temperature and water level data points.

Solinst[®]

Solinst Canada Ltd., 35 Todd Road
Georgetown, ON L7G 4R8
Tel: +1 (905) 873-2255; (800) 661-2023
Fax: +1 (905) 873-1992; (800) 516-9081
E-mail: instruments@solinst.com

Junior ...

...the newest addition to the Levellogger Family



\$385 US

Reduce Your Bottom Line

A low cost alternative in the Levellogger Series

- Accuracy of 0.1% FS
- 32,000 Datapoints
- 5 Year Battery
- 1 Year Warranty
- Compatible with Levellogger Gold Series, Software and Accessories

Leveloader Gold



- Rugged Data Transfer Device
- Dedicated to Levellogger Series
- Stores 1.39 Million Datapoints
- Real-Time View
- Re-program in the Field

www.solinst.com

Southwest HYDROLOGY

The Resource for Semi-Arid Hydrology

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



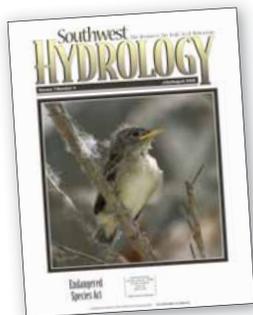
From the Publisher

The Endangered Species Act (ESA) was passed in 1973 to protect species and habitat, yet it has had far-reaching impacts on water management, especially in the West where competition for water is growing. In places such as the Klamath River Basin in the Northwest and Texas's Edwards Aquifer region, ESA issues have triggered major conflicts, but have also served as a focal point for bringing together disparate parties—many of whom have no direct interest in the species themselves—to work out water-sharing agreements. In other areas, incompatibilities between the ESA and other laws such as the Clean Water Act and court-determined stream adjudications place water management agencies in no-win situations. Increasingly, meeting the water needs of species is gaining priority relative to those of other water users, whose shares must then be adjusted. In this issue, we look at several examples of how the ESA affects water management.

We are pleased to note that Southwest Hydrology is now being printed on recycled paper with environmentally friendly, soy-based ink. This change was implemented in the May/June 2008 issue.

We welcome two new sponsors of Southwest Hydrology in this issue: the National Center for Atmospheric Research and the New Mexico Office of the State Engineer/Interstate Stream Commission. They, together with our other 2008 sponsors (see page 9) and our advertisers make continued publication of this magazine possible. We are grateful to all of our supporters as well as the contributors to this issue.

Betsy Woodhouse, Publisher



The endangered southwestern willow flycatcher is a "poster species" for water-related Endangered Species Act issues in the Southwest. It lives in dense riparian vegetation, which is becoming increasingly scarce in many areas. This 13-day old fledgling was photographed in the Kern River Valley, California, by Bob Steele Photography.

Southwest Hydrology

Publisher
Betsy Woodhouse

Technical Editor
Howard Grahm

Editor
Mary Black

Graphic Designers
Mike Buffington
Cindy Grooms

SAHRA Knowledge Transfer
Gary Woodard

Contributors

Terry Fulp	Rolf Schmidt-Petersen
Grace M. Haggerty	John Stomp
Andrew Hautzinger	John Swett
John Hickey	Douglas Tave
Lisa M. McKnight	Laura Vecerina
Richard Meyerhoff	Todd Votteler
Mark Murphy	David Walker
Dwight Russell	

Advisory Board

David Bolin, R.G.
Charles Graf, R.G.
Jim Holway, Ph.D.
Jeff Johnson
David Jordan, P.E.
Karl Kohlhoff, P.E., B.C.E.E.
Stan Leake
Ari Michelsen, Ph.D.
Mark Murphy, Ph.D.
Peggy Roefer
Martin Steinpress, R.G., C.HG.

Printed in the USA by CityPress

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, The University of Arizona. Copyright 2008 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.
ISSN 1552-8383

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.

Free Job Announcements

Southwest Hydrology will publish job announcements in the Employment Opportunities section. The first 70 words for each announcement is free; after that, the charge is \$70 per additional 70 words. To place an ad, contact us as shown below. All announcements, of any length, may be posted on our website 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
SAHRA - 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.

[SOUND PRINCIPLE NO. 33]

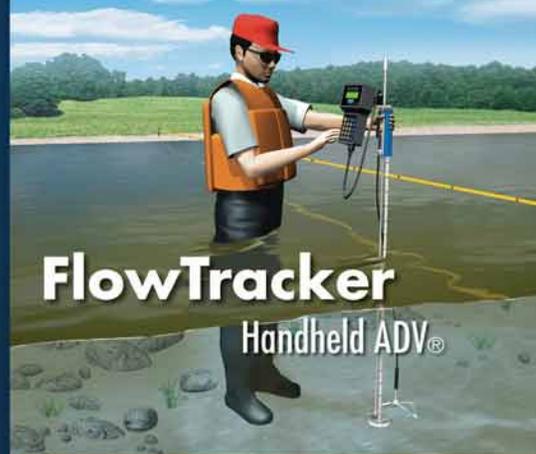
WE **MEASURE** FLOW

(in places you never thought possible)



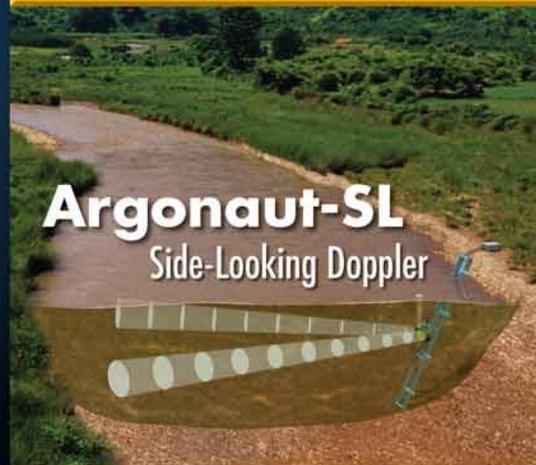
Argonaut-SW
Shallow Water Doppler®

Irrigation Canals



FlowTracker
Handheld ADV®

Natural Streams



Argonaut-SL
Side-Looking Doppler

Real-Time Discharge

A remarkably simple concept that you can afford.

- 💧 We understand what it's like out in the field, because that's where we got our start.
- 💧 We have made using precision-based acoustic Doppler technology easy to use in even the most rugged, and challenging conditions.
- 💧 More options, better customer support and more value for less money.



YSI incorporated

Sound Principles. Good Advice.

[+1.858.546.8327]

9940 Summers Ridge Road
San Diego, California, USA

For **FREE** technical notes, access to web-based training and product information, visit www.sontek.com.
Questions? E-mail: inquiry@sontek.com.

Inside This Issue

Departments

8 On the Ground

Survey Sez, by Gary Woodard

10 Government

- AZ county requires water supply before development approval
- Developments on Lake Powell-to-Utah pipeline
- Bill eases rules for Pecos water purchase
- TX/NM waste dump raises concerns
- Agencies form climate alliance
- Metropolitan joins Drop 2
- Impacts of Delta delivery cuts
- Feds rule on compensatory mitigation

10 HydroFacts

33 Business Directory and Classifieds

34 R&D

- DDT still found in fish
- Stationarity is dead
- Feds flood Grand Canyon
- Copper may inhibit EDCs
- Chromium removal tested
- Can Ogallala be recharged through playas?
- Augmentation options studied
- USGS releases GWFLOW

37 Company Line

- Helm change at Basin Water
- CH2M to divert Rio Grande water

38 In Print & Online

- Subsurface cleanup in the Southwest
- Will natural attenuation work?
- Help for watershed restoration
- Impact of fed rulings on SW waters
- Acceptable risk for drinking water
- Gold Rush still affects environment
- Online USGS map traces high flows
- National TMDL clearinghouse
- CA ecosystem/water blog
- Drinking water journal debuts
- EPA info for small water systems

42 Calendar

Endangered Species

The Endangered Species Act (ESA) is increasingly forcing water managers to maintain a quantity and quality of water suitable for certain species and their habitats. This raises a number of challenges, not the least of which is determining how much water a species or habitat actually needs. In many situations, conflicts between ESA and other laws means that the loss of some species or habitat is unavoidable, but ESA has provisions for that too, such as restoring habitat or creating it elsewhere. ESA's reach has extended far beyond species, however, in being a catalyst for developing water management plans for a wide variety of stakeholders, as illustrated in these feature articles.

16 ESA and Water Projects in the West—An Overview

Lisa M. McKnight

Mystified by the ESA definitions of “incidental take,” “harm,” or “habitat degradation”? Learn about ESA's regulatory requirements and agency/manager responsibilities. *Take* a minute to deconstruct ESA's legal terminology to keep your water project from *harm* and we promise we won't *adversely modify* or *jeopardize* your thinking.

18 Managing Multiple Species in the Klamath

Betsy Woodhouse and Dwight Russell

Endangered fish, commercial fisheries, tribal interests, agriculture, hydropower, and domestic water needs all compete for Klamath River water. Shifting priorities, drought, and fish kills have further muddied the remaining waters, leaving no clear solution.

20 Raising Endangered Fish in New Mexico

Grace M. Haggerty, Douglas Tave, Rolf Schmidt-Petersen, and John Stomp

To maintain populations, bridge water shortages, and breed the endangered Rio Grande silvery minnow for reintroduction into its historic range, two refugia have been constructed in the Middle Rio Grande.

22 The Edwards Aquifer: ESA-Driven Management

Todd Votteler

After decades of conflict over water from the Edwards Aquifer in Texas, a lawsuit concerning the *federal* Endangered Species Act brought *state* regulation to the aquifer, resulting in the establishment of a *regional* authority to regulate pumping. Other states may want to pay attention.

24 Weaving Disparate Threads: CWA and ESA

Richard Meyerhoff and Mark Murphy

The Endangered Species Act and the Clean Water Act of the 1970s both address environmental degradation, but their respective species-specific and waterbody-specific goals can create conflicts. How can the requirements of both be met?

26 The Lower Colorado River Multi-Species Conservation Program

John Swett, Laura Vecerina, and Terry Fulp

This large-scale program led by Reclamation involves dozens of stakeholders and aims to protect 26 species for 50 years along the Colorado River from Lake Mead to Mexico, while simultaneously meeting the demands of all other water users. How? Examples of early efforts illustrate the types of activities that will be involved.

28 How Much Water Do Stream-Dependent Species Need?

Andrew Hautzinger, John Hickey, and David Walker

How do we determine how much water—at what frequencies, intervals, and magnitudes—that threatened and endangered species need? Hydrologic models combined with known ecological requirements of native habitat allow impacts of reservoir releases and water management policies to be evaluated before any changes are implemented.

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



This publication is 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.