

Salt Lake City Meeting Successful

The **USCID Fifth International Conference on Irrigation and Drainage** was held November 3-6, 2009, in Salt Lake City, Utah. The Conference theme was *Irrigation and Drainage for Food, Energy, and the Environment*. Water professionals are facing new challenges related to increasing water scarcity, and
(continued on page 9)



Anne Castle, Assistant Secretary, Water and Science, USDI, gives closing keynote address.

Sacramento and Fort Collins Two Meetings in 2010

USCID Members and colleagues can look forward to two important conferences next year. Each will address a critical challenge facing the industry — scarcity of financing options and water shortages.

Upgrading Technology and Infrastructure in a Finance-Challenged Economy is the theme of the first USCID meeting, to be held March 23-26, in Sacramento, California. As droughts, climate change, aging infrastructure and increased scrutiny of water management practices drive the need for modernization, financing improvements has become difficult in a tight credit market.

Maintaining Food and Fiber Production in a Water-Challenged Environment, the theme of the fall meeting, will focus on **SCADA and Technology** as tools to increase production. Plan to be in Fort Collins, Colorado, on September 28 - October 1,
(continued on page 16)

Prez

Two interesting new articles cast light on the impending impacts of a changing climate on Western hydrology. The first, by a pair of hydrologists from the U.S. Forest Service, showed that the relatively modest changes observed in mean annual runoff in the Pacific Northwest are largely driven by changes in the driest 25 percent of years. Seventy-two percent of the 43 stations studied showed significant declines in streamflow during these low flow years, with half of the stations exceeding a 29 percent decline during low flow years in the period 1948 to 2006. Thus, while wet years are still relatively wet, dry years are becoming considerably drier. This finding raises major concerns for those irrigation systems that don't have access to multi-year storage.

The second article comes from a group of hydrologists in Taiwan and China. They looked at precipitation extremes as a function of global mean temperatures. They found that precipitation intensity increases about 23 percent for each degree C rise in global temperature. In the top 10 percent "bin" of temperatures, the intensity increased by 95 percent for each degree of increase. This finding confirms the widespread prediction that the frequency of extreme precipitation
(continued on page 16)

Variability within Irrigated Fields

by Byron Clark, *Davids Engineering, Davis, California*; and Charles M. Burt, *California Polytechnic State University, San Luis Obispo, California*

In agricultural production and research, it is common to represent fields as uniform areas. For example, fertilizers, soil amendments and other inputs have traditionally been applied uniformly (or as uniformly as possible), based on estimated needs for the field as a whole (or as an "average").

Of course, it is also recognized that fields are not truly uniform with respect to soil characteristics, uniformity of applied water, pest pressures, fertility needs, crop growth and yield, and other characteristics. With the emergence and refinement of variable rate application technology, many growers now attempt to maximize returns
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USCID

1616 Seventeenth Street, #483
Denver, CO 80202
Telephone: 303-628-5430
Fax: 303-628-5431
E-mail: stephens@uscid.org
Internet: www.uscid.org

The United States Committee on Irrigation and Drainage is a
National Committee of the International Commission on Irrigation and Drainage.



USCID

Mission Statement

The Mission of the United States Committee on Irrigation and Drainage is to foster sustainable, socially acceptable and environmentally responsible irrigation, drainage and flood control systems and practices for providing food, clothing and shelter to the people of the United States and the World.

USCID Newsletter and Membership

The *USCID Newsletter* is published in Winter, Spring and Fall for USCID Members. News items and technical articles of interest to the irrigation community are invited. Membership information is available on the USCID website.

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ICID News and Activities



Call for Papers Issued for Tehran Congress

The **21st International Congress on Irrigation and Drainage** will be held October 15-23, 2011, in Tehran, Iran. All paper proposals must be submitted to ICID through the National Committees; USCID will send instructions to USCID Members in early 2010.

The Congress Theme is *Water Productivity Towards Food Security*. The following topics will be addressed during the Congress:

Question 56: Water and Land Productivity Challenges

56.1: Water and Land Productivity: Concepts, Indices and Targets

56.2: Innovations, Technologies and Best Practices for Sustaining and/or Increasing Water and Land Productivity

56.3: Productivity of Low Quality Waters for Irrigation Uses

56.4: Improving Crop Water Productivity under Stressed Environment

56.5: Irrigation and Drainage Management Improvements

Question 57: Water Management in Rainfed Agriculture

57.1: Drainage and Flood Management in Rainfed Farming

57.2: Water Harvesting and Conservation

57.3: Supplementary Irrigation

57.4: Rainfed Farm Management

Symposium: Climate Change Impacts on Soil and Water Resources

Special Session: Modernization of Water Management Schemes

The **8th International Micro Irrigation Congress** will also be held in Tehran in conjunction with the ICID Congress. The theme is *Innovation in Technology and Management of Micro-Irrigation for Crop Production Enhancement*. Congress objectives are:

- To share experiences in the use of new technologies and best management practices in drip, micro-sprinkler and other localized irrigation systems.
- To review the status of use of micro irrigation for smallholders.
- To understand socio-economic and technological factors impeding expansion of drip and micro-sprinkler irrigation area.

Visit www.icid2011.org to download the Call for Papers for both the ICID 21st Congress and the 8th Micro Irrigation Congress. □

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Submersible Dredge Demonstration on CAP Canal Successful

by George J. Cairo, George Cairo Engineering, Inc.; and Ben Weinrib, Environmental Dredging Contractors, Inc.

Tornado Motion Technologies developed state-of-the-art technology collaboratively with George Cairo Engineering, Inc., for dredging sediment in concrete lined irrigation canals and reservoirs. Recently, Environmental Dredging Contractors and GCE completed a demonstration of this new technology utilizing the Submersible Dredge. The Sub-Dredge is unique in many ways, including the patented Eddy Pump technology, remote control operation, and the ability to perform dredging while the canal or reservoir is in service. The demonstration in Central Arizona was conducted on the Central Arizona Project's Central Main Turnout located near Eloy, Arizona. The test successfully removed about 2,500 cubic yards of sediment and deleterious materials with no damage to the unreinforced concrete liner, while producing minimal to no detectable turbidity.

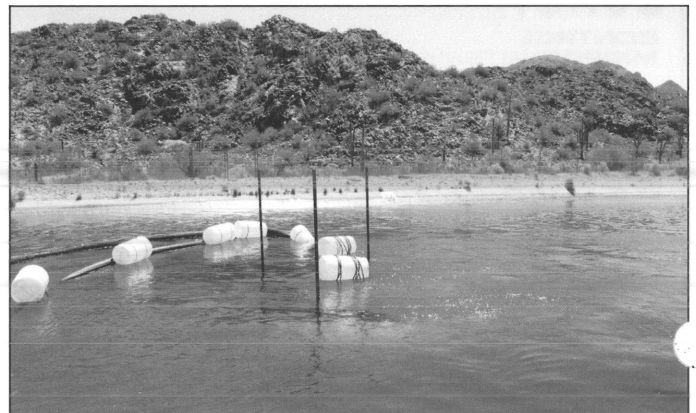
By utilizing the remotely operated Sub-Dredge, EDC was able to meet all the requirements of the CAP, which included an unmanned system, minimal turbidity, high percent solids collection, no damage to the unreinforced concrete liner, while the canal remained in service. The Sub-Dredge operates with underwater cameras and a GPS integrated RTK positioning system which allows the dredge to operate in non-visible conditions. The minimal turbidity and high percent solids is achieved by the patented EDDY Pump design, which operates on different hydrodynamic principles than a



conventional centrifugal pump, allowing it to have a suction force approximately three to four times greater than the leading centrifugal. This, in turn, allowed the Sub-Dredge to handle higher percent solids with a turbidity level at the head and 100 feet downstream that only increased 1.5 NTUs during operation. Finally, with the PLC controlled ground sensing technology, the Sub-Dredge can surgically remove all sediment while having no contact with the liner.

The demonstration proved to be a great success, as EDC was able to remove

approximately 100-200 cubic yards per hour and is now under contract with CAP to remove sediment from their large conveyance canal system. Further technological advancements are currently underway, to make the Sub-Dredge an even more efficient solution to canal dredging, including a new lighter unit for use in earthen irrigation canals and reservoirs. □



[SOUND PRINCIPLE NO. 31]

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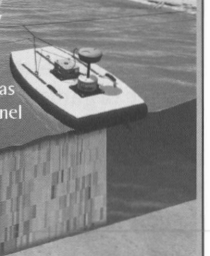


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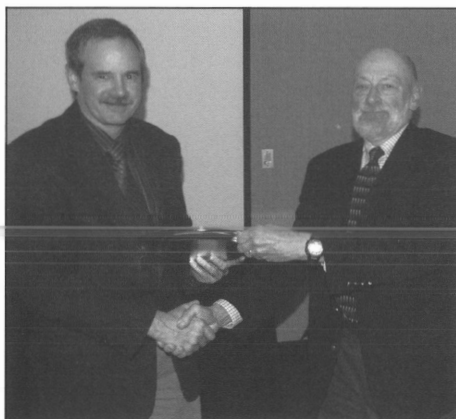


Clemmens, Dedrick Honored by USCID

Two long-time employees of the Agricultural Research Service, USDA, were recently honored by USCID. The awards were presented on November 4 during the Fifth International Conference on Irrigation and Drainage in Salt Lake City.

Albert J. Clemmens received the USCID *Merriam Improved Irrigation Award*. The Award was endowed by the late John L. Merriam, Professor Emeritus, California Polytechnic State University, and recognizes those who facilitate the worldwide distribution of information and applications concerning the value of flexible irrigation water supply and distribution systems and their utilization, especially to facilitate surface irrigation methods and upgraded on-farm water management. Clemmens is the Center Director for the USDA Arid Land Agricultural Research Center in Maricopa, Arizona. He has more than 30 years of extensive experience in all aspects of water conservation in irrigated agriculture through research, technology transfer and consultancies. Clemmens is best known for his research on improving surface irrigation through simulation modeling and design, software for design and calibration of flumes and weirs for flow measurement, methods for improving the operation of irrigation water delivery systems to provide better service to users through such things as canal automation, and the application of statistics to describing irrigation uniformity at field and district scales. In addition, his experience includes multi-disciplinary evaluations of irrigation project performance, district water balances, development and application of water conservation practices and policies, and criteria for water user organizations. Much of his research has focused on the use of computer technology for design and operation of irrigation systems. He has more than 280 professional publications.

Clemmens served on the USCID Board of Directors from 1999 through 2004. He was selected to give the prestigious N.D. Gulhati Memorial Lecture for



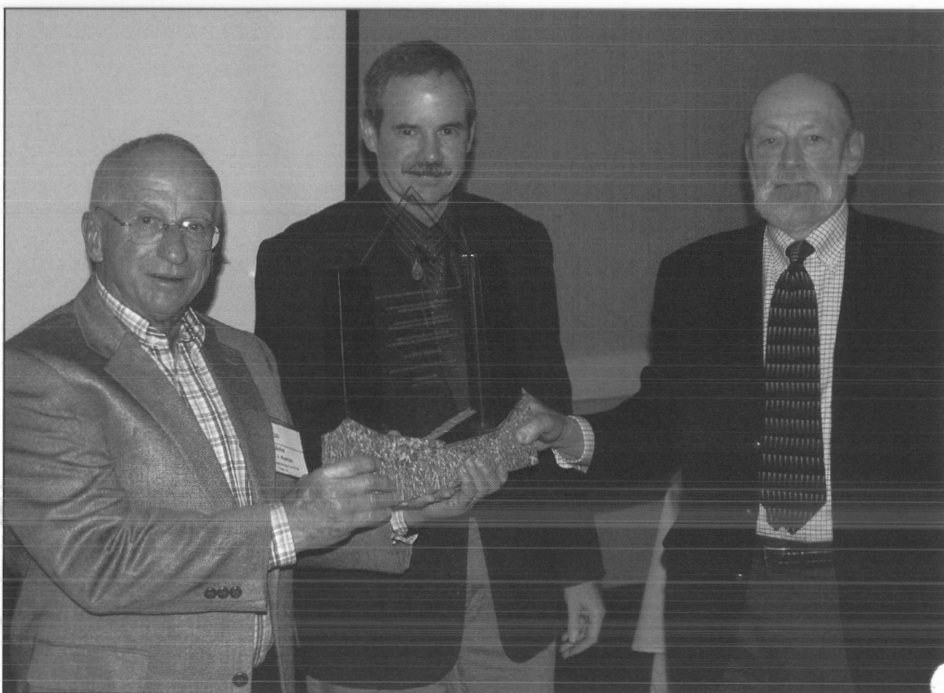
Mark Svendsen (right) presents Merriam Award to Bert Clemmens.

International Cooperation in Irrigation and Drainage during the 20th ICID Congress in Beijing, China, in 2005. He was a founding member of the American Academy of Water Resources Engineers and the Environmental and Water Resources Institute of ASCE. He has been active in the technical committees of ASCE and other societies, and has received several significant awards, including the 2005 ASCE Royce J. Tipton career achievement award for irrigation and drainage and the 2006 ASABE Award for Advancement of Surface Irrigation. Within Arizona, he is a member of the Governor's Advisory Committee on Agricultural Best

Management Practices. He is an alumnus of Arizona State University, where he received his bachelor's and master's in civil engineering and his doctorate in industrial engineering.

Reflecting on receiving the Merriam Improved Irrigation Award, Clemmens said, "John Merriam was a champion for improving irrigation systems to help farmers, particularly for providing flexibility in water delivery. He inspired me early in my career and I have not forgotten his message to consider the farmers first, when recommending irrigation system improvements. It is an honor to receive an award set up in recognition of John."

The USCID *Service to the Profession Award* was given posthumously to **Allen R. Dedrick**, who died in a boating accident in January 2009. Dedrick was known nationally and internationally for his scientific leadership in the area of irrigation water management, including level-basin technology and canal system monitoring. He spent 25 years at the U.S. Water Conservation Laboratory in Phoenix, Arizona, serving as Director from 1990 until 1998. From 1998 until he retired in 2005, he served as Deputy Administrator for National Resources and Sustainable Agricultural Systems



John Replogle (left) and Bert Clemmens receive the USCID Service to the Profession Award from Mark Svendsen on behalf of Al Dedrick.

for the ARS National Program Staff in Beltsville, Maryland.

Dedrick served as a consultant for irrigation projects in Sudan and Morocco, and was the U.S. representative to the International Standards Organization subcommittee on standards for irrigation and drainage equipment for more than 28 years. Named a Fellow in the American Society of Agricultural and Biological Engineers in 1999, Dedrick chaired the ASABE Soil and Water Committee on Standards. He was active in USCID for many years, and served two terms on the USCID Board of Directors. He received bachelor's and master's degrees from the University of Nebraska, and a doctorate from Utah State University. □

Iowa State Student Receives Scholarship

Laura Christianson, a Ph.D. student at Iowa State University in Ames, Iowa, received the 2009 *USCID/ Summers Engineering Scholarship*. The \$1,000 scholarship was presented during the recent Fifth International Conference in Salt Lake City.

Christianson received a bachelor's degree from Oklahoma State University and a master's degree from Kansas State University. Her doctoral work (Agricultural and Biosystems Engineering, with a co-major in Sustainable Agriculture) involves the use of woodchip bioreactors for nitrate removal from agricultural drainage. She is working with landowners and commodity/watershed groups to design, install and monitor bioreactors across Iowa and has also worked with the Natural Resources Conservation Service, USDA, to develop an interim standard for this emerging technology.



Scholarship winner Laura Christianson is congratulated by USCID President Mark Svendsen.

She received a Fulbright Fellowship to study the feasibility of woodchip bioreactors for agricultural drainage in New Zealand. She has shared her research with international scientists at conferences in Ukraine (2006) and Israel (2009).

Christianson's career goal is to serve on the agricultural engineering faculty at a major land grant institution, teaching and conducting research that will assist land owners and policymakers in implementing sustainable environmental practices in the United States and internationally. "With our pressing global water issues, today is an exciting time to be working in the agricultural field, and I eagerly anticipate my future role," she said. USCID Member **Ramesh Kanwar**, Chair of the Agricultural and Biosystems Engineering Department at Iowa State University, serves on her Ph.D. committee. "Ms. Christianson is an outstanding young graduate student and has a sincere desire to understand complex water issues on a global scale," he said. Christianson gave a poster presentation of her research in Salt Lake City.

The USCID/Summers Engineering Scholarship was endowed by a generous contribution from the late Joseph B. Summers, Summers Engineering Company. □

Previous Recipients, USCID Awards

USCID Merriam Improved Irrigation Award

Joseph B. Summers, 1999
E. Gordon Kruse, 2001
John A. Replogle, 2002
Grant G. Davids, 2003
Jesse Silva, 2004
Charles M. Burt, 2005
Arnold K. Dimmitt, 2006
Marshall J. English, 2008

USCID Service to the Profession Award

Marvin E. Jensen, 2000
Maurice L. Albertson, 2001
Richard G. Allen, 2002
Jack Keller, 2003
Walter J. Ochs, 2004
Darell D. Zimbelman, 2005
John W. Keys III, 2006
Larry D. Stephens, 2007
Kenneth and Ruth Wright, 2008

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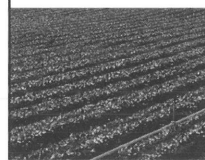
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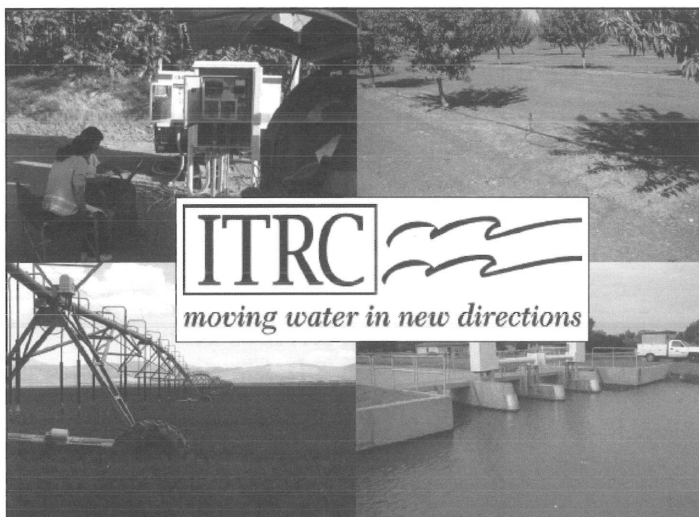
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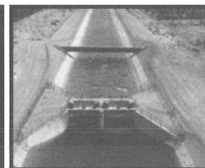
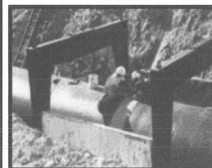
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Salt Lake City (continued)

competing uses of water. These uses include water for food, energy and the environment. This Conference provided a forum for water professionals, managers, policymakers and others to discuss their experiences with balancing water demands. More than 120 people from nine countries attended the Conference. Attendees enjoyed the interesting and diverse presentations.

On Tuesday morning, November 3, 25 people participated in a VIP tour of the Jordanelle Dam and Hydroelectric Plant, conducted by the Central Utah Water Conservancy District. The participants enjoyed walking through the new state-of-the-art hydropower production facilities and control facilities. After the visit to Jordanelle, attendees were able to participate in hands-on flow measurement, as **SonTek/YSI Incorporated** demonstrated some of their real-time flow measurement capabilities.

Tuesday's luncheon speaker was ICID President Chandra Madramootoo, McGill University, Montreal, Canada. The opening plenary session began Tuesday afternoon with outstanding presentations by Michael Styler, Executive Director of the Utah Department of Natural Resources; Kerry McCalman, Manager of the Bureau of Reclamation's Power Resources Office; Gene Shawcroft, Assistant General Manager of the Central Utah Water Conservancy District; **James E. Ayars**, Agricultural Research Service; **Franklin E. Dimick**, Dimick Water Resources Engineering; and **Charles M. Burt**, California Polytechnic State University. The day was capped off by a Meet the Exhibitors session and a Welcome Reception/Exhibition.

The morning of Wednesday, November 4, included two concurrent sessions, on Applications of Technology and Environment and Drainage. The afternoon sessions continued the theme of Applications of Technology and added a focus on Water and Energy Efficiency. The presentations provided an excellent mix of theory and application, with good case studies.

The dinner speaker Wednesday evening was **Tag I. Flint**, General Manager of

the Weber Basin Water Conservancy District. He gave an overview of issues facing his water district and the need for avoiding extreme positions while approaching problems.

A Poster Session was held Thursday, beginning during the continental breakfast and continuing during the coffee breaks and lunch.

Thursday morning's oral presentations focused on Water Policy and case studies. The luncheon speaker was USCID President **Mark Svendsen**, who discussed the Quality of Water Governance in the Middle East. The afternoon session included a panel discussion moderated by MaryLou Smith of Aqua Engineering. The closing Keynote Speakers were John Mann, Utah's Assistant State Engineer; and Anne Castle, Assistant Secretary, Water and Science, U.S. Department of the Interior.

On Friday, November 6, participants enjoyed an all-day tour of northern Utah, including the Utah State University water lab and Campbell Scientific, manufacturer of instrumentation, data loggers and data acquisition systems.

The Conference brought together water resource professionals from the United States and their counterparts from other countries involved in irrigation, drainage and water resources planning. □

Missouri River Basin Report

Rain and snow throughout much of the Missouri River basin in October produced 136 percent of normal runoff, according to the Corps of Engineers Northwestern Division.

"The main stem reservoirs have nearly recovered from a decade of drought. Two of the three biggest reservoirs are nearly full; only Fort Peck remains low," said Jody Farhat, Chief of the Water Management office. "Because Fort Peck is the most upstream reservoir, our only option for bringing it back into balance with the others is to maintain the lowest possible releases in the coming months." □

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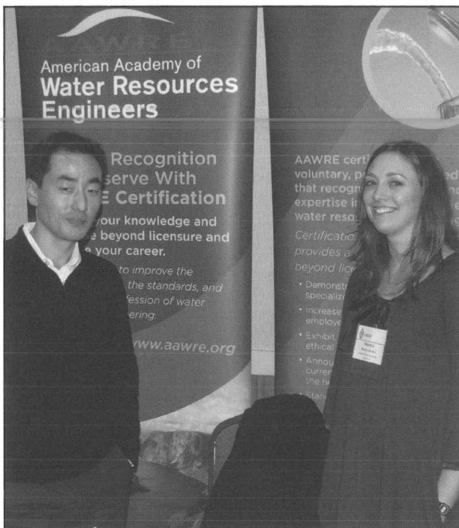
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- » CDM
- » Control Microsystems, Inc.
- » Davids Engineering, Inc.

The current forecast for runoff this year is 33.7 acre feet, 136 percent of average. The six main stem power plants generated 608 million kWh in October, only 66 percent of normal because of reduced releases from the dams.

View daily and forecasted reservoir and river information at www.nwd-mr.usace.army.mil/rcc. □

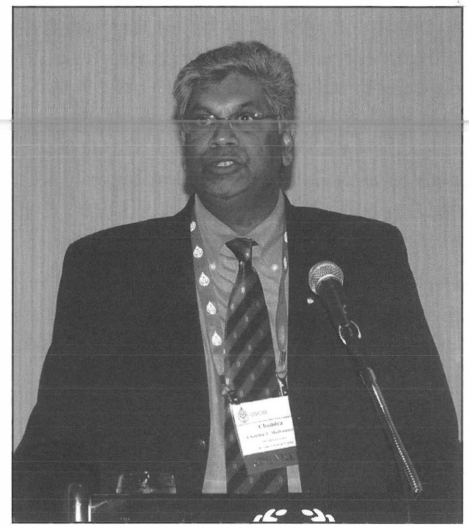
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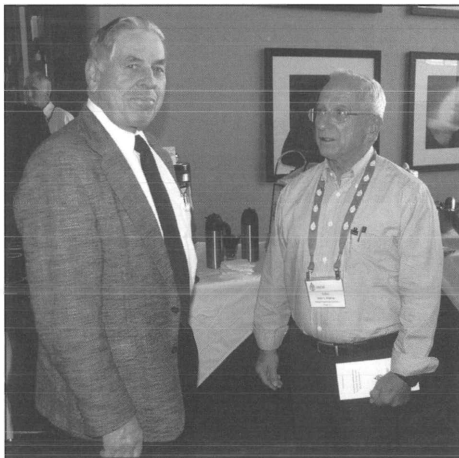
Frank Kim, American Academy of Water Resources Engineers, and Marilyn Surakus, Rubicon Systems America, Inc.



Weston Winegar, Sandy, Utah, represents Sutron Corporation.



ICID President Chandra Madramootoo gives lunch Keynote Presentation.



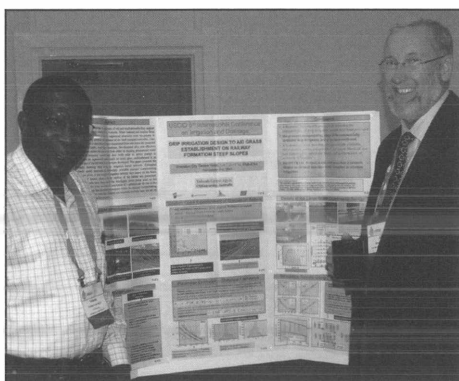
Frank Dimick and John Replogle.



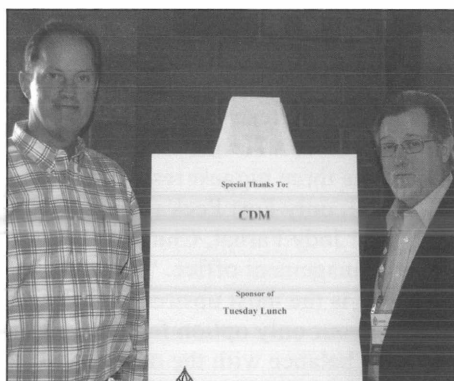
Emeka Nwafor, Shayne Young and Lynn Hansen enjoy Campbell Scientific factory tour.



Mark Crookston, Northern Colorado Water District; and Fred Holloway, Stevens Water Monitoring Systems, Inc.



Yeboah Gyasi-Agyei discusses his Poster Presentation with Jim Ayars.

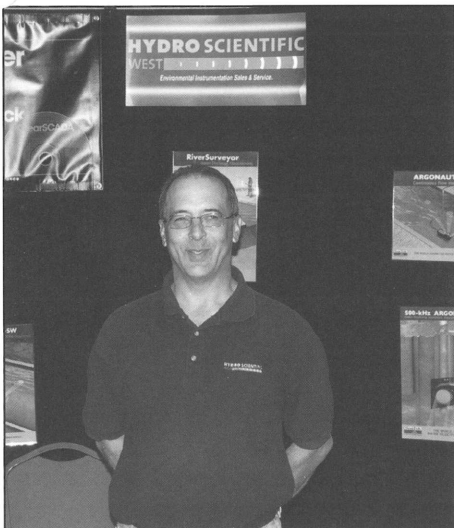


CDM representatives David Ogden and Rick Gold sponsor the Tuesday Lunch.

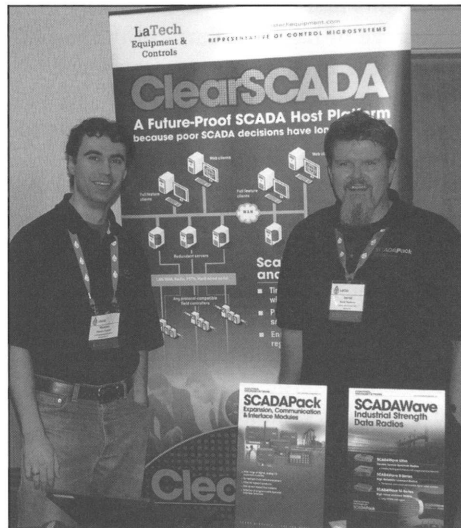


Gary Merkley, Alejandro Paolini, Daniel Howes and John Replogle.

Salt Lake City — November 3-6, 2009



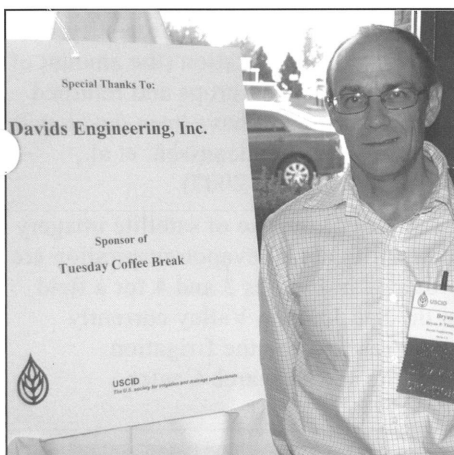
Ron Newman, HydroScientific West



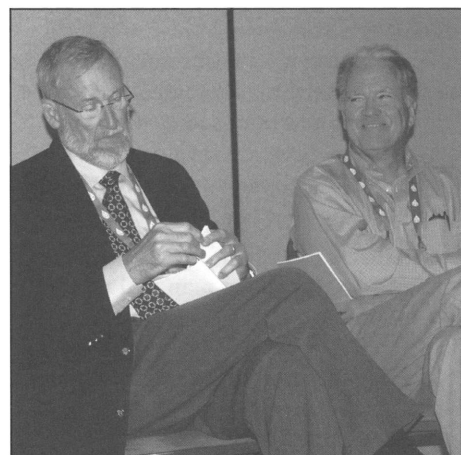
Corporate Member Control Microsystems is represented by Shanene Pezeshki and David Southern.



Wednesday dinner speaker Tage Flint, Weber Basin Water Conservancy District.



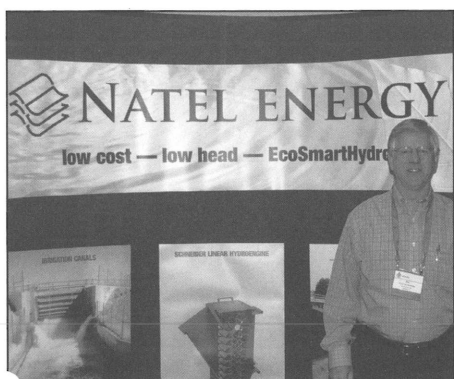
Bryan Thoreson, Davids Engineering, Inc., sponsor of the Tuesday coffee break.



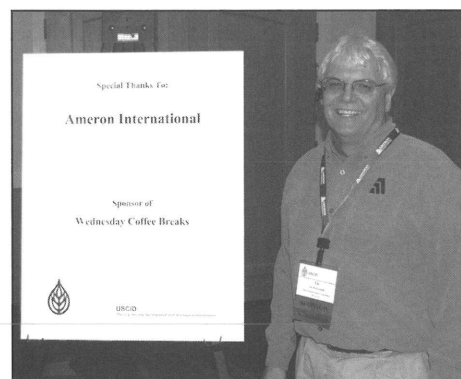
Jim Ayars, USDA-ARS, and Charles Burt, Cal Poly, Thursday afternoon panel members.



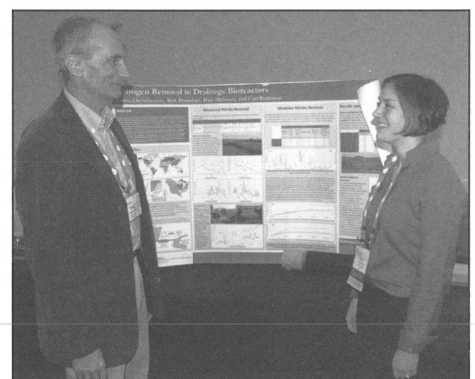
Jim Heintz and Gary Rossi de Guevara, Advanced Drainage Systems.



Joe Blankenship represents Corporate Member Natel Energy.



Vic DeGrande and Ameron International sponsors the Wednesday Coffee Breaks.



Doug Toews, USDA-NRCS, meets Laura Christianson, winner of the 2009 USCID/Summers Engineering Scholarship.

Variability (continued)

by “prescribing” variable amounts of inputs based on observations of crop vigor, soil characteristics or other indicators.

This technical note is intended to examine how we are using new sensing technology to improve the accuracy of field-scale irrigation/agronomy research.

We have decades of research from small, replicated crop plots. This traditional research has been essential for helping improve productivity in irrigated agriculture. But there are also reasons to conduct research on full-sized fields that are farmed by real farmers. These reasons include:

- Farmers tend to give greater credibility to research conducted on a large scale.
- The conditions of small research plots may not accurately reflect the constraints encountered in commercial fields.
- Researchers are usually not farmers. Control plot yields may be very different in research plots than on good commercial farms.
- Boundary conditions may be significant on small plots.
- It is difficult to obtain true costs using small research plots.

One particular challenge for laying out control and research plots on full-sized

fields is that there is always inherent variability throughout the field. Therefore, yield differences between treatments can sometimes be more indicative of baseline variability than of differences in response to treatments. One particular challenge is in “normalizing” the yields of all blocks to eliminate these inherent baseline differences — especially if historical yield data is not available by block.

In recent years, improvements in sensor technology have increased researchers’ ability to “see” the variability between and throughout fields, and therefore better utilize large fields for research. For example, ground-based or aerial remote sensors provide the means to quantify spatial variations of important drivers and indicators of crop water use, crop growth and ultimately yield. The use of ground-based induction sensors to measure bulk soil conductivity is a well established technology that allows for mapping of soil texture, soil water content and soil salinity within a field. Bulk conductivity measurements are calibrated based on strategically located soil samples and are used to develop relationships between bulk soil conductivity and one or more soil characteristics (Lesch, et al., 2005).

Examples of the use of the EM38 bulk conductivity sensor to map soil texture and salinity are provided for the same field in Figures 1 and 2, respectively. In Figure 1, a measure of the relative water

content of a soil at saturation (“saturation percentage”) is shown for a 160-acre field. Saturation percentage can be used to estimate soil texture, cation exchange capacity, and soil water holding capacity (Peacock and Christensen, 2000). In Figure 2, average soil salinity to a depth of four feet is shown. From inspection of the figures, it can be seen that areas with the greatest saturation percentage (heavier soils) do not necessarily exhibit the greatest salinity, possibly due to the presence of tile drainage.

As another example, the use of multispectral satellite imagery, such as Landsat, to monitor vegetation growth is also a well established technology that has been used in agricultural and natural research environments for decades. Often, an indicator of photosynthetic activity such as the Normalized Difference Vegetation Index is used to quantify variability in vegetation density and health. Additionally, during the last 10 to 20 years, methods to quantify actual evapotranspiration (the amount of water consumed by crops and returned to the atmosphere) have been developed and validated (Bastiaanssen, et al., 2005; Allen, et al., 2007).

Examples of the use of satellite imagery to quantify actual evapotranspiration are provided in Figures 3 and 4 for a field in the San Joaquin Valley currently under research by the Irrigation Training and Research Center.

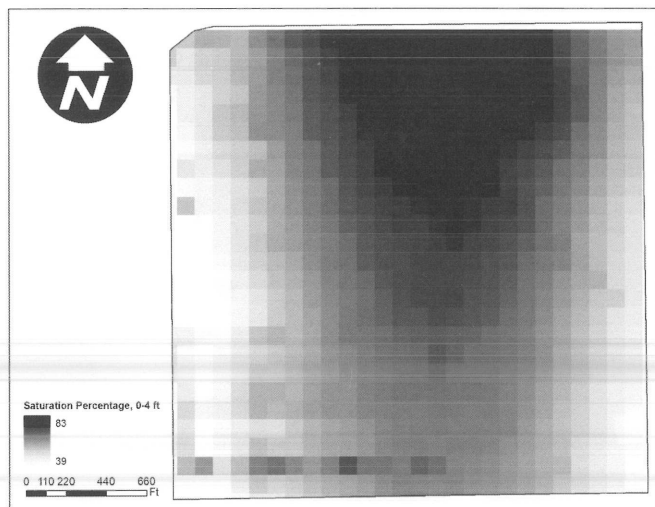


Figure 1. Saturation Percentage Estimated Using EM38 Bulk Soil Conductivity, 4/15/02.

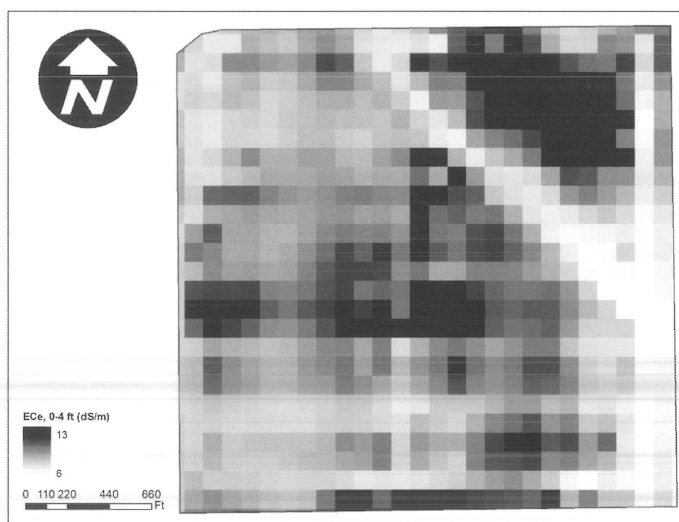


Figure 2. Soil Salinity Estimated Using EM38 Bulk Soil Conductivity, 4/15/02.

Bastiaanssen, W.G.M., E.J.M. Noordman, H. Pelgrum, G. Davids, and R.G. Allen. 2005. SEBAL Model with Remotely Sensed Data to Improve Water Resources Management Under Actual Field Conditions. *Journal of Irrigation and Drainage Engineering* 131(1): 85-93.

Lesch, S.M., D.L. Corwin, and D.A. Robinson. 2005. Apparent Soil Electrical Conductivity Mapping as an Agricultural Management Tool in Arid Zone Soils. *Computers and Electronics in Agriculture* 46(1-3): 351-378.

Peacock, W. and L.P. Christensen. 2000. Interpretation of Soil and Water Analysis (PDF) in: *Raisin Production Manual*. University of California Division of Agricultural and Natural Resources Publication 3393, Oakland, CA. pp. 115-120.



Figure 3. ET_a on August 2, 2008, for the ITRC study field. From the Surface Energy Balance Algorithm for Land (SEBAL[®]) and LandSat Imagery.

Figures 3 and 4 show the estimated ET on a pistachio field near Lost Hills, California, before (Figure 3) and after (Figure 4) ITRC applied a kaolin spray on the leaves in the four treatment blocks (T2, T4, T6, and T8). Without the information of the baseline variability, conclusions regarding the effect of the kaolin spray would be incorrect. The types of differences shown in the figures provide valuable information that can assist in deciding where samples should be taken, how results from different blocks can be normalized to eliminate inherent baseline differences, and how blocks should be laid out (or what areas should be avoided). Large scale remote sensing-based estimates of ET can provide a much more accurate picture of

treatment effects than limited soil moisture measurements in small areas.

From a practical application for research and regular field irrigation, Figures 3 and 4 show the wide variability of just one variable — ET_a — within the field. This variability points out the danger of relying on just one or two sensors in a field to adequately portray ET, soil moisture, plant stress or any other indicator of plant/water status.

References

Allen, R.G., M. Tasumi, A. Morse, R. Trezza, J.L. Wright, W.G.M. Bastiaanssen, W. Kramber, I. Lorite, and C.W. Robison. 2007. Satellite-Based Energy Balance for Mapping Evapotranspiration with Internalized Calibration (METRIC) — Applications.

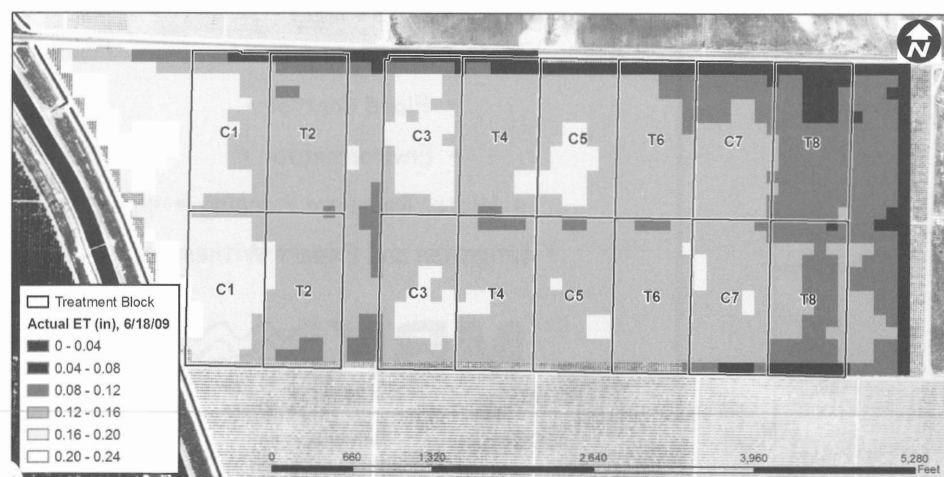


Figure 4. ET_a on June 18, 2009, for the ITRC study field. From the Surface Energy Balance Algorithm for Land (SEBAL[®]) and LandSat Imagery.

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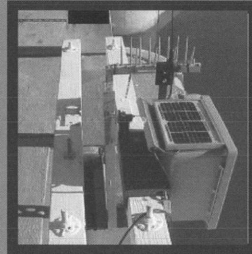
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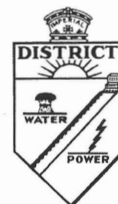


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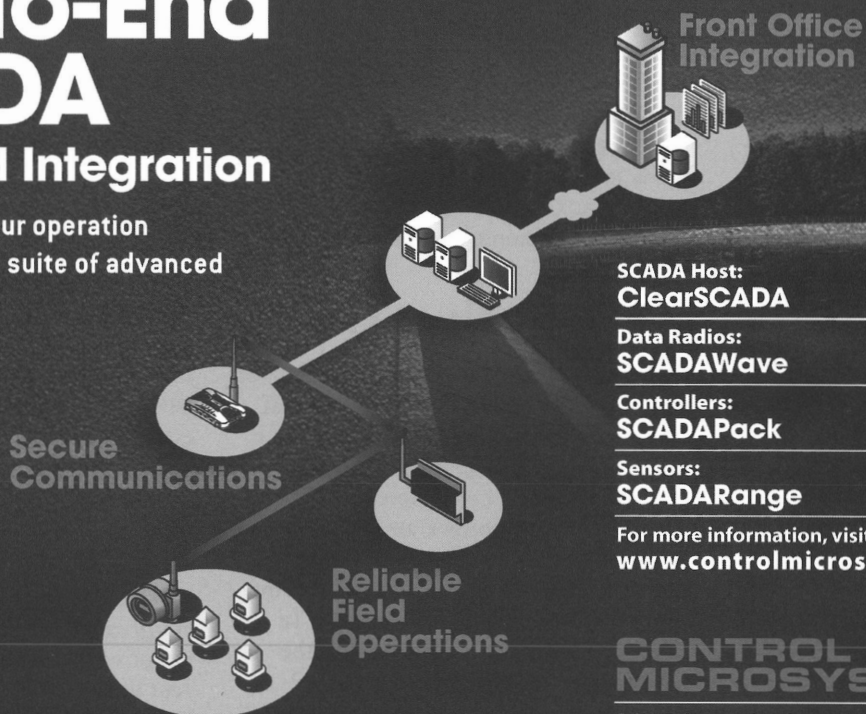


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Prez (continued)

events will increase as the planet heats.

As many of you know, several years ago we introduced a new non-voting position to the USCID Board — Board Advisor — to give us access to skills and perspectives which we might otherwise lack. **Dennis Wichelns** has served in that capacity for the past several years, regularly attending meetings and generously sharing his wise council. Dennis has recently taken a new position with the International Water Management Institute in Sri Lanka, but we asked him to continue to collaborate with us, from a distance, and he graciously agreed. At the same time, we asked **Steve Macaulay** to take up an advisory role with the Board, and are delighted that he has also agreed.

For the past two years we have also benefitted from the advice of an Advisor from the commercial side. This second advisory position was envisioned as one that would pass, every year or so, to a different representative from one of our Corporate Members. **Chris Ward** of **SonTek/YSI Incorporated** has provided sound advice from an industry perspective for the past two years. Chris has stepped down, and we invited **Gary Rossi de Guevara** of **Advanced Drainage Systems** to take on this role, and he, too, generously accepted. We are very pleased to welcome both Steve and Gary to our Board meetings, beginning with Albuquerque next May.

Other initiatives during the past several years are also bearing fruit. We have now completed an update of our Bylaws, and these will be posted soon on the website. The website has also been updated and hosts an increasing volume of content and its own search engine. We now have a “members only” section, which includes a searchable directory of members. We have also completed a *USCID Operations Manual*, which documents our business practices and routines, from record maintenance to conference organization. This will be a great help in maintaining organizational continuity and orienting incoming board members and staff going forward.

Finally, the very good news that we have just concluded a renewable annual

contract with the **Bureau of Reclamation** to provide them with a variety of services. This will strengthen our long-standing relationship with the Bureau, while providing a valuable source of revenue to USCID. Larry has been working on this for some time and deserves a large measure of thanks for bringing it to fruition.

Mark Svendsen

President, USCID □

2010 Meetings (continued)

for this important Conference.

Both Conferences will follow the traditional format that begins with a morning field tour, followed by two and a half days of technical sessions, and concluding with a day-long field tour. An Exhibition will be a highlight of each meeting, and receptions, lunches and dinners will provide additional networking opportunities.

The Preliminary Program for the Sacramento Conference is online now (www.uscid.org/10idconf.html.) The final program, registration and exhibitor forms, and field tour and hotel information will be online in December. **Bryan P. Thoreson**, Davids Engineering, Inc., is the General Chairman.

A Call for Papers has been issued for the Fort Collins Conference; the deadline for abstracts is January 15. The Call, including topics, is online at www.uscid.org/10coloconf.html.

Gerald A. Gibbens, MWH, chairs the Conference planning committee. □

CSU Receives Grant

Colorado State University has received a \$1.7 million grant from the Corps of Engineers to fund the construction of a levee testing facility. The open-air simulator will be constructed next spring at the Foothills Campus. The hope is that the tests will advance understanding of the effects of extreme wave conditions on levee erosion. In addition to funding construction, the Corps grant will help maintain a 10- to 15-person team that will work on the project for the next year. □

George Henry Hargreaves, 1916-2009

George Hargreaves passed away on September 5, 2009, at the age of 93. He was born in Chico, California, on April 2, 1916. He spent his high school years in Ukiah, near the family farm in Redwood Valley, California. He earned degrees from the University of California, Berkeley, and the University of Wyoming.

During WWII, he was a naval officer in charge of activities related to mine warfare and sonar research. After the war, he worked in soils, irrigated agriculture and water resources development for the Bureau of Reclamation, Agency for International Development and the Natural Resources Division of the Inter-American Geodetic Survey. During these years, he worked in Greece, Costa Rica, Peru, Haiti, Philippines, Brazil, Colombia and the Panama Canal Zone.

After retiring from government service in 1970, he joined Utah State University as an irrigation research engineer, and in 1986, he was named research professor emeritus. He authored *World Water for Agriculture*, 1977; served as lead author for *Irrigation Fundamentals*, 1998 (*Fundamentos Del Riego*, 2000); and wrote numerous technical papers published in professional journals.

In 1997, he received the prestigious Royce J. Tipton award from the American Society of Civil Engineers. The “Hargreaves Formula” for estimating evapotranspiration is used worldwide. He was a Life Member of USCID and participated in many ICID and USCID meetings.

Sara Hargreaves, George’s wife of nearly 50 years, passed away on October 10, 2009. She attended many ICID conferences with George. They are survived by four children, including USCID Member George Leo Hargreaves. Memorial contributions in honor of George H. Hargreaves may be sent to the Utah State University College of Engineering Irrigation Program, www.usu.edu/giving. □

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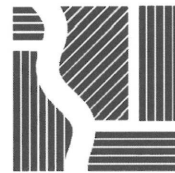
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News of Members

The **Coachella Valley Water District** has dedicated the Thomas E. Levy Groundwater Replenishment Facility. The facility in La Quinta, previously known as Dike 4, was officially named on October 21. Levy, the District's former general manager, was instrumental in negotiating the Quantification Settlement Agreement of 2003.

Wayne Dahl is now affiliated with Dahl Consultants, in Cameron Park, California.

Kevin L. King is now affiliated with Solano Irrigation District, Vacaville, California.

Mark Niblack, formerly with the Bureau of Reclamation, is now a self-employed engineering consultant.

Harry O. Starkey, General Manager of the Berrenda Mesa Water District, has advised that the District has consolidated its administrative office with the O&M office in Lost Hills, California, effective November 30, 2009.

Willem F. Vlotman is now Assistant Director, Basin Plan Modelling, with the Murray-Darling Basin Authority in Canberra, Australia.

Dennis Wichelns is now with the International Water Management Institute in Colombo, Sri Lanka.□

New Features Enhance Website

A **Members Only** section of the USCID website is now online. Visit www.uscid.org to access a Membership Directory for Individual Members, update your contact information, pay dues, and download 2009 *USCID Newsletters*. A user name and password were sent to Members in a recent e-mail; you'll receive a membership card with the 2010 user name and password with your dues renewal notice.

Another recent addition to the public section of the USCID website is an excellent search engine; link to **Search This Site** to try this feature.□

Satellite Mapping Program Cited

Mapping Evapotranspiration from Satellites, a joint effort of the Idaho Department of Water Resources and the University of Idaho, is a 2009 Innovations in American Government Awards winner. The Innovations Award is an annual competition administered by the Ash Institute for Democratic Governance and Innovation at Harvard University's Kennedy School of Government. The program provides accurate and repeatable ET data and maps for water resources management in Idaho.

University of Idaho professor **Richard G. Allen** developed the extensive computer algorithms needed to transform the satellite data into ET maps. The program uses Landsat satellite images to compute and map ET because it is the only operational satellite with a high enough resolution to map ET at the field level, and because it has the required thermal sensor. Landsat is jointly run by NASA and the USGS.□

Loan Reports

Water Current, Summer 2009. University of Nebraska-Lincoln Water Center.

Colorado Water, May/June and January/February 2009. Water Center of Colorado State University.

Resources, Summer and Fall 2009. Resources for the Future.

River Report, Summer 2009. Colorado River Project.□

Necrology

William O. Pruitt, Davis, California, died in January. He retired from the University of California, Davis, Department of Land, Air, and Water Resources, in 1986. He had been a Member of USCID since 1978.

New Members

Individual Members

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University of Nevada, Reno
2933 Hot Springs Road
Minden, NV 89423

Gary Egan
Civil Engineer
Bureau of Reclamation
7745 Hickory Avenue
Orangevale, CA 95662
Office: 916-978-5220
E-mail: gegan@usbr.gov

Hamid J. Farahani
Associate Professor
Clemson University
64 Research Road
Blackville, SC 29817
Office: 803-284-3343, x229
E-mail: hfaraha@clemson.edu

Hatim Geli
Utah State University
1 Aggie Village, #G
Logan, UT 84341
Office: 435-797-1041
E-mail: hatim.geli@aggiemail.usu.edu

Kristoph-Dietrich Kinzli
Colorado State University
1372 Campus Delivery
Fort Collins, CO 80523
Office: 970-491-1141
E-mail: kinzli@engr.colostate.edu

Thomas James Ostrowski
California Polytechnic State University
1517 Davis Place Road
Mount Shasta, CA 96067
E-mail: tostrows@calpoly.edu

Saravanan Sivarajan
Utah State University
839 North 700 East, #5
Logan, UT 84321
E-mail: trysaru@gmail.com

Yujin Wen
Texas A&M University
200 Charles Haltom Avenue, #1D
College Station, TX 77840
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USCID Notes

by Larry D. Stephens, Executive Vice President

Sadly, I must note that long-time USCID Member **George H.**

Hargreaves and his wife Sara passed away recently. George was an active member of USCID, attending a number of our conferences and participating in ICID meetings as well. Condolences to Leo and Mark Hargreaves in their loss. George, well known among irrigation professionals around the world, will certainly be missed!

Upgrades to the USCID website continue, including a search engine. Most significant is a Members Only section, which includes some new features, most notably a Directory of Members. The online Directory will be updated frequently to reflect changes in contact information, as well as new members. The Directory has two primary search items — surname or organization, with state as a secondary search field. I recently sent an e-mail to Members with the 2009 username and password. The 2010 username and password will be on the membership card you'll receive when it is time to renew your dues for 2010. And, feel free to send me an e-mail if you want to enter the Members Only section but have lost the login information. Your suggestions for additional website features are also invited — send an e-mail with your suggestions.

Congratulations to **Bert Clemmens** who received the 2009 USCID/Merriam Improved Irrigation Award. Bert was recognized for his outstanding career with the Agricultural Research Service;

and for his support of USCID. He served on the Board of Directors for six years and has been a leader in developing the format used for our Water Management Conferences. Bert received the award from President **Mark Svendsen** during the USCID Conference last month. Bert also graciously accepted the 2009 Service to the Profession Award, presented posthumously to **Allen R. Dedrick** in recognition of his ARS career.

Thanks to the leadership provided by **Steve Knell** and **Reed Murray**, the 2009 USCID conferences, in Reno and Salt Lake City, were technical successes. Thanks, especially, goes to ICID President Chandra Madramootoo, who made the opening Keynote presentation in Salt Lake City.

During the past several years, the USCID Board of Directors has benefitted from the contributions of Board Advisors. I am confident that our new Advisors, **Steve Macaulay** and **Gary Rossi de Guevara**, will provide the excellent guidance we've enjoyed from **Mark Svendsen**, **Dennis Wichelns** and **Chris Ward**. Steve, formerly Chief Deputy Director of the California Department of Water Resources, is now a Vice President of West Yost, Davis, California. Gary is associated with **Advanced Drainage Systems**, and has exhibited at nearly every USCID Conference for several years. Welcome Steve and Gary!

I encourage you to participate in our 2010 Conferences. USCID Board Member **Bryan Thoreson** is chairing the Planning Committee for the Sacramento Conference in March.

USCID Meetings

March 23-26, 2010, USCID Water Management Conference, Sacramento, California. Theme: *Upgrading Technology and Infrastructure in a Finance-Challenged Economy*.

September 28 - October 1, 2010, USCID Water Management Conference. Theme: *Maintaining Food and Fiber Production in a Water-Challenged Environment: SCADA and Technology for Improved Production*.

ICID Meetings

October 10-16, 2010, Yogyakarta, Indonesia, 61st IEC Meeting and 6th Asian Regional Conference.

October 15-23, 2011, 62nd IEC Meeting and 21st Congress, Tehran, Iran.

2011, 3rd African Regional Conference, Mali.

May 16-20, 2011, 24th European Regional Conference, Groningen, The Netherlands.

Check the online Preliminary Program and see that an outstanding technical program has been organized. Then, next fall, **Jerry Gibbens** will chair the Planning Committee for the Conference to be held in Fort Collins. The Call for Papers for the Fort Collins Conference is now online. Note that this will be third USCID Conference that will focus on the use of SCADA for improving management of irrigation systems. □