

## Dauids, Schild and Wright Elected to USCID Board

In January 1996 balloting, **Grant G. Davids**, **Neil W. Schild** and **Ruth M. Wright** were elected to three-year terms (1996-1999) on the USCID Board of Directors. Davids was elected to his first term; Schild and Wright to their second terms. The other candidates for the Board were **William H. Koellner**, **Richard L. Erickson** and **James D. Rhoades**.

Retiring from the Board were **Darell D. Zimbelman** and **Allen R. Dedrick**.

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## 1996 USCID Board Meeting Greydanus Named President

**Herbert W. Greydanus** was elected President of USCID during the 1996 Annual Meeting of the Board on February 23, 1996. Greydanus, Senior Vice President, Bookman-Edmonston Engineering, Inc. in Sacramento, California, succeeds **Darell D. Zimbelman**, who served as President since 1994.

**James F. Ruff**, Director of Colorado State University's Engineering Research Center Hydraulics Laboratory, was re-elected Secretary.

In other actions, the Board reviewed the 1995 Financial Statement and adopted

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## Program for Las Vegas Meeting Set

USCID received an excellent response to its Call for Papers for the Conference **Competing Interests in Water Resources — Searching for Consensus**. The Conference will be held December 5-7, 1996, at the Alexis Park Resort Hotel in Las Vegas, Nevada. More than 50 abstracts were received from authors in the U.S. and several other countries; 25 were accepted for the technical sessions and 20 for the Poster Session. The Final Program and Registration Form will be sent to USCID Members soon, and may be seen on USCID's World Wide Web page (see story in column 3).

The Conference will address issues related to competition for water such

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## USCID Announces Fargo Meeting

An Announcement and Call for Papers was recently issued for the USCID Water Management Conference, **Best Management Practices for Irrigated Agriculture and the Environment**. The Conference will be held July 16-19, 1997, in Fargo, North Dakota. It will be sponsored by USCID and the **Bureau of Reclamation**.

The purpose of the Conference is to develop a broad understanding of how management practices can be economically applied to allow

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## President's Message Herb's Words

**Dear USCID Members:**

We have new challenges and opportunities! We have continued our successes in high quality seminars and look forward to more. Our membership remains steady, and we look to more professional diversity and growth.

The June 27-29, Bismarck, North Dakota, USCID/Bureau of Reclamation Wetlands Seminar on **Water for Agriculture and Wildlife and the Environment — Win-Win Opportunities** was attended by many professionals who were not USCID Members and of 34 papers, 30 were given by non-members. Several attendees subsequently joined USCID. This response is, in large measure, fulfillment of your Board's emphasis in recent years to broaden our membership to involve the interests that have become active stakeholders in water management.

I am pleased to announce Commissioner **Eluid L. Martinez**, Bureau of Reclamation, has accepted our

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## [www.uscid.org/~uscid](http://www.uscid.org/~uscid) USCID Goes Online with Web Site

Internet users can now access information about USCID via the USCID home page on the World Wide Web. Members and others interested in

*(continued on page 15)*

## United States Committee on Irrigation and Drainage

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Denver, CO 80202

Telephone: 303-628-5430

Fax: 303-628-5431

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Darell D. Zimbelman

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## President's Message (continued)

invitation to join USCID and chair the Membership Committee. Reclamation has been a strong supporter of USCID since its formation in 1952. The Commissioner's involvement continues that tradition. The Board of Directors, during its August meeting, decided to extend an invitation to host the ICID International Executive Council (IEC) meeting in the year 2001 with an accompanying Pan-American Regional Conference. Colorado State University has graciously offered to host the conference on campus, and is planning to offer selected short courses before the conference. The invitation will be extended to the IEC at the Cairo meeting in September. With their acceptance, we can look forward to a challenging effort to organize and carry out a successful meeting like the ICID Congress that USCID organized at CSU in 1984.

In keeping with past practice, USCID screened and offered constructive comments on papers proposed for the two Questions to be discussed during the Cairo Congress. A total of 21 abstracts were submitted to ICID. In a departure from past practice of accepting our papers, ICID accepted only 14 papers on the basis of the abstracts, in order to reduce the volume of the proceedings. The Board of Directors believes that limiting the opportunities is counter productive. Recognizing, however, the limitation goal, the Board of Directors has arranged to discuss with the ICID Management Board the role of USCID to select papers.

In the near term, the Committee on Competing Interests in Water Resources is completing arrangements for a conference on December 5-7 in Las Vegas on **Competing Interests in Water Resources — Searching for Consensus**. A total of 25 papers have been accepted for four sessions and 20 papers for a poster session. All papers will be included in the proceedings.

A water management conference on **Best Management Practices for Irrigated Agriculture and the Environment** will be held on July 16-19, 1997, in Fargo, North Dakota.

The conference will be jointly sponsored by USCID and the Bureau of Reclamation. Abstracts for proposed papers are due by October 1, 1996.

I want to take this opportunity to remind all members that our individual benefits from USCID are proportional to our participation, and the organization's strength depends on our collective participation. The ranks of several committees have thinned for various reasons. Please give careful thought to activities which interest you and call a committee chairperson, Larry Stephens or me.

Finally, I want to thank **Darell Zimbelman** for his work on the Board of Directors and particularly as President for two years. We all look forward to his effective role representing USCID as an ICID Vice President and as an Ex-Officio Member of the USCID Board of Directors.

Professionally yours,

*Herb*

Herbert W. Greydanus  
President, USCID. □

## 1996 Highlights — USCID



Joe Summers and Jerry Schaack observe Bismarck Seminar presentations.



Participants at USCID Board of Directors Meeting, February 23, 1996, (left to right) Bill Price, Darell Zimbelman, Marvin Jensen, Herb Greydanus, Rick Gold, Rick Allen, Grant Davids, Ruth Wright, Neil Schild, Kirk Dimmit, Larry Stephens, Jim Ruff and Cliff Barrett.



Bill Koellner, Corps of Engineers, Session Moderator at Bismarck Seminar.



Bill Klostermeyer (left) introduces Bismarck lunch speaker Warren Jamison.



Dennis Breitzman, Bureau of Reclamation, Friday lunch speaker at the Bismarck Seminar.



Wayne Deason, Bureau of Reclamation, Moderator of Bismarck Session 1.



USCID President Herb Greydanus, Bookman-Edmonston, accepts congratulations from outgoing President Darell Zimbelman.



Bismarck Seminar General Chairman Jerry Schaack, Garrison Diversion Conservancy District, moderates closing session.

# Issues Confronting Salinity and Drainage Management in Irrigated Agriculture

by Ian C. Tod, *Independent Water Resources Consultant, Cambridge, United Kingdom*; and Mark E. Grismer, *Professor of Hydrology and Agricultural Engineering, University of California, Davis*

## Introduction

While irrigation and drainage are subsystem components of the same water management system, there has been a tendency for each to be designed separately and to be implemented by different agencies at different times. In fact, drainage is often considered the "poor relation" of irrigation. Considerable efforts are made to analyze and design irrigation systems and management schemes, while design of the related drainage system is often left to a "later" date. Reasons for omitting drainage systems from the initial stages of irrigation system design include difficulties in predicting when drainage will become a problem, the absence of cost-effective and readily-available disposal options, and a tendency to underestimate drainage requirements to ensure favorable economic rates of return to the overall project. However, in many locations, the sustainability of the irrigation system is dependent on solutions being identified to existing or anticipated drainage problems that result from irrigation activities.

In humid temperate climates, the volume of drain water is usually not an issue as there are often extensive natural drainage systems to facilitate disposal; but, the presence in drainwater of fertilizers and other agrochemicals leached from the soil profile can cause water quality problems. In semi-arid and arid climates, drain water quality is further reduced by the leaching of evaporative salts or resident soil trace elements. In addition, the disposal of large volumes of drain water can be problematic due to limitations in the assimilative capacity of natural river and aquifer systems.

Drainage problems seriously affect the sustainability of irrigated agriculture in

the San Joaquin and Imperial Valleys of California, as well as large projects in northern India and the Pakistani floodplain. In the San Joaquin Valley, the presence of selenium and other trace elements in drainwater has severely reduced disposal options. Further south, in the Imperial Valley, the option of disposing of drainwater to the natural drainage sink of the Salton Sea is becoming more restricted due to deteriorating Sea water quality and encroachment of the Sea onto adjacent farm land, or onto lands used for domestic, recreational or industrial purposes. In Pakistan, where extensive irrigation projects have been operating since the early 1900's, considerable resources have been allocated to solve drainage problems, and yet in many areas, crop production is still severely affected by waterlogging and salinization. In India, where several large irrigation projects have been constructed more recently, waterlogging and salinization are rapidly emerging problems despite exceptional irrigation water quality.

Long-term sustainability of irrigated agriculture projects requires that an integrated approach be taken towards design of the irrigation/drainage systems and related water management schemes. The performance of drainage systems should be evaluated in the particular hydrologic setting of the project early on at the farm and regional scales. Additional tools need to be developed to improve the understanding of drainage systems. In this note, some of the factors requiring further analysis towards developing these tools are discussed.

## Irrigation and Drainage Systems

The irrigation/drainage system is the water conveyance infrastructure designed to supply sufficient water to meet crop water demand while also removing excess water, salinity and other contaminants from the area, such that crop production or the soil environment is not adversely impacted. The benefits of the irrigation/drainage

system and associated water management should be assessed against the short- and long-term impacts of the system on the broader environment.

Different parts of the irrigation/drainage system have different characteristics. The irrigation delivery system is operated with a high degree of control, and usually by a public sector agency. The field application system is operated by individual farmers with varying degrees of control. In contrast, the drainage collection system is a passive system with limited controls, as flows in the system are mainly influenced by soil hydraulic properties, and sometimes regional groundwater flows. Drainage collection systems are usually operated and maintained by individual farmers. The drainage disposal system has varying degrees of control with the extent of control increasing as the volume of drainwater increases and the quality of drainwater decreases. Public sector agencies are usually involved in project-scale drainage disposal systems.

The passive collection characteristics of the drainage systems have resulted in a tendency to underestimate the complexity of the actual systems. For example, field techniques have not been developed to evaluate the performance of drainage systems relative to the removal of rootzone drainage as there is a common assumption that all rootzone drainage (deep percolation) is removed by the local drainage laterals and collectors. In reality, this is rarely the case, as the drainage systems also collect water originating elsewhere, including regional groundwaters of variable quality, evapoconcentrated rootzone drainage from previous irrigation seasons, and that part of the rootzone drainage water that bypasses the collector system elsewhere and joins regional flows. Neglecting the contributions of shallow groundwater flows to the subsurface drainage system is inherent to the Dupuit-Forchheimer assumptions commonly used in horizontal drain spacing designs.

Separation of the irrigation/drainage system into different components has led to resources being concentrated on improving the performance of more readily controllable and visible irrigation components while drainage components, and in particular drainage collection systems, have been neglected. The analytical tools available for analysis and design of drainage systems often do not represent the prevailing hydrologic conditions accurately. There has been little research work to improve drainage equations since the 1960s and improved analytic methods are required to be able to analyze drainage systems more accurately.

### **Factors Requiring Further Research**

An integrated approach to water management problems at farm and regional levels requires an appreciation of the different factors affecting system performance. Among the factors that require further research are:

**Assessment of drainage system performance.** Though defined, drainage efficiency criteria have rarely been applied to subsurface drains, partly because of the difficulties of measuring rootzone drainage volumes in the field, as well as analyzing soil-water chemistry as water moves from the root-zone to the drains. In addition, identifying the origin of different flows into drains is difficult, and the techniques, such as use of isotopic tracers, tend to be expensive to apply. However, methods to identify the source of drain flows need to be developed in order to understand drainage flow regimes properly, so that drain flows and drain water quality can be predicted more accurately and with greater confidence during the design or remediation process.

**Field drainage and disposal.** Drainage collection systems are often the responsibility of individual farmers, and systems are designed on the assumption that another party will be responsible for the drain water disposal. However, this can result in the quantity or quality of drainwater in the collection system not being acceptable for the district, or regional disposal system. Field drainage collection systems need to be designed

to account for the disposal method. For example, vertical (tubewell) drainage allows more flexibility in operation than horizontal drainage, and can be used to vary the drain water discharge in a controlled manner consistent with cropping needs.

**Short-term vs. long-term impacts of drain water management.** Drainage events occur over longer terms than the irrigation events or seasons, perhaps requiring months or years to dissipate. Before the impact of drainage systems can be evaluated properly, drainage events (both drain water quantity and quality) need to be monitored over long times consistent with the hydrogeologic setting of the drainage system.

**Drain water flows and quality.** Traditionally, the main emphasis of drainage system design has been on removing excess water and drainwater flows, while less emphasis has been given to drainwater quality. Often, the two factors are considered separately. This is due in part to the complexity of analyzing the water chemistry as such factors as residence time, rate of dissolution, movement and concentrations of different constituents as they vary with time. Perhaps simulation of the flow lines to the drainage systems that significantly influence the quality of the drainwater will be useful.

**Project stakeholders.** Drainage problems are part of larger hydrologic systems and the success of drainage systems will depend on their acceptance by all parties involved. The ownership of irrigation water is usually well defined, and the responsibilities of the various parties involved are clear. However, when irrigation water enters the ground, the responsibility for the groundwater and the drainwater, both in terms of quantity and quality is ambiguous. A stakeholder analysis should be undertaken to coordinate the project parties involved in the drainage system (including potentially reluctant upslope, or upstream growers). For example, where public finance is available for construction of drainage systems, there is a tendency to minimize drain spacings. If drains are installed by the private sector, a "trial and error" approach is followed where drains are

installed and their performance monitored before deciding whether closer spacing is required. In the United Kingdom and parts of California, installation of horizontal subsurface drainage systems all but ceased after government subsidies were withdrawn, and farmers overcame their drainage problems by adjusting their agricultural practices rather than installing drains at their own expense. However, little has been done to actively involve all of the irrigation project parties responsible for the "drainage issues" associated with the project.

### **Conclusion**

Greater understanding of drainage systems as they actually operate, both hydrologically and institutionally, is required to ensure the sustainability of large irrigation projects. Over-simplification of drainage system design and neglect of drain water disposal impacts have resulted in drainage systems not being properly understood and managed. Serious problems have occurred associated with drainwater quality or quantity, seemingly unanticipated, while adequate solutions to drainage problems have not been found in many places.

The role and performance of drainage in irrigation/drainage systems needs to be reassessed. Local water management practices should be integrated with larger-scale considerations, and individual system components should be designed with broader regional considerations. Efficiency criteria, applied to both the irrigation and drainage systems, should be developed to evaluate the overall performance of the project irrigation/drainage systems and used as part of project water management. □

## CSU Creates Water Center

Colorado State University has announced plans to bring 30 programs and nearly 200 faculty members who deal with water resources under an umbrella organization — The Water Center.

“At Colorado State, we have tremendous expertise and a tremendous track record in water resources, but we lacked the vehicle to respond in a unified way to today’s interdisciplinary problems,” said Neil Grigg, head of the Department of Civil Engineering and Director of The Water Center.

The principle organizers of the new Center are the Colleges of Engineering, Agricultural Sciences and Natural Resources, but faculty from other colleges also will take part.

A five-member board of directors — composed of the deans from the Colleges of Agricultural Sciences, Engineering and Natural Resources, and the directors of Cooperative Extension and the Agricultural Experiment Station — appointed Grigg Director to get the Center organized. Decisions regarding the Center’s operations are made by a management committee that includes Grigg, heads of five other departments and Robert Ward, Director of the Colorado Water Resources Institute.

Grigg says the Center’s long-range vision eventually will include creating a facility for The Water Center that incorporates classrooms and laboratories; a water museum; and a media center containing information about water, as well as the University’s wealth of historical documents, archives and special collections related to water. □

## ASCE Moves HQ to Washington Area

The American Society of Civil Engineers has moved its worldwide headquarters to the Washington, DC, area. The society is moving nearly 200 staff positions to Reston, Virginia, from its former location in New York City. ASCE will continue to maintain its downtown Washington, DC, office, which houses government and public relations, the ASCE Foundation and the Civil Engineering Research Foundation. The Publications Division will move to the new Reston office in July 1997. It currently remains in New York City.

ASCE’s new offices are located at 1801 Alexander Bell Drive, Reston, VA 20191. The phone numbers are 800-548-ASCE or 703-295-6000; fax is 703-295-6222. □

## Reclamation Announces Grants

The Bureau of Reclamation recently announced that \$728,250 has been made available for 13 fish and wildlife restoration challenge grants in 11 western states. The successful applicants were chosen from a pool of 61 proposals.

Although there were not enough funds available for all the potential projects, Reclamation and The National Fish and Wildlife Federation are working together to expand the available funds for next year. Reclamation requested \$2.5 million in its FY97 budget to continue offering challenge grants for projects in the West that enhance Reclamation’s water resource mission by employing sound environmental practices. In 1994, Reclamation and NFWF first formed a partnership to identify, fund and administer selected restoration projects. □

## USCID Members Receive ASCE Awards

Several USCID Members were 1996 recipients of awards from the Water Resources Engineering Division of the American Society of Civil Engineers. The awards were announced at the North American Water and Environment Congress, held June 22-28, 1996, in Anaheim, California.

**Henry Falvey** received the *Hunter Rouse Hydraulic Engineering Lectureship* in recognition of international leadership in research in the areas of fluid mechanics, hydraulic structures and controls, cavitation and air entrainment. Falvey is President of Henry T. Falvey & Associates and is Visiting Professor of Civil Engineering at Colorado State University. Previously, he was with the Bureau of Reclamation for 25 years.

**E. Gordon Kruse** was presented the *Royce J. Tipton Award* for an internationally recognized record of innovative research in the areas of irrigation water supply, control and distribution leading to improved irrigation efficiency and reduced environmental problems. Kruse retired in 1993 from the Agricultural Research Service of the U.S. Department of Agriculture.

**Everett V. Richardson** was given the *Hans Albert Einstein Award* in recognition of his leadership and contributions in the fields of sediment transport, bridge scour and alluvial channel dynamics. He is Senior Associate with Ayres Associates in Fort Collins, Colorado. He was on the faculty of Colorado State University for many years.

**Timothy K. Gates** and two co-authors were recognized for the Best Research Paper in the *Journal of Irrigation and Drainage Engineering* for the paper “Irrigation and Drainage Design and Management Model: Development.” His co-authors were Luis A. Garcia and Henry Manguerra. □

# Meetings Calendar

**SEPTEMBER 22-25, 1996; Rivertech '96;** Chicago, Illinois. Contact International Water Resources Association, F. Lee Brown, 1915 Roma NE, Albuquerque, NM 87131; telephone 505-277-9400, fax 505-277-9405, e-mail flbrown@unm.edu.

**SEPTEMBER 22-26, 1996; GIS and Water Resources;** Fort Lauderdale, Florida. Contact AWR, 950 Herndon Parkway, Suite 300, Herndon, VA 22070.

**SEPTEMBER 22-27, 1996; Water: Sustaining a Critical Resource;** Tashkent, Uzbekistan. Third USA/CIS Joint Conference on Environmental Hydrology and Hydrogeology. Contact AIH, 2499 Rice Street, Suite 135, St. Paul, MN 55113; telephone 612-484-8169, fax 612-484-8357.

**SEPTEMBER 24-25, 1996; Polluted Runoff? Nonpoint Source and Stormwater Management in Colorado;** Longmont, Colorado. Contact John D. Stednick, Colorado State University; telephone 970-491-7248.

**SEPTEMBER 25-27, 1996; ModelCARE 96 — Calibration and Reliability in Groundwater Modeling;** Golden, Colorado. Contact Conference Secretariat, International Ground Water Modeling Center, Colorado School of Mines, Golden, CO 80401; telephone 303-273-3103, fax 303-273-3278.

**OCTOBER 6-8, 1996; International Workshop on Water Development as an Engine for Economic Growth of Major Regions,** Sanli Urfa, Turkey. Contact Asit K. Biswas, 76 Woodstock Close, Oxford OX2 8DD, U.K.

**OCTOBER 13-19, 1996; 64th ICOLD Annual Meeting;** Santiago, Chile. Contact USCOLD, 1616 Seventeenth Street, Suite 483, Denver, CO 80202; telephone 303-628-5430, fax 303-628-5431, e-mail stephens@uscold.org.

**OCTOBER 16-18, 1996; Third International Workshop on Application of Remote Sensing in Hydrology;** Greenbelt, Maryland. Contact Janice Akre, National

Hydrology Research Institute, 11 Innovation Boulevard, Saskatoon, SK S7N 3H5, Canada; telephone 306-975-5514, fax 306-975-5143.

**OCTOBER 29-30, 1996; 7th Annual South Platte Forum;** Denver, Colorado. Theme: *Bringing the River Back . . . to the Future: Urban and Rural Watershed Management.* Contact David Graf, Colorado Water Resources Research Institute, 410 University Services Building, Colorado State University, Fort Collins, CO 80523; telephone 970-491-6308, fax 970-491-2293.

**OCTOBER 29-31, 1996; International Conference on Water Resources and Environment Research: Towards the 21st Century;** Kyoto, Japan. Contact General Secretariat, Water Resources Research Center, DPRI, Kyoto University, Uji, Kyoto 600, Japan; telephone and fax 81-774-32-3093, e-mail conf@wren2.dpri.kyoto-u.ac.jp.

**NOVEMBER 3-5, 1996; Irrigation Association 17th Annual International Irrigation Exposition;** San Antonio, Texas. Contact IA, 8260 Willow Oaks Corporation Drive, Suite 120, Fairfax, VA 22031; telephone 703-573-3551, fax 703-573-1913.

**NOVEMBER 3-6, 1996; ASAE International Evapotranspiration and Irrigation Scheduling Conference;** San Antonio, Texas. Contact Walter C. Bausch, USDA-ARS, AERC, Foothills Campus, Colorado State University, Fort Collins, CO 80523; telephone 970-491-8264, fax 970-491-8247.

**NOVEMBER 5-7, 1996; Prevention of Hydrogeological Hazards: the Role of Scientific Research;** Alba, Italy. Contact CNR, Strada delle Cacce, 73-10135 Torino, Italy; telephone 39-11-343-428, fax 39-11-343-574.

**NOVEMBER 10-14, 1996; ASCE Annual Convention and Exposition;** Washington, DC. Contact ASCE, 1801 Alexander Bell Drive, Reston, VA 20191; telephone 800-548-ASCE or 703-295-6000, fax 703-295-6222.

**NOVEMBER 17-22, 1996; Hydrology in the Humid Tropic Environment;** Kingston, Jamaica. Contact A. Ivan Johnson, 7474 Upham Court, Arvada,

CO 80003; telephone and fax 303-425-5610.

**NOVEMBER 24-26, 1996; International Conference on Water Resources Management Strategies in the Middle East;** Tel-Aviv, Israel. Contact the Secretariat, P.O. Box 3082, 61030 Tel-Aviv, Israel; Fax 972-3-524-4618.

**NOVEMBER 25-27, 1996; International Seminar on Technology for Water Management in the 21st Century: Soft Options or Hard Choices?;** Kasatsu, Japan. Contact World Water Council Secretariat, Montreal, Canada; fax 514-287-9057.

**JANUARY 28-29, 1997; The Bottom Line — Making Irrigation Pay;** Fresno, California. Contact California Irrigation Institute; telephone 916-366-9376.

**APRIL 7-11, 1996; 17th USCOLD Annual Meeting and Lecture;** San Diego, California. Contact USCOLD, 1616 Seventeenth Street, Suite 483, Denver, CO 80202; telephone 303-628-5430, fax 303-628-5431, e-mail stephens@uscold.org.

**JUNE 2-4, 1997; Workshop on The Use of Water in Sustainable Agriculture;** Albacete, Spain. Contact the Secretariat, Escuela Tecnica Superior Ingenieros Agronomos, Campus Universitario, 02071 Albacete, Spain; telephone and fax 34-67-509-479.

**AUGUST 3-8, 1997; 7th Stockholm Water Symposium;** Stockholm, Sweden. Contact Stockholm Water Company, S-106 36 Stockholm, Sweden; fax 46-8-736-2022; e-mail sympos@sthwat.se.

**AUGUST 5-8, 1997; Waterpower 97;** Atlanta, Georgia. Contact ASCE, 1801 Alexander Bell Drive, Reston, VA 20191; telephone 800-548-ASCE or 703-295-6000, fax 703-295-6222.

**AUGUST 7-9, 1997; Debris-Flow Hazards Mitigation; Mechanics, Prediction and Assessment;** San Francisco, California. Contact ASCE, 1801 Alexander Bell Drive, Reston, VA 20191; telephone 800-548-ASCE or 703-295-6000, fax 703-295-6222.

**AUGUST 10-14, 1997; ASAE Annual International Meeting;** Minneapolis, Minnesota. Contact ASAE, 2950 Niles

Road, St. Joseph, MI 490085; fax 616-429-3852.

**AUGUST 11-15, 1997; 27th Congress of the International Association of Hydraulic Research;** San Francisco, California. Contact G. H. Jirka, 119 Hollister Hall, Cornell University, Ithaca, NY 14853; telephone 607-255-3438, fax 607-255-9004.

**SEPTEMBER 1-6, 1997; IX World Congress of the International Water Resources Association: Water Resources Outlook for the 21st Century — Conflicts and Opportunities;** Montreal, Canada. Contact F. Lee Brown, 1915 Roma NE, Albuquerque, NM 87131; telephone 505-277-9400, fax 505-277-9405, e-mail flbrown@unm.edu.

**OCTOBER 5-9, 1997; ASCE Annual Convention and Exposition;** Minneapolis, Minnesota. Contact ASCE, 1801 Alexander Bell Drive, Reston, VA 20191; telephone 800-548-ASCE or 703-295-6000, fax 703-295-6222.

**OCTOBER 21-24, 1997; 2nd International R&D Conference;** Vadodara, India. Contact Member Secretary, Central Board of Irrigation and Power, Malcha Marg, Chanakyapuri, New Delhi 110 021, India; telephone 91-11-301-5984, fax 91-11-301-6347.

**JULY 6-10, 1998; Hydrology in a Changing Environment;** Exeter, United Kingdom. Contact Bruce Webb, Department of Geography, University of Exeter, Amory Building, Rennes Drive, Exeter, Devon EH4 4RJ, UK; fax 44-1392-263-342.

**JULY 18-23, 1998; ASAE Annual Meeting;** Salt Lake City, Utah. Contact ASAE, 2950 Niles Road, St. Joseph, MI 49085; telephone 616-429-0300, fax 616-429-3852.

**AUGUST 3-7, 1998; ASCE Water Resources Engineering Division Conference;** Memphis, Tennessee. Contact ASCE, 1801 Alexander Bell Drive, Reston, VA 20191; telephone 800-548-ASCE or 703-295-6000, fax 703-295-6222.□

## New Publications

*Journal of Hydrologic Engineering.* A new journal published quarterly by the American Society of Civil Engineers. It details information on development of new hydrologic methods, theories and applications to current engineering problems. The journal publishes peer-reviewed papers on analytical, numerical and experimental methods for investigating and modeling of hydrologic processes. The *Journal of Hydrologic Engineering* is available by annual subscription: Print — \$26 ASCE members, \$117 non-members; CD ROM — \$39 ASCE members, \$155 non-members. To order, contact Publications Marketing at ASCE, 1801 Alexander Bell Drive, Reston, VA 20191; telephone 703-295-6000, fax 703-295-6222.

*Surface Irrigation.* Published by the University of California, this manual shows growers how to improve the efficiency of surface irrigation. It emphasizes furrow irrigation but also includes chapters on flood irrigation. 105 pages. \$15. To order, contact Janice Heine, Cooperative Extension Office, Department of Land, Air and Water Resources; 113 Veihmeyer Hall, University of California, Davis, CA 95616, telephone 916-752-1130.□

## Martinez Named Reclamation Head

**Eluid L. Martinez** became the 14th Commissioner of the **Bureau of Reclamation** last December.

Martinez served in the New Mexico Engineer's Office for the past 23 years, working as the State Engineer, Secretary of the New Mexico Interstate Stream Commission, State Engineer's Principal Hearing Examiner, Chief of the Technical Division, and National Director for the Interstate Council on Water Policy.

The first Hispanic American to serve as Commissioner in the Bureau's 93-year history, Martinez replaces **Daniel P. Beard**.

A native of Rio Arriba County, New Mexico, Martinez received an undergraduate degree in engineering at New Mexico State University and an M.S. at the University of New Mexico's School of Engineering.

Commissioner Martinez recently joined USCID and has agreed to Chair the Membership Committee.□



## NRCS, WHC Sign Pact; Announce Workshop Series

Pledging to work together to improve wetlands on private lands, the top executives of the Wildlife Habitat Council (WHC) and the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) recently signed a memo of understanding and announced their first cooperative project — workshops dealing with wetlands.

Through this partnership, NRCS will work with private industry to develop wildlife habitat and wetlands on unused industry and corporation lands. A major goal of this joint effort is to blend wildlife habitat and wetlands areas into existing, as well as new, corporate development plans.

Scheduled Workshops include:

San Francisco, CA, September 23-25

Houston, TX, January 28-30, 1997

Atlanta, GA, February 25-27, 1997

For more information, contact the Wildlife Habitat Council, 1010 Wayne Avenue, Suite 920, Silver Spring, MD 20910; telephone 301-588-8994, fax 301-588-4629. □

## ILRI Seeks Salinity Info for Network

The International Institute for Land Reclamation and Improvement (ILRI) and the International Program for Technology Research in Irrigation and Drainage (IPTRID) have established a program to bring professionals on waterlogging and salinity control in developing countries together through networking.

The main objective of the project is to collect:

- Addresses of institutions, experts and manufacturers
- Information about on-going courses, training activities and research projects
- "Grey Literature" on the theme of environmental sustainability, including the sub-themes of health, waterlogging and salinity

ILRI seeks information such as books, reports, theses, computer programs, newsletters, bulletins and brochures on waterlogging, salinity and health as it relates to irrigation and drainage. This information will be stored in DRAiN, the Drainage Information Network.

Information may be sent to ILRI-IPTRID Network and Information Centre, P.O. Box 45, 6700 AA Wageningen, The Netherlands; telephone 31-8370-74733, fax 31-8370-24812, e-mail NABER@jka.wau.nl. □

## Fargo (continued)

agricultural operations to approach optimum production and at the same time reduce the potential for adverse impacts on the environment. The Conference will focus on the development and implementation of Best Management Practices that provide for a sustainable ecosystem encompassing the quality and quantity of surface and ground water resources.

The **Oakes Test Area**, a 5,000-acre irrigation research site in southeastern North Dakota, will be used as a case study for the conference. Research studies at the Oakes Test Area have focused on the effects of irrigated agriculture on groundwater quality and return flows, and on the development of best management practices for irrigated crop production. Researchers from North Dakota State University, the Bureau of Reclamation and the Garrison Diversion Conservancy District will present the Oakes research results.

The Call for Papers invited proposals for papers addressing the following major topics:

- Development and Application of Best Management Practices
- Irrigation Water Management
- Water Quality

The deadline for receipt of abstracts is **October 1, 1996**. To receive additional copies of the Call for Papers, contact the USCID Denver office. □

## Board Meeting (continued)

a Budget for 1996 (see pages 10-11); reviewed plans for the 1996 Wetlands Seminar and the 1996 Competing Interests Seminar; reviewed ICID activities and cooperation with other professional societies; heard USCID committee reports; and reviewed the results of the 1995 survey of Members.

Copies of the Board Meeting Minutes are available to USCID Members by calling the USCID Denver Office.

On Saturday following the meeting, several Board members toured facilities of the **Coachella Valley Water District** and the **Imperial Irrigation District**. □

# Irrigation Renewal in Vietnam

by Mark Svendsen, Consultant in  
Irrigation Management, Philomath,  
Oregon

Vietnam has a long history of water control activities. In the ninth century, the first dike was built in the Red River Delta — a structure 8.5 kilometers in length. By 1248, the local dike systems were linked into a single closed system that has remained the model for water control until today. Generation by generation, the inland dike system in the Red River Delta developed to its current length of 7,764 kilometers. The Red River Delta now constitutes a mature irrigation and drainage system with little scope for additional expansion. Irrigation expansion in the Mekong Delta in the south, by contrast, has been rapid in recent years with considerable scope remaining for increasing annual irrigated area through improved water control (including flood management) activities.

Although small indigenous irrigation systems have been present for centuries in Vietnam as well, so-called modern irrigation development began during the early years of the French colonial period, but then stagnated until 1975. Since that time, the number of irrigation schemes in the country has more than doubled. This increase occurred in spite of a decline in real capital investment in the water resources sector over the period 1976-1990 by nearly a quarter. Labor contributions from villagers for irrigation system construction partially offset this decline.

Vietnam undertook market-oriented agricultural reforms beginning in 1986. These reforms, termed *doi moi* or "renewal," put cultivation back on an individual household basis and restored producer incentives. The *doi moi* reforms, coupled with the expansion in irrigated area, have led Vietnam to become the world's third largest rice exporter today, after the United States and Thailand. The establishment of market-oriented incentives for agricultural producers led, to some extent, to one-time gains as

## United States Committee on Irrigation and Drainage 1995 Financial Statement and 1996 Budget

	1995 Actual	1996 Budget
<b>Revenues:</b>		
<b>Membership Dues</b>		
Individual . . . . .	13,970	14,500
Library . . . . .	500	800
Institutional . . . . .	1,375	1,400
Corporate . . . . .	4,000	4,000
Sponsoring Organizational Member . . . . .	25,000	25,000
Sustaining Members . . . . .	5,000	10,000
<b>Interest Income</b>		
Life Member CD's . . . . .	312	0
Other - Money Market . . . . .	447	400
Life Member - Fidelity . . . . .	518	2,315
Unrealized Gain - Investment . . . . .	1,908	0
Contributions - Operations . . . . .	475	400
ICID Publication Sales . . . . .	241	300
ICID Journal Cards and Ads . . . . .	5,606	4,500
ICID Journal Subscriptions . . . . .	1,598	1,600
USCID Membership Directory Advertisements . . . . .	1,260	1,500
USCID Publication Sales . . . . .	561	1,000
1995 Seminar - Flood Management . . . . .	15,964	0
1995 Seminar - Water Management . . . . .	18,973	0
1996 Seminar - Wetlands . . . . .	0	23,000
1996 Seminar - Competing Interests . . . . .	0	23,000
15th Congress Page Charges . . . . .	812	200
<b>Total Revenue:</b> . . . . .	<b>\$98,520</b>	<b>\$113,915</b>
<b>Direct Costs:</b>		
ICID Arrears . . . . .	5,000	11,000
ICID Publication Sales . . . . .	0	500
ICID Journal Cards and Ads . . . . .	141	2,800
ICID Journal Subscriptions . . . . .	0	1,500
ICID Annual Contribution . . . . .	9,115	10,030
15th Congress Page Charges . . . . .	0	2,927
USCID Publications . . . . .	361	5,000
Publication Order Fulfillment . . . . .	260	300
1995 Seminar - Flood Management . . . . .	11,756	0
1995 Seminar - Water Conservation . . . . .	12,176	0
1996 Seminar - Wetlands . . . . .	0	11,000
1996 Seminar - Competing Interests . . . . .	0	11,000
Membership Directory . . . . .	1,682	1,500
<b>Total Direct Costs:</b> . . . . .	<b>\$40,491</b>	<b>\$57,557</b>
<b>Overhead Expenses:</b>		
Accounting . . . . .	450	4500
Auditing . . . . .	446	400
Communications . . . . .	1,468	1,500
Contractors . . . . .	31,193	34,000
Graphic Design . . . . .	0	200
Dues and Subscriptions . . . . .	40	100
Equipment . . . . .	668	500
Office Rent . . . . .	2,079	2,160
Legal, Licenses and Fees . . . . .	76	175
Supplies and Copies . . . . .	2,208	2,200
Postage and Mailing . . . . .	4,647	4,500
Printing . . . . .	5,107	5,100
Travel and Meetings . . . . .	6,980	5,000
Miscellaneous and Contingency . . . . .	0	73
<b>Total Overhead Expenses</b> . . . . .	<b>\$55,362</b>	<b>\$56,358</b>
<b>Total Direct Costs and Overhead Expenses</b> . . . . .	<b>\$95,853</b>	<b>\$113,915</b>
<b>Net Revenues Over Costs and Expenses</b> . . . . .	<b>\$2,667</b>	<b>\$0</b>

## United States Committee on Irrigation and Drainage

### Balance Sheet — December 31, 1995

#### Assets

##### Current Assets

##### Cash in Checking

Colorado State Bank . . . . . 6,060

Money Market Account . . . . . 12,132

18,192

Summers Engineering - Fidelity . . . . . 12,354

Life Member Funds - Fidelity . . . . . 28,570

##### Prepaid Expenses

1996 Meetings . . . . . 1,717

**Total Current Assets:** . . . . . **\$60,834**

**Total Assets:** . . . . . **\$60,834**

#### Liabilities and Capital

##### Current Liabilities

AWF Funds Collected . . . . . 270

**Total Current Liabilities** . . . . . **270**

##### Fund Balances

##### General Fund Balance

Balance at Beginning of Year . . . . . 19,286

Current Net income . . . . . 2,669

21,955

##### Life Membership Fund Balance

Balance at Beginning of Year . . . . . 25,705

Contributed Reserve Funds . . . . . 100

Current Year Memberships . . . . . 450

26,255

##### Summers Engineering Fund Balance

Balance at Beginning of Year . . . . . 10,219

Current Year Contributions . . . . . 630

Interest and Dividends . . . . . 3,371

Unrealized Gain/Loss . . . . . 1,459

Scholarships Paid . . . . . (500)

12,354

**Total Fund Balances:** . . . . . **\$60,564**

**Total Liabilities and Fund Balances:** . . . . . **\$60,834**

I have examined the Income Statement for the Twelve Months ended December 31, 1995, and the Balance Sheet through December 31, 1995, for the U.S. Committee on Irrigation and Drainage and certify that the documents are correct and accurate.

Signed/A. Fred Stoll, Accountant

I have also examined the 1995 financial documents for the U. S. Committee on Irrigation and Drainage and find them to be correct and accurate.

Signed/James F. Ruff, Secretary, USCID

the constraints imposed by the collective system were released. Continued growth thus requires continued change, in terms of higher input use, improved technology, expansion of cultivated area and improved water control. Today, water resource development and control figures heavily in the country's development plans for continued agricultural growth. The draft 1996-2000 Five Year Plan anticipates investments of US\$1.0 billion in the water resource sector over the plan period, underscoring the importance of an effective and efficient water resource investment planning process. An effective planning process is one that produces sound well-prepared projects that interact beneficially with each other and produce a minimum of undesirable impacts and side effects.

The Asian Development Bank is currently supporting work by northwest hydraulic consultants of Canada, allied with DHV of The Netherlands, to assist the Ministry of Agriculture and Rural Development in examining the water resource planning and design process in Vietnam and suggesting areas where improvements should be considered to streamline this process. Results should be available later this year.□

## Data Grants Announced

Hydrosphere Data Products Inc., Boulder, Colorado, has announced that it will award \$20,000 in data grants during 1996 to support environmental research worldwide. Grant recipients will receive free use of titles from Hydrosphere's commercial library of ready-to-use-environmental databases on CD-ROM, featuring USGS hydrologic, NOAA climatologic, EPA water quality and other environmental databases.

The criteria for grant awards will be the potential of proposed or ongoing research to yield theoretical advances or technological innovations that encourage the establishment of sustainable development public policies or professional practices. Applicants must also demonstrate the inability to obtain necessary data with existing research resources.

Research areas previously supported by Hydrosphere include the fate and transport of contaminants, endangered species protection, watershed ecosystems, hydrologic decision support systems, distributed hydrologic models, riparian habitat rehabilitation and wetlands restoration.

Applications for 1996 grant awards should be submitted to Hydrosphere before October 31, 1996. For more information, contact Hydrosphere at 1002 Walnut Street, Suite 200, Boulder, CO 80302; telephone 303-443-7839, fax 303-442-0616, e-mail [tim@hydrosphere.com](mailto:tim@hydrosphere.com).

## Call for Papers for Workshop in Spain

**The Use of Water in Sustainable Agriculture** is the theme of a workshop to be held June 2-4, 1997, in Albacete, Spain. The workshop is organized by University of Castilla-La Mancha and CIGR. A Call for papers has been issued for contributions to the following themes, with special emphasis on semiarid regions:

- Water as a limiting factor for development
- Environmental impact of irrigation
- Water management in sustainable agriculture

The deadline for receipt of two-page summaries of proposed papers is September 30, 1996. For more information, contact the Secretariat, Escuela Tecnica Superior Ingenieros Agronomos, Campus Universitario, 02071 Albacete, Spain; telephone and fax 34-67-509-479.□

## Chinese Delegation Visits USCID Office

Seven members of the Department of Water Resources, Zhejiang Province, China, met with USCID Executive Vice President Larry Stephens last fall.

The Chinese delegation, led by Deputy Director-General Chen Yuejun, discussed U.S. water resources management issues during their visit, held in Denver. Stephens provided the group with information about USCID and ICID and discussed the goals and objectives of the organizations.□

## ICID Drainage Workshop Announced

The 7th ICID International Drainage Workshop, **Drainage for the 21st Century**, will be held November 17-21, 1997, in Penang, Malaysia. The Workshop will be sponsored by ICID, the Malaysian National Committee on Irrigation and Drainage (MANCID) and the Department of Irrigation and Drainage Malaysia.

The following topics will be featured during the Workshop:

- Policy Issues and Strategies for Emerging Problems
- Planning, Design and Construction Practices
- The Management Challenge
- Training and Research

For more information, contact the Secretariat, 7th ICID International Drainage Workshop, c/o Department of Irrigation and Drainage, Jalan Sultan Salahuddin, 50626 Kuala Lumpur, Malaysia; telephone 60-3-298-2316, fax 60-3-291-1082.□

## Endangered Fish Spawned in Floodplain Study

Federal biologists recently took spawn from razorback suckers as part of a study to determine the effects of selenium contamination on the reproductive success of this endangered Colorado River basin fish.

The U.S. Fish and Wildlife Service and **Bureau of Reclamation** plan to restore periodically inundated wetlands, or floodplain areas, that once provided havens for young razorbacks. The scientists will analyze the selenium content of the eggs and larval fish because many potential sites are contaminated with selenium.

Water development projects and the building of flood control structures now prevent the Colorado River from overflowing its banks and flooding surrounding areas to the extent that it once did. The goal of the restoration project is to restore floodplain habitat function to the degree necessary to recover the endangered fishes.

In the Grand Valley, the irrigation of selenium rich soils leaches the element from the soil and carries it to the Colorado River and adjacent wetlands. The element concentrates in spots that now receive infrequent flushing by the river. The experiment is designed in part to determine the contamination levels that impair survival of larval razorbacks. The Fish and Wildlife Service has completed an inventory of potential floodplain restoration sites. Biologists are now sorting out the best sites for restoration efforts, and selenium contamination is a limiting factor.

Restoration efforts will involve the acquisition of easements and, in some instances, outright purchase of sites. Water will be returned to floodplain restoration sites through the breaching of levees and similar actions. No land-owner will be forced to sell or to grant easements; the restoration program will operate on a voluntary basis. □

## Ninth World Water Congress

The **Ninth World Water Congress** will be held September 1-6, 1997, in Montreal, Canada. The theme of the Congress, which is sponsored by the International Water Resources Association, is *Water Resources Outlook for the 21st Century: Conflicts and Opportunities*.

Seven specific topics will be addressed during the Congress:

- Mechanisms for conflicts resolution
- Policies and strategies for sustainability of fresh water resources after UNCED
- Management of water resources under scarcity and flood conditions
- Ecosystem and environmental concerns
- Raising public awareness of water issues
- Economic, social, population and gender aspects
- International water: legal, cooperative and institutional framework

For more information, contact Aly M. Shady, Canadian International Development Agency, 200 Promenade du Protage, Hull, Quebec, Canada K1A 0G4; telephone 819-994-4098, fax 819-953-3348, e-mail [aly\\_shady@ACDI-CIDA.GC.CA](mailto:aly_shady@ACDI-CIDA.GC.CA). □

## USCID Publishes Flood Meeting Proceedings

The Proceedings of the **1995 USCID Flood Management Seminar** have been published by USCID. Papers included in the Proceedings were presented during the Seminar, which addressed the theme *The Realities of Floods — A Multi-Disciplinary Review of Flood Management Issues*.

In addition to several special presentations, including the Keynote Address by Brigadier General Gerald E. Galloway, the proceedings include 20 papers on the following topics:

- Politics of Floods
- The Flood Management Milieu
- Management of Floods
- Where Do We Go From Here?
- Case Studies

The 260-page Proceedings is \$18 for USCID Members; \$36 for non-members, plus \$3 postage and handling. To order, contact USCID at 303-628-5430, fax 303-628-5431, e-mail [stephens@uscid.org](mailto:stephens@uscid.org). □

## USCID Hosts Wetlands Meeting

The U.S. Committee on Irrigation and Drainage sponsored a Wetlands Seminar June 27-29, 1996, in Bismarck, North Dakota. The Seminar Theme was **Water for Agriculture and the Environment — Win-Win Opportunities**. More than 70 people attended the Meeting, which was co-sponsored by the Bureau of Reclamation.

Papers presented during the Technical Sessions and Poster Session addressed the following topics:

- Agriculture and Wetlands Compatibility
- Wetlands and Water Quality
- Water for Wetlands: Appropriation/Allocation
- Fish and Wildlife Diversity and Productivity

Special lunch and dinner presentations were made by **Warren L. Jamison**, Manager of the **Garrison Diversion Conservancy District**; **Lloyd Jones**, Vice President, Delta Foundation; and **Dennis Breitzman**, Area Manager, **Bureau of Reclamation**.

The Proceedings of the Seminar will be available later this year. □

## World Water Council Organized

Following several years of planning, the framework for a **World Water Council** has been established as an international non-governmental organization devoted to the efficient conservation and development of global water resources to meet the current and future needs of all life on the planet.

The World Water Council will serve as a neutral, independent forum on water issues for its members and through them, the world community. Where possible, the World Water Council will rely on existing institutions and will work synergistically with them to identify and fill existing gaps. It aims to cover all global water issues irrespective of national boundaries, political division and stages of development.

Mahmoud Abu-Zeid of Egypt has been named Chairman of the Board of Governors, and the Permanent Secretariat will be located in Marseille, France. □

## USCID Delegation Heads for Cairo

A contingent of about 40 people from the U.S. is expected to attend the **47th International Executive Council Meeting** and the **16th Congress of ICID** in Cairo, Egypt, September 15-22, 1996.

The theme of the Congress is *Sustainability of Irrigated Agriculture*. Papers by several U.S. authors were accepted for the Congress Questions, the Special Session and the Symposium.

USCID President **Herbert W. Greydanus** will lead the U.S. delegation. Current ICID Vice President **Darell D. Zimelman** and USCID representatives to ICID Committees and Working Groups will also attend the meetings. Additional USCID participants will include the presenters of Congress Papers. □

### Necrology

**James L. Ogilvie**, a long-time Member of USCID, died November 13 in Denver. He was 84. He worked for the Bureau of Reclamation and later became manager and chief executive officer of the Denver Water Department until his retirement in 1980.

**William E. Warne**, a former member of USCID, died March 9, 1996, in Menlo Park, California. He was 90. After spending nearly 25 years with the Bureau of Reclamation and the Department of the Interior, including a stint as Assistant Secretary, he served as Director of the Departments of Fish and Game, Agriculture and Water Resources for the State of California. He supervised a major phase of the California Water Project. He later became a farmer, raising walnuts and almonds. Warne helped organize the Western Study Tour following the 12th ICID Congress in 1984.

# California Water News

**Water Transfer Approved.** The first long-term water transfer under the Central Valley Project Improvement Act of 1992 guidelines was approved by the Bureau of Reclamation last fall. The water transfer application was submitted by the Central California Irrigation District on behalf of Redfern Ranches, of Firebaugh. Redfern Ranches will fallow some of its filed during the 1995, 1996 and 1997 water years to make water available for transfer. The water will be used to irrigate existing crops in three adjacent Federal water districts in 1996 and 1997.

**Interim Use of San Luis Drain.** The Bureau of Reclamation and the San Luis & Delta-Mendota Water Authority have signed an agreement to allow a 28-mile section of the 85-mile-long San Luis Drain to re-open for a two-year trial period. The agreement will allow fresh water from the Central Valley Project to be sent to important wetland habitat in California's Central Valley. Those wetlands now receive mostly agricultural drainage water which is known to be contaminated with salts and toxic chemicals, such as selenium. The agreement is an interim approach to determining the most effective strategies to better manage the drainage problems in the San Joaquin Valley. The project is expected to provide useful information in developing long-term solutions.

**DWR Issues American River Report.** The Department of Water Resources recently released a report summarizing two federal studies focusing on water issues in and near the American River Basin. A Corps of Engineers study addresses the critical need for increased flood protection for the Sacramento area. A study by the Bureau of Reclamation analyzes water supply needs, and ways to meet those needs, in five counties. To receive a copy of the DWR report, contact Ricardo Pineda at 916-653-5434. □

## Las Vegas (continued)

as water rights; conjunctive uses of water; demand management; water marketing and water transfer; and the environmental, social and economic impacts of proposed solutions to water shortages.

The Technical Sessions and Poster Session will focus on the following topics:

- Environmental Needs
- Demand Management
- Water Marketing and Water Transfers
- Social and Economic Impacts

To encourage broad representation of constituencies of both water users and providers, nearly 50 water-related groups have been invited to be **Cooperating Organizations** for the Conference.

Plan now to attend this important USCID Conference. □

## Web Site (continued)

irrigation, drainage and water resources can retrieve information on USCID, including members of the Board of Directors, USCID Committees, membership, dues, meetings and publications.

A **Resources** page lists organizations involved in water resources, allowing USCID home page users an easy way to find and link to other home pages of professional interest.

Individuals and organizations may also apply for USCID membership online and receive timely information about publications for sale and upcoming meetings.

USCID Members are encouraged to use the USCID World Wide Web address to establish hyperlinks with their business or personal home pages.

A new USCID e-mail address has also been established: [stephens@uscid.org](mailto:stephens@uscid.org).

Please review the USCID web page; your suggestions for additional features, or additional organizations for the **Resources** page, are invited! □

# Maxwell Parshall, 1908-1996

Maxwell Parshall died January 30 in Hamilton, Montana.

Mr. Parshall, a civil engineer, was associated with **Colorado State University** from 1932 through 1969, and ran the National Weather Station in Fort Collins for 40 years.

In 1983, he received the Colorado State University Engineering Dean's Council Distinguished Service Award.

Mr. Parshall's father, Ralph Parshall, was known throughout water engineering as the inventor of the flow measuring device, the Parshall Flume. □

## Missouri River Basin Report

Storage in the Missouri River reservoirs crested at 68.5 million acre-feet on July 7 after 10 consecutive months of above normal runoff. The system reached 70 percent full, according to the Corps of Engineers, Missouri River Division.

Runoff above Sioux City, Iowa, totaled 3.8 MAF in July, 120 percent of normal. Although the July runoff was high, it was a significant reduction from the February-June runoff of 164 percent of normal.

Evacuation of the excess flood water stored in the reservoirs began in earnest in July. Storage needs to be reduced to the base of the flood control pool, 57.2 MAF by March 1, 1997, to be ready to accept next year's runoff. Due to the large amount of water in storage, the 1996 navigation season has been extended by 10 days, to December 11, at St. Louis.

With normal precipitation the remainder of the year, the Corps forecasts 1996 runoff at 35.4 MAF; normal is 24.6 MAF. □

## In-Place Canal Lining Reports Available

In response to an overseas inquiry, USCID Member **Joseph B. Summers** has collected information on the Coachella Canal In-Place Lining Prototype. Copies of the reports are available on loan from USCID.

The purpose of the prototype project was to line a 1.5-mile section of the Coachella Canal, an existing earthen canal, while the canal remained in service. It was lined with PVC lining material held in place by a 3-inch-thick concrete protective cover. The project took place from during 1988-1991, which included a two-month partial suspension and a 13-month total suspension of work caused by various construction problems and the resulting need for an amended funding agreement among the funding parties, the **Bureau of Reclamation, Metropolitan Water District of Southern California** and the **Coachella Valley Water District**.

The reports include two prepared by the Bureau of Reclamation, the *Design Summary*, November 1990 and the *Technical Report of Construction*, January 1993. Other reports include articles published by the manufacturer of the in-place lining equipment, GOMACO Corporation.

Contact the USCID Denver Office to receive loan copies of the reports. □

## Cal Poly Signs Agreement with Research Center in Vietnam

The Irrigation Training and Research Center at California Polytechnic State University, San Luis Obispo, has entered into an agreement with the Research Centre for Irrigation and Water Supply of Vietnam to bring California irrigation technology to Vietnam.

USCID Member **Charles Burt**, Director of the Cal Poly Center, and Nguyen Tuan Anh, Director of the Research Centre, recently signed a memorandum of understanding in Hanoi.

The Cal Poly Center will help coordinate joint venture and marketing efforts by California manufacturers of irrigation equipment. Agencies such as the World Bank and the Food and Agriculture Organization are expected to participate in the technology transfer.

Vietnam has identified approximately five million acres of land that can be irrigated with U.S. drip and sprinkler irrigation.

While having a generally tropical climate, Vietnam has a six-month dry season during which irrigation is needed to achieve reasonable agricultural crop production. Burt said coffee, tea, rubber, pineapple and cassava could be planted in large areas of the Central Highlands, where the only feasible irrigation methods are drip and sprinkle — technologies practically unknown in Vietnam. □

## Loan Reports

The following publications and reports are available on loan from the USCID Denver office.

*Drainage and the Environment, Post-Workshop Proceedings, 6th ICID Drainage Workshop, Ljubljana, Slovenia, April 1996.*

*The Role of Advanced Technologies in Irrigation and Drainage Systems in Making Effective Use of Scarce Water Resources, Proceedings, ICID Special Technical Session, Rome, Italy, 1995. Two volumes.*

*15th ICID Congress Transactions, The Hague, The Netherlands, 1993. Volume 2, Post-Congress.*

*Catalogue of International Postgraduate Courses, 1996-1997. Infrastructure Hydraulics Environment (IHE), Delft, The Netherlands.*

*Report to the California Water Commission, September - August, 1996. California Department of Water Resources.*

*Currents, December 1995 - September 1996. Wright Water Engineers, Inc.*

*Resource Law Notes, January, April and August 1996. Natural Resources Law Center, University of Colorado.*

*Inter-American Development Bank, Annual Report 1995. Inter-American Development Bank.*

*Irrigation Business & Technology, December 1995, April and June 1996. The Irrigation Association.*

*ICID Newsletter, No. 1-3, 1996. International Commission on Irrigation and Drainage.*

*Irrigation Newsletter, March-April, 1996. Department of Irrigation, Katmandu, Nepal.*

*IWRA Update, February 1996 and Summer 1996. International Water Resources Association.*

*Water Operation and Maintenance, December 1995, March and June 1996 Bulletins. Bureau of Reclamation.*

*Water Operation and Maintenance Index, July 1996. Bureau of Reclamation.*



- National Hydrologic Outlook: Spring Flood Potential, March 18, 1996.* National Weather Service.
- Proceedings, World Food Day Symposium 1994.* Malaysian National Committee on Irrigation and Drainage.
- Finance & Development,* December 1995, March and June 1996. The International Monetary Fund and The World Bank.
- Western Water,* November/December 1995, March/April, May/June and July/August 1996. Water Education Foundation.
- The Missouri River Report,* February and August 1996. Missouri River Basin Association.
- Journal of Irrigation Engineering and Rural Planning,* August 1995 and February 1996. The Japanese Society of Irrigation, Drainage and Reclamation Engineering.
- Water International,* December 1995, March and June 1996. International Water Resources Association.
- Our Planet,* No. 5 and 6, 1996. United Nations Environment Programme.
- Resources,* Fall 1995, Winter and Spring 1996. Resources for the Future.
- The IDB,* November 1995 - July 1996, Inter-American Development Bank.
- Historical Accounts of Upper Colorado River Basin Endangered Fish,* September 1995. Recovery Program for Endangered Fish of the Upper Colorado River Basin.
- Rocky Mountain Institute Newsletter,* Fall/Winter 1995, Spring/Summer 1996.
- Water 2010, Four Scenarios for 21st Century Water Systems.* Rocky Mountain Institute.
- Floodplain Management,* Winter 1996. Texas Water Commission.
- Colorado Water,* December 1995, February, April, June and August 1996. Colorado Water Resources Research Institute.
- Watermarks,* Winter 1996. Center for Research in Water Resources, University of Texas at Austin.
- Water Current,* December 1995, February, April, June and August 1996.
- University of Nebraska Water Center/Environmental Programs.
- The AgInformer,* June 1996. JMLord, Inc.
- Water Gazette,* July 1996. Coachella Valley Water District.
- KCID Journal,* June and December 1995. Korean National Committee on Irrigation and Drainage (in Korean).
- Quarterly Newsletter,* March, June, September and December 1995. Korean National Committee on Irrigation and Drainage (in Korean).
- Proceedings, National Conference on Environmental Impact Assessment for Irrigation, Drainage and Flood Control,* June 1994. Malaysian National Committee on Irrigation and Drainage.
- IIC 1995 Annual Report,* Inter-American Investment Corporation.
- Irrigation & Drainage Research in the Agricultural Research Service,* October 1993. Current Researchers, Accomplishments Since 1987, Publications Since 1985.
- IIMI 1994 Annual Report.* International Irrigation Management Institute.
- 7th Iranian National Seminar on Irrigation and Drainage,* 1994. Abstracts of articles. Iranian National Committee on Irrigation and Drainage.
- U.S. Water News,* April 1966.
- Water Resources Development in Louisiana 1995,* Corps of Engineers.
- Small Scale Irrigation in South Africa,* October 1994. Water Research Commission of South Africa.
- Community Participation and Sustainable Development,* April 1993. Proceedings of the International Workshop on Smallholder Irrigation, South Africa.
- Non-Structural Aspects of Flood Management in Bangladesh,* July 1995. Bangladesh National Committee on Irrigation and Drainage.
- Water for Life: Water and British Aid in Developing Countries.* Overseas Development Administration.
- Journal of Hydraulic Engineering,* No. 7-12, 1994 and No. 1-9, 1995. Chinese Hydraulic Engineering Society, Beijing.
- Agriculture & Equipment International,* No. 3/4 1996.
- News and Views,* April 1995. British ICID National Committee.
- FASE Reports,* Spring/Summer, 1996. Foundation for Advancements in Science Education.
- ACWA News,* March-August 1996. Association of California Water Agencies.
- International Water and Irrigation Review,* October 1995 and April 1996.
- ODA Water,* Fall 1995 and Spring 1996. Overseas Development Administration.
- MANCID Bulletin,* 1995. Malaysian National Committee on Irrigation and Drainage.
- Water Conservation News,* July 1996. California Department of Water Resources.
- North Dakota Water,* March 1996. North Dakota Water Education Foundation.
- NRCS/RCA Issues Briefs,* September 1995 - March 1996.
- Grid, IPTRID Network Magazine,* December 1995 and March 1996. International Program for Technology Research in Irrigation and Drainage. □

## Election (continued)

A total of 253 ballots were counted by a Tellers Committee of Wayne O. Deason, John Osterberg and Larry D. Stephens.



**Grant G. Davids** is Principal, Davids Engineering, Inc., Davis, California. He received a B.S. Degree in Agricultural Engineering from California

Polytechnic State University, San Luis Obispo, in 1975. His first professional assignment involved on-farm irrigation scheduling and system design in California's San Joaquin Valley, primarily for private farming companies. From 1978 to 1981, he served as On-Farm Development Advisor to the Government of Sri Lanka on the World Bank-funded Mahaweli River Basin Development Project. In that capacity, he developed criteria and implemented procedures for development of small farms for improved irrigation of rice and other crops. From 1982 to 1993, he served as a consulting engineer with CH2M Hill in that firm's Boise and Sacramento offices and worked on a wide variety of water resources projects in the Western U.S. and Asia, including extensive project work for irrigation districts and the Bureau of Reclamation on irrigation, drainage and water quality investigations. In 1993, he founded Davids Engineering, Inc., a firm specializing in providing consulting services to irrigation and water districts and resource management agencies. He has authored more than 100 project reports and professional articles, and was an invited speaker for USCID's October 1995 Water Conservation Seminar. He is a registered agricultural and civil engineer in California; a Life Member of USCID and Life Member of the American Society of Civil Engineers; and currently serves on the Cal Poly Agricultural Engineering Department Advisory Council. For the past several years, he has served on the USCID Working Committee on Sustainable Crops and Water Use.



**Neil W. Schild** is Manager of the Water Resources Department for Montgomery Watson, Sacramento, California. He has been with Montgomery

Watson for two years in the engineering and environmental fields. He has a B.S. Degree in Agricultural Engineering from Kansas State University. Prior to joining the consulting field, he was Assistant Regional Director, Mid-Pacific Region, Bureau of Reclamation. He worked for 34 years for the Bureau of Reclamation, U.S. Geological Survey and Soil Conservation Service. He is a Registered Professional Engineer in California and is a member of USCID, and the American Society of Agricultural Engineers. He has been an active participant in USCID and ICID activities. He has prepared numerous professional papers, including the 39th International Executive Council in Yugoslavia, the 14th Congress in Brazil and the Third Pan-American Regional Meeting in Mexico in 1992. He has served as session moderator for several USCID technical meetings. He served a three-year term on the USCID Board of Directors from 1992-1994.



**Ruth M. Wright** is an Attorney in Boulder, Colorado. She graduated with honors from Marquette University and received the Juris Doctor from the University of

Colorado School of Law. She retired from the Colorado Legislature in December 31, 1994, where her service included eight years as House Minority Leader. In her law practice, she specializes in drainage and flood control law, working closely with civil engineers in the legal and professional liability aspects of their plans and designs. She has written numerous publications and reports related to the legal and environmental issues of water

resources projects. She held two gubernatorial appointments, one on the Colorado State Health Board and the other on the Colorado Water Quality Control Commission. Currently, she is a Member of the Board of Directors, Northern Colorado Water Conservancy District, and is a Member of the Great Outdoors Colorado Board of Trustees. She is a 23-year Member of USCID and actively participated in the ICID Congresses in Moscow, Athens and Grenoble. She is now serving a second three-year term on the USCID Board of Directors. □

## New Members

The following have joined USCID since publication of the last Newsletter:

### Individual Members

#### **Thomas H. Birmingham**

Civil Engineer  
1424 Hamilton Street, NW  
Washington, DC 20011  
Office: 202-882-3883  
Fax: 202-882-3883

#### **Christie Moon Crother**

Project Manager  
Eastern Municipal Water District  
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Fax: 909-929-0257

#### **Marilyn Cundiff-Gee**

Wildlife Conservation Board  
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Fax: 916-323-0280

#### **Allen T. Hjelmfelt, Jr.**

Research Hydraulic Engineer  
Agricultural Research Service, USDA  
University of Missouri,  
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#### **Brenda W. Jahns**

Deputy Attorney General  
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Office: 916-324-5476  
Fax: 916-322-2630

**Eluid L. Martinez**

Commissioner  
Bureau of Reclamation  
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Office: 202-208-4157

**Bruce C. Moore**

Manager, Resources Management  
Bureau of Reclamation  
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Sandy, UT 84092  
Office: 801-524-5415  
Fax: 801-545-3029

**Peter J. Nicholson**

Chief Executive Officer  
Carpi USA  
4150 Washington Road, Suite 207  
McMurray, PA 15317  
Office: 412-942-1360  
Fax: 412-942-1362

**Blair L. Stringam**

Research Engineer  
Utah State University  
Biological and Irrigation Engineering  
Logan, UT 84322  
Office: 801-797-2863

**Stuart Styles**

Project Engineer  
California Polytechnic State University  
233 Stagecoach Road  
Arroyo Grande, CA 93420  
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Fax: 805-756-2433

**John Tsiros**

U.S. Environmental Protection Agency  
960 College Station Road  
Athens, GA 30605  
Office: 706-546-3160  
Fax: 706-546-3340

## News of Members

**Daniel P. Beard**, former Commissioner of the Bureau of Reclamation, is now Regional Vice President of the National Audubon Society for the Rocky Mountain Region in Boulder, Colorado.

**John J. Buckley**, of Ensign & Buckley, Larkspur, California, has announced the availability of PC-WHAM<sup>®</sup>, a new computer program designed to easily analyze hydraulic transients for a typical hydroelectric power plant or pumping plant. For information, call Buckley at 415-461-2515.

The **California Department of Water Resources** has announced the retirement of Deputy Director **Carlos Madrid**, who retires after 37 years with DWR. He was in charge of the Divisions of Local Assistance, Safety of Dams and Flood Management.

**Robert D. Clark** is with the California Central Valley Flood Control Association in Sacramento, California. He also manages the Sacramento River Water Contractors Association.

**Franklin E. Dimick** has retired from the Bureau of Reclamation and is now a Senior Project Manager with HYA Consulting Engineers in Sacramento, California.

**James E. Hardee**, formerly with SFC Engineering Company, is now affiliated with Hardee Consulting, Phoenix, Arizona.

**Gilbert N. Haycock** has returned to the U.S. from Dhaka, Bangladesh, where he spent several years on an assignment with the Agency for International Development. He now lives in Aurora, Colorado.

**Dale E. Henry**, along with his wife, Jean, and two preschool sons, has moved to Tashkent, Uzbekistan. He will be studying the Russian language at the Tashkent Institute of Engineers of Irrigation and Agricultural Mechanization.

**L. Douglas James** received the *Water International* Best Paper Award from the International Water Resources Association for his paper, "Flood Action: An Opportunity for Bangladesh." He is affiliated with Utah

State University and the National Science Foundation.

**Edib Kirdar** is a Faculty Associate at Arizona State University, School of Agribusiness and Environmental Resources, Tempe, Arizona. He is also active in E.K. Associates, which provides Water Operation and Management Training Programs. He established the firm in 1990, following his retirement after 32 years of service with the Salt River Project.

**Walter H. Ochs** retired from the World Bank on May 31, 1996. He is a consultant in Annandale, Virginia.

**Arnold Rummelsburg**, retired engineer-manager of the Wheeler Ridge-Maricopa Water Storage District, received the Nationwide Public Projects Coalition's highest honor, the Needs of the People Award.

**Larry J. Schluntz** received a Superior Service Honor Award from the Bureau of Reclamation in recognition of his outstanding knowledge and dedication to water development.

**Kenneth H. Solomon** has accepted a new position as Department Head for Bioresource and Agricultural Engineering at California Polytechnic State University in San Luis Obispo, California. He will also be affiliated with the Irrigation Training and Research Center at Cal Poly. He was formerly director of the Center for Irrigation Technology, California State University, Fresno.

**George O. Thomas** has retired from the Western Area Power Administration and is now a consulting engineer in Evergreen, Colorado.

**Douglas J. Wegener** has retired from the Bureau of Reclamation.

**Kenneth R. Wright** is conducting paleohydrology investigations at Machu Picchu, Peru, and Mesa Verde National Park under archeological permits from the government of Peru and the U.S. Department of the Interior. Ancient use of water by those early civilizations is being studied with the assistance of professional archeologists familiar with the sites. Wright is a member of the Society for American Archeology. □

## USCID Notes

by Executive Vice President  
Larry Stephens

As always, things change through time, and the changes can be both good and bad, happy and sad. Among the changes in 1996 was the completion of Board of Directors terms for **Al Dedrick** and **Darell Zimbelman**. Both served six years on the Board, and Darell was President the past two years. They were outstanding to work with. Both are professionals in every sense of the word — Al and Darell truly care about USCID and ICID and represented you very well. So, it is sad that their active involvement on the Board is ended.

On the other hand, there was good news also. **Herb Greydanus** was elected President and Herb is doing an outstanding job, both as President and as Chairman of the active Committee on Competing Interests in Water Resources. And, **Grant Davids** was elected to the Board. During the two Meetings he has attended, Grant has demonstrated excellent insight. You Members should be congratulated for electing this young engineer to the Board — he will represent you well!

Further good news regarding the Board — **Ruth Wright** and **Neil Schild** were reelected for their second terms, so, fortunately, some things didn't change.

USCID is certainly involved in many activities these days. As you may have read elsewhere in this Newsletter, the Wetlands Seminar in Bismarck was a technical success, and with nearly 75 participants, it was well attended. The

upcoming Conference in Las Vegas on Competing Interests should be a big success — nearly 50 abstracts were submitted and most were accepted; will be a busy meeting, with a large poster session to accommodate all the responsive papers.

On July 16-19 next year, USCID and the Bureau of Reclamation are organizing a Conference on **Best Management Practices for Irrigation and the Environment**. The Call for Papers for this Conference was recently mailed and Abstracts are due by October 1. Please review the call and offer a paper. While some of USCID's recent Seminars have been specialized (e.g., flood management and wetlands), the Fargo Conference should be of interest to all USCID Members and to everyone professionally involved in irrigation and drainage.

Another of the positive changes this year — USCID has joined the rush to use the new communications techniques. With the services of a Denver area internet provider, USCID has an e-mail address and a page on the World Wide Web. The e-mail address is: **stephens@uscid.org**; the web page can be found at: **www.uscid.org/~uscid**. Meeting announcements, including online registration, membership information, publications and general information are on the web page. Check it out and send us your comments and suggestions for additions.

Finally, a very special *thank you* goes to USCOLD Member **Ronald E. Spath** who got the USCID web pages online. Truly an extraordinary effort as a volunteer! Thanks again, Ron! □

## USCID/ICID Meetings

### USCID

**December 5-7, 1996**, Las Vegas, Nevada. *Competing Interests in Water Resources — Searching for Consensus*.

**July 16-19, 1997**, Fargo, North Dakota. USCID Water Management Conference, *Best Management Practices for Irrigated Agriculture and the Environment*.

### ICID

**September 15-22, 1996**, Cairo, Egypt. 47th IEC Meeting and 16th Congress.

**September 15-19, 1997**, Oxford, England. 48th IEC Meeting and 18th European Regional Conference.

**November 17-21, 1997**, Penang, Malaysia. 7th ICID International Drainage Workshop, *Drainage for the 21st Century*.

**July 1998**, Jakarta, Indonesia. 49th IEC Meeting and 10th Afro-Asian Regional Conference.

**September 1999**, Granada, Spain. 50th IEC Meeting and 17th Congress.

**July 14-23, 2002**, Montreal, Canada. 53rd IEC Meeting and 18th Congress.