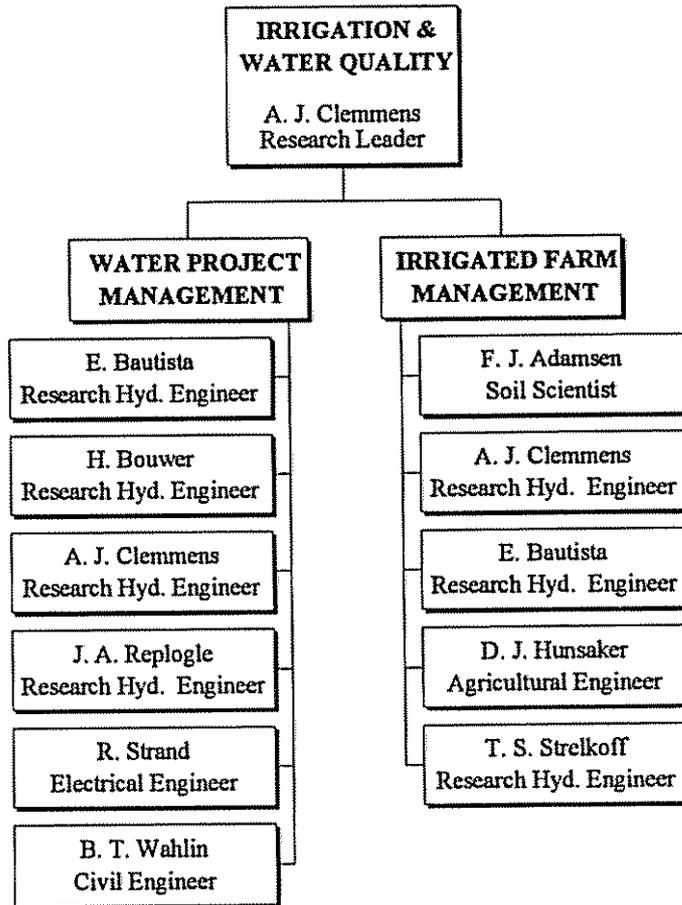


## **I&WQ Management Unit**

# I&WQ Organization



## Mission

The mission of the Irrigation and Water Quality Management Unit is to develop management strategies for the efficient use of water and the protection of groundwater quality in irrigated agriculture. The unit addresses high priority research needs for ARS's National Programs in the area of Natural Resources & Sustainable Agricultural Systems. The unit primarily addresses the Water Quality and Management National Program. It also addresses the application of advanced technology to irrigated agriculture.

## I&WQ RESEARCH STAFF



**FLOYD J. ADAMSEN, B.S., M.S., Ph.D., Soil Scientist**

Management practices that reduce nitrate contamination of groundwater while maintaining crop productivity; application of 100% irrigation efficiency; winter crops for the irrigated Southwest that can be double-cropped with cotton; contributions of natural and urban systems to nitrate in groundwater.

**EDUARDO BAUTISTA, B.S., M.S., Ph.D., Research Hydraulic Engineer**

On-farm irrigation system hydraulic modeling; hydraulic modeling of irrigation delivery and distribution systems; control systems for delivery and distribution systems; effect of the performance of water delivery and distribution systems on-farm water management practices and water use efficiency; integrated resource management and organizational development for irrigated agricultural systems.

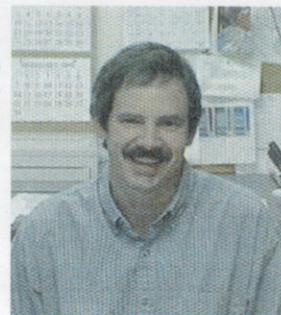


**HERMAN BOUWER, B.S., M.S., Ph.D., P.E., Chief Engineer and Research Hydraulic Engineer**

Water reuse; artificial recharge of groundwater; soil-aquifer treatment of sewage effluent for underground storage and water reuse; effect of groundwater pumping on stream-flow, surface water-groundwater relations.

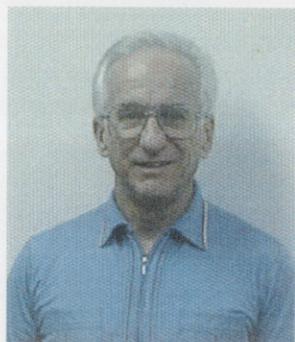
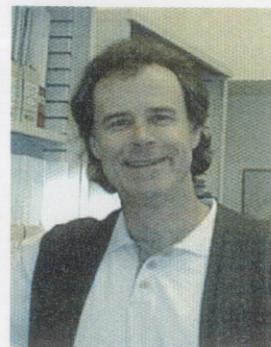
**ALBERT J. CLEMMENS, B.S., M.S., Ph.D., P.E., Laboratory Director, Research Leader for Irrigation and Water Quality, and Supervisory Research Hydraulic Engineer**

Surface irrigation system modeling, design, evaluation, and operations; flow measurement in irrigation canals; irrigation water delivery system structures, operations management, and automation.



**DOUGLAS J. HUNSAKER, B.S., M.S., Ph.D., Agricultural Engineer**

Effects of soil and irrigation spatial variability on crop water use and yield in large irrigated fields; level basin irrigation design and management procedures for applying light, frequent water applications to cotton; CO<sub>2</sub> effects, in particular, of evapotranspiration in the free-air CO<sub>2</sub> enrichment (FACE) environment; evaluation of water requirements and irrigation management of new industrial crops--lesquerella and vernonia.

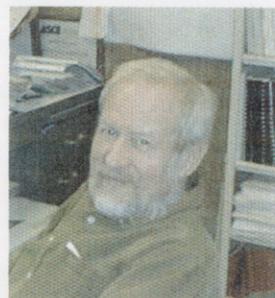


**JOHN A. REPLOGLE, B.S., M.S., Ph.D., P.E., Chief Scientist and Research Hydraulic Engineer**

Flow measurement in open channels and pipelines for irrigation; irrigation water delivery system structures, operations, and management.

**ROBERT J. STRAND, B.S., Electrical Engineer**

Automatic control of irrigation delivery systems; development and integration of field sensors, intelligent field hardware, USWCL feedback and feedforward control software, and commercial supervisory control software to create a plug-and-play control system.



**THEODOR S. STRELKOFF, B.C.E., M.S., Ph.D., Research Hydraulic Engineer**

Surface-irrigation modeling: borders, furrows, two-dimensional basins; erosion and deposition; design and management of surface-irrigation systems; canal-control hydraulics; flood-routing methodologies; dam-break floodwaves; flow in hydraulic structures.

**BRIAN T. WAHLIN, B.S., M.S., Civil Engineer**

Flow measurement in open channels and pipelines for irrigation; irrigation water delivery system structures, operations, and management.



## **IRRIGATED FARM MANAGEMENT ANALYTICAL LABORATORY**

**J. Askins, K. Johnson, and S. Colbert, Physical Science Technicians**

High performance liquid chromatography (HPLC) is used to analyze nitrate, sulfate, chloride, and bromide ions in soil samples. Total elemental carbon and nitrogen and isotopic ratios of C<sup>13</sup> and N<sup>15</sup> are determined with the mass spectrometer. The autoanalyzer, a system utilizing colorimetry to determine nitrate and ammonia content of water samples and extracts of soil samples, has been expanded to include bromide capability. The atomic absorption spectrometer has been moved into this laboratory.

In addition to running and maintaining instruments, research technicians process data and address the precision of the data. Good precision testing alerts the operator to the necessity of a rerun and informs scientists of data reliability. Technicians also weigh soil samples, combine and summarize data from HPLC, autoanalyzer, and weighings, collect samples in the field, help with irrigation and other field work, update protocols, count seeds, and perform numerous other duties as needed.