



IN MEMORIAM

James W. Biggar
Professor of Land, Air, and Water Resources, Emeritus
UC Davis
1928 – 2012

After 36 years of service, Professor James W. Biggar retired from the University of California, Davis in January 1993. Jim's remarkable career spanned the development of several state and federal water projects that forever influenced the irrigation and water landscape of California. Raised on a farm in southern Ontario, he received a B.S. degree in Chemistry at the University of Toronto (Guelph), and M.S. and Ph.D. degrees in Soil Physics at Utah State University. Jim joined the California Agricultural Experiment Station as an Assistant Irrigationist. After spending one- year as an Associate Soil Physicist at Texas A&M University, Weslaco, he eventually joined the UC Davis faculty in 1957.

Jim's timely appointment to UC Davis occurred when water projects were beginning to develop in the farm land of the San Joaquin Valley. Many questions remained regarding the quality and quantity of water resources required for both agricultural production in the Central Valley and human consumption in southern California. Jim's research focused on increasing irrigation efficiency to limit accumulation of detrimental levels of soluble salts, herbicides and pesticides in drainage and surface waters while maintaining crop production. Before his research, it was a universal practice to leach excessive solutes from soils by ponding water on the soil surface that passed through the soil profile during water- saturated conditions. He initiated basic laboratory and field research using a large array of isotopic tracers to understand and quantify the chemical and physical processes occurring as water moves through a soil. His investigations revealed that the efficiency of leaching soluble salts from an agricultural field depends upon both the rate and amount of water that is applied to the soil surface.

Jim was an extraordinary teacher who brought wisdom and knowledge to the classroom with an inspirational though perhaps wry sense of humor. He was completely committed to his students in and out of the classroom and throughout their careers. With his teaching excellence recognized by his departmental colleagues, he was soon appointed as a Lecturer and subsequently promoted to Associate Professor. Later, Jim became a Professor and Water Scientist within the College of Agricultural and Environmental Sciences. He initiated and regularly taught three upper division courses: water quality, salt control and reclamation; processes of water and soil pollution; and ecological studies of streams and ponds. His graduate level course, advanced topics in water chemistry, was truly exceptional. Each year he would supplement these courses by offering group study courses specifically designed to meet special needs of both undergraduate and graduate students. He served as the advisor for two undergraduate majors – renewable natural resources and soil and water science, and the advisor for two graduate degree programs – soil science and ecology. Jim attracted graduate students and postdoctoral scholars from around the world. He enthusiastically shared the supervision of more than 60 M.S. and Ph.D. students and more than 100 international postdoctoral and sabbatical scholars.

During the second decade of his career, Jim became interested in the spatial and temporal variability of natural field soils. Jim and his colleagues carried out unique measurements that identified the highly heterogeneous and scale- dependent nature of soil properties and soil solute transport characteristics. These measurements were followed by the development of a number of techniques for quantifying soil property variability. Published in *Hilgardia* in 1973, the study was declared an international Science Citation Classic

and in 1981, it was only the fourth such recognition from the Davis campus. That comprehensive study established research and management tools for field- scale processes and triggered the initiation of international "site- specific agriculture" symposia, now known as "precision agriculture" that convene annually throughout the world. Hundreds of scientists and engineers are now using these techniques and developing even more advanced approaches for quantifying soil heterogeneity. Jim became an internationally renowned scientist for his contributions in such subjects as chemical transport in soils, spatial variability of field soils, nitrogen pollution from agricultural operations, description and field- scale measurement of soil hydraulic properties, and the impact of soil and irrigation management on soil microbes.

In addition to teaching and research, Jim provided regular service to state, national and international agencies and professional societies. He was an editor, member, and chair of numerous committees. Jim also served many special and elected appointments and was involved in many other meetings and conferences, reviews, invited presentations, consultations, and other activities. He guided, challenged, moved, supported and inspired people and organizations alike. For his visionary leadership, he received numerous honors, awards and resolutions that include American Society of Agronomy Fellow, Soil Science Society of America Fellow and the Soil Science Research and Distinguished Service Awards of the Soil Science Society of America. Upon Jim's retirement from the Department of Land, Air and Water Resources, the UC Kearney Foundation of Soil Science sponsored an International Vadose Zone Hydrology Conference held in Davis and published its proceedings in a book to honor his professional collegiality, insight, impact and legacy.