



Serving Stewards of Western Water since 1993

BRYAN P. THORESON, Ph.D., P.E.

Project Manager/Principal Engineer

Education

Ph.D., Agricultural Engineering, University of Arizona, Tucson, AZ.

M.S., Agricultural Engineering, South Dakota State University, Brookings, SD.

B.S., Agricultural Engineering, South Dakota State University, Brookings, SD.

Professional Registrations

Registered Civil Engineer, California (No. C56194)

Registered Civil Engineer, Washington (No. 36249)

Summary

Dr. Thoreson has more than 20 years of professional experience in water resources and irrigation engineering both in the western United States and overseas. Dr. Thoreson specializes in water flow measurement and uncertainty analyses and data management, including database development for water balances, water right analysis, crop water use, land use analysis, and reservoir operations. Dr. Thoreson has worked extensively using Access and Oracle databases to store time series data for assembling and computing water balances. Dr. Thoreson has played a major role in developing water balances and quantifying water conserved by various conservation practices for irrigation and water districts in the Sacramento, San Joaquin and Imperial Valleys of California and elsewhere. These water balances have ranged from the field to basin scale and included analysis and formulation of conjunctive management strategies. Dr. Thoreson has authored more than 40 papers focusing on data management for irrigation water resources planning and management and on analysis of crop ET developed from remote sensing (SEBAL[®]) techniques.

Selected Experience

Orland Unit Water Users Association

Orland Project Regulating Reservoir--Feasibility Investigation, Final Design and Construction

Dr. Thoreson is managing the final design and construction of a regulating reservoir and related lateral improvements estimated to save about 3,400 acre-feet of water annually for the Orland Unit in the Sacramento Valley. Dr. Thoreson has guided the project from concept through feasibility, final design through contracting and ultimately construction and operation.

Imperial Irrigation District

Efficiency Conservation Definite Plan and Efficiency Conservation Program

Dr. Thoreson led the effort to develop an integrated data management system for the Imperial Irrigation District (IID) in support of on-farm and distribution system conservation programs. The data management system will enroll growers in the on farm program, manage contracts with growers and

track water conservation achieved by these programs documenting IID's water conservation to meet the Colorado River Quantification Settlement Agreement (QSA) requirements. Dr. Thoreson developed a semi-automated water balance including the water distribution system, irrigated lands and drainage system tracking surface water imports and rainfall. This semi-automated water balance, programmed in IID's Water Information System (WIS), assembles flow records and computed estimates for other flow paths from the WIS into monthly and annual system water balances. Dr. Thoreson has developed a 13-year field scale data set detailing land use and quantifying crop season water balances to support the efficiency conservation program implementation. Models run daily and monthly tracking water use and conservation. The data continues to grow as the models continue to track water deliveries and ET estimates.

Turlock Irrigation District

Turlock Irrigation District Water Management Planning

In 1998, Dr. Thoreson developed a database used to complete a 25-year water balance for Turlock Irrigation District in support of the District's Agricultural Water Management Plan (AWMP). This AWMP was developed under the guidelines of the Agricultural Water Management Council created by the Agricultural Water Suppliers Efficient Water Management Practices Act and approved in 2001. Dr. Thoreson served as the project manager and lead engineer for updating the water balance through 2008 and to update the initial AWMP. An assessment of accuracy and computation of confidence intervals for each flow path in the water balance was also completed. In 2011, Dr. Thoreson led the development of a semi-automatic TID water balance application. The application was programmed in an MS Access database. With this application, TID is able to complete each year's water balance analysis soon after the calendar year ends.

South San Joaquin Irrigation District

Water Balance Assessment and Boundary Flow Measurement Plan

Dr. Thoreson served as project manager and lead engineer for the development of a water balance for South San Joaquin Irrigation District (SSJID). Technical aspects of Dr. Thoreson's work involved estimates of flow measurement accuracy and formulation of seepage estimates and a root zone water balance to estimate evapotranspiration of applied water. Dr. Thoreson worked closely with SSJID staff to develop the water balance and understand and recommend improvements to the District's flow measurement and data management programs. SSJID acted on the water balance assessment recommendations by engaging Davids Engineering to develop a boundary flow measurement plan to strengthen the District's water measurement program. This three-year plan to improve water measurement was adopted by the District's Board in 2011. When called upon, Dr. Thoreson continues to support SSJID with water measurement improvements.

Benton Irrigation District

Comprehensive Water Conservation Plan and Feasibility Investigation

Dr. Thoreson served as project manager and lead engineer for the development of a water conservation plan for Benton Irrigation District (BID). Through incentives offered to irrigation districts to improve efficiency, the Bureau of Reclamation and Washington State Department of Ecology are working to improve conditions for anadromous fish in the Yakima River. Primary objectives are to reduce diversions and sediment-laden irrigation return flows to the river. Technical aspects of Dr. Thoreson's work involved formulation of a district water balance and estimation of crop ET by traditional and remote sensing (SEBAL[®]) techniques. The water balance results were used to assess individual water conservation opportunities and formulate alternative conservation improvement programs. The Phase

1 Plan was approved by a Federal-State Program Review Committee leading to approval to proceed into Phase 2 Feasibility Investigation. Dr. Thoreson played a key role in the Feasibility Investigation by refining the timing and quantities of water conservation and the benefits to the Yakima River. The project was approved for funding by the Bureau of Reclamation and Washington State Department of Ecology, and is currently being constructed.

Professional Organizations

American Society of Agricultural Engineers

American Society of Civil Engineers

U.S. Committee on Irrigation and Drainage (Life Member):

- Associate Editor of Irrigation and Drainage Managing Water for Sustainable Agriculture (2000-present)
- Board of Directors (2009-present)

Publications

Dr. Thoreson has authored numerous project reports and professional papers.