WILLIAM J. DUNN, Ph.D.
SENIOR ENVIRONMENTAL SCIENTIST

Dr. Bill Dunn has 45+ years of work experience as an environmental and water resources scientist, systems ecologist and project manager. Throughout his professional career, Dr. Dunn's project work has focused on helping private and public-sector clients meet their water use needs while protecting the long-term health and integrity of natural systems, and surface and groundwater sources. From 1986 to 2006, Dr. Dunn was a senior environmental and water resources scientist at CH2M HILL. He was the firm's regional director for water resources and environmental services in an 11-state southeast region; his responsibilities included direction of watershed and large ecosystem studies, riverine and estuarine watershed assessment, and restoration. This work covered projects from Florida to New England, and across the Gulf coast from Florida to Texas. Dr. Dunn started Watershed Connections, Inc. in 2006, to provide senior environmental sciences support to the St. Johns River Water Management District in water supply planning, water resource investigations, development of protective constraints for wetlands, lakes, rivers, springs, and estuaries, technical peer review of District's proposed minimum flows and levels. In 2010, Dr. Dunn was a founding partner and principal scientist for Dunn, Salsano & Vergara, LLC. In early 2019 Dr, Dunn joined Barnes Ferland and Associates, Inc. as a senior environmental scientist.

Years of Experience: +45

Education:

- Ph.D., Systems Ecology, University of Florida, 1989
- M.S., Botany, University of Florida, 1982
- B.S., Biology, Tufts University, 1976

Experience Highlights:

- 45 years leading Environmental Science Projects
- Long career in support of SJR Districts water management missions, contracting began in 1995
- Completed dozens of Environmental Assessments of watershed systems, headwaters to estuary
- Has developed numerous environmental criteria for prevention of harm for the District and CFWI.

Select Project Experience

St. Johns River Water Management District Water Supply Planning & Water Resources Management - Beginning in 1995 Dr. Dunn began supporting two of the District's missions: water supply planning, and water resources management.

- Dr. Dunn has been developing and implementing field sampling for baseline characterization studies and impact monitoring programs for over 40 years. He led SJRWMD's efforts to develop its District-wide adaptive management monitoring plan for water resources and assisted the District with design of its minimum flows and levels (MFL) monitoring network. The assessment includes integrating the District's water resources monitoring network in the upper and lower Floridan, intermediate aquifers, surficial aquifer system, lakes, wetlands, rivers and streams, and springs.
- Dr. Dunn led efforts by SJRWMD to demonstrate wetlands augmentation as an approach for avoiding environmental impacts resulting from groundwater withdrawals. Four pilot projects are underway to assess the environmental performance and cost of wetland impact avoidance. Direct augmentation using raw ground water (two sites) and retained surface water (two sites) is being tested. Questions regarding the feasibility of full-scale wetland augmentation as a water management approach are being answered, including the:
    - Volume of water required to maintain the hydrologic regime
    - Most efficient means of applying water to wetlands, spatially and seasonally
    - Ecological response of wetlands to augmentation
    - Methods providing greatest ecological response for the cost
- Dr. Dunn developed and implemented a hydrological and biological monitoring plan for each augmentation project. He directed the baseline sampling at each site and is currently overseeing the operational monitoring. For one of the augmentation projects, Bennett Swamp, a 3,000-acre forested wetland in Volusia County, Dr. Dunn's project team had to set rehydration. This was accomplished by evaluating current and historic hydrologic regimes in the swamp. Field measurements of vegetative and soil indicators of hydrology were compared to modeled stage-duration curves for historic conditions. Biological indicators of current water levels were shown to be well below historic levels. Historic impacts from surface water alterations and ground water withdrawal have shifted the stage-duration curve,

with the greatest impact in the range of the frequent low to average portions of the curve. Comparison of modeled and field estimated curves provided a useful tool for hydrologic projects. In Bennett Swamp, a 1-foot increase in the stage curve was recommended as an initial rehydration target.

- Dr. Dunn has also provided peer review of MFLs set by SJRWMD for the Wekiva and St. Johns Rivers. As part of this peer review process, he visited field monitoring sites and evaluated the effectiveness of the monitoring programs, data collection, data analysis, and interpretation.
- Dr. Dunn was CH2M HILL's lead scientist for District-wide water supply planning with SJRWMD. The project was a comprehensive investigation of alternative water supply strategies for those areas of the District projected to have severe impacts to wetlands and other natural systems due to groundwater withdrawal within a 25-year planning period. Dr. Dunn led several key parts of the investigation: (1) development of impact assessment and mitigation costing methodologies for potential impacts of aquifer and water table reductions on wetlands and other natural systems, (2) development of projections of extent and degree of potential future impacts, (3) estimation of basin-wide wetland mitigation costs associated with projected future groundwater pumping scenarios, (4) development of strategies to avoid impacts to natural systems and development of strategies to mitigate for permitted and unpermitted impacts, and (5) design and implementation of four wetland water level augmentation demonstration projects.
- Under the Water 2020 program, Dr. Dunn was one of CH2M HILL's key senior water resources staff to assist SJRWMD with future water supply planning efforts. The program goal was to identify sources and projects sufficient to meet year 2020 water supply needs for public and natural systems. On behalf of the District, Dr. Dunn led the facilitation efforts for the development of the water supply plan for the East Central Florida Planning area, which included Orange, Lake, and Seminole Counties. This area comprises the largest population center in the District.
- In addition, under the Water 2020 program Dr. Dunn chaired the Environmental Constraints Subcommittee. This subcommittee developed approaches for incorporating withdrawal constraints to protect critical natural resources, MFLs, native vegetative communities, prevention of salt-water intrusion, and minimized effects on existing legal users. The water resources constraints are incorporated into an optimization and decision model that is linked to SJRWMD's integrated surface water/groundwater model.
- Dr. Dunn assisted SJRWMD with developing and implementing an adaptive management program for water resources management in the District. Water supply planning conducted by SJRWMD showed a finite limit to the amount of groundwater withdrawal that can be sustained without causing adverse impacts to the water resource and dependent natural systems. To be better prepared for managing water resources, SJRWMD adopted an adaptive management approach for water supply management. Dr. Dunn led the team that developed a regional water resource monitoring plan for the water resource caution areas.
- Dr. Dunn served as an expert witness for SJRWMD on three past occasions. His areas of expertise included water resources, lake and wetland ecology, lake and wetland hydrology, environmental monitoring, data collection and analysis, and effects of groundwater withdrawals on the surficial aquifer. In this capacity he reviewed documents and depositions, prepared summaries of technical issues, conducted field surveys and investigations, gave depositions and provided expert testimony in court and administrative hearings.
- Dr. Dunn served for three years as independent Scientific Peer reviewer for MFLs established by the SJRWMD; provided technical peer review oversight for District's program to set protective flows and levels for wetland and aquatic systems within the District. Peer review efforts included review of MFLs for rivers (St, Johns, Ocklawaha, Silver, Wekiva and Blackwater), lakes (Geneva, Cowpen, Tahoe, Poinsett, Apshawa), and freshwater springs (Wekiwa, Rock, Silver, Green, Gemini, and Ponce DeLeon).

City of Ocala Constructed Wetland for Treatment and Recharge of Reclaimed Water - Dr. Dunn was the senior environmental scientist on design and permitting of innovative approach for a groundwater recharge and treatment wetland project for City of Ocala. He led the successful feasibility assessment of the project concept. He then served as environmental permitting lead on the design and permitting phase of the project which was completed in mid-2018. This project reduced the City's nitrogen loading footprint. The project will also increase the recharge to the Upper Floridan aquifer benefitting the Silver Springs system. Project had garnered significant support from the SJRWMD public, elected officials.

DONTHAMSETTI RAO, Ph.D.
SENIOR WATER RESOURCE ENGINEER / SCIENTIST

Dr. Donthamsetti Rao is a Senior Engineer / Scientist working as a contract employee with Barnes, Ferland and Associates, Inc. since 2017. He has a strong background in hydrology/hydraulics/water resources with over 40 years of professional, research, and teaching experience. He has over 70 publications to credit (reports of special investigations and research papers). Over 30 years of professional experience gained primarily at the St. Johns River Water Management District (SJRWMD) includes special investigations covering a broad range of water resource problems: resource analysis (streamflow, rainfall, spring discharges, and water levels); floodplain analysis; water supply potential determination; minimum flows and levels determination; salinity control analyses; impacts of spring-flow reductions on ecology; environmental hydraulic/hydrologic criteria analyses, and; modeling of flow in rivers and reservoirs for finding solutions to many water resource related questions. At the SJRWMD, he held a series of positions that grew progressively in responsibilities and stature: Hydrologist III/IV, Engineer IV, Supervising Professional Engineer, Chief Hydrologic Engineer, and Senior Engineer Scientist. In these capacities, he served as principal investigator, principal modeler, project manager, and supervisor for numerous water resource studies. He also provided litigation support as an expert witness.

Years of Experience: +40

Education:

- BS Civil Engineering
  Indian Institute of Technology, Kharagpur
- MS Water Resources/Ground Water Flow
  Indian Institute of Technology, Kharagpur
- MS Hydrology and Water Resources
  Georgia Institute of Technology
- PhD Hydrology and Water Resources
  Georgia Institute of Technology

Professional Registration

Florida Professional Engineer,
No. 25575 since 1979-2022,
License will be renewed as
needed.

Experience Highlights:

- 35 years leading hydrology/hydraulics/ water resources projects
- Served as Chief Hydrologic Engineer and Senior Engineer Scientist with SJRWMD

Select Project Experience

Southwest Florida Water Management District General Engineering Services Contract - Data Assessment for HEC-RAS Unsteady Flow Modeling of Upper Peace River, Florida/2022/ - The HEC-RAS steady flow model was developed by the SWFWMD in support of previous minimum flow evaluation of the Upper Peace River. Model calibration and verification are anticipated to be included as part of the Minimum Flows and Levels (MFLs) re-evaluation. Working as a contract employee with BFA, Dr. Rao performed detailed reviews and recommendations of existing: 1) HEC-RAS Steady Flow Model; 2) Flow and Stage Data; 3) Topographic and Bathymetric Data and 4) Structure Data. He also prepared a Review and Recommendation Memo and Summary Report and Conclusions.

Suwannee River Water Management District General Engineering Services Contract - Minimum Flows and Levels (MFLs) Peer Review for Lakes Alto, Butler, Hampton and Santa Fe, Florida/2021/- Working as a contract employee with Dunn, Salsano and Vergara Consulting, LLC , Dr. Rao participated the technical peer review of four lake MFLs developed by the SRWMD. For this peer review, Dr. Rao served as an expert in hydrology, hydraulics, and modeling. Dr. Rao's technical reviews covered independent review and critical evaluation of all information used for the hydrology, hydraulics, time series, water budget and surface water modeling used develop the recommended MFLs for each of the four lake systems. Dr, Rao developed detailed comments and recommendations with detailed supporting narrative. Reviewer's comments were collectively submitted to SRWMD with a written report that included a summary of all substantive comments.

City of Ocala Wetland Treatment & Recharge Park/2018/ - This innovative project uses a constructed wetland system to treat and recharge reclaimed water. Project will significantly reduce the City's total nitrogen loading to the Upper Floridan aquifer (UFA), playing a key role in the City's nitrogen reduction goals set under the Silver Springs-Sliver River TMDL/BMAP. The project will also increase recharge to the UFA benefitting the Silver Springs system. The projected garnered strong support and significant cost share funding from public, elected officials, and permitting agencies (FDEP and SJRWMD). Dr. Rao provided technical review of hydraulic design for design and permitting of the City of Ocala's Wetland Groundwater Recharge Park. In this senior review role, Dr. Rao worked in support of Dr. Bill Dunn the project's senior environmental scientist from start to finish through initial feasibility evaluation, design, and permitting.

City of Ormond Beach (COB) Consumptive Use Permit (CUP) Renewal/2022/ - The COB CUP expires during 2024 and water use needs are projected to increase. Since 1994, BFA has assisted COB with water resource evaluations and CUP renewals that involved water use projections, groundwater flow modeling, wetlands impact assessment and compliance monitoring programs. Working as a contract employee with BFA, Dr. Rao performed statistical analysis for 10 wetland sites and two MFL lakes at COB's Rima Ridge Wellfield. He compared rainfall, water levels and wellfield pumpage data to evaluate causative effects and potential wetland impacts.

St. Johns River Water Management District - Evaluation of Minimum Flows and Levels (MFLs) for the Rainbow River/2011/ This was a cooperative project between SJRWMD and SWFWMD. Dr. Rao performed data development for minimum flows and levels determination of the Rainbow River in SWFWMD. The tasks involved analysis of historic stage and discharge data, and location-to-location correlations by HEC-RAS modeling for the existing and a variety discharge withdrawal conditions.

St. Johns River Water Management District - Minimum Flows and Levels (MFLs) determination of the Silver and Ocklawaha Rivers/2011/ - Data development for minimum flows and levels (MFLs) determination of the Silver and Ocklawaha Rivers in SJRWMD. The tasks involved analysis of long-term (historic) stage and discharge data, and location-to-location correlations by HEC-RAS modeling for the existing and a variety discharge withdrawal conditions.

St. Johns River Water Management District Upper St. Johns River Basin Flood Control and Environmental Restoration Project/2011/ - This was a cooperative project between SJRWMD and Army Corps of Engineers. The Upper St. Johns River Hydrologic Simulation Model (USJHSM) was developed using NRCS methods based on the use of SCS runoff curve numbers. Dr. Rao fully expanded the USJHSM with additional subroutines/procedures to incorporate various intricacies of the basin, and thoroughly calibrated the model. It became the primary model used for evaluation of basin conditions under various project scenarios from 1980-2011. He prepared a 1200- page model documentation report.

St. Johns River Water Management District Upper St. Johns River Potential Water Supply Yield Determination at S.R. 50 with MFLs as Constraint/2007 - 2009/ Dr. Rao was Principal investigator and Author. Using both USGS monitored discharge data and the model simulated data the study evaluates potential water supply yield of the Upper St. Johns River at S.R. 50. Special Publication SJ2009-SP2.

St. Johns River Water Management District Evaluation of Minimum Flows and Levels for the Wekiva River at the State Road 46 Bridge using the 1935- 2004 USGS Streamflow Data/ 2006 - 2008/ MFLs for the Wekiva River were established in 1992 and verified in 1994 based on USGS monitored discharge data for the period 1936 – 1990. A reevaluation of MFLs is required using the 1936 – 2004 USGS data because over 10 years passed since the last verification. This staff member compiled the data and conducted pertinent analyses and produced relevant graphs to complete the re-evaluation process. Special Publication SJ2008-SP3.

St. Johns River Water Management District Verification Study of Minimum Surface Water Levels for Lakes in the MFLs Program/2004 - 2005/ - SJRWMD has over 100 lakes within its jurisdiction. The District established MFLs for all the lakes, but verification of MFLs was not completed. Verification of MFLs entails producing simulated data for the lakes for a period of 30 years or more under the 'current' conditions and evaluate MFLs and examine whether the MFLs are being met. Since producing modeled data for 100 lakes is a long-term process, a project was assigned to this staff member to verify MFLs based on the available observed stage data. This staff member evaluated the MFLs for the 100+ lakes by various data evaluation computer programs (which he himself developed in the past) and producing the MFLs graphs by Grapher. Technical Memorandum (2005).