

US EPA ARCHIVE DOCUMENT

Assessing Florida's large rivers: GIS-based data-mining and the impacts of the Atlantic Multi-decadal Oscillation

James A. Gore, Environmental Science, Policy and Geography University of South Florida - St. Petersburg

Barnali M. Dixon, Andrew F. Casper, Environmental Science, Policy and Geography University of South Florida - St. Petersburg

As an outgrowth of our work to establish state-mandated MFL's (minimum flows and levels), we have discovered that standard time-series analysis of the previous two decades of flow do not adequately provide management answers for appropriate flow regimes. There are distinctive flow patterns related to the AMO (Atlantic Multi-decadal Oscillation). These have distinctive impacts upon Northern Flow Pattern rivers, now entering into a dry tri-decade, and Southern Flow Pattern rivers, now entering into a wet tri-decade of rainfall patterns. From our research on the Peace River (SRP), we have found that different fish species dominate community structure in wet versus dry tri-decades. We have been using a GIS-based water flow and quality simulation (SWAT) to understand changes in water quality and quantity based upon changes in land-use over the past 60 years. Although only in the initial phases of work, we hope to use these data to predict changes into the future as well as recreate the water quality, flow patterns, and fish and benthic invertebrate community structures based upon changes in channel geometry, hydrographic patterns, and habitat requirements of resident biota by creating an interface between SWAT and the instream flow model, PHABSIM.

Dr. James A. Gore is Professor and Chair of Environmental Science, Policy and Geography at the University of South Florida, St. Petersburg. Jim received his BA degree from the University of Colorado and MA and PhD degrees from the University of Montana. Dr. Gore has held professorships at the University of Wyoming, the University of Tulsa, held the Eminent Scholar Chair in Environmental Science in the Troy State University system and, prior to coming to USFSP, was Professor and Chair of the Department of Environmental and Health Sciences at Columbus State University. Jim is a Fulbright scholar having held senior research fellowships in Israel (six weeks) and southern Africa (12 months). Most recent publications include "Preliminary Analysis of Habitat Loss for Target Biota in Rivers Impacted by Long-Term Flow Increases from CBM Production" in the Proceedings of the 9th International Petroleum Environmental Conference, several papers in press, and several book chapters including "Ecohydrology of lotic invertebrates" and "The Benefits and Dangers of Ecohydrological Models to Water Resource Management Decisions" which will appear in *Ecohydrology: Processes, Models and Case Studies*. An approach to the sustainable management of water resources (CABI Publ., London).