

TOWARD A DYNAMICAL, TRANSDISCIPLINARY MODEL OF A WATER-SUBSIDIZED SYSTEM

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The Tempisque-Bebedero watershed is a highly interconnected watershed, with complex dynamics between both social and environmental variables. In such a system, it can be difficult to compare the effects of potential management choices due to unexpected interactions and unintended consequences. Mathematical modeling can shed light on these interactions and potential tradeoffs by operationalizing the system dynamics through carefully chosen model outputs. To appropriately choose these outputs, input from relevant stakeholders was solicited through a scenario planning workshop. Stakeholder perceptions of important and well-understood drivers of change within the basin contributed to model output selection. Additionally, ecological and environmental variables representing Water Institute Graduate Fellow (WIGF) research were included. To operationalize the model, expertise from the WIGF cohort was utilized: Oswaldo Medina's anthropological network research provided the basis for novel quantitative modeling of governance. Incorporating ecological degradation of the wetland via cattail invasion drew from Stefano Barchiesi's research in Palo Verde National Park. Caroline Huguenin's work lent perspective on unique climatic conditions and perturbations in Northwest Costa Rica. Stability analysis of the model was then used to explore resilience implications of various policy and management decisions, with applications to other watersheds with complex interactions. Methods and preliminary results are presented.