Assessing the role of natural flow variability and the impact of flow standards on Maine's surface waters

THE NEED

The State of Maine's efforts toward implementing an effective framework for water use regulation (Chapter 587) directly contribute to the broad goal of sustainable use of water supplies. The complexity of the problem (hydrologic, ecological, climatic and socioeconomic) necessitates an ongoing dialogue with stakeholders, policy makers and managers at all levels of decision-making. In this inclusive process of stakeholder input and discussion of all concerns, the role of research on pertinent issues is one of filling knowledge gaps and providing improved decision support tools for informed deliberations. To this end, this project focuses on the assessment of the role of natural hydroclimatic variability on Maine's surface waters, their impact on flow metrics and rules for reliable water supply, and finally an assessment of the extent to which new rules impact ecosystem health (quantified as ecologically-relevant metrics of flow). Within the context of the ongoing rulemaking efforts for water use (co-PI Courtemanch being the lead-author of the current draft), this research is firmly embedded in the statewide process of responding to stakeholder concerns and promoting sustainable water use to balance human and ecological flow needs.

OVERVIEW & OBJECTIVES

The project seeks to provide a detailed assessment on the incipient and ongoing hydroclimatic change in Maine, and how these changes map onto the scales and metrics relevant to the Chapter 587. A key objective of this project is to generate usable scientific information regarding hydroclimatic variability and change that can be used for a systematic analysis and review of the flow thresholds within the Chapter 587.

PROJECT PLAN

The following research foci will be pursued:

- A systematic diagnosis of the changes in the magnitude and timing of streamflow, and identification of the large-scale climatic analogs that are drivers of this hydrologic change, on interannual-to multidecadal and longer time scales.
- An assessment of the State of Maine's Sustainable Water Use and instream flow standards within the context of changing climate and characterize the associated uncertainty.
- A comprehensive assessment of the statewide streamflow variability based on the suite of metrics consistent with the Indicators of Hydrologic Alteration approach. On multiple time scales, assessment of the relative sensitivity of these metrics to recent trends in the magnitude and timing of streamflow.

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