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From Cobbles to Causation: Translating Flow Ecology Relationships to Management Actions

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Abstract

The Ecological Limits of Hydrologic Alteration (ELOHA) framework uses relationships between changes in hydrology and changes in ecology to establish targets or thresholds that can be used to guide flow management decisions that protect stream health. However, the translation of ELOHA-derived relationships to management actions requires numerous decisions that are typically made after the analyses are complete. An alternative is an iterative process wherein decisions are informed by desired management endpoints and constraints (e.g., legal requirements to avoid flooding). For example, the choice of ecological endpoints (e.g. community, trait based, or indicator species) should be informed by established management goals and the combination of stressors that co-occur with hydrologic alteration. Similarly, the appropriateness of hydrologic metrics (e.g., base flow magnitude, low flow duration, storm flow recession rates) will vary based on the management goals, existing, and competing needs for water resources. Successful implementation of the ELOHA framework requires translation of these complex relationships to readily interpretable tools and thresholds. We explore examples of how these challenges are being addressed through case studies involving development and implementation of flow-ecology relationships.