How does flow regulation affect riverine fishes?

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Our group’s integrated research program is focused on the response of fishes to regulated flow regimes. Using a combination of field-based and laboratory studies, our graduate students (4) are testing predictions that deal with the consequences of winter flow regulation on egg/alevin survival and development, pre-smolt survival and smoltification, as well as seasonal changes in stream fish assemblages and population dynamics. While focused on flow variation, concomitant changes in physicochemical environmental attributes (i.e., , dissolved oxygen, water temperature, and ice dynamics) are also being investigated to assess their importance in affecting biological response. Preliminary results from the Atlantic salmon egg survival research in the Tobique River basin (northern NB) indicate that regulated headwater reaches experience accelerated egg development but the lowest average survival and highest variability in survival to eyed and hatch stages of development. Complex interactions between hyporheic dissolved oxygen in redds and fluctuating river stage may be contributing to reduced survival during early spring. The experimental work showed no differences in winter survival, condition, or growth of pre-smolt salmon subjected to diel flows 2-4 times greater than in control tanks. Collectively, such studies are fundamental to quantifying the potential impacts of flow regulation on fish productivity so that effective mitigative measures can be adopted.