

Public Preferences for Ecosystem Services from Dam Removals: A Nonmarket Valuation Approach to Improve Decision-Making

By Ben Blachly

January 2019

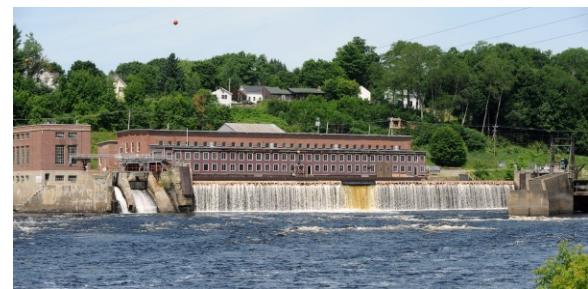
Why do we need nonmarket valuation?

In many cases, decisions about dams rely on cost-benefit analysis. Is it more cost effective to maintain, upgrade, or remove a particular dam? A shortcoming of this approach is that markets do not exist for many of the ecosystem services that are potentially affected by the decision. Lacking reliable price information, values of such ecosystem services are omitted from cost-benefit analyses and thus are likely to be underprovided. Nonmarket valuation allows us to uncover those prices so that decisions about dams can more easily incorporate a wider range of impacts.

What are the goals of this research?

This research has two primary objectives. The first is to understand public preferences about tradeoffs between ecosystem services from dam management. The estimates reflecting public preferences can then be coupled with simulated tradeoffs in production of ecosystem services (e.g., production possibility frontier work by Roy et al (2018)) to understand socially-preferred decisions about dams.

The second objective of this research is to improve our understanding of how uncertainty in changes in ecosystem services (e.g., imperfect predictions about the impact on fish



Gulf of Maine Atlantic salmon are an endangered species and a key beneficiary of dam removals in the Penobscot, like the removal of the Veazie Dam completed in 2013.

populations) and geographic scale affect nonmarket valuation estimates of ecosystem services from dam removals. The individual roles of these two factors as well as their interaction are important for interpreting the results of nonmarket valuation studies. It also has critical implications when applying derived value estimates to alternate sites and scales, a process known as benefit transfer.

Where and how is the study being conducted?

The study involves administering a mail survey to residents of the Penobscot watershed in Maine. The setting is appropriate for a few reasons. First, the Penobscot is home to two recent high-profile dam removals so local residents are likely to have some familiarity with the issue. Second, the Penobscot watershed is composed of five sub-watersheds, allowing us to easily vary the geographic scale at which the valuation is framed (Figure 1).

What have we learned so far?

Preliminary results suggest that nonmarket values are highly sensitive to geographic scale. For example, the average marginal willingness to pay (WTP) for endangered *Atlantic salmon* is about twice as high when elicited at the smaller geographic scale compared to the larger scale. Additionally, different preferences for environmental risk appear to be an important driver of differences in WTP. The next step is to explore how different approaches to modelling risk preferences can allow results from one scale to be transferred to another. Reduction in the magnitude of 'transfer errors' would allow nonmarket values estimated at one scale to readily enter the decision calculus of stakeholders operating at varying scales.

Researchers

Ben Blachly, PhD candidate, Department of Environmental and Natural Resource Economics, University of Rhode Island (ben.blachly@uri.edu)

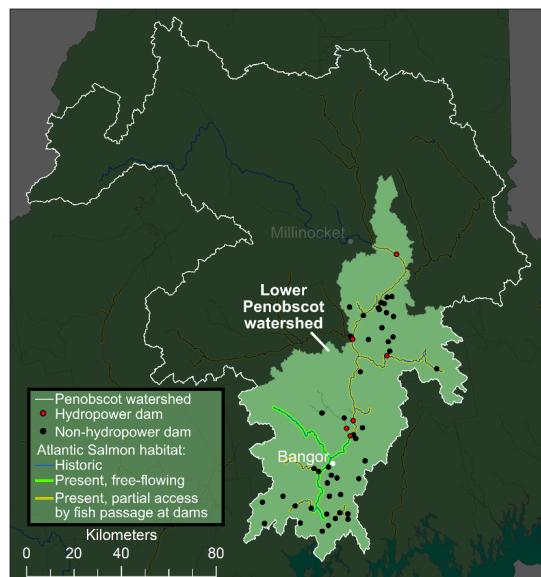
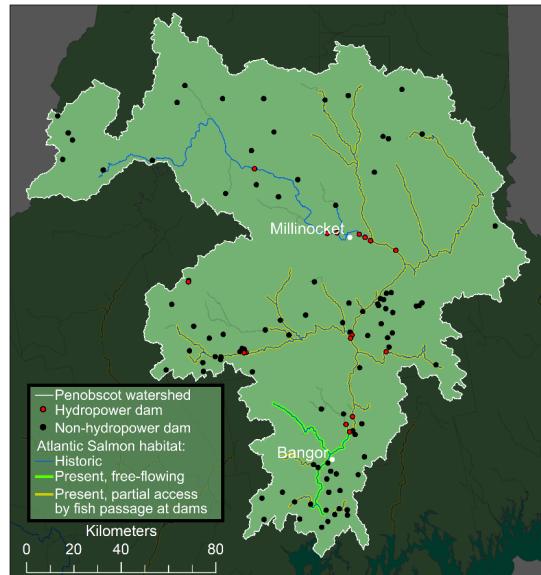


Figure 1. Dams and Atlantic salmon habitat shown at the two geographic scales: Penobscot watershed (top) and Lower Penobscot watershed (bottom).

Emi Uchida, Professor, Department of Environmental and Natural Resource Economics, University of Rhode Island (euchida@uri.edu)

Samuel G. Roy, Postdoctoral Fellow, Mitchell Center for Sustainability Solutions, University of Maine (samuel.g.roy@maine.edu)

Funding

Support for the NH EPSCoR Future of Dams Project is provided by the National Science Foundation's Research Infrastructure

Improvement NSF # IIA 1539071. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

