

Collaborative valuation of ecosystem services to inform lake remediation

Danielle Spence, Global Institute for Water Security & the School of Environment and Sustainability, University of Saskatchewan; Helen M. Baulch, Global Institute for Water Security & the School of Environment and Sustainability, University of Saskatchewan; Patrick Lloyd-Smith, College of Agriculture and Bioresources & the Global Institute for Water Security, University of Saskatchewan

Cultural eutrophication and harmful algal blooms (HABs) are complex, costly issues facing decision makers. When designed in collaboration with impacted communities, economic valuation of lake ecosystem services (ES) can contribute to informed environmental decision-making by quantifying the economic benefits of lake restoration and understanding the trade-offs people are willing to make amongst ES. In this research, we collaborated with a community to develop and implement a discrete choice experiment survey to understand people's preferences and willingness to pay for restoring Elk/Beaver Lake, Canada. Elk/Beaver Lake has been experiencing worsening water quality issues, including more frequent, longer-lasting HABs. Survey respondents indicated that these water quality issues impacted their use of Elk/Beaver Lake, with most respondents suggesting they did not feel safe swimming in or allowing their pets drink from the lake. Choice models were used to analyze responses to the choice experiment survey, demonstrating that the aggregate annual economic benefits of lake restoration across different model specifications ranged from \$27 to \$55 million, which is substantially greater than estimated costs of lake restoration. Model outputs also reveal that survey respondents had strong preferences for non-use ES, such as biodiversity, whereas preferences for recreational fishing were more divided, suggesting that for this lake, prioritizing lake health and biodiversity is a collective priority. The results of this study (i) contribute to the growing literature showing substantial benefits to society from restoring lakes, and (ii) demonstrate that collaborative valuation techniques are a valuable tool for informing lake decision-making by revealing acceptable trade-offs and priorities amongst lake ES.