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Benefit Transfer And Ecosystem Services: Linking Water Quality And Recreation In North Carolina

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Water quality plays an integral role in the provision of several ecosystem services including water recreation, drinking water, and commercial fisheries. It is closely tied to upstream land use patterns in that greater degrees of agricultural and urban use generally mean degraded water quality. Nitrogen concentrations are a prominent indicator of water pollution, frequently leading to algal blooms which in turn cause fish kills and unappealing odors and appearance. As such, water quality may influence the water recreation decisions of individual recreators, who tend to prefer higher water quality and are willing to pay for it. This paper employs the benefit transfer method to estimate the economic benefits of freshwater-based recreation in response to changes in ambient water quality. Benefit transfer methods apply valuation results produced in prior research to a new context and conserve time and resources by obviating the need to carry out an original study. With the Neuse Basin in North Carolina as the study area, we implement a function transfer drawn from the results of a random utility maximization travel cost model estimated for the eastern half of North Carolina. This model infers a value for changes in water quality by examining recreation sites choices and the sites' respective trip costs and ambient water quality. We calculate economic benefits for the baseline scenario and a scenario producing a change in the water quality variable total nitrogen. The chosen scenario involves increased corn production and a drop in forest and pasture acreage driven by the current push for ethanol. This shift leads to more nitrogen loading in waterbodies and decreased recreation value. We find that for a 20% increase in ambient nitrogen concentration, per trip losses for water recreation range between \$0.55 and \$1.40. Annual aggregate losses are estimated at approximately \$800,000 for the Neuse Basin. The results show that benefit transfer can be a useful means to estimate ecosystem benefits from land use changes.