SUMMARY

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Advancing Methods for Valuing Recreation

MacNair, D., G. Parsons, T. Tomasi, and H. Byrd. 2021.
Trip equivalency for economic valuation in recreation demand models: Implications for compensatory restoration and benefits transfer. *Marine Resource Economics* 37:1–17.

Introduction

Economic studies to value public outdoor recreation sites can be costly, complex, and comprehensible only to the economists who perform them. Developing simpler approaches that still provide useful information is a valuable advance of the practice. In the paper cited above and summarized here, we provide just such an advance in economic methods for valuing beaches, parks, and other places to bike, hike, fish, hunt, and enjoy nature.

Normally, economic valuation of recreation involves collecting expansive data using surveys on how often people go to a large collection of possible sites to visit, how far each alternative site is from each person, and what the quality attributes are for every site. Then, these data are fed into a complex statistical model that predicts how often people recreate and where they go, depending on the costs of travel to all the possible destinations, as well as the amenities and features they have. People go farther (spend more money on travel) to get to better sites. Estimating this trade-off statistically reveals a willingness-to-trade money for site visits. This is the economic value of recreation. With the model in hand, one can simulate how various kinds of changes—damaged facilities from storms or flooding, a new urban park, an oil spill closing beaches, or an improvement in fishing from removing a dam as compared to the loss of boating from removing that dam—affect the value of recreation. This is how economists evaluate the benefits and costs of events or actions that affect recreation resources.

Trip Equivalency Analysis

The paper shows that all the information embedded in the complicated process just described often can be boiled down to the number of trips taken to a site. The *simple count* of how many people visit serves as an *index of value* that a recreation site provides. Hence, changes in the number of trips to a site is an index for the effects of quality changes, either positive or negative.

In a wide variety of circumstances, this formula for loss of a site named J:

$$N\left[\ln\left\{\exp(V_0)+\sum_{j=1}^{J-1}\exp(X_{ij}\beta)\right\}-\ln\left\{(\exp(X_{ij}\beta)+\exp(V_0)+\sum_{j=1}^{J-1}\exp(X_{ij}\beta)\right\}\right]$$

reduces to this:

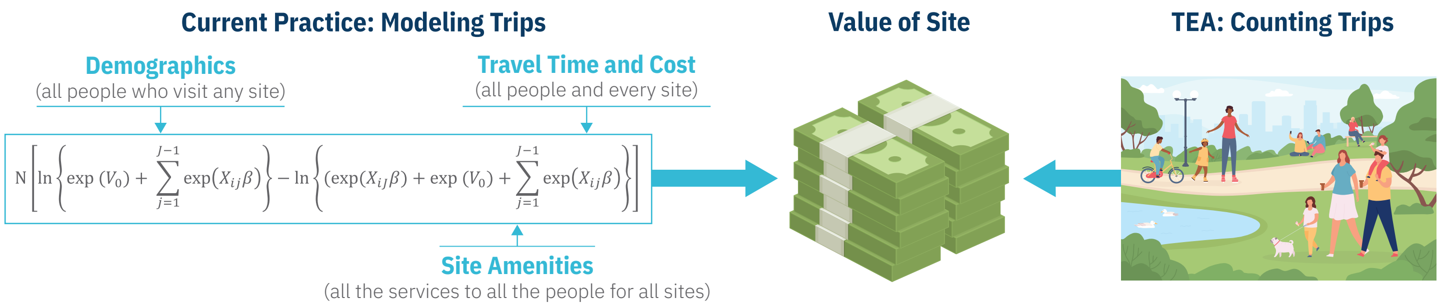
Number of Trips to *J* before it was lost.

Well, that sure is simpler to understand! It is also simpler to estimate and cheaper to gather the data.

This is "Trip Equivalency Analysis," or TEA, in which counts of the changes in the number of trips at the affected site are shown to be functionally equivalent to results of models that explicitly consider all the complex substitution patterns across all sites people may consider.

replacing or substituting these trips with trips to other sites or engaging in other types of recreation activities or staying home to paint the shutters. It seems obvious that one needs to consider the availability and quality of all the substitutes. Is replacement easy? How does the quality at the substitute sites or activities compare to the closed site? That is the information gathered in current practice and depicted in the long formula above. It also seems intuitively obvious that if a substitute fishing site was of poor quality, more trips at the poor quality site would be needed to compensate for one lost trip at a good one. TEA shows, perhaps surprisingly, this is not so; if the *same number of trips* is taken to each site, then the sites *must have the same value*. The locations and qualities of recreation and non-recreational substitutes are "baked in" to the number of trips observed. Much like a market price that summarizes all the complex information about all that it takes to produce a good and how many people want it compared to other options, in

TEA: Equivalent Information But MUCH Simpler



TEA works because if two sites have the same number of trips, then their value to the public (as would have been predicted by the complex model) is the same. The sites may be in different locations and have different characteristics, but if they attract the same number of visitors, they must generate the same level of aggregate well-being. Suppose one site is closer to a population center, while another has better facilities. If the sites have the same amount of visitation, they provide the same overall value, with the better facilities at the distant site making up for the extra cost of getting there.

Consider a fishing pier closed after a hurricane. In thinking about this damage, we might focus on the "lost trips." If 50,000 fishing trips were lost, people must be

TEA, the number of trips summarizes all the complex information about the nature of substitute sites that underlies value.

Suppose an oil spill results in the closure of a site close to a town and that compensatory restoration consists of a new site constructed further from town. TEA requires that the new site provide the same number of trips as the lost site to ensure equivalent recreation value as the closed site. Because the new site is located further from town, it would have to have sufficiently attractive features to induce as many people to travel further. All the analyst needs with TEA is to estimate lost trips at the closed site and gained trips for the new site to be confident that the two render the same level of welfare to the public.

This shortcut of replacing lost trips with trips gained one-for-one has been used before, but has been treated as ad hoc. The paper provides a theoretical justification for the approach. Moreover, we provide a complete guide to when TEA is applicable and when the TEA shortcut is a not the way to go. Basically, if the number of trips taken to the affected site(s) is a large fraction of all trips taken to all locations, then TEA can become a poor approximation to the complex model. But in many cases of interest, TEA will be very close, and even if there is some divergence, it needs to be asked whether the simpler, cheaper, and comprehensible TEA model is still a more practical option for solving the problem at hand than the complicated traditional approach.

One environmental economist exclaimed, upon hearing of our TEA result "You're going to put us out of business!" It was only three-quarters in jest. The real value of our paper lies in providing a simpler approach that can get us to defensible results faster and cheaper—and that is good for everyone.

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