

BENEFIT TRANSFER USING META-ANALYSIS IN
RECREATION ECONOMIC VALUATION

1. INTRODUCTION

Natural resource managers, regulatory agencies, and decision makers often encounter the situation where an economic analysis is mandatory, but time and funding for a new economic valuation study to conduct a full-scale assessment of benefits and costs are constrained. Benefit transfer is a practical tool commonly used to estimate values of non-market goods and services, and serves as an alternative to the entirely new primary valuation research (Luken et al., 1992; Desvousges et al., 1992; Morgan and Owens, 2001). The opportunity to use existing studies makes benefit transfer convenient to many analysts and decision makers. Some of the advantages of performing benefit transfers over conducting new economic valuation studies include lower cost, shorter estimation time, and relative independence from budgetary constraints. However, there are reasons to be concerned about the validity of the transferred values compared to the non-market values estimated from the 'first best' empirical studies. Thus, benefit transfer approaches require scrutiny before their application in a policy setting.

Various benefit transfer approaches have been used in natural resources and environmental valuation. First, a unit-day value transfer method was developed by the U.S. Water Resources Council and the U.S. Department of Agriculture (USDA) Forest Service (Loomis and Walsh, 1997; US Water Resources Council, 1973, 1979, 1983). Since the Resource Planning Act of 1974 (RPA), the USDA Forest Service has been periodically updating its unit-day value estimates summarizing existing recreation valuation studies. Application of RPA values is, however, seriously constrained by the rigidity of its point estimates. Second, a direct transfer approach, in which the benefit is transferred from the best-matched study, is frequently used in benefit transfer (Boyle and Bergstrom, 1992; Desvousges et al., 1992). Obviously, the difficulty in this approach is not only a matter of availability of the best-matched study, but also the correspondence of resource attributes and values between study and policy sites (Rosenberger and Phipps, this volume). Third, a benefit function transfer approach that accounts for the differences in site attributes is regarded as a potentially better approach to benefit transfer (Loomis et al., 1995; Loomis, 1992; Downing and Ozuna, 1996; Kirchhoff et al., 1997; Brouwer and Spaninks, 1999). The recreation valuation literature suggests benefit function transfer is a superior method in that it enables researchers to adjust the estimated demand function to calculate values of a resource at the new policy site. Fourth, benefit transfer with meta-analysis is a new approach, which extends the benefit function transfer by using a meta-analysis of existing studies to estimate the benefit function. This

approach accounts for the variability in benefit estimates with respect to the valuation methodologies and site attributes in benefit estimation, thus potentially better reflecting the values of resources (Rosenberger and Loomis, 2000b; Rosenberger and Phipps, 2002; Shrestha and Loomis, 2001).

Meta-analysis uses existing valuation studies to develop a benefit transfer function (BTF) that can be applied in estimating non-market values at unstudied policy sites. Meta-analysis is a statistical method that synthesizes existing research findings (Glass et al., 1981, 1976; Stanley, 2001). This method has been frequently used in numerous disciplines since the seminal work of Gene V. Glass in 1976. Meta-analysis in recreation valuation was introduced as meta-regression analysis (Walsh et al., 1989, 1992; Smith and Kaoru, 1990), particularly to explain variation in consumer surplus or willingness to pay (WTP) measures. Some recent applications of meta-analysis in economic valuation studies include groundwater quality (Boyle et al., 1994), air quality (Smith and Huang, 1995), endangered species (Loomis and White, 1996), air pollution and visibility (Smith and Osborne, 1996), health effects of air pollution (Desvousges et al., 1998), recreation (Rosenberger and Loomis, 2000a, 2000b; Shrestha and Loomis, 2001; Sturtevant et al., 1998), and wetlands (Brouwer et al., 1999, Woodward and Wui, 2001).

Most past recreation meta-analyses were focused on synthesizing valuation literature. However, meta-analysis could be an appropriate method for benefit transfer, which enables researchers to better account for the site/resource characteristics and methodological differences in their value estimates (Sturtevant et al., 1998). In recreation economic valuation, the empirical studies measure economic value of the resources in terms of WTP or consumer surplus for the study site or resource using non-market valuation methods, for example, contingent valuation (CVM) or travel cost methods (TCM). In meta-analysis these primary estimates of WTP enter as observations of the dependent variable in a regression model (Walsh et al., 1992; Smith and Kaoru, 1990; Sturtevant et al., 1998). Site attributes, valuation method, and user socioeconomic variables of the original research are incorporated as explanatory variables in the model. Once the meta-regression model is estimated, it may be used as a BTF to estimate WTP values of the policy site. Thus, the information and knowledge about the policy site that corresponds to the variables of the BTF would allow researchers to adjust the function to fit the characteristics of the policy site, providing more accurate benefit estimates for the policy site.

Benefit transfer using meta-analysis has several advantages. First, information is utilized from a number of studies providing a more robust measure of central tendency than can usually be obtained from any single study. Second, methodological differences in the original studies can be controlled for when estimating a value from the meta-regression equation. Third, by setting the explanatory variables specific to the policy site, the analyst can potentially account for the heterogeneity in the policy site attributes. For these reasons, the benefit estimate using meta-analysis is likely to be a better approximation of the value of the resource at the policy site.