



# Economic Values without Prices: The Importance of Nonmarket Values and Valuation for Informing Public Policy Debates

By John Loomis

In the U.S., continued improvements in human health and well-being increasingly depend on improving the quality of our environment. The quality of the air we breathe, the water we drink, and the water quality of rivers and lakes we recreate in, affect our mental and physical well-being, in many ways. Yet, these valuable services of clean and natural environments are not directly priced in markets. As such, they tend to be overlooked by some policy makers who mistakenly believe that the only values that count are market revenues or local jobs. However, people do receive economic benefits from clean and natural environments because these environments provide utility. With our rising incomes and increasingly scarce natural environments, environmental quality is becoming increasingly valuable to us.

But, how do we quantify the economic values that clean and natural environments provide to people if there are no explicit market prices? To answer that question, economists have devised techniques of using *implicit or simulated* markets to estimate the monetary values of environmental quality. Most of these techniques are based on the fact that people do or will make *trade-offs or sacrifices* of other market goods or income in order to consume higher levels of environmental quality. The fact that people will pay more for houses, accept lower paying jobs, or travel further to visit areas of higher environmental quality should convey to policy makers that environmental

Nonmarket valuation is used to infer values for items that are not subject to markets like environmental services or health. Generally people are not charged for swimming in a public river or cleaner air. When a project is proposed that affects such activities, nonmarket valuation is employed to estimate project benefits.

## Articles in this Theme:

- Economic Values without Prices: The Importance of Nonmarket Values and Valuation for Informing Public Policy Debates** ..... 179
- The Road Less Traveled: Revealed Preference and Using the Travel Cost Model to Value Environmental Changes** . 183
- Can Stated Preference Valuations Help Improve Environmental Decision Making?** ..... 189
- Benefit Transfer – The Quick, the Dirty, and the Ugly?**... 195

quality has an economic value, dollar per dollar as valuable as many market goods.

Economic valuation of environmental quality has the potential to bring a more balanced perspective to the allocation and management of natural resources. Environmental valuation allows benefits received by society to be compared to the monetary costs and to the opportunity costs of other foregone investments. The inclusion of monetary estimates of the economic value of environmental quality allows for more formal consideration of these values in the decision making. Essentially, economic valuation of environmental quality allows those benefits to be treated equally, dollar per dollar, with market goods and costs, so as to ensure that society receives the maximum benefit from all its scarce resources whether marketed or not.

Estimating monetary benefits for environmental quality avoids several problems that often plague policy debates. First, valuation avoids the frequent false characterization of some policies as being a choice between “the economy versus the environment.” Economic valuation of environmental quality demonstrates that the environment is a source of utility to people. Although environmental quality has some subtle differences from commodities because environmental quality is a public good rather than a private good, this should not obscure the fact that the environment is a source of economic benefit to people. Rather, the subtle distinction that the environment is a public good usually means that society cannot count on markets to provide economically efficient levels of the public good. For example, once the air is kept clean for one person it is available to everyone else in that town at no additional cost (i.e., air quality is nonrival). This feature makes it inefficient to charge additional people for consuming the cleaner air or to try to exclude non-payers (which is often not technically possible for most public goods).

Second, environmental valuation often demonstrates that most public policies need not be “all or nothing.” That is, the first few acres of wetlands protected probably have higher values for the ecosystem services provided than an additional acre of corn or soybeans in the Midwest. Finally, economic valuation of benefits and costs provides input to decisions makers on the question of “how clean is clean enough, how safe is safe enough?” Although economics should not be the final word on these important decisions, neither should the technical pursuit of purity overwhelm common sense. Beyond some threshold level of cleanliness or

safety, additional cleanup or precautions cost society more than the value of the gain in safety. Diminishing marginal returns apply to safety or cleanliness too just as much as to fertilizer application.

However, without a common monetary metric to compare cost and benefits, it is difficult to know when we have reached that point of diminishing returns. Hence, the usefulness of valuation techniques is their ability to inform policy makers and stakeholders about how the benefits and costs change with different levels of food safety or water quality. With this information on economic efficiency, in conjunction with concerns about equity and distributional issues (e.g., environmental justice), policy makers can make more informed trade-offs.

But just how valuable is the economic valuation work of economists? Posed a different way, “Are the benefits of these studies, in terms of more efficient use of natural resources, worth the costs of these studies?” This is a tough question, one asked in many fields including weather forecasting and flood prediction. Given that policy decisions are (and should be) affected by many concerns besides economic efficiency (e.g., distributional equity, sustainability), it is rare to be able to point to any one information source in the policy process and say it was the definitive factor. Nonetheless, it would appear foolish to make million-dollar, and sometimes billion-dollar, decisions without carefully considering the full range of benefits and costs of the available alternatives.

### **Concepts of Nonmarket Valuation**

The same concept of value used to value market goods is used to value

nonmarket resources: willingness to pay. Price in the market is just willingness to pay for one more unit of the good. Without markets we do not have prices, but trade-offs that people make often demonstrate a willingness to pay. Nonmarket valuation is much like detective work in attempting to infer the monetary willingness to pay for environmental quality from bundled transactions such as home purchases, jobs accepted, or distances traveled for recreation. It is well accepted in real estate transactions that location matters. Part of that location is proximity to desirable environmental amenities (e.g., parks, good air quality) and distance from undesirable features (e.g., confined animal feeding operations). Because environmental amenities are scarce, buyers compete for houses with closer proximity to environmental amenities or higher levels of environmental quality, bidding up prices of these houses. Statistical analysis allows economists to disentangle the portion of the house price differential due to the location being nearby environmental amenities. This allows calculation of how much people have paid for the higher levels of environmental quality.

Recreational fishing and boating also provides a benefit to its participants. It is a benefit they would, if they had to, pay more for than the current nominal fishing license fee or boat launch fee. The fact that they do not have to pay “what the market will bear” results in the visitor retaining a “consumer surplus” as extra income in their wallet or purse. Much like irrigation water from publicly provided projects that is not sold at its market clearing price, neither is recreation, yet both have economic value greater than their administered prices.

In the case of recreation, economists rely on visitors' travel behavior to trace out a demand curve for recreation at a particular site. From the demand curve, we can estimate the additional amount a visitor would pay, if they had to, for continued access to the recreation resource. This actual behavior-based approach is referred to as the Travel Cost Method (TCM); discussed more in detail in Shaw's article in this issue. Because different visitors live at different distances from the site, the analyst can observe how the number of trips taken varies with variations in travel costs to the site. Essentially we observe spatially varying prices. Thus, the demand curve can be estimated by multiple regression using this cross-section data on travel costs (as proxies for price) and number of trips taken each season. By observing how recreation visitation changes with increased river flows, higher reservoir levels, and improved water quality, economists can statistically estimate the demand shifts for improved water resource conditions. From these demand shifts, the additional dollar amount a visitor would pay for the improved water resource condition can be calculated.

Recreation, however, is only half the story. Many individuals who may never fish or boat still receive some benefits from just knowing that free flowing rivers exist (Sanders, Walsh, & Loomis, 1990) or endangered species exist (Loomis & White, 1996). In these cases, all households would be asked to pay for protection of resources. Today, this is done in the form of a hypothetical referendum, where households are asked if they would vote in favor of a particular resource management action, if it costs their household \$X. The analyst varies the monetary magnitude of \$X across the households (some get a

high amount, some get a low amount), so that a demand-like relationship can be traced out. From this demand curve, willingness to pay is calculated. This technique is commonly referred to as the Contingent Valuation Method (CVM). This survey-based approach can be used to value either recreation or existence values (often referred to as passive use values). Tom Stevens talks in more detail about these stated preference methods in the following article in this issue.

### **Agency and Court Acceptance of Nonmarket Valuation**

Many federal and state agencies use nonmarket valuation to provide information on the economic benefits and costs when making natural resource allocation decisions. Beginning in 1979, Federal agencies such as the U.S. Army Corps of Engineers and Bureau of Reclamation were required to use the travel cost method and contingent valuation methods to value recreation benefits at projects with high visitation levels (U.S. Water Resources Council, 1979). During the 1980s, the U.S. Army Corps of Engineers published manuals on how to perform the contingent valuation method (Moser & Dunning, 1986). Today, the U.S. Bureau of Reclamation maintains a staff of several economists who are trained in and publish in the area of nonmarket valuation. Federal agencies such as the Environmental Protection Agency (EPA), which are required to conduct benefit-cost analyses of environmental regulations, frequently perform or rely upon existing TCM and CVM studies to provide estimates of nonmarket benefits. The National Park Service utilizes nonmarket values in its evaluation about whether to remove dams

on the Elwha River that are blocking salmon migration in Olympic National Park (National Park Service, 1995) and in natural resource damage assessment.

When Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the U.S. Department of the Interior adopted CVM as a valuation method for valuing the loss in recreation and existence values from toxic waste sites and hazardous materials spills (U.S. Department of the Interior, 1986). Although industry challenged the use of CVM, the Court of Appeals upheld CVM, and ordered the Department of the Interior to broaden its use to measure existence values (what the court called passive use values) even when there was direct, on-site recreation use of the resource (State of Ohio vs. U.S. Dept. of the Interior, 1989). Consistent with economic theory, the court saw recreation use and existence values as additive.

The Exxon Valdez oil spill put CVM in the spotlight. When Congress passed the Oil Pollution Act of 1990, the responsible agency, the National Oceanic and Atmospheric Administration (NOAA), recommended CVM be used to measure both the recreation and passive use values lost due to oil spills. Given the controversy surrounding this, NOAA appointed a *blue ribbon* panel chaired by two Nobel Laureates to assess the reliability of the CVM for measuring passive use values. In its report in 1993, the Panel concluded that carefully designed and implemented CVM studies could provide estimates of passive use/existence values that would serve as a useful starting point for administrative and judicial decisions (Arrow et al., 1993).

Nonmarket valuation is not limited to federal agencies. Numerous

state agencies use TCM and CVM for valuation of recreational fisheries and hunting. The states of Arizona, California, Idaho, Maine, Michigan, Montana, New Mexico, Texas, and Wisconsin (just to name a few) have all sponsored nonmarket valuation surveys resulting in TCM- and CVM-derived values for hunting and fishing in their respective states. The State of California used CVM and measurement of existence values for protecting Mono Lake as a bird habitat, but also for assessing the damages of oil spills.

## Conclusion

What can nonmarket valuation contribute to better policy making? In some cases it can change the character of the debate from being "the economy versus the environment" to one of recognizing people care about the environment in the same way they care about market goods. In other situations, nonmarket valuation can bring balance to questions of "how safe is safe enough?" given scarce resources in society. What is the value of valuation? The value lies in providing a more complete accounting of the benefits and costs to all of the people. For *without* economic valuation, the predictions of the public choice economists are frequently realized: (a) those who would bear concentrated costs can block resource reallocations that benefit society as a whole, and (b) those few that stand to gain concentrated benefits can spread even larger costs out

over millions of taxpayers. Valuation studies have the potential to provide an effective way to diminish the often bemoaned role of *special interests* in the current policy process. Although policy makers and society will often have other objectives in addition to economic efficiency, more informed trade-offs can be made between objectives if the benefits and costs of each alternative are known. Although it is true that *benefits and costs are not all that matter*, it is rare that *benefits and costs do not matter at all* to public decision makers and society.

## For More Information

Arrow, K., Solow, R., Portney, P., Leamer, E., Radner, R. & Schuman, H. (1993). Report of the NOAA Panel on Contingent Valuation. *Federal Register*, 58(10), 4602-14.

Loomis, J., & White, D. (1996). Economic benefits of rare and endangered species: Summary and meta-analysis. *Ecological Economics*, 18(3), 197-206.

Moser, D., & Dunning, M. (1986). *A guide for using the contingent valuation methodology in recreation studies*, National Economic Development Procedures Manual--Recreation Vol. 2, IWR Report 86-R-5. Institute for Water Resources, Fort Belvoir, VA: U.S. Army Corps of Engineers.

National Park Service. (1995). *Elwha River Ecosystem Restoration*. Final Environmental Impact Statement. U.S. Dept. of the Interior:

Denver Service Center, National Park Service.

Sanders, L., Walsh, R., & Loomis, J. (1990). Toward empirical estimation of the total value of protecting rivers. *Water Resources Research*, 26(7), 1345-58.

State of Ohio v. U.S. Department of the Interior, No. 86-15755 (US D. Ct. App. D.C. July 14, 1989).

U.S. Department of the Interior. Federal Register: Natural resource damage assessments, final rule. Washington, DC; 1986, 51(4), 27674-753.

U.S. National Oceanic and Atmospheric Administration. Federal Register: Oil Pollution Act damage assessments, final rule. Washington, DC; 1996, 61(4), 439-510.

U.S. Water Resources Council. Federal Register: Procedures for evaluation of National Economic Development (NED) benefits and costs in water resources planning, final rule. Washington DC; 1979, 44(242), 72892-976.

U.S. Water Resources Council. (1983). Economic and environmental principles and guidelines for water and related land resources implementation studies. Washington, DC: U.S. Government Printing Office.

*John Loomis (jloomis@lamar.colorado.state.edu) is professor, Department of Agricultural and Resource Economics, Colorado State University, Fort Collins, CO.*