

APPENDIX B | ANALYSIS OF THE ECONOMIC BENEFIT MEASURES PRESENTED IN THE DEFENDERS OF WILDLIFE STUDY (JUNE 2004)¹

1. This appendix considers the June 2004 report by the Defenders of Wildlife titled, “Economic Impact Assessment of Designating Critical Habitat for the Lynx (*Lynx Canadensis*)” – hereafter referred to as the DOW Report. Specifically, this appendix considers Section II of that report, “Economic Impact Analysis of the Critical Habitat Designation: Methodology,” in particular, sub-section II.3 “Quantification of benefits generated by designation of critical habitat” as it pertains to the Canada lynx designation.
2. This discussion focuses on three issues: 1) defining the appropriate “extent-of-the-market”, 2) the proper measurement of non-use values for the purposes of policy analysis, and 3) the defensibility of the benefits transfer performed in the report.

B.1 EXTENT OF THE MARKET

3. The phrase “extent of the market” as it applies to policy analysis has to do with the types of benefits quantified in the analysis and the types and numbers of people over which these benefits are measured. The DOW Report asserts two large groups of benefits should be included in the analysis and labels these “Improved prospects for lynx recovery” and “Preservation of undeveloped landscapes.” The DOW Report states,

To the extent that people place a value on the recovery of lynx populations and on the protection of other forest species, and to the extent that people value the other (besides habitat provision) services provided by forested ecosystems, economic theory requires that those values be included in the present analysis (emphasis added).²

4. The DOW Report appeals to economic theory as justification for the inclusion of these two categories of benefits (one due entirely to the protection of the species and one due entirely to the form of the regulatory action giving rise to the protection). It is important to recognize that the economic theory which underlies regulatory analysis, called “welfare economics”, does not identify categories of benefits (or values), and therefore, economic theory does not require that any specific set of values be considered. This is not to say there are no benefits from land preservation or species conservation (whether

¹ The appendix was written by Dr. Raymond Kopp, Senior Fellow, Resources for the Future.

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there are or not is an empirical matter), only that there are numerous categories of benefits, and those chosen for inclusion in a policy study are chosen by decision makers. Thus, for example, while some might enjoy benefits from violating the legal rights of others, such benefits would likely be excluded from policy consideration on non-economic grounds.

5. Similarly, the DOW Report states,

The validity of including both non-use and option values in economic analyses also has been recognized by the courts (U.S. Court of Appeals 1989) and in legislation (U.S. Department of Commerce 1994; U.S. Department of Interior 1994).³

6. It is important to note the DOI 1989 ruling was in the context of natural resource damages where compensation is the standard. The ruling is not concerned with regulatory analysis with the exception of the Court's acknowledgement that non-use values are a proper component of human well-being. Like the category of benefits due to open space preservation considered in the DOW Report, the inclusion of non-use values is not a decision made on economic grounds. As noted above, whether such benefits as enhanced non-use values are or are not included in a specific regulatory analysis is up to the decision maker, not the economist.
7. Issues of extent of the market pertain not only to categories of benefits but to the categories of people over which benefits are measured as well. Individuals viewing lynx in the wild may enjoy the benefit of such viewing and efforts to increase the lynx population through habitat designation may lead to more viewing opportunities and thus more benefits to those viewing the animals. Suppose some of these viewers come from Germany, should the value they receive be included in the cost-benefit analysis? Again, this is not an economic question, but rather a policy one.
8. While few Germans may come to lynx country for animal viewing making the benefits they receive exceedingly small, the category of non-use values does not require travel to lynx habitat, and therefore the category could be quite large. Whether an analysis includes the nonuse value of non-US citizens, or the non-use value of US citizens living outside the states of Montana, Minnesota and Maine (where most of the cost of designation will fall), are non-economic, policy questions and therefore the categories of people over which benefits are quantified are non-economic decisions.
9. The DOW Report argues that economic theory requires that every measurable benefit attributable to the preservation of the lynx and its habitat be summed across all individuals in the US and be included in these types of economic analyses. As stated above, economic theory is silent on this issue and it is up to the decision maker to define the extent of the market and categories of benefits considered.

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B.2 REGULATORY ANALYSIS OF ENVIRONMENTAL REGULATIONS AND NON-USE VALUES

10. Following the Court of Appeals ruling in 1989 a lengthy debate ensued over the inclusion of non-use value (or equivalently termed existence value, bequest value, and passive use value) in economic analysis of Federal regulations. Much of the discussion focused on the measurement technique use for non-use value, contingent valuation (CV), and the notion stated by Rosenthal and Nelson "[i]f the concept of existence value is accepted for general use by economists and policy analysts, and a whole host of new existence values is identified, virtually any kind of project or proposal may become justifiable."⁴
11. Assuming that estimates of passive use are valid and reliable, is there a case to be made for the position that using such estimates in analyses of government regulations will lead to "too many" programs passing the cost-benefit test? Too many programs passing a cost-benefit test is not reflective of some underlying inadequacy in the measurement of non-use value in the cost-benefit context, but rather indicates a failure on the part of the Federal government to coordinate and conduct proper regulatory analyses.
12. The "too many programs pass" phenomenon can be examined with a simple hypothetical example. Suppose EPA is considering two major regulations -- one on air toxic emissions and one on ground water protection. It is thought by EPA that both regulatory programs would have significant passive use benefits and so a contingent valuation study is proposed to be used in each analysis. EPA designs two independent CV surveys that meet the relevant requirements for valid and reliable estimates of total value. One survey focuses exclusively on the air toxic regulation and the other on the water regulation. Both surveys use the same payment vehicle, a tax surcharge for the next five years.
13. EPA fields each survey to independent samples of U.S. households, constructs an aggregate estimate of the willingness to pay (WTP) for each individual program, and then uses these WTP estimates as the basis for benefit estimates in each proposed regulation's economic analysis. If EPA intends these regulations to be put in place at approximately the same time, under particular circumstances one can argue that the benefits of either program may be overstated.
14. The overstatement could come from at least two causes. First, there is the pure substitution effect. If some CV respondents viewed these programs as substitutes, then the WTP for one program, given that the other already exists, will be less than the WTP if the other program does not exist. Second, to the extent the required tax payments are sufficiently large to be binding on the income of some CV respondents, the WTP for either program will be less when the other program (and its associated tax) is in place.
15. Given the example above, one can imagine the problems that would arise if numerous proposed regulations from various federal agencies use CV based estimates of benefits in their respective regulatory analyses, but where independent respondents were asked about each proposed program in the absence of knowledge regarding the other programs. Each CV benefit estimate is valid and reliable given the circumstances of the choice as

⁴ See Rosenthal and Nelson, 1992.

presented to the respondent, that is, no other public goods are offered. However, taken as a package of programs providing multiple public goods, respondents would view each component (proposed program) differently, where the WTP for the package would be less than or equal to the sum of the WTP for the individual components.⁵

16. If one is using CV to estimate the value of species and habitat conservation, then one might imagine establishing an “ESA budget” for the respondent. That is, determine the length of time respondents consider to be the appropriate budget period for such designations – perhaps three years - decide how many ESA designations will occur in the 3-year period, and combine them into one WTP to pay elicitation for those designations.
17. Whether the above approach can produce reliable benefits estimates is a question that must be answered with empirical analysis, but such analysis is not needed to identify a problem in the DOW approach of asking WTP for a public good under the assumption the good has no substitutes of any degree and no budget implications.

B.3 BENEFITS TRANSFER

18. The basis for the valuation of benefits contained in the DOW Report is a “benefits transfer.” That is, new analysis of the benefits of lynx preservation was not conducted, rather estimates of benefits from the literature were used. This is not an uncommon approach and is appropriate if certain guidance is followed.
19. The Office of Management and Budget (OMB) has written guidelines for conducting credible benefit transfers.⁶ The important steps in the OMB guidance are listed below followed by an analysis of the extent to which the DOW Report’s adheres to these guidelines.
 1. Specify the value to be estimated for the rulemaking.
 2. Identify appropriate studies to conduct benefits transfer based on the following criteria:
 - The selected studies should be based on adequate data, sound and defensible empirical methods and techniques.
 - The selected studies should documents parameter estimates of the valuation function.

⁵ There is an important caveat to this statement. And that is, for the statement to be valid the individual program CV surveys must not underestimate the WTP for the objects of choice offered respondents. This is not always guaranteed since there are several features of the survey design that could lead to an understatement of WTP. For example, respondents may not believe that governments can provide the environmental public goods as described in the survey, or they may feel the tax surcharge would not end after five years, or they may believe it is the polluter’s financial responsibility to undertake the regulatory action. If the individual surveys do understate WTP, then even if they are conducted independent of one another, actual benefits of the package of programs may not be overstated.

⁶ U.S. Office of Management and Budget, “Circular A-4,” September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

- The study and policy contexts should have similar populations (e.g., demographic characteristics). The market size (e.g., target population) between the study site and the policy site should be similar.
 - The good, and the magnitude of change in that good, should be similar in the study and policy contexts.
 - The relevant characteristics of the study and policy contexts should be similar.
 - The distribution of property rights should be similar so that the analysis uses the same welfare measure (i.e., If the property rights in the study context support the use of willingness-to-accept measures while the rights in the rulemaking context support the use of willingness-to-pay measures, benefits transfer is not appropriate).
 - The availability of substitutes across study and policy contexts should be similar.
3. If it is possible to choose between transferring a function or a point estimate, the entire demand function should be transferred rather than adopting a single point estimate.
20. As described above, an initial step of benefits transfer is to describe the policy context so that its characteristics and consequences are understood. It is equally important to describe the population impacted by the proposed policy. As part of this step, it is important to determine whether effects of the policy will be felt by the general population or by specific subsets of individuals (e.g., users of a particular recreation site or children). Information on the affected population will generally be used to convert per person (or household) values to an aggregate benefits estimate.
21. The policy context in the case of the lynx is the regulatory action under consideration (lynx habitat protection in Maine, Minnesota, Montana, and Washington), the nature of the consequences, (specific, quantitative measures of improvements to the lynx and its population), and the people who will benefit from the program. The DOW report does a good job of describing the lynx, its habitat and the process of designation.
22. Existing, relevant studies are then identified by conducting a literature search. This literature search should, ideally, include searches of published literature, reviews of survey articles, examination of databases, and consultation with researchers to identify government publications, unpublished research, works in progress, and other "gray literature."
23. The analyst should then review and assess the studies identified in the literature review for their quality and applicability to the policy case. The quality of the study case estimates will, in part, determine the quality of the benefit transfer. Indicators of quality will generally depend on the method used. See the previous discussions on each of the primary research methods for more information on assessing the quality of studies.

24. Assessing studies for applicability involves determining whether available studies are comparable to the policy case. Specifically, the analyst should assure that (1) the basic commodities are essentially equivalent; (2) the baseline and extent of the change are similar; and (3) the affected populations are similar. Only one study is identified in the DOW report.
25. The DOW Report transfers the values from a single study, a published 1997 survey conducted in the United Kingdom (UK study) valuing increases in river otter populations.⁷ In the DOW Report the “commodity” being valued is certainly not equivalent as it is a different animal living in a different type of ecosystem. The “affected populations” refers to those enjoying the benefits of the lynx preservation, an obviously different population than those surveyed in the UK study.
26. The 25 percent population increase is the same in the UK study as the increase assumed in the lynx benefits analysis, but there is no way to tell if the baseline populations are the same. Perhaps most important, the consequences of the regulatory action are not based on any scientific understanding of the affect the designation would have on the lynx and its population. Rather, a 10 and 25 percent improvement in lynx population is simply asserted with no reference to any scientific literature. Thus, there is no basis for the policy case modeled in the analysis.
27. There are four types of benefit transfer studies: point estimate, benefit function, meta-analysis, and Bayesian techniques. The point estimate approach involves taking the mean value (or range of values) from the study case and applying it directly to the policy case. As it is rare that a policy case and study case will be identical, this approach is not preferable. The DOW study uses a single point estimate from a single study. As noted in the OMB Guidance, use of a single point estimate is generally not recommended.
28. Benefit transfer involves judgments and assumptions. Throughout the analysis, the researcher should clearly describe all judgments and assumptions and their potential impact on final estimates, as well as any other sources of uncertainty inherent in the analysis. However, the DOW Report does not consider uncertainty.
29. In summary, the benefits transfer contained in the DOW Report does not follow the guidelines specified by the OMB for defensible benefits transfers, and thus it is not possible to know if the results obtained are valid.

⁷ White, Piran C.L., Keith W. Gregory, Patrick J. Lindley, and Glenn Richards. 1997. Economic Values of Threatened Mammals in Britain: A Case Study of the Otter *Lutra lutra* and the Water Vole *Arvicola terrestris*. *Biological Conservation* 82: 345-354.