

APPENDIX E | RECREATION BENEFITS TRANSFER DISCUSSION

1. This appendix discusses the benefits transfer applied in Section 5 of this analysis to estimate a reduction in social welfare that may occur associated with increased congestion on snowmobile trails.
2. The economics literature has considered the reduction in social welfare that can result from congestion at a recreational site. For example, Cicchetti and Smith (1976) considered how varying the levels of congestion at a low-density recreation area in a National Forest varied the overall consumer surplus provided to recreators in the area. Only one study, however, provides insight into whether snowmobilers experience a reduction in surplus in response to an increase in congestion. This study was conducted for the National Park Service study to assess the impacts of temporary changes in snowmobiling regulations at Yellowstone National Park (RTI International, 2004 and 2005) provides insight into whether snowmobilers experience a reduction in surplus in response to an increase in congestion.¹
3. The Yellowstone study applied a travel cost (random utility) model to assess the changes in surplus associated with varying management regimes. In particular, the Yellowstone study estimated per-day willingness to pay values under various alternative management regimes. These alternatives varied in terms of the mix in mode of access (e.g., snowcoach, guided snowmobile, unguided snowmobile) as well as daily entry limits (i.e., degree of crowding). The values reported by the authors are relative to a scenario in which there is a ban on snowmobiles in the park. This study received considerable review and public comment, and represents a high-quality random utility model (RUM).
4. The Yellowstone study reports that scenarios in which there was less crowding provided snowmobilers with a greater per-day surplus; that is, we would expect snowmobilers at Yellowstone to hold a slightly higher willingness to pay for a day of snowmobiling under conditions of "low crowding" versus conditions of "moderate crowding." For the Yellowstone sample of snowmobilers, congestion was a negative attribute of their recreational experience. Specifically, mean willingness to pay across the scenarios based on the moderate crowding condition varied from \$230 to \$260, while mean willingness to pay under the low crowding condition varied from \$300 to \$320. Thus, The implied reduction in willingness to pay resulting from a change from low to moderate crowding was \$60-\$70 per day, representing a reduction in willingness to pay of 22 percent due to greater congestion.

¹ For a complete discussion of the data relied upon and model developed, see RTI, International 2004. Economic Analysis of Temporary Regulations on Snowmobile Use in the Greater Yellowstone Area. Final Report; and RTI, International 2005. Winter 2002-2003 Visitor Survey: Yellowstone and Grand Teton National Parks. Revised Final Report.

5. The above estimates are based on a definition of "low" crowding equal to "fewer than 250 machines in Yellowstone per day." The definition of "moderate" crowding is "250-700 machines in Yellowstone per day". With about 185 miles of groomed trail in Yellowstone, these densities equate to one to nearly four snowmobilers per mile per day. Information is not available regarding the per mile density of snowmobilers in the study area. For perspective, however, the 60,427 snowmobilers per year in Yellowstone recreate on 185 miles of trail (326 snowmobilers per mile per year), while in Unit 1 of the study area, an estimated 26,468 participants recreate over 784 miles of trail (35 snowmobilers per mile per year).²
6. This analysis interprets these definitions of crowding to imply that moderate crowding represents about three times as many participants as low crowding, or a 300 percent increase in crowding. Thus, for a 300 percent increase in crowding, The Yellowstone study found a 22 percent reduction in willingness to pay, or about a 0.07 percentage point change in willingness to pay for each one percentage point increase in crowding. This reduction in willingness to pay is applied in this analysis. In Maine, the predicted increase in registrants is approximately 3.5 percent per year resulting in an increase in snowmobilers of 92 percent between 2006 and 2025. Even considering this projected increase, the estimated number of snowmobilers per mile per year in Maine in 2025 will be 67, compared to 326 in Yellowstone based on the 2004 study.
7. In addition to consideration of the quality of the underlying study, a principal factor to consider in transferring information from a study conducted at one location to another location is whether the sites are sufficiently similar. In comparing Yellowstone National Park to northern Maine and sites in Minnesota there are numerous and significant differences. Principal among these differences is the extent to which congestion currently affects snowmobilers in Maine. A qualitative survey-based consumer profile conducted in Maine in 1996 ranked the attribute of "few people using trails" as between somewhat important and very important to snowmobilers when deciding where to snowmobile in Maine.³ The Yellowstone study notes that snowmobilers are attracted to the park for the chance to see unique natural features such as wildlife, and geysers, and may not mind what some see as a hindering 45-mph speed limit in place in the park.⁴ However, the existing literature base does not provide information specific to Maine; in the absence of site-specific information, this analysis applies general estimates of the likely impact of increased congestion from the Yellowstone study to areas in the study area. Given the paucity of underlying research, the magnitude of error inherent in this transfer is unknown, and the results presented should be interpreted in this context.

² Source: Maine Snowmobile Association registration data, and trail GIS layer.

³ Reiling, et al. 1996. An Economic Evaluation of Snowmobiling in Maine. Conducted by Stephen Reiling, Department of Resource Economics and Policy University of Maine, Orono, Maine for The Maine Snowmobile Association.

⁴ RTI, 2004. p.3-22.