

The University of North Carolina
Institute of Statistics
Chapel Hill

DEPARTMENT OF MATHEMATICAL STATISTICS

June 18, 1947

Mr. Newton B. Drury, Director
National Park Service
Department of the Interior
Washington 25, D. C.

Dear Mr. Drury:

After a letter from Mr. A. E. Demaray, and a conference with Dr. Roy A. Pruitt of the National Park Service, I am convinced that it is possible to set up appropriate measures for evaluating, with a reasonable degree of accuracy, the service of national parks to the public.

The development of criteria for evaluating benefits to the public has been a long-term interest of mine. Following the example set a hundred years ago by the French engineer, Jules Dupuit, who wrote formulae for the benefits of roads, bridges, and canals, I have worked out more general formulae for benefits from wider and more complicated classes of public services.

These formulae, of course, involve coefficients which must, in each case, be determined by factual statistical studies. The development of such studies I believe to be possible through several modes of attack which Dr. Pruitt and I discussed. One of these, of whose feasibility I am confident, and which might be pursued further, is as follows:

Let concentric zones be defined around each park so that the cost of travel to the park from all points in one of these zones is approximately constant. The persons entering the park in a year, or a suitably chosen sample of them, are to be listed according to the zone from which they come. The fact that they come means that they service of the park is at least worth the cost, and this cost can probably be estimated with fair accuracy. If we assume that the benefits are the same no matter what the distance, we have, for those living near the park, a consumers' surplus consisting of the differences in transportation costs. The comparison of the cost of coming from a zone with the number of people who do come from it, together with a count of the population of the zone, enables us to plot one point for each zone on a demand curve for the service of the park. By a judicious process of fitting it should be possible to get a good enough approximation to this demand curve to provide, through integration, a measure of the consumers' surplus resulting from the availability of the park. It is this consumers surplus (calculated by the above process with deduction for the cost of operating the park) which measures the benefits to the public in the particular year. This, of course, might be capitalized to give a capital value for the park, or the annual measure of benefit might be compared directly with the estimated annual benefits on the hypothesis that the park area was used for some alternate purpose.

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The problem of relations between different parks can be treated along the same lines, though in a slightly more complicated manner, provided people entering the park will be asked which other national parks they have visited that year. In place of a demand curve, we have as a result of such an inquiry, a set of demand functions. The consumer surplus still has a defining meaning, as I have shown in various published articles, and may be used to evaluate the benefits from the park system.

This approach through travel costs is one of several possible modes of attack on this problem. There are also others, which should be examined, though I think the method outlined above looks the most promising.

Very sincerely,
Harold Hotelling
Harold Hotelling

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