

The Value of Water Supply Reliability in Urban Water Systems¹

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Reliability is an important dimension of urban water supply. While out-of-pocket losses appear small, water customers place high values on reliability. This demand for reliability can be measured by contingent valuation methods, while the costs of providing various levels of reliability can be estimated through hydrologic simulation. A framework for optimizing reliability is presented and the contingent valuation survey is described. Results from three Colorado towns are presented. © 1994 Academic Press, Inc.

I. INTRODUCTION

Government officials frequently confront decisions that require a trade-off between cost and risk. These decisions extend from investments which increase power and water supply capacity to traffic and air safety, regulations on new drugs, seat belts and working conditions. In such cases, the increased cost of the investment or regulation usually is known, while the risk preferences of the affected consumers or workers are not. Thus, monetary benefits of risk reduction are difficult to quantify, making it difficult to determine the optimal level of risk reduction.

The provision of urban water supply is a prototypical example. Water supplies are subject to hydrologic risks that, historically, have been handled by designing systems that are capable of meeting demands during the "drought of record" or the most severe actual hydrologic event on record. Today, hydrologic risk can be simulated through computerized synthetic hydrology programs. Water utilities are now beginning to plan for explicit risk levels for different classes of water use, e.g., high reliabilities for uses essential to public health, and lower levels for demands that include lawn, garden, and park uses.

These risk levels, however, are usually chosen by water officials and/or city councils with little or no information concerning the actual and perceived conse-

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