

METHODS DEVELOPMENT FOR ENVIRONMENTAL  
CONTROL BENEFITS ASSESSMENT

Volume IV

MEASURING THE BENEFITS OF AIR QUALITY IMPROVEMENTS  
IN THE SAN FRANCISCO BAY AREA

by

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USEPA Grant # R805059-01-0

Project Officer

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OTHER VOLUMES IN THIS SERIES

volume 1, Measuring the Benefits of Clean Air and Water, EPA-230-12-85-019.

This volume is a nontechnical report summarizing recent research for EPA on methods development for better estimates of **economic** benefits from environmental improvement. The report presents the basic **economic** concepts and research methods underlying benefits estimation as well as a number of case studies, including several **from** other volumes of this series. Finally, it offers insights regarding the quantitative benefits of environmental improvement.

Volume 2, Six Studies of Health Benefits from Air Pollution Control, EPA-230-12-85-020.

This volume contains six statistical epidemiology studies. They show that large associations between health and current levels of air pollution are not robust with respect to the statistical model specification either for mortality or morbidity. They also find that significant relationships, mostly small, occasionally appear.

Volume 3, Five Studies on Non-Market Valuation Techniques, EPA-230-12-85-021.

This volume presents analytical and empirical comparisons of alternative **techniques** for the valuation of non-market goods. The methodological base of the survey approach - directly asking individuals to reveal their preference in a structural hypothetical market - is examined for bias, replication, and validation characteristics.

Volume 5, Measuring Household Soiling Damages from Suspended Particulate: A Methodological Inquiry, EPA 230-12-85-023.

This volume estimates the benefits of reducing **particulate** matter levels by examining the reduced costs of household cleaning. The analysis considers the reduced frequency of cleaning for **households** that clean themselves or hire a cleaning service. These estimates were **compared** with willingness to pay estimates for total elimination of air pollutants in several U.S. cities. The report concludes that the willingness-to-pay approach to estimate particulate-related household **soiling** damages is not feasible.

Volume 6, The Value of Air Pollution Damages to Agricultural Activities in Southern California, EPA-230-12-85-024.

This volume contains three papers that address the **economic** implications of air pollution-induced **output, input pricing, cropping, and** location pattern adjustments for Southern California agriculture. The first paper estimates the **economic losses** to fourteen highly valued vegetable and field crops due to pollution. The second estimates earnings **losses** to field workers exposed to oxidants. The last uses an **econometric** model to measure the reduction of **economic** surpluses in Southern California due to oxidants.

Volume 7, Methods Development for Assessing Acid Deposition Control Benefits,  
EPA-230-12-85-025.

This volume suggests types of natural science research that would be most useful to the economist faced with the task of **assessing** the **economic** benefits of controlling acid precipitation. Part of the report is devoted to development of a resource allocation process framework for explaining the behavior of **ecosystems** that can be integrated into a **benefit/cost** analysis, addressing diversity and stability.

Volume 8, The Benefits of Preserving Visibility in the National Parklands of the Southwest, EPA-230-12-85-026.

This volume examines the willingness-to-pay responses of individuals surveyed in several U.S. cities for visibility **improvements** or preservation in several National **Parks**. The respondents were asked to state their willingness to pay in the form of higher utility bills to prevent visibility deterioration. The sampled **responses** were extrapolated to the entire U.S. to estimate the national benefits of visibility preservation.

Volume 9, Evaluation of Decision Models for Environmental Management, EPA-230-12-85-027.

This volume discusses **how** EPA can use decision models to achieve the **proper** role of the **government** in a **market economy**. The **report recommends** three **models** useful for environmental **management** with a focus on those that **allow** for a consideration of all tradeoffs.

Volume 10, Executive Summary, EPA-230-12-85-028.

This volume summarizes the methodological and empirical findings of the series. The **consensus** of the **empirical** reports is the benefits of air pollution control appear to be sufficient to warrant current **ambient** air quality standards. The report indicates the greatest proportion of benefits from control resides, not in health benefits, but in aesthetic improvements, maintenance of the ecosystem for recreation, and the reduction of damages to artifacts and materials.

## DISCLAIMER

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## ABSTRACT

This **study** reports the results of using two alternative methods of measuring benefits of air quality changes in the San Francisco Bay Area; both methods are based on the hypothesis that benefits are measured by willingness to pay. In one method, property values **were** used to infer willingness to pay for air quality. In the other method, willingness to pay was obtained directly from a survey.

Pollution was shown to have a statistically significant negative effect on property values. Willingness to pay obtained from the survey was shown to be correlated with visibility and health effects (as defined by the **PSI** index). Both methods resulted in an estimate of average benefits per household of about **\$80 annually** for a 30 percent improvement in air quality; this represents an annual total benefit of about \$130 million for a 30 percent improvement for the Bay area (using 1977-1978 air quality conditions as a base and 1978 socioeconomic conditions and property values).

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