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Costs and Benefits of Water Quality Protection

Section 305(b) of the Clean Water Act calls for states to prepare estimates of the economic and social costs and benefits necessary to achieve the goals of the Act, i.e., water quality that is good enough to support a balanced population of shellfish, fish, and wildlife and allow recreational activities in and on the water. Unfortunately, this is a very daunting task. Data on the amount of money spent on pollution control by the public and private sectors can be difficult to obtain. Measuring benefits poses an even more complex challenge—it is easier to describe benefits than it is to put a dollar value on them because many types of benefits do not involve market transactions. Many argue that it is not appropriate to try to put a dollar value on all of the benefits of a clean environment.

Water Quality Costs and Benefits Identified by the States

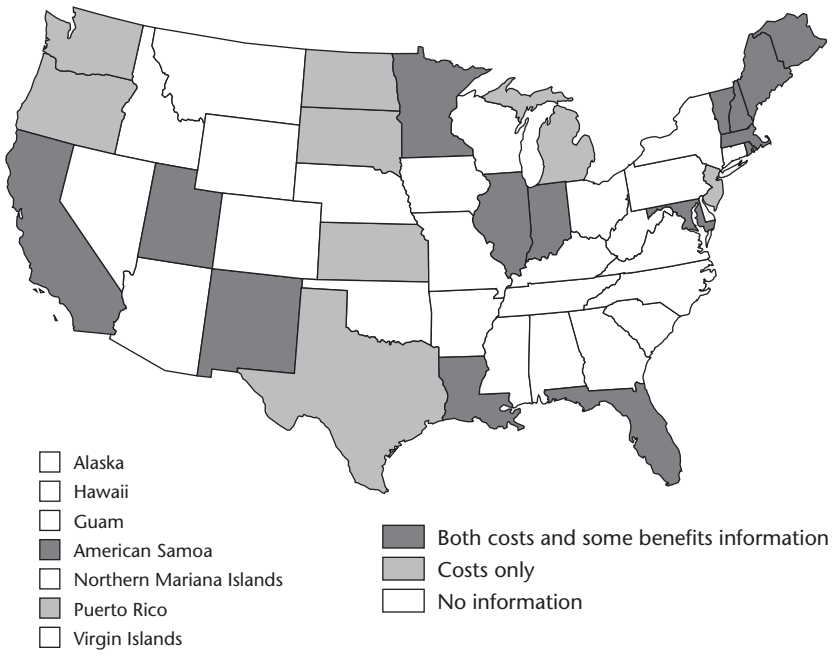
Most states reported that they encountered some difficulty in reporting on the economic and social costs and benefits of actions to achieve the goals of the Act. Many states were able to provide some estimates of expenditures on some aspects of water quality protection or restoration (Figure 8-1). Typically, this cost information included the amount of money provided through grants or loans to upgrade municipal wastewater treatment plants or the annual budget for the jurisdiction's water quality management program.

Reporting on benefits was more difficult than reporting on costs and most states provided only limited qualitative descriptions of the types of benefits accompanying implementation of the Clean Water Act. A few states, however, conducted cost/benefit analyses. The following examples highlight some of the data reported by states.

Many types of benefits, such as a healthy environment to pass on to our grandchildren, cannot be calculated.

Figure 8-1

States Reporting on Costs and/or Benefits



Based on state 2000 305(b) reports.

Maine

In 2000, the cost to administer all water-related programs in Maine was $11.1 million. This cost included licensing, compliance, enforcement, technical assistance, pollution prevention, wastewater engineering, environmental assessment, lake restoration, nonpoint source (NPS) controls, and ground water protection. Although the state did not provide an assessment of benefits for all of these programs, Maine did provide an assessment of the value of lakes to the state's economy.

Over the last 4 years, several studies have been completed by state and university researchers that have linked water quality in Maine's lakes to economic measures. A 1996 report, *Water Quality Affects Property Prices: A Case Study of Selected Maine Lakes*, analyzed the linkage between water clarity and property values. This valuation study was the first of its kind and led to a companion study using contingent valuation methods published in 1998, *Lakefront Property Owners' Economic Demand for Water Clarity in Maine Lakes*. A third investigation of the value of lakes to Maine's economy was completed in 1997, *Great Ponds Play an Integral Role in Maine's Economy*. A fourth study published in 1998 as a Ph.D. thesis, *Values and Impacts Associated with Access Users' Recreational Use of Maine's Great Ponds*, illustrates the value placed by transient users on water quality and their willingness to pay for water quality programs.

The results of all of these related studies provided a means to quantify the economic costs of lake water quality degradation and the benefits to the state of maintaining and further improving water quality. The state was able to determine that a 1 meter reduction of summertime minimum clarity (secchi transparency) resulted in a reduction of from 3 to 5% in expected market price of lakefront property. Further analysis by the state suggests that as much as 3 to 5% of the tax burden could be shifted from lakefront owners to others in the watershed, depending on the specific town involved. Preliminary estimates of aggregate property value loss on the 164 monitored low-color lakes (minimum clarity of 3 meters) ranged between $200 and $400 million.

More than a quarter of Maine's adults (>200,000 people) use lakes each year. These users spend about $100 million annually in recreational costs associated with lakes, which stimulates local economies. In addition, the consumer surplus, or the value derived in excess of what is paid for the recreational experience, exceeds $7.5 million annually. The study showed that this consumer surplus would decline by $1 to 2 million annually if small but measurable declines in lake water quality occurred.

Lake-based expenditures by all users support over 50,000 jobs in Maine and generate an estimated $1.8 billion in total direct expenditures. The state estimated that the net benefit of avoiding measurable water quality degradation in lakes exceeds $2 billion annually. Estimates of the willingness of access users to pay for water quality is estimated to be $2 to $6 million annually. The total value to the public of water quality protection for Maine lakes was very high, and substantially exceeds current public and private expenditures for water quality programs and services.

Michigan

Since 1972, the state has spent about $4.5 billion on about 1,100 municipal wastewater treatment plant improvement projects. Michigan estimates that $2 billion is needed to meet federal and state requirements for municipal wastewater treatment and an additional $1 billion is needed to meet optimal conditions that reflect water quality enhancement, growth capacity, and economic development. In addition, the state estimates costs of $700 million and $1.2 billion for combined sewer overflow initiatives in the Rouge and Detroit River basin communities, respectively.

During the latter part of 2000, Michigan promulgated rules to establish legal authority for a statewide water quality trading program designed to optimize the costs of improving water quality, facilitate Total Maximum Daily Load implementation, and provide economic incentives for nonpoint source pollutant reductions. Michigan's Water Quality Trading Program investigated the possibility of using market-based pollutant trading concepts to provide financial incentives for combined sources (industrial, agricultural, and municipal) and to improve overall water quality while minimizing costs. The results of the study indicate that trading has potential application to those watersheds that require nutrient loading reductions (e.g., Huron, Kalamazoo, Lake Macatawa, and Saginaw Bay watersheds). Through the implementation of effluent trading, the state expects to improve water quality, minimize costs, form partnerships, and provide greater flexibility for a sustained local economy in attaining water quality objectives.

North Dakota

The costs associated with municipal point source pollution control programs in North Dakota have been quite significant. Most of these expenditures have been in the area of capital investments. In 1998 and 1999, approximately $29 million from the State Revolving Fund (SRF) was used to construct wastewater system improvements. In addition to available SRF funding, several communities have upgraded their wastewater treatment facilities at their own expense. Beside construction costs, $7 million per year is spent on operating and maintenance costs of wastewater treatment facilities.

North Dakota did not quantify monetary benefits of water quality expenditures in their 305(b) report. The state notes that secondary wastewater treatment has been achieved in every municipality. The qualitative benefits of this include the elimination and reduction of point source waste loads to receiving waters and the reduction of stressors to public health. The state also notes an increased awareness of NPS pollution such as runoff from confined animal feeding operations and other types of NPS pollution by both the public and private sectors.