

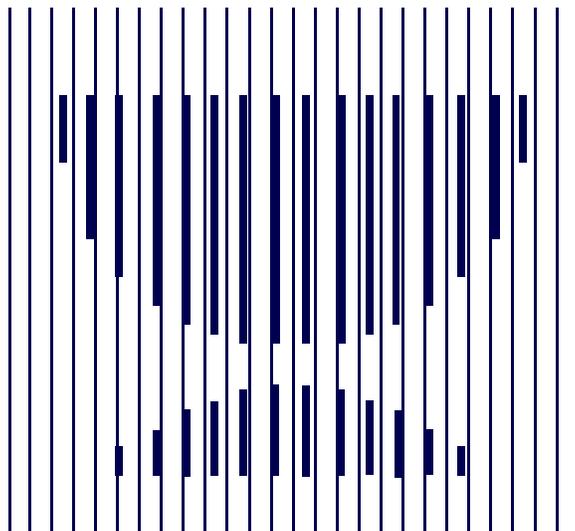


# CBO MEMORANDUM

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**A PRELIMINARY ANALYSIS OF  
UNFUNDED FEDERAL MANDATES  
AND THE COST OF THE  
SAFE DRINKING WATER ACT**

**September 1994**



**CONGRESSIONAL BUDGET OFFICE**





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**CONGRESSIONAL BUDGET OFFICE  
SECOND AND D STREETS, S.W.  
WASHINGTON, D.C. 20515**



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The Congressional Budget Office (CBO) is studying unfunded federal mandates--especially those involving environmental policy--at the request of the Chairman of the Senate Committee on Governmental Affairs. This memorandum presents preliminary findings from that ongoing study. Terry Dinan of CBO's Natural Resources and Commerce Division prepared the report under the direction of Roger Hitchner and Jan Paul Acton.

The memorandum describes trends in federal aid to state and local governments, discusses the pros and cons of federal mandates, and examines some of the potential consequences of providing federal funding for mandates. It also considers evidence about the costs that the Safe Drinking Water Act imposes on local governments and highlights some of the important methodological issues associated with measuring them. The forthcoming final report will provide more details about those matters and discuss several policy options for minimizing costs.

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## SUMMARY AND INTRODUCTION

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The past several years have witnessed a growing movement to draw attention to the costs that state and local governments bear in complying with federal requirements. (A coalition of state and local officials even went so far as to declare October 26, 1993, National Unfunded Mandates Day.) The increasing concern about the effects of such costs on state and local government has led the Congress to consider legislation that would limit its ability to pass additional unfunded mandates or that would increase the information it must consider when unfunded mandates are being enacted. The options it is examining range from preventing the passage of state and local requirements that are not accompanied by federal dollars to such lesser measures as forming a commission to study the cost of mandates or expanding the cost estimates of legislative proposals affecting states and localities prepared by the Congressional Budget Office (CBO). Environmental laws have been cited as particularly burdensome at the local level. As a result, concerns about unfunded mandates have played a central role in the debate on the reauthorization of the Clean Water Act and the Safe Drinking Water Act.

Yet despite the amount of discussion about unfunded mandates, little empirical work has been done.<sup>1</sup> Most previous attempts focused on the cost of a single regulation (rather than on the cumulative effects of multiple regulations) and were carried out at the time that the regulation was proposed. The studies are not, therefore, based on actual experience.

Several years ago, the Environmental Protection Agency (EPA) undertook a major examination of the cost of multiple environmental regulations. It estimated that the annualized cost of pollution control in 1995 would total \$5 billion for states and \$35.8 billion for local governments (measured in 1992 dollars).<sup>2</sup> These cost estimates are useful, but they have important limitations. First, they represent total expenditures for pollution control--including the expenditures that state and local governments would have made in the absence of federal regulations. Second, they are based primarily on engineering analyses conducted at the time that the regulations were being developed and not on actual cost data.

Several local governments have also begun to try to calculate the costs that they have incurred as a result of federal mandates. For example, the city of Columbus, Ohio, estimated that it spent \$68 million for pollution control

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1. Advisory Commission on Intergovernmental Relations, *Federally Induced Costs Affecting State and Local Governments: Concepts, Experiences, and the Question of Relief*, draft report (May 1994), p. ii.; Center on Budget and Policy Priorities, *Unfunded Mandate Legislation: An Analysis of the Glenn-Kempthorne Bill* (Washington, D.C.: Center on Budget and Policy Priorities, May 1994).

2. Environmental Protection Agency, *Environmental Investments: The Cost of a Clean Environment* (November 1990).



in 1991 (measured in 1992 dollars). That estimate includes the cost of complying with federal and state mandates as well as the cost of pollution control measures that the city would have undertaken in the absence of those mandates.<sup>3</sup>

In an effort to better understand the magnitude of the costs imposed by federal mandates on local governments, the Congressional Budget Office is examining available evidence on the costs that local governments bear to comply with the Safe Drinking Water Act (SDWA). This act is only one component of the unfunded mandate issue, but critics point to its requirements as particularly burdensome. CBO's analysis considers three different sources of information: engineering analyses performed at the time that the regulations were developed, census data on actual expenditures, and self-reported cost data provided by cities and counties.

CBO is also studying broader trends in federal aid to state and local governments, the implications of funding mandates at the federal level, non-monetary concerns about federal mandates, methodological issues associated with measuring the costs that result from federal mandates, and appropriate methods for considering those costs in their proper context. Preliminary conclusions from the study include the following:

- o According to the Advisory Commission on Intergovernmental Relations, the number of federal mandates rose from fewer than 5 in 1960 to 66 in 1990. At the same time, census data show that federal aid to state and local governments for uses other than public welfare has generally been declining on a per capita basis since 1978.
- o The cost of federal mandates must be measured carefully. Failing to treat capital costs correctly and to account for federal funds in figuring local costs will result in misleading findings that can dramatically overstate or understate a mandate's costs. In addition, general subsidies, such as tax benefits, that the federal government provides to state and local governments should be taken into consideration. Attributing a particular share of them to any given mandate, however, is difficult.
- o The most troublesome methodological issue is determining the incremental cost of federal mandates. That calculation subtracts

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3. Environmental Law Review Committee, *Environmental Legislation: The Increasing Costs of Regulatory Compliance to the City of Columbus* (Columbus, Ohio: Mayor's Office, May 1991).



the costs that communities would have incurred in the absence of a mandate from the total costs they incur for compliance.

- o Available evidence indicates that treating drinking water to standards specified under the SDWA would result in a total cost of less than \$20 per year for most households. Proposed rules that are now being considered could double or triple that cost. All such estimates, however, reflect the total rather than the incremental costs of compliance. Communities undoubtedly would have undertaken some of those measures in the absence of the SDWA.

## BACKGROUND ON THE FEDERAL MANDATE DEBATE

No definition of either "federal mandate" or "unfunded federal mandate" is universally accepted. The Advisory Commission on Intergovernmental Relations (ACIR) has defined eight principal types of federal actions that can induce spending by state and local governments (see Box 1). Much disagreement exists, however, about which of these actions should be classified as federal mandates and which should be considered unfunded federal mandates.

Because definitions of federal mandates differ, so, correspondingly, do estimates of their number. The ACIR estimates that the number of federal mandates grew from fewer than 5 in 1960 to more than 60 in 1990. This tally of federal mandates includes direct orders, two types of grant-in-aid conditions on spending, and partial preemptions--programs that state or local governments may administer if they adopt standards that are equal to or more rigorous than a federal standard.<sup>4</sup> The National Conference of State Legislatures uses a more inclusive definition of federal mandates and as of December 1993 had identified 185 of them.<sup>5</sup> Neither of these estimates, however, provides information on the relative magnitude of the mandates.

One indication of the mandates that local governments perceive as the most objectionable comes from the choice of mandates included in surveys conducted for the U.S. Conference of Mayors and the National Association

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4. Advisory Commission on Intergovernmental Relations, *Federally Induced Costs*, p. 2.

5. National Conference of State Legislatures, "Mandates Catalogue" (Washington, D.C., December 1993). The conference's definition of the term "federal mandate" includes all of the kinds of federal action listed in Box 1 except two: court decisions or administrative regulations that impose an implied constitutional or statutory obligation on state and local governments, and regulatory delays and nonenforcement.



**BOX 1.**  
**TYPES OF FEDERAL ACTION THAT CAN  
INDUCE SPENDING AS DEFINED BY THE  
ADVISORY COMMISSION ON  
INTERGOVERNMENTAL RELATIONS**

- o Grant-in-aid matching requirements and conditions on spending and administration.
- o Direct orders that mandate state and local governments to perform an activity for which there is little or no federal funding.
- o Federal regulations that allow state or local government enforcement if the state or local standards are equal to or higher than the federal standard.
- o Prohibitions of state or local actions that could save state and local costs.
- o Tax policies that make it more difficult or expensive for state and local governments to raise revenues, borrow funds, fund public-private partnerships, and privatize public functions.
- o Court decisions or administrative regulations that impose an implied constitutional or statutory obligation on state and local governments to do or not do something.
- o Regulatory delays and nonenforcement.
- o Laws that expose state and local governments to liability lawsuits.

**SOURCE:** Advisory Commission on Intergovernmental Relations, *Federally Induced Costs Affecting State and Local Governments* (September 1994).



of Counties. These local government associations collected information about specific mandates to draw attention to the entire mandate issue (see Figure 1 and Appendix A). Clearly, cities and counties are concerned about numerous environmental mandates.

Dismay about the growing number of federal requirements and the restrictions they place on how state and local governments may spend their budgets is not new. In 1980, for example, a study prepared for the Congress's Joint Economic Committee measured the local costs resulting from federal requirements.<sup>6</sup> The motivation for that study was "a growing concern among local officials that the ability to allocate revenue in a timely and efficient manner is being slowly eroded by new Federal guidelines, regulations and other requirements." That concern persists to this day.

### Trends in Federal Aid to State and Local Governments

A fundamental difference between the concerns expressed in 1980 and the concerns of today is the amount of federal funds accompanying additional federal mandates. In the early and mid-1970s, growth in the number of federal requirements was accompanied by increases in direct federal aid to state and local governments. Although such requirements have continued to grow throughout the 1980s and the early 1990s, federal aid to state and local governments--adjusted for inflation and measured on a per capita basis--fell significantly from 1979 through 1982 and has never again reached its 1978 peak (see Figure 2).

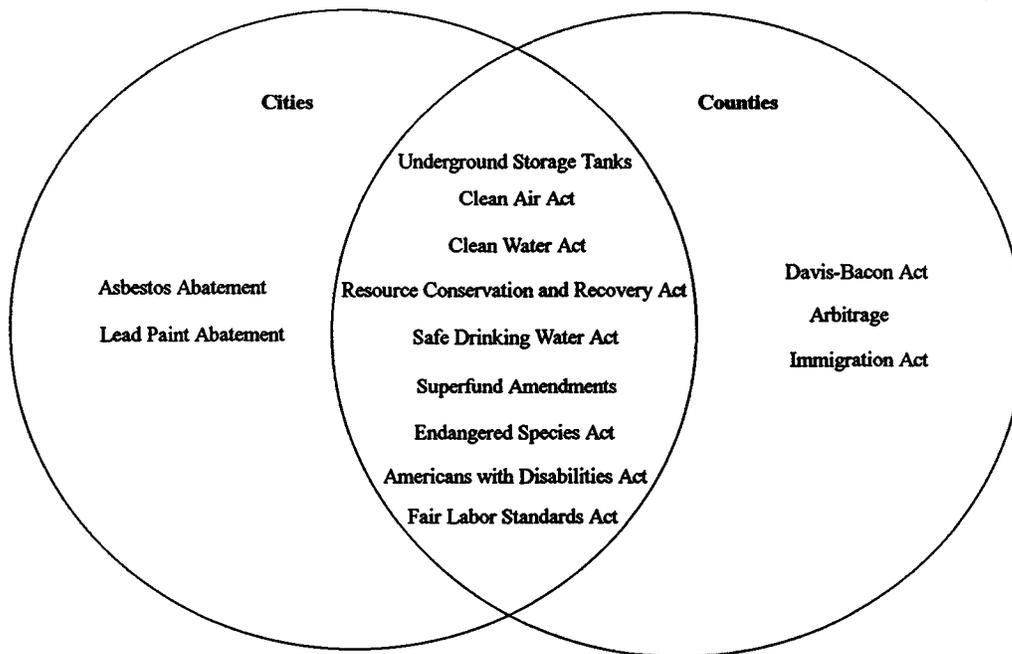
A large share of the revenue that the federal government provides to state and local governments goes for public welfare programs. This component of federal aid has been growing on a per capita basis since 1980 and as a result can obscure the extent of the aid provided for other uses. The amount of funds provided to state and local governments for uses other than public welfare has declined since 1978 on a per capita basis (see Figure 3). In addition, federal aid as a share of state and local expenditures for items other than public welfare has fallen from 16 percent in 1978 to 9 percent in 1991 (see Figure 4).

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6. Thomas Muller and Michael Fix, "The Impact of Selected Federal Actions on Municipal Outlays," in Joint Economic Committee, *Special Study on Economic Change*, vol. 5, *Government Regulation: Achieving Social and Economic Balance*, Joint Committee Print (December 1980).



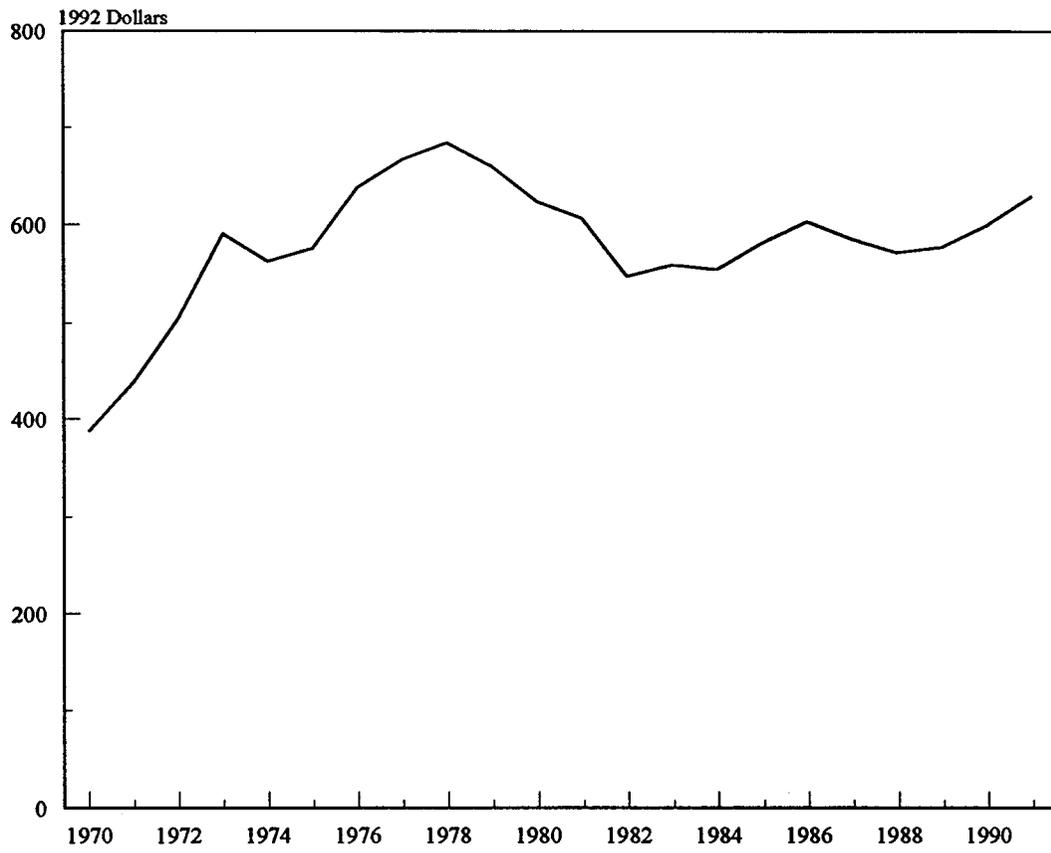
FIGURE 1. MANDATES INCLUDED IN SURVEYS OF U.S. CITIES AND COUNTIES



SOURCE: Congressional Budget Office based on U.S. Conference of Mayors, *Impact of Unfunded Federal Mandates on U.S. Cities* (Washington, D.C.: U.S. Conference of Mayors, October 1993); and National Association of Counties, *The Burden of Unfunded Mandates: A Survey of the Impact of Unfunded Mandates on American Counties* (Washington, D.C.: National Association of Counties, October 1993).



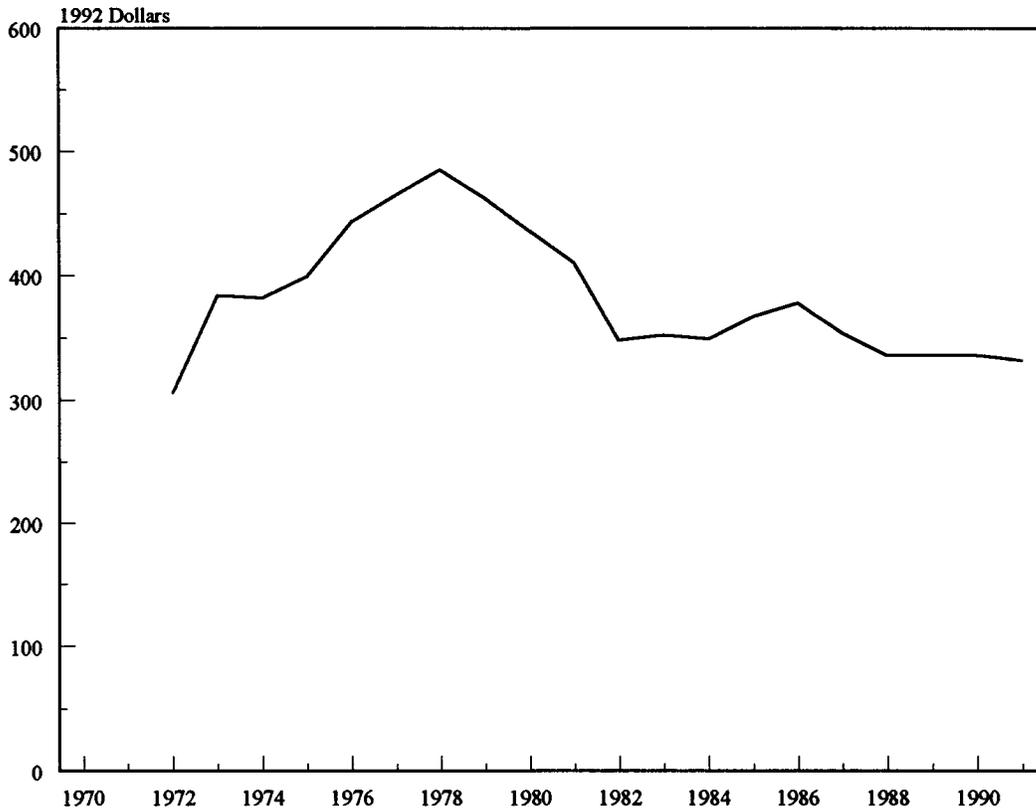
FIGURE 2. FEDERAL AID RECEIVED BY STATE AND LOCAL GOVERNMENTS  
MEASURED ON A PER CAPITA BASIS, 1970-1991



SOURCE: Congressional Budget Office based on the Census Bureau's Government Finances Series.



FIGURE 3. FEDERAL AID RECEIVED BY STATE AND LOCAL GOVERNMENTS MEASURED ON A PER CAPITA BASIS, NET OF FUNDS FOR PUBLIC WELFARE, 1972-1991

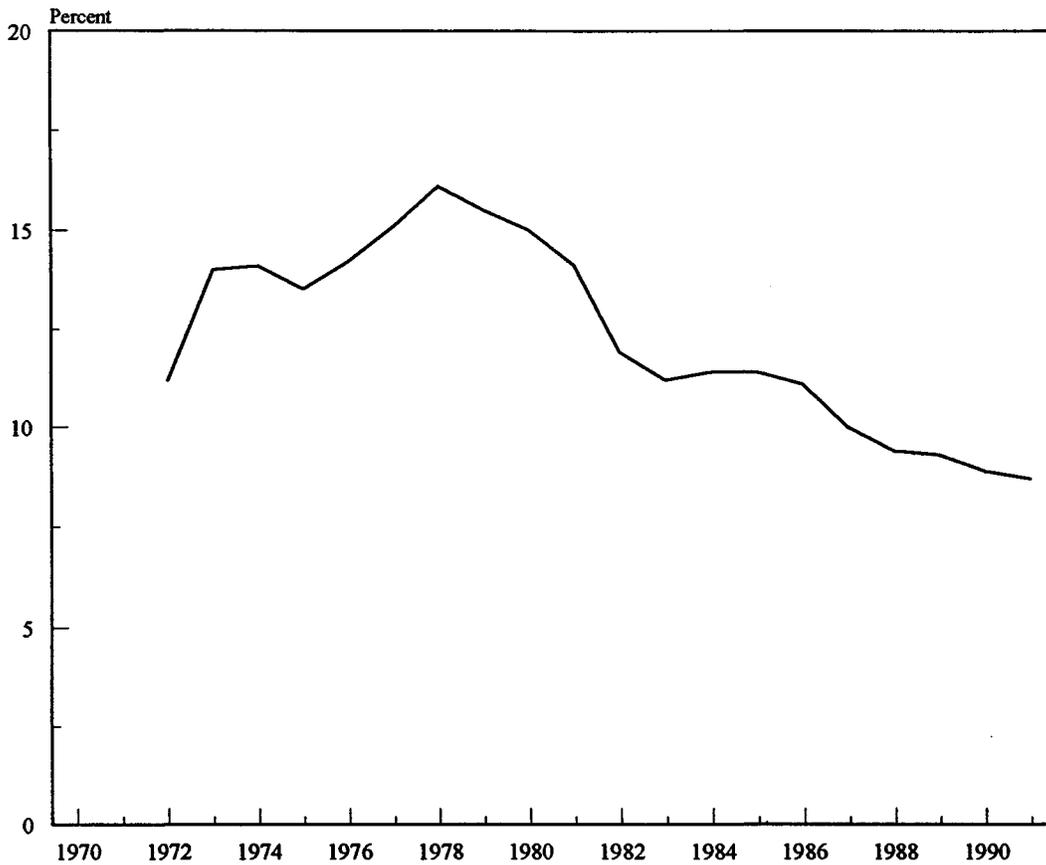


SOURCE: Congressional Budget Office based on the Census Bureau's Government Finances Series.

NOTE: Federal revenue received by state and local governments that is classified as public welfare includes Aid to Families with Dependent Children, Medicaid, low-income home energy assistance programs, welfare institution payments, money for the homeless, children's services and foster services, social services block grants, and unemployment trust fund administrative expenses (David Kellerman, Bureau of the Census, personal communication, September 11, 1994).



FIGURE 4. FEDERAL AID AS A PERCENTAGE OF STATE AND LOCAL EXPENDITURES FOR ITEMS OTHER THAN PUBLIC WELFARE, 1972-1991



SOURCE: Congressional Budget Office based on the Census Bureau's Government Finances Series.

NOTE: Federal revenue received by state and local governments that is classified as public welfare includes Aid to Families with Dependent Children, Medicaid, low-income home energy assistance programs, welfare institution payments, money for the homeless, children's services and foster services, social services block grants, and unemployment trust fund administrative expenses (David Kellerman, Bureau of the Census, personal communication, September 11, 1994).



## Pros and Cons of Federal Mandates

Local officials object to federal mandates on the grounds that they force localities to allocate their funds in a manner that may be inconsistent with local priorities.<sup>7</sup> For example, many local officials have indicated that they would spend additional funds on increased police protection and crime prevention if the cost of federal mandates was reduced.<sup>8</sup>

A related concern is that mandates that are set at the federal level may not reflect the unique situation of individual communities. Local governments may have better information on local circumstances and thus be able to assess the specific costs and benefits of a mandate--as it relates to them--more accurately. Drinking water regulations illustrate the problems involved. These regulations are based in part on their affordability for large water systems, which have lower unit costs as a result of economies of scale.<sup>9</sup> For some smaller communities, the compliance costs associated with such regulations may impose a heavier fiscal burden and may exceed the benefits that they receive.

As another example, officials in arid western cities, such as Tucson and Phoenix, have complained that the requirements of the Clean Water Act are ill-suited to their climate.<sup>10</sup> They believe that some of the investments that they are required to make are costly yet do little to reduce risks. Some local officials also argue that they are required to comply with mandates that are based on inadequate scientific evidence.<sup>11</sup>

Another problem is that some federal mandates may discourage local innovation in achieving the goals that they are intended to promote. Environmental regulations that specify the use of a particular technology (such

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7. For a more detailed discussion of the logic of assigning responsibility for environmental protection to different levels of government, see Congressional Budget Office, "Environmental Federalism: Allocating Responsibilities for Environmental Protection," CBO Staff Working Paper (September 1988).

8. U.S. Conference of Mayors, *If Unfunded Federal Mandates Were Relieved: Potential Impact on Policing and Crime Prevention* (Washington, D.C.: U.S. Conference of Mayors, March 1994).

9. Environmental Protection Agency, *Technical and Economic Capacity of States and Public Water Systems to Implement Drinking Water Regulations: Report to Congress* (September 1993), p. 20.

10. U.S. Conference of Mayors, *Impact of Unfunded Federal Mandates on U.S. Cities* (Washington, D.C.: U.S. Conference of Mayors, October 1993), pp. D-1 through D-3.

11. For example, see the statement of Steve Bartlet, Mayor of the City of Dallas, before the Investigations and Oversight Subcommittee, House Science, Space, and Technology Committee, March 22, 1994; and Advisory Commission on Intergovernmental Relations, *Federally Induced Costs*.



as the best available technology for wastewater and drinking water treatment) may discourage local governments from trying more cost-effective approaches.

Yet despite such drawbacks, federal mandates may offer several advantages. In some cases, the decisions of a municipality may result in "externalities"--effects on citizens or businesses outside its boundaries. A local government generally does not have a sufficient incentive to take such external effects into account in its decisionmaking. For example, the emissions from a municipal incinerator could have adverse health effects on people living far outside the municipality's boundaries. The local citizens would bear the cost of reducing the incinerator's emissions but would not receive all of the benefits that would result. Consequently, the local government would not have an incentive to choose a sufficiently high level of protection.

Another advantage to regulation at the federal level is the broader range of expertise and resources available. Some activities (such as setting health standards or developing technology-based standards) require a great deal of technical information. Many local governments lack the ability and the incentive to obtain it, whereas the federal government can supply it to communities at little additional cost.<sup>12</sup>

Uniform national standards can have an advantage from both an efficiency and an equity perspective. Companies that have plants in different locations may find it less costly to meet one uniform national standard than many different state or local ones. Furthermore, uniform national standards ensure that citizens can travel throughout the United States and be assured of a certain level of protection--for example, safe drinking water. Such standards also guarantee citizens a minimal level of certain benefits no matter where they live. A person in a wheelchair can thus be assured of access to public transportation regardless of the priority that his or her community might attach to accessibility in the absence of a federal mandate.

Finally, uniform national standards may prevent some local governments from setting lower local standards in order to attract businesses to their area. In other cases, however, local governments may prefer to have the option of adopting lower standards to compete for business investment.

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12. Statement of Elliot Schwartz, Acting Assistant Director of the Natural Resources and Commerce Division, Congressional Budget Office, before the Senate Committee on Governmental Affairs, September 14, 1988.



## Implications of Providing Federal Funds for Federal Mandates

Local officials complain that it is unfair that federal officials are able to establish mandates, whereas local officials are responsible for funding them. Regardless of whether mandates are funded by the federal government or by local governments, individuals (as taxpayers and consumers) and businesses will ultimately bear the cost of implementing them. The question of what level of government should pay for mandates can, however, have important equity and efficiency implications.

In some cases, identifying who benefits from a mandate may help determine the appropriate source of funds. For example, the nation as a whole can benefit from lower health care costs if local governments provide immunizations for children. Given that the costs are local but the benefits national, federal funding may be appropriate. In other cases, the fact that the benefits from a mandate extend beyond local boundaries may not necessarily mean that the federal government should provide funds. For instance, individuals living outside a local jurisdiction may benefit when that locality reduces the discharges from its wastewater treatment facility. In that case, however, the "polluter-pays" principle may apply--those that create the pollution should bear the cost of reducing it.

Mandates that are paid for by the federal government are generally funded primarily through federal business and personal income taxes. Mandates that are financed by local governments are generally funded mainly through local taxes or user fees. Because these alternative sources of revenues may have different incidences, the choice of financing may raise added concerns over the progressivity of the funding, interregional effects, and the like.

Federal funding can ease the burden of mandates on local governments. It can also be targeted to provide relief for communities that bear a particularly large fiscal burden in complying with a mandate (such as small communities that are unable to achieve economies of scale or communities with an exceptionally low tax base). If federal funding programs are not carefully designed, however, they can reduce the incentives that local governments have to make efficient choices.

When local governments pay for a federal mandate, they have an incentive to choose the most cost-effective strategy possible for complying with it. In an examination of federal infrastructure projects, the Congressional Budget Office found that federal infrastructure programs, as currently structured (that is, providing a share of the cost of the infrastructure), "fail to provide either infrastructure users or state and local managers with incentives



to make efficient choices."<sup>13</sup> For example, mass transit systems built with federal funds tend to have excess capacity.<sup>14</sup> Another CBO study found that wastewater treatment plants made less efficient investments when local governments covered a smaller portion of the costs of a project. Higher local cost shares resulted in the selection of simpler treatment technologies, limited construction of reserve capacity, rigorous local oversight of costs, and, ultimately, shorter construction periods.<sup>15</sup>

In addition, the availability of federal funds may cause states and local governments to delay taking action on their own in order to receive federal dollars. CBO found, for instance, that some local governments may have put off needed investments in wastewater treatment in hopes of qualifying for matching grants.<sup>16</sup> That type of strategic behavior could delay the process of achieving the goals of the mandate. It is particularly likely to occur in situations in which the federal government attempts to fund only the incremental share of a mandate's cost--that is, the additional expenditures that a mandate requires municipalities to make, over and above what they would have spent in the absence of the mandate.

Further, the knowledge that federal funds are available to address a problem can lessen the incentives of municipalities to use other strategies to avoid that problem in the first place. Drinking water offers a good illustration. When drinking water treatment is funded at the local level, expanding municipalities have an incentive to promote water conservation in order to delay the need for additional treatment capacity. The city of Denver, in an effort to delay the need for additional water supplies and, correspondingly, additional treatment, has adopted water conservation measures that are expected to reduce projected water demand in 2010 by between 10 percent and 15 percent. It is estimated that additional measures could reduce demand by another 10 percent to 15 percent.<sup>17</sup>

Finally, each dollar of federal funds that is provided does not always result in an additional dollar of total expenditures to attain a social goal, such as clean air or clean water. In some cases, federal dollars may replace at least a share of the funds that state or local governments would have chosen

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13. Congressional Budget Office, *New Directions for the Nation's Public Works* (September 1988), p. xvi.

14. *Ibid.*, p. 35.

15. Congressional Budget Office, *Efficient Investments in Wastewater Treatment Plants* (June 1985), p. xii.

16. Congressional Budget Office, *New Directions for the Nation's Public Works*, p. 105.

17. John R. Morris, "Water Conservation Progress in Denver," *Contemporary Policy Issues*, vol. 9 (July 1991), pp. 35-45.



to spend to meet that goal in the absence of federal aid (or even in the absence of a federal mandate). This phenomenon is known as fiscal substitution and can be seen most clearly in the historical level of expenditures made on infrastructure for wastewater treatment (see Figure 5). The amount of federal funds available (through the EPA) to subsidize local construction of wastewater treatment facilities rose from \$1.4 billion in 1972 to \$7.3 billion in 1977. The amount of local funds used to construct wastewater treatment plants fell, however, from \$5.4 billion in 1972 to \$0.9 billion in 1977.

Federal funding programs need not result in inefficient choices at the local level. But they must be carefully designed to provide local officials with an incentive to meet the goal that the federal mandate aims to achieve in the most cost-effective way. In general, providing federal funds based on factors that are outside the immediate control of states and localities (such as their population) rather than on factors that states and localities can control in the short run (such as the size of the infrastructure project they plan to undertake) tends to minimize the distortionary effects that federal funds can have. Using factors that are not open to immediate control minimizes the incentives to choose a more extensive infrastructure project than necessary or to delay making needed investments simply to obtain additional federal funds. Further, the more flexibility that states and localities have in allocating federal funds, the greater their incentive to use them in the most cost-effective way.

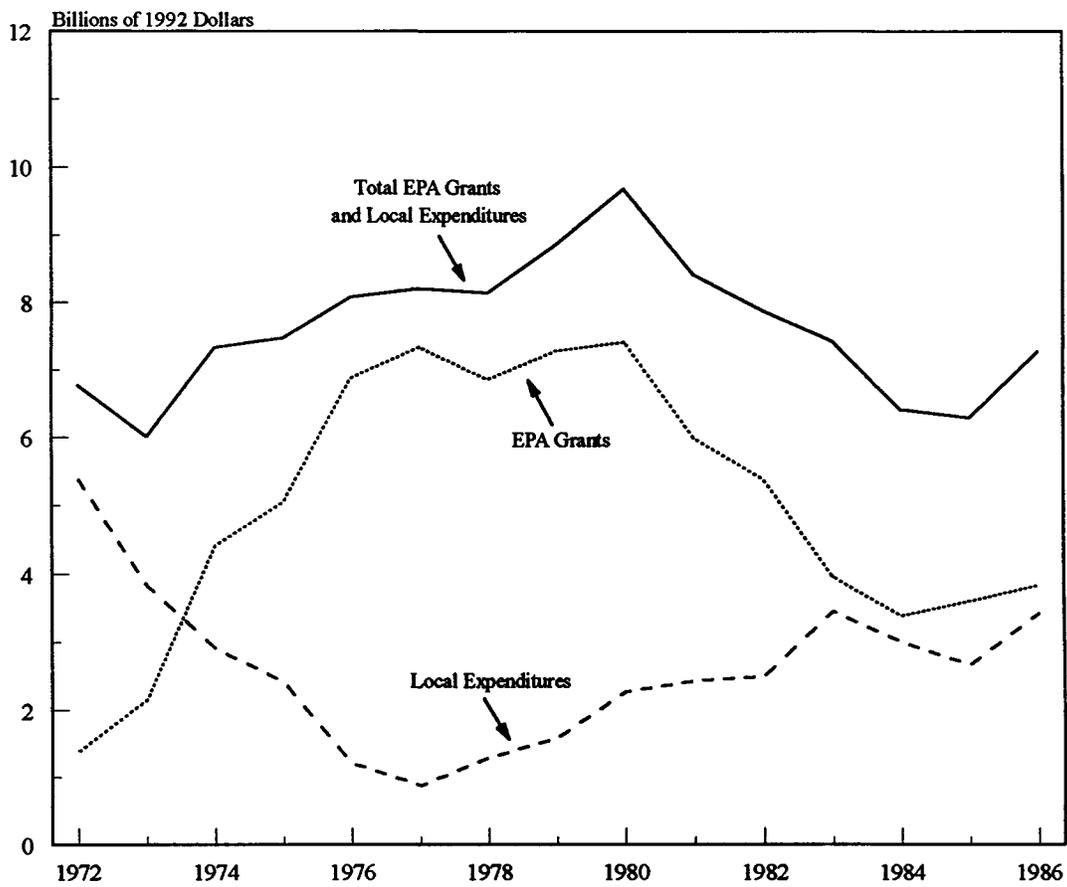
Providing federal funds based on factors that are outside the control of states and localities has advantages, but it has limitations as well. Basing the allocation of the money on such factors may not achieve the legislative purpose of the mandate. Given the difficulty of choosing appropriate criteria for assistance, any formula is likely to be controversial on grounds of both efficiency and fairness.

## THE SAFE DRINKING WATER ACT

Some observers consider the Safe Drinking Water Act one of the more burdensome federal mandates, which makes it a good starting point for examining how mandates affect local governments. Information about the costs that municipalities bear to comply with the SDWA is useful in that effort. Also important, however, is a consideration of the cumulative costs of multiple mandates.



FIGURE 5. TRENDS IN LOCAL EXPENDITURES AND EPA GRANTS TO LOCAL GOVERNMENTS FOR WASTEWATER TREATMENT INFRASTRUCTURE, 1972-1986



SOURCE: Congressional Budget Office based on Environmental Protection Agency, *Environmental Investments: The Cost of a Clean Environment* (November 1990).



## Background on Drinking Water Regulations

Before the establishment of the Environmental Protection Agency and the enactment of the SDWA, local governments treated their drinking water to ensure acceptable taste and odor and to prevent the outbreak of acute waterborne disease. Voluntary standards established by the Public Health Service in 1962 were widely followed.<sup>18</sup> In 1974, the Congress passed the SDWA and directed the EPA to promulgate national interim primary drinking water regulations while final regulations were being developed. The interim regulations codified existing health standards; they were promulgated in December 1976 and became effective in mid-1978. Another rule, the total trihalomethane regulation, was promulgated in 1979 (but became effective 18 months later). The interim regulations and the total trihalomethane rule were the only national regulations covering drinking water in effect before the passage of the 1986 amendments to the SDWA.

The 1986 amendments directed the EPA to promulgate regulations for 83 specific contaminants as well as regulations mandating filtration (for those water systems supplied by surface water sources) and disinfection (for all water from public water supplies).<sup>19</sup> In addition, the law required the EPA to regulate 25 additional contaminants every three years. Since 1986, the EPA has promulgated seven major regulations that establish standards for groups of specific contaminants (see Appendix B). Three regulations are currently in the proposal stage.

## Measuring the Cost of the SDWA

Many communities share the common goal of providing their residents with safe drinking water. Most would, therefore, undertake some testing and treatment of their drinking water even in the absence of federal requirements. The true cost of a federal mandate is the additional expenditures that it requires municipalities to make. Unfortunately, the data to estimate what municipalities would have done in the absence of federal mandates do not exist. Instead, three sources--each with different strengths and weaknesses--offer information about the cost of federal requirements related to drinking water:

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18. Environmental Protection Agency, *Environmental Investments*.

19. Environmental Protection Agency, *Estimates of the Total Benefits and Total Costs Associated with Implementation of the 1986 Amendments to the Safe Drinking Water Act* (March 1990).



- o Engineering-based estimates that use models to predict the costs that different types of water systems will incur;
- o Census data that indicate actual expenditures for drinking water by local governments in the United States; and
- o Case studies that indicate the actual costs incurred by selected communities to treat their drinking water.

Although each source of information can provide some insight into the cost of federal requirements, no single one is completely satisfactory. Engineering-based approaches have been used to provide national estimates of such costs, but they are based on numerous assumptions that may not hold true in the real world. Census data offer information on the changes in community expenditures for drinking water over time, but they do not reveal what share of that change is due to the treatment of drinking water (rather than its pumping and distribution). Case studies may give an accurate picture of the costs that a particular community has incurred to treat its drinking water, but communities are unique, making it difficult to generalize from case studies to the national level. None of the sources provide any direct information on what level of treatment communities would have selected in the absence of federal mandates.

Yet despite their limitations, the three sources taken together offer indications of the costs that local communities have incurred in complying with federal drinking water regulations.

### Engineering-Based Cost Estimates

Two organizations provide engineering-based estimates of the cost of meeting federal requirements for safe drinking water: the EPA and the American Water Works Association (AWWA), a group of major suppliers of drinking water. A strength of these estimates is that they are comprehensive; that is, they attempt to estimate the total national cost of meeting federal requirements. But this type of estimate also has two primary drawbacks.

First, it does not indicate what communities would have done in the absence of federal regulations. In figuring how much a mandate costs, a distinction should be drawn between the total cost of meeting federal requirements and the incremental cost. The total cost refers to the costs that drinking water systems incur when they treat water to the level specified by federal regulations. It comprises all treatment costs incurred after the standard is set, regardless of whether communities would have chosen to meet



the standard in the absence of a regulation. The incremental cost of a federal regulation is the additional cost that communities incur as a result of it. It equals the total cost of meeting the federal requirement minus the costs that drinking water systems would have incurred to treat their drinking water in the absence of federal regulations.

The incremental cost of a federal regulation is the cost of the mandate. It is the preferred measure for understanding the regulation's impact, but it is much more difficult to estimate than the total cost. The EPA and the AWWA estimate only the total cost of meeting federal requirements; they do not try to estimate the incremental cost. The EPA's estimates implicitly assume that no water system requiring treatment to meet a drinking water standard at the time the standard is promulgated would have chosen to undertake that treatment in the absence of the regulation. Likewise, they assume that no communities would have tested for regulated contaminants in the absence of federal requirements.

The second drawback to engineering-based models is that they are founded on numerous assumptions about how individual communities will comply with the requirements. The accuracy of the estimates depends on the realism of the modeling and the validity of those assumptions, which include the following:

- o The occurrence of contaminants and the type of water system in which they exist (surface water or groundwater, large or small).
- o The actual number of treatment units. Information is available on the number of water systems in the United States, but estimates of the number of treatment units differ.
- o The treatment technologies that water systems would choose.
- o The cost of purchasing and operating given technologies.
- o The cost of monitoring water quality.

Engineering-based cost estimates may ultimately prove to be quite different from the costs that specific water systems incur to treat their drinking water to the level of federal standards. Nevertheless, by making assumptions about how communities will respond to a regulation, engineering analyses can provide some understanding of the cost of a regulation as it is being developed. In addition, they offer a relatively inexpensive way to estimate the cost of existing regulations.

