all identified needs (about $4.2 billion each year, on average). 10/ On the basis of estimated 1983 outlays, this represents about a 31 percent increase in annual federal spending for wastewater through 1984. To match federal spending, state and local governments combined would have to spend about $1.5 billion a year in 1983 and 1984 and about $2.7 billion in each year between 1985 and 1990. In 1985 and thereafter, states and local jurisdictions combined would have to double their current capital spending to meet these projected needs.

But "needs," as interpreted by the EPA in terms of meeting the goals of the Clean Water Act, are based on a fixed national standard for wastewater treatment. This implies bringing effluent to a certain minimum quality before it can be discharged. In two situations, the EPA's interpretation may be causing overinvestment: where a lesser quality effluent will not result in a degraded environment (such as in some coastal areas), and where secondary or better treatment still does not result in clean water (such as in waterways degraded by causes other than wastewater).

EFFICIENCY OF CURRENT FEDERAL WASTEWATER PROGRAMS AND STRATEGIES FOR IMPROVEMENT

Benefits of wastewater collection and treatment systems accrue both to primary users and to downstream communities. Building adequate facilities solves local wastewater collection and water quality problems; but clean water also benefits other parties downstream who pay nothing for it. Because of this, no single community would be willing to charge its residents the full cost of wastewater treatment. Consequently, the responsibility for maintaining high quality rivers, lakes, and streams is shared both by direct users and by all levels of government. A federal role that maintains both the current level of participation and the current rate of spending will fall short of fully meeting wastewater treatment needs, as defined by the EPA standards. In light of the Congress' commitment to restrain the growth of federal spending, legislators may want to consider measures that would improve the cost effectiveness of spending without raising the level.

Several strategies are available for improving the efficiency of current spending. The mechanisms of current clean water policy leave room for possible economies. In effect, the Clean Water Act mandates use of certain costly technologies to meet water quality standards. In many instances, these processes are the only means by which wastewater treat-

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10. The federal share prior to 1985 was 75 percent of capital costs, dropping to 55 percent in 1985. This estimate neglects a higher federal share if innovative systems are funded.

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ment plants can achieve EPA standards. In other cases, a secondary level of treatment is not essential, however. At times, water quality is more directly linked to sources of pollutants other than wastewater--soil erosion, for example. In these cases, capital-intensive wastewater treatment may not improve water quality. Elsewhere, natural processes, such as mixing, dilution, and bacterial decomposition, can make expensive treatment unnecessary. More flexible regulations that could be adaptable to local water quality or hydrological conditions could allow wastewater treatment needs to be met at a lower cost. In addition, Congressionally enacted block grants might provide federal assistance more efficiently than do the current project grants. Where federal funds are not sufficient to meet local needs, alternatives would be available to states and localities to help finance wastewater treatment projects. Finally, private financing or ownership might help relieve local jurisdictions of the burdens of capital formation.

Current Policy

Under the appropriations ceilings now authorized, the EPA and other federal agencies will spend an average of $3.2 billion on wastewater facilities each year between 1983 and 1990 (see Table IV-1). 11/ To match these federal grants, states and localities will spend about $1.8 billion a year over the same period. Assuming annual requirements of about $6.6 billion per year (from the EPA's needs survey), about $1.6 billion in annual needs, or 24 percent, would remain unmet under present policy. To meet all needs as estimated by the EPA, federal spending under current matching ratios would have to increase to an average of $4.2 billion each year between 1983 and 1990. Federal spending could be increased to $3.7 billion a year (the midpoint between meeting all needs with higher federal spending and spending under currently authorized federal ceilings). This would leave the rest to be met by applying other strategies.

Effects of Increasing the Nonfederal Share. The currently planned increase in the nonfederal share from 25 percent to 45 percent in 1985 stands to affect two groups of communities more severely than all others: smaller communities (less than 10,000 in population) and older, financially distressed urban centers. In a review of the facilities grants program in 1981, the EPA noted that per capita treatment costs, under a 25 percent nonfederal share, were significantly higher for small communities. The causes identified were small-sized plants that failed to realize economies of scale and the relatively high costs of collecting wastewater from small

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11. Municipal Wastewater Treatment Construction Grant Amendments of 1981 authorized appropriations at $2.6 billion a year through 1985. Estimate assumes continued authorizations through 1990.

TABLE IV-1. ESTIMATED FEDERAL AND NONFEDERAL CAPITAL OUTLAYS FOR WASTEWATER FACILITIES UNDER CURRENT POLICY (In billions of dollars)

Funding Source	1983	1984	1985	1986	1987	1988	1989	1990	Annual Average
EPA a/	3.4	2.8	3.0	2.7	2.4	2.5	2.5	2.6	2.7
Other Federal b/	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Nonfederal	1.1	0.9	2.5	2.2	1.8	2.0	2.1	2.1	1.8
Total	5.0	4.2	6.0	5.4	4.5	4.9	5.1	5.2	5.0

SOURCE: Congressional Budget Office.

a. Assumes 1985 level of EPA appropriations authorization ($2.6 billion) for 1986 through 1990.

b. Includes FmHA and HUD grant and loan program outlays at a constant 1982 level.

dispersed populations. 12/ Besides supporting lower per capita incomes, most smaller cities have lower bond ratings, and consequently must pay proportionately more to borrow money.

Many financially distressed older cities accounted for the highest per capita needs in the EPA needs survey. In the Urban Institute's study of 28 large cities, a strong correlation was noted between high per capita needs, low fiscal capacity, and declining sewer maintenance expenditures attributable to financial pressures. 13/

Increased Flexibility in Meeting Federal Regulatory Requirements

In certain instances, as noted above, economies could possibly be achieved by a relaxation of the federal regulations that prescribe the way in

12. See Environmental Protection Agency, 1990 Strategy for Municipal Wastewater Treatment-Funding (January 1981).

13. See Humphrey and Wilson, Capital Stock Condition, pp 12-14.

which wastewater treatment authorities meet clean water standards. Current policies allow little latitude in this area.

Costly wastewater treatment can be futile where external agricultural, industrial, or natural causes impair water quality. In rural communities, for instance, river or stream water may be so degraded by causes unrelated to wastewater or its treatment--soil erosion, phosphorus and nitrogen runoff from fertilizers, or chemical contamination from pesticides--that treated wastewater is in fact much cleaner than the natural waterways it empties into. Intense farming or natural erosion upstream from an urban area may so dominate natural water quality that secondary and advanced treatment systems have little measurable influence on river or stream quality. Minneapolis-St. Paul and St. Louis are typical examples of cases in which millions of dollars have been spent to reduce discharges, yielding little improvement in river water quality. In Pennsylvania, acid drainage from coal mines has degraded several thousand miles of streams, some of which now cannot support aquatic life. Such examples suggest that local waivers of strict national treatment standards might reduce treatment costs without further degrading water quality.

Where wastewater empties into coastal water, wastewater discharges might be allowed after only limited treatment. In some coastal systems, natural currents cause mixing, dilution, and biological decomposition of waste so that, in the discharge area, environmental degradation does not result and healthy biological communities thrive. Again, making waivers available rather than adhering rigidly to secondary treatment guidelines might make economic sense. In a recent study, the General Accounting Office estimated up to $10 billion could be saved by granting such secondary treatment waivers to 800 coastal communities. 14/ This estimate includes all possible applications; in some locations, such waivers might cause environmental degradation. Situations would differ, of course, and the costs and benefits would have to be evaluated case by case.

The EPA has identified about $5.7 billion in needs for removal of pollutants beyond secondary treatment levels, suggesting a need for advanced wastewater treatment (AWT) in places where such removal would help achieve ambient water quality standards based on designated use. 15/

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14. See General Accounting Office, Billions Could Be Saved Through Waivers for Coastal Wastewater Treatment Plants (May 22, 1981).

15. AWT removes up to 99 percent of solid matter, bacteria, and organic oxygen-demanding pollutants. In addition, higher levels of nitrogen and phosphorus are removed by adding chemical and physical processes not used in typical secondary treatment plants.

Beyond the level of 85 percent removal, the costs per unit of pollutant removed by secondary treatment increase dramatically, and these high marginal costs may not be justified on the basis of marginal water quality benefits. Where receiving streams are already degraded by agricultural residues, making communities pay high premiums to remove those substances from a wastewater discharge may not be appropriate. In Sac City, Iowa, for example, an AWT project approved for federal financing has been initiated to remove ammonia from the city's discharge, even though, since 1971, no ammonia levels attributable to Sac City's effluent have violated present water quality standards. Valued sport fish--smallmouth bass and walleye, which abound in clean water--already inhabit the receiving stream in Sac City. Between 1980 and 1982, an EPA program for reviewing AWT needs saved $300 million by reconsidering site-specific water quality and potential improvements of advanced treatment; if the EPA continues this practice, even more could be saved.

Savings to the Federal Government. Although estimating the exact savings or reductions in need following from more flexible regulations is difficult, perhaps 5 percent of the secondary treatment needs, one-third of the AWT needs, and half of the potential coastal waivers might be realized as savings. Together, these amount to about $8 billion in savings over 20 years, or a yearly reduction in total wastewater needs of about $420 million (6 percent). To guard against environmental degradation resulting from relaxed regulations, waivers could be thoroughly evaluated during EPA's normal Environmental Impact Study process.

Block Grants

Instead of disbursing funds on a project-by-project basis, a shift to federal block grants to states for water pollution control might reduce overall administrative costs. Block grants could be distributed among states on the same basis used to allocate project grants--that is, according to a formula that reflects population and EPA's assessment of relative need. Only 56 block grants (to the 50 states, the District of Columbia, and five territories) would be made each year, as opposed to some 500 to 700 project grants made each year under the current distribution system. Although some of the costs of disbursing and auditing project funds would be transferred to the states, if this arrangement had been in effect during fiscal year 1981, perhaps $10 million in federal administrative costs could have been reallocated to direct federal aid.

Block grants would also give the states more leverage and discretion in disbursing their allotted funds. In New Jersey, for example, the Governor recently announced that his state would like to use federal capital grants

combined with state bond proceeds to make low- or no-interest loans to municipalities through a new Infrastructure Bank. Under this block grant approach, the state of New Jersey estimates that some 200 treatment systems could be upgraded rather than the 11 now possible under EPA project grants. 16/

One result of a block grant approach, however, would be that the municipalities receiving loans would end up paying higher user fees than they do now. According to an initial state of New Jersey estimate, user fees would increase by some 30 percent. 17/

Alternatives Available to the States

State and local authorities are already exploring nonfederal financing sources in anticipation of the scheduled reduction in federal matching share to be effective in 1985. These jurisdictions could expand such efforts to compensate for funding lost to a diminished federal role. Money from various sources, packaged into what has come to be called "creative financing solutions," may be available to help states and localities prevent federal cuts from translating into serious degradations of water quality. A higher nonfederal share almost certainly would mean increased user fees, however.

Many states have recently established bond banks, for example, to assist local communities. 18/ Under this arrangement, a state buys local revenue bonds, repackages them, and sells them as state revenue bonds at lower interest rates than local bonds would have received. The net effect is

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16. See Joseph F. Sullivan, "Kean Seeks Agency to Help Maintain Roads and Sewers," The New York Times (October 4, 1982).

17. Though a 30 percent increase is perhaps high compared to fees under direct EPA project grants, the estimate does not consider potential efficiency gains that would be promoted by local jurisdictions under higher user fees. Downsizing plant components and substituting more efficient technology could result in a smaller increase in user fees than might be expected.

18. In 1982, seven states operated bond banks for water development: Alaska, Idaho, Maine, New Hampshire, Nevada, North Dakota, and Vermont. For additional details, see Robbi J. Savage, State and Local Roles in Funding Clean Water, report prepared by the Association of State and Interstate Water Pollution Control Administrators for the Lincoln Institute of Land Policy (October 1982).

a lower cost to users for raising development capital. Some states also offer local jurisdictions bond insurance or bond guarantees, which can lower borrowing costs as well.

Several other options are available that increase marketability of local bonds. These include mini-bonds, which are small-denomination, tax-exempt bonds sold to local citizens; 19/ innovative bonding (zero-coupon, variable-rate, put-option, bonds with warrants); and short-term debt, which includes tax-exempt commercial paper; and tax-anticipation notes.

Using only local funds to finance new low-cost technology is another option that has become increasingly attractive. In the case of four Pennsylvania municipalities that constructed wastewater treatment facilities solely with local funds, both construction and maintenance costs were reduced to about half the equivalent project costs of conventional federally funded projects. 20/ In Medford, Oregon, a locally funded plant cost an estimated $18 million less than the estimated cost under the EPA program. 21/ One source of savings would stem from avoiding the administrative overhead that usually prolongs federally funded projects from two to about eight years. In the case of the four Pennsylvania municipalities, the project took only 19 months from design through start of operations. Second, genuinely innovative technologies could be used, though these might not meet EPA guidelines, to achieve final effluents that do meet all federal and state standards.

Involving the Private Sector

From the standpoint of municipal governments, involving the private sector--either in financing or in ownership of wastewater treatment facili-

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19. In a four-month period in 1978, East Brunswick, New Jersey, a community of 33,000, issued $1 million worth of mini-bonds. Prompted by that success, Massachusetts, Oregon, and several other states authorized localities to issue mini-bonds.

20. The municipalities were Carlisle, Hampden, Hatfield, and Ephrata. For additional details, see Tracey W. Greenlund, Low Load Aeration Process Design Theory, Tracey Engineers, Inc., Camp Hill, Pennsylvania (1982).

21. See U.S. House of Representatives, Committee on Public Works and Transportation, Subcommittee on Oversight and Review, Implementation of the Federal Water Pollution Control Act (December 1980).

ties--can relieve local jurisdictions of the burden of capital formation while allowing a reasonable rate of return to investors. But from the federal perspective, it is questionable whether so called "backdoor" subsidies--investment tax credits, rapid depreciation provisions 22/--and low interest rates available on municipal bond issues are the most efficient way of helping local jurisdictions raise development capital. Some analysts of "privatization" through tax subsidies claim that direct interest subsidies to municipalities would be the more efficient of these two courses. 23/

Two types of privatization are feasible: private financing of facilities and public operation under a lease-back provision; and private ownership and operation. The former arrangement may be preferable to city officials, who may want to retain control of their municipal facilities; the latter may be preferable to private industry, because corporations can take full advantage of all tax benefits if facilities are privately owned and operated. Some private-sector representatives have expressed skepticism of partnership arrangements with local government, fearing project delays and the higher costs typical of public involvement. 24/ Moreover, under private ownership and public leaseback schemes, investment tax credits are no longer available to the private owner, which reduces the profitability of such arrangements.

Two types of private ownership and operation arrangements may be feasible. The first would require that a municipality or other public authority issue an industrial development bond to raise capital to finance the facility. These are municipally issued bonds that are tax exempt when used to finance private development of wastewater treatment facilities. The authority deposits the bond proceeds with a bank and receives a certificate of deposit in return. The interest the bank pays equals the certificate-holding authority's interest obligation to the bondholders. The certificate, plus the standard federal deposit insurance available through banks, is used to guarantee the bond, ensuring a good rating and a low interest rate. The bank then contracts with a private company to construct and operate the wastewater facility under an operation and maintenance

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22. Made available under the Economic Recovery Program Tax Act of 1981.

23. See, for example, Congressional Budget Office, Reducing the Deficit: Spending and Revenue Options (February 1983), pp. 283, 310.

24. An example comes from personal communication with Harvey Goldman, partner, Arthur Young and Company, New York, New York (November 9, 1982).

contract. The bank receives investment tax credits, depreciation benefits, and lease payments from the private company. The municipality gets wastewater treatment user fees that are lower than if it financed the facility directly (because of the value of the certificate and insurance as a guarantee). In addition, the municipality's risk in the bond market is reduced. The private company makes money on the difference between user fees and lease payments to the bank.

This arrangement was devised to finance solid waste disposal projects, but it has not yet been tried for a wastewater project. 25/ Several questions remain, including the propriety of using federal deposit insurance to guarantee bonds and the tax-exempt treatment of bonds used for this purpose. 26/ Finally, whether direct interest subsidies to municipalities would be more cost effective than "backdoor" subsidies to private industry is unclear.

Private ownership and operation of wastewater facilities might be profitable without industrial development bonds. The combination of accelerated depreciation (five years on equipment, 15 years on real property), a 10 percent investment tax credit, interest deductions on privately raised capital, and collection of user fees might provide sound investment packages for private-sector investors.

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25. Personal communication with Robert Price, partner, Pepper, Hamilton, and Scheetz, Philadelphia (December 8, 1982).

26. Though currently legal, legislation has been introduced (H.R. 1635, introduced by Representative Pickle on February 24, 1983) that would make illegal the use of federal deposit insurance to lower bond ratings. The Office of Management and Budget has prevented this practice in the past under its administrative authority, but new statutory authority now appears required to prevent future use of the practice.

CHAPTER V. WATER RESOURCES--MULTIPURPOSE DAMS AND NAVIGATION WORKS

Needs for investment in water resources are divided roughly evenly between efforts that would prolong the useful lives of numerous dams and navigation works and those that would provide new or replaced capacity. On the basis of estimates by the U.S. Army Corps of Engineers, which builds and maintains multipurpose dams and a large share of all navigation works, the CBO estimates annual federal costs to meet water resources needs to be about 60 percent higher than current spending, going from $2.3 billion to $3.7 billion each year between 1982 and 1990. To meet total needs--about $4.1 billion a year--states and local governments would have to spend an additional $400 million a year. Backlogs of projects that have been approved but not begun have compounded these needs. CBO analysis concludes that needs estimates may be exaggerated, finding the federal role in financing (nearly 100 percent) and paying (roughly 70 percent) for these services one likely cause of overstatement, along with nonfederal financing shares that may be too small, and undercharges to users. Adjustments in the current allocation of costs, entailing realignment of responsibilities among levels of government, intergovernmental grants or loans, and major increases in user fees, could help contain increases in federal costs, holding them perhaps at $3.1 billion a year, or about 35 percent above current federal spending.

THE PROBLEMS IN WATER RESOURCES

The federal government, largely under the auspices of the U.S. Army Corps of Engineers, plays a dominant role in building and maintaining the nation's water resources public works--navigational canals, locks and dams, ports, and multiple-purpose dams. (Multipurpose dams generally impound river water to serve several functions including flood control, irrigation, navigation, hydroelectric power generation, municipal and industrial water supply, and recreation.) In keeping with this major role, the Corps of Engineers is also the main source of information on water resources needs.

Inland Waterways

The Corps of Engineers has concluded that many U.S. canals, locks, and dams are past the end of their design lives and need systematic maintenance and rehabilitation. Such manifestations of neglect can interfere with the efficient use of these facilities. 1/ Of the 194 locks in the inland waterway system, the average age is 40 years, and some locks are approaching 80 years of service. A 50-year service life is generally considered the limit for safe and efficient operation of navigational locks. The corps estimates that reconstruction or rehabilitation of 37 locks would have to be initiated between 1981 and 1990 to maintain navigational efficiency and safety. Construction of these facilities would be finished between 1995 and 2000, at an estimated total cost of about $5.4 billion.

Ports and Harbors

Over time, dredged ports and harbors naturally lose depth as silt and other material deposited by wave and current action and inflowing rivers cause their floors to rise. The Corps of Engineers reports that, besides routine dredging to maintain present depths, major dredging will be needed to deepen three important ports--Baltimore, Norfolk, and Baton Rouge. That deepening will be needed to accommodate expanding export shipping, particularly of coal. Today's largest coal-carrying ships (super-colliers) require port depths of 55 feet or more; most U.S. coal ports have average depths of 45 feet. Though deepening three ports may reflect overoptimism about U.S. trade prospects in view of the fact that foreign demand for U.S. coal has recently subsided, deepening at least one coal port to maintain U.S. competitiveness with other coal-exporting countries appears realistic. 2/ The Office of Technology Assessment has estimated that about 10 percent can be cut from the cost of export coal as received by Europe and the Pacific Rim countries if U.S. ports could handle these super-colliers. 3/ At current and projected levels of export-coal demand, it appears to be cost

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1. See U.S. Army Corps of Engineers, National Waterways Study, Institute for Water Resources, review draft (July 1981).

2. Most coal-exporting and -importing countries have at least one deep-draft port equipped to service super-colliers. The only U.S. port deeper than 45 feet, however, is Long Beach, California, and it is not equipped to service a large volume of coal.

3. See Office of Technology Assessment, Coal Exports and Port Development (April 1981).

effective to dredge one or two ports to 55 feet, so that lower coal prices could be realized without overinvesting in port deepening. The average cost of deepening a major coal port is about $600 million.

Dams

The Corps of Engineers recently conducted a nationwide inspection of about 9,000 primarily nonfederal dams (roughly one-seventh of the United State's some 68,000 dams) and found that about one-third, or nearly 3,000 dams, were unsafe because of inadequate spillway capacity, unstable structural components, seepage, or inoperable components. [4] Most of these unsafe dams were privately owned (64.8 percent) or state-owned (34.8 percent), with a very small percentage (0.4) owned by the federal government. Nearly 3,000 federally owned dams were not inspected, however, and many of these could be unsafe as well. Rehabilitating all unsafe nonfederal dams (based on one-third of the total nonfederal dam inventory) could cost an estimated $6.8 billion over ten years.

CURRENT POLICY IN WATER RESOURCES

The federal government has assumed responsibility for certain types of water resource projects primarily to stimulate regional economic development, and for others, to provide nonsalable benefits that the private market would not furnish. Federal water resources programs for financing, constructing, and operating water resources projects are administered primarily by four agencies: the Corps of Engineers, the Department of the Interior's Bureau of Reclamation, the Department of Agriculture's Soil Conservation Service, and the Tennessee Valley Authority (TVA). In all, about 25 federal agencies have some authority for water resources development. The Corps of Engineers has built and maintained inland waterways and ports under various rivers and harbors acts since 1826. All four federal water agencies finance, build, and sometimes operate dams for a wide variety of purposes under an equally wide array of enabling federal statutes. Some 20 federal acts, dating back over a century, have formed the federal water resources program for these four agencies, including development for flood control, drainage, irrigation, municipal and industrial water supply, fish and wildlife conservation, navigation, hydroelectric power, and area redevelopment.

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4. See U.S. Army Corps of Engineers, National Program of Inspection of Non-Federal Dams, Final Report to Congress (May 1982). Of all the unsafe dams, about 82 percent were so judged because of inadequate spillways, which can undermine dams' structural soundness.

Cost Sharing Conventions

For most types of projects, the federal government finances all capital costs but ultimately pays for somewhat less because of reimbursements from users and other nonfederal contributions. Cost sharing for joint federal/state water resources projects varies according to the type of project and lead federal agency. For the average inland waterway or harbor project, the federal government pays about 93 percent of combined capital and operating costs over the project's life. The average federal share of a multipurpose dam project is about 70 percent of combined costs, but portions may vary from a low of about 36 percent for a single-purpose hydroelectric project to a high of about 89 percent of an irrigation project (see Table V-1). 5/ States or localities generally contribute land, easements, or rights-of-way; users sometimes repay part of the initial capital cost and more often, pay operating and maintenance costs. Together, state and user contributions cover the nonfederal share.

Federal Spending

In the early 1960s, annual federal spending for construction, operation, and maintenance of water resources projects averaged between $5.5 billion and $6.5 billion. Since reaching a peak in 1965, federal spending has generally declined, standing now at a low point of $3.7 billion (see Figure V-1). Since the late 1970s, federal capital expenditures have declined even more rapidly. The Corps of Engineers' combined capital outlays for flood control, multipurpose dams, and navigation, for example, fell from about $2.1 billion to $1.2 billion between 1977 and 1983. The primary reason for such a steep decrease, besides budgetary pressures, has been the inability of the Congress and the Executive Branch to reach an accord over the proper role of the federal government in making water resources investments. As a result, no federal water resources projects have been authorized since 1976. 6/ Overall, however, water resources expenditures appear to be shifting, away from massive new construction projects and toward rehabilitation of existing public works and more efficient management.

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5. See Water Resources Council, Options for Cost Sharing--Part 5A, Planning and Cost Sharing Policy Options for Water and Related Land Programs, (November 1975).

6. For further treatment of this subject, see forthcoming CBO study of options for water resources development policy.

TABLE V-1. EFFECTIVE NONFEDERAL COST SHARES OF FEDERAL WATER RESOURCES DEVELOPMENT, BY AGENCY
(In percents)

Services	Army Corps of Engineers	Bureau of Reclamation	Soil Conservation Service	25 Federal Agencies
		MULTIPURPOSE DAMS		
Urban Flood Damage Reduction	17	a/	a/	20
Rural Flood Damage Reduction	7	10	27	11
Irrigation	19	18	54	19
Municipal and Industrial Supply	54	71	100	64
Hydroelectric Power	61	65	b/	64
Water Quality	3	82	b/	60
Fish and Wildlife	11	13	57	14
General Recreation	17	18	63	19
		NAVIGATION WORKS		
Inland Waterways c/	6	7	b/	6
Commercial Harbors	16	b/	b/	16
All Navigation	7	7	b/	7
Agency Mean	20	37	49	30

SOURCE: Congressional Budget Office from Water Resources Council data. (TVA data not included.)

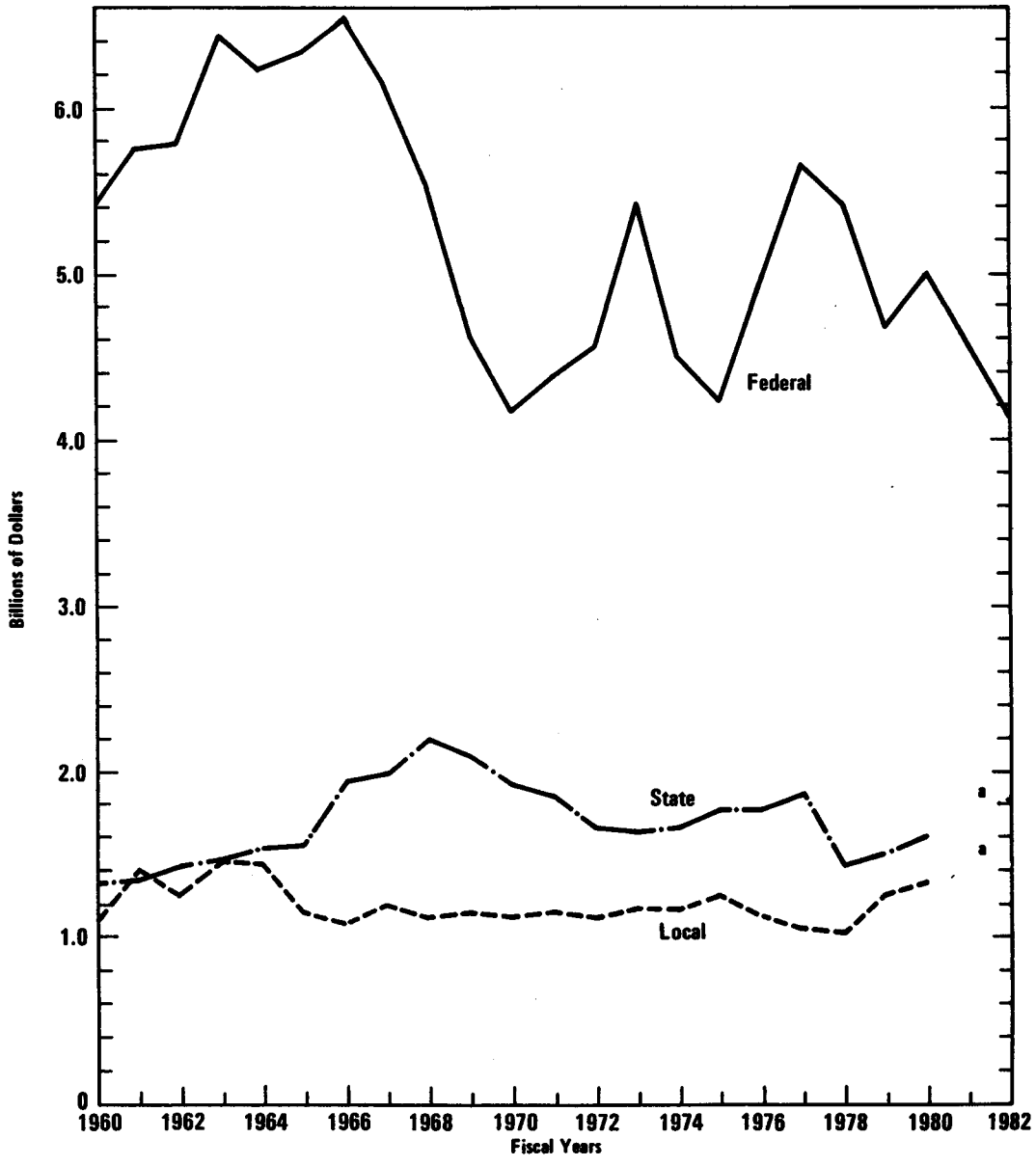
a. Agency reported a cost category for this purpose but not cost sharing.

b. Agency indicates no activity for this purpose.

c. Receipts from the fuel tax implemented pursuant to the Inland Waterway Revenue Act of 1978 are not included; estimates may therefore be slightly low.

Figure V-1.

Federal, State, and Local Spending for Water Resources, 1960-1982



SOURCE: Congressional Budget Office from data supplied by the Congressional Research Service and the U.S. Department of Commerce, Bureau of the Census.

[a] Actual state and local data for 1980-1982 not available.

State and Local Spending

Over this same 1960-1980 period, state spending for water resources has fluctuated only narrowly, between $1.2 billion and $2.0 billion a year. Local spending has also been relatively stable, fluctuating between an annual high of about $1.4 billion in 1963 and a low of about $1.0 billion 1978. In 1981, funding from four sources was commonly used by the states to meet their own water resources needs and to provide the nonfederal capital share of some federal projects: appropriated funds from general state revenues ($184 million), general obligation bond issues ($1.1 billion), revenue bonds ($840 million), and dedicated taxes or user fees ($138 million). 7/ Figure V-2 displays how funding from these four sources combined to provide about $2.3 billion for state use in water resources in the last two years.

Economic Effects of Water Projects

Despite extensive research, general conclusions regarding the macroeconomic effects of water projects remain obscure. One recent survey of some 80 published studies suggests three observations: 8/

- Major water resources projects do not appear to be a critical factor in national economic development; rather, they tend to shift economic growth from one region to another.

- Water projects are not the most efficient investments to stimulate jobs or countercyclical economic development; direct tax incentives or public service employment are more cost effective in achieving these goals.

- Very little is known about the economic effects of infrastructure rehabilitation investments; much more is known about the effects of new construction.

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7. These data were collected from state water resources and budget personnel for 1981 and 1982. Fiscal year conventions, budgeting practices, and accounting systems vary widely among the states, making any estimate of this nature very imprecise. These estimates should be considered a "snapshot" in time, subject to change for a different period of analysis.

8. See Northeast Water Resources Project, The Economic Impact of Water Resources, a report prepared by the Nova Institute for the Consortium of Northeast Organizations (September 1979).

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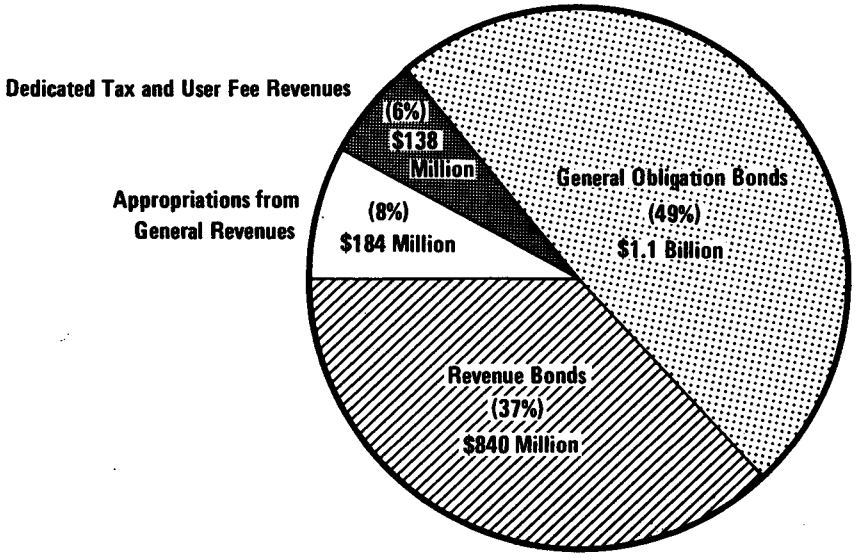
Figure V-2.

State Funding for Water Resources Projects by Source, 1981-1982



SOURCE: Congressional Budget Office.

Major Financial Needs

On the basis of the assessments above of current condition of the three types of water resources facilities, about $1.2 billion a year in new capital expenditures could be needed between 1983 and 1990 to improve inland navigation works, deepen three harbors, and improve the safety of nonfederal dams (see Table V-2). About $48 billion in authorized Corps of Engineers or Bureau of Reclamation water projects are currently awaiting funding from the Congress. Many of these projects have local support only because of the generous federal cost-sharing terms offered at the time they were authorized; some local monies were committed solely to leverage the much larger federal sums. Further, many of these projects do not represent a need in terms of safety or public health or well-being. Finally, some projects counted in the $48 billion backlog may also be represented in the estimate of needs for inland waterways and ports; hence, they may be counted twice. Conservatively, if 25 percent of this backlog represented genuine federal needs, an additional $0.6 billion a year would be included in a needs estimate. Finally, about $2.3 billion would be spent each year until 1990 to complete all ongoing federal water resources construction and major rehabilitation projects. Needs could total about $4.1 billion a year, of which the federal share would be about $3.7 billion.

TABLE V-2. CAPITAL NEEDS ESTIMATE FOR WATER RESOURCES, 1983-1990 (In billions of dollars)

Type of Water Resource and Timespan of Estimate	Estimate of Total Needs	Annual Needs	
		High Estimate	Low Estimate a/
Inland Waterways (31 years)	12.3	0.4 b/	0.3
Ports and Harbors (31 years)	1.7	0.06 b/	0.02
Dam Safety (Ten years)	6.8 c/	0.7 d/	0.4
Backlog of Authorized Projects (20 years)	12.0	0.6 e/	0.3
Ongoing Construction Projects (Seven years)	16.1	2.3 f/	2.3
Total g/		4.1	3.3

SOURCE: Congressional Budget Office and other sources cited below.

a. Reestimates by CBO.

b. Corps of Engineers estimate includes rehabilitation of 58 locks, four major channel deepenings, 206 safety actions, and miscellaneous rehabilitation. See U.S. Army Corps of Engineers, Institute for Water Resources, National Waterways Study (July 1981 review draft).

c. Calculated by CBO from available Corps of Engineers data on known costs, extrapolated for one-third of all nonfederal dams. (The corps cautions that this methodology can be misleading.)

d. Corps of Engineers estimate. See U.S. Army Corps of Engineers, National Program of Inspection of Non-Federal Dams, Final Report to Congress (May 1982).

e. Authorized backlog of Corps of Engineers and Bureau of Reclamation projects only. Data reestimated by CBO.

f. Based on construction outlays of the Corps of Engineers, Bureau of Reclamation, and Soil Conservation Service in 1982, held constant over the average construction period of seven years. Reestimated by CBO.

g. Details may not add to totals because of rounding.

EFFICIENCY OF CURRENT PROGRAMS

Undercharges to users appear to have caused exaggerated estimates of needs for water resources investments. The federal government has a clear role in meeting many of the water resources needs, but state and local governments, and users as well, have a major stake in safe, efficiently operated water projects. Under current cost-sharing policies, what emerge as "needs" may well be inflated by an overly generous federal share. Because the nonfederal participants in water resources projects pay so small a portion of costs, they have an incentive to promote all projects, regardless of their real perception of "need" for the project. For example, local sponsors pay only 17 percent of the costs to construct flood control dams, 11 percent of the cost to construct irrigation dams, and 7 percent of the cost of navigational facilities. Yet, the benefits of these projects accrue mostly to these small groups of users. Many projects now classified as needs could probably be eliminated if users were faced with paying the full costs of water-related services provided them.

Though pinpointing such reductions is difficult, several recent studies help make rough estimates possible. On the basis of a 25-year economic forecast, Data Resources Incorporated (DRI) recently projected inland waterway traffic under full-cost user fees between 1980 and 2000. 9/ No congestion-related new construction, DRI concluded, would be needed anywhere on the inland waterway system under full cost user fees. This calls into question a Corps of Engineers' estimate of $3.0 billion of channel modification over 31 years. Though deepening coal ports would provide capacity expansion and real savings on the U.S. export price of coal, the 1980 surge in coal export demand has subsided, and forecasts since then are more conservative. Even without any deepening to service super-colliers, if estimated coal port capacity in 1990 is measured against estimated export demand by region, on average, east coast ports could have 55 percent "over-capacity," and gulf coast ports could have 59 percent over-capacity. 10/

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9. New lock capacity could be called for around the year 2000. See Data Resources, Inc., The Impacts of Waterway User Fees on Barge Traffic and Water-Served Regions, report prepared for the U.S. Department of Transportation (1982).

10. Over-capacity estimates consider current aggregate export capacity, reasonably firm plans for new capacity (berths, storage, transfer facilities), projection of demand from countries importing U.S. coal, and estimates of the U.S. share of the world coal market (35 percent of the European market and 25 percent of the Far East market in 1990). See Robert C. Major, U.S. Steam Coal Exports: Who Will Benefit? presented at Data Resources International Petroleum and Coal Conference, Pittsburgh, Pennsylvania (November 19, 1981).