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HARD CHOICES

A Report on the Increasing Gap Between America's Infrastructure Needs and Our Ability To Pay for Them

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Appendix 19. OREGON

A CASE STUDY

PREPARED FOR THE USE OF THE

SUBCOMMITTEE ON ECONOMIC GOALS AND INTERGOVERNMENTAL POLICY

OF THE

JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES

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Preface

Infrastructure problems are widespread. They do not respect regional or state boundaries. To secure a better data base concerning national and state infrastructure conditions and to develop threshold estimates of national and state infrastructure conditions, the Joint Economic Committee of the Congress requested that the University of Colorado's Graduate School of Public Affairs direct a twenty-three state infrastructure study. Simultaneously, the JEC appointed a National Infrastructure Advisory Committee to monitor study progress, review study findings and help develop policy recommendations to the Congress.

In almost all cases, the studies were prepared by principal analysts from a university or college within the state, following a design developed by the University of Colorado. Close collaboration was required and was received from the Governor's staff and relevant state agencies.

Because of fiscal constraints each participating university or college agreed to forego normal overhead and each researcher agreed to contribute considerable time to the analysis. Both are to be commended for their commitment to a unique and important national effort for the Congress of the United States.

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INFRASTRUCTURE NEEDS AND RESOURCES OF SELECTED STATE AND LOCAL GOVERNMENT PROGRAMS IN OREGON

BUREAU OF GOVERNMENTAL RESEARCH AND SERVICE
University of Oregon
Eugene

Revised
September 5, 1983

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INFRASTRUCTURE NEEDS AND RESOURCES OF SELECTED STATE AND LOCAL GOVERNMENT PROGRAMS IN OREGON

Executive Summary

This report is the product of Oregon's participation in a multistate analysis of infrastructure needs and resources, sponsored by the Joint Economic Committee of Congress. Oregon is one of about twenty states participating in the study.

The main object of the study was to identify the information that is available on Oregon's infrastructure needs and revenues to meet the needs and, secondarily, based on the available information, to develop estimates of the cost of meeting infrastructure needs and the revenues available to pay those costs up to the year 2000.

Types of infrastructure included in the study are highways, roads and streets, mass transit, airports, sewerage systems, water systems, water transport and terminals, and solid waste facilities. The information came from a large number of state and local government reports and documents that are highly variable with respect to accuracy and completeness of data, definition of "need," and estimating approaches. The resulting estimates in the report must be regarded as only a "first cut" which is subject to a great deal of further refinement. Perhaps the report's most important contribution is its identification of data gaps that must be filled before valid and reliable estimates can be developed.

A summary of the results of this analysis of Oregon's infrastructure needs and resources is given in the following table.

OREGON STATE-LOCAL INFRASTRUCTURE NEEDS AND RESOURCES
FOR SELECTED FUNCTIONS
1981-2000
(1982 dollars, billions)

Infrastructure	Needs	Resources	Needs v. Resources
Airports	$0.367	(not estimated)	
Mass Transit	0.606	(not estimated)	
Sewerage	3.600	$2.000	(-$1.600)
Solid Waste: High	0.100	0.057	(- 0.043)
Low	0.045	0.057	+0.012
Trafficways	6.957	5.208	(-1.749)
Water Systems:			
Agriculture		(not estimated)	
Municipal: High	3.000 to 4.000	1.700	(-1.300 to -2.300)
Low	1.700	1.700	-0-
Water Transport & Terminals	0.386	0.280	(-0.106)

The study identified serious gaps and inadequacies in the available data. Of the infrastructure types studied, current comprehensive estimates of state and local needs on a long-range basis were available only for airports. Good information and long-range projections are available for the state highway system, but the state has not dealt with the road and street needs of local governments, and local governments themselves have only fragmentary data. A long-range estimate of sewerage needs is available from the U.S. Environmental Protection Agency, but the data are not comprehensive; that is, data are lacking for collection system extensions, storm sewer extensions, etc. The state has prepared short-range estimates of need for small transit systems, and longer-range estimates are available from two of the three metropolitan transit districts, but no statewide overview of needs for mass transit systems is available. The available estimates for municipal and industrial water systems are incomplete with respect to both the number of systems included and components of systems covered. There is no information from central sources on infrastructure needs for solid waste, water transportation and terminals, or agricultural water supplies.

Other data necessary to make a comparison between needs and available resources are also lacking. Estimates of future revenue to finance needs have not been developed. There is also an absence of data on past and current capital outlays for certain of the infrastructure types.

The report's conclusion notes that the gaps and inadequacies of available data on infrastructure needs are not surprising, since each agency and each local government gathers data only to meet its own specific requirements. The recent emergence of a statewide concern with the infrastructure problem may produce renewed efforts to provide for a central data clearinghouse at the state level. It may also lead to consideration of the need for a central state planning unit of the type found in most other states.

September 1983

I. INTRODUCTION

Deterioration of public infrastructure has recently been recognized as a problem nationally, as well as in Oregon. Books, articles in national media, and numerous official investigations have portrayed the problem as one of crisis proportions.[1] At least nine bills in the 1983 Oregon legislature deal with some aspect of the infrastructure problem.[2]

This report is the product of Oregon's participation in one of the national studies, specifically, a project sponsored by the Joint Economic Committee of Congress (J.E.C.) and coordinated by Marshall Kaplan, Dean of the Graduate School of Public Affairs at the University of Colorado, Denver. On invitation of Congressman Henry Reuss, then Chair of the J.E.C., Governor Atiyeh agreed early in February 1983 to Oregon's participation and designated the Bureau of Governmental Research and Service, University of Oregon, as the agency to conduct the study, with coordination by the Economic Development Department. Oregon is one of about twenty states participating in the J.E.C. project.

Scope of This Study

This study is a survey of existing data and reports on Oregon state and local government infrastructure needs and the financial resources available to meet them, projected to the year 2000. Several observations will help to clarify the scope of this study.

1. The study outline called for estimates of investment needs, revenue, and needs v. revenue for the year 2000 for the services listed below.

2. It was found that estimates of future needs and resources were not available in a number of cases. The Bureau did not

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1. For example: Pat Choate, America in Ruins (Washington, D.C.: Council of State Planning Agencies, 1982); "State and Local Government in Trouble," Business Week, October 26, 1981; and "The Decaying of America," Newsweek, August 2, 1982. A brief, informal survey by staff of the U.S. Advisory Commission on Intergovernmental Relations counted 23 major studies of infrastructure problems recently completed or currently underway by various governmental agencies or national organizations as of March 1983 (See U.S.A.C.I.R., "Major Studies of Public Physical Infrastructure," March 1983).
2. HB 2002, HB 2342, HB 2738, HB 2877, HJR 4, HJR 8, HJR 27, SB 238, and SJR 11. These bills provide variously for planning and financing an increased level of infrastructure investment by Oregon state and local governments.

attempt to generate any verifiable estimates beyond those already available from the public agencies involved. The brief time and limited resources available to support this work precluded any original research for use in this study by either the involved agencies or the Bureau. However, in some cases the Bureau has added some general estimates based on data at hand in order to meet study requirements. These estimates are described in the text and tables and should be considered as gross rather than operational estimates.

3. The study is limited to Oregon state and local government infrastructure. It does not include federal government infrastructure such as federal dams, jetties, forest roads, and other facilities that are vital to Oregon's economic development and quality of life.

4. "Infrastructure" is defined for purposes of this study to include highways, roads and streets; mass transit; airports; water transport and terminals; agricultural, municipal and industrial water systems; sewerage; and solid waste facilities.

5. In making projections to the year 2000 the study assumes continuation of the present mix of federal, state and local responsibilities and funding sources.

The chapters that follow summarize the sparse data available on needs for public investment and the resources available to finance them for each type of infrastructure included. The concluding chapter identifies some obvious gaps and deficiencies in the data contained in available reports and information sources and makes some recommendations as to steps that might be taken to improve the information base. The balance of this chapter describes Oregon governmental responsibility for infrastructure planning and development, states the demographic and economic assumptions utilized in the study, and discusses the concept of infrastructure "need."

Governmental Responsibilities

Oregon does not have a central state planning agency. Rather, specific functional planning activities are undertaken, if at all, by individual state agencies. Agencies that have varying degrees of involvement with the infrastructure systems included in this study are:

1. Department of Transportation, Highway Division
2. Department of Transportation, Public Transit Division
3. Department of Transportation, Aeronautics Division
4. Department of Economic Development, Ports Division
5. Department of Water Resources
6. Department of Human Resources, Health Division
7. Department of Environmental Quality
8. Executive Department, Intergovernmental Relations Division

Some of these agencies have statutory mandates to prepare functional plans. Others collect data and carry on planning activities only to the extent required for such purposes as applying for and/or administering federal and state grant or loan programs or other specific activities or programs.

Two state agencies have broad, cross-cutting responsibilities related to public infrastructure, but neither is a state planning agency of the type found in many other states. The Economic Development Department (EDD) has a special concern with infrastructure because of the significant role of infrastructure as a factor in industrial location and expansion. The Department of Land Conservation and Development (DLCD) also has a special interest in infrastructure planning, but its jurisdiction is limited to land use matters. The Intergovernmental Relations Division (IRD) of the Executive Department also has some involvement, primarily through administering Community Development Block Grant funds.

All of the agencies listed, including EDD, DLCD, and IRD have provided information helpful to the completion of this study, but, as noted below, none of them was able to provide data and projections of the scope attempted in Colorado and some other states that either have central state planning agencies and programs or have recently completed special statewide studies of infrastructure needs.

Much of the responsibility for public infrastructure is vested in Oregon's 36 counties, 243 cities and numerous districts, particularly those associated with water, sewer, port, transit and irrigation. Data on local government infrastructure needs and resources prepared by individual local governments were found to be quite fragmented. Generalizations based on the scattered capital improvement programs, functional plans, and related documents that were available are subject to substantial error.

Oregon's Present and Future Economy and Population

Along with the other Pacific Coast states, Oregon's population increased rapidly during the 1960s and 1970s, reaching 2,633,000 in 1980. The Willamette Valley, with 11.3 percent of the state's area, contains 69 percent of the state's population. Three of Oregon's four metropolitan areas are located within the Valley -- Portland, Eugene-Springfield, and Salem. Medford, located in southwestern Oregon, was designated an SMSA in 1980. Portland, the state's only major metropolitan area, extends into the state of Washington. The three counties within the Oregon portion of the Portland metropolitan area contained 40 percent of the state's total population in 1980.

According to Oregon's current annual financial report:

> The overall economy of the state improved in the decade of 1970-1980 in comparison to national

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> economic trends. The state's dependence on the lumber and wood products industries declined since 1950 from about 59% of total manufacturing employment to about 31.3% in 1981. At the same time, high technology industries now account for about 22.3% of total manufacturing employment. . . .
>
> The lumber industry is still considered a bellwether of economic trends in the state. Because of its dependence on trends in national housing and other construction activity, the industry is closely related to the performance of the national economy and in the past has been considered essential to economic well-being. Changing employment patterns and increasing economic diversity are partially changing this causal relationship.
>
> . . . .
>
> Agriculture is often classed as Oregon's second largest industry. Agricultural employment has dropped in the last decade due to less labor-intensive production methods. The agricultural sector of the economy is well diversified. Farm income, although affected by the international value of the dollar, has shown recent improvement.[3]

Oregon per capita personal income closely followed national trends during the 1970s, staying within one percent of the national average during 1976-1979. As is noted below, Oregon per capita income has fallen below national levels during the early 1980s.

Projecting Oregon's long-run infrastructure needs is complicated by the effect of the continuing recession on the estimates of future population and economic conditions. Oregon has been hit harder, and over a longer time, by the current national recession than most other states. This has resulted mainly from its continuing dependence on the lumber and wood products industry which has been severely affected by the slowdown of national construction.

While state per capita personal income showed modest gains during the early 1980s, it has fallen below the national average during 1980 and 1981 for the first time since 1975. The Oregon unemployment rate has exceeded the national rate for a number of years. During 1982 the rate averaged 11.5 percent. Oregon's population, which increased at an average rate of 2.6 percent a year during the 1970s, has exhibited an out-migration trend during 1980-1982. See Table 1.

The fast-deteriorating economy of 1980-82 created severe budget problems for Oregon state government. By September 1982 the shortage of

3. Oregon Executive Department, Annual Financial Report for the Year Ended June 30, 1982 (Salem).

revenue needed to support the state's approved budget for 1981-83 exceeded $500 million, resulting in expenditure reductions and emergency tax increases. The recession has also affected the finances of local governments through resistance to local levy proposals, reduced federal payments, and reduced revenue from construction-associated payments.

Table 1

OREGON PERSONAL INCOME, UNEMPLOYMENT AND POPULATION
1979-1982

	Per Capita Personal Income		Unemployment Rate		Oregon Population	
Year	Oregon	U.S.	Oregon	U.S.	Number	Percent Change
1979	$ 8,663	$ 8,655	6.8%	5.8%	2,584,350	-- %
1980	9,270	9,480	8.3	7.1	2,639,915	2.2
1981	10,008	10,491	9.9	7.6	2,660,735	0.8
1982	--	--	11.5	9.7	2,656,185	(-0.2)

SOURCE: Income, Bureau of Economic Analysis, Survey of Current Business (August 1982); unemployment rate, Oregon Employment Division Oregon Labor Trends (February 1982); population (July's), Center for Population Research and Census, Portland State University.

Future changes in Oregon's population and economic conditions will affect needs for infrastructure and the ability to pay for it. As is noted in the discussion of individual facility needs, several of the projections of long-range needs are based on alternative assumptions regarding population growth. Some of the projections of capability to achieve the need are based on alternative assumptions regarding future economic conditions.

While not directly of use in considering year-2000 conditions, the short-range forecasts of the Oregon Executive Department do give some indications of Oregon prospects. According to the current forecast, state economic conditions are expected to improve, but slowly. The Oregon economy is not expected to regain its 1979 peak until mid-1987.[4]

The only recent and consistent forecasts of demographic and economic conditions in Oregon for the year 2000 have been developed by the Oregon Department of Energy. The Department is required by law to issue an annual forecast of energy demand for the following 20 years. Both econometric and end use models are used by the Department, and

4. The forecasts cover a five-year period, based on economic and revenue models. They are based in part on national forecasts prepared by Data Resources, Inc. See Oregon Executive Department, Oregon Economic and Revenues Forecast (Salem, March 1983).

forecasts of various economic and demographic variables are prepared for use in the models. These forecasts, shown in Table 2, have been adopted as year-2000 assumptions for use in this report. The Department forecasts generally reflect a moderation of the growth of past decades during the 1980-2000 period.

Table 2

OREGON ENERGY DEPARTMENT FORECASTS

Item	1970	1980	1990	2000	Annual Growth Rate 1980-2000
Population (thousands)	2,091.5	2,633.1	3,025.7	3,370.8	1.2%
Real Total Personal Income (millions)*	$6,702	$9,912	$12,923	$16,159	2.5
Total Employment (thousands)	802.8	1,166.0	1,383.0	1,596.5	1.6

* In terms of 1967 dollars -- deflated by the U.S. Consumer Price Index.
SOURCE: Oregon Department of Energy, Seventh Annual Report (January 1983).

The Concept of "Need"

Infrastructure "need" can be described, estimated and projected in many different ways, and documents dealing with such needs frequently fail to state the assumptions on which "need" was determined. There are no standard criteria by which to evaluate any given level of service, and it is difficult, if not impossible, to take account of changing public expectations from time to time and from place to place. "Need" is a relative concept, but it is very hard to identify the circumstances and conditions to which it is relative.

An Illustrative Typology of Need

At the outset, this study identified five types of infrastructure "need," and its authors hoped to be able to classify reported needs in accordance with that typology. The five types are:

Part 1: Routine Care.--Certain infrastructure needs are best taken care of as part of routine maintenance. Routine maintenance includes scheduled repair and replacement to avoid breakdown and keep facilities functioning. It also includes "preventive" maintenance, which reduces the amount of repair and replacement by cutting the rate of deterioration. To the extent that routine and preventive maintenance are "deferred," expenditure cohorts show up in "Part 2" or "Part 3" needs described below. Data on past and present levels of expenditure for "Part 1" needs are usually difficult to break out from reported figures on facility operations, and even if historic data were available, they would give no indication of the extent to which maintenance is being deferred.

Part 2: Catch-Up Repair.--Past deferred maintenance produces an inventory of deteriorated facilities that are in need of repair. These costs are related to, but are in excess of, Part 1 expenditures. Some jurisdictions may expressly recognize and program for Part 2 expenditures, so that deterioration of this kind can be eliminated over a specific period of time. However, such expenditures may be identified either as current operation and maintenance or as capital outlay, and no data were readily available to document the extent of this type of need.

Part 3: Reconstruction and Replacement.--Some deterioration is so substantial that reconstruction or replacement rather than repair is required. This can be the result of the deterioration of a facility that cannot be fully maintained because of its nature. It also can be the result of deferred maintenance, inadequate maintenance technology, or technological obsolescence of the facility itself. Expenditures for such needs are usually reported as capital outlay, but information identifying these needs separately from other capital needs is not available from existing sources. The distinction between reconstruction and repair is often not important. Repair tends to be dealt with as part of operation and maintenance programming, while reconstruction is part of capital outlay programming.

Part 4: Improvements.--Reconstruction and new construction may be required to upgrade levels of service or to take advantage of new technology that can reduce future costs. The need to upgrade levels of service may result from local demands or from mandates from higher levels of government. Some information is available in capital improvement plans and related documents to identify this type of need; but available aggregate data do not readily distinguish these from other capital outlays.

Part 5: Expansion.--Finally, new construction is required to accommodate growth in the population or economic development. Again, infrastructure needs data have often not clearly distinguished between this type of need and "Part 4" or other capital outlay needs.

While it has not been possible to divide the needs data into the five parts described, all their distinctive characteristics are important to understanding the infrastructure needs and to the development of appropriate investment strategies. For example, if Part 1 needs have not been entirely covered within the regular operation and maintenance program during past years, additional Part 2 or Part 3 requirements will result because of deferred maintenance. As another example, when replacement or reconstruction is carried out to care for Part 3 needs, it is common to include upgrading or expansion increments within the same project. It is often not necessary to segregate the cost for corrections from the costs for improvement or expansion. Hence, costs to meet the needs of parts 3 to 5 often will be intermingled. Any program to assist with financing any one of the five listed parts of the total need should be evaluated as to its impact on the other parts.

Levels of Analysis

It has been suggested that participating states gear their estimates and projection to three different levels of analysis.

1. A broad needs estimate based on a combination of professional standards and summary analyses.

2. An estimate linked to resources and based on capital planning; and

3. An estimate based on political priorities and/or opportunity costing.

Because Oregon was a late entrant into the study, it has been necessary to limit the analyses made. As a result, the year-2000 estimates represent a single level of analysis. For the most part, they appear to reflect a mid range; that is, most estimates are linked to resources and capital planning. However, some of the Bureau's estimates were made without the benefit of capital plans of the operating agencies, and consideration of politics, priorities and realities may have influenced some of the agency estimates. The general sources are from long-range studies of state agencies, short-range studies by state or local agencies extended to 2000 on a per capita basis, and on past experience extended to 2000 on a per capita basis. In any event, the sources of the estimates and the types of capital improvements included are described in the text that follows.

It may be pertinent to note that resources available to finance infrastructure needs of the next 20 years will be affected by innumerable factors, none of which is easy to forecast. Included are the state of the economy and its varying effect on the different governmental functions; the changing role of federal grants in state-local finance; future changes in the proportion of personal income spent on public goods; and political priorities for needs of competing governmental functions. Still another factor is the relation between revenue sources and price levels. For example, payroll taxes (local transit) and timber sales (county roads) tend to reflect changes in price levels. Changes in gasoline taxes (highways) are less responsive; they require legislative action and, usually, voter approval.

As is noted in the text, when revenue estimates were not available from the studies, the Bureau made rough estimates based on data for past years and, in some cases where historical information was lacking, from rough approximations. In sum, then, resources available to finance the needs mainly reflect a continuation of past effort, and the needs versus resources figures indicate the increased (or decreased) effort that is required to meet needs compared with previous years.

Needs v. Resources

A summary of the results of the analyses of Oregon's infrastructure needs and resources is given in Table 3. These data are subject to the qualifications and limitations discussed above and in chapter IX.

Table 3

OREGON STATE-LOCAL INFRASTRUCTURE NEEDS AND RESOURCES
FOR SELECTED FUNCTIONS
1981-2000
(1982 dollars, billions)

Infrastructure	Needs	Resources	Needs v. Resources
Airports	$0.367	[not estimated]	
Mass Transit	0.606	[not estimated]	
Sewerage	3.600	$2.000	[-$1.600]
Solid Waste: High	0.100	0.057	[-0.043]
Low	0.045	0.057	+0.012
Trafficways	6.957	5.208	[-1.749]
Water Systems:			
Agriculture		[not estimated]	
Municipal: High	3.000 to 4.000	1.700	[-1.300 to -2.300]
Low	1.700	1.700	-0-
Water Transport and Terminals	0.386	0.280	[-0.106]

II. AIRPORTS

Background

Aviation in Oregon has developed under changing patterns of federal, state and local regulations and support. While federal guidelines and financial aid have been the most important factors in development, state and local support have had significant influence on the emphasis and direction of development since World War II.

The principal coordinating agency for planning and development of airports in Oregon is the Oregon Aeronautics Division. This agency, now a division within the Oregon Department of Transportation, was established in 1921 and was the first state aviation agency in the United States. Public-use airports, including all personal-use airports, heliports and seaplane bases, are licensed by the Division of Aeronautics. In addition, the Division is authorized by state law to provide financial and technical assistance to municipalities, counties and port districts for the planning and development of airports and to maintain and operate state-owned airports.

A two-year study to update the Oregon Aviation System Plan was completed in 1982. This study was jointly sponsored by the Federal Aviation Administration and the Oregon Department of Transportation (Aeronautics Division) and included cooperation and coordination with local governmental agencies and pertinent private organizations. All public-use airports in the state were evaluated in terms of current conditions and capacities, and projections of specific needs to 1993 were estimated. Seven volumes of supporting documents containing the results and recommendations of this study have been published.

As enumerated in this study, there were 103 public-use airports in Oregon in 1980. Of these, 36 were owned or controlled by the state, 8 by port districts, 34 by cities and counties, 21 by private owners, and 4 by the U.S. Forest Service.

Investment Needs

In order to evaluate future needs for the Oregon Aviation System Plan, the recent update study classified existing and proposed airports according to three basic categories using various criteria included in an "evaluation model." The three categories were those airports to be included in the Oregon Aviation System Plan (OASP), those to be included in the National Aviation System Plan, and those not qualifying for inclusion in either plan.

A total of 90 airports (80 existing and 10 new) are included in the Oregon Aviation System Plan. Of these, 62 (53 existing and 9 new) are included in the National Aviation Plan. Three of the new airports will replace existing ones. Ten state-owned airports that did not meet the entry criteria for inclusion in the system plan will be maintained only until final disposition is determined.

The recent OASP study identified 1,178 specific airport improvement projects as candidates for recommended funding during 1982-1993. Costs for these improvements were estimated and summarized by class of airport and by assumed governmental level of funding.[1] These levels assume that the past proportion of various project costs funded by federal, state and local governments will continue through the projection period. A total of $151 million (1982 dollars) of airport needs, excluding Portland International Airport, by 1993 was listed. Distribution of estimated funding requirements for levels of government was based on continuation of existing programs and requirements. Estimates of needs by 1993 (in 1982 dollars), exclusive of Portland International Airport, by level of governmental responsibility are: federal, $99 million; state, $10 million; and local, $42 million. The Port of Portland has estimated that Portland International Airport needs will be $108 million (in 1981 dollars) for the period.

The federal cost is based on a 90 percent share for those projects that are eligible for funding under the Airport Development Aid Program or the Planning Grant Program, and 100 percent of those qualifying as facilities and equipment projects. The state costs assume that 50 percent of the local share of costs for projects eligible for state funding at publicly owned facilities will be paid by the state, and 100 percent of the local share of eligible project costs for state-owned facilities will be paid by the state. Also included are some projects that are not eligible for public assistance either because they are privately owned or are not considered eligible for grant programs (e.g., parking areas, hangars, fuel storage tanks, general aviation terminals, etc.).

If the average annual rate of need indicated in the airport plan for the period 1982-1993 were to continue to 2000, airport needs by level of government would be as shown in Table 4.

Table 4

ESTIMATED OREGON AIRPORT IMPROVEMENT NEEDS BY AIRPORT CLASSIFICATION
1981 to 2000
(1982 dollars, millions)

Airport Class	Total	Funding Share		
		Federal	State	Local
National Aviation System Plan Airports:				
Portland International	$115.5	$ 53.5	--	$ 62.0
Others	245.9	162.0	10.0	73.9
Non-National Aviation System Plan Airports	5.3	--	3.6	1.7
Total Oregon Aviation System Plan Airports	$366.7	$215.5	$13.6	$137.6

SOURCE: Refer to footnote 1 and PIA estimates from Port of Portland 1979-2000 Airport Plan.

1. Oregon Study Team and Marjorie Hanley Associates, Oregon Aviation System Plan, Volume III - System Requirements (Oregon Department of Transportation, 1983).

Revenue

Federal.--The Federal Airport and Airway Improvement Act of 1982 provides funding programs for airport construction projects. Revenue to implement this Act is derived from various excise taxes, including the tax on domestic air passenger ticket sales, 8 percent; tax on airfreight waybills, 5 percent; international departure tax, $3 per person; tax on noncommercial aviation gas, 12 cents per gallon; tax on noncommercial aviation jet fuel, 14 cents per gallon; and taxes on aircraft tires and tubes. Amounts available annually are subject to congressional approval and are apportioned by the Federal Aviation Administration. The Oregon aviation update study estimated that possible funding levels for airports and programs in Oregon for the years 1982 to 1987 might be $70.7 million -- $16.4 million for Portland International and $54.3 million for other airports in the state.[2] If the annual rate of funding indicated by this total were to be extrapolated to the year 2000, the federal funding available for Oregon airport improvements, excluding Portland International, from 1982 to 2000 would total $162.9 million. On the same basis, the federal funds available for Portland International would total $37.1 million. (All revenue estimates are in 1982 dollars.)

State.--Principal sources of revenue for the Oregon Aeronautics Division are fuel taxes, aircraft registration fees, pilot registration, and leases and concessions at state-owned airports. The aviation plan study estimated two alternative projections of aviation revenue -- a "no growth forecast" and a "recovery forecast" based on alternative assumptions of the state's future economic conditions and demand for aviation facilities. Gross revenue projections are compared to Aeronautics Division administration, operation and maintenance needs to determine the amount of funds that may be available to provide financial assistance to nonstate airports and for capital improvements to state-owned airports. The study concludes that "if no increases occur in Oregon Aeronautics Division tax rates and fees, revenue forecasts indicate that there will be insufficient funds to cover Aeronautics Division operating budget starting in the 1981-83 biennium. No revenue would be available for Financial Aid to Municipalities nor for State airport capital improvements in later budget periods." The study recommends that jet fuel taxes be increased by 1/2 cent per gallon, aviation gas tax be increased by 3 cents per gallon, and that the aircraft registration fee be doubled.

The Oregon Aviation System Plan[3] provides four levels of state revenue need for both the "no growth" and the "recovery" forecasts for the 1983-1993 period. Level 1 includes only operating expenses, and level 4 provides for operating expenses and capital improvement amounts for state support for all projects listed as needs in the

2. Oregon Study Team and Marjorie Hanley and Associates, Oregon Aviation System Plan, Volume V - Action Program (Oregon Department of Transportation, 1983).
3. Ibid.

plan. Levels 2 and 3 provide for increasing partial support for capital projects. The study recommends that taxes on jet fuel, aviation fuel, and fees for aircraft registration be increased. However, even under the "recovery" economic conditions it is anticipated that such recommended increases would not be sufficient to support all capital needs.

Local.--Revenue to support locally owned airports comes largely from landing fees, charges, building and land rents and leases, fuel sales, and federal and state grants. Other sources include seed crop sales (Corvallis) and other locally generated revenue.

Need v. Revenue

If the tenuous assumptions inherent in the projected levels of need and revenue for federal assistance in airport improvements by 2000 are accepted, a total shortfall of federal funds for the period of over $17.1 million might be expected for airport development at Portland International. The projected federal revenue for other airports would be approximately equal to the projected needs for the same period.

Without increases in Oregon Aeronautics Division revenue sources, the state will not be able to fulfill any of the estimated state capital investment needs during the period 1982-2000. If the recommended increases of the state aviation plan study were adopted and the economy of the state followed the "recovery" economic pattern, the state would have sufficient revenue to meet most of the capital needs until 1987, after which additional taxes or sources would be required to provide for subsequent needs. The specific amounts of shortfall in state capital investment funds that might be anticipated under all of the possible combinations of revenue sources and economic conditions have not been estimated by the state study or by this study.

At the local level, the Port of Portland estimates that long-term leases with air carriers will generate enough revenue to meet their capital needs. In the absence of adequate empirical information on which to base an estimate of future other local jurisdiction revenue for airport improvements, no comparisons can be made of the probable capability of these local agencies to provide for the estimated future needs.

III. MASS TRANSIT

Background

In 1982 there were 27 local public transit systems in Oregon. Of these, 4 were serving metropolitan areas and 8 were small-city, fixed-route systems. The remaining 15 were city-urban, rural, and taxi-demand systems.

The state agency responsible for statewide coordination of planning and development of public transportation is the Public Transit Division of the Oregon Department of Transportation. This agency was created by the Oregon legislature in 1969 and provides technical consultation and financial assistance to local transit authorities.

The largest mass transit system in the state is Tri-Met in the Portland area. This agency is a transit district formed in 1969 to serve the Portland urbanized population of approximately one million persons. In 1980, Tri-Met operated approximately 560 buses over 75 routes at a zone fare starting at 75 cents. The district is currently in the process of constructing a 15-mile light rail system between downtown Portland and the city of Gresham and is studying the feasibility of two other light rail routes.

The second largest system in the state is the Lane Transit District (LTD). This district was formed in 1969 and has a service area population of approximately 200,000 persons in the Eugene-Springfield area. In 1980, LTD had over 20 routes and 70 buses with a basic fare of 60 cents.

The city of Salem owned and operated the "Cherriots" transit system until 1979, when the Salem Transit District was formed to serve the 135,000 persons inside the Salem urban growth boundary. The city continued to operate the system under contract until 1982, when the district assumed operation of the system following approval of two successive tax levies. The system operates approximately 50 buses over 20 routes at a basic fare of 35 cents.

The fourth metropolitan transit system is owned and operated by the Rogue Valley Transportation District, which serves 80,000 persons in the Rogue Valley around Medford. This district was established in 1974 and operates 16 buses over 6 routes with a zone fare starting at 50 cents.

The eight small-city, fixed-route systems provide public transportation to cities and urban areas with populations of 10,000 to 50,000. Four (Albany, Linn-Benton, Roseburg and Woodburn) are city owned and operated, three (Astoria, Corvallis and Newport) are city owned with private contractor operation, and one (Klamath Falls) is owned and operated by a transportation district.

Investment Needs

Capital needs assessments and projections by the various districts vary considerably in terms of projection period and method, and no single source of investment needs for public transit in the state exists.

Estimates of future needs for Tri-Met have been made on a project-by-project basis to 2000, and estimated costs have been assigned to each project.[1] A "committed" system includes the present system, the Banfield Transitway, plus 87 new articulated buses (capital cost estimates are $195.6 million). Two alternate "recommended" systems have been proposed. Both represent substantially increased levels of service by increasing routes and service frequency; both recommend additional standard buses. The "bus option" system places emphasis on expansion of the articulated bus fleet (capital cost estimates to the year 2000 are $541.6 million). The "light rail option" is based on construction of a Westside Corridor light rail facility (capital cost estimates total $388.5 million). All costs are in 1982 dollars.

Estimates of mass transit capital needs for the Eugene-Springfield area have also been made on a project-by-project basis for the period 1978-2000.[2] These improvements also represent an increase in routes and service frequency above and beyond needs to accommodate population increases. If the projects that have been completed through 1982 are subtracted, the projected capital needs of the Lane Transit District from 1982-2000 are $29.0 million (in 1982 dollars).

Because of Salem's recent reorganization and expansion, the district has made no estimates of future capital needs. However, the deputy administrator of the state Public Transit Division has suggested a probable need of approximately $1 million per year for construction of shops, transfer stations and shelters and replacement and expansion of the bus fleet. At this rate, a total of $20 million for capital costs would be needed for the 1982-2000 period.

Capital needs projections for the Rogue Valley Transportation District and for the small-city and rural transit systems have been made by the Department of Transportation.[3] The principal capital costs for these systems are anticipated to be for bus replacement. Projections to the year 2000, based on the 1983-1987 estimates by the

1. Metropolitan Service District, Transportation Improvement Program (Portland, October 1982); and Regional Transportation Plan for the Portland Metropolitan Area (July 1982).
2. Lane Council of Governments, Transportation Improvement Program: Eugene-Springfield Area, FY 1980-81 to FY 1984-85, and FY 1982-83 to 1986-87 (October 1980 and September 1982); and Eugene-Springfield Area 2000 Transportation Plan (December 1978).
3. Oregon Policy and Planning Section and Public Transit Division, Oregon Transit Plan, Technical Report on Small City and Rural Transit Systems (Salem, January 1983).

Department of Transportation indicate investment needs of $5.3 million for the Rogue Valley Transportation District, $5.3 million for the eight small-city, fixed-route systems, and $3.2 million for the demandresponsive systems. A summary of the estimated public transportation investment needs for the state to the year 2000 is shown in Table 5. Based on existing matching ratios, sources by agency are also estimated. No estimates have been made for the investment needs of new transit systems which may be formed during the projection period.

Table 5

ESTIMATED PUBLIC TRANSIT INVESTMENT NEEDS
1981-2000
(1982 dollars, millions)

Transit Systems	Total	Federal	State	Local
Metropolitan Systems:				
Tri-Met	$541.6	$432.4	$17.6	$91.6
Lane Transit District	29.0	23.2	2.9	2.9
Salem Transit	21.4	17.2	2.1	2.1
Rogue Valley Transportation District	5.3	4.3	0.5	0.5
Small-City, Fixed-Route	5.3	4.3	0.5	0.5
Demand-Responsive Systems	3.2	2.6	0.3	0.3
TOTAL	$605.8	$484.0	$23.9	$97.9

Revenue

The principal sources of revenue for capital improvements for public transportation in Oregon have come from federal government grants under provisions of sections 3 and 5 of the Urban Mass Transit Act (UMTA). Section 3 grants have provided for 80 percent of costs for capital expenditures by public transit agencies on a project-by-project basis by the Urban Mass Transit Administration. Section 5 has provided for formula grants to public transit agencies on an 80 percent federal, 20 percent local basis and can be used for both operating and capital expenditures. Grants under these provisions are made directly to the local transit authorities.

Under the new Surface Transportation Assistance Act of 1982, an added one cent per gallon fuel tax will become available for local transit subsidies. While the grant provisions are essentially the same, the proposed appropriation for new section 9 (comparable to the old UMTA section 5) of UMTA is significantly reduced. A substantial amount of federal funding (approximately $200 million) for the light rail system in Portland has been approved under a full-funding agreement as a result of transfers of funds from the deletion of the Mount Hood

Freeway and I-505 from the interstate system. The legislature also agreed to provide approximately $15 million of the local 15 percent match for the light rail system and has created a construction fund to be released as needed.

Since the allocation process of most federal funds for local transit improvement is undergoing substantial revision, dollar amounts that may be provided to agencies in Oregon cannot be predicted.

In past years the state legislature has allocated $1.5 to $2 million from the general fund to the Public Transit Division. This revenue has been used primarily to provide part of the local matching share for federal capital improvement grants. The objective of the Division has been to provide half of the local 20 percent match. However, in view of the current economic difficulties, it is anticipated that for the near future the funds allocated to the Division may provide for only one-fourth or less of local matching requirements.

The basic sources of local revenue for operating and capital costs for transit systems in Oregon are fare-box revenue, property taxes (Salem, Medford and small cities), payroll taxes (Portland and Eugene), and special levies (periodically for all systems). Small-city and rural systems also receive state and federal (section 18) operating assistance through the Public Transit Division. These sources are particularly sensitive to changes in economic conditions and to property tax limitation measures.

The only local revenue projection for capital improvements has been made by Tri-Met. That agency has estimated local revenue available for capital projects for 1980-2000 will be approximately $6.4 million.[4]

Need v. Revenue

The only need versus revenue comparison that can be made is for Tri-Met. Projections indicate there will be a shortfall of approximately $85 million (in 1982 dollars) in local revenue for capital projects in the Portland area for the period 1982-2000.

The Surface Transportation Act of 1982 provides for an additional one cent per gallon tax to be allocated to mass transit subsidies. While this Act continues authorization for operating subsidies, the administration has recommended that amounts appropriated for this purpose be reduced substantially below previous years and eventually be eliminated. If local transit districts must allocate additional amounts of local revenue for operating costs, local revenue available for matching federal capital improvement grants will be reduced.

4. Metropolitan Service District, Regional Transportation Plan For the Portland Metropolitan Area (July 1982).

IV. SEWERAGE SYSTEMS

Background

Oregon has eliminated gross pollution of its waters from industrial and municipal wastewater outfalls. The state has some 340 domestic sewage treatment plants of which 215 are municipally owned. The others are private, state or federal facilities. Of the total, 39 serve populations over 10,000 or large industrial loads, or both. Only 21 cities with populations over 300 were without sewers, and only 8 of these had significant problems as of 1980. Oregon's sewered population is served by secondary sewage treatment or better. Unmet sewerage needs include some upgrading of existing facilities. However, other things such as expansion to serve growth and development and replacement or repair of deteriorating infrastructure are also significant.

The sewerage systems addressed in this report are publicly owned and operated. Most are city facilities, but there are a few exceptions. The Unified Sewerage Agency, a Washington County service district that provides sewage treatment on a regional basis, is the largest of these. It provides treatment facilities to sewered areas both inside and outside cities in its service area. The Bear Creek Valley Sanitary Authority provides sewers to substantial areas outside the city of Medford, including some small cities, and contracts with Medford for sewage treatment. There are a few other district organizations in the state, and a few sewage treatment plants serve more than one city or city and district under contract or cooperative arrangements.

A number of industries, primarily pulp mills and food processing plants, have independent industrial waste treatment plants, and some isolated industrial and commercial developments also have private sewerage facilities. Special waste handling equipment is also used to deal with certain non-point pollution sources, such as those due to concentrations of animals. These are private facilities, and needs in these areas are not included in this study.

There are several unincorporated problem areas that are currently unsewered. The largest of these are adjacent to the cities of Portland and Eugene and contain about 150,000 persons. Because of an open-gravelly soil structure in those areas, most of the existing private septic tanks and cesspools give their owners little difficulty. The matter of concern is pollution of the groundwater from discharges from the on-site disposal systems. Other recognized areas with imperiled groundwater are LaPine and North Florence. If 175,000 additional persons were sewered to correct some of those and other unsewered problem areas, the sewered population of the state would rise from 68 percent to about 75 percent.

Oregon's water quality standards, which are based on analysis of individual segments of receiving waters, sometimes exceed the standards established by the Federal Water Pollution Control Act which is administered by the U.S. Environment Protection Agency (EPA). The Oregon Department of Environmental Quality (DEQ) enforces the state and federal standards in Oregon. The state water quality standards are set by the Oregon Environmental Quality Commission (EQC), consistent with state law and federal mandates.

The DEQ rating system, used to prioritize sewerage needs for federal grant purposes, has one hundred sixty-eight projects on its 1983 list. The five highest-priority projects and a few special ones are being funded from 1983 grant funds. Five or six more will be funded the following year if the federal grant funding level is as anticipated by current federal policy. Although these highest-priority projects include a greater proportion of costly projects than the rest of the list, there is no reason to expect the present level of federal grants to ever catch up with the need if all the jurisdictions wait in line for a share of federal funds.

Sewerage Investment Needs

The Environmental Protection Agency makes an analysis of sewerage needs every two years in cooperation with the Oregon DEQ. Currently, Oregon's needs, projected to 2000, total $3.6 billion. EPA studies are made to assist Congress in understanding the costs involved in achieving the goals of the federal water quality control program. For this reason, the needs identified by EPA do not reflect all needs. However, the EPA needs include substantial ones that are not eligible for federal grant funds. Oregon would be eligible for about $394 million in grant funds by 2000 if it received the Oregon share of $37.3 billion, which is EPA's estimate of the federal funding potential. This is based on a federal estimate that Oregon's needs are 1.0558 percent of the national needs for work that is eligible for grant funds.[1] Most of the grant-eligible needs are part of $886 million needed for treatment plants and sewer line construction and rehabilitation. However, all of that amount is not grant eligible. For example, most infiltration-inflow correction and facilities to serve growth are no longer eligible. The breakdown of Oregon's needs identified by EPA and expressed in 1982 dollars, is as follows:

I.	Secondary Sewage Treatment	$ 189,165,000
II.	Other Treatment	38,700,000
IIIA.	Infiltration-Inflow Correction	71,071,000
IIIB.	Major Sewer System Rehabilitation	17,604,000
IVA.	New Collectors	363,303,000
IVB.	New Interceptors	206,026,000
	Subtotal	$ 885,869,000
V.	Correcting Combined Sewer Overflow	674,022,000
VI.	Treatment or Control of Stormwater	2,081,460,000
	TOTAL	$3,641,351,000

1. The backlog needs in EPA categories I through IV have been assumed to reflect the eligible projects.

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The Oregon needs that are not included in the EPA tally include several significant obligations that must be addressed if local jurisdictions are to have the infrastructure needed for growth and economic development. Three of these are as follows:

1. Collection systems to serve development new since 1972 or that can be projected as occurring by the year 2000. The EPA study includes only those collector sewers and related facilities that are needed to correct $363 million in violations caused by raw sewage discharges and malfunctioning septic tank discharges existing in 1972. (Category IVA -- New Collector Sewers.) These are the only collection system needs that are expected to be eligible for grant funding in Oregon. There is no available estimate of the collection system needs to allow for expansion of Oregon's population and to service currently unserved commercial and industrial properties that may be needed by the year 2000.

2. Storm sewers and drainageway improvements. The EPA study includes an estimate of the cost of abating pollution from some stormwater runoff, but this does not include the cost of improving or expanding the stormwater runoff system itself. The EPA estimate includes only "costs of abating pollution in urbanized areas from stormwater runoff channeled through sewers and other conveyances used only for such runoff." Further, the EPA estimate covers only the three major urbanized areas of Oregon -- Portland metro, Eugene-Springfield, and Salem. Even with these limitations, the estimate under EPA Category VI (Treatment or Control of Stormwater) totals $2.081 billion. A complete estimate of stormwater system needs would require inclusion of the remaining urban centers of the state. (There is some indication this would raise the EPA figure to about $3 billion.) It would also require inclusion of the cost of new or improved storm sewers and drainageways, plus any additional treatment or control resulting from new stormwater conveyances.

3. Repair and replacement of the existing and new sanitary and stormwater conveyance and treatment systems. The EPA estimate of new construction needs would cover some undetermined segment of the repair and replacement needs necessary to keep sewerage facilities efficiently functional. Not only is there no data on the portion of the EPA needs estimate that reflects costs due to deferred maintenance, there is no overall estimate of the cost of caring for existing facilities. This is a basic part of the cost of preserving the sewerage infrastructure, and with each new investment in modernized facilities it becomes a greater part of the remaining need that is over and above the amounts the EPA has estimated as future needs. Deferred maintenance should decrease because communities receiving federal aid have an obligation to keep their facilities in running order and to

include an amount sufficient to cover repair and replacement needs in their user charges. As previously indicated, there is no source of information from which any reliable estimate of this need can be made. However, sewer user charge increases can be expected if that revenue source includes adequate provisions for repair and replacement funds.

In summary, there are no central-source estimates of the following sewerage needs:

- o Collection system extension
- o Storm sewer extension and improvement
- o Repair and replacement of the sewerage infrastructure.

There is also no estimate of potential reductions in repair and replacement through more rigorous preventive maintenance.

Sewerage Revenue

There is no projection of the total revenue that may be available to finance sewerage needs. The EPA projections include an estimate that under the present concept of a federal grant program Oregon could anticipate $394 million in grant funds between now and 2000. That is about 11 percent of EPA's projected Oregon needs and, therefore, is substantially less than 11 percent of Oregon's total sewerage needs.

The best available data on the history of sewerage expenditures is in the U.S. Bureau of the Census annual reports entitled Governmental Finances. Oregon expenditures reported for 1957 to 1981 are shown in Table 6. The most significant entries are those reporting expenditures for capital outlay only. The other expenditures shown in Table 6 include operation and maintenance and interest payments on debt.[2]

Table 7 converts these reported expenditures to 1982 constant dollars and to a per capita figure, using the total state population for each year. Capital expenditures since 1973, expressed in 1982 dollars, have averaged $85 million per year or $35 per capita per year. This is a significant increase in effort compared to the prior years and in part reflects the expanded federal grant program enacted in 1972. A relatively constant expenditure level has been maintained over recent years. If the past per capita expenditure levels were to continue for the next 20 years, the expenditures would total $2.0 billion in 1982 dollars.

Repair and any replacement that are not defined as capital outlay are not included in the figures above. The extent to which repair and

2. Expenditures for principal payments on debt are excluded from Table 6 because the capital outlay amount includes expenditure of borrowed money; inclusion of principal payments would result in duplicate reporting.

Table 6

OREGON SEWERAGE EXPENDITURES BY YEAR
(current dollars, in millions)

Fiscal Year	Total Expenditures	Capital Outlay	Other
1957	$ 5.6	$ 3.5	$ 2.1
1962	12.5	9.1	3.4
1967	16.6	10.7	5.9
1972	29.2	17.7	11.5
1973	42.3	27.8	14.5
1974	55.4	35.6	21.8
1975	100.2	72.0	28.2
1976	91.7	59.2	32.5
1977	95.7	57.9	37.8
1978	84.4	42.8	41.6
1979	115.4	73.2	42.2
1980	131.6	81.2	50.4
1981	130.5	78.1	52.4

SOURCE: Data for 1957-1967, U.S. Bureau of the Census, Census of Governments; data for 1972-1981, U.S. Bureau of the Census, Governmental Finances in (year).

Table 7

OREGON SEWERAGE EXPENDITURES BY YEAR
(1982 dollars -- millions and per capita)

Fiscal Year	Capital Outlay		Other	
	Amount	Per Capita	Amount	Per Capita
1957	$14.4	$ 8	$ 8.6	$ 5
1962	33.1	18	12.4	7
1967	32.8	16	18.1	9
1972	39.3	18	25.6	12
1973	57.9	26	30.2	14
1974	67.7	30	41.4	18
1975	124.8	54	48.9	21
1976	96.3	41	52.8	23
1977	87.9	37	57.4	24
1978	60.5	24	58.8	24
1979	95.4	38	55.0	22
1980	93.4	36	59.2	22
1981	83.5	31	56.0	21

NOTE: See Appendix A for price deflator and population data.

replacement become necessary because of weaknesses in preventive maintenance is also unknown. Some of the repair and replacement need is met through operation and maintenance expenditures; the part that is not is deferred, and at least some of this eventually will become a future capital outlay need. The EPA needs projection probably does not include any real measure of future capital needs that will result from the infrastructure deterioration that is occurring but has not yet been converted into a capital project.

Repair and replacement that are not deferred would be part of the expenditures for sewerage purposes other than capital outlay. There is no information on the total preventive maintenance, repair and replacement needs. Most of the expenditures for purposes other than capital outlay shown in tables 6 and 7 are probably for purposes other than repair and replacement, but some undetermined investment is made in preservation. Certain replacement and improvement of the sewerage infrastructure also would be included.

Expenditures for sewerage purposes other than capital outlay have been increasing each year. For the past seven years the increase has been approximately proportional to population growth. Expenditures per capita have averaged $22. If this per capita expenditure level continues for the next 20 years, the total expenditure would be $1.3 billion in 1982 dollars.

Need v. Revenue

EPA grants have been a primary source of funds for some Oregon sewerage facilities. State grants have assisted with some projects, but the primary state assistance has been to reduce bond interest charges by making state loans to local jurisdictions at favorable state-borrowing rates. Certain other federal grants, such as those under HUD and FmHA programs, have also assisted in the past, but their availability has declined significantly.

Congress would be providing $421 million in 1982 dollars to Oregon if it provides the funds that EPA has indicated could be warranted under the existing federal program to assist with the 1982 estimate of needs to the year 2000. Oregon local governments would need to provide about $272 million to match the $421 million. The federal matching ratio for EPA grants has been reduced from a federal-local ratio of 75-25 to 55-45 to become effective in 1985. The estimate above accounts for a number of jurisdictions with on-going projects that remain qualified for the 75-25 match ratio. The $693 million (federal, $421 million; local, $272 million) is far short of the $3.6 billion in Oregon needs identified in the EPA needs study.

EPA needs projection	$3.6 billion
Possible federal grants with local match	.7 billion
SHORTFALL	$2.9 billion

The EPA-identified stormwater problems are about $2.8 billion of the shortfall. Even though this is a large figure, EPA has not included all the stormwater problems in their needs assessment.

The $693 million is substantially below the $2.0 billion that would result from a 20-year continuation of the per capita effort of the recent past. The substantial difference between these figures may result from several factors:

1. The $2.0 billion covers facilities such as sewer lateral extensions that are beyond those for which EPA makes needs assessments. In addition, it includes expenditures for sanitary and storm sewer extension and betterment, which are not accounted for in the EPA needs assessment.

2. The $2.0 billion may include expenditures for grant-eligible projects that are financed without grant funds.

3. The higher figure also includes capital expenditures for an undetermined part of the need to replace worn or obsolete infrastructure.

As previously indicated, if the past capital outlay effort per capita were to continue until the year 2000, the expenditures would total $2.0 billion in 1982 dollars. This can be compared with the following needs:

EPA needs projection	$3.6 billion
Collection system extensions	NA
Storm sewers	NA
Repair and replacement	NA
TOTAL CAPITAL NEED:	Over $3.6 billion
Continuation of expenditure effort	2.0 billion
SHORTFALL	Over $1.6 billion

Until there is some estimate of sewerage needs other than those projected by EPA, there is no way to quantify the sewer and replacement needs. It seems clear that a continuation of recent sewerage capital expenditure levels will address substantially less than half the state's sewerage needs. Further, considering recent changes in federal programs, the recent expenditure levels can continue only if state or local sources provide more revenue.

V. SOLID WASTE MANAGEMENT

Background

Solid waste management is receiving a new level of systematic state attention. In the early 1970s the state began a program that called for local solid waste management plans. Counties or groups of counties served as planning units, and state grants helped with the planning effort. Later, state grants and loans assisted with construction and the equipment purchases necessary to shift to a higher standard of waste disposal. The most pronounced result has been the elimination of uncontrolled open dumps and burning dumps in favor of organized landfill disposal.

The last few years have seen a further refinement of disposal practices. Prior to 1979 the main activities at sanitary landfills were compacting the waste and covering it with a layer of earth at the end of each day's operation. By 1981, leachate control and disposal, surface drainage control, monitoring wells, and methane gas control had become common parts of sanitary landfill facilities and operations. Instead of merely selecting a plot of ground and rearranging the soil and waste, the typical modern waste disposal site requires an investment of about $1 million in an engineered facility. One result has been that a modern landfill serves an area larger than a political jurisdiction. This has increased county involvement in waste disposal and, for the Portland metropolitan area, has made solid waste disposal one of the responsibilities of the Metropolitan Service District.

Special provisions for waste transport become important in Oregon areas where distance from a disposal site exceeds 20 miles. Forty transfer stations have been established to provide local access to a disposal station where the population is sparse or other conditions preclude a local disposal site. Approximately 90 percent of the transfer stations are in four counties, where they have been used primarily in rural areas as an alternative to small landfill sites.

The major public role in the program has been the replacement of unsuitable disposal sites with sanitary landfills that meet modern pollution control standards, construction of some transfer stations, and providing equipment to operate the sites. Nearly all solid waste in Oregon is collected by private companies, and these companies have varying degrees of involvement with landfills and transfer stations in different areas of the state. Because of difficulties caused by heavy rainfall, some coastal areas use waste burners, and most landfill material is incineration ash.

Oregon had about 200 solid waste disposal sites in 1971. After eliminating nonstandard dumps, there are now 100 landfills operating under state permits. This includes both the sites used for mixed waste and those for various forms of nonputrescible waste such as

demolition waste. Of the total, 72 are publicly owned and 28 are private. Of the publicly owned sites, about one-half are privately operated under contracts with a city, county or the Metropolitan Service District. Approximately one-fourth of the 100 landfills are serving relatively remote, arid eastern Oregon locations. These sites involve a minor investment compared to the others, and the equipment for their care is used primarily for other purposes.

The location, design and operation of solid waste landfill sites are regulated under permits issued by the Oregon Department of Environmental Quality (DEQ). A city-owned site or one provided by a private collector with a city franchise also may be regulated by the city. Similar county-private arrangements also occur. Landfill sites are generally located outside cities, and are all subject to local land use controls.

Hazardous waste requires careful management, but this responsibility is placed on the company that generates the hazardous material. To serve those needing a hazardous waste depository, Oregon has a privately run hazardous waste site in a remote location. Except for state regulation and local diversion of hazardous waste from landfills, the handling of hazardous waste is a private responsibility. No public infrastructure is involved.

The U.S. Environmental Protection Agency has identified two Oregon sites as among 418 uncontrolled hazardous waste sites in the nation that are likely to pose the greatest danger to the public. These are both industrial sites considered to be the responsibility of the owners.

Investment Needs

Although the state has a goal of reducing the amount of solid waste needing land disposal by encouraging source separation, recycling and reuse, the present pattern suggests that mixed solid waste will increase approximately in proportion to population growth. The rate of increase in some waste also depends on the level of industrial activity. Public facility capital investment needs for the next 20 years have not been projected by any existing study. However, sufficient information seems to be available to permit a rough indication of the size of the need.

Two projections have been made based on general information from several sources, including DEQ's Solid Waste Division reports and interviews with state agency staff. The first provides an indication of the amount of initial public investment in new facilities that seems likely over the next 20 years, considering the present public-private relations. The second provides an indication of the overall capital investment needs without regard to whether the investment is public or private. In the solid waste field, in particular, the cost to persons served is primarily reflected in collection fees and

dumping fees, whether ultimate disposal is publicly or privately managed. Some counties and a few cities put general fund revenue into waste disposal, but in many areas, including the large population centers, an initial public investment is being followed by substantial reliance on user charge revenue.

Current Public Needs.--The major current needs are for the Portland and Salem metropolitan areas. The Portland area's major public investment needs are for two additional transfer stations and a new landfill. These will cost about $30 million, to be financed through the Metropolitan Service District. Necessary equipment for operations is provided by private companies which will operate the district's facilities under contract. The district program includes plans for waste reduction and energy recovery through construction of an incinerator-boiler plant which will cost over $130 million. If the district is able to find a suitable site for this facility, it will be constructed privately, but probably with the aid of industrial revenue bonds. To this degree, it does not affect public infrastructure needs.

The Marion County (Salem) portion of what is known as the Chemeketa solid waste planning area needs about $2 million in further public investment, primarily for an additional transfer station. Two new landfills are planned, but under the program for that area, private solid waste collection companies will finance and operate the landfills. Similarly, a planned waste reduction and energy recovery burner costing about $40 million would be a private investment, if it is achieved.

There are a few locations scattered throughout the state with smaller scale current needs. In addition, Lane County will be scheduling a transfer station within the next few years to replace the landfills serving the Cottage Grove-Creswell area, and Douglas County will need a replacement for the Roseburg site in about ten years. The other major landfills in the state should have the capacity to serve for twenty years.

Equipment to service a major landfill costs $100,000 to $200,000 and lasts eight years or more. Coastal burners, put into use a few years ago, probably will have a ten-year replacement cycle. These burners are purchased in pairs; small ones cost $250,000 to $300,000, larger ones cost about $1.5 million.

In summary, there is a current need for a public investment of about $35 million and an undetermined private investment. Within the next 20 years an additional $10 million in public investment may be required to replace disposal sites, rural transfer stations, and waste reduction burners. In that context, the statewide 20-year need may be only $45 million in 1982 dollars.

Continuing Annual Need (Public and Private).--The private-public interface of solid waste disposal is very complex and, to some degree, unpredictable. If the statewide need for a solid waste disposal infrastructure is projected without regard to whether it is in public or private ownership, the continuing need may be about $5 million per year or $100 million for any 20-year period. The annual need of $5 million was estimated as follows:

Assumption*	Average Annual Need
Three substantial disposal sites need replacement each year at $1 million each	$3 million
Landfill and transfer station equipment each year requires	$1 million
Special problems of metropolitan areas add $20 million every 20 years	$1 million
AVERAGE ANNUAL NEED IN 1982 DOLLARS	$5 million

* Based on a crude evaluation of the 100 landfills in the state and assuming average landfill life, 20 years; equipment life, 8 years.

For 20 years, this totals $100 million in 1982 dollars. Because of the scale of the investment in recent years and the expected investment within the next few years, there may be a period later in this decade when the annual capital requirements will be low. Unless steps are taken to even out fluctuations, this will be followed by another surge of need as the present disposal sites reach their capacity. If further experience establishes their economic feasibility, investments in incineration plants with energy recovery could occur during this decade, and that would extend the life of the present disposal sites. If resource recovery through recycling and reuse becomes more widespread, this also could result in some modest extension of the time that the present disposal sites can serve.

Omissions from the Projections.-- Costs for disposal facility operations are not included, but those costs should include a portion for preventive maintenance, repair, and parts replacement, all of which are important for the effective functioning of the disposal system. The special capital and operations costs associated with the voluntary resource recovery activities occurring in the state also are not included. Neither of the need projections includes costs for collection or collection equipment. The current need estimate does not include an amount for public system equipment replacement. The special costs for final closure of a landfill and for post-closure monitoring are just beginning to receive systematic attention and are not included. These various undetermined costs are by far the greatest part of the cost of solid waste management and, in addition to operation costs, may well contain a substantial part of the cost for an effective solid waste disposal infrastructure.

Revenue

There are no organized data on statewide public expenditures for solid waste disposal. However, state construction grants provide some indication of the recent public investment in capital facilities. Grant amounts pay not more than 30 percent of public expenditures. The grants for construction are shown in Table 8.

Table 8

SOLID WASTE CAPITAL PROGRAM
DEQ Grants in $1,000, by Year of Last Payment
(current dollars)

Year	Amount of Grants
1974	$ 7.5
1975	2.7
1976	32.1
1977	54.3
1978	2,353.7
1979	109.8
1980	307.0
1981	119.1
1982	2,326.5

SOURCE: Oregon Department of Environmental Quality.

The amount of grants made per year has been very uneven. In addition, the year reported as the grant year may not be the year in which all expenditures occurred. However, an average yearly expenditure can be calculated by expanding the grant amount to reflect the total expenditure for which the 30-percent grants were made, adjusting the results to 1982 dollars and converting the result to a per capita figure. The resulting average over the period is equivalent to an expenditure of $0.94 per capita per year in 1982 dollars. A comparable effort over the next 20 years would result in an additional expenditure of $57 million in public funds. The legislature has shifted away from grants, but offers low-interest loans for future projects.

The $0.94 per capita per year average effort of the past nine years is below total infrastructure investment during that period. An undetermined amount of public expenditures for capital facilities was made without matching grants. Further, the private-public intertie in the solid waste field means some private facilities in some parts of the state are comparable to public facilities in other parts of the state. Preventive maintenance, repair, and some equipment replacement is financed through operation and maintenance expenditures. In contrast to water supply and sewerage expenditures where investments in capital outlay tend to be roughly equal to expenditures for other purposes, capital outlay for solid waste

purposes is a smaller proportion of the whole. For 1982, county expenditures for solid waste capital outlay were only 17 percent of total county solid waste expenditures, according to a Bureau of Governmental Research and Service survey.

Need v. Revenue

State grants for solid waste facilities through the DEQ have helped upgrade solid waste disposal methods over the past decade. This assistance will continue in the immediate future by providing grants to the remaining problem locations. Once the initial cycle of assistance has been completed, state grants are no longer assured, but continuation of the state grant assistance may be assumed until current needs have been met.

The following comparisons of need to revenue should be used with caution. All the figures depend on assumptions that are speculative. The dollars are at 1982 value.

It would require about ten years of effort to finance the current public investment need of $35 million, assuming a per capita effort level of $0.94 per year.

An additional $18 million would be available during the following ten years (to the year 2000), assuming that the level of effort drops to $0.60 per capita because state grant assistance is terminated. This compares with the $10 million of public investment needed for that decade and leaves a reserve to cushion the expansion of need as the landfills with about twenty-year capacity reach the end of their useful lives.

Compared to the estimated $5 million average annual need to replace solid waste disposal facilities and equipment, a $0.60 per capita per year effort provides only $1.8 million per year. The private effort would need to be $3.2 million or the public effort would need to be greater.

Until there are some more comprehensive data on solid waste needs and revenues, there is no way to suggest a level of reliability of the above estimates. It seems clear that, compared with many other parts of the public infrastructure, dealing with solid waste in Oregon does not require a large capital investment. The greatest portion of solid waste disposal goes into operation and maintenance, rather than into infrastructure. When collection costs are included, infrastructure becomes a minor part of the whole. The interest in energy recovery from solid waste may change the picture, but if it does, it will be because the value of the energy recovered pays most of the added cost. For an extended period, at least, Oregon seems able to landfill most of its solid waste at less cost than other alternatives and at a cost for infrastructure that is relatively minor when compared to sewerage, water supply or transportation.

VI. TRAFFICWAYS

Background

As used in this study, the terms trafficways and highways are synonymous. The terms include rural roads, streets, highways and related structures; planning and engineering for these facilities; and street lighting and snow and ice removal.

The trafficways system in Oregon consists of approximately 121,500 miles of state highways, county roads, and city streets. Of this total, 7,500 miles are on the federal-aid state system and 7,880 are on the federal-aid local system. Other rural roads, local urban streets, nonfederal-aid state highways, forest roads, etc., account for the remaining 106,100 miles of the system.

The state highway system includes interstate routes, federal-aid primary, parts of federal-aid secondary and federal-aid urban networks, and a relatively insignificant mileage of nonfederal highways. The state provides the matching share of revenue required to qualify for these federal funds. The federal-aid local system includes trafficways on part of the federal-aid urban system and part of the federal-aid secondary system. In Oregon, half of the funds available under federal-aid secondary financing and all of the urban funds are allocated to locally determined facilities, with approval by the State Highway Division. Half of the local matching share of financing for these systems is provided by the state, and half is provided by cities or counties by intergovernmental transfer to the state, which supervises construction activities. Individual cities and counties are responsible for construction and maintenance of local streets and roads that are not on the federal-aid system.

The principal coordinator of the systems that have access to federal grant funds is the Division of Highways of the Oregon Department of Transportation. This agency is responsible for approval and construction of all federally assisted trafficways in the state and is also responsible for maintenance of all state highways. Policy authority for the division is vested in the Oregon Transportation Commission, an appointed body of five persons. Expenditures by the Highway Division (including cooperative funds provided by federal and local governments) increased from $138.8 million in 1977 to $290.1 million in 1981. Local government road and street expenditures (excluding transfers to the state for federal-aid projects) for the same period increased from $123.8 million to $206.4 million. The total highway expenditures by year and the component parts that were capital outlays are indicated in Table 9.

The principal sources of state highway revenue, aside from federal grants and local cooperative funds, are fuel taxes, license fees, and motor transportation weight-mile fees. The principal sources of

financing for county roads are state shared highway user revenue (20 percent to counties in proportion to vehicle registration), National Forest revenue, O&C revenue, and traffic fines. Revenue for city street expenditures is derived principally from state shared highway user revenue (12 percent on a per capita basis), property taxes, special assessments, and transfers from other nonstreet funds.

Table 9

TRAFFICWAY EXPENDITURES -- TOTAL AND CAPITAL OUTLAY
Oregon State and Local Governments
1977-1981
(current dollars, in millions)

Year	Total			Capital Outlay		
	State	Local	Total	State	Local	Total
1977	138.8	123.8	262.6	92.1	30.2	122.3
1978	165.5	151.3	316.9	100.6	40.7	141.3
1979	185.9	186.9	372.8	116.4	63.0	179.4
1980	285.9	187.3	473.2	226.4	58.6	285.0
1981	290.1	206.4	496.4	234.7	57.6	292.3

SOURCE: U.S. Bureau of the Census, Governmental Finances in (year) (Washington, D.C.: USGPO).

Investment Needs

Biennial surveys of the state system by the Highway Division are made to determine the degree of improvement or deterioration of the system. A summary of the findings of these surveys since 1978 is shown in Table 10. The figures indicate that there has been some improvement in conditions of the system during the past six years, but that nearly one-half of the mileage is still classified as "poor" or "very poor."

Table 10

COMPARISON OF THE CONDITION OF STATE HIGHWAY SYSTEM PAVEMENTS
1978, 1980 and 1982

Condition Rating	1978 Percent	1980 Percent	1982 Percent
Very Good	7%	9%	9%
Good	14	18	15
Fair	23	27	29
Poor	40	38	37
Very Poor	16	8	10

SOURCE: Oregon Department of Transportation, Motor Vehicle Cost Responsibility Study, 1980 (March 1981) and State Highway System Preservation Report (January 1983).

Two levels of future needs were estimated for the state system by the Highway Division.[1] The one requiring the lowest investment was based on maintaining present conditions -- i.e., the deteriorated condition would remain at approximately 50 percent. A second estimate was made based on improving conditions -- i.e., decreasing the percentage of deteriorated mileage. No estimates have been made of investment needs for improving the state system so that 100 percent of the mileage is in fair or good condition. The state's population growth will create a demand for additional local street and highway mileage. However, a need for significant increases in interstate or state highway mileage is not anticipated by the Highway Division.

The state system needs are summarized by type of investment in Table 11. Assuming that the past and current ratios of federal dollars to state and local dollars available for these improvements will continue for the projection period, state and federal needs are shown in Table 12. Any decline in federal contributions would result in higher state amounts.

Table 11

STATE SYSTEM INVESTMENT NEEDS
1981 to 2000
(1982 dollars, millions)

Type of Investment	Average Annual		1981-2000 Totals	
	Maintain Present Conditions	Improve Conditions	Maintain Present Conditions	Improve Conditions
State Highway System (noninterstate)	$ 78	$188	$1,483	$3,570
Interstate System	46	57	873	1,076
Bridges	18	21	345	406
Operations[1] and Safety	17	22	325	384
TOTALS	$159	$288	$3,026	$5,436

1. Railroad crossings, traffic signals, passing lanes, etc.

SOURCE: Oregon Department of Transportation, State Highway System Preservation (Salem, January 1983).

1. Oregon Department of Transportation, State Highway System Preservation (January 1983).

Table 12

STATE SYSTEM INVESTMENT NEEDS BY GOVERNMENT LEVEL
ASSUMING CONTINUATION OF CURRENT FUNDING RATIOS
1981 to 2000
(1982 dollars, millions)

Type of Investment	Matching Ratio	Maintain Present Condition			Improve Conditions		
		Totals	Federal	State	Totals	Federal	State
State Highway System (noninterstate)	88/12	$1,483	$1,187	$296	$3,570	$3,147	$423
Interstate System	92/8	873	804	69	1,076	990	87
Bridges	80/20	345	276	69	406	325	81
Operations & Safety	90/10	325	293	32	384	384	43
TOTALS		$3,026	$2,560	$466	$5,436	$4,846	$634

A recently completed survey of trafficway needs by counties indicated that approximately $512 million in capital expenditures will be needed in the next ten years to preserve the hard-surface county roads in Oregon. These needs include federal-aid secondary county roads and other county roads, but do not include rural-access roads that are not part of the county road system. If this average is projected another eight years, the total needs during the period from 1982-2000 would be $912.6 million.

A similar survey of Oregon cities has been made, but survey summaries have not been translated into dollar needs for city street systems. Assuming that the ten-year city-county relation for road and street improvements (60 percent county, 40 percent city) continues through 2000, 1982-2000 city street needs would total $608 million. On that basis, total state-local trafficway needs would total $6.9 billion during the 1981-2000 period ($5.4 billion to satisfy state traffic needs, $1.5 billion to satisfy local needs, both in 1982 dollars).

Trafficways Revenue

The Surface Transportation Act of 1982 provides that an additional 4 cents per gallon gas tax be allocated for federal-aid trafficway systems. Preliminary estimates from the Federal Highway Administration indicate that formula apportionment funds (federal-aid interstate, primary, secondary, urban, bridges, safety) for Oregon under the new Highway-Transit Act will average $146.8 million per year for the next four years. It is estimated that Oregon will receive an additional $10 million to $20 million per year from discretionary funds during the same time period.

The Federal Highway Act allows local governments in urbanized areas to withdraw segments of interstate highways that are not crucial to the national system. The interstate funds then may be used for highway or transit improvements in the urbanized areas. Three segments

of the interstate system in Oregon have been withdrawn under this provision -- I-305 in Salem and I-505 and the Mount Hood Freeway in Portland have been approved for withdrawal by the governor and the secretary of transportation. The funds from this source to be applied to urbanized area trafficways that are not on the interstate system after 1982 total approximately $382 million.

If the short-range estimates for formula apportionments and discretionary funds were to continue throughout the projection period following 1982, and if Oregon receives the full $382 million in interstate transfers, a total of approximately $3,460 million would be available to Oregon from federal sources between 1982 and 2000.

From 1972 to 1981 the Highway Division revenue from state sources increased from approximately $80 million to $150 million. Not all of this increase was due to increases in highway usage. In 1977 the user rate was increased, and in 1981 the allocation of highway weight-mile tax for state police and state parks purposes was eliminated. In 1982 the fuel tax increased from 7 cents to 8 cents per gallon and the weight-mile tax was increased again. From 1972 to 1981 the proportion of net revenue spent for construction varied from 11 to 23 percent, and 25 to 53 percent was spent on maintenance of the state highway system. The remainder of the net state revenue was used for administration, debt service, shops, weighmaster operations, and miscellaneous minor betterments. These trends are listed by year in Table 13.

Table 13

EXPENDITURES OF NET HIGHWAY DIVISION REVENUE FROM STATE SOURCES
1972 to 1981

	1982 Dollars (in millions)				Percent of Total		
Year	Construction	Maintenance	Other	Total	Construction	Maintenance	Other
1972	$89	$49	$91	$229	39%	21%	40%
1973	62	55	114	231	27	23	50
1974	57	53	76	186	30	29	41
1975	52	57	103	212	25	27	48
1976	21	62	76	159	13	39	48
1977	25	59	86	170	15	35	50
1978	30	61	84	175	17	35	48
1979	28	66	84	178	16	37	47
1980	56	64	67	187	30	34	36
1981	55	57	76	188	29	30	41

SOURCE: Oregon Department of Transportation, "Perspectives on Funding Oregon's Highway Program," (September 1982).

Because of the need to commit an increasing part of available state funds to the maintenance of rapidly deteriorating highways, the Highway Division has estimated that by 1989 it will be unable to allocate any funds for construction and matching of federal funds unless additional methods of revenue generation are provided.[2]

Since 1978 the Highway Division has committed an average of $21 million per year (in 1982 dollars) to capital outlay from state funds. If additional revenue sources are provided to maintain this level of commitment until 2000, approximately $406 million will be available for matching federal funds for construction. If no additional revenue sources are provided, the Highway Division estimates that it will be able to take full advantage of federal-aid programs for the state system until 1984 and from then until 1989 at a reduced level of federal-aid program commitment. After 1989 no additional revenue sources, approximately $139 million may be available from state sources for capital outlay for highways.

In summary, state revenue would total $3.9 billion -- $3.5 billion federal sources, $0.4 billion from state sources.

Many factors will influence the amount of revenue available from city and county sources for highway construction in the future, including property tax limitations, amount of federal timber sale shared revenue, changes in state highway user taxes and fees, shifts to mass transit usage, etc. Specific projections of these factors on local revenue have not been made.

The level of local funding for highway expenditures in the past is shown in Table 14. These trends indicate an average per capita expenditure of $24 (in 1982 dollars) during the period. If these past trends of local revenue generation for trafficway capital investment are maintained on a per capita basis, the totals produced (using the population projections assumed for this study) for the period 1981 to 2000 would approximate $1,342 million.

2. Oregon Department of Transportation, "Perspectives on Funding Oregon's Highway Program," (September 1982).

Table 14

OREGON LOCAL GOVERNMENT HIGHWAY EXPENDITURES
FOR CAPITAL OUTLAY IN CURRENT AND 1982 CONSTANT DOLLARS

	Total Amount		Per Capita	
Year	Current Dollars (million)	Constant Dollars 1982=100	Current Dollars	Constant 1982 Dollars
1957	$19.8	$81.5	$11	$47
1962	15.9	57.8	9	32
1967	18.8	57.7	9	29
1972	21.7	48.2	10	22
1973	25.8	53.8	12	24
1974	29.0	55.1	13	24
1975	34.2	59.3	15	26
1976	25.1	40.8	11	17
1977	30.2	45.8	13	19
1978	40.7	57.5	16	23
1979	63.0	82.1	25	32
1980	58.6	68.9	22	26
1981	57.6	61.6	22	23

NOTE: See Appendix A for price deflator and population data.
SOURCE: U.S. Bureau of the Census, Governmental Finances in (year) (Washington, D.C.: USGPO).

Need v. Revenue

Federal-aid highway revenue has been the principal source of funding for construction of highways in Oregon for many years. However, availability of the revenue is dependent on some matching funds from the state, and, to a lesser degree, from local governments, and comparisons of need and revenue for construction of the highway, road and street systems are dependent on assumptions made as to levels of revenue available from all sources.

If the existing federal programs continue and if new revenue sources enable the state to continue with its average commitments for highway construction, the state should be able to maintain the present level of highway conditions with no further deterioration. However, between 1982 and 2000 these levels of funding would produce a shortfall of $1,414 million ($137 state and $1,277 federal) to provide for improvement of highway conditions so that less than 50 percent of the mileage is deteriorated.

If the state does not provide additional revenue sources, the shortfall of state funds of $243 million to $387 million will be critical

because the state will not be able to provide matching amounts to take full advantage of available federal funding.

Changes in total federal funds for federal-aid programs or changes in emphasis on program components (e.g., elimination of federal-aid urban or secondary road programs) would result in serious shortfalls of revenue to meet various trafficway needs.

Based on the tenuous assumptions regarding local government road and street needs ($1.5 billion) and revenue ($1.3 billion), there would be a shortage of about $200 million during the 1981-2000 period. The total state-local shortage would total $1.9 billion (assuming "improving condition" estimates for the state system).

VII. WATER SYSTEMS

Background Information on Water Supply and Use

Oregon is a state of rainfall extremes, ranging from over 100 inches per year in some coastal locations to less than 12 inches per year in eastern desert locations. The state's out-of-stream needs in 1970, predominantly for irrigation, were less than 10 percent of the 84 million acre feet per year of surface water originating in the state. In 1970, the out-of-stream water use in million acre feet per year was estimated as follows:

Out-Of-Stream Water Use	Million Acre Feet Per Year	Percent
Irrigation	5.4	81%
Self-supplied Industry	0.8	12
Public Municipal and Industrial Supply	0.3	4
Rural Domestic and Livestock	0.2	3
Total	6.7	100%

SOURCE: Water Resources Research Institute, Oregon State University, Oregon's Water Resource: A Summary of Available Information (1977).

Water supply problems are compounded by numerous climatic conditions, including seasonal and cyclical variations in precipitation. Even though Oregon's annual water replenishment is substantial, the more arid portions of the state benefit from multi-year reservoir storage which saves water in wet years for use during dry years. In other locations, reservoirs are used to reduce flood hazards by capturing high flows in late fall and early winter and then promptly releasing the water to remain ready for the next high-flow period. Flood control reservoirs and other impoundments also commonly capture late winter and spring flows for release during the dry part of the annual rainfall cycle.

Released water serves many purposes in addition to out-of-stream uses. Released water helps maintain the fishery through improvement of water quality and quantity. Other major in-stream water uses are navigation and electric power generation.

The broadest element of water resource management is the allocation of the substantial but limited supply among power production, fishery enhancement, irrigation and, to some degree, navigation. The relatively small amount for public water supplies can be particularly critical, and localized shortages for this purpose do occur. The water resource is affected by interstate and international interests in the Columbia River basin.

The Water Policy Review Board is charged with the responsibility of formulating a coordinated, integrated state water resources policy. In discharging its responsibility, the Board has divided the state into 18 major river basins to address the state's diversity of water use, water needs, and water availability. Studies have been completed and water use programs have been adopted for 15 of the basins. The programs classify the waters for future beneficial needs. As a part of developing basin water use programs, the Water Policy Review Board has established minimum streamflows for protection of aquatic life that are considered as water rights in the distribution of water. Over 400 minimum streamflow locations have been established since 1955, offering substantial protection to instream values. In addition to the adopted programs, the director of the Water Resources Department issues water rights for beneficial use of water, without waste, under the 1909 Water Code. The Code is in conformance with the appropriative doctrine where water rights first-in-time are first-in-right. The state's management of its water resources is based on 75 years of statutory and case law.

Major water storage projects are normally financed by federal agencies, but the distribution and use of the stored water must comply with state law and the authorizing documents. The actual manipulation and use of the water resources is through somewhat-coordinanted but independent actions of various state, federal and local government agencies and of private individuals. The state Water Resources Department has loan funds for both irrigation and public water system projects.

Undergound aquifers are important sources of water for irrigation. In addition, about three-fourths of the public water systems with less than 1,000 connections and a smaller proportion of the larger systems depend on groundwater. The extent to which groundwater supply is threatened due to excess withdrawal is not known until a critical condition is discovered. There are five recognized areas of critical groundwater in the state where withdrawals are restricted under the management authority of the state Water Resources Department.

Major industries such as food- and wood-processing operations have in the past developed water supplies that are separate from public systems. However, except for some of the heavy water users, most industries are supplied by public systems, along with commercial and residential needs.

The following discussion of Oregon water infrastructure needs includes a brief review of agricultural water and a more extended summary of residential, commercial, and industrial supply furnished through public water supply systems.

Agricultural Water Supply and Revenue

Agricultural Water Supply

There are over 5 million acres in crop production and over 16 million acres that are potentially irrigable in Oregon. However, in 1979 only about 1,972,000 acres were being irrigated, using an estimated 2.5 acre feet of water per acre. New areas have been irrigated during the past ten years, generally as the result of individual decisions by private landowners, but, in contrast to earlier eras, there is no current significant public program that would substantially increase the number of irrigated acres in the state. Indeed, changes in power cost could cause some presently irrigated acres to become uneconomic. Some irrigation practices may be refined to improve the efficiency of water use. Some gravity irrigation channels with excess fall are being studied as locations for small hydroelectric generators, and their feasibility may encourage improvement of leaking dams and channels to preserve the maximum feasible flows.

Infrastructure in the form of irrigation dams, reservoirs and ditches has been developed mainly through federal and private investments, both of which are beyond the scope of this study. The major state role has been to provide loans from the proceeds of a bond issue approved in 1977. Local governments, primarily irrigation districts, function mainly to maintain facilities and to regulate the use of water.

In the case of groundwater source, no public facilities are involved. There are some recognized problem locations in the state where greater community action is needed to resolve irrigation needs. One area near Hermiston needs water to overcome shortages due to a depletion of groundwater supply. Affected landowners have not been able to agree on a solution, but an effective one probably requires diversion of water from the Columbia River.

There are no current state projections of public facility needs to respond to future agricultural water supply demand. As indicated, however, federal and private investments are often needed, and the repair and improvement of agricultural water supplies places a continuing responsibility on public agencies, particularly irrigation districts.

Agricultural Water Revenue

There is no projection of total revenue available to finance water needs. Federal funding data do not permit the convenient isolation of revenue for Oregon agricultural water supply. Congressional appropriations for Federal Bureau of Reclamation work in Oregon totaled $154 million between 1903 and 1980, of which $142 million went for construction. These funds make up the major part of the $141 million cost of Bureau of Reclamation investment now in Oregon.

Of this amount, $84 million is for irrigation and $5.3 million is multi-purpose, which includes an unspecified part for irrigation. An unspecified part of $37 million additional on which construction work is in progress is also for irrigation. Current information on local public funding, primarily through irrigation districts, is apparently not conveniently available from any central source. The U.S. Bureau of the Census quinquennial census of governments reports fiscal data for "irrigation and water conservation" districts in Oregon. However, the most recent data are for 1977.[1]

Agricultural Water Needs v. Revenue

Since there are no readily available, organized data giving quantitive indications of agricultural water needs or revenue, no evaluation of the adequacy of the present program can be made. Federal funds, primarily through the programs of the U.S. Bureau of Reclamation and the Soil Conservation Service, have had a significant impact by making more water available where it is needed for irrigation purposes. These programs are less active today than during earlier periods.

Municipal and Industrial Water Systems

While there have been three estimates of capital requirements for Oregon municipal and industrial water systems since 1976, none comprehensively covers investment needs. The studies are briefly summarized below.

IRD Study, 1980.--In 1980 the state Intergovernmental Relations Division (IRD) conducted a study of drinking water systems with the cooperation of Oregon counties. These systems also provide commercial and industrial water and a fire protection supply. The survey covered all systems serving the public. Under Oregon law, this includes all systems with four or more separate customers. There are more than 1,500 systems in the state. IRD estimated that the 995 systems that responded to the 1980 survey serve 1.3 million of the state's population. This compares with a state Health Division estimate of 2 million persons served by water systems. This indicates that the 1980 survey respondents not only represented 65 percent of the systems but also 65 percent of the population served by systems. As another indication of the percent coverage of the survey, the state Health Division has identified 842 water systems serving 15 to 15,000 connections. The 1980 study received 736 responses from systems of that size.

The 1980 survey asked for cost data under three headings, as shown in the following table.

1. Expenditure and revenue data for 1977 are as follows: total expenditure, $7,337,000; capital outlay, $2,658,000; total revenue, $7,400,000; tax revenue, $326,000.

Table 15

RESULTS OF IRD STUDY OF CAPITAL NEEDS OF OREGON DRINKING WATER SYSTEMS
(1980 dollars in millions)

Item	Number of Respondents Giving Cost Estimates	Cost
1. Improve the source or supply for the 20-year future	281	$583
2. Improve the source or supply for the present	348	329
3. Improve water quality	NA	526

SOURCE: Oregon Intergovernmental Relations Division.

In addition to the respondents giving cost estimates, another 349 described future needs, and 319 described current needs but did not estimate costs. The remainder did not respond to the need questions.

Overall, only 19 percent of the state's public water systems are included in the estimate of $583 million in year-2000 needs. Further, although the questions were intended to obtain data only on supply and quality needs, some respondents apparently considered distribution system needs as part of supply. Also, some respondents may have reported quality needs separately from supply or source needs, rather than considering quality needs as a portion of supply needs; others clearly did not. However, for purposes here, it is presumed that the three cost estimates of Table 15 are not additive; that is, items 2 and 3 are included with item 1.

Considering the underreporting and the lack of cost estimates for reported needs, it seems reasonable to conclude that $583 million ($685 million in 1982 dollars) is a very low indication of Oregon public water system needs to the year 2000. If the nonreporting systems had comparable needs, the total need would range from $3 to $4 billion. This level of need, however, does not account for the possibility that the systems that did report on the IRD survey may have included those with the greatest needs.

State Health Division Survey, 1976.--Based on a 1976 sample survey, the Oregon Health Division estimated that $108 million in water system improvements were necessary to overcome statewide deficiencies in the 842 water systems serving between 15 and 15,000 customers.[2] This amounts to about $176 million in 1982 dollars. In addition to

2. This excludes about six of the largest water systems in the state.

the incomplete coverage of systems, the Health Division estimate did not include certain needs, including those to accommodate community growth and development.

Oregon Water Resources Department Survey, 1982.--A 1982 survey by the Oregon Water Resources Department indicated that $45 million in water improvement projects were contemplated by 243 of 423 responding entities serving communities of less than 30,000 population. The survey was made in contemplation of a ballot measure making these entities eligible for state loans at low interest rates.[3]

Future Expenditures Based on Past Experience

The estimates of need available from the state agencies fall considerably below projections of future capital outlays, based on investments of past years. Expenditures of Oregon water utilities for 1957 to 1981 are shown in Table 16. The most significant entries are those reporting expenditures for capital outlay only. The other expenditures shown in Table 16 include operation and maintenance and interest payments on debt.[4]

Table 17 converts these reported expenditures to 1982 constant dollars and to per capita figures. Capital expenditures since 1972, expressed in 1982 dollars, have averaged $57 million per year or $23 per capita per year. An increased expenditure level, averaging $29 per capita, has been maintained over the last four years. If this latter per capita expenditure level continued for the next 19 years, expenditures would total $1.7 billion in 1982 dollars.

The $1.7 billion reflects only part of the total, since repair and replacement that are not included in capital outlay are not included in the figures above. The extent to which repair and replacement become necessary because of weaknesses in preventive maintenance is also unknown. Some of the repair and replacement need is met through operation and maintenance expenditures; the part that is not is deferred, and at least some of this eventually will become a future capital outlay need. The results of the IRD survey in 1980, noted above, also probably do not include any real measure of future capital needs that will result from the infrastructure deterioration that is occurring but has not yet been converted into a capital project.

Summary.--Public water system needs to the year 2000 may range from $3 to $4 billion. If capital expenditures during the 1981-2000 period approximated the same level as per capita capital outlays of 1978-1981, they would total $1.7 billion.

3. Oregon Water Resources Department news release, March 8, 1982.
4. Expenditures for principal payments on debt are excluded from Table 16 because the capital outlay amount includes the expenditure of borrowed money, and inclusion of principal payments would result in duplicate reporting.

Table 16

WATER UTILITY EXPENDITURES BY YEAR
Oregon Publicly Operated Systems
(current dollars, in millions)

Fiscal Year	Total Expenditures	Capital Outlay	Other
1957	$ 16.7	$ 7.5	$ 9.2
1962	25.3	11.5	13.8
1967	26.4	9.8	16.6
1972	41.7	15.1	26.6
1973	48.1	17.4	30.7
1974	60.6	28.1	32.5
1975	63.2	24.5	38.7
1976	74.3	32.8	41.5
1977	86.1	29.1	57.0
1978	97.8	40.0	57.8
1979	109.7	47.8	61.9
1980	153.6	82.6	71.0
1981	159.6	82.1	77.5

SOURCE: Data for 1957-1967, U.S. Bureau of the Census, Census of Governments; data for 1972-1982, U.S. Bureau of the Census, Governmental Finances in (year); and adjustments for errors in published data for 1977 and 1978.

Table 17

WATER UTILITY EXPENDITURES IN 1981 DOLLARS
Oregon Publicly Operated Systems
(1982 dollars -- millions and per capita)

Fiscal Year	Capital Outlay		Other	
	Amount	Per Capita	Amount	Per Capita
1957	$30.9	$18	$37.9	$22
1962	41.8	23	50.2	28
1967	30.1	15	50.9	25
1972	33.6	15	59.1	27
1973	36.2	16	64.0	29
1974	53.4	24	61.8	27
1975	42.5	18	67.1	29
1976	53.3	23	67.5	29
1977	44.2	18	86.5	36
1978	56.5	23	81.6	33
1979	62.3	24	80.7	32
1980	97.1	37	83.4	32
1981	87.8	33	82.9	31

NOTE: See Appendix A for price deflator and population data.

Water Utility Revenue

There is a scarcity of compiled information on water utility revenue. While U.S. Census Bureau reports provide a breakdown of expenditure data, revenue is reported in total.[5] As noted above, however, extension of past capital expenditure data from the Census Bureau to the year 2000 indicates potential revenue of $1.7 billion.

Based on data from individual water systems, Oregon water districts are largely self-supporting from water sales, interest income, and other operating revenue. Relatively little revenue is derived from property taxes or general fund sources in the case of cities or counties. However, cities make extensive use of special assessments to finance local water facilities, and a number of Oregon cities have enacted special development charges on new construction, which are used to finance water systems.

Municipal and industrial water systems have competed for certain federal grants, such as those under HUD and FmHA programs. The HUD Community Development Block Grant program is perhaps the most significant federal grant source presently channeling funds into water system improvements. Large jurisdictions receive entitlement allocations from the CDBG source, and use of these revenues for water system expenditures is at the discretion of individual jurisdictions. Nonentitlement jurisdictions may submit proposals for Community Development Block Grants, and many water system improvements have received favorable consideration. Applications for 1982-83 funds included $12.5 million in water project requests from 31 Oregon jurisdictions as part of $36 million in total grant requests.[6] Of the $4.8 million in available grant funds, water related projects received one-half, or $2.4 million. These federal grant sources are relatively insignificant compared to federal investments in transportation and sewerage.

Needs v. Resources

Based on the highly tenuous estimates noted above, needs during the 1981-2000 period range from $1.7 billion to $3 to $4 billion, while resources (based on past experience) are assumed to total about $1.7 billion. From all indications, extension of the past level of effort (the $1.7 billion figure) probably would not meet all the important needs of Oregon's public water systems. A particular quality need that adds an increment of need is the treatment of surface water supply to respond to the EPA-established turbidity standards. The future expenditure level probably does not reflect the costs associated with the level of turbidity correction.

5. The exception is the Census of Governments, Finances of Special Districts, which reports total revenue and tax revenue of water districts.
6. Grant requests are no indication of need. When the amount of grant funds is substantially below the demand, only a portion of the jurisdictions with projects that could be eligible will submit applications.

In the case of both agricultural and municipal water, until there is some estimate of water system needs other than those estimates now available, there is no way to quantify the water systems' need for new and replacement facilities. It is not clear whether a continuation of recent water system capital expenditure levels will address the state's water system needs. Further, if recent changes in federal programs are assumed to reflect the trend in federal assistance, the recent expenditure levels can continue only if state or local sources provide some increase in revenue. The state loan program helps by providing a more favorable interest rate on state bonds.

VIII. WATER TRANSPORT AND TERMINALS

Background

There are twenty-three port districts in the state of Oregon -- fourteen are on the coast, three are on the lower Columbia River (below Portland), and six are on the mid-Columbia River. Of these, thirteen can accommodate only shallow draft shipping (under 22 feet), and four (Coos Bay, Newport, Astoria and Portland) can accommodate deep draft vessels. The remaining ports do not have any marine terminal facilities.

These ports engage in a wide variety of activities, including building and operating marine terminals and associated backup facilities (warehouses, storage, and special equipment), dry docking and ship repair, construction, operation of pleasure boat marinas and commercial fishing moorage, industrial land development, parks and recreation development and maintenance, and development and operation of airports.

For this study, only those activities involving capital expenditures for water transport and terminals were included in the summary of infrastructure needs. Dredging and jetty construction by the U.S. Army Corps of Engineers were excluded.

Estimates of capital needs and revenue for ports with these activities were obtained by interviews with managers or representatives of individual port districts. Except for the Port of Portland,[1] there are no formal studies or published reports that comprehensively estimate or project port development needs to the year 2000.

Investment Needs

Based on the interviews conducted, projected capital investment needs for the deep draft ports are $366 million -- Portland, $289 million; Astoria, $64 million; Newport, $13 million. The needs of the Port of Coos Bay are primarily for industrial land development, and significant investments in marine terminal facilities are not anticipated.

The estimated future needs for capital improvements of shallow draft port facilities vary from $0.1 million to $2.5 million. If an average of $1.5 million per port is assumed, a total of approximately $20 million in capital improvements may be estimated for these facilities by the year 2000.

1. Port of Portland, Marine Terminals Master Plan, Report of the Citizen's Task Force, Recommendations for year 2000 development (Portland, 1982).

Revenue

In the past, no federal or state funds have been available to port districts for capital costs of marine terminals, and none are currently projected for the future. Principal sources of revenue for these types of improvements by local port districts are charges to users, private investment for special purpose facilities (grain elevators, petroleum storage, log chippers, etc.) on port property, transfers from other port activities, and property taxes.

The Port of Portland estimates that in the next twenty years the needed capital improvement revenue can be provided through private financing, user charges, revenue from other activities, and property taxes. The ports of Astoria and Newport estimate that all projected future revenue will be needed for maintenance and operation of existing facilities and for debt payment.

In general, the shallow draft ports do not anticipate that future revenue will exceed the cost of operation and maintenance by any significant amount.

Need v. Revenue

It appears that in the next twenty years the Port of Portland will be able to finance its projected capital improvement needs from current revenue. However, a shortfall of approximately $85 to $110 million for the twenty-year period in 1982 dollars is indicated for marine terminal expansion and replacement at other Oregon ports.

IX. CONCLUSION

The main object of this study has been to identify the available information on Oregon's long-range infrastructure needs and resources and, secondarily, to summarize the overall needs and resources based on whatever information was available. The summary of data is presented in Table 3 in chapter I. The estimates indicate only the range of gross needs, as is acknowledged in this concluding chapter.

If current, comprehensive data on infrastructure condition and need were available, state and local governments could gain a reasonably accurate impression of future capital requirements and their relative importance among levels of government and among the various public functions. With such information, fiscal policy could be established and priorities determined.

Such information is not available for Oregon. Although several agencies maintain data bases and may have a good "feel" for needs and resources within their respective functional areas, there is both a lack of statewide data and a lack of statewide commonality of terms and concepts regarding infrastructure needs. As was pointed out in chapter I, an adequate estimate of future capital needs would require resolution of such conceptual issues as the five types of need discussed on pages 6-7 and the levels of analysis discussed on page 8. There is a lack of clarity and consistency regarding these issues among the Oregon estimates that are available. For example, estimates of future highway needs assume continuation of an undefined level of deterioration for a portion of the state highways, and the most recent and comprehensive data on municipal and industrial water needs do not clearly distinguish supply system needs from distribution system needs, nor water quality improvement from water supply improvement.

In addition to these problems there is a lack of standardization of forecast dates and of assumptions regarding inflation rates and future population levels.

Of the infrastructure types that were studied, the only current comprehensive estimate of state and local needs on a long-range basis has been prepared for airports. Good information and long-range projections are available for the state highway system, but the state has not dealt with the road needs of local government, and local governments have only fragmentary data. A long-range estimate of sewerage needs is available from the U.S. Environmental Protection Agency, but the data are not comprehensive; that is, data are lacking for collection system extensions, storm sewer extensions, etc. The state has prepared short-range estimates of need for small transit systems, and longer-range estimates are available from two of the three metropolitan transit districts, but no statewide overview of needs for mass transit systems is available. There is no information

from a central source on the infrastructure needs for solid waste, water transportation and terminals, or agricultural water. The needs estimate for municipal-industrial water systems is incomplete.

Estimates of future revenue to finance the needs are generally lacking for all functions. Airport revenue from the federal government is estimated on a short-range basis and state revenue on a 10-year basis. A few, mainly short-range, estimates of local airport revenue are available from local governments. Revenue projections have been prepared for state highways and county roads, but not for local streets. Except for transit data available from Tri-Met, revenue data are entirely lacking for the other services.

In addition to the lack of estimates of future needs and resources, there is an absence of data on past and current capital outlays for certain functions. The U.S. Bureau of the Census releases annual estimates of capital outlays for highways, sewerage, and water supply systems.[1] In addition, the Oregon Department of Transportation collects comprehensive data for state and local highway expenditures. There is no annual, central source for capital outlays of mass transit, airports, water transportation and terminals, agricultural water, or solid waste disposal systems.[2]

These deficiencies merely bear witness to the fact that Oregon has never fixed responsiblity in any single agency for development of statewide demographic, economic and social data that could support the functional planning activities of the various agencies. As things stand, each agency and each local government must generate its own data base on an as-needed basis as specific occasions arise, and it is not surprising that there are gaps, inconsistencies and, most likely, errors in the data that do exist in the scattered agencies and local government units.

There have been some past efforts to address this problem, but they have for the most part fallen by the wayside. In 1968 there was an ad hoc interagency State Statistical Standardization Committee that completed a comprehensive inventory of the types of data collected and published by state agencies, but it ceased to function as various members left state employment. In 1977 the Program Advisory Panel of the Bureau of Governmental Research and Service proposed to the governor that a system of state agency data management be established,

1. U.S. Bureau of the Census, Governmental Finances in (year) (Washington, D.C.: USGPO). The reports also include data for education, health and hospitals, and electric and transit utilities, combined. The Oregon data for cities (starting in fiscal 1981) and counties (starting in fiscal 1982) have been cooperatively developed by the Bureau of the Census and the Bureau of Governmental Research and Service, University of Oregon.
2. However, city and county data for certain of these functions have been collected by the Bureau of Governmental Research and Service. Refer to footnote 1.

but the proposal was never implemented. There is at the present time an Oregon Data Center, a consortium of four agencies (Intergovernmental Relations Division, Office of Population Research and Census, Bureau of Governmental Research and Service, and the State Library), but its functions are limited to dissemination of Census data, and the funding it formerly received from the Northwest Regional Council has been discontinued.

A publication of the Council of State Governments provides the following description of Wisconsins's central data program, and it may be taken as an illustration of the type of program that could remedy some of the deficiencies encountered in this study.

> The Wisconsin system is operated by the Management Information Unit (MIU) of the State Bureau of Planning and Budget within the Department of Administration. By statute the MIU is required to '. . . collect, analyze, interpret, and in cooperation with the other agencies, maintain the comprehensive data needs for effective state agency planning and effective review of those plans by the Governor and the legislature . . . and . . . periodically make population estimates and projections. . . .' Thus, the MIU mission has been interpreted as the design, development, implementation, and maintenance of an information system useful for state government planning, budgeting, and management.
>
> The primary functional elements of the Wisconsin information system are demographic, socioeconomic, housing, and land use. The support elements are the census clearinghouse data and statistical processing.
>
> The demographic element consists primarily of population estimates, population projections and population studies. The most significant for planning is the biennial population projections by age and sex for all counties, generally for a period of some twenty years into the future. The projections are used by state agencies for state planning and budgeting, by regional and county planning groups and by a wide variety of other public and private agencies. Short term projections are also made for various purposes including the determination of shared tax payments to local governments. Other activities include detailed population studies such as analysis of special census results, migration, population trends, annexations, population characteristics, and the needs for special enumerations.

> The socioeconomic component consists basically of the assimilation of pertinent data and statistics from Federal, state, local, and private sources; the transformation of such data into more usable information; and, its dissemination to users. This also includes the design, conduct, and reporting of special analyses and studies such as state revenue data, migration, and economic development in support of state planning, budgeting, and management.
>
> The housing element consists of housing needs studies, market analysis, allocation policy development, and housing survey development. The land use element is not yet completed.
>
> The Census Clearinghouse element consists of accumulating and disseminating census data in useful form to state agencies, regional and local agencies, legislators, and other users. The statistical processing element consists of computer programs and associated procedures and talents necessary to provide data processing support to all elements of the Wisconsin system.[3]

Beyond the apparent need to support state agency and local government planning with some kind of central data coordination and projection program lies a related question of Oregon's lack of a central state planning agency. While state planning takes a variety of forms in different states, and it is difficult to determine with certainty whether some states would or would not be regarded as having a central planning activity, it appears that Oregon is one of only about six states that do not have a central planning capability of some kind -- the others being Arkansas, Illinois, Nevada, Ohio and, perhaps, Washington.[4] The Intergovernmental Relations Division and the Department of Land Conservation and Development are sometimes identified as Oregon's state planning agencies, but IRD clearly has no formal mandate or program for statewide planning, and DLCD's role is to attempt to conform agency functional planning to city and county comprehensive planning, not to serve as a state planning agency.

A history of state planning in Oregon, prepared by the Bureau of Governmental Research and Service in 1974,[5] indicates that while

3. Council of State Governments, State Planning: Intergovernmental Policy Coordination (Lexington, 1976), pp. 37-38.
4. Bert Wakeley, Associate Director for Executive Management, Council of State Planning Agencies, telephone conversation with the author, April 12, 1983.
5. Bureau of Governmental Research and Service, University of Oregon, Oregon State Government Policies: The Quest for Coordination (Eugene, August 1974), pp. 145-225.

several starts have been made over the years, Oregon has not succeeded in establishing an effective central state planning activity since the State Planning Board which functioned from 1935 to 1939. During those four years, a substantial data base was developed, a rudimentary state comprehensive plan was prepared,[6] and the basic analysis was developed to support the Willamette River flood control system; multiple use-sustained yield forest management programs; range conservation; water pollution control; and Columbia River power development.

Perhaps economic exigency will stimulate interest in state planning in the 1980s as it did in the 1930s. HB 2738 in the current legislative session would establish an "Executive Council for Infrastructure Management and Development." The Council would be directed to develop state infrastructure priorities and report annually to the Legislative Assembly on related economic and financial matters. This would not be a central state planning agency as that term is commonly used, but it would perform some of the functions of such an agency.

6. Oregon State Planning Board, Oregon Looks Ahead (Salem, 1938), 100 pp.

APPENDIX A

U.S. IMPLICIT PRICE DEFLATOR AND OREGON POPULATION
1957-1982

As is noted in the text, trends of capital outlay during past years have been used as one indication of future infrastructure revenue for certain of the governmental functions. For that purpose, past and future outlays have been converted to per capita, 1982 dollars. The population and price deflators used in those calculations are as follows:

Year	Implicit Price Deflator* 1972=100	1982=100	Population (million)
1957	54.0	24.3	1.737
1962	61.1	27.5	1.825
1967	72.5	32.6	2.006
1972	100.0	45.0	2.183
1973	106.7	48.0	2.225
1974	116.8	52.6	2.266
1975	128.2	57.7	2.299
1976	136.6	61.5	2.342
1977	146.3	65.9	2.396
1978	157.3	70.8	2.472
1979	170.4	76.7	2.544
1980	189.2	85.1	2.633
1981	207.9	93.5	2.660
1982	222.3	100.0	2.656

* Price deflator for government purchases of goods and services.

SOURCE: Implicit price deflator (1972=100), U.S. Bureau of Economic Analysis, Survey of Current Business (October 1982 and February 1983). Population, Center for Population Research and Census, Portland State University.

BIBLIOGRAPHY

GENERAL ECONOMIC AND POPULATION DATA

Center for Population Research and Census, Portland State University. Population Estimates of Oregon Counties and Incorporated Cities, July 1, 1982, and revisions for previous years. Portland, December 31, 1982.

League of Oregon Cities. Managing and Financing Growth. Salem, August 1982.

Oregon Department of Energy. Seventh Annual Report. Salem, January 1983.

Oregon Employment Division. Oregon Labor Trends. Salem, various dates.

Oregon Executive Department. Annual Financial Report For the Year Ended June 30, 1982. Salem.

_____. Oregon Economic and Revenues Forecast. Salem, March 1983.

Oregon 2000 Commission. The Challenges and Costs of Rapid Population Growth. Salem, no date.

U.S. Bureau of Economic Analysis. Survey of Current Business, "State Personal Income, 1929-81: Revised Estimates," August 1982; "Summary National Income and Produce Series," (implicit price deflators) October 1982.

HISTORICAL DATA ON CAPITAL OUTLAYS

Bureau of Governmental Research and Service, University of Oregon. Financial Data For 132 Oregon Cities, Fiscal 1981. Eugene, June 1982.

_____. "Financial Data For Oregon Cities and Counties, Fiscal 1982." Unpublished.

Oregon Department of Transportation. Oregon City Street Financial Report. Salem, various years.

_____. Oregon County Roads Financial Report. Salem, various years.

Oregon Executive Department. Oregon's Recommended Budget, 1983-1985 and previous years. Salem.

U.S. Bureau of the Census. Census of Governments, "Governmental Finances," 1957, 1962, 1967, 1972, 1977. Washington: USGPO, various dates.

_____. Governmental Finances in (year), annual. Washington: USGPO, various dates.

_____. State Government Finances in (year), annual. Washington: USGPO, various dates.

AIRPORTS

Oregon Department of Transportation, Aeronautics Division. Oregon Aviation Plan, Vol. III, System Requirements; Vol. V, Action Program; Vol. VII, Commuter Air Service Needs. Study prepared for Federal Aviation Administration and the Oregon Department of Transportation by Marjorie Hanley and Associates and Oregon Study Team. Salem, 1983.

TRAFFICWAYS

City of Salem. Proposed Comprehensive Capital Improvement Program. Salem, January 3, 1983

Lane Council of Governments. Transportation Improvement Program: Eugene-Springfield Area, FY 1980-81 to FY 1984-85. Eugene, adopted October 30, 1980.

_____. Transportation Improvement Program: Eugene-Springfield Area, FY 1982-83 to FY 1986-87. Eugene, adopted Sept. 16, 1982.

_____. Eugene-Springfield Area 2000 Transportation Plan. December, 1978.

Metropolitan Service District. Transportation Improvement Program For the Portland Urbanized Area: Fiscal Years 1983-Post 1986. Portland, October 1982.

_____. Regional Transportation Plan For the Portland Metropolitan Area. Portland, adopted July 1982.

Oregon Department of Transportation. Six Year Highway Improvement Program: Fiscal Years 1982-1987. Salem, adopted January 1982.

_____. State Highway System Preservation Report. Salem, January 1983.

_____. Motor Vehicle Cost Responsibility Study 1980: Final Report. Prepared for the Sixty-First Legislative Assembly of the State of Oregon. Salem, March 1981.

_____. "Perspective on Funding Oregon's Highway Program," Salem, September 1982.

Oregon Highway Division. Highway Fiscal and Statistical Data, 23rd ed. Salem, October 1982.

_____. Tables on highway finance prepared for state legislature. Salem, January 3, 1982.

WATER TRANSPORT AND TERMINALS

Ogden Beeman and Associates in association with Manalytics, Inc. and Benkendorf Evans, Ltd. Oregon Ports Study, 1980: Final Report. No date.

Odgen Beeman and Associates and Port of Portland. Columbia/Snake River System Ports Development Planning Study. Action Plan, July 1982, and River System Potential, March 1982. Portland.

Port of Portland. Marine Terminals Master Plan. Report of the Citizen's Task Force. Recommendations for Year 2000 Development. Portland, 1982.

_____. Annual Report, 1980-81, 1981; and Annual Report 1981-82, 1982. Portland

SEWERAGE

Oregon Department of Environmental Quality. Water Quality Control in Oregon. Portland, April 1975.

_____. Water Quality in Oregon. Portland, 1980.

Pacific Economica, Inc. Sewage Treatment and Solid Waste Disposal Facility Financing Study. Prepared for the Oregon Department of Environmental Quality. May 1981.

U.S. Environmental Protection Agency. Cost Estimates for Construction of Publicly Owned Wastewater Treatment Facilities: 1982 Needs Survey.

SOLID WASTE

Oregon Department of Environmental Quality. Oregon Solid Waste Management Status Report. Portland, 1979.

_____. 1980 Accomplishments in Solid Waste Management. Portland, 1981.

_____. Managing Solid Waste in Oregon. Portland, 1981.

Pacific Economica, Inc. Sewage Treatment and Solid Waste Disposal Facility Financing Study. Prepared for the Oregon Department of Environmental Quality. May 1981.

MASS TRANSIT

Lane Council of Governments. Transportation Improvement Program: Eugene-Springfield Area, FY 1980-81 to FY 1984-85. Eugene, adopted October 30, 1980.

_____. Transportation Improvement Program: Eugene-Springfield Area, FY 1982-83 to FY 1986-87. Eugene, adopted September 16, 1982.

_____. Eugene-Springfield Area 2000 Transportation Plan. December 1978.

Metropolitan Service District. Transportation Improvement Program For the Portland Urbanized Area: Fiscal Years 1983-Post 1986. Portland, October 1982.

_____. Regional Transportation Plan For the Portland Metropolitan Area. Portland, adopted July 1982.

Oregon Department of Transportation, Public Transit Division. Public Transportation in Oregon, 1979-1980. Salem.

Oregon Department of Transportation, Policy and Planning section and Public Transit Division. Oregon Transit Plan. Technical Report on Small City and Rural Transit Systems. Salem, 1983.

WATER SYSTEMS

Oregon Health Division. The Oregon Drinking Water Program. Portland 1982.

Oregon Intergovernmental Relations Division. SB 288 Drinking Water System Assessment. Salem, June 1980.

Water Resources Research Institute, Oregon State University. Oregon's Water Resource: A summary of Available Information. Corvallis, 1977.