

Research Report

Socio-Economic Characteristics for the Allocation of Transportation Resources

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In cooperation with
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16. Abstract The Transportation Resource Allocation Index (TRAI) for eight transportation service proposals was computed as a pilot study and as a working test of the techniques in the Tri-Cities area of Richland, Kennewick and Pasco, Washington. This Report II contains background data covering the economic characteristics of the area. These data were used for the development of the evaluation technique.			
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**An Analysis of the
Socio-Economic Characteristics of the Study Area,
In Relation to Transportation Demand
for
A Study of the Allocation of Transportation Resources**

Prepared by

Economic Section
Public Transportation and Planning Division
Washington State Department of Transportation

In Cooperation with U.S. Department of Transportation
Federal Highway Administration

The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of Washington, Department of Transportation. This report does not constitute a standard, specification, or regulation.

The population and employment forecasts for this study were estimated prior to the WPPSS 1 and 4 shut downs in 1982. However, the techniques suggested for the allocation process are still valid and applicable.

AN ANALYSIS OF THE SOCIO-ECONOMIC CHARACTERISTICS
OF THE SUDY AREA IN RELATION TO TRANSPORTATION DEMAND
FOR THE TRANSPORTATION RESOURCE ALLOCATION

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INTRODUCTION

This report contains an analysis of the socio-economic characteristics of the area, with forecasts to the year 2000 for population and employment. These were developed for the study as background information before the 1982 changes occurred as a result of the WPPSS 1 and 4 shut-down. However, these data still served the purpose of the study in developing the evaluation technique.

I. THE STUDY AREA ECONOMY

Description of the Area

The Washington State Department of Employment Security, Annual Planning Report 1980, Richland-Kennewick-Pasco SMSA, July 1, describes the area as follows:

"Located in the South Central part of Washington State the Richland-Kennewick-Pasco area comprises the combined counties of Benton and Franklin. The two counties cover 2,972 square miles or 4.5 percent of the state's total land area. The land is characterized by rolling desert hills intersected by three utilitarian rivers. The Columbia and Snake Rivers are the prominent geographical formations and four multi-purpose dams the McNary, Lower Monumental, Ice Harbor and the Priest Rapids service the area as well as the state.

An array of transportation modes facilitates travel and the marketing of goods within the two counties. A network of State (240) and U.S. Highways (12 and 395) connect the area with major metropolitan areas in Washington and Oregon. Three transcontinental railroads serve the area: the Amtrak system, Burlington Northern and Union Pacific. Commercial air-travel is supplied through the Tri-Cities Airport in Pasco and the Richland Airport. Local airfields in Kennewick, Prosser and Connell service the needs of business and private aircraft. Slack-water navigation on the Columbia and Snake Rivers is another alternative and two common barge carriers have daily schedules between inland ports and tidewaters."

What this official State document fails to mention is the uniqueness of the two county area and its near desert economy in many subregions along with its outstanding supply of surface waters. It was these resources which probably triggered the Government's selection of the area as the best location of a then beginning atomic weapons fuel production facility in early 1943. And it was this same beginning and mix of resources that brought a new kind of economy to the area and provided the physical basis and reasons for what exists there today.

The Study Area Economic Base

The two county Tri-City or SMSA is probably best recognized for its nuclear related activity and "atomic works" which to many observers represents a very mysterious and sinister operation, justified only by a few peaceful adaptations. Admittedly the nuclear related activities have dominated the SMSA economic profile and probably will continue to do but at a lesser level and broader scope. Activities will still be more energy associated with nuclear developments a heavy contributor to the economy of the area.

What is usually and handily referred to as the "Hanford Nuclear Complex" is really a multi-varied mix of industrial activity considerably different in character and scope. Concentrated in a 570 square mile area whose southern boundary is only a few miles north of the city of Richland, this "nuclear complex" includes operation of the vast scientific laboratory facilities, nuclear waste handling and processing, chemical and byproduct processing, supplying of extensive technical and testing services, energy related research services, reservation housekeeping and supporting chores and finally operation of the N Reactor for the steam generation of electric energy. Added to these direct reservation activities is WPPSS ongoing construction of three nuclear reactors, DOE and Westinghouse Fast Fuel Test Reactor construction and operation, Exxon with its fuels and laser beam adaptations, plus a second fringe of supporting engineering, research and technical service providers adjacent to but outside the Reservation Area proper.

The complex began in the early 1940's as a producer of weapons materials. At one time there were seven reactors producing weapons fuels. These were slowly phased out over the years with the last one shut down in the early 1960s. The N Reactor

was the last one constructed and came on line in 1965. This was a dual purpose facility which produced both fuels for weapons and steam for generating electric energy. While no longer producing weapons materials, this reactor is still operating and one of the major sources of thermal energy in the Pacific Northwest. All of these facilities were taken over by private contractors in the mid-1960s. For example, Battelle took over the laboratories, Douglas the waste handling and processing (now Rockwell), United Nuclear the N Reactor, etc.

All government housing and commercial facilities were sold to the public at the same time, changing Richland from a "government town" to an almost typical Washington State community. DOE still maintains a large administrative staff serving the Government's remaining involvement in the area and the ongoing contracts with the private operators of the facilities (such as Battelle's operation of the government laboratory facilities).

Because the U.S. Bureau of Census Standard Industrial Classification (SIC) system provides a convenient and well definable structure for assessing (and explaining) Study Area economic base and growth prospects, it provides the framework for the following industry/economic evaluations. While other economic indicators are sometimes used in regional economic analyses, employment is the most preferred and used. Employment data are regularly available and consistent, with helpful benchmarks or revisions developed from time to time by a variety of governmental (and nongovernmental offices) agencies. Official employment data are typically available by SIC sectors and as well as county levels and some subregional distributions. Therefore, for these reasons and others, employment has been taken as the representative of economic events in this area.

Employment indicators show that the Tri-City SMSA economy was a strong and expanding one with total employment doubling over the 70-80 decade. Table E1 summarizes employment developments in the Tri-City SMSA (Benton-Franklin Counties) in terms of wage and salary workers by total and major industrial classifications on an average annual basis for each of the ten years covered. In addition to presenting each year's annual average employment for each of the major industry sectors, the table also contains a computed yearly index with 1970 as a common base. That the area has experienced outstandingly rapid employment

growth in most of the industry sectors over the 10 years is well documented by these statistics. The industry sector 10 year growth rates reflected by these indices range from a low of 34 percent for the classifications of transportation, communication and public utilities to a high of 511 percent for construction. At the same time, total employment was rising at a ten year rate of 106 percent. (Note, 10 year growth trends are analyzed in greater detail in a later chapter.)

In addition to wage and salary workers, agriculture contributes substantially to the area's economic activity with 1.3 million acres under cultivation, a fourth of which is irrigated lands. Crop production in 1978 totaled \$219 million. Agriculture employment has been holding relatively steady and in 1980 was estimated to be about 4000. Self employment was reported to be about 4,400 in 1980. This activity contributes significantly to the areas economic base.

The strength reflected in the areas economic base and the growth rates shown in Table E1 appear to be a plus characteristic for the SMSA. However, such an optimistic conclusion may not be without some uncertainty given the somewhat unusual "mix" and concentration of economic activity typical of this area.

Table E2 and Chart E1 compare the SMSA with the State for both 1970 and 1979 (latest full year available). Chart E1 is the graphic version of Table E2 data. Table E3 compares the State and SMSA shifts in industry rankings over the decade. There appear to be substantial differences between the two economies and their mix of industries which could be reflected by differences in transportation system need.

As shown by both the table and chart, Statewide government related employment was the number one contributor to work force by accounting for nearly a quarter of all employment in 1979 as it had in 1970. For the SMSA, however, government employment ranked in fourth position for both periods even though the industry sector noted an 81 percent increase over the nine years while its percent share was falling from 19 percent to 16.6 percent.

The finding that the SMSA, Government sector did not make a stronger contribution to the areas 1979 economic patterns is somewhat surprising especially

TABLE E1

STUDY AREA* NONAGRICULTURAL WAGE AND SALARY WORKERS

By Major Industry Sector

INDUSTRY SECTOR	YEARLY AVERAGE											
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	
Total Employment	28,890	28,240	29,130	30,580	33,810	37,910	41,080	47,360	53,770	59,510	61,130	
Employment Index	100.0	97.8	100.8	105.8	117.2	131.2	142.2	163.9	191.0	206.0	212.0	
Total Manufacturing	5,530	5,250	5,340	5,700	6,090	6,920	7,310	8,040	8,930	9,350	9,440	
Employment Index	100.0	94.9	96.6	103.1	110.1	125.1	132.2	145.4	161.5	169.1	170.7	
Food and Kindred Products	1,570	1,700	1,590	1,880	1,850	2,050	2,300	2,300	2,540	2,500	2,540	
Employment Index	100.0	108.3	101.3	119.8	117.8	130.1	146.5	146.5	161.9	159.2	161.8	
Printing and Publishing	360	330	370	410	440	490	470	510	530	450	410	
Employment Index	100.0	91.7	102.3	113.9	122.2	136.1	130.6	141.7	147.2	125.0	113.8	
Chemicals	3,110	2,710	2,830	2,720	3,030	3,390	3,540	4,180	4,760	5,280	5,420	
Employment Index	100.0	87.1	91.0	87.5	97.4	109.0	113.8	134.4	153.1	169.8	174.3	
Stone, Clay, Glass	60	60	60	70	80	80	-	-	160	170	-	
Employment Index	100.0	100.0	100.0	116.7	133.3	133.3	-	-	-	-	-	
Primary and Fabricated Metals	140	150	260	320	390	600	460	360	330	310	280	
Employment Index	100.0	107.1	185.7	228.6	278.6	428.6	328.6	257.1	235.7	221.4	200.0	
Other Manufacturing	290	300	230	300	300	310	540	690	610	640	670	
Employment Index	100.0	103.5	79.3	103.5	103.5	106.9	186.2	237.9	210.3	220.7	213.8	
Construction	1,700	1,630	2,310	3,090	3,960	5,390	5,330	7,400	9,810	10,400	10,370	
Employment Index	100.0	95.9	135.9	181.8	232.9	317.1	313.5	435.3	577.1	611.8	610.0	
Transportation, Comm. and Utilities	1,820	1,850	1,810	1,800	1,780	1,740	1,890	2,010	2,340	2,440	2,430	
Employment Index	100.0	101.7	99.5	98.9	97.8	95.6	103.9	110.4	128.6	134.1	133.5	
Wholesale and Retail Trade	5,570	5,650	5,850	6,110	6,470	6,990	8,080	9,040	10,460	11,400	12,050	
Employment Index	100.0	101.4	105.03	109.7	116.2	125.5	145.1	162.3	187.8	204.7	216.3	
Finance, Insurance and Real Estate	680	700	830	870	970	930	1,090	1,330	1,480	1,680	1,820	
Employment Index	100.0	102.9	122.1	127.9	139.7	136.8	160.3	195.6	217.7	247.1	267.6	
Service	7,990	7,560	7,390	7,520	8,670	9,590	10,590	12,010	13,560	14,310	14,580	
Employment Index	100.0	94.6	92.5	94.1	108.5	120.0	132.5	150.31	169.8	179.1	182.4	
Government	5,450	5,430	5,380	5,310	5,720	6,280	6,770	7,470	8,520	9,860	10,370	
Employment Index	100.0	99.7	98.7	97.4	105.0	115.2	124.2	137.1	157.3	180.9	190.3	

SOURCE: STATE OF WASHINGTON EMPLOYMENT SECURITY DEPARTMENT

* Benton and Franklin Counties which make up the Tri-Cities Standard Metropolitan Statistical Area (SMSA).

The strength reflected in the areas economic base and the growth rates shown in Table E1 appear to be a plus characteristic for the SMSA. However, such an optimistic conclusion may not be without some uncertainty given the somewhat unusual "mix" and concentration of economic activity typical of this area. (Chart E1) At the same time, and quite oppositely, this unique "mix" of industry sectors and resulting economic activity could be the basis for the generation of economic well being and transportation needs greater than that implied in the statistics themselves.

Table E2 and Chart E1 compare the SMSA with the State for both 1970 and 1979 (latest full year available). Chart E1 is the graphic version of Table E2 data. Table E3 compares the State and SMSA shifts in industry rankings over the decade. There appear to be substantial differences between the two economies and their mix of industries which could be reflected by differences in transportation system need.

As shown by both the table and chart, Statewide government related employment was the number one contributor to work force by accounting for nearly a quarter of all employment in 1979 as it had in 1970. For the SMSA, however, government employment ranked in fourth position for both periods even though the industry sector noted an 81 percent increase over the nine years while its percent share was falling from 19 percent to 16.6 percent.

The finding that the SMSA, Government sector did not make a stronger contribution to the areas 1979 economic patterns is somewhat surprising especially since all Washington Public Power Supply System employment is credited to government rather than the category of transportation, public utility and communication. (This assignment of industry classification stems from the

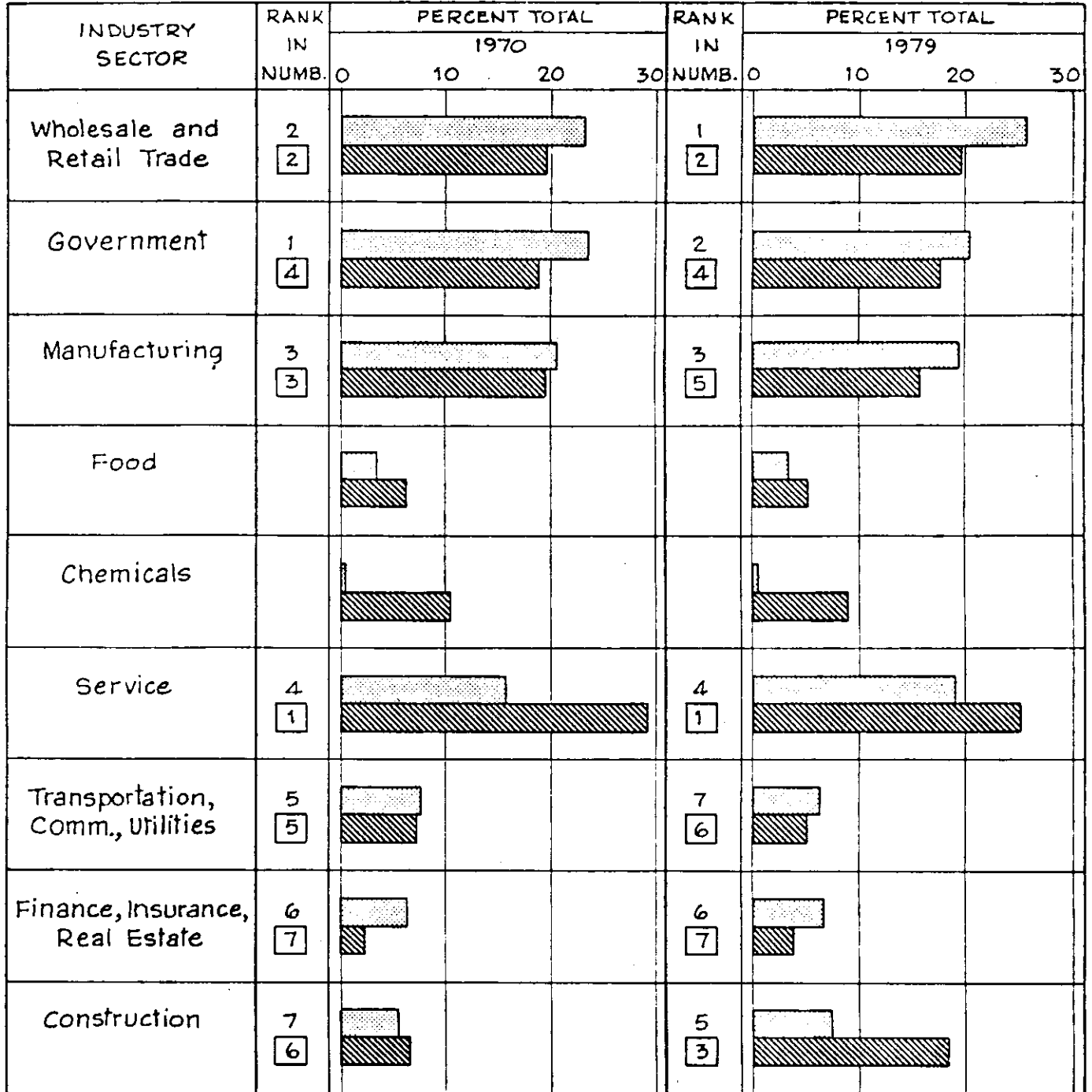
TABLE E-2

COMPARISON OF STATE AND STUDY AREA EMPLOYMENT PROFILES
1970 - 1979
By Major Industry Classification

INDUSTRY CLASSIFICATION	1970		1979		Percent Change
	Employment	Percent Share	Employment	Percent Share	1970-1979
Total Employment					
State	1,060,900	100.0	1,616,000	100.00	52.3
Study Area	28,890	100.0	59,510	100.0	106.0
Manufacturing					
State	217,400	20.5	309,200	19.1	42.2
Study Area	5,530	19.1	9,350	15.7	69.1
Food Products					
State	37,400	3.5	37,800	2.3	1.1
Study Area	1,570	5.4	2,500	4.2	59.2
Chemicals					
State	5,700	0.5	8,600	0.5	50.900
Study Area	3,110	10.8	5,280	8.9	69.8
Stone, Glass, Clay					
State	5,400	0.5	7,000	0.4	24.0
Study Area	60	0.2	170	0.3	183.3
Primary & Fabricated Metal					
State	20,300	1.9	39,900	2.5	96.6
Study Area	140	2.5	310	0.5	121.4
Other Manufacturing	—	—	—	—	—
Construction					
State	49,000	4.6	99,800	6.2	103.7
Study Area	1,700	5.9	10,400	17.5	511.8
Transportation Comm., Utilities					
State	69,900	6.6	89,100	5.5	27.5
Study Area	1,820	6.3	2,440	4.1	34.1
Wholesale and Retail Trade					
State	246,800	23.3	399,400	24.7	61.8
Study Area	5,570	19.3	11,400	19.2	104.7
Finance Insurance & Real Estate					
State	57,300	5.4	92,400	5.7	61.3
Study Area	680	2.4	1,680	2.8	147.1
Services					
State	167,600	15.8	297,000	18.4	77.2
Study Area	7,990	27.7	14,310	24.1	79.1
Government					
State	251,400	23.7	326,300	20.2	29.8
Study Area	5,450	18.9	9,860	16.6	80.9

CHART E 1

COMPARISON OF STATE AND STUDY AREA
EMPLOYMENT PROFILES 1970-1979
BY MAJOR INDUSTRY CLASSIFICATION



-LEGEND-

- [N] study Area Ranking
- [Stippled Bar] State
- [Hatched Bar] Study Area

TABLE E3
COMPARISON OF CHANGE IN RANK ORDER
OF INDUSTRY SECTOR IMPORTANCE
1970 AND 1979

INDUSTRY SECTOR	STATE RANK		INDUSTRY SECTOR	STUDY AREA	
	From	To		From	To
Government	1	2	Service	1	1
Wholesale and Retail Trade	2	1	Wholesale & Retail Trade	2	2
Manufacturing	3	3	Manufacturing	3	5
Service	4	4	Government	4	4
Trans., Comm., & Utilities	5	7	Trans., Comm., & Utilities	5	7
Finance, Insurance & Real Estate .	6	6	Finance, Insurance & Real Estate .	6	6
Construction	7	5	Construction	6	3

Indicates Industry Sector Change in Rank Order of Importance

since all Washington Public Power Supply System employment is credited to government rather than the category of transportation, public utility and communication. (This assignment of industry classification stems from the intricacies of the Standard Industrial Classification procedures plus some specialized requirements inherent in Washington State tax liability determinations.) Further complicating to the evaluation is the fact that only a small portion of WPPSS 1600 employee were actually engaged in electric energy generation, with another 800 physically located at the five nuclear reactor construction sites. Many WPPSS employees are involved in work activities having to do with planning, licensing and administering construction projects.

The same explanation can be applied to the observed differences in percent shares between the SMSA and State for the transportation, public utilities and communications sector. The SMSA noted a lower share than the State for this industry sector both in 1970 and 1979. By 1979 the SMSA had fallen further behind the State average by dropping its percent share of total employment from 6.3 to 4.1 as compared with the State share of 6.6 and 5.5 over the same ten years. Had all WPPSS employment been credited to the public utility classification, the SMSA percent share would probably have exceeded the State average.

As the SMSA's major employment contributor, the service industry sector ranked first in both 1970 and 1979. At the same time however, other industry sectors were growing in relative importance. While employment in service lines rose 82 percent between 1970 and 1979 the industry's share of total employment dropped from 27.0 percent in 1970 to 24.1 percent in 1979.

Energy related activity is a major part of the business services provided by such operators as Battelle and others. However, the Hanford Complex itself is only one of the many markets for these professional services and a relatively small one. In fact, most users of these technical research services are located outside the Pacific Northwest, which in effect makes the service classification an "export base" activity for this SMSA. Service industry activity is usually not considered an export base and therefore an employment driver (stimulator).

The manufacturing sector ranked equally important employmentwise in both the State as well as the SMSA in 1970 ranking in third position with percent shares of 20.5 and 19.7 respectively. By 1979, statewide manufacturing employment still held in third position with a 19.1 percent share. The SMSA on the other hand reported manufacturing dropping to 5th position and a 15.7 percent share even with an 80 percent increase in employment between 1970 and 1979.

While 1970 percent share ratios of 20 percent for both the State and SMSA were comparable, the distribution of manufacturing activities within each total varied significantly. For example in 1970 statewide, the chemical industry accounted for less than 0.5 percent of the total manufacturing employment, but in the SMSA it represented nearly 11 percent. Differences between food processing percentages were small but still indicated that the SMSA was a major center for this activity with ratios of 3.5 percent for the state and 5.4 percent for the SMSA. Both State and SMSA percent shares of manufacturing declined by 1979 despite the 70 percent increase in the SMSA's chemical and food industry employment over the time span.

Among the Hanford based companies carrying chemical product manufacturing classifications (usually as one of several SIC codings) are: Exxon with nuclear fuel cell products, Rockwell with nuclear waste handling and processing and United Nuclear with nuclear products along with operation of the N Reactor facility. These manufacturing activities exist here only because of the area's nuclear orientation, without which these industries would not be operating in the area. They are not "typical" chemical product manufactures such as the fertilizer and other relatively large scale chemical processors located in the Port of Kennewick's industrial area.

Currently, the construction industry is the SMSA's major employment driver with a 1970-1979 increase of 511 percent. In 1970 this industry accounted for only six percent of the total employment and its sixth position, only slightly higher than the State average of 4.6 percent and a seventh position. By 1979 however, SMSA construction had risen to third position by accounting for 17.5 percent of the total wage and salary employment and had replaced trade as the third most important employment source. The 1979 construction average did not include another 600 WPPSS workers directly assigned to construction related activities but classed as government.

Retail and wholesale trade is usually a strong supporter of any area's economy and continues this role here by holding second position in both 1970 and 1979, with percent shares of 19.3 and 19.2 respectively, while experiencing a percentage increase of 104 percent over the nine years.

Part of the increase in trade activity can probably be attributed to the fact that until "private contractors" took over the operations of the Hanford complex from the U.S. Government in 1964 (Battelle, Douglas, IsoChem, United Nuclear, etc.) the area was somewhat lacking in retail and service capabilities. That vacuum is now being rapidly filled. Along with this has been the consistent growth of the SMSA economy itself which in turn generated more job opportunities in trade and personal service industries.

For the State, government and trade exchanged number one and two rankings over the nine years with the trade percent share increasing slightly and government dropping by about the same proportion. Within the SMSA, however, these same industries maintained their 1970 positions.

Table E4 presents another version of SMSA employment patterns--in the form of available 1980 monthly estimates by the same industry sector distributions as those of Table E1. While a single year is no valid representative of seasonality, the data suggest at least that the area's monthly employment swings are substantial. A more important finding in this monthly data is that the SMSA overall economic performance is heavily dependent on the construction employment associated with WPPSS reactor projects Numbers 1, 2 and 4. This dependence is well documented by noting that the June 1980 WPPSS projects craft worker strike dropped total construction employment from a level of 11,500 in May to a low of 4,930 for June. This drop occurred in spite of the fact that construction employment usually rises between May and June. This low level prevailed throughout the entire strike period and construction employment was only beginning to recover at year's end. Furthermore, since this June construction employment drop was not made up by gains in other industry sectors, total employment for the month dropped by 5,310. Such a decline is contrary to normal seasonal patterns which usually show an increase in total employment between May and June.

TABLE E 4

**MONTHLY NONAGRICULTURAL WAGE AND SALARY WORKERS EMPLOYED IN THE STUDY AREA
IN TERMS OF 2 DIGIT SIC INDUSTRY CLASSIFICATIONS**

INDUSTRY CLASSIFICATION	1980 MONTHLY TO DATE											
	January	February	March	April	May	June	July	August	September	Oct. (1979)*	Nov. (1979)*	Dec. (1979)*
Total Employment	60,600	61,170	60,280	62,950	64,360	58,520	56,610	56,200	58,030	61,230	61,170	61,130
Employment Index	100.0	100.9	99.5	103.9	106.2	96.6	93.4	92.7	95.8	101.0	100.9	100.9
Total Manufacturing	9,500	9,580	9,660	9,590	9,700	9,790	8,920	8,210	8,990	9,570	9,470	9,440
Employment Index	100.0	100.8	101.7	101.0	102.1	103.1	93.9	86.4	94.6	100.7	99.7	99.4
Food and Kindred Products	2,560	2,590	2,630	2,520	2,620	2,720	2,090	1,350	2,140	2,700	2,610	2,540
Employment Index	100.0	101.2	102.7	98.4	102.3	106.3	81.7	52.7	83.6	105.5	102.0	99.2
Printing and Publishing	460	490	490	520	490	410	260	300	350	380	400	410
Employment Index	100.0	106.5	106.5	113.0	106.5	89.1	56.5	65.2	76.1	82.6	87.0	89.1
Chemicals	5,410	5,420	5,430	5,440	5,490	5,550	5,630	5,640	5,600	5,400	5,400	5,420
Employment Index	100.0	100.2	100.4	100.6	101.5	102.6	104.1	104.3	103.5	99.8	99.8	100.2
Stone, Clay, Glass	-	-	-	-	-	-	-	-	-	-	-	-
Employment Index	-	-	-	-	-	-	-	-	-	-	-	-
Primary and Fabricated Metals	290	280	290	300	300	310	290	280	270	280	280	280
Employment Index	100.0	96.6	100.0	103.5	103.5	106.9	100.0	96.6	93.1	96.6	96.6	96.6
Other Manufacturing	780	800	820	810	800	800	850	640	630	620	610	620
Employment Index	100.0	102.6	105.1	103.9	102.6	102.6	83.3	82.1	80.1	79.5	78.2	79.5
Construction	10,040	10,180	8,250	10,600	11,530	4,930	5,120	5,280	5,720	10,740	10,620	10,370
Employment Index	100.0	101.4	82.2	105.6	114.8	49.1	51.0	52.6	57.0	107.0	105.8	103.3
Transportation, Comm. and Utilities	2,360	2,420	2,470	2,470	2,490	2,540	2,490	2,510	2,530	2,540	2,460	2,430
Employment Index	100.0	102.5	104.7	104.7	105.5	107.6	105.5	106.4	107.2	107.6	104.2	103.0
Wholesale and Retail Trade	11,780	11,720	12,020	12,300	12,430	12,570	12,280	12,450	12,830	11,820	11,890	12,050
Employment Index	100.0	99.5	102.0	104.4	105.5	106.7	104.2	106.7	109.0	100.3	100.9	102.3
Finance, Insurance and Real Estate	1,800	1,820	1,830	1,890	1,930	1,970	1,970	1,950	1,950	1,770	1,800	1,820
Employment Index	100.0	101.1	101.7	105.0	107.2	109.4	109.4	108.3	108.3	98.3	100.0	101.1
Service	14,600	14,770	15,010	15,170	15,230	16,490	15,470	15,470	15,310	14,570	14,530	14,580
Employment Index	100.0	101.2	102.8	103.9	104.3	106.1	106.0	106.0	104.9	99.8	99.5	99.9
Government	10,450	9,590	10,930	10,810	7,390	10,090	10,240	10,210	10,590	10,210	10,330	10,370
Employment Index	100.0	91.8	104.6	103.4	70.7	96.6	98.0	97.7	101.3	97.7	98.9	99.2

* With 1980 Data unavailable at Study Time, Monthly Estimates for 1979 were substituted.

SOURCE: STATE OF WASHINGTON EMPLOYMENT SECURITY DEPARTMENT

This apparent sensitivity of the areas economic base to nuclear construction employment levels has more serious and long term economic implications than just a temporary loss of jobs because of a strike. This could come with the completion of the three projects when craft workers together with engineering-administrative workers can be expected to consider leaving the area unless new jobs in construction or other industrial activities can be generated. One possible scenario might be that about 6,000 construction related jobs would be lost to the area with only 300-500 replacement in the form of energy generation operations workers as those three generating facilities come on line.

As further insight to the SMSA's economic base make up, a survey of Hanford Reservation complex "contractors" (exclusive of construction related) found them to be employing approximately 15,000 workers in 1980. Such a finding indicated that about 25 percent of the two county area total employment can be attributed to the Reservation operations per se. Firms surveyed included: Battelle, WPPSS, Rockwell, Westinghouse, United Nuclear, Exxon, the Richland Office of U.S. Department of Energy, U.S. Testing Co., plus several other providers of technical and scientific services. Workers in companies under contract with DOE total 12,000 in 1980. This does not include WPPSS or its construction activity.

Review of Past Economic Trends in the Tri-Cities Economic Base

Table E1 also serves to present wage and salary employment trends over the last decade. Changes in levels are graphically dramatized in Chart E3 which compares developments in the major industry classifications. Generally, changes in major industry sector index levels are relatively similar except for construction which differs substantially. Total employment in the two counties began to rise significantly in 1974 but the more dramatic increases started with the period 1976-1977 during which the index of total employment rose 21 points. It continued to rise faster over the following years, jumping 27 points between 1977-1978 and was only slightly less upward with 16 points between 1978-1979. Preliminary estimates for the 1979-1980 period indicate that the increase will only be in the range of 6-10 points. A large part of this declining rate of employment increase can be attributed to the June craft worker strike which tended to lower the annual average during the six months of reduced construction sector employment.

Table E1 notes that while SMSA total employment was increasing 106 percent between 1970 and 1979, major industry sector changes ranges from 80 to 512 percent. Transportation, communication and public utilities employment gains were lowest at 34 percent with construction highest at 512 percent. Between these extremes, trade noted a 105 percent gain, with both service and government sectors recording an 80 percent increase. The finance, insurance and real estate sector experienced a 147 percent increase, but since only 1,000 additional workers were involved in this rise (compared with 8,700 for construction, 6,300 in service and 5,800 in trade) it made only a modest, but still respectable, contribution to the area's economic growth.

Official and complete 1980 data are not yet available but until the craft worker strike, total monthly SMSA Area total employment was running 3000-5000 above than for the same months a year ago. Secondary employment generated by increases in major industry sectors have to be substantial. Based on Washington State's input/output model calculations and multipliers, each new construction job creates another 1.4 jobs while each new trade job adds 0.66 workers in other industry sectors with each new service sector job accounting for 0.67 additional workers.

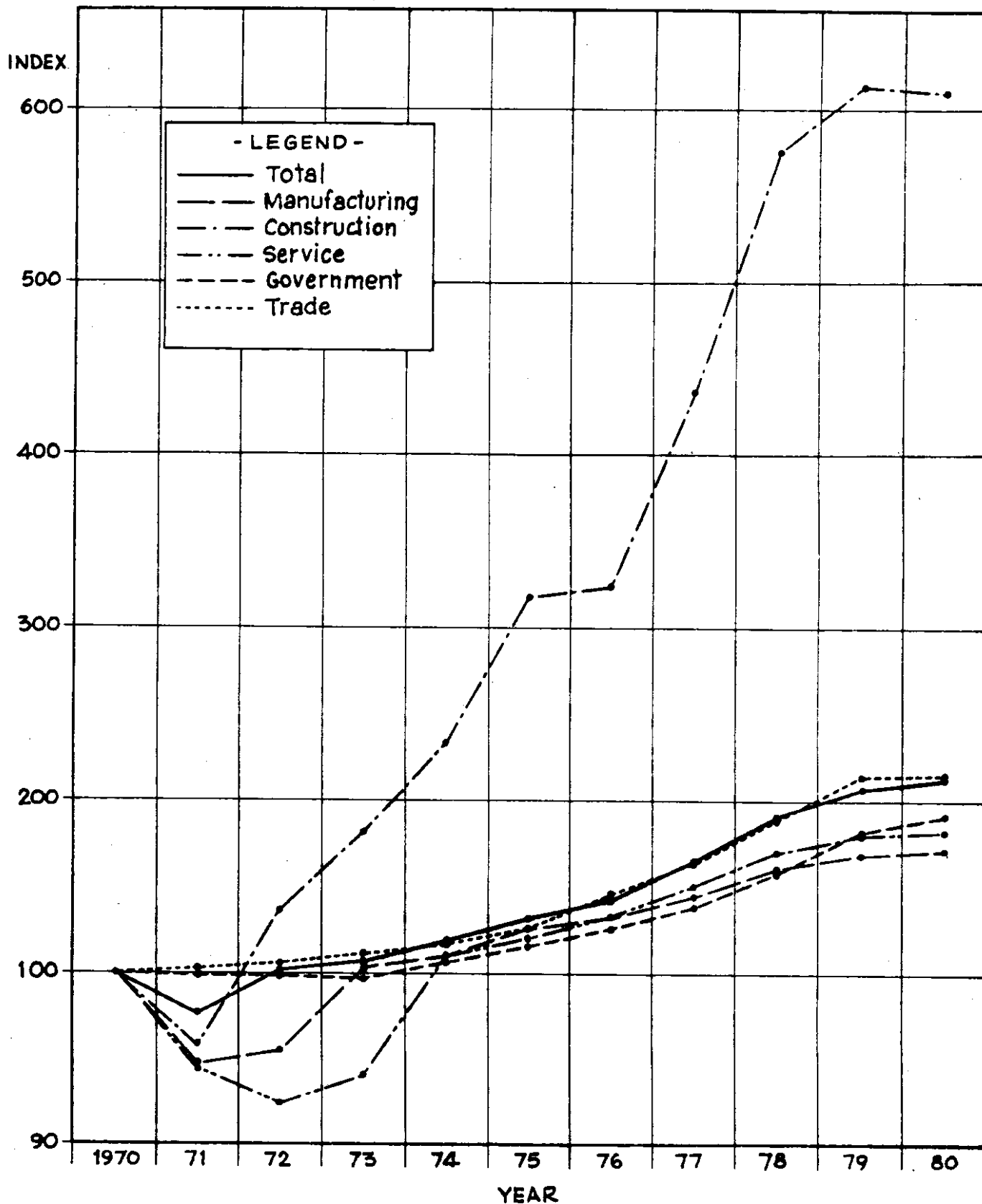
The last column in Table E2 compares State and SMSA Area percent changes in employment for the period 1970-1979. Chart E4 matches State indices with those of the area for the major industry sectors. Both series are computed on a 1970 base. As expected, both the chart and the table show that SMSA industry sector employment increases are consistently above those for the State as a whole. In summary, the two county area is recognized as one of the growth regions of the State both in total employment as well as individual industry sector employment.

In its analyses of the area growth trends, the Washington State Department of Employment Security in its "Annual Report, 1980", quoted the following which generally supports the consultant findings:

"The overall pace of economic growth within the Tri-Cities region during the 1970's has been impressive. In particular, the rate of growth in employment over the past several years has been even more remarkable. The expansion in nonagricultural wage and salary employment between 1977 and 1978 in an annual average comparison was 16.5 percent. For 1978 to 1979 such a comparison shows an estimated growth of 7.9 percent. These rates have far exceeded those for the United States as a whole as well as those for the State of Washington. Nationally, the number of jobs rose by 3.2 percent between FY 1978 and FY 1979. The state increase was more than twice this with an overall increase of 7.3 percent over this same period. Those industries within the Tri-Cities which have contributed to the majority of its net increase in employment over the past several years were chemical and allied products, construction, trade, services, and the government sector.

The source of employment growth since that time has been a rapid increase in economic activity for a majority of the basic industries in the local economy. For the Tri-Cities area these include agriculture, chemical and allied products, construction, services to business, and some components of government. All of these industries, to the exclusion of agriculture, have promoted strong expansions in the local economy. Also, all of these industries except agriculture are directly related to the Hanford nuclear reservation.

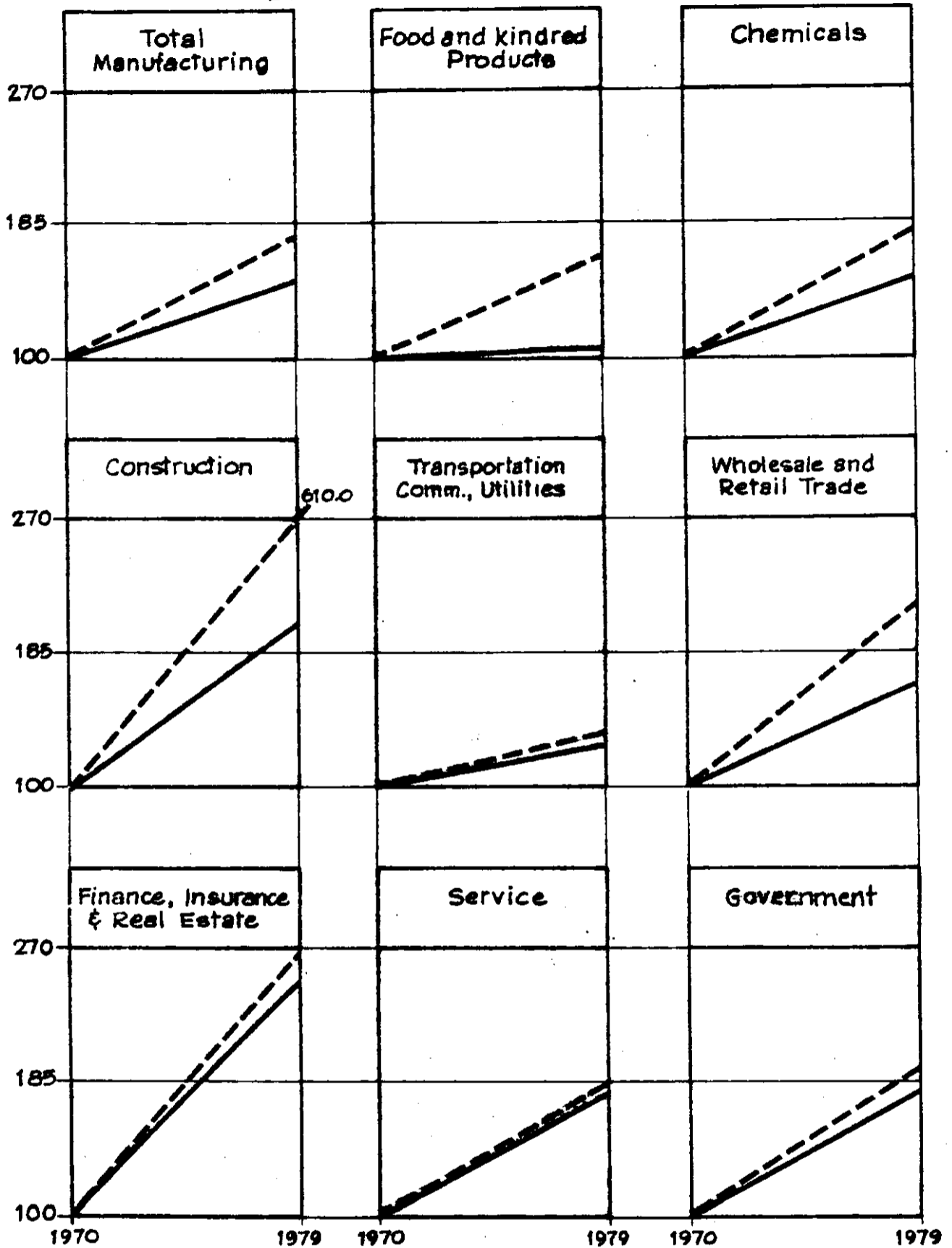
COMPARISON OF STUDY AREA INDUSTRY SECTOR EMPLOYMENT INDICES
Annual Average Wage and Salary Employment 1970-1980
For Total and Major Employment Generating Industry Classifications



COMPARISON OF STATE AND STUDY AREA EMPLOYMENT INDICES
1970 - 1979

BY MAJOR INDUSTRY SECTOR

LEGEND: - - - STUDY AREA — STATE



service (road facilities at the sites themselves are ample). It is the Port of Kennewick's hope that a bypass highway can be developed which will eliminate truck travel over city streets. To date, however, transportation facilities are not a negative factor in the area's industrial development aspirations.

Pasco Port representatives indicated that the restraints of Highway #395 were not particularly serious. They further indicated that transportation generally had not been a deterrent in their industrial development programs. While Burlington

Northern RR has discontinued its Pasco transshipment facility and cancelled the intercontinental freight rate schedule Pasco formerly enjoyed, the impact has not been as adverse as originally anticipated. Pasco area shippers have been able to obtain, with the Port's assistance, backhaul rail service from Portland and Seattle without extra charge. Deliveries can be made to area customers at low cost even though they are somewhat higher than those previous to the discontinuance of the intercontinental rate. Pasco's industrial tracts are also well served by a combination of rail, water and truck along with a privately operated petroleum pipeline.

Richland, through its Port representatives and city planners, voiced the fewest complaints regarding transportation resources even though it appears that the area is the least well served by rail and barge service but its truck service is without any major limitations. Industrial areas there are served mainly by motor carriers but with the possibility of barge service at some sites. Rail service is available over the DOE system which covers the entire Hanford Reservation area. This in-place rail system could be a major plus factor if the Reservation Area is ever opened up for commercial industrial development including heavy energy using industries. The City of Richland's plans for development of the Horn Rapids tract is expected to be heavily dependent on rail service available to the area plus extensive road construction.

It is possible that part of the Study Area's current satisfaction with its transportation complex could be the fact that its economy and industry mix is not making too many demands on it. There appears to be a relatively low level of commodity movement between industries operating here. Several industries, largely chemical, exporting to regional and national markets are taking full advantage of the barge service available as well as a natural gas pipeline for supplies of raw stocks. Area shippers and distributors have formed trade associations which effectively utilize the rate structure and facilities operative here. Agriculture raw stocks moving to processing plants and finished products moving to regional and national markets appear to be well served by this in place road system. There appears to be no major complaints of food processors relative to transportation need.

The area's rail service matches that anywhere in the State, with east-west service and unlimited connections. Eastward, Burlington Northern rail service goes via Spokane, Minneapolis, Chicago, and Galesburg. Union Pacific routes are more southward via Denver and Kansas City. All combinations of connections can be made along these major routes. Westward, Burlington Northern serves Seattle along with an alternative route to Portland. It is this route, in combination with the Union Pacific, which provide Kennewick's industrial site with an excellent rail potential. The Union Pacific Line also provides service to Portland. In addition to this transport service, Pasco serves a major train assembly yard for the Burlington Northern.

Motor carrier service is unlimited. The Washington State Department of Utilities and Transportation reported that more than 1,200 carriers are authorized to serve the Tri-City Area for all varieties of cargos. The Agency also indicated that if there were any unserved shipping needs in this area, carriers would take steps to respond to that demand.

Both Pasco and Kennewick Ports have in place barge facilities regularly utilized. One large grain terminal operating at on the Snake/Columbia Rivers junction moves significant volumes of farm products annually. The Richland Port has provided for some specialized shipments of nuclear construction related materials but has no formal barge handling facility although one is planned.

Hanford Reservation construction activity has generated a continuous flow of heavy construction materials and supplies along with highly specialized reactor equipment all of which movement has been accommodated by the area's transportation complex. Much of the Hanford related movements has been accomplished by a combination of water/land facilities with overland moves from barge to construction site carried out by non-highway techniques.

Air shipments reach the area via the carriers providing regular passenger service to both Richland and Pasco airports. There is no scheduled major air cargo service and the demand to date would probably not support such.

That the area's transportation complex is responding well enough to requirements of the economy is not to imply that it is not without some shortcomings. Some parts of the road system may be operating close to maximum capacity so far as the movement of freight is concerned. Local shippers report some sections needing upgrading and improved for safety and trip time considerations. Transportation is usually a critical requirement in any well functioning economy and the Tri-Cities area is an example of one highly dependent on such facilities, which to date have about matched demand despite the lack of an Interstate component.

The movement of goods and products may not be a critical consideration in the area's transportation planning, but workers travel from home to work and back, could be. The problem of home/work trip time and congestion is growing more acute with WPPSS extending its manhour construction schedule as well as the long term upward trend in employment among industries serving the nuclear complex along with the general maturing of this areas economic base.

At present there is little statistical evidence to support the contention of some that home/work trip time and the resulting congestion is negatively impacting the area's economic prospects. However, there are rumors of this. Companies such as Battelle and others have had to take steps to mitigate this problem by staggered work schedules in order that their employees can avoid peak traffic hours and thus be more effective producers.

There are reasons to believe that home/work trip time is a concern in some of the companies' worker recruitment programs. It also has been speculated that workers trip time could be a negative factor in new industries choosing to locate in the area. While there have been no formal reports of specialized and footloose industries deciding to leave the area because of home to work congestion this possibility has not been ruled out by area developers. Along with trip time and congestion, the area's relative isolation could be a contributing factor to recruitment problems. It is understood that some companies offer higher wages in worker recruitment activity as an offset to the area's isolation factor.

A major step in resolving the home/work/home trip time and vehicle congestion could be the development of effective and comprehensive public transit

sponsorship of U.S. Department of Energy and operated by Rockwell. This system provides scheduled pick up service along some Richland City streets with a park and ride terminal at the 1100 Area (Stevens Ave. Rockwell facilities). Service is limited to the Richland area and only transports Hanford workers to job sites on a regular three shift schedule. In addition to the Reservation service, several of the "contractors" have combined with DOE to provide daytime commuter service between the Federal Building in downtown Richland, the Stevens Ave. warehouse terminal workers area, the 1000 area and 300 area for workers without using their own car. This service is more of a fuel saving concept than for trip time or congestion reduction plus a convenience to workers moving between areas.

With only few major work destinations--the Hanford Reservation with several reasonably important subarea destinations along the way or immediately adjoining--the daily flow of work force to and from place of employment appears to be ideally suited for innovative public transportation planning. This observation is borne out by routine vehicle statistics (ADT). With morning and night peak vehicle counts considered, the case for public transportation is even stronger. Peak traffic estimates have been developed by use of multipliers and these strongly support the public transportation concept by indicating the extent of the problem. There is growing evidence to conclude that peak home/work/home travel with its considerable trip time loss and congestion is the crux of the transportation problem in the Tri-Cities area. Outside of these worker peak travel complications, daily traffic patterns and vehicle flows in this area are probably as normal as those for any area of the State.

It is likely that if peak home/work/home travel could be effectively accommodated by the area's transportation system, all other travel (people and commodity movements) within, to or from the area could be routinely satisfied.

II. GROWTH POTENTIAL OF THE TRI-CITIES ECONOMIC BASE

Preface

Since the time that Table E-5 and Table E-6 were developed, the study area's 1982 employment levels and economic prospects have changed drastically with the curtailment of WPPSS project Nos. 1 and 4. This change was not anticipated during the development of the study and all earlier forecasts therefore are high. The information, however, can be used for study purposes in the development of an evaluation technique for the allocation process. That the forecasts are high does not interfere with the final objective of the study.

Anticipated Growth of Study Area Economic Base

A comprehensive economic base study is a usual prerequisite to long term projections of area employment and populations. It was not necessary for this study since most of the needed economic information had already been generated by a wide range of area economic analyses and forecasts (see Appendix and the accompanying bibliography). Data from some of these earlier analyses and forecasts were directly applicable but much of the available material had to be modified on the basis of later information plus some specially prepared economic evaluations. The composite results are shown in Table E5.

Total wage and salary worker employment in the two county area is expected to rise from 61,000 in 1980 to 86,000 by 1990 and reach 98,000 by the year 2000. Chief mover in this increase will be the trade industry sector with a 48 percent increase between 1980-1990 and 24 percent increase from that decade to 2000. The second major stimulant to the area's economic base will be the service industry which will contribute a 37 percent increase between 1980 and 1990 and a 35 percent increase from 1990 to 2000.

As it has in the past, energy related activities largely in the form of construction employment is expected to again dominate the SMSA economic patterns, but will not continue to be the growth stimulator that it has been the past decade. Other industry's sectors continuing to be strongly supportive to the area's economic well

TABLE E5
 EMPLOYMENT TRENDS IN THE BENTON-FRANKLIN COUNTY SMSA
 ANNUAL AVERAGE BY MAJOR INDUSTRY SECTORS 1980 - 1990 - 2000

INDUSTRY CATEGORY	1980 1/		1990 2/		2000 3/	
	Number	% Increase over Decade	Number	% Increase over Decade	Number	% Increase over Decade
Agricultural	4,820 4/		5,410 4/	-	5,300 4/	-
Self Employed	4,370 4/		4,810 4/	-	5,010 4/	-
Wage and Salary Workers	61,130		85,900	+ 40.5	97,900	+14.97
Total Manufacturing	9,400		13,000	+ 38.3	15,000	+ 15.4
Food Processing	2,040		4,000	+ 96.1	5,100	+ 27.5
Chemical Products	5,420		7,200	+ 32.8	8,300	+ 15.3
Construction	10,370		15,000	+ 44.6	10,000	- 33.3
Trans./Comm./Public Utilities	2,430		2,800	+ 15.2	3,000	+ 7.1
Trade	12,050		17,800	+ 47.7	22,000	+ 23.6
Finance, Insurance & Real Estate	1,820		3,000	+ 64.8	3,900	+ 30.0
Services	14,580		20,000	+ 37.2	27,000	+ 35.0
Government	10,370		14,300	+ 37.9	17,000	+ 18.9

1/ Washington State Department of Employment Security yearly averages for wages and salary workers only

2/ Composite based on application of 1970-1980 average annual change to the 1980 base plus modification by consultant.

3/ Composite based on application of 1/2 of 1970-1980 average annual change to the 1990 base plus modification by consultant.

4/ Estimates based on BPA and HAPI series but no composite forecasts were attempted because of insufficient data.

being include food processing, government, and finance/insurance/real estate. Trade (wholesale/retail) employment gains reflect the secondary influence of increased basic and export industries employment but in addition indicate that the area is becoming more important as a regional trade and distribution center. Service industries are expected to continue strong. The business service industry sector with its tremendous scientific research capability and national markets is in reality an export base which in turn generates significant secondary and induced employment activity (not usually true for this classification in most areas). As the table notes, growth in this industry sector has been outstanding and is expected to continue to be a dominant economic force in the area.

Construction activity has to be a major determinant in the area's economic future. As of early 1980, this industry employment sector had quadrupled since 1970 and was accounting for more than 17 percent of total SMSA work force. However, by mid-year and a strike of nuclear project construction workers the construction industry employment dropped to 5,000, about 6 percent of total employment. It is not imprudent therefore to expect that without nuclear reactor construction projects, the SMSA "normal" construction employment while trending upward represents only about 4,000-6,000 jobs in 1980.

A major question is what will happen to the construction work force as WPPSS Projects #1-2-4 are completed. For this studies purpose we have accepted the DOT assumption that additional reactor projects will choose to locate within the Hanford Reservation holding employment at about 1980 high levels. This is a reasonable anticipation in view of the growing problems of locating nuclear reactors anywhere but Hanford. (PGE-PPL on the Columbia and Puget Sound Power and Light in Skagit County.) Waste handling activity will also help maintain 1980 employment levels within the Hanford Reservation in the future.

Work force manpower projections provided by WPPSS for the three projects indicate that its construction employment will peak between 1982-1983. Following that there will be an extended period of leveling out after which project construction employment will steadily decline and reach zero as the three generating facilities come on line. (Partially offsetting that decline will be the operating work force which will require about 400-500 workers.) WPPSS

construction employment peaks have been estimated at 3,500 in the case of WPPSS #2, 2,460 for WPPSS #1 and 3,100 for WPPSS #4. Generally, each of these peaks have a two year duration. The extent to which these peaks overlap will determine the overall high employment levels. Therefore, the short term energy related construction employment will depend on the timing of these work force schedules which have slipped considerably because of the strike, design changes, as well as new NRC requirements.

Agricultural and self employment are not included in the forecasts but need to be generally recognized since their influence is considerable. Agricultural and self employment together were estimated to average 9,200 area jobs in 1980. That total has been increasing slightly over the decade with self employment rising while agricultural employment decreased slightly. If projections of the State Employment Security Office are believable both will be rising in coming years. The foreseeable agricultural worker increase can be attributed to the opening up of additional irrigated lands and the increase in large scale/corporate farming throughout the two counties.

Table E5 forecasts are composites of information from previous studies adjusted on the basis of later and more complete data along with consideration of the many economic developments which have surfaced since the original reports. They take full cognizance of the expectations for nuclear reactor construction on the Hanford Reservation including the possibility that the area might be opened to private industrial development for heavy energy using industries. Other potential developments considered in the forecasts were such activities as the expansion of waste handling facilities on the Reservation, an alcohol producing plant in the Kennewick Area, along with expanded agricultural production and food processing throughout the two county area, due largely but not entirely to the large irrigation projects (Second Bacon Siphon Tunnel and the Horse Heaven Hill, project). A third major influence stems from the expanding activities of research and business service companies operating in the area. In addition to these specific basic industry expectations, it was assumed that there would be a general filling in of trade and personal services job opportunities as the economy expands.

The consultant's preliminary 1990 and 2000 forecasts are a combination of extrapolations based on selected industry sector 10 year growth rates adjusted by ongoing economic developments. The 1990 forecast was primarily the direct application of 1970-1980 average annual growth rates (computed from the official monthly estimates of the Washington State Department of Employment Security) to each industry sector in the 1980 employment base. The year 2000 forecasts carried the assumption that industry sector growth rates would be half those experienced between 1980-1990. These half rates were applied to the updated 1990 base and extrapolated to 2000. Initially, some consideration was given to using 1975-1980 average annual growth rates since they were more current but substantially higher. This was dropped after study since it appeared that this higher rate would have produced 1990 employment expectations which could not be supported by the foreseeable economic events.

Additional information and guidelines were developed in meetings with Department of Employment Security employment specialists, planning agency representatives and local business leaders. This background of expert opinion was subsequently used to make best judgment modifications of each industry sector 10 year extrapolation. The resulting modifications were matched with other forecast series to determine if there was any economic basis for further change. Major importance was placed on the seven year industry sector forecasts for the two counties prepared annually by employment specialists of the State Department of Employment Security. While these state forecasts were preliminary and not designed for publication, they did provide informed guidance in finalizing expected levels of economic activity. A matchup of the composite and other forecasts series is presented in Appendix and their apparent differences noted. These other series included those of BPA, the Washington Department of Commerce and Economic Development, HAPI, the Washington State Office of Financial Management and several other specialized works. (All listed in the Bibliography).

Table E6 forecasts of Metropolitan Area total employment distributed by TAZ Districts developed by the Washington State Department of Transportation have been reviewed and deemed sufficiently comparable to those of Table E5 after allowing for differences in area coverage. Table E6 forecasts differ from Table E5 in that they pertain only to the Greater Tri-City Area which includes the three

TABLE E6
 STUDY AREA EMPLOYMENT BY DISTRICTS
 ESTIMATES FOR 1980 AND FORECASTS TO 1990 AND 2000

DISTRICTS	1980	1990	2000
TOTAL ALL DISTRICTS	54,502	73,918	87,569
PERCENT CHANGE OVER DECADE	-	35.6	18.5
1. North Richland	5,083	7,911	11,585
2. Central Richland	5,310	6,585	7,561
3. West Highlands	3,866	6,727	6,961
4. Central Kennewick	8,112	9,655	11,012
5. Finley	2,391	2,880	3,150
6. West Pasco	450	639	669
7. Central Pasco	12,850	15,950	17,976
8. Meadow Springs	370	395	410
101. Burbank - Wallula	830	994	1,054
103. North Pasco	190	239	249
105. Rural Franklin No. 1	440	719	800
109. Rural Franklin No. 2	130	400	390
112. Hanford Reservation	13,650	13,650	13,650
113. West Richland	450	6,729	11,632
118. Horse Heaven Hills	230	260	270
121. Rural Benton	150	185	200

cities and their suburbs plus a small sector of Walla Walla County, while Table E5 includes employment in all of Benton and Franklin Counties (the official Tri-Cities Standard Metropolitan Statistical Area). Table E5 presents employment by major industry classification while Table E6 distributes total Metropolitan Area employment by district of work only. This distribution by district is needed, however, for the critically important calculations of worker home to work trip as described in report Chapter V. (Details for this clustering of 134 TAZ into 16 districts and the identify of TAZ in each district will be found in Appendix.)

A reasonable matchup of the consultants forecasts with those of DOT was necessary in order that an acceptable level of confidence could be had in the calculations of worker home to work trips. In reviewing DOT forecasting techniques and results it appeared that reasonable consideration was given to foreseeable developments within industry classifications, but these were never expressed as separate industry totals but only allocated on the basis of expected TAZ location. These separate TAZ assignments were then aggregated into a Metropolitan Area total.

It is the consultant's opinion that DOT forecasts of total employment by TAZ districts fit workably well into Table E5 forecasts for the two counties. Somewhat more confidence can probably be placed in the two county forecasts since they carefully considered developments in each of the major industry sectors and utilized more formalized forecasting techniques. The two series do, however, move in close accord. DOT 1980 forecasts represented 89 percent of the two county total and by the year 2000 the percentage share was still 89 percent.

Alternate Economic Developments with Potential for Altering Forecasts

While the forecasts in Table E5 are based on the best economic information available at this time, there are many overlying influences working which could change the picture significantly. Among them are:

Hanford does not become the nuclear reactor energy generating center of the West.

Restrictions are put on energy generating capability at Hanford.

Maximum usage of Hanford facilities and in place services as a diversified industrial complex.

Mineral discoveries in immediate area.

Construction of the Benton Franklin Dam immediately north of Hanford.

Greater water availability and opening of new lands to irrigation.

Transportation system improvements will enable the area to become a major distribution center exceeding present anticipations.

Oregon's energy generating facilities now planned for Columbia River area do not move to Hanford.

Major changes in nation's birth/death rates.

Land and climate change.

Improvements in Columbia River transportation.

In addition to altering residential alternatives, North Richland Bridge would open up new areas for industrial production.

Additional constraints put on industry energy use.

There may not be sufficient economic growth in the area as a whole or the State to support the expectations of local developers and planners.

Some proposed corridor routes may not be in place in time to accommodate the assumed industrial and residential concentrations in specific districts.

Local governments may not have the financial posture or capability to develop the infrastructure necessary for the anticipated developments.

Opening of new residential areas may not take the pressure off Richland and Kennewick housing demands.

All the potential developments and influences listed above have been considered to the extent possible within the study projections. However, a change in any one of the assumptions could alter the forecast levels substantially. The alternatives are offered here as a basis for informed interpretation of the study's economic findings.

III. POPULATION PREDICTIONS AS FUNCTION OF CHANGES IN AREAS ECONOMIC BASE

Table P1 presents DOT Tri-City Metropolitan Area populations for 1980-1990 and 2000. Population in this urban area is expected to rise from 114,000 in 1980 to 150,000 in 1990 and reach 175,000 by the year 2000, percentage increases of 32 percent and 17 percent respectively.

DOT population (and employment) projections being utilized in this analysis began with a 1977 economic base study which developed forecasts for the years 1980, 1990 and 2000. These were for the Tri-City Metropolitan Area and in units of specially designed Traffic Analysis Zones (TAZ). The work was carried out by DOT and local planners in cooperation with the Benton Franklin Governmental Conference which office had the responsibility for supervising and administering the consultant contract. While these forecasts were workable and reasonably representative at that time, they were soon negated by the unexpected and rapid growth in the area economy. This growth stemmed mainly from Hanford's suitability for nuclear reactor siting and Washington Public Power Supply System's decision to build three reactors on that site along with concentrating its administrative activities adjacent to the Federal Reservation. Demand for research services by the area operators further accelerated growth pressures.

With the need for more reliable economic data as input to the DOT North Richland Bridge Feasibility Study, this earlier employment/population data had to be updated. Accordingly, DOT again took the lead responsibility in the revision of the 1980 base year in cooperation with the local area planners under the coordination of the Benton Franklin Governmental Conference. Forecasts, both employment and population for the years 1900 and 2000 were developed by DOT staff working in cooperation with the Benton Franklin Governmental Conference.

For this studies purpose, Table P1 populations are shown in terms of 16 districts which are clusters of adjoining TAZ units and identified by a recognizable name of the neighborhood.

Table P1
TRI-CITIES METROPOLITAN AREA POPULATION BY TAZ DISTRICTS
ESTIMATES FOR 1980 AND FORECASTS TO 1990 AND 2000

DISTRICTS	1980	1990	2000
TOTAL ALL DISTRICTS	114,255	150,310	175,331
PERCENT CHANGE OVER DECADE		31.55	16.65
1. North Richland	3,201	7,996	11,011
2. Central Richland	27,378	29,618	29,771
3. West Highlands	11,752	13,952	15,623
4. Central Kennewick	31,361	33,802	35,279
5. Finley	3,443	3,715	4,070
6. West Pasco	7,198	10,499	12,076
7. Central Pasco	15,843	19,424	21,085
8. Meadow Springs	3,540	4,948	5,744
101. Burbank - Wallula	2,925	3,370	3,558
103. North Pasco	230	242	258
105. Rural Franklin No. 1	967	5,274	10,510
109. Rural Franklin No. 2	142	3,252	7,591
112. Hanford Reservation	0	0	0
113. West Richland	3,102	10,000	13,302
118. Horse Heaven Hills	2,589	3,022	3,782
121. Rural Benton	584	1,196	1,671

While the populations presented in Table P1 are not direct functions of the DOT employment forecasts shown in Table E6, they are in sufficient accord to serve as their advocates. The population levels contained in Table P1 are supportable by Tri-City Metropolitan Area employment forecasts for Table E6 and these in turn are in accord with Table E5 employment forecasts for the entire two county area as previously described in Chapter II.

DOT population forecasts correspond reasonably well with the official BPA series shown in Table P2; and there are valid reasons for their differences. Whereas DOT District forecasts include only the Metropolitan Tri-City Area (Richland, Kennewick and Pasco plus a small piece of Walla Walla County, BPA data cover all of Benton and Franklin counties.

Moreover, DOT predictions coming two years later than BPA benefited from the updated 1980 base as well as a better fix on the economic events which were impacting the smaller area population levels in the late 1970s. With these differences in mind it still appears that DOT increases are supportable by BPA studies and do represent the major portion of the two county population.

With most of the two county employment concentrated in the DOT study area (89 percent) and growing, it was not surprising to find that population too was growing more rapidly than the larger SMSA. BPA forecasts expect the two counties population to increase 27.9 percent between 1980 and 1990 along with an increase of 13.5 percent between 1990 and 2000. DOT forecasts indicate higher rates of increase --31.6 percent for 1980-1990 and 16.6 percent for 1990-2000.

This difference in growth rates between BPA and DOT series moves the percent share from 83.7 in 1980 to 88.5 by the year 2000. It is the consultants opinion that this substantial increase in the DOT percent share suggest at least that BPA forecasts were on the low side. Most of this under accounting probably came because BPA did not have updated 1980 data to serve as its forecasting base.

As further insight to population trends in the general area and a basis for comparison, 1980 official Census estimates are shown in Table P-2. Apparently, BPA underestimated the 1980 two county population by about 10,000 and this

TABLE P 2
BENTON-FRANKLIN COUNTY POPULATION
1970 - 1980 - 1990 - 2000

	1970		1980		1990		2000	
	Census**	BPA*	Census**	BPA*	Census**	BPA*	Census**	BPA*
Total for Two Counties	93,356	136,425	144,469	174,550	174,550	198,075		
Benton County	67,540	104,200	109,444	132,675	132,675	150,875		
Franklin County	25,816	32,225	35,025	41,875	41,875	47,200		
Percent Change Over Decade								
Census Counts	—	—	54.8	—	—	—		
BPA Forecasts	—	—	—	27.9	—	13.5		
DOT Forecasts	—	—	—	31.6	—	16.6		
Percent Share of DOT Forecasts								
to BPA two County Forecasts		83.7		86.1		88.5		

* BPA Source, See Bibliography

** Official U.S. Census of Population

Note: This table is offered as a basis for matching DOT Metropolitan Area population forecasts with those of BPA for the full two counties. There appears to be reasonable similarity between the two series but Metropolitan Area population is growing much faster than county wide population.

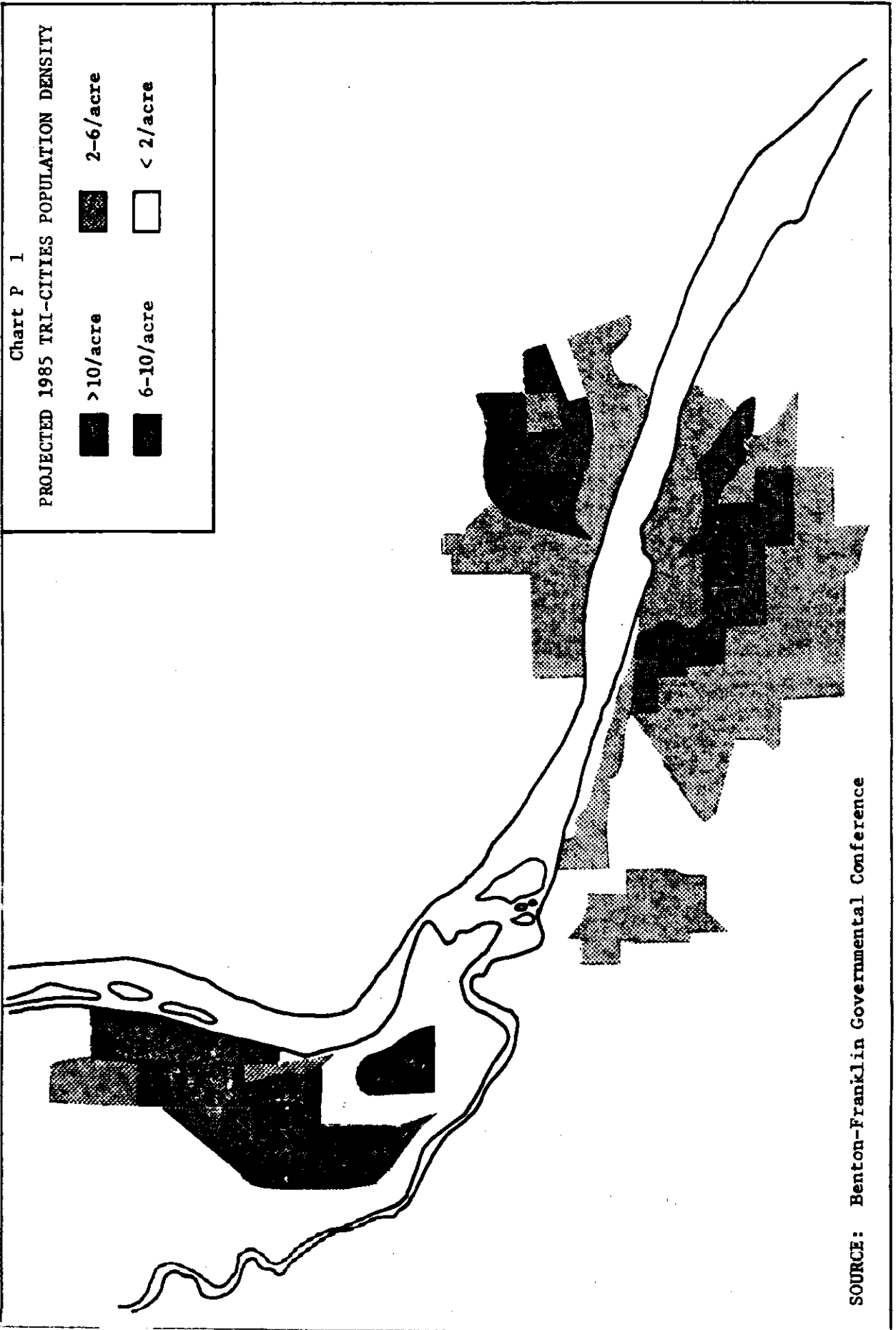
probably carried over into forecasts for the subsequent decades. For this study's objectives no useful purpose could be served by an update of BPA data. It appears that Table E5 SMSA employment forecasts interpret ongoing economic developments sufficiently well to hold substantially above BPA levels. That DOT employment forecasts in Table E6 were in accord with the consultants Table E5 is some assurance that DOT population forecasts for the Tri-City Metropolitan Area were based on employment and population expectations above those considered by BPA.

Chart PX1 compares population densities in the area. Since this data was developed for another study, it does not relate to specific districts but is still useful in appreciating the population concentration patterns of the area. The Chart shows that 1985 population concentrations are expected to range from a high of 10 per square acre in the Cities of Richland, Kennewick and Pasco to 6-10 and 2-6 in some of their less congested areas and fewer than two persons per acre in their environs.

For long-term and broad area considerations, demographic characteristics determine and thus influence population trends. However for this study, foreseeable population levels are presumed to be dependent primarily on increased job opportunities. Although unemployment levels here have stayed reasonably constant, the high levels of skill requirements associated with new job opportunities in the past 10 years here have tended to and will continue to attract skill possessing immigrants to the area. Since this is a relatively small metropolitan area, its normal labor force could hardly be expected to provide the number of workers and skill capability required for the 30,000 new jobs which were created between 1970 and 1980. Most of the firms offering business and research services have a long history of recruiting workers from the outside area. Craft workers are always attracted to large construction job sites such as WPPSS represents. Previous WPPSS studies indicate that the area had been an exporter of craft workers who were now returning to the area as job opportunities arose.

While many of these increasing job opportunities are being filled by relatively young people without families, a significant number of incoming workers bring families with them. A substantial number of new workers commute to the area

from their present place of residence or choose to locate outside the study area itself. Many others establish temporary workweek homes and commute weekends. WPPSS studies have shown that many construction workers commute for considerable distances to project sites without coming into the mainstream of study area home to work travel or counted as a resident. In either case, the migration of workers to the area has resulted in substantial population growth as reflected in 1970-1980 trend as well as that expected over the next two decades. The result of the population rise has been additional demands upon the area's home to work home transportation corridors and its infrastructure generally.



SOURCE: Benton-Franklin Governmental Conference

IV. MATCHUP OF TRANSPORTATION SYSTEM CAPABILITY WITH FORESEEABLE ECONOMIC BASE DEMANDS AND POPULATION LEVELS

Except for more workers traveling from home to work sites and a moderate increase in volumes of products and materials in transport, no great change in demand for transportation capability or alternative modes is expected to be generated by the growth in the area's foreseeable economic base. However, any level of transportation resources deficiencies existing now would be magnified with the increased level of economic activity.

It could be speculated that if a worker population of 54,500 experienced transportation problems in 1980, the addition of another 19,500 workers by 1990 without any improvement in transportation facilities or paratransit systems, the situation could do nothing but worsen. By the year 2000, another 13,500 or about 87,500 workers would be traveling between home to work destinations.

Unless more information becomes available, we can only assume that the home to work travel patterns of self-employed will about match that of wage and salary workers with more trips between districts. Agricultural work centers will probably be outside the metropolitan area. It is likely that home to agricultural work centers travel will not be a significant factor in transportation need.

Foreseeable increases in the movement of materials, commodities and products can be expected to be reasonably well accommodated by only a moderate expansion in transportation resource capability. There will be increases in the area's commodity flows but with 1,200 carriers already authorized to serve the area and the considerable rail service capability, it is hard to imagine that the foreseeable levels of increased transportation demand and economic growth could not be met. There is likely to be increased flows of materials between producers in the area but this intraarea movement should not add significantly to any problems faced in the existing transportation structure.

Air service capability is considered by some to be inadequate, but even with an increase in foreseeable air traffic it would be unrealistic to expect airlines to provide more service than the area market will support. With airline deregulation,

the Tri-Cities Area is likely to have to accept the fact that "feeder service" to major connecting centers and nearby cities is to be a major part of its air transport capability. In this connection, Cascade Airline the only line serving Richland directly, expects to go to larger and jet planes in the near future but the Richland airport does not have facilities for accommodating this service. Studies of this and other problems, i.e., larger jet plane service to the Pasco airport, etc., are currently underway but little information is presently available. Air cargo service schedules and volumes will probably increase as cargo movements grow, as long as there will be profit in providing such services.

Water transportation in the form of Columbia River barge movements has provided satisfactory service in the past especially in connection with bulk movements of chemical and agricultural products as well as heavy nuclear reactor equipment. Barge service is expected to grow and its capacity increase will reasonable match the growing economic base but there are some misgivings. River barge commodity flows may be constrained by Bonneville Dam lock capacity. Studies have shown that this lock facility may have to be expanded to meet foreseeable water transportation demands. A recently completed Washington Port Association study reports that the facility will be at lock capacity sometime between 1985 and 1990 rising from 7,130,000 to 13,391,000 tons. By 2000, tonnage moving through the Bonneville locks will exceed 15,800,000 tons and require a 675 ft. by 86 ft. facility replacing the present 500 ft. by 76 ft. facility.

V. STUDY AREA FISCAL REVIEW FOR TRANSPORTATION PURPOSES

Introduction

This fiscal review shows how fiscal resources were allocated in the SMSA and to what extent the three identified problems discussed below affected that allocation.

The major problems in urban transportation financing are:

- Increases in highway costs due to inflation while revenues tended to remain static.
- Erosion of the primary tax base (fuel tax) due to lower vehicle miles traveled, and more fuel efficient vehicles.
- Unanticipated additional demands for highway maintenance.

Highways, Roads, Streets and Bridges

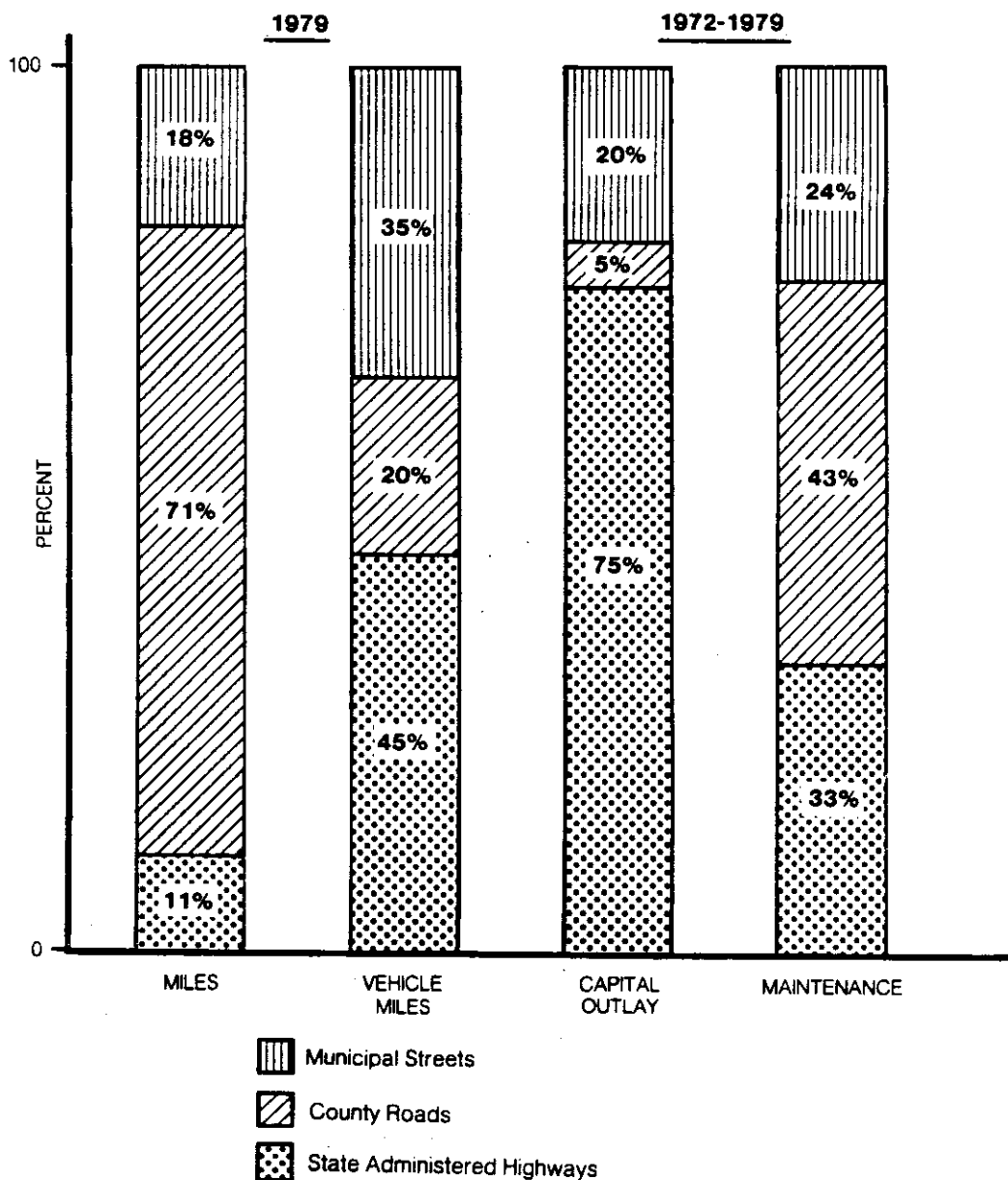
Vehicles, Miles, Travel, Capital Outlays and Maintenance

There are approximately 120,000 registered vehicles within the SMSA and they traveled 1.2 billion vehicle miles in 1980. The number of vehicles increased 67 percent between 1972 and 1980 while travel increased 52 percent. Based upon the 1.1 persons per vehicle in the area, by the year 2000 there will be approximately 190,000 registered vehicles in the SMSA.

Highway, road and street mileage in the SMSA totals 2,677 miles of which 2,026 miles are rural and 651 miles are urban. Most of the roads are administered by the County and the county roads have lower amounts of travel than city streets and state highways. The majority of capital outlays for the last eight years has been on state administered highways, although the counties have expended more on maintenance than the other two jurisdictions. (Chart VI)

Percentage of Miles, Vehicle Miles, Capital Outlay & Maintenance by Jurisdiction

Tri-Cities Standard Metropolitan Statistical Area



Funds Available and Disbursements

Approximately \$203 million was available and disbursed for highways, roads, streets and bridges for the period 1972 through 1979. The local jurisdictions administered 46.5 percent of this total and 53.5 percent was available for state administered highways.

The \$108 million expended on state administered highways consisted of 36 percent state and 64 percent federal funds. About 91 percent of these funds were expended on capital outlay and 9 percent on maintenance. (Chart V2)

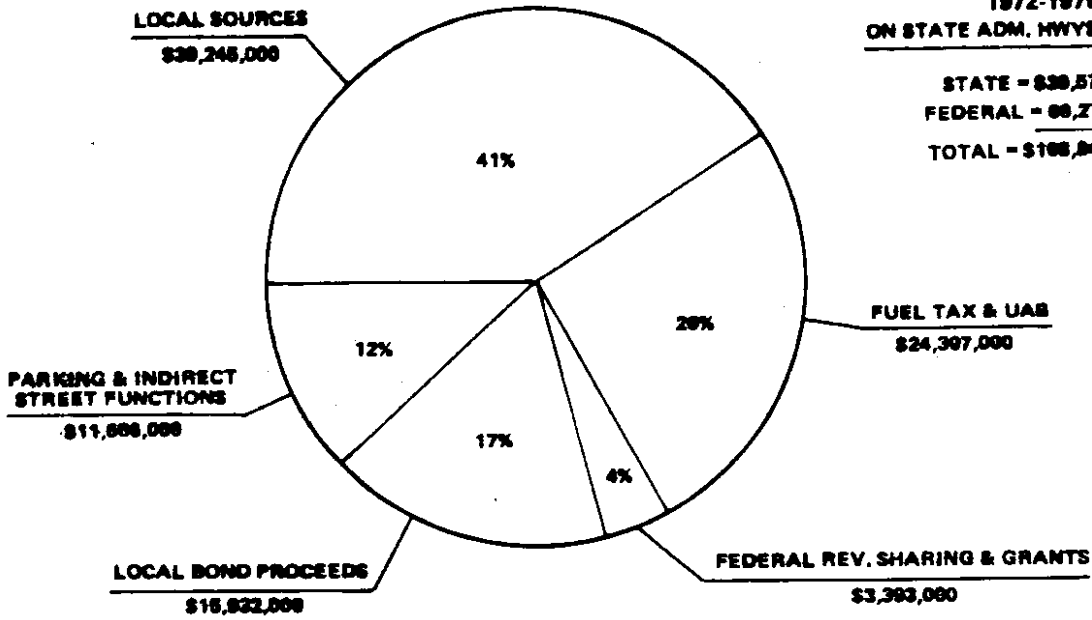
The \$203 million amounted to approximately \$130 million in deflated dollars on a 1972 base. Chart V3 gives a comparison of expenditures in actual and deflated dollars.

BENTON & FRANKLIN SMSA 1972 - 1979

LOCAL FUNDS AVAILABLE AND DISBURSEMENTS

I FUNDS AVAILABLE

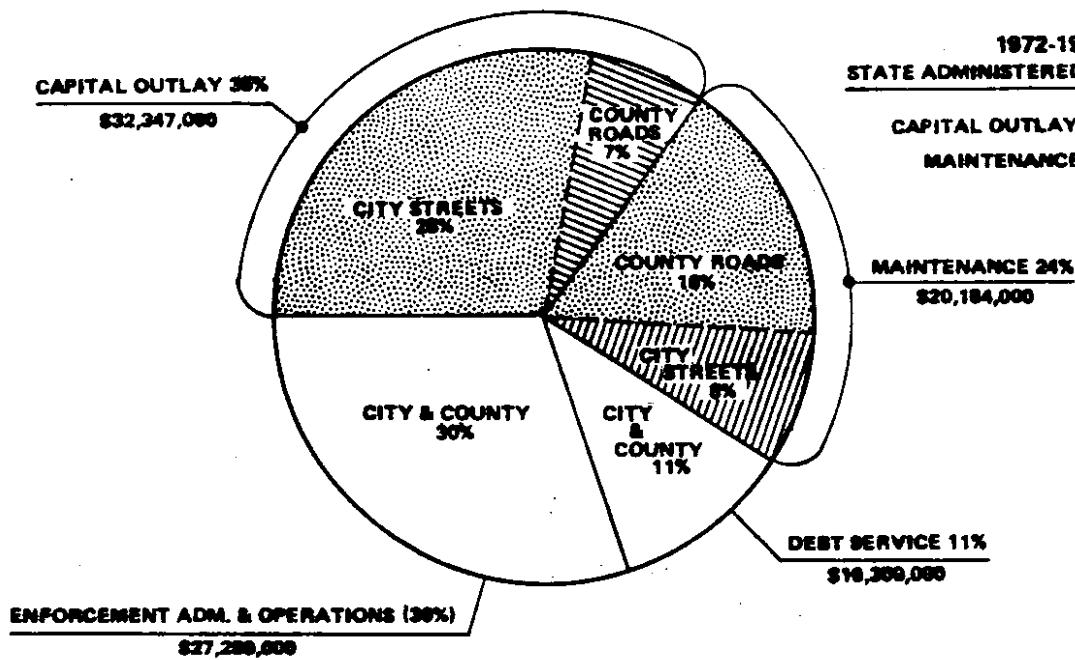
\$94,543,000



1972-1979
ON STATE ADM. HWYS. B & F SMSA

STATE - \$38,571,000
FEDERAL - 88,271,000
TOTAL - \$108,842,000

II DISBURSEMENTS

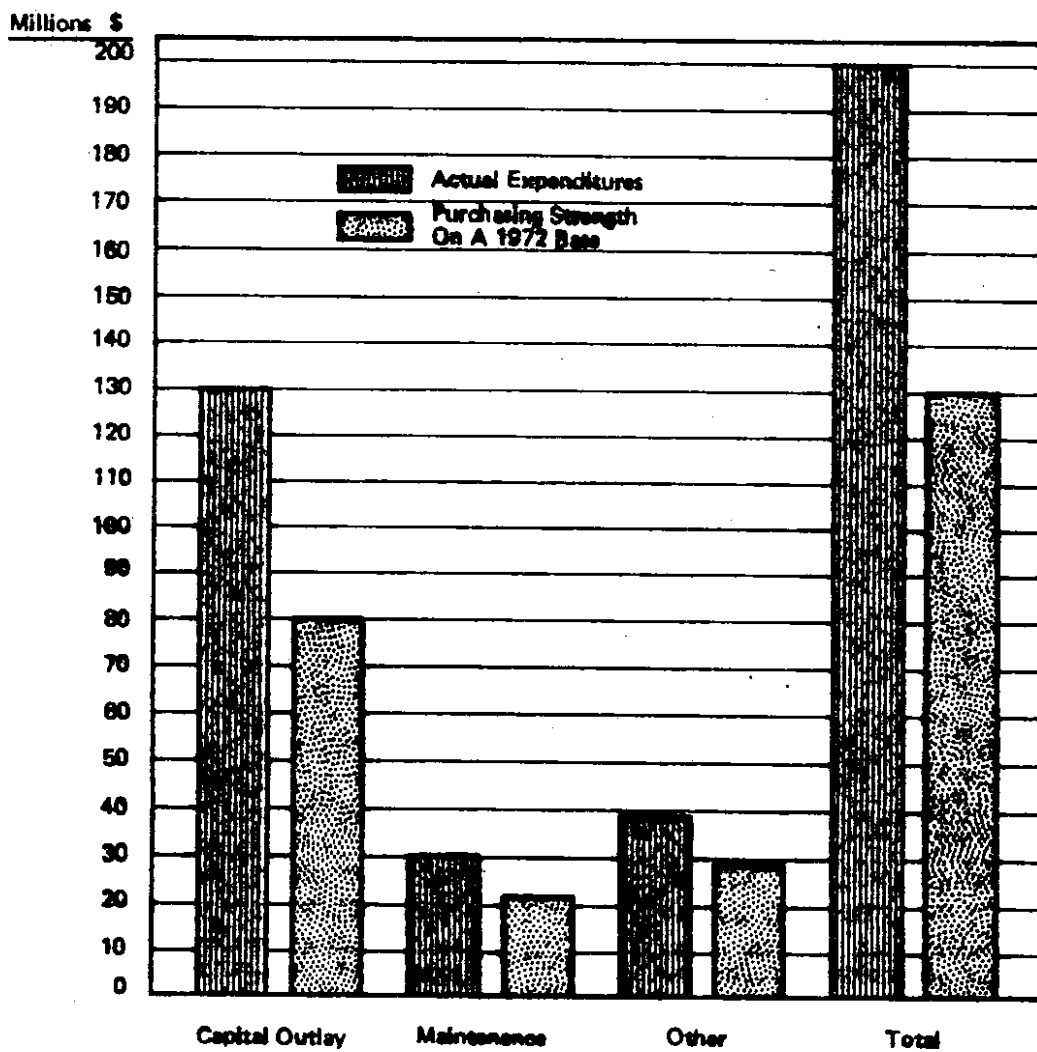


1972-1979
STATE ADMINISTERED HWYS. B & F SMSA

CAPITAL OUTLAY 38% \$32,247,000
MAINTENANCE 18% 16,123,000
TOTAL \$108,842,000

MAINTENANCE 24%
\$20,184,000

**1972 Through 1979 Highway, Road, And Street Disbursements
In Actual And Deflated Dollars For
Benton And Franklin SMSA**



Capital Outlay and Maintenance Per Vehicle Mile

The capital outlays and maintenance disbursements (in 1972 dollars) per vehicle mile in the SMSA for selected years were:

Table VI

	<u>Per Vehicle Mile</u>		
	<u>1972</u>	<u>1975</u>	<u>1979</u>
<u>Capital Outlay</u>			
State Highways	\$.015	\$.013	\$.033
County Roads	.004	.002	.003
City Streets	<u>.004</u>	<u>.002</u>	<u>.011</u>
Total	\$.008	\$.007	\$.019
<u>Maintenance</u>			
State Highways	\$.002	\$.002	\$.002
County Roads	.008	.006	.004
City Streets	<u>.001</u>	<u>.001</u>	<u>.003</u>
Total	\$.003	\$.003	\$.003

The capital outlay cost per vehicle mile is usually lower on state administered highways than on county roads because of the higher vehicle miles of travel on these highways but the study area is an exception because of the large capital outlay for structures and construction on the Interstate System.

TABLE V2

PER CAPITA DISBURSEMENT COMPARISON BETWEEN STUDY AREA AND STATE FOR
HIGHWAYS, ROADS, STREETS AND BRIDGES
1972 And 1979

	PER CAPITA 1972		PER CAPITA 1979	
	STUDY AREA	STATE	STUDY AREA	STATE
Highways, Roads, Streets and Bridges				
<u>Capital Outlay</u>				
State Highways	\$49.88	\$60.72	\$235.08	\$78.57
County Roads	7.50	8.23	10.09	10.73
Municipal Streets	15.30	13.23	67.82	20.64
Sub-Total Capital Outlay	\$72.68	\$83.18	\$312.99	\$109.94
<u>Maintenance</u>				
State Highways	\$6.91	\$7.84	\$16.19	\$13.76
County Roads	14.28	12.66	14.06	19.04
Municipal Streets	5.59	5.60	16.04	8.12
Sub-Total Maintenance	\$26.78	\$26.10	\$46.29	\$40.92
<u>Other Local Disbursements</u>	\$27.99	\$29.74	\$52.38	\$35.45
Total Highways, Roads, Streets & Bridges	\$127.45	\$139.02	\$411.66	\$186.31
Total Local Only	\$71.10	\$70.46	\$160.39	\$93.98

b. Per Capita Comparison

Per capita expenditures for highways, roads, streets and bridges in the area for 1972 was slightly lower than the statewide per capita expenditures. By 1979, however, the Study Area per capita expenditures were approximately double the statewide, due mostly to Interstate expenditures, and bridge expenditures on the municipal street system. The study area per capita capital outlay expenditures were \$235 for state administered highways in contrast to \$79 statewide, and \$68 for municipal streets compared to \$21 statewide.

User Revenue Generated Compared to User Funds Allocated to the Area

In 1979 the owners of the 116,000 vehicles in the area paid approximately \$9.1 million in state fuel tax, \$2.8 million in state motor vehicle fees, and \$4.6 million in federal user taxes for a total of \$16.5 million. Approximately \$3.4 million of these user revenues generated were earmarked for state disbursements to cover expenses for collection costs, debt service and the highway patrol. In contrast, approximately \$29.3 million of funds from user tax revenues were allocated to the area: \$2.8 million county and city fuel tax allotments; \$1.6 million Urban Arterial Board allotments; \$20 million for state expenditures on rural roads and \$4.9 million on municipal extensions. The comparisons per vehicle for selected years in the area are summarized below and indicate a significant change in the rates of users funds allocated to user revenues generated:

Table V3

	User Tax Revenue Generated <u>Per Vehicle</u>	User Funds Allocated <u>Per Vehicle</u>	Ratio-Funds Allocated to Revenues <u>Generated</u>
1972	\$123.00	\$110.00	.89
1975	\$119.00	\$113.00	.95
1977	\$133.00	\$213.00	1.88
1979	\$142.00	\$326.00	2.30

The increase in the ratio of funds allocated to revenues generated is again a reflection of the allocation of funds to the Interstate System and municipal bridges in the study area.

User and Non-User Funds Allocated to Highways, Roads, Streets and Bridges

On a statewide level, for all local county and city road funds available for 1972 through 1979, the non-user allocation of funds amounted to 65 percent and the user allocation approximately 35 percent. In the SMSA, local funds available for roads

and streets from user revenue amounted to approximately 26 percent and from the non-user sources 74 percent. (Table V4) There is no source of revenue available for state administered highways that can be classified as non-user. The user beneficiary therefore pays for all state administered highways.

TABLE V4

Comparison of Local Funds Available from the User and Non-User Beneficiary for Roads, Streets and Bridges, for the Study Area and Statewide, 1972 through 1979
(Amounts in Thousands)

<u>Beneficiary</u>	<u>Study Area</u> <u>Local Roads and Streets</u>		<u>All Counties</u> <u>Local Roads and Streets</u>	
	<u>Amount</u>	<u>Percent</u>	<u>Amount</u>	<u>Percent</u>
	a) User	\$24,000	26	\$ 669,000
b) Non-User	<u>\$70,000</u>	<u>74</u>	<u>\$1,248,000</u>	<u>65</u>
	\$94,000	100	\$1,917,000	100

	<u>Study Area</u> <u>State Administered Highway</u>	
	<u>Amount</u>	<u>Percent</u>
c) User	\$108,000	100
d) Non-User	<u>0</u>	<u>0</u>
	\$108,000	100

The user funds available for local roads and streets include fuel tax and urban arterial board apportionments. The non-user include property tax revenues, local bond proceeds, and federal revenue sharing and grants. The bond proceeds and federal funds classified as non-user provided a relatively higher amount of funds available for the study area than statewide for the period 1972 through 1979. See Table 10 in Appendix A for details.

Considering the allocation of all monies including local and those allocated for state administered highways in the area, the split between the user and non-user allocation for the eight year period amounted to 65 percent user and 35 percent non-user. (Table V 5).

In contrast the user taxes paid by the vehicle owners in the area for the eight year period amounted to 58 percent of the total, or \$37 million less than user funds allocated. The user allocation is higher than taxes paid because of the apportionments to the Interstate and municipal bridges.

Table V 5

Summary for Area of Funds
 Allocated and Taxes Paid for Highways, Roads,
 Streets and Bridges 1972 Through 1979
 (Amounts in Thousands)

<u>Beneficiary</u>	<u>Funds Allocated</u>		<u>Taxes Paid</u>		<u>Difference</u> (000)
	<u>Amount</u>	<u>Percent</u>	<u>Amount</u>	<u>Percent</u>	
User (a + c)*	\$132,000	65	\$ 95,000	58	\$37,000
Non-user (b + d)	<u>\$ 70,000</u>	<u>35</u>	<u>\$ 70,000</u>	<u>42</u>	<u>--</u>
	\$202,000	100	\$165,000	100	\$37,000

*The user funds allocated are a + c and the non-user b + d from Table 7.

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APPENDICES

APPENDIX A
Forecasts

VI. APPENDIX A

The report notes that the usual comprehensive economic base study was not required because most of the needed information could be obtained from previous economic studies and analyses of employment and population forecasts the past two decades. The Tri-Cities has been one of the most studied areas of the State. None of these studies anticipated the shut-down of WPPSS 1 and 4 in 1982 and this impact is not considered in these forecasts.

Included in this listing of previous studies are: the DOT North Richland Bridge Feasibility Study, WPPSS Population Forecasts by Decade to 2030, a Battelle Population Forecast by Decade to 2030, a Battelle Analysis of Tri-City Area Growth Potential Including Employment/Population Forecasts to 2000, a Benton-Franklin Governmental Conference Study of (Tri Met) Employment and Population Forecasts by TAZ to 2000 (HAPI); Bonneville Power Administration Employment, Population and Housing Forecasts by Decade to 2000 by County; Washington State Department of Commerce and Economic Development Assessment of Economic Area IX (Benton/Franklin) along with a number of evaluations and forecasts for specialized purposes such as sewerage and water facility planning.

Techniques used in these previous studies varied. Bonneville Power Administration made use of a simulation model with appropriate multiplier applications for each county and employment changes subsequently related to population. The Benton-Franklin Governmental Conference Program (HAPI) made use of an "export base" concept and supporting multipliers. WPPSS findings were based on a forecast of employment translated into population. Washington Department of Commerce worked back from a state simulation and input/output model to break out state totals into regions by the use of appropriate multipliers. Most of the studies, WPPSS, Battelle and others presented total employment forecasts in terms of industry sector, while DOT distributed its employment totals only by district of work rather than industry sector. All the employment forecast services accompanied their employment forecasts with population predictions but only DOT broke these out by district of residence.

During the review it became apparent most of the earlier forecasts had underestimated the growth in the area. However, their findings and coverage provided insight on the economic character of the area which would have otherwise been unobtainable. BPA was low in its two year old 1980 employment estimate being only slightly higher than what the Employment Security Department analysts was already reporting for 1979. Washington State Department of Commerce and Economic Development's three year old forecasts for 1980 were 14,000 below Employment Security 1979 counts. In developing its now five year old 1980 employment forecast for the area, Battelle utilized the best predictive information available at the time including several previous BPA studies, average and monthly employment estimates issued by the State's Department of Employment Security. In addition, Battelle had carried out a comprehensive survey of major Tri-City employers. Even with this further economic documentation, Battelle's 1980 employment forecast was found to be 13,000-15,000 below what the Department of Employment Security had already reported for 1978. That studies population forecasts were functions of employment and probably resulted in a population understatement for the Tri-Cities area ranging between 20,000-30,000.

In finalizing the composite forecasts presented in Table E5 of the report, three sets of industry sector forecasts were entered on Working Paper N and compared. The three series utilized included BPA, HAPI and the consultants own series based on extrapolation of industry sector average annual growth rates. The three were further evaluated against a backdrop of announced and/or rumored developments. (Chapter II listed a number of these potential developments which could alter the forecast levels). Most of these forces for change are unique or enough locally oriented that they usually cannot be provided for in a mathematical model but can be major determinants in the forecasting process.

With these three forecast series as a base and considering the economic forces effecting them outside the strict mathematical systems, a best judgment composite forecast was made. Since the extrapolated series benefited from the updated 1980 base as well as timely awareness of recently announced developments, the extrapolation dominated the composite forecasts. Working Paper N contains details for this procedure and is available for those interested. Table AE-1 equates the composite forecast with the three sources from which it was developed.

TABLE AE-1
COMPARISON OF THREE FORECAST SERIES WITH COMPOSITE

	1980						2000							
	ES	HAPI	BPA	HAPI	BPA	Composite	ES	HAPI	BPA	HAPI	BPA	Composite	Extrap.	Composite
Agriculture	NA	5,700	3,950	7,000	3,825	NA	NA	7,000	3,775	7,000	3,775	NA	NA	NA
Self Employment	NA	4,400	4,350	4,900	4,725	NA	NA	5,000	5,025	5,000	5,025	NA	NA	NA
Nonagricultural Salary and Wage Earner Emp.	61,130	43,600	54,750	49,800	71,800	89,616	85,900	58,700	88,000	58,700	88,000	102,650	102,650	97,900
Manufacturing	9,440	9,700	8,675	12,700	10,850	12,564	13,000	15,200	11,995	15,200	11,995	14,937	14,937	15,000
Food Products	2,540	2,900	2,175	4,700	2,775	3,220	4,000	5,700	3,050	5,700	3,050	5,068	5,068	5,100
Printing Publishing	410	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chemicals	5,420	4,700	NA	5,600	NA	7,214	7,200	6,000	NA	6,000	NA	8,273	8,273	8,300
Stone/Clay/Glass	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals	NA	700	NA	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Construction	10,370	6,000	7,350	5,100	5,025	20,397	15,000	6,200	7,025	6,200	7,025	21,165	21,165	10,000
Transportation	2,430	1,900	2,325	2,100	3,050	2,792	2,800	2,300	3,400	2,300	3,400	3,000	3,000	3,000
Communication														
Public Utilities														
Trade	12,050	7,700	11,550	9,400	17,675	17,834	17,800	11,200	22,275	11,200	22,275	21,699	21,699	22,000
Finance/Insurance														
St. Real Estate	1,820	1,200	1,550	1,300	NA	2,992	3,000	1,500	NA	1,500	NA	3,880	3,880	3,900
Services	14,580	9,900	15,600	11,600	22,200	19,786	20,000	13,600	27,000	13,600	27,000	23,220	23,220	27,000
Government	10,370	6,400	8,175	7,400	10,475	14,342	14,300	8,400	12,275	8,400	12,275	16,760	16,760	17,000

ABBREVIATIONS:

ES: Washington State Department of Employment Security

HAPI: Human Affairs Planning Institute

BPA: Bonneville Power Administration

Extrap: Consultants extrapolation of average annual growth rates tax from 1980 and 1990 economic base

Composite: Final adjusted employment forecast based on consultant extrapolations plus modifications conditioned to local economic influences and foreseeable developments some of which have been announced.

Whereas both the BPA and HAPI series had been prepared by "export base" techniques and resulting multipliers, there were some coding procedures which contributed to their low forecasts. Under State Employment Security Office coding procedures, WPPSS is coded "government" rather than a "public utility" which would be normally expected. The industry sector "public utility" is an export base driver and an employment generator which the "government" sector is not. "Service" activity is usually not an export base divided but in the case of the Tri-Cities it certainly is that.

Special exceptions had to be made in the construction industry forecasts. The routine application of that industry sectors 1970-1980 growth rates would have produced meaningless forecasts.

Discussions with industry representatives and local business leaders, plus consideration of the rumored siting of more private utility reactors at Hanford and the slippage of WPPSS schedule, indicated that construction employment forecasts would have to be an arbitrarily determination rather than one produced by a simulation model or extrapolation. It was assumed that by 1990 construction employment in the SMSA Area would be 15,000. While Hanford Reservation activity is not the only contributor to the two county construction worker total, nuclear related projects probably accounted for 1/3 to 1/2 of the two county total in 1980.

Further, we assumed that most of the on going reactor construction projects would be completed or phased out as the facilities came on line and began generating electric energy. As an offset to that we accepted the DOT judgment that total employment in the Hanford Reservation (District #112) in the year 2000 would hold at 13,500 but construction employment would make up a smaller part of this total with increases coming in such nuclear related operations as waste handling and processing expansion. The further assumption was made that if construction outside the Hanford Reservation area grew at its 1980-1990 rate the two county 2000 total would drop to 10,000.

Except for construction forecasts which had little supporting economic or statistical evidence, industry sector forecasts appear to have reasonable

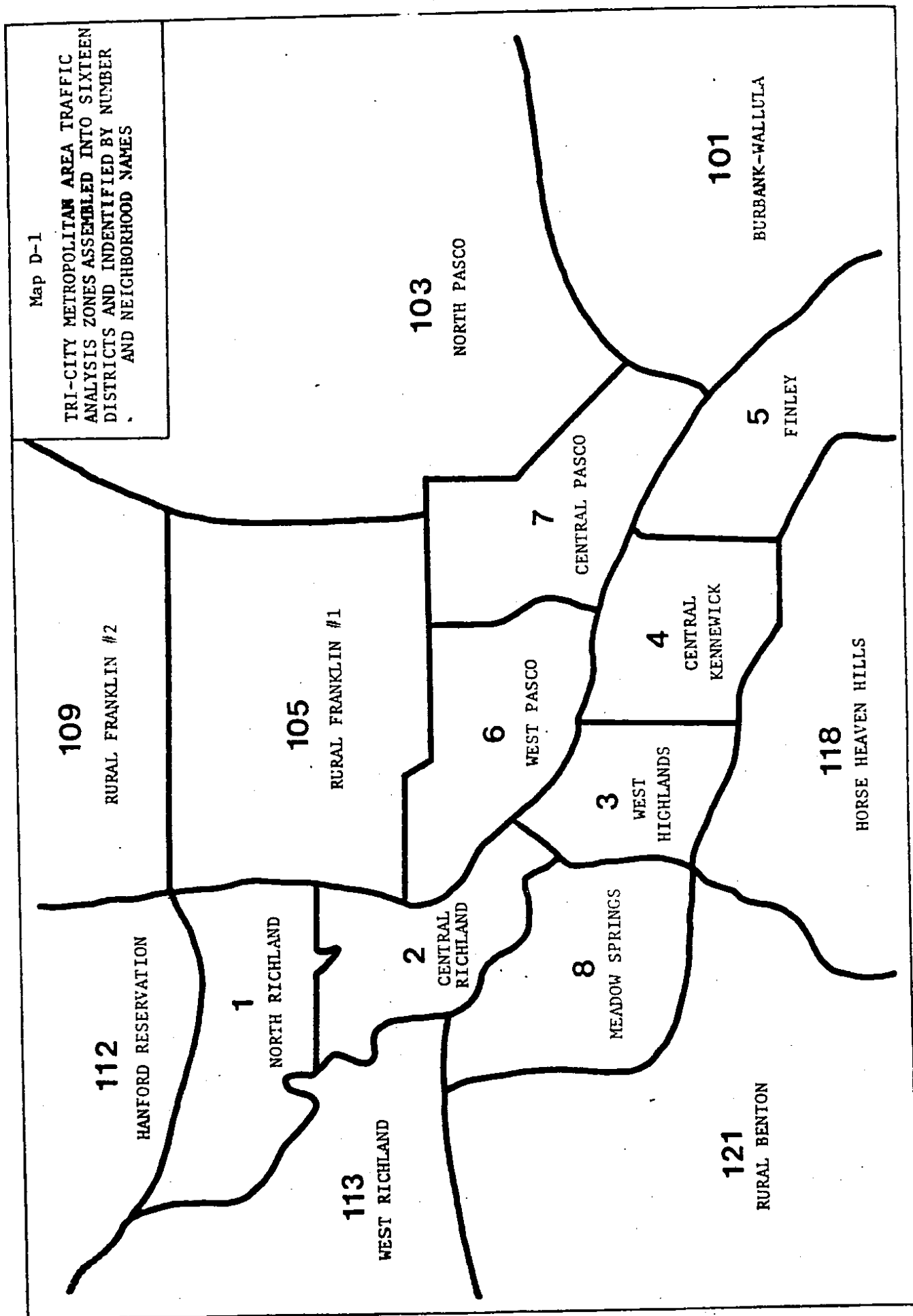
expectations and generally approximate trends reported in most of the dozen plus studies reviewed. As noted earlier, the composite forecasts benefited from much more data being available as well as updates of previous information. Most importantly the composite forecasts start with a 1980 base that was far more realistic and complete than anything predicted prior to 1979.

For those interested in 1980-1990-2000, detail of employment and population for each of the 134 TAZ (Tables AP1 and AE2), these data are available on request to DOT. Because each computer produced series requires four to ten typed pages, they have, for convenience, not been included in this report. The full tables identify the separate TAZ included within each district. Map D1 on Page 64 identified boundaries of each district, its DOT number and an assigned neighborhood name.

2/S&E12

Map D-1

TRI-CITY METROPOLITAN AREA TRAFFIC
ANALYSIS ZONES ASSEMBLED INTO SIXTEEN
DISTRICTS AND IDENTIFIED BY NUMBER
AND NEIGHBORHOOD NAMES



APPENDIX B
Basic Economic Indicators

APPENDIX B

Basic Economic Indicators

Table of Contents

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TABLE 1

STUDY AREA* NONAGRICULTURAL WAGE AND SALARY WORKERS

By Major Industry Sector

INDUSTRY SECTOR	YEARLY AVERAGE										
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Total Employment	28,890	28,240	29,130	30,580	33,810	37,910	41,080	47,360	53,770	59,510	61,130
Employment Index	100.0	97.8	100.8	105.8	117.2	131.2	142.2	163.9	191.0	206.0	212.0
Total Manufacturing	5,530	5,250	5,340	5,700	6,090	6,920	7,310	8,040	8,930	9,350	9,440
Employment Index	100.0	94.9	96.6	103.1	110.1	125.1	132.2	145.4	161.5	169.1	170.7
Food and Kindred Products	1,570	1,700	1,590	1,880	1,850	2,050	2,300	2,300	2,540	2,500	2,540
Employment Index	100.0	108.3	101.3	119.8	117.8	130.1	146.5	146.5	161.9	159.2	161.8
Printing and Publishing	360	330	370	410	440	490	470	510	530	450	410
Employment Index	100.0	91.7	102.3	113.9	122.2	136.1	130.6	141.7	147.2	125.0	113.8
Chemicals	3,110	2,710	2,830	2,720	3,030	3,390	3,540	4,180	4,760	5,280	5,420
Employment Index	100.0	87.1	91.0	87.5	97.4	109.0	113.8	134.4	153.1	169.8	174.3
Stone, Clay, Glass	60	60	60	70	80	80	—	—	160	170	—
Employment Index	100.0	100.0	100.0	116.7	133.3	133.3	—	—	—	—	—
Primary and Fabricated Metals	140	150	260	320	390	600	460	360	330	310	280
Employment Index	100.0	107.1	185.7	228.6	278.6	428.6	328.6	257.1	235.7	221.4	200.0
Other Manufacturing	290	300	230	300	300	310	540	690	610	640	620
Employment Index	100.0	103.5	79.3	103.5	103.5	106.9	186.2	237.9	210.3	220.7	213.8
Construction	1,700	1,630	2,310	3,090	3,960	5,390	5,330	7,400	9,810	10,400	10,370
Employment Index	100.0	95.9	135.9	181.8	232.9	317.1	313.5	435.3	577.1	611.8	610.0
Transportation, Comm. and Utilities	1,820	1,850	1,810	1,800	1,780	1,740	1,890	2,010	2,340	2,440	2,430
Employment Index	100.0	101.7	99.5	98.9	97.8	95.6	103.9	110.4	128.6	134.1	133.5
Wholesale and Retail Trade	5,570	5,650	5,850	6,110	6,470	6,990	8,080	9,040	10,460	11,400	12,050
Employment Index	100.0	101.4	105.03	109.7	116.2	125.5	145.1	162.3	187.8	204.7	216.3
Finance, Insurance and Real Estate	680	700	830	870	970	930	1,090	1,330	1,480	1,680	1,820
Employment Index	100.0	102.9	122.1	127.9	139.7	136.8	160.3	195.6	217.7	247.1	267.6
Service	7,990	7,560	7,390	7,520	8,670	9,590	10,590	12,010	13,560	14,310	14,580
Employment Index	100.0	94.6	92.5	94.1	108.5	120.0	132.5	150.31	169.8	179.1	182.4
Government	5,450	5,430	5,380	5,310	5,720	6,280	6,770	7,470	8,520	9,860	10,370
Employment Index	100.0	99.7	98.7	97.4	105.0	115.2	124.2	137.1	157.3	180.9	190.3

SOURCE: STATE OF WASHINGTON EMPLOYMENT SECURITY DEPARTMENT

* Benton and Franklin Counties which make up the Tri-Cities Standard Metropolitan Statistical Area (SMSA).

TABLE 2

**COMPARISON OF STATE AND STUDY AREA EMPLOYMENT PROFILES
1970 - 1979
By Major Industry Classification**

INDUSTRY CLASSIFICATION	1970		1979		Percent Change 1970-1979
	Employment	Percent Share	Employment	Percent Share	
Total Employment					
State	1,060,900	100.0	1,616,000	100.00	52.3
Study Area	28,890	100.0	59,510	100.0	106.0
Manufacturing					
State	217,400	20.5	309,200	19.1	42.2
Study Area	5,530	19.1	9,350	15.7	69.1
Food Products					
State	37,400	3.5	37,800	2.3	1.1
Study Area	1,570	5.4	2,500	4.2	59.2
Chemicals					
State	5,700	0.5	8,600	0.5	50.900
Study Area	3,110	10.8	5,280	8.9	69.8
Stone, Glass, Clay					
State	5,400	0.5	7,000	0.4	24.0
Study Area	60	0.2	170	0.3	183.3
Primary & Fabricated Metal					
State	20,300	1.9	39,900	2.5	96.6
Study Area	140	2.5	310	0.5	121.4
Other Manufacturing	—	—	—	—	—
Construction					
State	49,000	4.6	99,800	6.2	103.7
Study Area	1,700	5.9	10,400	17.5	511.8
Transportation Comm., Utilities					
State	69,900	6.6	89,100	5.5	27.5
Study Area	1,820	6.3	2,440	4.1	34.1
Wholesale and Retail Trade					
State	246,800	23.3	399,400	24.7	61.8
Study Area	5,570	19.3	11,400	19.2	104.7
Finance Insurance & Real Estate					
State	57,300	5.4	92,400	5.7	61.3
Study Area	680	2.4	1,680	2.8	147.1
Services					
State	167,600	15.8	297,000	18.4	77.2
Study Area	7,990	27.7	14,310	24.1	79.1
Government					
State	251,400	23.7	326,300	20.2	29.8
Study Area	5,450	18.9	9,860	16.6	80.9

TABLE 3

**MONTHLY NONAGRICULTURAL WAGE AND SALARY WORKERS EMPLOYED IN THE STUDY AREA
IN TERMS OF 2 DIGIT SIC INDUSTRY CLASSIFICATIONS**

INDUSTRY CLASSIFICATION	1980 MONTHLY TO DATE											
	January	February	March	April	May	June	July	August	September	Oct. (1979)*	Nov. (1979)*	Dec. (1979)*
Total Employment	60,600	61,170	60,280	62,950	64,350	58,520	56,610	56,200	58,030	61,230	61,170	61,130
Employment Index	100.0	100.9	99.5	103.9	106.2	96.6	93.4	92.7	95.8	101.0	100.9	100.9
Total Manufacturing	9,500	9,580	9,660	9,590	9,700	9,790	8,920	8,210	8,990	9,570	9,470	9,440
Employment Index	100.0	100.8	101.7	101.0	102.1	103.1	93.9	86.4	94.6	100.7	99.7	99.4
Food and Kindred Products	2,560	2,590	2,630	2,520	2,620	2,720	2,090	1,350	2,140	2,700	2,610	2,540
Employment Index	100.0	101.2	102.7	98.4	102.3	106.3	81.7	52.7	83.6	105.5	102.0	99.2
Printing and Publishing	460	490	490	520	490	410	260	300	350	380	400	410
Employment Index	100.0	106.5	106.5	113.0	106.5	89.1	56.5	65.2	76.1	82.6	87.0	89.1
Chemicals	5,410	5,420	5,430	5,440	5,490	5,550	5,630	5,640	5,600	5,400	5,420	5,420
Employment Index	100.0	100.2	100.4	100.6	101.5	102.6	104.1	104.3	103.5	99.8	99.8	100.2
Stone, Clay, Glass	—	—	—	—	—	—	—	—	—	—	—	—
Employment Index	—	—	—	—	—	—	—	—	—	—	—	—
Primary and Fabricated Metals	280	280	290	300	300	310	290	280	270	280	280	280
Employment Index	100.0	96.6	100.0	103.5	103.5	106.9	100.0	96.6	93.1	96.6	96.6	96.6
Other Manufacturing	780	800	820	810	800	800	650	640	630	620	610	620
Employment Index	100.0	102.6	105.1	103.9	102.6	102.6	83.3	82.1	80.1	79.5	78.2	79.5
Construction	10,040	10,180	8,250	10,600	11,530	4,930	5,120	5,280	5,720	10,740	10,620	10,370
Employment Index	100.0	101.4	82.2	105.6	114.8	49.1	51.0	52.6	57.0	107.0	105.8	103.3
Transportation, Comm. and Utilities	2,360	2,420	2,470	2,470	2,490	2,540	2,490	2,510	2,530	2,540	2,460	2,430
Employment Index	100.0	102.5	104.7	104.7	105.5	107.6	105.5	106.4	107.2	107.6	104.2	103.0
Wholesale and Retail Trade	11,780	11,720	12,020	12,300	12,430	12,570	12,280	12,450	12,830	11,820	11,890	12,050
Employment Index	100.0	99.5	102.0	104.4	105.5	106.7	104.2	105.7	109.0	100.3	100.9	102.3
Finance, Insurance and Real Estate	1,800	1,820	1,830	1,890	1,930	1,970	1,970	1,950	1,950	1,770	1,800	1,820
Employment Index	100.0	101.1	101.7	105.0	107.2	109.4	109.4	108.3	108.3	98.3	100.0	101.1
Service	14,600	14,770	15,010	15,170	15,230	15,490	15,470	15,470	15,310	14,570	14,530	14,560
Employment Index	100.0	101.2	102.8	103.9	104.3	106.1	106.0	106.0	104.9	99.8	99.5	99.9
Government	10,450	9,590	10,930	10,810	7,390	10,090	10,240	10,210	10,590	10,210	10,330	10,370
Employment Index	100.0	91.8	104.6	103.4	70.7	96.6	98.0	97.7	101.3	97.7	98.9	99.2

* With 1980 Data unavailable at Study Time, Monthly Estimates for 1979 were substituted.

SOURCE: STATE OF WASHINGTON EMPLOYMENT SECURITY DEPARTMENT

COMPARISON OF STUDY AREA INDUSTRY SECTOR EMPLOYMENT INDICES
 Annual Average Wage and Salary Employment 1970-1980
 For Total and Major Employment Generating Industry Classifications

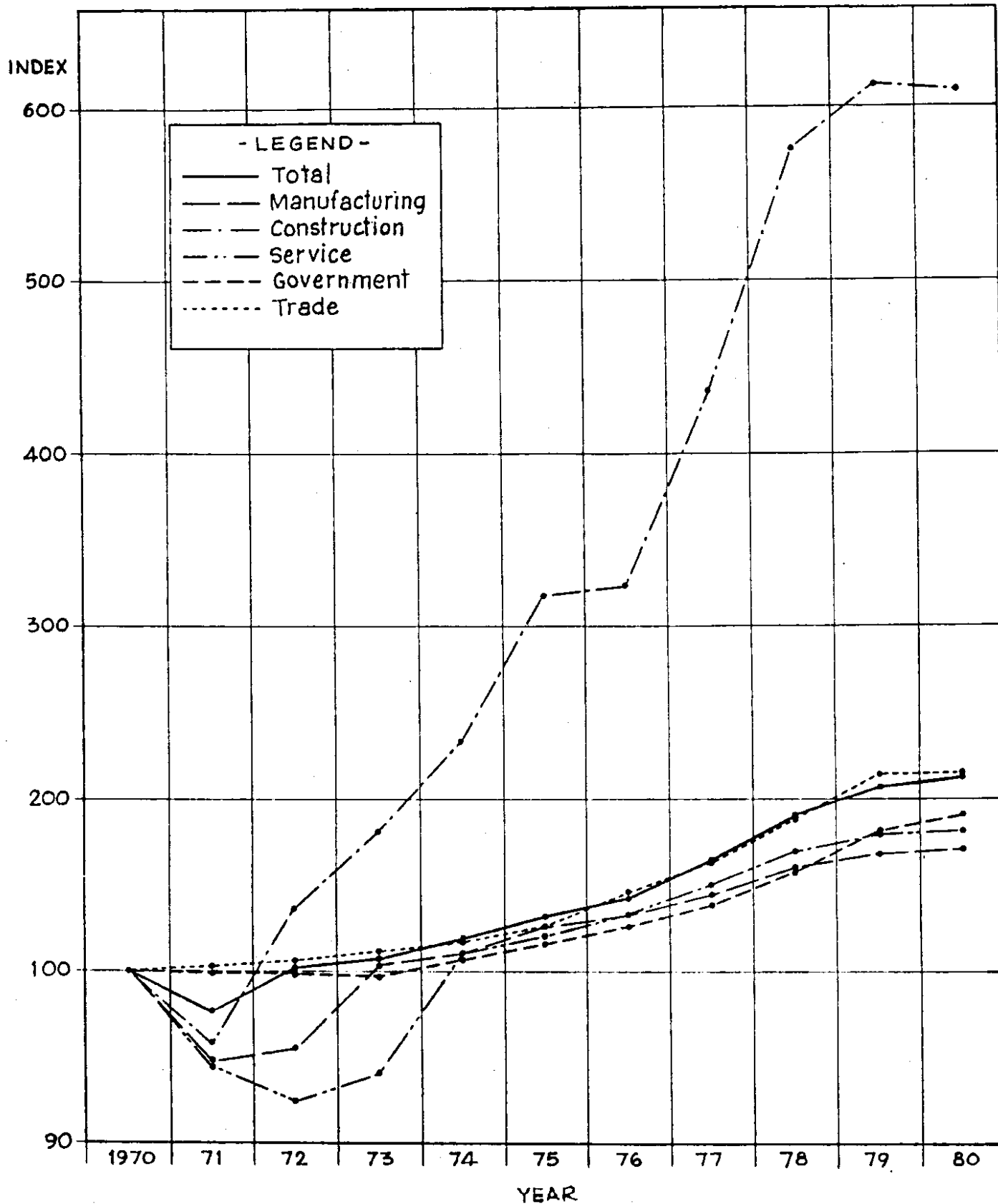


TABLE 4
COMPARISON OF CHANGE IN RANK ORDER
OF INDUSTRY SECTOR IMPORTANCE
1970 AND 1979

INDUSTRY SECTOR	STATE RANK		INDUSTRY SECTOR	STUDY AREA	
	From	To		From	To
Government	1	2	Service	1	1
Wholesale and Retail Trade	2	1	Wholesale & Retail Trade	2	2
Manufacturing	3	3	Manufacturing	3	5
Service	4	4	Government	4	4
Trans., Comm., & Utilities	5	7	Trans., Comm., & Utilities	5	7
Finance, Insurance & Real Estate ..	6	6	Finance, Insurance & Real Estate ..	6	6
Construction	7	5	Construction	6	3



Indicates Industry Sector Change in Rank Order of Importance

TABLE 5
EMPLOYMENT TRENDS IN THE BENTON-FRANKLIN COUNTY SMSA
ANNUAL AVERAGE BY MAJOR INDUSTRY SECTORS 1980 - 1990 - 2000

INDUSTRY CATEGORY	1980 1/	1990 2/ Number	% Increase over Decade	2000 3/ Number	% Increase over Decade
Agricultural	4,820 4/	5,410 4/	-	5,390 4/	-
Self Employed	4,370 4/	4,810 4/	-	5,010 4/	-
Wage and Salary Workers	61,130	85,900	+ 40.5	97,900	+14.97
Total Manufacturing	9,400	13,000	+ 38.3	15,000	+ 15.4
Food Processing	2,040	4,000	+ 96.1	5,100	+ 27.5
Chemical Products	5,420	7,200	+ 32.8	8,300	+ 15.3
Construction	10,370	15,000	+ 44.6	10,000	- 33.3
Trans./Comm./Public Utilities	2,430	2,800	+ 15.2	3,000	+ 7.1
Trade	12,050	17,800	+ 47.7	22,000	+ 23.6
Finance, Insurance & Real Estate ...	1,820	3,000	+ 64.8	3,900	+ 30.0
Services	14,580	20,000	+ 37.2	27,000	+ 35.0
Government	10,370	14,300	+ 37.9	17,000	+ 18.9

1/ Washington State Department of Employment Security yearly averages for wages and salary workers only.

2/ Composite based on application of 1970-1980 average annual change to the 1980 base plus modification by consultant.

3/ Composite based on application of 1/2 of 1970-1980 average annual change to the 1990 base plus modification by consultant.

4/ Estimates based on BPA and HAPI series but no composite forecasts were attempted because of insufficient data.

TABLE 6
STUDY AREA EMPLOYMENT BY DISTRICTS
ESTIMATES FOR 1980 AND FORECASTS TO 1990 AND 2000

DISTRICTS	1980	1990	2000
TOTAL ALL DISTRICTS	54,502	73,918	87,569
PERCENT CHANGE OVER DECADE	—	35.6	18.5
1. North Richland	5,083	7,911	11,585
2. Central Richland	5,310	6,585	7,561
3. West Highlands	3,866	6,727	6,961
4. Central Kennewick	8,112	9,655	11,012
5. Finley	2,391	2,880	3,150
6. West Pasco	450	639	669
7. Central Pasco	12,850	15,950	17,976
8. Meadow Springs	370	395	410
101. Burbank - Wallula	830	994	1,054
103. North Pasco	190	239	249
105. Rural Franklin No. 1	440	719	800
109. Rural Franklin No. 2	130	400	390
112. Hanford Reservation	13,650	13,650	13,650
113. West Richland	450	6,729	11,632
118. Horse Heaven Hills	230	260	270
121. Rural Benton	150	185	200

TABLE 7
BENTON-FRANKLIN COUNTY POPULATION
1970 - 1980 - 1990 - 2000

	1970		1980		1990		2000	
	Census**	BPA*	Census**	BPA*	Census**	BPA*	Census**	BPA*
Total for Two Counties	93,356	136,425	144,469	174,550	174,550	198,075	198,075	198,075
Benton County	67,540	104,200	109,444	132,675	132,675	150,875	150,875	150,875
Franklin County	25,816	32,225	35,025	41,875	41,875	47,200	47,200	47,200
Percent Change Over Decade								
Census Counts	--	--	54.8	--	--	--	--	--
BPA Forecasts	--	--	--	27.9	--	13.5	--	13.5
DOT Forecasts	--	--	--	31.6	--	16.6	--	16.6
Percent Share of DOT Forecasts								
to BPA two County Forecasts		83.7		86.1		88.5		88.5

* BPA Source, See Bibliography

** Official U.S. Census of Population

Note: This table is offered as a basis for matching DOT Metropolitan Area population forecasts with those of BPA for the full two counties. There appears to be reasonable similarity between the two series but Metropolitan Area population is growing much faster than county wide population.

Table 8
**TRI-CITIES METROPOLITAN AREA POPULATION BY TAZ DISTRICTS
 ESTIMATES FOR 1980 AND FORECASTS TO 1990 AND 2000**

DISTRICTS	1980	1990	2000
TOTAL ALL DISTRICTS	114,255	150,310	175,331
PERCENT CHANGE OVER DECADE		31.55	16.65
1. North Richland	3,201	7,996	11,011
2. Central Richland	27,378	29,618	29,771
3. West Highlands	11,752	13,952	15,623
4. Central Kennewick	31,361	33,802	35,279
5. Finley	3,443	3,715	4,070
6. West Pasco	7,198	10,499	12,076
7. Central Pasco	15,843	19,424	21,085
8. Meadow Springs	3,540	4,948	5,744
101. Burbank - Wallula	2,925	3,370	3,558
103. North Pasco	230	242	258
105. Rural Franklin No. 1	967	5,274	10,510
109. Rural Franklin No. 2	142	3,252	7,591
112. Hanford Reservation	0	0	0
113. West Richland	3,102	10,000	13,302
118. Horse Heaven Hills	2,589	3,022	3,782
121. Rural Benton	584	1,196	1,671

TABLE 9
MILES OF HIGHWAYS, ROADS AND STREETS
IN BENTON AND FRANKLIN COUNTIES 1979

	RURAL			URBAN			TOTAL
	ARTERIAL	ACCESS	TOTAL RURAL	ARTERIAL	ACCESS	TOTAL URBAN	
BENTON COUNTY							
State	153	—	153	32	—	32	185
County	316	467	783	29	68	97	880
City	15	22	37	114	233	347	384
Total	484	489	973	175	301	476	1,449
FRANKLIN COUNTY							
State	105	—	105	6	—	6	111
County	329	619	948	19	45	64	1,012
City	—	—	—	33	72	105	105
Total	434	619	1,053	58	117	175	1,228
BENTON & FRANKLIN SMSA							
State	258	—	258	38	—	38	296
County	645	1,086	1,731	48	113	161	1,892
City	15	22	37	147	305	452	489
Total	918	1,108	2,026	233	418	651	2,677

TABLE 10

HIGHWAY, ROAD AND STREET FUNDS AVAILABLE 1972 - 1979
 BENTON AND FRANKLIN SMSA
 (Thousands of Dollars)

	1972	1973	1974	1975	1976	1977	1978	1979	Total 72-79	Annual Average Amount	Annual Average Percent
Local Sources	\$3,571	\$5,222	\$2,080	\$3,007	\$7,349	\$4,567	\$6,220	\$7,229	\$39,245	\$4,906	19.3
State Government	2,369	2,633	2,047	2,106	2,396	3,551	3,769	5,456	24,307	3,038	11.9
Federal (Revenue Sharing & Grants)	368	379	29	101	263	519	885	849	3,393	424	1.7
Local Bond Proceeds	513	974	-	2,814	3,436	2,446	2,055	3,694	16,932	1,991	7.8
Parking and Indirect Street Functions	635	896	697	1,981	1,744	1,396	1,521	2,796	11,666	1,458	5.7
Subtotal Local Receipts	\$7,456	\$10,104	\$4,853	\$10,009	\$15,188	\$12,479	\$14,450	\$20,004	\$94,543	\$11,817	46.4
State Funds on State Highways	2,513	3,645	2,085	1,786	3,604	5,353	7,363	13,222	39,571	4,946	19.5
Federal Aid on Highways	2,815	3,297	1,753	5,714	9,906	13,353	13,191	19,242	69,271	8,659	34.1
Sut Total State and Federal	\$5,328	\$6,942	\$3,838	\$7,500	\$13,510	\$18,706	\$20,554	\$32,464	\$108,842	\$13,605	53.6
Total Funds Available	\$12,784	\$17,046	\$8,691	\$17,509	\$28,698	\$31,185	\$35,004	\$52,468	\$203,385	\$25,422	100.0
Total Funds Available Deflated	\$12,784	\$16,081	\$7,365	\$13,573	\$21,101	\$21,507	\$22,438	\$30,254	\$145,003	\$18,125	

SOURCE: WASHINGTON STATE DEPARTMENT OF TRANSPORTATION - FORM PR-535

TABLE II

ANNUAL DISBURSEMENTS FOR HIGHWAYS, ROADS, STREETS AND BRIDGES
1972 - 1979
BENTON AND FRANKLIN SMSA
(Thousands of Dollars)

	1972	1973	1974	1975	1976	1977	1978	1979	Total		Percent
									72 - 79	Amount	
Capital Outlay											
On State Highways	\$4,680	\$5,850	\$2,709	\$6,310	\$12,510	\$17,536	\$18,752	\$30,372	\$98,719	\$12,340	49.6
On County Roads	704	804	625	582	686	974	1,094	1,304	6,773	847	3.4
On Municipal Streets	1,435	1,945	1,161	1,002	5,214	2,096	3,959	8,762	25,574	3,197	12.9
Sub Total Capital Outlay	\$6,859	\$8,599	\$4,495	\$7,894	\$18,410	\$20,606	\$23,805	\$40,438	\$131,066	\$16,384	65.9
Maintenance											
On State Highways	648	1,092	1,129	1,190	1,000	1,170	1,802	2,092	10,123	1,265	5.1
On County Roads	1,340	1,303	1,288	1,442	1,718	1,860	2,274	1,817	13,042	1,630	6.5
On Municipal Streets	524	588	762	662	711	755	1,067	2,073	7,142	893	3.6
Sub Total Capital Maintenance	\$2,512	\$2,983	\$3,179	\$3,294	\$3,429	\$3,785	\$5,143	\$5,982	\$30,307	\$3,788	15.2
Local Administrative & Operative	968	1,205	791	716	914	1,243	1,438	1,929	9,204	1,150	4.6
Local Payments to Other Governments	440	59	—	651	4,013	963	140	122	6,388	798	3.2
Local Debt Service	583	833	445	967	1,521	2,770	1,268	1,901	10,288	1,286	5.2
Local Indirect Street Functions & Parking	635	896	697	1,981	1,744	1,399	1,521	2,815	11,688	1,461	5.9
Sub Total - Miscellaneous	\$2,626	\$2,993	\$1,933	\$4,315	\$8,192	\$6,375	\$4,367	\$6,767	\$37,568	\$24,867	100.0
Total Disbursements	\$11,997	\$14,575	\$9,607	\$15,503	\$30,031	\$30,766	\$33,315	\$53,187	\$198,981	\$16,197	
Total Disbursements 1972 Dollars	\$11,997	\$13,402	\$7,365	\$11,192	\$21,205	\$20,063	\$18,437	\$25,915	\$129,576	\$8,188	
Total Disbursements Less State Admin. Hwys. 1972 Dollars	\$6,669	\$7,411	\$5,017	\$6,352	\$11,972	\$8,149	\$8,233	\$11,708	\$65,511	\$8,188	

SOURCE: WASHINGTON STATE DEPARTMENT OF TRANSPORTATION FORM PR 535

A. 13

Study and Forecast of Tri-City Economic Activity and Its related Impact on Gasoline Needs and Housing
Marvin Clement, Keith E. Yandon, Brian Laughlin, W. A. Reardon
May 1974

Washington State Information Report
Washington State County Population Forecasts by Age and Sex: 1970-2005
Population, Enrollment, and Economic Studies Division
Office of Financial Management
Second Edition: June, 1978

Supplemental Report on Population Estimates for Hanford Defense Waste Draft
Environmental Impact Statement

K. E. Yandon

J. S. Burlison

R. G. Rau

October 1980

Study on Specialized Transit Benton and Franklin Counties

The Task Force on Specialized Transit, Social Agencies Coordinating Committee,
Community Services Council

State Transportation Plan

Volume 2

Future Directions and Actions

Washington State Department of Transportation

February 1980

Industrial Site Brochures

Port of Kennewick

Industrial Brochures

Port of Pasco

Manpower Projections

Washington Public Power Supply System

August 27, 1980

Tri-Cities Chamber of Commerce Miscellaneous Publications

Public Transportation Benefit Area

Feasibility Study, Franklin County

Munro Associates

February 11, 1981