BASELINE DESCRIPTION OF SOCIO-ECONOMIC CONDITIONS IN THE UINTAH BASIN

Phase I of a Two-Phase Impact Analysis of Proposed Oil Shale Development

prepared for

THE WHITE RIVER SHALE OIL PROJECT

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1.0 INTRODUCTION

1.1 Nature and Scope of the Study

This report constitutes the first of a two-phase study of the socio-economic impacts of oil shale development in the Uintah Basin (East-Central region) of Utah. This Phase I report contains a socio-economic description of the region and will provide a "baseline" or "benchmark" for the Phase II assessment of what socio-economic changes might be expected as a result of oil shale development.

Elements of the regional socio-economic environment included as a part of Phase I are as follows: Economic characteristics, structure and growth; infrastructure and public service provision; availability and use of water and land; socio-cultural characteristics; selected legal and institutional factors related to energy development; and methodology and assumptions employed in preparing the project baseline.

1.2 Delineation of the Impact Region

The regional socio-economic environment delineated for the study includes Duchesne and Uintah counties in Eastern Utah and Rio Blanco County in Western Colorado. Additionally, the four cities of Duchesne, (Duchesne County) Roosevelt (Duchesne County), Rangeley (Rio Blanco County) and Vernal (Uintah County) were identified as the existing and potential service certers whose proximity to the proposed shale oil development site marked them for inclusion in the analysis. In delineating the impact region it was reasoned that the area should

1) be large enough to effectively internalize a significant portion of all important development induced socio-economic changes; 2) reflect the extent of local labor markets; 3) reflect the effective range of trade and service centers in supplying goods and services to the regions population; and 4) be identified in a manner which facilitates approximation of the study region and important subregional boundaries using conventionally defined areal units for socio-economic and hydrologic data.

1.3 Organization of the Study

Chapters are devoted to each of the following dimensions of the environment in the Uintah Basin: economic; infrastructure and public services; physical and biological; social and cultural; institutional; and population and economic trends in the absence of oil shale development.

In Chapter 2.0, the economic environment is described and analyzed. Attention is given to the structure of industrial activities in the region and changes which have occurred in that structure, especially since 1970. The welfare levels of area residents as measured by income levels, income distribution, and unemployment rates are also emphasized. Because agriculture has been the single most important sector, special attention is given to its characteristics and recent trends in employment and production.

A description of the region's infrastructure is provided in Chapter 3.0. An identification is made of the services provided by the private sector. Of concern here are those areas likely to be most affected by rapid population growth. These would include the delivery of public

services such as education, police and fire protection, water supply and sewerage services, and various types of health care. Data is provided on expenditures for the several types of services and also for revenues available to various governmental units providing these services.

The physical environment of the Uintah Basin is described in Chapter 4.0. Emphasis is given to the profile of land use and ownership, especially that within urban areas and adjacent land suitable for urban development. In addition, water supplies, a critical element in any assessment of future economic growth, and water uses are reviewed. Culinary water systems in the several cities are examined both for delivery capacity and quality.

The social and cultural environment of the region is described in Chapter 5.0. This chapter provides a description of selected demographic features of area residents, a sketch of the several cultures that coexist in the region, and an analysis of attitudes toward existing conditions and potential development as revealed by two surveys and newspaper editorials. In addition, a description of various historical, archaeological, and paleontological features of the region is provided.

Selected aspects of the institutional environment are described and analyzed in Chapter 6.0 Included are a review of important legal and institutional constraints on development and a discussion of new institutions created to deal with development problems. Attention is also given to the revenue timing and distribution problems created by rapid population growth.

Projected growth of population and employment in the Uintah Basin in the absence of any oil shale development is the subject of Chapter 7.0.

Two sets of baseline projections are presented. The first is that known as the Utah Process, developed by the Office of the State Planning Coordinator, State of Utah. These projections, made through 1990, indicate rapid population growth to 1980 as a result of conventional energy exploration and production activities, but do not assume any significant oil shale development. These data will be used as the baseline or benchmark projection of population and economic activity in the Phase II study. The widely used OBERS projection is also reviewed, but that data has been rendered obsolete by rapid growth in the Basin since 1970. The projection is reviewed for two reasons: 1) to indicate the pattern of development that would have occurred if there had been no energy related development; and 2) to meet the recommendation of the Council on Environmental Quality (1973) that the OBERS projections be used in the preparation of environmental impact statements.

2.0 ECONOMIC ENVIRONMENT

The objectives of this chapter are: to provide a detailed description of the economy of the study area; to compare it to the economic structure of Utah and the United States; to assess welfare levels of area residents through an analysis of comprehensive data on income levels and distribution and unemployment rates; and to anticipate some of the changes that could be expected if a major oil shale mining and processing complex were to be developed. Throughout the discussion, those economic activities or characteristics that are likely to be significantly impacted will be emphasized. A secondary objective is to add the economic data to the base developed in this Phase I study that will serve as the basis for the impact analyses.

This chapter will deal only with the historic and current economic situations. The neutral or base-line projections of population and economic activity (i.e., the no-project alternative scenario) will be outlined in Chapter 7.0, and the future economic situation assuming large scale oil shale development will be developed in the Phase II report.

The historic period is divided into the pre-1971 period, especially the years 1960 and 1970 for which there exists detailed economic data from the U.S. Census of Population taken in each of those years, and the more recent 1971-1974 period which has been one of significant change for the study area but for which the data base is much more limited. Increased activity in conventional oil and gas exploration and production has resulted in rapid growth of employment and

population in the Uintah Basin since 1970. These changes are assessed primarily by using data developed by state agencies and other non-federal sources.[a]

2.1 Economic Structure and Growth

The economic structure of the region is best described by the distribution of employment by sector and the sources of personal income and earnings. Summary data for the three-county area are shown in Tables 2.1-1 and 2.1-2. (Detailed employment and income data for each of the three counties are included in Tables 1-6 in Appendix A). Reference to Table 2.1-1 indicates that agriculture, accounting for almost 15 percent of total employment, is the most important basic or export sector; mining is second with 12.6 percent of employment. If indirect relationships were included, agriculture would be relatively more important because some employment in other sectors (e.g., farm implement and supply dealers, processors of agricultural production, and transportation) is directly linked to the agricultural sector.

As is true in most regions, the trade and services sectors are the largest in terms of relative share of employment. Furthermore, the shares of employment accounted for by these sectors tend to vary

[a]The comprehensive and high quality data published by the Utah Department of Employment Security (1974a and 1974b, for example) were invaluable in evaluating the 1971-1974 trends.

TABLE 2.1-1

EMPLOYMENT BY INDUSTRY AND PERCENTAGE COMPOSITION, UTAH, STUDY AREA, AND DUCHESNE, UINTAH, AND RIO BLANCO COUNTIES; 1970

Industry	Utah (State)	Study Area	County		
			Duchesne	Uintah	Rio Blanco
Agriculture	15,158 (3.9%)	1,268 (14.8%)	466 (19.3%)	496 (11.9%)	306 (15.5%)
Mining	11,549 (3.0)	1,081 (12.6)	86 (3.6)	715 (17.2)	280 (14.1)
Contract construction	20,763 (5.3)	582 (6.8)	160 (6.6)	270 (6.5)	152 (7.7)
Manufacturing	56,279(14.5)	422 (4.9)	137 (5.7)	243 (5.8)	42 (2.1)
Transportation, communication, and public utilities	25,467 (6.5)	482 (5.6)	158 (6.5)	230 (5.5)	94 (4.7)
Wholesale and retail trade	83,109(21.4)	1,720 (20.1)	460 (19.1)	966 (23.2)	294 (14.8)
Finance, insurance and real estate	16,166 (4.2)	194 (2.3)	38 (1.6)	100 (2.4)	56 (2.8)
Services	108,511(27.9)	2,054 (24.0)	648 (26.9)	803 (19.3)	603 (30.5)
Government	52,230(13.4)	753 (8.8)	260 (10.8)	340 (8.2)	153 (7.7)
Total	389,232	8,556	2,413	4,163	1,980

Source: From computer tapes provided by Regional Economics Information System, Bureau of Economic Analysis, U.S. Department of Commerce, 1974.

TABLE 2.1-2 TOTAL PERSONAL INCOME AND EARNINGS, STUDY AREA, 1959 and 1971 ($000)

	1959	1971
Personal Income:	37,220	82,637
Wage and salary disbursements	22,032 (59.2%)[a]	47,695 (57.7%)
Other labor income	709 (1.9)	2,295 (2.8)
Proprietors' income	8,797 (23.6)	15,136 (18.3)
Farm	4,288 (11.5)	9,569 (11.6)
Non-farm	4,509 (12.1)	5,567 (6.7)
Property income	4,195 (11.3)	12,454 (15.1)
Transfer payments	2,448 (6.6)	8,016 (9.7)
Less: Contributions for social insurance	678	2,959
Earnings:	31,538	65,126
Farm earnings	5,311 (16.8%)[b]	11,251 (17.3%)
Non-farm earnings	26,227 (83.2)	53,875 (82.7)
Government	5,377 (17.0)	12,160 (18.7)
Federal	1,868 (5.9)	3,869 (5.9)
State and local	3,509 (11.1)	8,291 (12.7)
Private	20,850 (66.1)	41,715 (64.1)

[a]Percent of total personal income

[b]Percent of total earnings

Source: Derived from data in Tables II-4 through II-6 (Appendix II).

only slightly among multi-county regions throughout the country. These are the population-dependent or population-serving sectors which tend to grow roughly in proportion to population (or basic employment), and are not considered as "driving forces" in regional economic change. That is, employment in trade and services is determined by population growth which, in turn, is determined by change in the basic sectors such as agriculture, mining, manufacturing, and government.

Between 1960 and 1970, both Duchesne and Uintah Counties experienced employment growth of 14.5 and 19.3 percent, respectively (Table 2.1-3). Rio Blanco County experienced a small (1.2 percent) decline. In the three-county area, growth in the manufacturing, trade, services, and government sectors more than offset the large declines in agriculture and mining employment. Despite the 20 percent reduction in employment in agriculture, this sector still did not decline as rapidly in the region as it did in the nation. Major employers in the area are listed in Table 2.1-4.

Of the $82.6 million in total personal income received in the study area in 1971, $65.1 million or 79 percent represented labor earnings, either wage and salary disbursements, other labor income, and proprietors' income (Table 2.1-2). Farm activity accounted for 17.3 percent of total earnings.

The recent period 1971-1974 has been one of accelerated growth for the Uintah Basin, especially in Duchesne County and, to a lesser extent, in Uintah County (Table 2.1-5). All relevant economic indicators, i.e., population, employment, and income, have been growing at rates significantly higher than those achieved in the 1960-1970

TABLE 2.1-3

PERCENTAGE EMPLOYMENT GROWTH BY INDUSTRY, UNITED STATES, UTAH, AND DUCHESNE, UINTAH, AND RIO BLANCO COUNTIES, 1960-70

Industry	United States	Utah	County		
			Duchesne	Uintah	Rio Blanco
Agriculture	-35.6%	-19.2%	-21.2%	-26.8%	-12.8%
Mining	-5.7	-13.8	-3.4	23.9	-34.3
Contract Construction	13.9	-4.4	-19.2	-17.9	-2.6
Manufacturing	10.0	13.2	30.5	35.8	-20.8
Transportation, communication and public utilities	12.4	3.7	4.6	5.0	-40.1
Wholesale and retail trade	26.8	34.0	14.7	60.5	4.6
Finance, insurance, and real estate	37.9	33.0	11.8	112.8	24.4
Services	42.8	59.2	45.6	13.4	30.2
Government	23.8	48.8	176.6	126.7	88.9
Total Employment	19.5%	27.4%	14.5%	19.3%	-1.6%

TABLE 2.1-4 MAJOR EMPLOYERS IN DUCHESNE, UINTAH, AND RIO BLANCO COUNTIES

County	Employer	Number of Employees
Duchesne	Duchesne School District	325
	Federal, state, and local government	250
	Loffland Brothers (oil well drilling)	160
	Shell Oil Co.	150
	Brinkerhoff Drilling Co. (oil well drilling)	100
Uintah	Uintah School District	400
	Federal, state, and local government	390
	Ute Indian Tribe Offices	300
	American Gilsonite Company	115
	Aston Brothers	100
	Stauffer Chemical Company	80
Rio Blanco	State and local government	600
	Chevron Oil Co.	a
	Texaco, Inc.	a

[a]Employment levels not available.

decade, and in some cases at rates several times higher than those for the state. Because growth in the state has also accelerated in the state in recent years, the development pace in the Uintah Basin is even more impressive. For example, the annual rate of population growth since 1970 in Duchesne and Uintah Counties has been 11.9 and 5.7 percent, respectively, compared to an annual growth rate for the state of 3.9 percent. This growth is largely attributable to a significant expansion of conventional oil and gas exploration and production activity. It is expected that these activities will expand through 1980 (see Chapter 7.0) causing further employment and population growth. It is important to emphasize that this growth in the Uintah Basin is occurring and will continue to occur whether oil shale proposals are implemented or not. State and local government and business leaders must be aware of this fact.

The development of an oil shale industry in the Basin would change significantly the industrial structure of the region. The mining and manufacturing sectors would increase in relative size while agriculture would continue to decline, possibly at a more rapid rate as farmers and farm workers found expanded off-farm employment opportunities. The trade, services, and transportation sectors would tend to maintain their relative size; of course, absolute employment in those sectors would increase significantly. The decline in agriculture also could be accelerated by transfers of land and water resources to urban and industrial uses, and by the outward flow of agricultural labor to the relatively high wage petroleum and related industries.

TABLE 2.1-5

SELECTED CHARACTERISTICS OF ECONOMIC GROWTH, UTAH AND DUCHESNE, UINTAH, AND RIO BLANCO COUNTIES, 1970-1974

	Population	Civilian Labor Force	Employment	Unemployment Rate	Personal Income (000)	Nonagricultural Payroll Wages (000)	Construction (000) Total[d]	Residential	Nonresidential	No. of New Dwelling Units
Utah (State):										
1970	1,066,000	415,900	390,700	6.1%	$3,416,000	$2,274,807	$222,358	$117,029	$ 87,288	9,070
1971	1,085,000	432,200	403,700	6.6	3,710,000	2,469,649	322,268	176,821	121,564	12,777
1972	1,128,000	454,160	425,860	6.2	4,197,000	2,794,377	387,280	256,519	98,955	17,320
1973	1,150,000	480,400	452,700	5.8	4,690,000	3,127,897	427,514	240,930	150,296	13,450
1974	1,240,000[a]	501,600	b	b	5,261,000[a]	3,528,372[a]	464,480	237,964	174,199	11,501
Growth Rate[c]	3.9%	4.8%	5.0%	--	11.4%	11.6%	20.2%	19.4%	18.9%	6.1%
Duchesne Co.:										
1970	7,400	2,880	2,580	10.4%	$17,604	$8,877	$ 381	$ 243	$71	20
1971	7,900	3,050	2,780	8.9	18,936	10,748	900	592	163	43
1972	9,700	3,780	3,605	4.6	30,465	18,135	3,837	2,128	1,321	120
1973	11,200	4,980	4,790	3.8	47,284	27,324	2,952	1,312	1,360	63
1974	11,600[a]	5,580	b	b	52,939	31,856	3,265	1,055	2,022	61
Growth Rate	11.9%	18.0%	22.9%	--	31.7%	37.6%	71.1%	44.3%	131.0%	32.2%
Uintah County:										
1970	12,800	4,750	4,470	5.9%	$35,620	$20,311	$1,643	$1,243	$300	95
1971	13,300	5,140	4,830	6.0	38,614	22,045	1,701	1,158	356	74
1972	14,400	5,880	5,620	4.4	50,180	30,785	4,388	2,008	2,178	122
1973	15,200	6,260	6,040	3.5	59,003	36,536	4,728	2,442	2,107	127
1974	16,000[a]	6,580[a]	b	b	70,443[a]	45,354[a]	5,252	2,584	2,439	119
Growth Rate	5.7%	8.5%	10.6%	--	18.6%	22.2%	33.7%	20.1%	68.9%	5.8%
Rio Blanco Co.:										
1970	4,842	1,988	1,946	2.1%						
1971	4,850	2,147	2,071	3.5						
1972	4,880	1,926	1,864	3.2	b	b	b	b	b	b
1973	5,040	2,037	1,967	3.4						
1974	5,080	2,070	2,020	2.4						
Growth Rate	1.2%	1.0%	0.9%	--						

[a] Preliminary

[b] Data not available

[c] Average annual rate of growth 1970-1974 or 1970-1973.

[d] Includes additions to existing buildings.

Source: Utah data--Utah Dept. of Employment Security, 1974; Bureau of Business & Economic Research, Univ. of Utah, 1974 and 1975.
Colorado Data--from worksheets provided by Division of Employment, State of Colorado, April, 1975, and from Monarchi, 1974.

Possible change in the cyclical stability of the region also is an important consideration. Personal income and earnings in Duchesne and Uintah Counties have been characterized by cyclical fluctuations over the period 1950-1971, largely explained by significant changes in agricultural revenues (see tables 4 through 6 in Appendix A). The developing conventional oil and gas exploration and production industry also may be subject to cyclical fluctuation. Price changes, resource discovery or depletion, and technological advance can have significant impacts both positive and negative on production and employment levels.

An oil shale complex, because of the known reserves of shale and the massive fixed capital stock, probably would not be subject to wide swings in output. Thus, it would add stability to the regional economy. If, as projected in Chapter 7.0, population and employment in the Basin begin to decline after 1980 as conventional oil and gas activity subsides, oil shale development would pick up any slack in the local economy. Thus, shale oil production would be a stabilizing force for the regional economy.

Another advantage associated with the growing size of the economy, especially growth in population and income, is that it facilitates an expansion of the range of activities that take place in the region. Low-population areas are often characterized by a lack of certain higher-order goods and specialized services. As population and income grow, thresholds are reached where additional activities (e.g., movies, department stores, legal services) become profitable. Truly one of the most important advantages of broad-based economic growth

is that the average resident has an expanded range of choice of places to spend his higher income as well as a broader range of employment opportunities. If other factors are assumed constant, such expanded range of choice implies a definite increase in the welfare of the average resident of the region.

2.2 Area Welfare: Income Levels and Distribution

In this section, average levels of income, the distribution of income, and average wage rates are used to assess the welfare status of residents in the study area. Where relevant these measures are compared to state and national data in order that comparisons can be made.

Table 2.2-1 shows median family income and the proportion of families at the extremes of the income distribution for the United States, Utah, and selected counties. The counties include those in the study area as well as several Utah counties at the high and low ends of the income scale. In 1960, median income in Utah was actually above the national average, but by 1970 the state average had fallen to a level six percent below that for the nation. 1970 median income in Uintah, Duchesne, and Rio Blanco Counties, ranging from $7,572 to $8,082, is significantly below the state average of $9,320 although these counties tend to rank in the middle of the ranking of all Utah counties. The highest incomes in the state are found in the urbanized counties along the Wasatch front; data for two of these, Davis ($10,871) and Weber ($10,071), are shown in the table. The lowest incomes in the state are found in the rural counties, such as Sanpete ($6,409) and Wayne ($5,836).

In general, Utah has had the most equal distribution of income of any state in the nation. This is indicated by the data on proportions of families at the extremes of the income distribution (Table 2.2-1). The state and many of the counties have smaller proportions at the extremes than does the nation. The complete income

TABLE 2.2-1

MEDIAN INCOME, PERCENT OF FAMILIES WITH INCOME OF LESS THAN POVERTY LEVEL AND $15,000 (10,000)[a] OR MORE: UNITED STATES, UTAH, AND SELECTED COUNTIES; 1960 AND 1970

	1960			1970		
		Families with Income			Families with Income	
	Median Income	Less Than $3,000	$10,000 or More	Median Income	Less Than Poverty Level	$15,000 or More
United States	$5,620	21.7%	14.3%	$9,867	10.7%	22.3%
Utah	5,899	14.7	13.8	9,320	9.1	17.0
Counties:						
Davis	6,548	8.6	15.4	10,871	4.5	21.9
Weber	6,313	11.6	15.1	10,071	7.4	21.4
Uintah	5,281	20.4	9.3	8,082	13.9	11.0
Duchesne	4,663	29.3	8.8	7,572	13.9	9.6
Rio Blanco	5,888	15.9	14.0	8,010	10.1	11.0
Sanpete	3,755	37.6	4.5	6,409	17.3	8.3
Wayne	3,721	41.0	9.4	5,836	10.5	4.1

[a]$15,000 for 1970 and $10,000 for 1960.

Source: U.S. Bureau of the Census, 1963 and 1973.

distribution for the state, nation, and study area counties (Table 2.2-2) shows the tendency for this region to have a more equal distribution of income. Note that the state and counties have a significantly higher percentage of families in the $6,000-$9,999 range than does the nation, and much smaller proportions in the higher income classes.

Most research has indicated that industrialization of areas previously non-industrial in character tends to raise average income levels and to make the distribution of income more equal.[a] Further economic expansion and industrialization of the Uintah Basin could be expected, therefore, to maintain or increase the relative equality of income distribution. Furthermore, urban growth is also associated with increased quality in the distribution of income:

> All of this combines to suggest the hypothesis that the small city, with a large share of income originating in small business "profits", has a relatively high degree of income inequality, but as this [typically] regional service center acquires factories and grows in size it will probably also become a more egalitarian society. (Thompson, 1965:109)

Average wage rates in selected industries for Utah and the study area are shown in Table 2.2-3. Although there is considerable variability among industries within each area and between areas within a given industry, wage rates in the Basin are roughly comparable to the state average. It should be anticipated that oil shale development would result in significant increases in wages in almost all sectors. Rates in the construction, mining, and manufacturing sectors would increase as a direct result of the construction and operation of the oil shale complex. Because other sectors have to compete for labor in the same regional market, wage rates in those sectors (i.e., trades, services, government, and transportation) would also tend to

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[a] See Thompson, 1965:106-115, and Thompson and Mattila, 1968:63-80.

TABLE 2.2-2

INCOME DISTRIBUTION FOR FAMILIES AND UNRELATED INDIVIDUALS, UNITED STATES, UTAH, AND DUCHESNE, UINTAH, AND RIO BLANCO COUNTIES, 1970

Income Class	United States	Utah	County		
			Duchesne	Uintah	Rio Blanco
$0 - 2,999	(8.9%)	22,031 (8.8%)	219 (13.1%)[a]	303 (10.1%)	140 (10.9%)
$3,000 - 5,999	(16.2)	38,549 (15.4)	362 (21.6)	525 (17.4)	324 (25.2)
$6,000 - 9,999	(25.9)	77,728 (31.1)	583 (34.8)	1,154 (38.3)	415 (32.3)
$10,000 - 14,999	(26.8)	69,106 (27.7)	348 (20.8)	700 (23.2)	265 (20.6)
$15,000 - 24,999	(22.3)	34,253 (13.7)	151 (9.0)	279 (9.3)	127 (9.9)
$25,000 or more		8,154 (3.3)	10 (0.6)	52 (1.7)	14 (1.1)
Median Income	$9,867	9,320	$7,572	$8,082	$8,010
Per Capita Income	3,920	2,703	2,041	2,234	2,481

[a]Percent of families in class.

Source: U.S. Bureau of the Census, 1973.

TABLE 2.2-3 AVERAGE MONTHLY NONAGRICULTURAL PAYROLL WAGE, BY MAJOR INDUSTRY DIVISIONS, UTAH, DUCHESNE, AND UINTAH COUNTIES, 1973

	Utah	Duchesne County	Uintah County
Manufacturing	$714	$512	$492
Mining	949	909	a
Construction	813	816	a
Transportation	885	672	778
Trade	481	406	510
Finance	585	600	a
Services	452	513	460
Government	680	533	622
Total	624	660	620

[a]Not published to avoid disclosure of individual firm data.

Source: Utah Department of Employment Security, 1974.

rise. This indirect response of wage rates in one sector to changes in rates in another is referred to as the "wage roll-out" effect, and has been documented in a number of studies (Thompson, 1965:70-74; and Lewis, 1969:206-219).

Growth in wage rates and per capita income is shown in Tables 2.2-4 and 2.2-5. From 1950 through 1970, wage rates in Duchesne County tended to be significantly below the state average; since 1970, however, they have increased rapidly, and, by 1973, stood six percent above the state average of $624 per month. Historically, wage rates in Uintah County have been close to the state levels, but at 1970 stood almost nine percent lower. Again, rapid increase through 1973 brought the county level to approximate parity with the state. In fact, wage rates in the Basin have now reached levels close to those observed in the urbanized counties along the Wasatch Front.[a]

Per capita income levels in the Uintah Basin counties have also grown rapidly since 1970, reflecting the improving economic situation there (Table 2.2-5). This measure has increased at annual rates of 18.3 and 12.3 percent, respectively, in Duchesne and Uintah Counties. The comparable rates of increase for the nation and state were 8.7 and 8.2 percent, respectively. By 1973, per capita income in the Basin was almost equal to the state level.

In summary, further industrialization of the Uintah Basin, whether it be through the development of an oil shale complex or

[a]Average 1973 wage rates in those counties were: Davis--$751; Weber--$580; Salt Lake--$648; Tooele--$687; and Provo--$552.

TABLE 2.2-4

AVERAGE MONTHLY NONAGRICULTURAL PAYROLL AND PERCENT OF STATE AVERAGE, UTAH, AND DUCHESNE AND UINTAH COUNTIES, SELECTED YEARS, 1950-1973

	Utah	Duchesne County	Uintah County
1950	$236	$185 (78.4%)[a]	$217 (91.9%)[a]
1955	30C	228 (76.0)	302 (100.7)
1960	368	278 (75.5)	394 (107.1)
1965	430	283 (65.8)	426 (99.1)
1970	529	460 (87.0)	482 (91.1)
1971	555	498 (89.7)	490 (88.3)
1972	589	579 (98.3)	551 (93.5)
1973	624	660 (105.8)	620 (99.4)

[a]Percent of average monthly wage for Utah.

Source: Utah Department of Employment Security, 1974.

TABLE 2.2-5

PER CAPITA INCOME: UNITED STATES, UTAH, AND DUCHESNE AND UINTAH COUNTIES: 1970-1973

Year	United States[a]	Utah[b]	County	
			Duchesne[b]	Uintah[b]
1970	$3,920	$3,200	$1,380	$2,780
1971	4,195	3,390	2.406	2,900
1972	4,549	3,720	3,140	3,480
1973	5,041	4,050	3,940	3,880
Average Annual Rate of Growth 1970-1973	8.7%	8.2%	18.3%	12.3%

Source: a) U.S. Bureau of Economic Analysis, 1974.
b) Utah Department of Employment Security, 1974.

other activities, should tend to increase wage and income levels and at least maintain the relatively equal distribution of income. Indeed, these trends have already been observed since 1970, a period when there has been a significant expansion of energy related industry (e.g., conventional drilling and exploration for gas and oil). Increases in wage levels, of course, mean an increase in general economic welfare although those who hire labor may find that their wage bill will be substantially higher than in the past. Farmers and ranchers, in particular, may find it necessary to pay higher wages to attract labor but may not experience increased demand for their output. One significant implication would be a reduction in the incidence of poverty among Uintah Basin families.

The incidence of poverty in Utah in 1970[a] as measured by the percentage of families having incomes below the poverty level (9.1 percent) is roughly comparable to the incidence in the United States (Table 2.2-6). The rate is somewhat higher in Uintah and Duchesne Counties (13.9 percent), and the difference is partially explained by the Indian population. In 1970, there were 782 families identified as being below the poverty level. The incidence of extreme poverty (i.e., family income less than 75 percent of the poverty level) is also higher in the Basin (8.6 percent of all families) than in Utah (5.9 percent).

It is anticipated that many, although not all, of these families would accrue economic benefits from further economic development of

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[a]The decennial census is the only source of information of this type.

TABLE 2.2-6

SELECTED MEASURES OF POVERTY: UNITED STATES, UTAH AND UINTAH BASIN COUNTIES, 1970

	United States	Utah	Uintah Basin Counties		
			Duchesne	Uintah	Rio Blanco
Income Less Than Poverty Level:[a]					
Families	5,482,886	22,802	419	233	130
Percent of all families	10.7%	9.1%	13.9%	13.9%	10.1%
Mean family income	1,942	$1,970	$2,337	$2,187	$1,256
Mean income deficit[b]	1,546	1,501	1,808	1,337	1,836
Percent receiving public assistance	21.4%	20.9%	20.0%	13.3%	---
Income Less Than 75 Percent of Poverty Level					
Families	a	14,692	259	148	104
Percent of all families	a	5.9%	8.6%	8.8%	8.1%
Mean income deficit[b]	a	$1,212	$1,563	$954	$1,329
Income Less Than 125 Percent of Poverty Level					
Families	a	33,339	540	322	209
Percent of all families	a	13.3%	17.9%	19.2%	16.3%
Mean income deficit[b]	a	$1,767	$2,327	$1,721	$1,838

[a] Not reported on a comparable basis.

[b] The income deficit is the difference between the mean income of families and unrelated individuals below the poverty level and their respective poverty thresholds.

Source: U.S. Bureau of the Census, 1973.

the region. Strong labor demand will not only tend to drive up income and wages, but will also create employment opportunities for many who have been only marginal members of the labor force for reasons of inadequate training, discrimination, or lack of initiative.

In summary, median income levels in the Uintah Basin have been significantly below state and national averages. Rapid economic growth since 1970 has resulted in above average growth in regional wage rates and average income levels; 1973 data indicates that Duchesne and Uintah Counties have reached approximate parity with the state in terms of these measures. Although accurate data is unavailable, it is reasonable to expect that the incidence of poverty in the Basin has declined significantly since 1970.

2.3 Area Welfare: Unemployment

During the periods 1960-1970 and 1971-1974, the unemployment rate in Utah averaged 0.6-0.7 percentage points more than the national rate (Table 2.3-1). In the first period, the average unemployment rate in Duchesne County was substantially higher (8.9 percent); unemployment in Uintah County was similar to the state experience. The higher rate in Duchesne County, again, is explained by the very high unemployment rates among the American Indian population. Since 1970, unemployment rates in the Uintah Basin have been significantly lower than the state and national levels, reflecting the accelerated employment growth in the region.

Data for the most recent six months (Table 2.3-2) indicate essentially full employment conditions in the Basin in the fall, with the rates increasing during the winter months. As the local data is not seasonally adjusted, the increased unemployment is largely explained by seasonal factors (i.e., a significant reduction in farm employment and some loss of construction jobs because of cold weather) rather than any fundamental change in the strong economic conditions in the three-county area.

Information on differential unemployment rates between the white and minority sectors of the labor force is extremely limited, but what is available suggests that the current situation is one of very low unemployment (i.e., full employment) for white workers and substantial unemployment among minority workers. As shown in Table 2.3-3, the 1973 unemployment rates among white workers in Duchesne and

TABLE 2.3-1

AVERAGE UNEMPLOYMENT RATES, UNITED STATES, UTAH, AND DUCHESNE, UINTAH, AND RIO BLANCO COUNTIES, 1950, 1955, AND 1960-1974

Year	United States[a]	Utah[b]	County		
			Duchesne[b]	Uintah[b]	Rio Blanco[c]
1950	5.3%	5.5%	8.7%	7.9%	
1955	4.4	4.1	7.6	5.6	
1960	5.5	4.8	8.3	4.6	
1961	6.7	5.3	9.7	5.0	
1962	5.5	4.9	9.0	2.3	
1963	5.7	5.4	12.2	4.7	
1964	5.2	6.0	9.3	8.3	
1965	4.5	6.1	8.9	5.9	
1966	3.8	4.9	6.1	5.5	
1967	3.8	5.2	7.5	5.3	
1968	3.6	5.4	8.2	5.1	
1969	3.5	5.2	8.7	4.6	
1970	4.9	6.1	10.4	5.9	2.1%
1971	5.9	6.6	8.9	6.0	3.5
1972	5.6	6.2	4.6	4.4	3.2
1973	4.9	5.8	3.8	3.5	3.4
1974	5.6	6.0	4.7	4.7	2.4
1960-1970 average	4.8%	5.4%	8.9%	5.2%	--
1971-1974 average	5.5	6.2	5.5	4.7	2.9%

Source: a) U.S. Bureau of Labor Statistics, 1974a.
b) Utah Department of Employment Security, 1974.
c) From worksheets provided by the Division of Employment, State of Colorado.

TABLE 2.3-2

UNEMPLOYMENT RATES, UNITED STATES, UTAH AND DUCHESNE, UINTAH, AND RIO BLANCO COUNTIES, SEPTEMBER 1974--FEBRUARY 1975

	United States[a,s]	Utah[b,s]	County		
			Duchesne[b,n]	Uintah[b,n]	Rio Blanco[c,n]
1974					
September	5.8%	5.9%	3.7%	1.4%	1.8%
October	6.0	5.8	3.0	2.5	2.6
November	6.6	5.8	4.2	3.1	2.1
December	7.2	5.8	4.8	4.5	2.2
1975					
January	8.2	6.5	7.9	6.7	1.7
February	8.2	6.8	8.0	7.5	2.7

[s]Seasonally adjusted.

[n]Not seasonally adjusted.

Source: a) U.S. Bureau of Labor Statistics, 1975.
b) Data supplied by Mr. Kenneth Jensen, Utah Department of Employment Security, March 17, 1975.
c) From worksheets provided by the Division of Employment, State of Colorado.

TABLE 2.3-3

WHITE AND MINORITY GROUP UNEMPLOYMENT RATES, UNITED STATES AND UINTAH BASIN COUNTIES, 1970 AND 1973

		United States	Utah	Uintah Basin Counties		
				Duchesne	Uintah	Rio Blanco
1970: Total	M	3.4	4.7	a	a	a
	F	5.2	5.9			
White labor force	M	3.6	4.7			
	F	4.8	5.9			
Minority labor force						
Negro	M	6.3	10.2			
	F	7.7	8.9			
Persons of Spanish language	M	5.8	9.7			
	F	8.1	10.1			
1973 (estimated):						
White labor force		4.3	a	3.2	3.0	a
Minority labor force		8.9	a	15.0	12.0	a

[a]Not available

Source: 1970 Data--U.S. Bureau of the Census, 1973.
1973 Data--Interview with Mr. Kenneth Jensen, Utah Department of Employment Security, April 4, 1975, and Bureau of Labor Statistics, 1975.

Uintah Counties were estimated at 3.2 and 3.0 percent, respectively, while the rates for minority workers were 15.0 and 12.0 percent.[a]

In summary, unemployment rates in the Basin through 1970 tended to be higher than in Utah or the nation. This was especially true for Duchesne County. Since 1970, however, strong demand for labor has resulted in below average unemployment rates in the region; by mid-1974 these rates had fallen to minimum levels (e.g., 1.4 percent in Uintah County in September). The expectation of continued employment growth even without shale development should keep the unemployment rate at a minimal level for the near future. Because of the "boom-bust" nature of conventional energy activity, however, the possibility of production declines and periods of high unemployment must be considered as probable. Oil shale development would probably create a situation of over-full employment for several years before the migration response was sufficient to generate more than sufficient labor supply, and would add stability to the labor demand function.

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[a]Native American Indians and Spanish Americans account for most of the minority labor force in the Basin.

2.4 Labor Force Characteristics

Selected labor force characteristics for the Uintah Basin counties and for the United States and Utah are presented in Tables 2.4-1 through 2.4-3. Labor force participation rates in Uintah and Rio Blanco counties are comparable to levels in the state and national economies. The participation rate in Duchesne County is, in general, significantly lower than the national and state average as a result of the significant Indian population and the much lower rate of labor force participation that characterizes that ethnic group. For the three-county area, the participation rate for male workers between 25 and 64 years of age is in excess of 90 percent.

The Basin is not characterized by significant long distance commuting. In both Utah and the United States, about one quarter of all workers are employed outside their county or residence, suggesting a significant commuting distance for these workers. In Duchesne and Uintah Counties only 11 and 8 percent, respectively, of the workers commute to an employment location outside their residential county. In Rio Blanco County less than 3 percent of the workers are commuters by this definition. Data on within-county commuting is unavailable; an effort will be made to develop data on that variable as part of the Phase II analysis.

The development of a major oil industry in the region would undoubtedly tend to increase the frequency of long distance commuting. One should expect significant inter-county commuting among the Uintah Basin counties and some commuting, although not on a significant scale, from Daggett County in Utah and perhaps Moffat County in Colorado. Thus, not only would there be an expansion in total employment in the

TABLE 2.4-1

LABOR FORCE AND LABOR FORCE CHARACTERISTICS: UNITED STATES, UTAH AND UINTAH BASIN COUNTIES, 1970

	United States	Utah	Uintah Basin Counties		
			Duchesne	Uintah	Rio Blanco
Males, 16 and older	67,235,510	330,157	2,244	3,843	1,675
In labor force	51,502,114	257,835	1,654	3,118	1,334
Percent of total	76.6	78.1	73.7	81.1	79.6
Females, 16 and older	73,851,760	351,169	2,214	3,840	1,578
In labor force	30,546,667	145,799	828	1,265	654
Percent of total	41.4	41.5	37.4	32.9	41.4
Percent in labor force:					
Male: 25-34 years	93.9%	93.1%	89.8%	96.6%	96.8%
35-44 years	94.8	96.2	87.6	93.7	98.6
45-64 years	87.2	90.7	82.5	95.7	87.4
Over 65	24.8	30.2	38.7	38.1	32.8
Female: 25-34 years	44.9	39.4	33.1	29.0	43.2
35-44 years	50.3	49.1	43.8	38.3	64.4
45-64 years	47.8	49.5	48.0	45.2	47.1
Over 65	10.0	9.7	8.8	10.0	7.3
Nonworker-Worker Ratio	1.87	1.58	1.87	1.82	1.39
Percent working outside county of residence	25.0%	23.4%	11.3%	8.2%	2.4%

Source: U.S. Bureau of the Census, 1973.

TABLE 2.4-2

MEDIAN ANNUAL EARNINGS OF EXPERIENCED CIVILIAN LABOR FORCE IN SELECTED OCCUPATION GROUPS, 1969

	Utah	Uintah Basin Counties		
		Duchesne	Uintah	Rio Blanco
Male:	7,454	6,345	7,285	6,367
Professional, managerial and kindred workers	9,606	8,455	8,387	8,837
Craftsmen, foremen and kindred workers	8,645	7,361	7,560	7,987
Operatives, including transport	6,773	5,763	7,382	5,590
Laborers, except farm	3,987	5,563	5,382	6,792
Farmers and farm managers	4,816	4,667	4,692	3,417
Farm laborers	2,244	3,361	3,225	3,757
Female:	2,917	2,073	2,620	2,462
Clerical and kindred workers	3,502	2,393	3,156	2,646
Operatives, including transport	2,830	---	2,059	---

Source: U.S. Bureau of the Census, 1973.

TABLE 2.4-3

OCCUPATIONAL PROFILE; UNITED STATES, UTAH, AND UINTAH BASIN COUNTIES, 1970

Occupation	United States (000)	Utah	Uintah Basin Counties		
			Duchesne	Uintah	Rio Blanco
Professional, technical, and kindred workers	11,349	65,127	424	510	255
Managers and administrators	6,371	34,822	247	397	204
Sales workers	5,443	26,565	153	219	52
Clerical and kindred workers	13,745	69,870	229	470	240
Craftsmen, foremen, and kindred workers	10,608	55,044	247	600	286
Operatives, except transport	10,497	36,971	199	599	203
Transport equipment operatives	2,958	14,069	108	221	48
Laborers, except farm	3,427	16,181	135	201	69
Farmers and managers	1,426	6,900	278	268	155
Farm laborers and forement	954	4,815	95	110	134
Service workers	8,625	45,563	233	456	269
Private household workers	1,152	2,635	19	23	31
Total Employed	76,554	378,562	2,367	4,074	1,946

Source: U.S. Bureau of the Census, 1973.

region but it should also be expected that average commuting distances would tend to increase. The combination of these two factors implies a more than proportionate increase in traffic volume on the area highway and road network.

In Table 2.4-3 the occupational profile for the region, state, and nation is shown. Clearly, rapid economic development will cause significant changes in the regional distribution of occupations. Increases could be expected in the professional and managerial classes as well as in the operative and transport equipment operative class. It is expected that the relative, if not absolute, numbers of farmers and farm workers would decline. The relative proportions of workers accounted for by the clerical, sales, and service workers could be expected to remain about constant as their numbers expand roughly in proportion to population.

Secondary data on wage rates for occupations in the Uintah Basin are nonexistent. Data for selected occupations in the Salt Lake City metropolitan area are provided (Table 2.4-4) as an indicator of the wage structure in the region. Data on the wage rates for building tradesmen in both the Denver and Salt Lake City areas are presented in Table 2.4-5. These data are taken from the Bureau of Labor Statistics Wage Survey made in 1972; estimates of first quarter 1975 wage rates were made by adjusting the 1972 data upward in proportion to growth in wage rates at the national level.

Undoubtedly, wage rates in the Salt Lake City area are in many cases higher than those for comparable occupations in the Uintah Basin. But, rapid employment growth in the Basin will mean that employers will

TABLE 2.4-4

MIDDLE RANGE OF WEEKLY EARNINGS, SELECTED OCCUPATIONS IN SALT LAKE CITY, UTAH, METROPOLITAN AREA, NOVEMBER, 1972, AND ESTIMATES FOR FIRST QUARTER, 1975

	November 1972	First Quarter 1975 (estimated)[a]
Office Occupations:		
Secretaries	$111.50 - $152.00	$128.00 - $175.00
Accounting Clerks (Class A)	108.50 - 154.00	125.00 - 177.00
Typists (Class A)	91.50 - 120.00	105.00 - 138.00
Professional and Technical Occupations:		
Computer Programmers (Class A)	$207.50 - $282.50	$239.00 - $325.00
Draftsmen (Class A)	174.50 - 212.50	201.00 - 244.00
Computer Operators (Class A)	144.00 - 199.50	166.00 - 229.00
Maintenance and Power Plant Occupations (Hourly Earnings):		
Maintenance Carpenters	$4.55 - $4.76	$5.25 - $5.45
Maintenance Electricians	4.63 - 4.98	5.30 - 5.75
Automotive Mechanics (Maintenance)	4.55 - 5.95	5.25 - 6.85
Maintenance Pipefitters	4.82 - 4.92	5.55 - 5.65
Custodial and Material Movement Occupations (Hourly Earnings):		
Janitors, Porters, and Cleaners:	$1.66 - $2.24	$1.90 - $2.60
Order Fillers	2.60 - 3.38	3.00 - 3.90
Truck Drivers	2.84 - 4.53	3.25 - 5.20
Warehousemen	2.40 - 3.27	2.75 - 3.75

[a]Estimated based on a 15 percent average increase in wage rates in the private non-farm sector.

Source: U.S. Bureau of Labor Statistics, 1973.

TABLE 2.4-5 HOURLY WAGE RATES[a] FOR BUILDING TRADES, DENVER AND SALT LAKE CITY, JULY 1, 1972, AND ESTIMATES FOR FIRST QUARTER 1975

	July 1, 1972		First Quarter, 1975 (estimated)[b]	
	Denver	Salt Lake City	Denver	Salt Lake City
Journeymen:				
Boilermakers	$7.80	$6.95	$8.75	$7.80
Bricklayers	8.25	7.48	9.25	8.40
Carpenters	6.57	7.00	7.40	7.85
Cement Finishers	6.55	7.00	7.35	7.85
Electricians	7.62	8.05	8.55	9.00
Power Equipment Operators	5.80	8.00	6.50	9.00
Lathers	7.19	6.94	8.05	7.80
Pipefitters	7.70	7.06	8.65	7.90
Structure-Iron Workers	6.75	6.88	7.55	7.70
Helpers and Laborers:				
Bricklayers Tenders	$4.58	$5.20	$5.15	$5.85
Building Laborers	4.25	4.96	4.76	5.55
Plumbers Laborers	4.84	4.94	5.45	5.55

[a] Excluding fringe benefits which typically add 5 to 15 percent to hourly wage costs.

[b] Estimates based on a 12.1 percent increase in wage rates in the contract construction industry since mid-1972.

Source: U.S. Bureau of Labor Statistics, 1974b.

have to compete for labor in a regional, not local, market so that they will have to meet or exceed regional averages to attract the necessary labor.

Finally, summary data on late-shift pay provisions in manufacturing plants in Salt Lake City are shown in Table 2.4-6. The mean differential for workers on the second shift is $0.10 per hour and $0.15 per hour on the third shift. Of those firms having provisions for late shifts, about 90 percent offer a pay differential for the less desirable shifts.

TABLE 2.4-6

LATE-SHIFT PAY PROVISIONS FOR MANUFACTURING PLANTWORKERS BY TYPE AND AMOUNT OF PAY DIFFERENTIAL, SALT LAKE CITY METROPOLITAN AREA, NOVEMBER, 1972

Late-shift pay provision	Percent of Manufacturing Plantworkers In establishments having provisions for late shifts	
	Second shift	Third or other shift
Total	88.2	67.5
No pay differential for work on late shift	10.6	2.7
Pay differential for work on late shift	77.6	64.8
Type and amount of differential:		
Uniform cents (per hour)	63.0	43.7
5 cents	3.0	--
8 cents	2.0	--
10 cents	39.4	8.8
12 cents	11.9	--
15 cents	2.5	15.0
17 cents	1.9	--
18 cents	2.4	2.5
20 cents	--	10.9
24 cents	--	4.1
30 cents	--	2.5
Uniform percentage	10.9	10.9
4 percent	1.5	--
5 percent	5.5	--
6 percent	--	1.5
10 percent	4.0	5.5
12 1/2 percent	--	1.5
15 percent	--	2.4
Full day's pay for reduced hours	2.2	2.2
Other formal pay differential	1.5	8.1

Source: U.S. Bureau of Labor Statistics, 1973.

2.5 The Agricultural Sector

Because agriculture is the single most important sector in the region and because it is likely to be significantly impacted by oil shale development, a detailed description of farm characteristics and activities is provided here. As indicated above, a significant part of economic activity in some other sectors also is linked closely to agriculture (e.g., processing, trade, and transportation) so that the total share of employment and income, both direct and indirect, is substantial.

Selected data on this sector are shown in Tables 2.5-1 and 2.5-2.[a] The area is characterized by relatively large average farm sizes, ranging from 723 acres in Duchesne County to almost 3,300 acres in Rio Blanco County.

Because much of the land area is unsuitable for any agricultural use, only 34 percent of the region's seven million acres are in farms. In addition, much of the farmland is of marginal quality, as indicated by the relatively low average value per acre which ranges from $44 in Uintah County to $86 in Rio Blanco County, based on 1969 data.

Sales of livestock, (beef cattle primarily and some sheep), account for about 90 percent of total agricultural revenues although crop production is probably more important than suggested by the sales

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[a] These data are drawn from the 1969 Census of Agriculture, which is the most recent set of comprehensive data available on local area agricultural activity. At March, 1975, data for the 1974 Agricultural Census are being collected, but it will be several years before it is published.

TABLE 2.5-1 FARMS, LAND IN FARMS, AND LAND USE, DUCHESNE, UINTAH, AND RIO BLANCO COUNTIES, 1969

	Duchesne County	Uintah County	Rio Blanco County
Number of farms	564	526	170
Land in farms, acres	408,209	1,443,299	556,544
Average size of farm, acres	723.4	2,743.9	3,273.9
Approximate county land area, acres	2,082,944	2,871,680	2,088,384
Proportion in farms	19.6%	50.3%	26.7%
Value of land and buildings	$35,223,979	$64,147,065	$35,620,393
Average per farm	$62,453	$121,952	$209,531
Average per acre	$86.32	$44.44	$64.00
Land-use:			
Total cropland, acres	96,035	93,023	54,319
Harvested cropland, acres	44,299	38,965	33,811
Pasture or grazing, acres	46,937	43,665	8,950
All other cropland, acres	4,799	10,343	11,558
Woodland, acres	8,376	33,456	20,110
All other land, acres	303,618	1,316,820	482,135
Irrigated land, acres	96,548	74,288	29,553
Proportion of farmland	23.7%	5.1%	5.3%

Source: U.S. Department of Agriculture, 1973.

TABLE 2.5-2

FARM INCOME, SALES, AND EXPENSES; DUCHESNE, UINTAH, AND RIO BLANCO COUNTIES, 1969

	County		
	Duchesne	Uintah	Rio Blanco
Market value of all agricultural products sold	$6,257,616	$6,365,757	$5,600,100
Average per farm	11,095	12,102	32,941
Crops	484,951	a	544,561
Forest products	200	a	200
Livestock, poultry, and their products	5,772,465	5,961,476	5,055,339
Total Production Expenses	5,349,788	5,764,522	4,639,051

[a]Not reported to avoid disclosure of individual firm data.

Source: U.S. Department of Agriculture, 1973.

data because a large part of total production is fed directly to livestock without being sold in the marketplace. Alfalfa and wheat are major crops in all three counties, and some corn is produced in Uintah and Duchesne Counties.

Significant numbers of farmers in the area spend time in off-farm employment. In 1969, for example, 61 percent of farm operators reported working off the farm and the majority of these reported more than 200 days of such work. Further industrial development in the region, whether it be oil shale processing or other activities, will increase both the opportunity and returns from such off-farm work. Thus, the frequency and direction of such work in the future should be expected to increase. Furthermore, the increased availability of relatively high-wage jobs in the non-agricultural sectors may cause some acceleration in the decline of agricultural employment which fell 22 percent in the region during the 1960-1970 decade.

Such a development may have a negative impact on farm output, but it would expand the range of employment opportunities for area farm operators and owrkers, thus implying a real increase in their welfare. Because the decision is not forced on them, those who leave farming or otherwise reduce their resource commitment thereto must be better off or they would not have moved. Therefore, the possibility of an expanded range of employment alternatives must be considered as being generally beneficial to those employed in the farm sector.

There is much concern in the intermountain area about the shifting of some agricultural land and water resources to urban-industrial uses. Although the loss of land to expanding urban uses in the study area to date has been minimal, the potential for such shifts on a significant

scale is very real as national demand for energy and related resources increases. The same is true for water; there is severe competition for water in the Upper Colorado River basin, and rapid energy resource development in the study area would intensify the non-agricultural water demands. As of 1969, some 200 thousand acres, or 81 percent, of cropland in the area was under irrigation, and the proportion of total crop output accounted for by that acreage would be even higher because of the higher yields obtained from irrigation. Clearly, shifting of water from agriculture probably would result in a reduction of farm output.

Although agricultural production and income[a] have been increasing in recent years, the importance of this sector is declining as the Basin industrializes. Furthermore, farm employment has been declining for three decades. Between 1960 and 1970, farm employment fell by 22 percent which represented a loss of 352 jobs. There is no reason to expect this trend to be reversed although the rate of decline is showing if only because the agricultural employment base is becoming quite small.

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[a]1971 farm income of $11.3 million was more than twice the 1959 level of $5.3 million.

2.6 Labor Turnover

Labor turnover data for selected industries in Utah is shown in Table 2.6-1; there is no data available for the Uintah Basin area. Of particular significance for the proposed oil shale complex is the "quit rate" defined as the number of workers quitting their jobs each month per 100 employed persons. High turnover rates, of course, result in significantly higher business costs, and maintenance of low turnover rates is a key variable in the management of a successful enterprise. In manufacturing, the "quit rate" has increased secularly from a rate of 1.8 per month in 1964 to 3.1 per month in 1974. In the mining sector, this rate has shown little secular trend, and has typically ranged from 1.0 to 1.8 quits per 100 employees per month. The data for the chemicals and petroleum segment of the manufacturing industry is roughly comparable to that for the mining sector--in both, the quit rate is significantly below the rate for all manufacturing industries combined.

Although these rates are indicative of the type of turnover that a prospective firm could expect if it located in Utah, there is no measure of variation among the several regions of the state. It is essential that working and living conditions be made as attractive as possible and consideration be given to minimizing potential commuting distance in order that labor turnover problems can be held down to tolerable levels. Presumably the rates shown in Table 2.6-1 would apply to the average firm operating under average circumstances in Utah. They could be used as approximate predictions of turnover

TABLE 2.6-1

LABOR TURNOVER RATES IN UTAH MANUFACTURING AND MINING INDUSTRIES, 1964 TO 1974 (RATES INDICATE MONTHLY TURNOVER PER 100 EMPLOYEES)

	Manufacturing				Mining				Chemicals and Petroleum			
		Separations				Separations				Separations		
	Accessions	Total[a]	Quits	Layoffs	Accessions	Total	Quits	Layoffs	Accessions	Total	Quits	Layoffs
1964	3.6	4.4	1.8	2.0	3.1	3.0	1.5	1.0	2.2	2.4	1.1	0.9
1965	3.6	4.1	1.7	1.8	2.2	2.0	1.0	0.6	2.4	2.9	1.3	1.0
1966	4.5	4.4	2.4	1.4	2.4	2.5	1.1	0.7	2.5	2.1	1.3	0.5
1967	4.3	4.3	2.2	1.4	3.1	3.2	1.8	0.9	1.6	1.9	0.8	0.1
1968	4.4	4.5	2.3	1.4	2.9	2.8	1.6	0.6	2.0	2.1	1.4	0.2
1969	4.5	4.7	2.4	1.6	2.4	2.1	1.3	0.3	3.0	3.1	1.5	0.3
1970	4.4	4.5	2.2	1.6	2.6	2.2	1.5	0.3	2.0	1.8	0.9	0.5
1971	5.0	5.0	2.2	2.1	1.7	2.9	1.2	1.3	2.9	2.8	1.3	0.4
1972	5.2	4.6	2.5	1.1	3.9	4.7	1.8	1.7	2.9	2.8	2.2	0.2
1973	5.6	4.9	3.0	0.9	3.2	2.6	1.7	0.4	2.4	2.6	1.9	0.2
1974	5.2	4.7	3.1	0.7	3.1	2.4	1.6	0.4	3.3	3.0	2.1	0.4

[a] Included in total separations, but not shown separately, are discharges for such reasons as incompetence, rule violation, dishonesty, etc.

Source: Utah Department of Employment Security, 1973, and worksheets provided by that department.

rates at the proposed oil shale complex assuming other conditions (e.g., housing, recreation, and transportation) were of average quality and located within reasonable distance of the site.

3.0 PUBLIC BUDGETS, TAX BASE AND COMMUNITY FACILITIES AND SERVICES

This chapter provides an overview of public budgets, selected elements of the tax base and community facilities and services for political subdivisions within the study region.

3.1 Public Budgets

Selected items of local government finances for the 1972 budget year[a] are presented for Duchesne, Rio Blanco and Uintah Counties in Tables 3.1-1 and 3.1-2, and for the cities of Vernal, Duchesne, Roosevelt and Rangely in Tables 3.1-3 and 3.1-4. Similar but not directly comparable data for the Ute Tribe for fiscal 1973 are presented in Tables 3.1-5 and 3.1-6.

Table 3.1-1 summarizes revenue sources for the three counties. General property tax provides the most significant revenue source followed by sale of current services in Duchesne and Uintah counties and by revenue from other agencies in Rio Blanco County.[b]

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[a] The budget year for counties reported here follow the calendar year while cities budgets are for the fiscal year.

[b] Revenue from other agencies was unusually large in Rio Blanco because of grants for capital outlay--see Table 3.1-2.

TABLE 3.1-1 REVENUES FOR COUNTIES: DUCHESNE, RIO BLANCO AND UINTAH, 1972

Item	Duchesne	Rio Blanco[a]	Uintah
Total Revenues	389,302	1,596,900	710,729
General Property Taxes	253,269	711,100	358,783
Other Local Taxes	7,117	31,000	44,132
Licenses and Permits		1,300	2,527
Fines and Forfeitures	21,894	1,100	23,317
Revenues from Use of Money and Property	18,702	4,100	21,283
Revenue from Other Agencies	27,579	567,900	188,533
Charges for Current Services	58,861	276,700	71,111
Other Revenues		3,700	1,043
Beginning Balance	315,840		
Total	705,142	1,596,900	710,729

[a]Compiled from Colony Development Operation, 1974.

Source: Department of Housing and Urban Development, 1972.

TABLE 3.1-2 EXPENDITURES FOR COUNTIES: DUCHESNE, RIO BLANCO AND UINTAH, 1972

Item	Duchesne	Rio Blanco[a]	Uintah
Total Expenditures	422,404	1,491,200	780,677
Commissioners	7,319	24,400	15,379
Judicial	7,639	11,100	10,307
Administrative	71,153	130,100	73,116
Planning		1,300	
Education and Public Relations	8,874		25,711
General Government Building	12,660	25,500	15,362
Non-Departmental	36,746		
Public Safety	38,903	60,900	71,060
Highways	202,212	286,000	290,743
Weed Control	19,105		23,003
Airports		6,400	892
Health and Hospitals	14,909	255,100	42,420
Public Welfare		65,100	7,252
Parks and Recreation		54,900	23,916
Cemetaries			15,391
Bond Issues			32,891
County Library			19,688
Miscellaneous Expenditures		72,600	
Capital Outlay		498,400	
Surplus	282,737		
Total	705,142	1,491,800	780,677

[a]Compiled from Colony Development Operation, 1974.

Source: Department of Housing and Urban Development, 1972.

TABLE 3.1-3

REVENUES FOR CITIES: VERNAL, DUCHESNE, ROOSEVELT AND RANGELY, 1972

Revenues	CITIES							
	Vernal 3,908		Duchesne 1,094		Roosevelt 2,005		Rangely[a] 1,591	
	Total Revenue	Dollars per Cap.	Total Revenue	Dollars per Cap.	Total Revenue	Dollars per Cap.	Total Revenue	Dollars per Cap.
Total Revenues	336,178	86.02	72,571	66.34	170,812	85.19	292,830	184.05
Taxes								
General Property	62,286	15.94	20,076	18.35	52,616	26.24	54,970	34.55
Delinquent	2,845	.73			2,741	1.37		
Sales and Use	84,361	21.59	11,007	10.06	53,555	26.71		
Franchise	7,401	1.89					4,190	2.63
Licenses and Permits	14,365	3.68	4,322	3.95	17,006	8.48	7,400	4.65
Intergovernmental								
Grants from Federal					738	.37		
Grants from State							13,650	8.58
State Shared Revenue								
State Liquor Fund	3,689	.94			1,893	.94		
Other	7,500	1.92	1,033	.94	290	.14	19,640	12.34
Charges for Services								
Special Fire Protection	1,034	.26			1,450	.72		
Highway and Street								
Street, Sidewalk, Curb					6,586	3.28		
Parking Meter	7,602	1.95						
Class "C" Fund	20,555	5.26	3,420	3.13	5,603	2.79		
Other							670	.42
Public Utilities	2,060	.53						

TABLE 3.1-3 (Con't.)

Revenues	CITIES							
	Vernal 3,908		Duchesne 1,094		Roosevelt 2,005		Rangely[a] 1,591	
	Total Revenue	Dollars per Cap.	Total Revenue	Dollars per Cap.	Total Revenue	Dollars per Cap.	Total Revenue	Dollars per Cap.
Sanitation Services								
Refuse Collection	35,443	9.07					3,150	1.98
Culture, Parks and Recreation								
Swimming Pool	21,009	5.38			5,032	2.51	5,130	3.22
Cemetary	1,390	.36	3,730	3.41	2,951	1.47		
Fines and Forfeitures			6,476	5.92	8,701	4.34	2,340	1.47
Fines	9,598	2.46						
Forfeitures	2,408	.62						
Miscellaneous	3,074	.79	3,934	3.60	9,804	4.89		
Transfers From Other Funds	49,458	12.66	18,573	16.98	1,848	.92		

[a]Compiled from Colony Development Operation, 1974.

Source: Department of Housing and Urban Development, 1972.

TABLE 3.1-4

EXPENDITURES FOR CITIES: VERNAL, DUCHESNE, ROOSEVELT AND RANGELY, 1972

Expenditures	CITIES							
	Vernal 3,908		Duchesne 1,094		Roosevelt 2,005		Rangely[a] 1,591	
	Total Exp.	Dollars per Cap.	Total Exp.	Dollars per Cap.	Total Exp.	Dollars per Cap.	Total Exp.	Dollars per Cap.
Total Expenditures	323,321	82.73	42,514	38.86	225,838	112.64	120,060	75.46
General Government								
Administration	29,975	7.67	9,616	8.79	35,834	17.87	33,810	21.25
Mayor & City Council			1,226	1.12			780	.49
Municipal Court	1,647	.42			1,585	.79		
General Gov't. Buildings	1,599	.41	3,606	3.30	12,461	6.21		
Public Safety							25,300	15.90
Police Department	42,778	10.95	10,276	9.39	34,213	17.06	21,450	13.48
Fire Department	4,876	1.25	906	.83	4,400	2.19	3,850	2.42
Inspection Department	3,983	1.02						
Other Protection	16,503	4.22			2,366	1.18		
Public Works	70,907	18.14						
Streets and Highways			11,399	10.42	47,800	23.84		
Class "C" Roads	7,798	2.00	3,420	3.13	5,603	2.79		
Sanitation					4,025	2.01		
Waste Collection and Disposal	40,781	10.44						
Public Utilities	5,227	1.34	706	.65	1,750	.87	171,450[b]	107.75
Public Health							15,260	9.59

TABLE 3.1-4 (Con't.)

Expenditures	CITIES							
	Vernal 3,908		Duchesne 1,094		Roosevelt 2,005		Rangely[a] 1,591	
	Total Exp.	Dollars per Cap.	Total Exp.	Dollars per Cap.	Total Exp.	Dollars per Cap.	Total Exp.	Dollars per Cap.
Culture, Parks and Recreation					1,850	.92	10,310	6.48
Golf Courses	6,078	1.56			47,600	23.74		
Swimming Pools	21,614	5.53			6,710	3.35		
Parks	11,354	2.91	912	.83	9,673	4.82		
Cemetaries	15,694	4.02	447	.41	7,300	3.64		
Libraries					2,668	1.33		
Capital Outlay							8,850	5.56
Fund Balance	42,507	10.88						

[a]Compiled from Colony Development Operation, 1974.

[b]Capital outlay includes all identifiable expenditures for capital improvements and capital equipment whether from current funds or bond funds.

Source: Department of Housing and Urban Development, 1972.

TABLE 3.1-5 REVENUES FOR UTE INDIAN TRIBE, UINTAH AND OURAY RESERVATION, 1973-74

Revenue	Amount
Total Revenue	$3,286,092
Oil and Gas	1,757,969
Grazing	31,760
Land Lease	59,691
Timber Sales	17,062
Interest on Treas. Fund	1,200,000
Misc. Treas. Collections	9,200
Local Income	210,400
Rent--Homes and Bldg.	4,411
Dividends--Dist. Corp.	88,814
Laundromat	10,709
Court Fines	16,367
Fish and Game	18,511
Casting Shop	3,253
Interest--CDs	42,000
Other Interest	25,000
Misc. Local Inc.	1,285

Source: Unpublished budget data sheets obtained from Ute Tribe Office in Ft. Duchesne, Utah, April, 1975.

TABLE 3.1-6

EXPENDITURES FOR UTE INDIAN TRIBE, UINTAH AND OURAY RESERVATION, 1973-74

Expenditure	Amount
Total Expenditures	$2,951,847
General Administration	(865,515)
Business Committee	171,527
Tribal Attorney	45,000
Administration	102,716
Public Relations	25,553
Treasurer	150,799
Budget and Account	90,139
Maintenance	263,022
Contribution to Government	16,759
Social	(585,144)
Community Building	37,863
Tribal Court	43,048
Juvenile Court	18,589
Law and Order	130,856
Environment Health	72,865
Education & Employment	77,071
Alcoholism	71,685
Rehabilitation Projects	24,348
Senior Citizens	17,700
Recreation	76,004
Youth Camp	10,000
Economic	(270,367)
Service Station	20,753
Forestry	11,000
Crafting Shop	30,079
Resources	112,872
Fish and Game	95,663
General Membership	(870,500)
Services and General Expense	48,000
Dividend Payment	822,500
Capital	(360,321)
Land and Stock	360,321

Source: Unpublished budget data sheets obtained from Ute Tribe Office in Ft. Duchesne, Utah, April, 1975.

Total revenues for 1972 were $389,302, $1,596,900 and $710,729 for Duchesne, Rio Blanco and Uintah Counties, respectively. Total county expenditures, presented in Table 3.1-2, were $422,404, $1,491,200 and $780,677 in 1972 for Duchesne, Rio Blanco and Uintah Counties, respectively.

Highways were the single most important item of expense in all three counties followed by health and hospitals in Rio Blanco County and by administrative expenses in both Duchesne and Uintah Counties.

Tables 3.1-3 and 3.1-4 overview revenues and expenditures, respectively, in the 1972 budget year for the cities of Vernal, Duchesne, Roosevelt and Rangely. Total revenues ranged from a low of $72,571 in Duchesne to $336,178 in Vernal. On a per capita basis, revenues ranged from a low of $66 in Duchesne to $184 in Rangely. Sales and use taxes provided the most important revenue source in Vernal and Roosevelt followed by property taxes. A reverse situation was found in Duchesne and Rangely where property taxes were the most important revenue source.

Table 3.1-4 shows expenditures by these cities in 1972. The major differences between cities and the counties in expenditure pattern were found in the areas of public safety and sanitation where the cities have primary responsibility and in the area of streets and highways where counties typically have a heavier expenditure obligation.

Tables 3.1-5 and 3.1-6 show revenues and expenditures respectively of the Ute Tribe for the 1974 budget year. Total revenues for the year were $3,286,092. The largest single revenue item was oil and gas at $1,757,969 followed by interest paid on treasury funds at $1,200,000. Total expenditures were $2,951,847. General administrative expenses

and dividend payments to the general membership both exceeded $800,000 followed by social program expenses of $585,000 and economic program expense of $270,000.

Comparison of the Ute Tribe budget with those of the cities and counties of the study region provides strong indication of the economic significance of the Ute Tribe.

3.2 Tax Base

The ability of the public sector to cope with increasing demand for services is governed by the size and growth rate of its tax base. For this reason, selected elements and trends which have influenced the tax base and spendable revenue of governmental units within the study region were assembled as a part of the base-line data.

3.2.1 Business Activity and Sales Tax Revenues

Items included as a part of this base-line to reflect the business climate and the prospects associated with sales taxes as a source of revenue were estimates of levels and change in business activity, in the years 1967, 1970, 1972 and 1973; trends in wholesale and retail trade in 1963, 1967 and 1973; and taxable sales and local option sales tax collections for local governmental units in Duchesne and Uintah Counties in 1970 and 1974.

Table 3.2.1-1 summarizes the pace of expansion in business activity within the state of Utah, Duchesne and Uintah Counties and Roosevelt and Vernal cities. Significant increases in business activity were common to all these units of government, but increases within the study region have exceeded those of the state. The index of business activity in Roosevelt city and Duchesne County was approaching a multiple of four times its 1967 base in 1973 and more than 2.5 times the 1967 base in both Vernal city and Uintah County. This compares with an approximate doubling of business activity for the state as a whole between 1967 and

TABLE 3.2.1-1

BUSINESS ACTIVITY IN SELECTED COUNTIES AND CITIES WITHIN THE STUDY REGION AND FOR THE STATE

Area or Place	Gross Sales ($000)			
	1967	1970	1972	1973
Duchesne County	10,904	14,626	39,757	41,541
Roosevelt City	7,414	10,401	22,101	28,744
Uintah County	23,7 5	30,331	58,476	69,458
Vernal City	13,366	16,852	29,793	34,038
Utah	1,924,653	2,460,387	3,290,118	3,774,221
	Index of Business Activity (1967 = 100)			
Duchesne County	100.0	134.1	364.1	380.9
Roosevelt City	100.0	140.3	298.1	387.7
Uintah County	100.0	127.5	245.8	292.0
Vernal City	100.0	126.1	222.9	254.7
Utah	100.0	127.8	170.9	196.1

Source: Utah Foundation, 1975.

and 1973. These data provide strong evidence of a major economic expansion within the study region completely in the absence of a shale oil development project.

Trends in wholesale and retail trade, presented in Table 3.2.1-2 depict a similar pattern, although the number of establishments has increased at a more modest rate than business activity over the 1967 through 1973 period.

Tables 3.2.1-3 and 3.2.1-4 summarize gross taxable sales and net local sales tax collections by local governmental units in 1970 and 1974. Total taxable sales for Duchesne and Uintah Counties increased from $13,502,622 and $29,806,756, respectively, in 1970 to $62,334,202 and $75,202,808 by 1974. Sales tax collections increased from $65,825 and $145,308 in 1970 to $303,880 and $366,614 by 1974. Local governmental units within the counties showed comparable rates of expansion in their sales tax revenues over the same time period.

3.2.2 Property Tax Data

Property tax data, including assessed valuation, taxes charged and current and recent past mill levies are presented for local units of government in Duchesne and Uintah Counties for the years 1970 and and 1974 in Tables 3.2.2-1, 3.2.2-2 and 3.2.2-3. Assessed valuation in Duchesne County increased from $15,631,136 in 1970 to $61,164,984 in 1974 while property taxes charged increased from $1,152,619 to $3,357,132. In the same years assessed valuation in Uintah County increased from $34,579,574 to $42,819,537 and property taxes charged increased from $2,296,440 to $2,513,726.

TABLE 3.2.1-2

TRENDS IN WHOLESALE AND RETAIL TRADE FOR SELECTED COUNTIES AND CITIES WITHIN THE STUDY REGION

County or City	Sales ($000) 1963 Wholesale Trade	1963 Retail Trade	1967 Wholesale Trade	1967 Retail Trade	1973 Wholesale Trade	1973 Retail Trade
Duchesne County	5,195	8,327	2,702	8,668	NA	39,200
Uintah County	7,845	16,322	7,968	16,116	NA	60,800
Vernal City	6,668	13,611	7,012	14,044	NA	28,000
	Number of Establishments					
Duchesne County	12	94	13	95	28	140
Uintah County	25	127	27	118	33	124
Vernal City	21	93	24	89	24	95

Source: Utah Industrial Promotion Division, 1974.

TABLE 3.2.1-3

TAXABLE SALES AND LOCAL OPTION SALES TAX COLLECTIONS BY LOCAL UNITS IN DUCHESNE AND UINTAH COUNTIES, 1970

Area	Gross Taxable Sales ($)	Net Local Sales Tax Collection ($)
Duchesne County		
Altamont Town	251,586	1,226
Duchesne City	1,872,158	9,127
Myton Town	142,528	695
Roosevelt City	9,526,134	46,440
Tabiona Town	87,744	428
Outside Municipalities	1,622,472	7,910
Total Duchesne County	13,502,622	65,825
Uintah County		
Vernal City	17,311,570	84,394
Maeser Town	586,060	2,857
Outside Municipalities	11,909,126	58,057
Total Uintah County	29,806,756	145,308

Source: Utah Foundation, 1971.

TABLE 3.2.1-4

TAXABLE SALES AND LOCAL OPTION SALES TAX COLLECTIONS BY LOCAL UNITS IN DUCHESNE AND UINTAH COUNTIES, 1974

Area	Gross Taxable Sales ($)	Net Local Sales Tax Collection ($)
Duchesne County		
Altamont Town	1,695,668	8,266
Duchesne City	6,266,614	30,550
Myton Town	306,402	1,494
Roosevelt City	32,804,070	159,920
Tabiona Town	139,402	680
Outside Municipalities	21,122,046	102,970
Total Duchesne County	62,334,202	303,880
Uintah County		
Vernal City	37,161,556	181,163
Maeser Town		
Outside Municipalities	38,041,252	185,451
Total Uintah County	75,202,808	366,614

Source: Utah Foundation, 1975.

TABLE 3.2.2-1 PROPERTY TAX DATA BY LOCAL UNITS OF GOVERNMENT IN DUCHESNE AND UINTAH COUNTIES, 1970

Tax Levying District	Assessed Valuation 1970	Mill Levy 1970	Taxes Charged 1970
DUCHESNE COUNTY			
Duchesne County	$15,681,136	17.70	$ 277,556
State School Levy	15,681,136	7.20	112,904
Central Utah Water Dist.(X)	15,681,136	1.00	15,681
Duchesne School District	15,681,136	42.59	667,860
Altamont Town - X	90,633	12.00	1,088
Duchesne City - X	740,100	26.50	19,613
Myton City - X	127,814	25.00	3,195
Roosevelt City - X	2,087,700	26.00	54,280
Tabiona Town - X	55,199	8.00	442
Outside Incorp. Municipalities	12,579,690	*	*
Duchesne Schools - X	12,679,690	*	*
County Totals	$15,681,136	*	$1,152,619
UINTAH COUNTY			
Uintah County	$34,579,574	11.00	$ 380,375
State School Levy	34,579,574	7.20	248,973
Uintah Water District (A)	33,893,392	0.20	6,779
Central Utah Water Dist. (X)	34,579,574	1.00	34,580
Uintah School District	34,579,574	44.97	1,555,043
Maeser City - A & X	657,404	6.00	3,945
Vernal City - A & X	4,449,679	15.00	66,745
Outside Incorp. Municipal.	29,472,431	*	*
Uintah Schools - A & X	28,786,249	*	*
Uintah Schools - X	686,182	*	*
County Totals	$34,579,374	*	$2,296,440

*Because of the complex and overlapping boundaries of the various special districts in the state, more than one levy may apply within a municipality or school district. In the preceding county tabulations, the different taxing areas are designated by one or more code letters following the name of the municipality or school district. Each code letter refers to some special taxing district which imposes or is authorized to impose a levy within the district. Of course, in addition to these taxing district levies, the countywide levies for state schools and county purposes are applied in the described taxing area.

Source: Utah Foundation, 1971.

TABLE 3.2.2-2 PROPERTY TAX DATA BY LOCAL UNITS OF GOVERNMENT IN DUCHESNE AND UINTAH COUNTIES, 1974

Tax Levying District	Assessed Valuation 1974	Mill Levy 1974	Taxes Charged 1974
DUCHESNE COUNTY			
Duchesne County	$61,164,984	9.15	$ 559,660
State School Levy	61,164,984	--	--
Central Utah Water Dist. (X)	61,164,984	2.00	122,330
Duchesne School District	61,164,984	41.058	2,511,312
Altamont Town - X	271,837	18.00	4,893
Duchesne City - X	1,714,918	26.50	45,445
Myton City - X	287,085	28.00	8,038
Roosevelt City - X	4,093,403	25.45	104,177
Tabiona Town - X	106,416	12.00	1,277
Outside Incorp. Municipal.	54,691,325	*	*
Duchesne Schools - X	54,691,325	*	*
County Totals	$61,164,984	*	$ 3,357,132
UINTAH COUNTY			
Uintah County	$42,819,537	9.70	$ 415,350
State School Levy	42,819,537	--	---
Uintah Water Dist. (A)	41,464,049	.30	12,439
Maeser Water District (B)	1,173,968	3.95	4,637
Jensen Water District (C)	1,575,276	3.50	5,513
Central Utah Water Dist. (X)	42,819,537	2.00	85,639
Uintah School District	42,819,537	44.66	1,912,321
Vernal City - A & X	6,767,544	11.50	77,827
Outside Incorp. Municipal.	36,051,993	*	*
Uintah Schools - A & X	31,947,261	*	*
Uintah Schools - A,B, & X	1,173,968	*	*
Uintah Schools - A,C, & X	1,575,276	*	*
Uintah Schools - X	1,355,488	*	*
County Totals	$42,819,537	*	$ 2,513,726

*Because of the overlapping boundaries of the various special districts in the state, more than one levy may apply within a municipality or school district. In the preceding county tabulations, the different taxing areas are designated by one or more code letters following the name of the municipality or school district. Each code letter refers to some special taxing district which imposes or is authorized to impose a levy within the district. Of course, in addition to these taxing district levies, the countywide levies for state schools and county purposes are applied in the described taxing area.

Source: Utah Foundation, 1975.

TABLE 3.2.2-3

TRENDS IN PROPERTY TAX LEVY BY DISTRICT IN UINTAH AND DUCHESNE COUNTIES

Tax Levying District	Total Levy Within Taxing Area 1974	1970	1965	1960	1950
DUCHESNE COUNTY					
Duchesne School District:					
Altamont Town - X	70.208	80.49	76.99	69.05	41.20
Duchesne City - X	78.708	94.98	90.99	83.05	66.20
Myton City - X	80.208	93.49	91.93	84.05	64.20
Roosevelt City - X	77.658	94.49	90.99	83.05	60.20
Tabiona Town - X	64.208	76.49	72.99	65.05	49.20
Outside Incorp. Municipal.	*	*	*	*	*
Duchesne Schools - X	52.208	68.49	64.99	57.05	41.20
UINTAH COUNTY					
Uintah School District:					
Vernal City - A & X	68.16	79.37	76.85	72.50	58.00
Outside Incorp. Municipal.	*	*	*	*	*
Uintah Schools - A & X	56.66	64.37	62.85	53.00	39.00
Uintah Schools - A,B, & X	60.61	64.37	62.85	53.00	39.00
Uintah Schools - A,C, & X	60.16	64.37	62.85	53.00	39.00
Uintah Schools - X	56.36	64.17	62.35	52.00	39.00

*Because of the overlapping boundaries of the various special districts in the state, more than one levy may apply within a municipality or school district. In the preceding county tabulations, the different taxing areas are designated by one or more code letters following the name of the municipality or school district. Each code letter refers to some special taxing district which imposes or is authorized to impose a levy within the district. Of course, in addition to these taxing district levies, the countywide levies for state schools and county purposes are applied in the described taxing area.

Source: Utah Foundation, 1975.

3.2.3 Federal Revenue Sharing Allocations

Although not typically considered a part of the tax base, revenues obtained from federal revenue sharing have emerged as a significant portion of the total budget in most local governmental units. Table 3.2.3-1 summarizes federal revenue sharing allocations to local governmental units within Duchesne and Uintah Counties for the fiscal years 1972-73 and 1973-74. Units in Duchesne County, including the city, received $260,790 in 1972-73 and $274,427 in 1973-74. Uintah County and Vernal City received $245,047 and $313,818 in the same budgeting period.

Generally rising trends are common to all elements of the tax base, but these appear to be most significantly associated with the sales and use taxes and with federal revenue sharing. Increases in the property tax base have been much slower to develop at least for those activities introduced in the study region between 1970 and 1974. The adequacy of these increases in the tax base to meet expanding demands for public services will depend on the rate of population increase, the configuration of personal preferences which evolve and the level of affluence enjoyed by that population. If population and demand for public service expand at faster rates than the tax base one could reasonably expect the per capita availability and/or quality of publically supplied services to be diminished. Many of the facilities and services, including those supplied by the private sector, are identified in terms of location and availability within the study region in the section which follows.

TABLE 3.2.3-1

FEDERAL REVENUE SHARING ALLOCATIONS TO LOCAL UNITS OF GOVERNMENT IN DUCHESNE AND UINTAH COUNTIES, 1972-73 AND 1973-74

Governmental Unit	Revenue Allocation 1972-73 ($)	1973-74 ($)
Duchesne County	140,353	143,014
Altamont Town	893	2,827
Duchesne City	7,025	17,399
Myton Town	2,745	2,979
Roosevelt City	54,957	65,968
Tabiona Town	281	1,336
Uintah and Ouray Tribe	54,536	40,904
Total Duchesne County	260,790	274,427
Uintah County	173,049	225,250
Vernal City	71,998	88,560
Total Uintah County	245,047	313,818

Source: Utah Foundation, 1975.

3.3 Facilities and Services

Facilities described as a part of the baseline included housing, education, utilities and communication, and transportation. Included among services are public safety, health and welfare and recreation. A documentation of the availability of facilities and services within the communities of the study region provides an indication of the relative availability of such items vis a vis other communities as a guide to prospective immigrants; and as a norm or objective for management of community resources by their leaders and elected public officials.

3.3.1 Housing Facilities

The 1970 census data on selected housing characteristics are summarized for Duchesne, Rio Blanco and Uintah Counties in Table 3.3.1-1 and for the cities of Duchesne, Rangely, Roosevelt and Vernal in Table 3.3.1-2.

In counties, the percentage increase in number of housing units between 1960 and 1970 was less than the 21.0 percent experienced by the state of Utah. Percent ages for the counties ranged from a low of 8.0 percent increase in Rio Blanco to 19.2 percent in Uintah County. Only Uintah County had a greater percentage of homes built after 1960 than the state and all three counties had higher percentages of homes built prior to 1950 than the state. Median value of owner occupied housing ranged from $2,500 to approximately $5,000 less than

TABLE 3.3.1-1

SELECTED HOUSING CHARACTERISTICS FOR COUNTIES IN THE STUDY REGION AND THE STATE OF UTAH, 1970

Item	Duchesne	Rio Blanco	Uintah	Utah
Total Population	7,299	4,842	12,684	1,059,273
No. of Housing Units	2,310	1,881	3,700	311,982
Changes 1960-1970 (%)	14.9	8.0	19.2	21.0
Median No. of Rooms	4.9	4.4	5.0	5.0
Structures Built in 1960 or Later	22.2	14.7	26.8	26.7
Structures Built Before 1950	60.2	69.9	51.4	49.7
No. Occupied Units	1,943	1,474	3,433	297,934
Average Person per Unit	3.7	3.2	3.6	3.5
Owner Occupied (%)	78.6	61.3	74.7	69.4
Median Value Owner Occupied ($)	11,980	12,532	14,504	17,057
Median Gross Rent Renter Occupied ($)	89	87	90	97
Moved into Unit During 1965-1970 (%)	46.5	51.6	52.5	49.9

Source: U.S. Department of Commerce, 1973.

TABLE 3.3.1-2

SELECTED HOUSING CHARACTERISTICS FOR CITIES IN THE STUDY REGION, 1970

Item	Duchesne	Rangely	Roosevelt	Vernal
Population	1,094	1,571	2,005	3,908
Number Housing Units	348	502	585	1,283
Owner Occupied	191	273	416	773
Median Number Rooms	4.9	4.8	5.3	3.4
Median Value ($)	11,100	11,800	13,600	15,600
Renter Occupied	112	165	144	425
Median Number Rooms	4.9	4.1	4.2	3.0
Median Contract Rent ($)	68	79	72	70
Vacant	21	42	10	83

Source: U.S. Department of Commerce, 1972.

state average which was $17,057.

Characteristics of housing in cities were similar to counties, but rents and owner occupancy were observed to be lower and median value was somewhat lower in Duchesne and Rangely than was observed in any of the counties or the state.

Housing and population data[a] for cities in the study region depicting conditions of late 1974 are summarized in Table 3.3.1-3. The cities of Duchesne, Roosevelt and Vernal were found to contain 722, 1092 and 1754 dwelling units respectively at the time of the survey. Vernal city had the highest proportion of both single family (63 percent) and apartment units (19 percent) and the lowest percentage of mobile homes (18 percent). Duchesne and Roosevelt showed similar percentages in type classification with 58 and 53 percent in single family, 8 and 13 percent in apartment units, and 34 and 34 percent in mobile home units.

Population per dwelling ranged from a low of 3.5 persons in Vernal to 4.12 persons in Roosevelt.

Housing quality varied considerably among the three cities. In Duchesne, 42 percent of housing units were classified as "sound," 36 percent as "deteriorated" and 22 percent as "dilapedated." Roosevelt was reported with 86, 10 and 3 percent and Vernal had 87, 12 and 1 percent in the same classification.

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[a]These housing and population data for Duchesne and Roosevelt were assembled by Mr. Jerrol Syme, Planning Advisor to the Uintah Basin Association of Governments. Similar data for Vernal city were assembled by Mr. Ken Fisher, Vernal City Planner and Assistant City Manager.

TABLE 3.3.1-3

TOTAL POPULATION AND HOUSING CHARACTERISTICS FOR DUCHESNE, ROOSEVELT AND VERNAL CITIES, DECEMBER, 1974

Item	Duchesne[a]		Roosevelt[a]		Vernal[b]	
	Number	Percent	Number	Percent	Number	Percent
Population	2,820		4,500		6,139	
Dwelling Units	722		1,092		1,754	
Single Family	408	58	580	53	1,091	63
Apartments	59	8	138	13	339	19
Mobile Homes	241	34	374	34	324	18
Population per Dwelling Unit	3.95		4.12		3.5	
Quality of Housing[c]						
Sound		42		86		87
Deterioriated		36		10		12
Dilapedated		22		3		1

Source:

[a]Data used for these two cities were supplied from unpublished housing and population studies conducted in Duchesne and Roosevelt under the sponsorship of Uintah Basin Association of Governments by Mr. Jerrol L. Syme, Planning Advisor, January, 1975.

[b]Data used for Vernal was supplied from an unpublished housing and population study conducted by Mr. Ken Fisher, Vernal City Planner and Assistant City Manager, April, 1975.

[c]Quality designations are not comparable between Vernal and Duchesne and Roosevelt because they were conducted by different individuals.

Comparison of the numbers of housing units in those cities with 1970 census data suggests that housing facilities have expanded by a greater amount in the past four years than in all of the previous decade. Between 1970 and 1974 dwelling units increased by 374 (107 percent) in Duchesne, 507 (87 percent) in Roosevelt and by 471 (37 percent) in Vernal. Between 1950 and 1960 the number of dwelling units increased by only 14.9 percent in Duchesne County and by 19.2 percent in Uintah County.

At the same time that housing units have increased by unprecedented numbers, population in these cities has grown even faster. An examination of comparative percentage changes in housing units and population between 1970 and 1974 gave the following results. In Duchesne city housing increased 107 percent while population increased by 158 percent, Roosevelt's housing units increased by 87 percent while population increased by 124 percent. In Vernal, housing increased by 37 percent while population increased by 57 percent. Quite obviously housing capacity within the study region was more fully used in 1974 than in 1970. Further expansion of the demand for housing beyond its current level, such as could be expected with development of the oil shale project, would not be as easily supplied as a similar expansion was in 1970. However, preliminary evidence suggests that the supply side of the housing market may be expanding even more rapidly than was measured in the previous five years[a] and could approach or even exceed the population expansion rate.

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[a]Building permits filed in the first quarter of 1975 in Vernal city exceeded the sum of all permits issued in the previous year.

3.3.2 Education Facilities

Selected characteristics of elementary and secondary schools are summarized in Tables 3.3.2-1 and 3.3.2-2 for 1969 and 1974 school years, respectively. Comparison of the two tables reveals that school enrollment in Duchesne district increased from 2,205 in 1969 to 3,491 in 1974. Over the same period, in Uintah district, student enrollment increased from 4,131 to 4,624. In 1969, teacher numbers were 87 and 180 in Duchesne and Uintah districts, respectively, and, in 1974, they were 150 and 169. Pupil-teacher ratios have declined in the Duchesne district from 25:1 in 1969 to 21:1 and increased in the Uintah District from 23:1 to 25:1.

Table 3.3.2-2 also shows the position of the Uintah and Duchesne districts relative to the ranges for all districts in the state. Both districts contained in the study region have pupil-teacher ratios near the top end of the state ratio which ranges from a low of 13.0 to 25.7. Maximum salaries in the two districts exceed the minimum in the state by $385 in Duchesne and by $685 in the Uintah district. In 1974 Duchesne district was ranked number 18 in size and Uintah district was ranked number 14. On other characteristics, including assessed value, capital outlay, current expense, percent state funds in operating and maintenance budget and preparations per teacher, these two districts were near the mid-point of the range for Utah school districts.

Table 3.3.2-3 shows fall enrollments in Duchesne and Uintah school districts for the years 1965-66, 1970-71, 1973-74 and 1974-75. Using 1965-66 as the base, the index of enrollment in 1974-75 was 149.3 in Duchesne and 110.7 in Uintah district.

TABLE 3.3.2-1 SELECTED CHARACTERISTICS OF ELEMENTARY AND SECONDARY SCHOOLS IN DUCHESNE AND UINTAH SCHOOL DISTRICTS, 1969

Item	Duchesne	Uintah
Student Enrollment	2,205	4,131
Elementary	1,340	2,326
Secondary	865	1,805
Teachers	87	180
Elementary	44	83
Secondary	43	97
Counselors	3	6
Administrative Personnel	14	18
Total Number of Schools	11	11
Elementary	6	7
Secondary	5	4
Pupil-Teacher Ratio		
Elementary	30:1	28:1
Secondary	20:1	19:1

Source: Utah Industrial Promotion Division, 1970.

TABLE 3.3.2-2

SELECTED CHARACTERISTICS OF DUCHESNE AND UINTAH SCHOOL DISTRICTS, 1974

Item	Duchesne	Uintah	Range for Utah Districts Low	Range for Utah Districts High
Number of Students	3,491	4,624	180	62,319
Number of Teachers	150	169	14	2,432
Size Rank (1973)	18	14		
Per Pupil				
Assessed Value ($)	9,509	9,122	3,568	20,818
Capital Outlay	59	83	4	980
Current Expense	985	832	763	1,821
Percent State Funds Maintenance and Operation	68	67	45	87
Pupil-Teacher Ratio	21.3	25.2	13.0	25.7
Maximum Salary	9,990	10,290	9,605	12,718
Preparations per Teacher	4.5	3.0	1.9	7.6

Source: Utah State Board of Education, 1974; and Utah Foundation, 1975.

TABLE 3.3.2-3

FALL ENROLLMENTS IN DUCHESNE AND UINTAH SCHOOL DISTRICTS, 1965-66, 1970-71, 1973-74 AND 1974-75

District	School Year			
	1965-66	1970-71	1973-74	1974-75
Duchesne	2,396	2,545	3,491	3,577
Uintah	4,343	4,307	4,624	4,809

	Index of School Enrollment (1965-66 = 100)			
	1965-66	1970-71	1973-74	1974-75
Duchesne	100.0	106.2	145.7	149.3
Uintah	100.0	99.2	106.5	110.7

Source: Adapted from Utah Foundation, 1975.

Expenditures for maintenance and operation and for capital outlay for the two school districts in the study region are summarized in Table 3.3.2-4. Total expenditure was $3,373,916($290 per capita) in Duchesne district and $4,010,385 ($250 per capita) in the Uintah district. Maintenance and operation expenses accounted for $3,185,404 or 94.4 percent of the total expenditure in Duchesne district and $3,657,689 or 91.2 percent in the Uintah district.

3.3.3 Utilities and Communications

Utilities included in the base-line included water systems, sewerage disposal systems, natural gas, and electrical power sources. Communications included radio and television stations, telephone and newspapers.

Table 3.3.3-1 provides a summary of data on water systems in Duchesne, Rangely, Roosevelt and Vernal. At this time, only the Vernal system had obtained higher than a provisional rating from the Utah State Health Department. System capacities vary from a low of 0.72 (MGD) in Rangely to a high of 9.00 (MGD) in Vernal.

In all four cities, efforts are underway either to expand existing facilities (Roosevelt, Rangely) or to secure additional water supply to accommodate further growth.

Selected data on sewerage disposal systems are presented in Table 3.3.3-2 for Duchesne, Roosevelt and Vernal. Both Duchesne and Roosevelt have lagoon systems and Vernal has a trickling filter system. Their respective population-equivalent capacities are 4,500, 3,600 and

TABLE 3.3.2-4

EXPENDITURES IN DUCHESNE AND UINTAH SCHOOL DISTRICTS, TOTAL AND PER CAPITA,[a] 1974

Item	Duchesne		Uintah	
	Total $	Per Capita $	Total $	Per Capita $
Total Maintenance and Operation	3,185,404	274.60	3,657,689	228.61
Instruction Costs	1,903,053	164.06	2,207,974	138.00
Other Operating Costs	1,134,390	97.79	1,422,130	88.88
Interest on Debt	147,961	12.76	27,585	1.72
Capital Outlay	188,512	16.25	352,696	22.04
Total	3,373,916	290.85	4,010,385	250.65

[a]Expenditures are expressed on a per student basis.

Source: Utah Foundation, 1975.

TABLE 3.3.3-1

SELECTED DATA ON CITY AND TOWN WATER SYSTEMS, 1974

City or Town	Peak Demand (MGD)	Deliverable Capacity (MGD)	Storage Capacity (MGD)	State Health Rating
Duchesne	0.67	1.35	2.00	Provisional
Rangely[a]		0.72		
Roosevelt[b]	2.02		1.50	Provisional
Vernal[c]	8.65	9.00	2.50	Approved

[a] City of Rangely has two 500 gal/minute systems, one culinary and one for irrigation. Present capacity will be increased for culinary to 1.4 MGD.

[b] Water is purchased from the Ute Indian Tribe. Wells are being drilled to expand capacity. Current rate is $2.67 per month for 8,300 gallons. Excess charge is 15 cents per 1,000 gallons.

[c] Current rate is $2.00 per month for first 15,000 gallons. Excess charge is 13 cents per 1,000 gallons.

Source: Utah Industrial Promotion Division, 1974.

TABLE 3.3.3-2

SELECTED DATA ON CITY AND TOWN SEWAGE DISPOSAL SYSTEMS, 1974

City or Town	Plant Type	Capacity		Average Daily Flow
		MGD	Pop. E.	MGD
Duchesne	Lagoon	0.60	4,500	0.10
Roosevelt	Lagoon	0.34	3,600	0.50
Vernal	Trickling Filter	2.70	5,000	1.7

Source: Utah Industrial Promotion Division, 1974.

5000. For Duchesne, the reported average daily flow into the system stood at approximately one-sixth of capacity while in Roosevelt it was in excess of capacity.

Current population estimates for Roosevelt and Vernal place them at least 1,000 population equivalents above design capacity[a] of the sewerage systems. Rate for hookup is $325 in Duchesne (monthly minimum is $3), and $125 in Vernal (monthly minimum is $1.75 for 12,000 galloms and an excess charge of 4 cents per 1,000 gallons). In Roosevelt the monthly charge is $3.

Utilities and communication services reported for Duchesne, Rio Blanco and Uintah counties are presented in Table 3.3.3-3. Natural gas is supplied by Mountain Fuel Supply and El Paso Natural Gas in the Utah counties and Western Slope Gas, Cascade Natural Gas and Greeley Gas supply various communities in Rio Blanco County. Electrical power is supplied by Utah Power and Light, Moon Lake Electric, Yampa Valley Electric and White River Electric.

Communications in the area are limited by small market size (population), low population density and the dominance of agriculture and mining in the economic base of the region. Radio KVEL is the only local radio station although the broadcasts of several commercial radio and television stations from the Salt Lake and Provo areas are received. Telephone service throughout the area is provided by the Mountain Bell System. At least six weekly newspapers are printed in

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[a] This assumes that all capacity in the system is available for the human population.

TABLE 3.3.3-3

UTILITIES AND COMMUNICATION SERVICES REPORTED FOR DUCHESNE, RIO BLANCO AND UINTAH COUNTIES

Services	Duchesne County	Rio Blanco County	Uintah County
Natural Gas	Mountain Fuel Supply	Western Slope Gas Cascade Natural Gas Greeley Gas	El Paso Natural Gas
Electrical Power	Moon Lake Electric	Moon Lake Electric Yampa Valley " White River "	Utah Power & Light Moon Lake Electric
Radio	None Locally (KVEL Vernal, Salt Lake, Provo)	None	None Locally (KVEL Vernal, Salt Lake, Provo)
Television	None Locally (Salt Lake & Provo)	None Locally	None Locally (Salt Lake & Provo)
Newspapers			
Daily	None	None	None
Weekly	Uintah Basin Standard Vernal Express	Rangely Times Meeker Herald	Vernal Express Standard

Source: Utah Industrial Development Division, 1974.

various areas within the region but no local daily newspaper is currently being published.

3.3.4 Transport Facilities

Consideration of transport facilities was limited to highways, rail service, air service, motor carriers and passenger bus. Transport facilities corresponding to these categories are identified for Duchesne, Rio Blanco and Uintah Counties in Tables 3.3.4-1, 3.3.4-2 and 3.3.4-3, respectively.

3.3.5 Public Safety

Recent data on numbers of police and firemen plus fire ratings for the cities included in the study region are contained in Table 3.3.5-1.

3.3.6 Public Health Facilities and Personnel

Hospitals, their bed capacity, and the number of active physicians, dentists and nurses available in Duchesne, Rio Blanco and Uintah Counties are presented in Table 3.3.6-1.

TABLE 3.3.4-1 TRANSPORT FACILITIES IN DUCHESNE COUNTY, 1974

Facilities	Identification	Remarks
Highways		
Federal Interstate	None	
Federal	40	East-West Service
State	33	Southwest-Northeast Service
State	87	Northwest-East Service
Rail Service	None	Price, Utah, Closest
Air Service		
Duchesne City	Municipal	Paved/5800 ft. Lights
Roosevelt City	Municipal	Paved/3600 ft. Lights
Motor Carriers		
Interstate	Uintah, Wycoff Bowen	
Passenger Bus	Continental-Trailways	Interstate Service

Source: Utah Industrial Promotion Division, 1974.

TABLE 3.3.4-2 TRANSPORT FACILITIES IN RIO BLANCO COUNTY, 1974

Facilities	Identification	Remarks
Highways		
Federal Interstate	None	
Federal	None	
State	64	East-Northwest Service
Rail Service	None	
Air Service		
Rangely City	Municipal	Paved/Limited Service
Private	General Petroleum	Dirt
Motor Carriers		
Intra-State	Harp, Pollard	
Passenger Bus	Continental-Trailways Wilderness Transit	None in Rangely

Source: Adapted from Colony Development Operation, 1974.

TABLE 3.3.4-3 TRANSPORT FACILITIES IN UINTAH COUNTY, 1974

Facilities	Identification	Remarks
Highways		
Federal Interstate	None	
Federal	40	East-West Service
State	44	North-South Service
State	121	East-West Service
Rail Service	None	Price and Green River, Utah
Air Service		
Vernal City	Municipal	Paved/6,600 ft./Lights/ Repair
Motor Carrier		
Interstate	Uintah, Wycoff P.I.E.	4 Terminals (Vernal)
Passenger Bus	Continental-Trailways	Interstate Service

Source: Utah Industrial Promotion Division, 1974.

TABLE 3.3.5-1

INDICES OF PUBLIC SAFETY AND NUMBERS OF PERSONNEL WITHIN THE STUDY REGION, 1974

Place	Police No.	Fire Department Type	Fire Insurance Class	Zoning Ordinance	Garbage Removal	
					Residential	Industrial
Duchesne Co.[a]	5	---	10	Yes	---	---
Duchesne	3	Volunteer	8	Yes	Yes	No
Roosevelt	4	Volunteer	7	Yes	Yes	Yes
Uintah Co.	5	Volunteer	10	Yes	---	---
Vernal	8	Volunteer	6	Yes	Yes	Yes

[a]Duchesne County also maintains a 15-man volunteer jeep patrol.

Source: Utah Industrial Development Division, 1974.

TABLE 3.3.6-1 PUBLIC HEALTH FACILITIES AND PERSONNEL IN COUNTIES WITHIN THE STUDY REGION, 1974

Item	Duchesne	Rio Blanco[a]	Uintah
Hospitals	Duchesne County Hospital (Roosevelt)	Rangely District Hospital (Rangely)	Uintah County Hospital (Vernal)
No. of Beds	33	28	31
No. of Physicians	4	4	5
No. of Dentists	3	5	4
Nurses	7	11	15

[a]Adapted from Colony Development Operation, 1974.

Source: Utah Industrial Promotion Division, 1974.

3.3.7 Recreation Facilities

Recreation facilities in the vicinity of the study region for 1970 are summarized in Tables 3.3.7-1 and 3.3.7-2. In the first table, nine types of recreation facility are arrayed. Both number of occurrences within the counties of Daggett, Duchesne and Uintah and the percentage each county is of the total state supply are recorded. Supply of recreation services exceeds the study region percentage of the state population in all categories but golf courses. Further, recreation availability exceeds population proportion by approximately 10 times in four categories.

Table 3.3.7-2 gives the relative availability of Bureau of Outdoor Recreation "Outdoor Recreation Sites." Area class ranges from "high density" (Class 1) to "historic and cultural" (Class 6). A majority (61.6 percent) of the recreation land found in the study region falls into natural environment (Class 3) and the next largest category is general outdoor recreation (26.5 percent). The study region is lacking outstanding natural features (Class 5) with zero acres and primitive features with only 6 acres.

TABLE 3.3.7-1 SUPPLY OF RECREATION FACILITIES IN DAGGETT, DUCHESNE AND UINTAH COUNTIES AND PERCENT OF TOTAL SUPPLY IN UTAH, 1970

Item	Occurrence in Counties (Number)	Percent of State Total (Percent)
Population (1970)	20,649	2.0
Water Oriented Recreation	345	19.7
Feature Oriented Recreation	132	18.2
Camping	1,771	18.9
Picnicking	597	4.9
Boat Launch Lanes	36	20.0
Water Surface Acres	24,200	5.5
Play Fields	48	7.3
Tennis Courts	7	1.6
Golf Courses	2	2.1

Source: Utah Department of Natural Resources, 1971.

TABLE 3.3.7-2

RELATIVE AVAILABILITY OF BUREAU OF OUTDOOR RECREATION OUTDOOR RECREATION SITES IN DAGGETT, DUCHESNE AND UINTAH COUNTIES AND THE STATE, 1970

Class of Area	Counties		Utah	
	Acres	Percent	Acres	Percent
Class (1) High Density Recreation	744	10.5	39,121	23.2
Class (2) General Outdoor Recreation	1,877	26.5	62,757	37.2
Class (3) Natural Environment	4,355	61.6	58,457	34.6
Class (4) Outstanding Natural Feature			3,433	2.0
Class (5) Primitive	6		7	
Class (6) Historic and Cultural	93	1.3	5,079	3.0

Source: Utah Department of Natural Resources, 1971.

4.0 LAND AND WATER RESOURCES

The chronological patterns of land and water resource development and use within the study region, as in most all inhabited areas of the Intermountain West, are remarkably interdependent. The arid nature of the climate dictates that virtually all activities, such as expansion of residential housing, irrigation and industrialization, must have access to a reliable source of water. Continued expansion of energy development in the study region including the development of oil shale will increase the demand for both water and land resources. The ease with which these demands can be met will depend upon the relative scarcity (price) of these resources, the institutional environment[a] and the configuration and magnitude of demands from activities other than oil shale which compete for the same resources. Base line information on current and/or historical patterns of land and water resource supply and use provide an essential basis for impact measurement and assessment, and is provided in the following sections.

4.1 Land Resources

Within the study region, land resources are abundant relative to the number of inhabitants and level of economic activity. The counties of Duchesne (3,255 square miles), Rio Blanco (3,263 square miles), and Uintah (4,487 square miles) contain more than seven million acres.

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[a]Discussion of the institutional environment is contained in Chapter 6.0.

Respective population densities per square mile in 1970 were 2.24, 1.48 and 2.8 for the three counties. Population density for the state in the same year was 12.90 persons per square mile. Duschesne, Uintah and the Western portion of Rio Blanco lie within the Colorado Plateau. This Plateau is characterized by areas of rough eroded lands, many nearly level bench lands and broad valleys with smaller basins along tributary streams. The benches and table lands are prominent features of the landscape and in many areas these provide a suitable land base for agriculture. The rough lands, although scenic, are not suited for intensive forms of agriculture but are utilized extensively as range for livestock and big game.

Soils of the study region are underlain with sedimentary rocks with the exception of the eastern portion of Rio Blanco County which is characterized by igneous and metamorphic rock. Much folding and faulting has occurred in the proximity of the Uinta Mountains, resulting in unconformities which dissect the area. The surface soils are generally sandy to gravelly mixed with clay soil derived from shale.

4.1.1 Ownership of Land

Land ownership patterns in the study region are similar to those of surrounding counties and the state of Utah. Data presented in Table 4.1.1-1 show that federal ownership ranges from 47.1 percent in Duchesne County to 72.8 percent in Rio Blanco County and is 67.1 for the state of Utah

TABLE 4.1.1-1

LAND AREA IN DUCHESNE, RIO BLANCO AND UINTAH COUNTIES BY OWNERSHIP: 1969

Ownership	Utah Percent	Duchesne Acres	Duchesne Percent	Rio Blanco[a] Acres	Rio Blanco[a] Percent	Uintah Acres	Uintah Percent
Federal Land	67.1	980,597	47.1	1,583,817	72.8	1,856,529	64.9
National Forest		739,414				268,053	
Bureau of Land Management		212,414				1,438,404	
Department of Defense						93,376	
Sport Fishing and Wildlife						7,448	
National Park Service						47,989	
Bureau of Reclamation		28,769				1,258	
Indian Land	4.1	204,164	9.8	0	0	411,023	14.4
State Land	7.2	74,502	3.6	0	0	232,625	8.1
State Land Board		48,108				230,775	
State Fish and Game		26,310				1,848	
State Parks and Recreation		84				2	
Private Land	21.5	783,587	37.6	504,303	27.2	349,931	12.2
Other	0.8	5,150	(A)[b]	(A)[b]	(A)[b]	11,972	0.4
Cities, Towns and Railroads		4,317		200		10,576	
Small Water Areas		733				1,396	
Total	100.0	2,083,900	100.0	2,088,320		2,862,080	100.0

[a]Estimates adapted from Colorado State University, 1974.

[b]Less than 0.1 percent of the county total.

Source: U. S. Department of Agriculture, 1970.

The percentage of land owned by Indians in Duchesne and Uintah Counties is significantly higher than for the state. Indian lands comprise 9.8 and 14.4 percent of total land area in these two counties while only 4.1 percent of total land in the state falls into this category. Ownership by the state is slightly higher than the overall state percentage at 8.1 percent for Uintah County and approximately one-half the state percentage in Duchesne. Land ownership by the state of Colorado in Rio Blanco county was nil. Private ownership of land ranges from a low of 12.2 percent in Uintah to 37.6 percent in Duchesne county. This range brackets the state percentage which is 21.5. Figure 4.1.1-1 provides a summary of land ownership for the Utah portion of the study region.

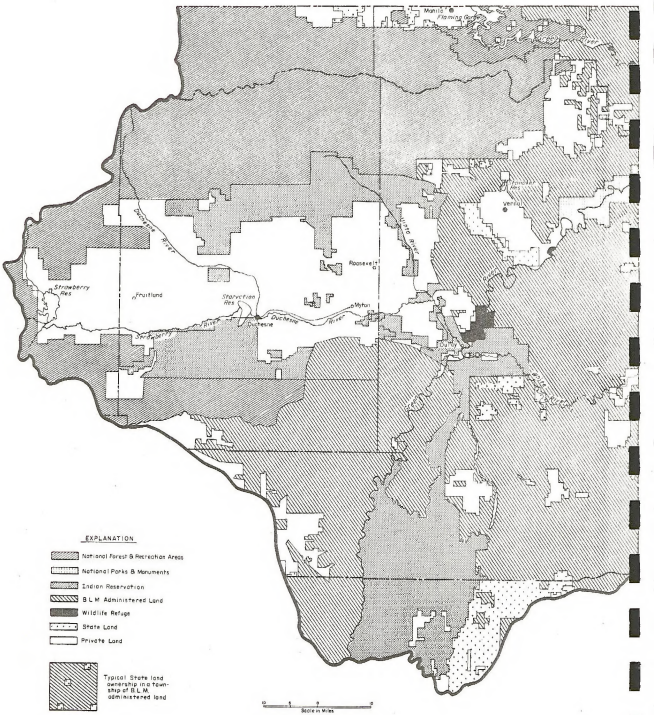
4.1.2 Land Use

Land use refers to the kind of activity for which a given parcel is being utilized. Because present and historic land use conditions and activities exert strong influence on the type and effect of future land use and development of related resources, it is important to include it as a part of the socio-economic base line.

Traditionally, land use patterns have changed marginally in response to change in relative prices, technological developments, and minor resource discoveries. However, recent oil and gas exploration activities in the study region and associated increases in demand for land introduce the possibility of supra-marginal changes in land use in the event shale oil development plans are implemented on schedule.

FIGURE 4.1.1-1

LAND OWNERSHIP



From "Recreation and Wildlife on Public Lands, U.S. Dept. of the Interior, Bureau of Land Management"

The configuration of interrelated land use in the area surrounding the proposed oil shale development in adjacent Utah counties is examined within the context of the Uintah Study Unit as defined by the Utah Division of Water Resources. Figures 4.1.2-1 and 4.1.2-2 show the boundaries of this unit which includes the entirety of Daggett, Duchesne and Uintah counties in Utah. Additionally, small portions of Carbon and Wasatch counties in Utah and of the states of Wyoming and Colorado are included within the Uintah Hydrologic Area.

Table 4.1.2-1 summarizes water related land use by county for Utah counties within the unit. The six major use classifications are irrigated cropland, dry cropland, other land use (including urban), industrial, open water surfaces, and phreatophytes. Appendix B, Table 1 includes a further disaggregation of these six groups into specific uses.

Table 4.1.2-2 summarizes water related land use in Utah by major drainage areas within the Uintah Study Unit for the same major use classifications as noted above. Appendix B, Table 2 includes a further disaggregation within major use categories and sub-basins.

In Tables 4.1.2-1 and 4.1.2-2 it is seen that the dominant form of land use within the developed portion of the Uintah unit is for cropland; some 244,432 acres are committed to this use. Of this amount, approximately 95 percent is located in Duchesne and Uintah counties and 79 percent is in the Uintah Drainage Area.

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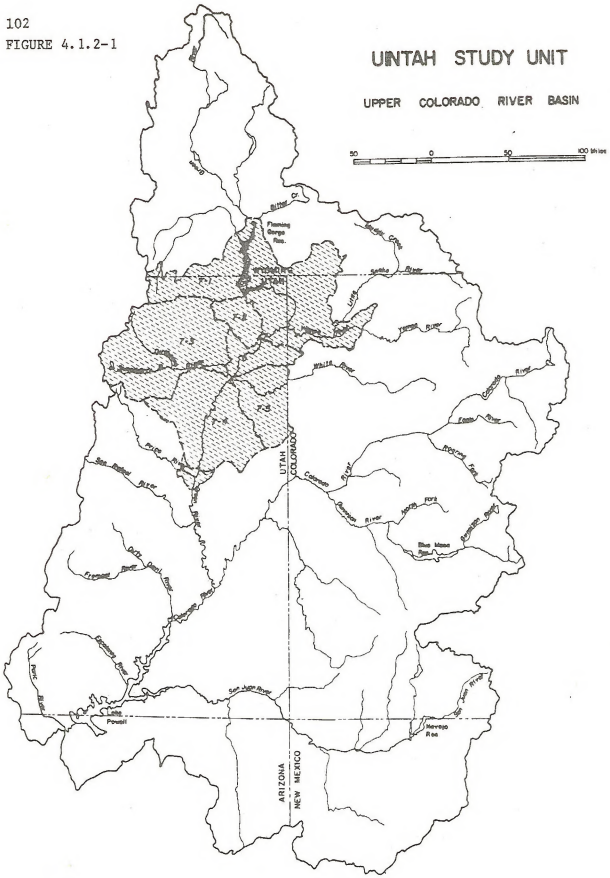
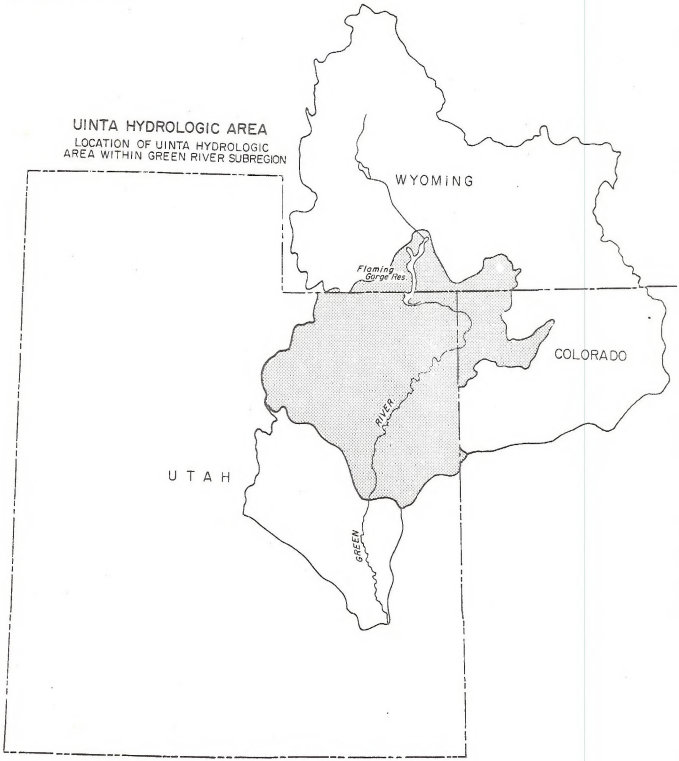
[a]The developed land area for which land use classification is available includes less than seven percent of the land area in the Uintah Study Unit shown in Figure 4.1.2-1.

FIGURE 4.1.2-1



Source: Utah State University-Utah Division of Water Resources, 1970.

FIGURE 4.1.2-2



Source: Utah State University-Utah Division of Water Resources, 1970.

TABLE 4.1.2-1

SUMMARY OF WATER RELATED LAND USE BY COUNTY IN UINTAH HYDROLOGIC AREA (units in acres)

Use Classification	Counties					
	Carbon	Daggett	Duchesne	Uintah	Wasatch	Total
Irrigated Cropland	599	9,566	130,065	102,428	88	242,746
Dry Cropland		182	1,458	46		1,686
Other Land Use[a]	25	467	3,382	3,480		7,354
Industrial Use		9	165	390		483
Open Water Surfaces	1		2,592	5,553		8,146
Phreatophytes	1,440	1,617	60,693	52,703	6	116,459
Total	2,065	11,841	198,355	164,519	94	376,874

Source: Utah Division of Water Resources, 1971.

[a]This category includes urban land and residential in rural areas. See Appendix IV Table IV-1 for more detailed classification of uses.

TABLE 4.1.2-2

SUMMARY OF WATER RELATED LAND USE
BY MAJOR DRAINAGE AREA (units in acres)

Use Classification	Upper Green	Ashley Brush Green River 'A'	Uinta	Green River 'B'	Total
Irrigated Cropland	9,566	35,127	191,076	6,977	242,746
Dry Cropland	182	20	1,471	13	1,686
Other Land Use[a]	467	2,800	3,909	178	7,354
Industrial Use	9	294	167	13	483
Open Water Surfaces	0	4,927	3,158	61	8,146
Phreatophytes	1,617	27,755	75,342	11,745	116,459
Total	11,841	70,923	275,123	18,987	376,874

Source: Utah Division of Water Resources, 1971

[a]This category includes urban land and residential in rural areas. See Appendix IV, Table IV-1 for more detailed classification of uses.

Census compilation of agricultural land use for Duchesne, Rio Blanco and Uintah counties is shown in Table 4.1.2-3. The most significant land use outside developed areas is grazing with 2,592,640 acres committed, followed by forest lands with 835,571 acres. Total agricultural use comprises approximately 60 percent of total land area in the three counties of the study region. Urban, residential and commercial land use for counties in the study region total slightly more than 4500 acres.[a]

Uintah County had 1555 acres in urban and residential use and 309 acres commercial in 1970. Duchesne County had 1502 and 165 acres in these respective categories. Urban land in Rio Blanco County was estimated at 775 acres in 1972. These acreages, when compared to the relatively vast land areas found in the vicinity of potential oil shale development suggest that mere physical availability of land to accomodate their new or expanded uses is not an important problem. However, in developed areas, constraints on new or expanded land use may arise in response to area zoning and use classification schemes. A discussion of this dimension of land use and its possible influence on land and water supply is contained in a discussion of legal and institutional factors which follows in Chapter 6.0.

Not all uses of land can be so precisely identified as those associated with developed areas, especially those privately held

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[a]Estimates for Duchesne and Uintah Counties were taken from the water related land use study of the Uinta hydrologic area conducted by the Utah Division of Water Resources in 1971. Data for Rio Blanco were derived from estimates contained in "An Environmental Impact Analysis for a Shale Oil Complex at Parachute Creek, Colorado," Vol. 3: Part 3 and 4. Colony Development Operation 1974.

TABLE 4.1.2-3

AGRICULTURAL LAND IN DUCHESNE, RIO BLANCO AND UINTAH COUNTIES, 1969

County	Cropland		Other Agricultural Land			
	Total acres	Irrigated acres	Total acres	Grazing acres	Forest acres	Other acres
Duchesne	75,009	74,963	1,023,244	395,587	558,557	69,109
Rio Blanco[a]	87,424	68,800	1,973,440	1,635,072	97,984	240,384
Uintah	87,195	83,435	906,384	561,981	179,040	165,363
Total	249,628	227,198	3,903,068	2,592,640	835,571	474,856

[a] Adapted from Colony Development Operation, 1974

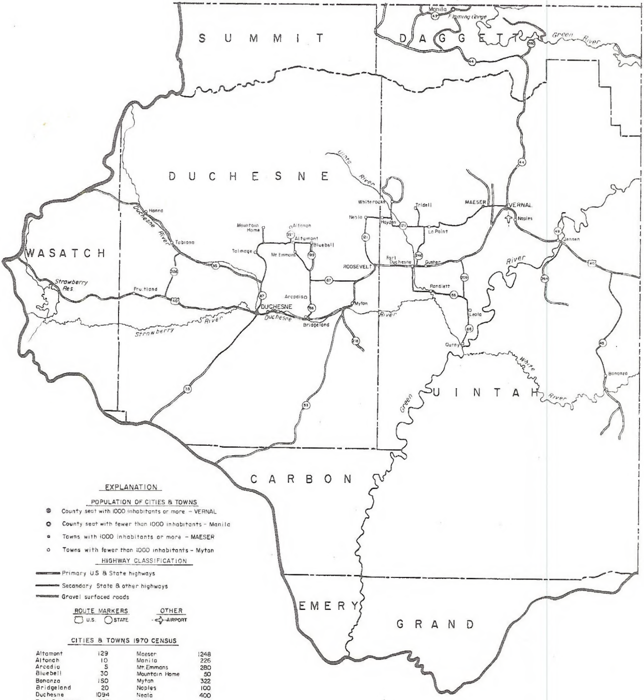
Source: U. S. Department of Agriculture, 1969

lands where exclusive use is possible. The more typical use pattern is one of joint and/or multiple use. This is particularly true in those areas (such as the study region) where vast portions of land are held in the public domain. As noted in Table 4.1.1-1, Federal and State ownership ranges from 53 percent in Duchesne County to more than 72 percent in both Rio Blanco and Uintah Counties. Multiple use is common practice on these lands including such diverse activities as timber production, livestock grazing and back packing. For these reasons, a series of maps are provided in Figure 4.1.2-3 through 4.1.2-7 to further depict the nature and extent of land use in the study region. These maps show the location and extent of land use by urban areas and transport routes, oil and gas fields and pipe lines, coal fields and oil shale deposits, agricultural lands including irtigated, dryland and potentially irrigable and deer winter range. Recognition of the extent, timing and nature of these uses provides an essentially positive means for avoiding conflicts which could arise when any particular use is expanded or contracted whether directly or indirectly associated with shale oil development.

4.2 Water Resources

As indicated in Figure 4.2-1 and 4.2-2, a major portion of the study region can be classified as semi-arid with average annual precipitation of less than 10 inches. [At elevations under 7 to 8 thousand feet, precipitation is very sparse and only at infrequent intervals except in the winter season.] However, more important

FIGURE 4.1.2-3 URBAN AREAS AND TRANSPORTATION ROUTES



CITIES & TOWNS 1970 CENSUS

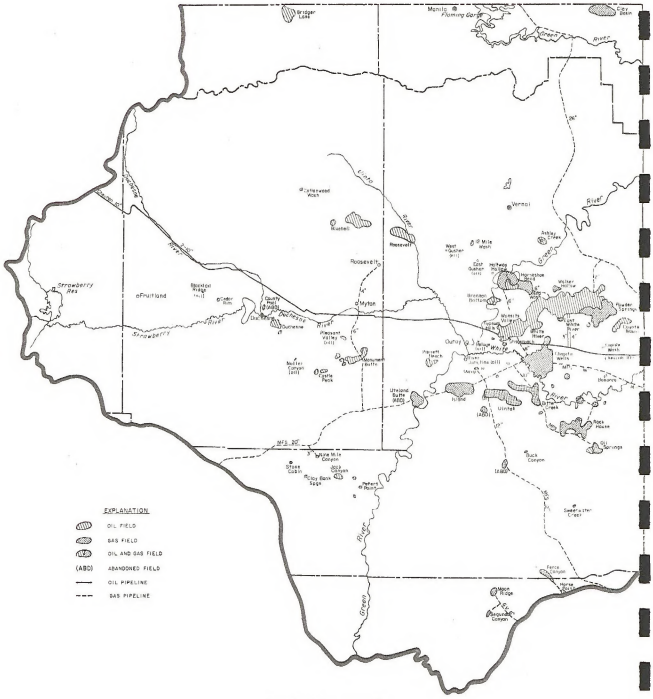
Altamont	129	Maeser	1248
Altonah	10	Manila	226
Arcadia	5	Mt. Emmons	280
Bluebell	30	Mountain Home	50
Bonanza	150	Myton	322
Bridgeland	20	Naples	100
Duchesne	1094	Neola	400
Fort Duchesne	200	Ouray	100
Fruitland	15	Randlett	25
Gusher	100	Roosevelt	2005
Hanna	25	Tabiona	125
Hayden	95	Talmage	10
Jensen	300	Tridell	40
Lapoint	200	Vernal	3908
Leota	85	Whiterocks	300

COUNTIES 1970 CENSUS

Daggett	666
Duchesne	7299
Uintah	12684

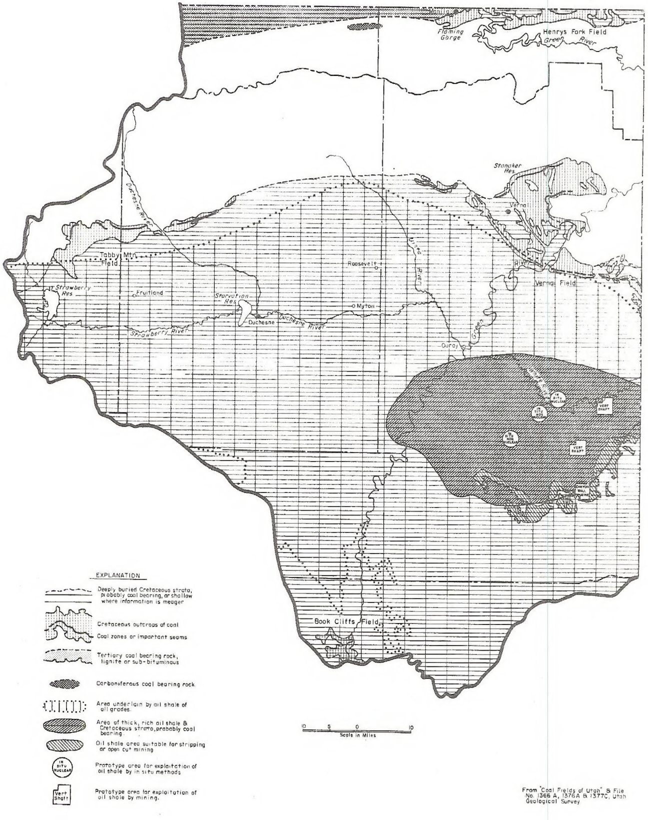
From "General Highway Map State of Utah", by Utah State Dept. of Highways, 1967
Census Data from Utah Highway Map by State Road Commission of Utah, 1971

FIGURE 4.1.2-4 OIL AND GAS FIELDS AND PIPELINES



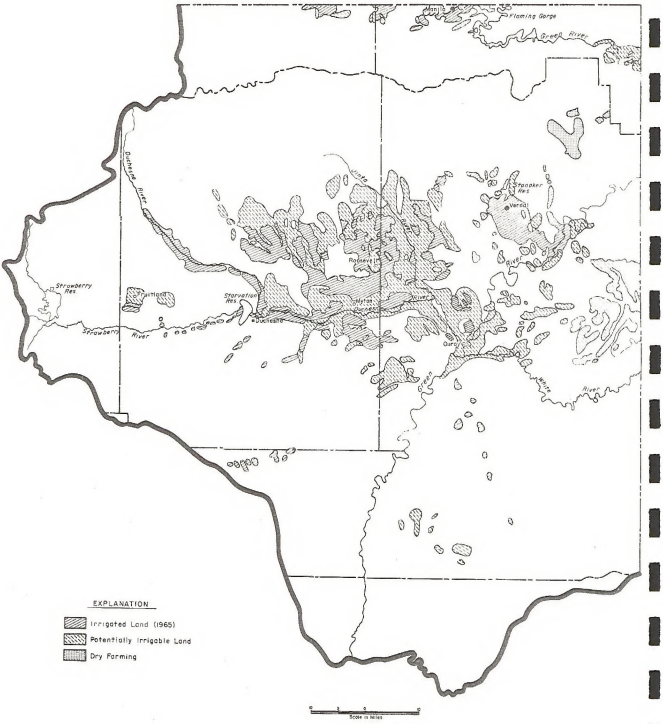
From - Oil & Gas Fields & Pipelines of Utah by U.S.G.S. Conservation Div. Branch of Oil & Gas Operations, Dec. 1960

FIGURE 4.1.2-5 COAL FIELDS AND OIL SHALE DEPOSITS



From "Coal Fields of Utah" & File No. 1366 A, 1376A & 1377C, Utah Geological Survey

FIGURE 4.1.2-6 IRRIGATED, DRY FARMED, AND POTENTIALLY IRRIGABLE LAND

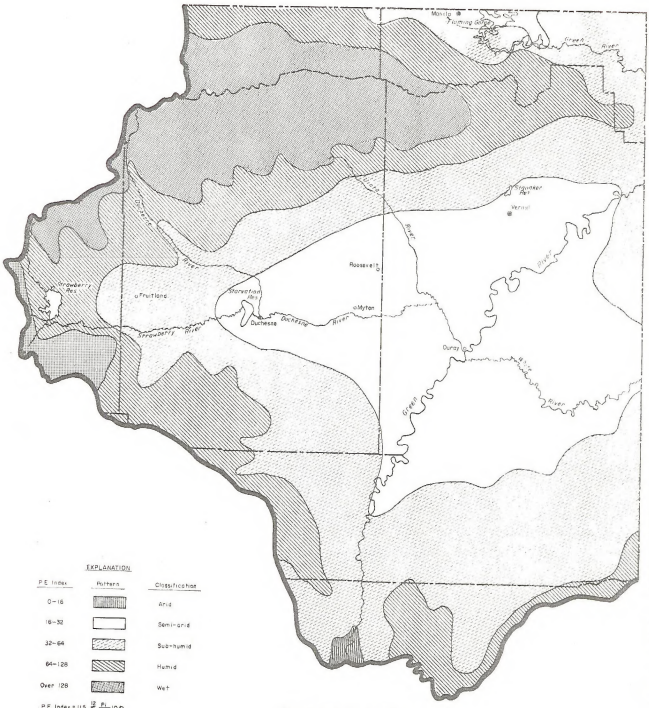


From Upper Colorado Region Comprehensive Framework Study, Appendix V, Economy of Upper Colo. Region, State-Fed. Inter-Agency Group for Pac. Southwest Inter-Agency Com. Water Resources Council, Nov. 1970

FIGURE 4.1.2-7 DEER WINTER RANGE

Source: Utah Division of Water Resources, 1971.

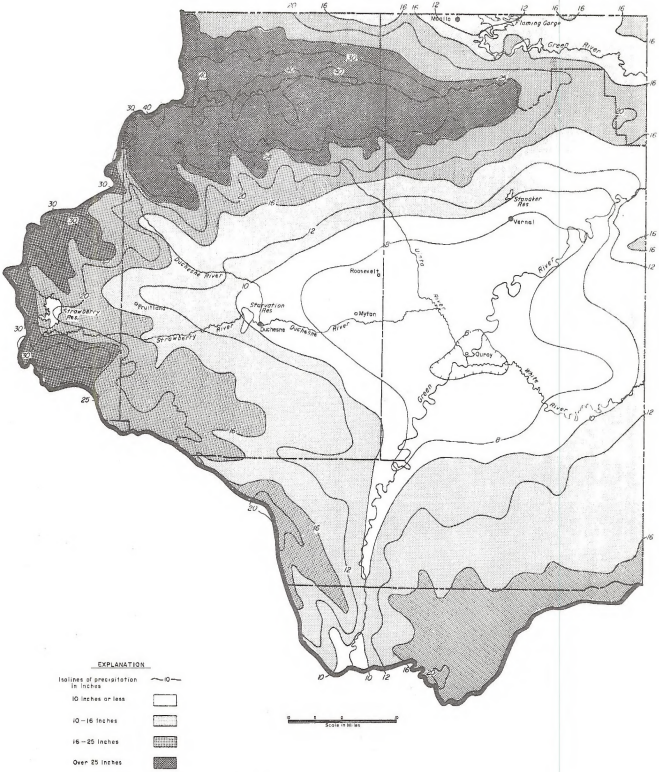
FIGURE 4.2-1 CLIMATIC CLASSIFICATION



From Hydrologic Inventory of the Uintah Study Unit, Utah, State Univ. Div. of Water Resources, March, 1970

FIGURE 4.2-2

NORMAL ANNUAL PRECIPITATION



From Normal Annual Precipitation 1931-1960 by Utah State Engineer Office, Utah Water & Power Boards, Soil Conservation Service, U.S. Dept. of Agriculture.

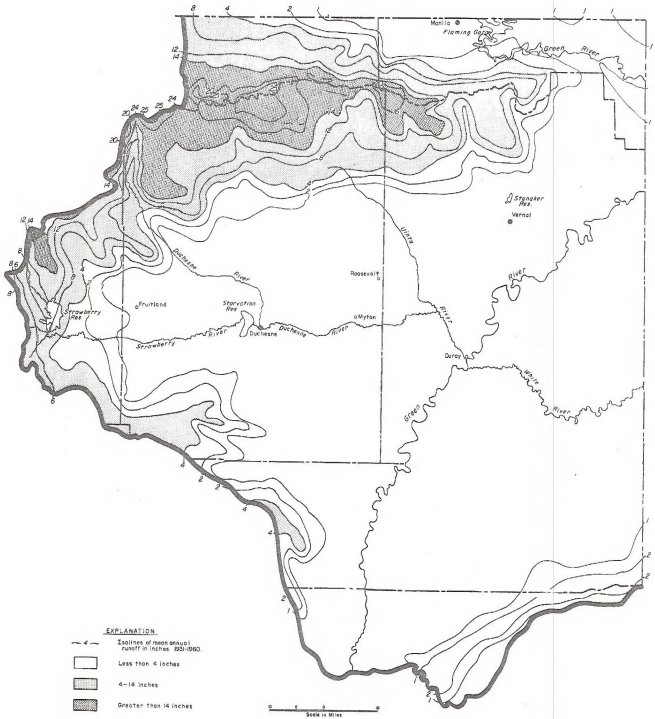
than total annual precipitation are the seasonal distribution of run off and stream flow and their coincidence with land areas where topography and temperature conditions permit abundant plant growth. Figures 4.2-3 through 4.2-8 contain maps which provide an overview of these characteristics and the resultant range and vegetative types which are found in the region.

4.2.1 Water Supply

Water supply to the lower elevations in the region depends on stream flow and reservoir storage which is fed by high mountain snow pack accumulated in the winter season. The quantity of water which traverses these lower elevation areas is depicted quantitatively and graphically in Figure 4.2.1-1. Estimates of water flow reported in this figure are mean annual flows (average yield per year) based on a 30 year history of flow measurements taken at strategic points on the system. The mean annual flows of the Uintah study unit are represented in the figure by indented arrowheads while flows due to evaporation exports, agricultural depletion and wet lands depletion are shown as arrowheads leaving the system. Flow in the Green River is seen to increase from 1,159,600 acre feet per season at Green River, Wyoming to 3,945,000 at Green River, Utah. This net increment of some 2,785,400 is contributed by tributaries along the segment. Similar estimates of increment (decrement) could be obtained between any two or more points along a river or its tributaries to generate an approximate estimate of water supply. Such an estimate may be useful but is not sufficient in the context of a river system which is as fully appropriated

FIGURE 4.2-3

MEAN ANNUAL RUNOFF



From Hydrologic Inventory of the Uintah Study Unit, Utah Basins Units, Utah Div. of Water Resources, Mar 1970.

FIGURE 4.2-4 NORMAL SEASONAL DISTRIBUTION OF FLOW

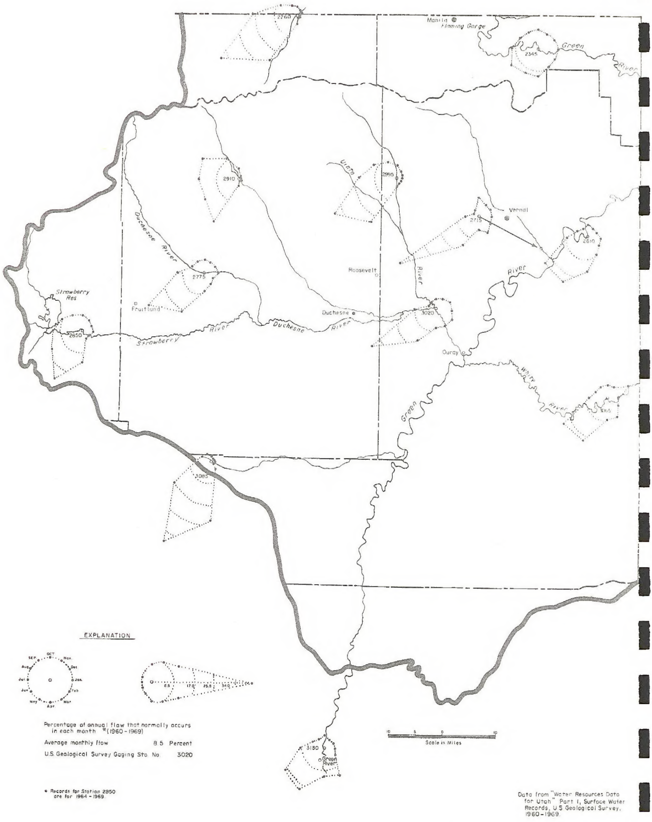
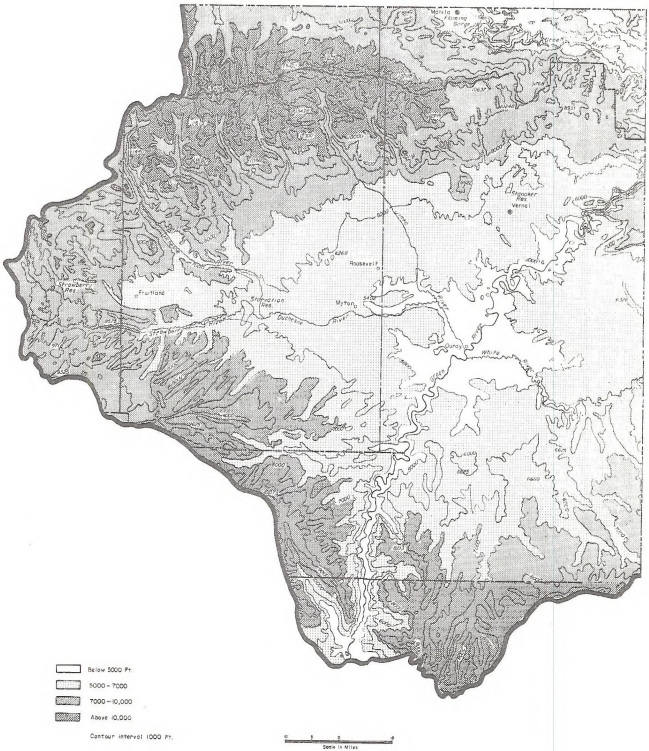


FIGURE 4.2-5

TOPOGRAPHY



From U.S. Geological Survey, Professional Paper 442, Plate 4, Sheets 1 & 2

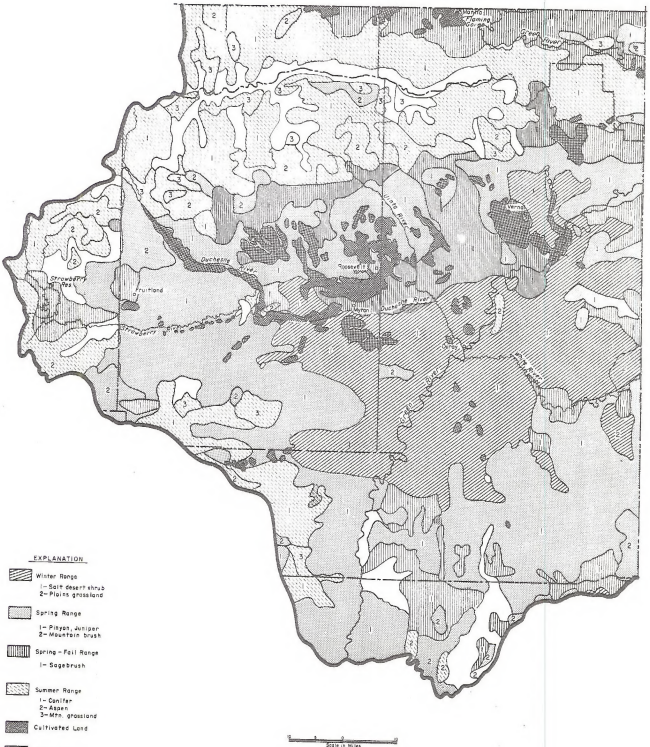
FIGURE 4.2-6

FROST-FREE SEASON

From Hydrologic Atlas of Utah, Utah State Univ., Utah Div. of Water Resources, Nov. 1968

FIGURE 4.2-7

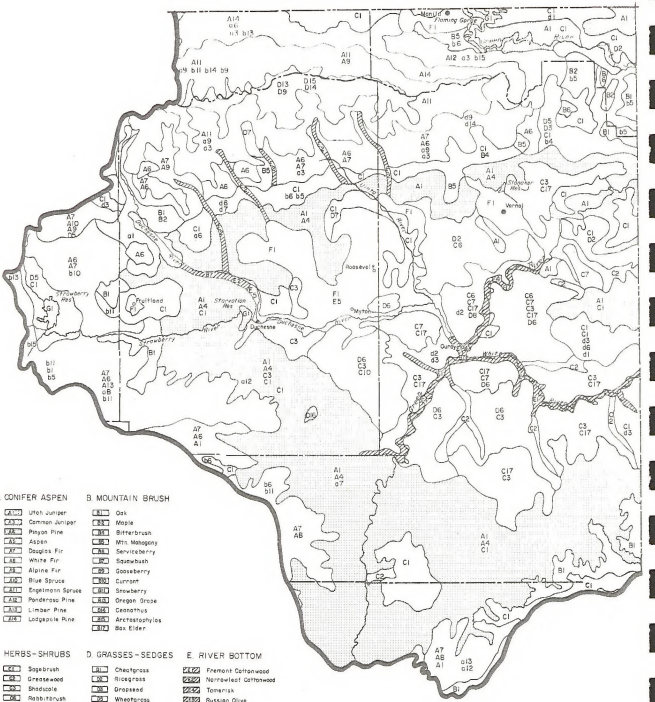
RANGE TYPES



From "Range Types of Utah", Range Management Dept, Utah State Univ., Logan, Utah.

FIGURE 4.2-8

VEGETATIVE TYPES



A. CONIFER ASPEN

- UJ Utah Juniper
- CJ Common Juniper
- PP Pinyon Pine
- A Aspen
- DF Douglas Fir
- WF White Fir
- AF Alpine Fir
- BS Blue Spruce
- ES Englemann Spruce
- PS Ponderosa Pine
- LP Limber Pine
- JP Lodgepole Pine

B. MOUNTAIN BRUSH

- O Oak
- M Maple
- BB Bitterbrush
- MM Mtn. Mahogany
- S Serviceberry
- SB Saskatoon
- GB Gooseberry
- C Currant
- SB Snowberry
- OG Oregon Grape
- CE Ceanothus
- AP Arctostaphylos
- BE Box Elder

C. HERBS-SHRUBS

- SB Sagebrush
- GW Greasewood
- SH Shadscale
- RB Rabbitbrush
- HB Horsebrush
- HG Halogeton
- PP Prickly Pear

D. GRASSES-SEDGES

- CG Cheatgrass
- RG Ricegrass
- GR Grassland
- WG Wheatgrass
- GA Galleta
- NG Needlegrass
- FT Foxtail
- BG Bluegrass
- TR Triserum
- FS Fescue
- SG Sedges
- SD Seeded

E. RIVER BOTTOM

- FC Fremont Cottonwood
- NC Narrowleaf Cottonwood
- TA Tamarisk
- RO Russian Olive

F. CULTURAL FORMS

- CL Cultivated Land

G. PHYSICAL FORMS

- W Water

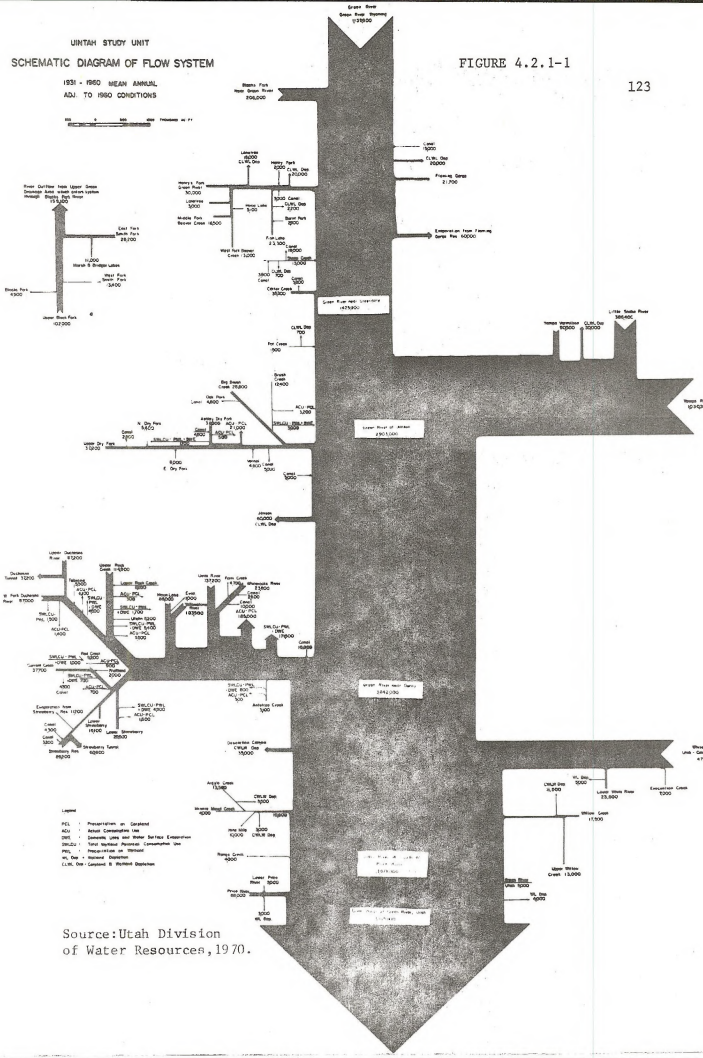
From "Major Plant Communities of Utah" by Robert H. Fosher, ©1968

UINTAH STUDY UNIT

SCHEMATIC DIAGRAM OF FLOW SYSTEM

1931 - 1960 MEAN ANNUAL
ADJ. TO 1960 CONDITIONS

FIGURE 4.2.1-1



New uses can be accomodated by augmenting water yield using technical means and/or by acquiring the rights to water which are committed in existing uses.

Estimates of physical supply for the study region provide a basis for evaluating the credibility of existing claims on water. Tables 4.2.1-1 through 4.2.1-4 contain water budgets for the four major drainages which encompass most of the study region[a] and the Utah oil shale development tracts of concern in this study. More detailed estimates for sub-basins within these drainages are available.[b]

Holders of legal rights to the use of this physical supply have been identified for these drainage areas and their sub-basins and the entire Upper Colorado Basin. Appendix B Table 3 presents an inventory of water rights and a listing of decreed rights compiled from the files of the Division of Water Rights for the Southeast Uinta Basin Division of the Uintah Basin Drainage. The Southeast Uinta Basin Division covers the Southeast side of the Green River below where it crosses the Utah-Colorado state line and above the confluence of the White River and all its tributaries in Utah.[c]

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[a]These drainages were identified earlier in summarizing land use as: 1) The Upper Green, 2) The Ashley Brush, 3) The Uintah Basin and 4) The Green and White.

[b]These budgets are available in the publication entitled "Hydrologic Inventory of the Uintah Study Unit", Utah Division of Water Resources-Utah Water Research Laboratory, PR WG 40-5: March 1970 Utah State University, Logan, Utah 84321.

[c]A complete inventory of water rights for the Utah portion of the Upper Colorado Basin Is contained in the publication entitled, "Inventory of Water Rights, Upper Colorado River Basin Utah", Division of Water Rights-Division of Water Resources, State Capitol Building, Salt Lake City, Utah; December 1974.

TABLE 4.2.1-1

MEAN MONTHLY AND MEAN ANNUAL WATER BUDGETS

Upper Green Drainage Area

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
Total river inflow	73,610	66,450	53,550	46,950	51,350	129,540	359,300	761,320	787,820	280,500	112,610	59,300	2,782,300
Total ungaged subsurface inflow	7,220	3,930	2,030	1,800	1,790	1,100	2,960	5,650	12,460	14,120	15,220	11,700	80,000
Total river surface and subsurface inflow	80,830	70,380	55,580	48,750	53,140	130,640	362,280	768,970	800,280	294,620	127,830	74,000	2,862,300
Total tributary surface and subsurface flow	6,830	5,420	4,670	4,340	4,480	6,470	13,450	47,010	56,200	22,770	12,940	7,720	192,300
Total river and tributary flow	87,460	75,800	60,250	53,090	57,620	137,110	375,730	813,980	856,480	317,390	140,770	78,720	3,054,600
Total cropland depletions	2,760	0	0	0	0	0	0	8,400	11,690	11,630	8,540	5,180	48,300
Total wetland depletions	1,700	0	0	0	0	50	400	5,770	8,940	11,070	9,430	6,040	43,400
Total reservoir evaporation Flaming Gorge Reservoir	3,600	1,500	1,200	1,200	1,500	2,900	5,000	7,300	9,900	11,000	8,100	6,800	60,000
Total reservoir surface storage change	98,910	84,090	42,680	37,240	33,980	8,270	20,160	127,370	268,450	47,230	66,420	107,650	0
Total outflow and/or storage change	178,510	158,390	101,730	89,130	90,110	175,890	149,670	665,140	558,500	236,460	181,120	168,350	2,903,000
Total estimated G.W. storage change	-3,280	-2,840	-1,670	-1,540	-1,530	-14,730	-15,470	45,410	26,270	-17,680	-4,690	-4,280	0
Total river outflow, Green River at Jensen, Utah	181,790	161,230	103,400	30,670	31,640	140,620	369,140	619,710	512,230	254,100	185,810	172,630	2,903,000

Source: Utah State University - Utah Division of Water Resources, 1970.

TABLE 4.2.1-2

MEAN MONTHLY AND MEAN ANNUAL WATER BUDGETS

Ashley Brush Drainage Area

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
Total tributary surface and sub-surface inflow	5,120	3,310	2,450	2,140	2,000	3,370	7,110	40.840	39,490	10,880	6,770	5,000	127,400
Total exported canal flow	770	0	0	0	0	0	40	1,960	1,650	1,190	1,220	970	7,800
Total cropland precipitation	1,030	950	1,050	880	810	920	1,080	1,040	1,050	880	1,020	990	11,700
Total cropland consumptive use	2,560	0	0	0	0	0	0	7,260	9,820	8,520	5,490	2,750	36,400
Total wetland precipitation	740	670	730	610	580	640	750	720	730	600	720	710	8,200
Total wetland consumptive use	1,150	0	0	0	0	100	340	4,050	5,390	6,450	5,170	2,850	25,000
Total domestic use & W.S. evaporation	200	70	60	60	60	150	330	520	640	710	540	260	3,600
Total reservoir surface storage	-400	200	200	200	200	200	500	2,100	1,000	-1,700	-1,600	-900	0
Total outflow and/ or storage change	2,610	4,660	3,370	3,370	3,130	3,480	7,730	26,710	22,770	-2,890	-2,310	770	74,000
Total estimated G.W. storage change	-160	1,020	-250	-250	-360	-140	2,850	4,340	3,950	-5,870	-4,470	-1,150	0
Total river outflow of Ashley Creek and Brush Creek	2,770	3,640	3,620	3,620	3,490	3,600	4,880	22,370	18,800	2,980	2,160	1,920	74,000

Source: Utah State University - Utah Division of Water Resources, 1970.

TABLE 4.2.1-3

MEAN MONTHLY AND MEAN ANNUAL WATER BUDGETS

Uinta Basin Drainage Area

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
Total tributary surface and sub-surface flow	38,590	30,280	28,180	25,010	23,210	30,320	64,560	219,830	238,600	102,220	63,680	46,030	910,500
Total imported canal flow	350	0	0	0	0	0	0	230	350	470	820	580	2,800
Total exported canal flow	2,370	960	860	840	700	750	2,340	18,330	30,280	20,920	14,050	8,400	101,300
Total cropland precipitation	9,780	4,170	4,090	5,970	6,010	6,540	7,060	8,440	6,060	5,430	10,230	11,030	84,800
Total cropland consumptive use	19,290	0	0	0	0	0	0	43,380	64,180	73,600	54,410	32,740	286,680
Total wetland precipitation	5,420	2,490	2,430	3,480	3,370	3,810	4,010	4,780	3,510	3,200	5,810	6,390	48,780
Total wetland consumptive use	9,260	140	10	10	40	410	5,260	34,020	46,980	58,600	46,060	31,810	232,600
Total domestic use and W.S. evaporation	350	60	50	50	50	50	80	870	1,440	1,990	1,790	1,120	7,900
Total reservoir evaporation	640	110	0	0	0	220	670	1,820	2,530	2,520	2,080	1,610	12,200
Total reservoir surface storage change	-1,710	4,240	5,140	4,320	4,170	6,740	15,310	10,560	350	-24,780	-17,490	-6,850	0
Total outflow and/or storage change	23,440	31,430	28,640	29,240	27,630	32,500	51,950	125,30^	102,760	-21,530	-20,160	-4,800	406,200
Total estimated G.W. storage change	3,440	6,310	1,320	2,310	1,490	1,800	22,050	48,300	4,430	-41,630	-32,820	-17,000	0
Total surface and subsurface river outflow of Duchesne River near Ouray	20,000	25,120	27,320	26,930	26,140	30,790	29,900	77,000	98,330	20,100	12,460	12,200	406,200

Source: Utah State University - Utah Division of Water Resources, 1970.

TABLE 4.2.1-4

MEAN MONTHLY AND MEAN ANNUAL WATER BUDGETS

Green and White Drainage Areas

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
Total river inflow	234,500	216,770	158,020	143,670	146,160	215,050	452,960	824,640	764,060	322,410	236,970	217,190	3,932,400
Total tributary surface and subsurface inflow	6,070	4,660	3,870	3,840	4,260	10,010	27,010	31,620	16,660	10,940	8,840	6,820	134,600
Total cropland depletions	930	0	0	0	0	0	80	2,460	3,720	5,340	4,040	1,940	18,500
Total wetland depletions	4,580	110	0	0	0	310	1,860	13,040	20,630	27,640	24,520	15,810	108,500
Total outflow and/ or G.W. change	235,480	221,320	161,890	147,510	150,420	224,760	478,070	842,500	757,670	301,090	217,650	206,650	3,945,000
Total estimated G. W. storage change	120	2,870	5,770	5,940	-50	-3,530	43,100	62,880	-29,690	-50,620	-25,530	-11,360	0
Total river outflow. Green River at Green River, Utah	235,360	218,450	156,120	141,570	150,470	228,280	434,970	779,620	787,360	351,610	243,180	218,010	3,945,000

Source: Utah State University - Utah Division of Water Resources, 1970.

4.2.2 Water Use

Water use can be identified in terms of diversions or of net depletion requirements. The most useful identification is obviously in terms of depletions in use since it gives recognition to the fact that most uses do not completely "use" water but that some portion will always return to the system. Use requirement then is defined as that portion of diverted water which is lost to the physical system through evaporation or export into other basins.

Water use has been specified for major sub-basins of the Upper Colorado Basin as a part of the comprehensive framework studies of the Colorado River System. The Green River Subregion comes closest to approximating the Uintah Study Unit. Water use requirements for 22 industries and households, fish and wildlife, recreation, and export were developed for the years 1965, 1980, 2000, and 2020. Table 4.2.2-1 presents these data for the Green River Subregion. Total water use requirement in 1965 was 1,054,823 acre feet per year for the complete list of uses represented in the table. This is expected to increase to 1,831,996 acre feet by the year 2020. It is of interest to note that the agricultural industry uses some 80 percent of total requirements in 1965, and, although the use level increases over the projected period, its percentage declines to about 50 percent of total use by the year 2020.

TABLE 4.2.2-1

WATER DEPLETION REQUIREMENTS FOR OBE-ERS PROJECTIONS, GREEN RIVER SUBREGION, UPPER COLORADO REGION, 1965, 1980, 2000, AND 2020

Sector	Acre-Feet Per Year			
	1965	1980	2000	2020
Agriculture	831,939	860,347	908,381	952,966
Oil and gas	8,071	10,026	9,079	2,799
Coal	5,879	10,826	22,297	23,844
Uranium and non-fuels	1,897	5,611	10,852	16,615
Food and kindred products	47	72	119	183
Lumber and wood products	192	488	885	1,475
Printing and publishing	1	3	5	11
Stone, clay and glass	40	75	143	284
Other manufacturing	19	112	254	565
Wholesale trade	37	60	116	222
Service stations	22	37	77	159
Eating and drinking places	43	77	165	355
Other retail	118	210	410	864
Oil field services	465	576	496	152
Lodging	65	139	335	769
Other services	53	118	313	795
ransportation	81	144	286	537
Electric energy	1,783	10,804	28,914	38,190
Other utilities	3	5	11	21
Contract construction	1,330	2,394	4,857	9,120
Rentals and finance	19	36	71	143
Government	313	580	1,176	2,386
Households	6,006	7,388	7,979	8,941
Subtotal	858,423	910,128	997,221	1,061,396
Fish and wildlife	8,000	49,400	49,400	49,400
Recreation	500	800	1,300	2,200
Export	120,900	255,000	587,000	652,000
Subtotal	987,823	1,215,328	1,634,921	1,764,996
Main stem reservoir evap.	67,000	67,000	67,000	67,000
Total	1,054,823	1,282,328	1,701,921	1,831,996

Source: Water Resources Council, 1971

5.0 SOCIO-CULTURAL ENVIRONMENT

This chapter provides a description of selected demographic features of residents in the region, a qualitative sketch of the several cultural traditions which coexist in the region, and a preliminary analysis of attitudes toward existing conditions and the prospects of large-scale energy development. In addition, a description of outstanding historical, archaeological, and paleontological features of the region is provided.

5.1 Demographic Profile of the Area Population

5.1.1 Current Population Levels

Table 5.1.1-1 shows the 1960 and the 1970 populations for Duchesne, Rio Blanco, and Uintah Counties and the principal towns and cities in each of these counties. It also shows the percentage population increase or decrease in each of these political entities over the decade in question. The data show wide variation in population change: the population in Rio Blanco County decreased 6 percent while that of Duchesne County increased over 42 percent; the population in Myton City decreased 2.1 percent while Duchesne City's population increased 42.1 percent; and the town of Tabiona experienced a population loss of 25.1 percent while the town of Maeser grew 34.3 percent. As a base for comparison, it is interesting to note that the state population increased almost 19 percent during the 1960-70 decade. Thus, although

TABLE 5.1.1-1

POPULATION OF COUNTIES, CITIES AND TOWNS INCLUDED WITHIN THE STUDY REGION IN 1960 AND 1970

Area or Place	Population 1960	1970	Change 1960-1970	Percent Change 1960-1970
Duchesne County	7,179	7,299	120	1.7
Altamont Town	102	129	27	26.5
Duchesne City	770	1,094	324	42.1
Myton City	329	322	-7	-2.1
Roosevelt City	1,812	2,005	193	10.7
Tabiona Town	167	125	-42	-25.1
Rio Blanco County	5,150	4,842	-308	-6.0
Meeker Town	1,655	1,597	-58	-3.5
Rangely Town	1,464	1,591	127	8.7
Uintah County	11,582	12,684	1,102	9.5
Maeser Town	929	1,248	319	34.3
Vernal City	3,655	3,908	253	6.9

Source: U.S. Bureau of the Census; Census of Population: 1970, Vol. 1, Characteristics of the Population, Part 46, Utah.

Duchesne and Uintah Counties experienced population increase, the rate of growth in these counties was not as great as that of the state.

Table 5.1.1-2 provides a population breakdown for families, households, and the number of persons per household for the three counties and the state. The number of families and households in the two Utah counties increased between 1960 and 1970, but decreased in Rio Blanco County. Although there was a decrease in the number of persons per household in Uintah and Duchesne Counties, this decrease was not as great as that for the state, which indicates that the birth rate for the predominately rural counties of the area is higher than that of the urban populations along the Wasatch Front. In Rio Blanco County the birth rate declined after 1960.

5.1.2 Composition of the Population

This section discusses the composition of the area's population by age, ethnic group, and educational attainment. Table 5.1.2-1 provides information on age composition for Duchesne, Rio Blanco, and Uintah Counties, as well as the state. The data reveal that the labor active populations (20-34 and 35-64) in each of the counties are appreciably less than the state average, and that for both men and women, Duchesne County has the lowest percentage in this category while Uintah and Rio Blanco Counties are about equal.

Besides the White population, the only other ethnic group of consequence is the Ute Indian population. As Table 5.1.2-2 indicates, Utes comprise 4.2 percent of the population of Duchesne County and

TABLE 5.1.1-2

POPULATION, FAMILIES, HOUSEHOLDS AND NUMBER OF PERSONS PER HOUSEHOLD IN DUCHESNE, RIO BLANCO AND UINTAH COUNTIES AND THE STATE, 1960 AND 1970

County	Population			Families		Persons/Household	
	1960	1970	1973	1960	1970	1960	1970
Duchesne	7,179	7,299	12,000	1,583	1,673	4.04	3.71
Rio Blanco	5,150	4,842	4,900	1,382	1,285	3.92	3.22
Uintah	11,582	12,684	15,200	2,605	3,013	3.96	3.68
Utah Total	890,627	1,059,273	1,157,000	209,373	249,741	3.62	3.46

Source: U.S. Bureau of Census, Census of Populations, 1960, 1970, Utah: General Population Characteristics, Utah Economic and Business Review, The Bureau of Economic and Business Research, University of Utah, Salt Lake City, Utah.

TABLE 5.1.2-1

AGE DISTRIBUTION OF THE POPULATION IN COUNTIES WITHIN THE STUDY REGION AND THE STATE, 1970

Age	Duchesne		Rio Blanco		Uintah		State	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Males								
0-19	1,726	23.7	1,103	22.8	3,110	22.9	238,107	22.6
20-34	578	7.9	413	8.5	1,041	8.2	110,803	10.6
35-64	1,098	15.0	829	17.1	1,844	14.5	140,358	13.4
65+	287	3.9	177	3.7	430	3.4	33,997	3.3
Females								
0-19	1,647	22.7	909	18.8	2,900	24.5	231,049	21.9
20-34	627	8.5	436	9.0	1,167	9.2	117,017	11.1
35-64	1,042	14.3	755	15.6	1,745	13.7	144,378	13.7
65+	294	4.0	220	4.5	447	3.5	33,564	3.3

Source: Employment Development Division, Utah Department of Employment Security, Salt Lake City, Utah.

TABLE 5.1.2-2

ETHNIC COMPOSITION OF THE POPULATION OF COUNTIES WITHIN THE STUDY REGION AND STATE, 1970

	Duchesne		Rio Blanco		Uintah		State	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
White	6,938	95.05	4,646	95.95	11,309	89.16	1,031,926	97.4
Black	0	0.00	11	.23	2	0.02	6,617	0.6
Indian	321	4.40	6	.12	1,337	10.54	11,273	1.1
Other	40	0.55	159	3.28	36	0.28	9,457	0.9

Source: U.S. Bureau of Census, Census of Population, 1970, Utah, General Population Characteristic.

10.5 percent of the population of Uintah County.

Table 5.1.2-3 contains information relating to educational attainment in the study areas. The data indicate that although high school and college completions for the study area are low relative to the state, the median number of school years completed by area students increased more between 1960 and 1970 than that for the state. They also reveal that high school completion in Rio Blanco County is substantially higher than that for the Utah counties.

It is interesting to compare the 1970 four-county completions with those of the Ute Tribe: 14.1 percent of Utes completed less than five years (compared to the four-county average of 1.95 percent); 22.7 percent of Utes completed high school (compared to the four-county average of 61.6 percent); and 0 percent of Utes completed college (compared to 10.7 percent for the four counties). The median years completed by Utes in 1970 was 10.0, while that for the four counties was 12.3 percent.

5.1.3 Emerging Population Characteristics and Trends

Table 5.1.3-1 shows population densities for the three counties and compares these with the overall Utah density. The population densities for the area are extremely low, even compared to the state average. Between 1960 and 1970, density increased 1.8 percent in Duchesne County and 9.7 percent in Uintah County, but decreased 6.3 percent in Rio Blanco County. Between 1970 and 1973, population density in Duchesne County increased nearly 65 percent. During this

TABLE 5.1.2-3

EDUCATIONAL ATTAINMENT OF PERSONS 25 YEARS AND OLDER IN THE STUDY REGION AND THE STATE, 1960 AND 1970

		School Years Completed				
	Total	Less Than 5 Years	High School	College	Median 1970	Median 1960
Duchesne	3,520	1.6%	54.0%	10.8%	12.1	11.4
Rio Blanco	2,532	2.1	65.7	9.3	12.4	12.4
Uintah	5,994	2.1	59.4	8.6	12.3	11.7
Utah	492,337	2.0	67.3	14.0	12.5	12.2

Source: U.S. Bureau of the Census, County and City Data Book, 1967, 1972. U.S. Government Printing Office, Washington, D.C.

TABLE 5.1.3-1

POPULATION DENSITY PER SQUARE MILE, 1960, 1970 AND 1973, AND PERCENT CHANGE IN DENSITY BETWEEN 1960-1970 AND 1970-1973 FOR THE STUDY AREA AND THE STATE

	Duchesne	Rio Blanco	Uintah	Utah
1973	3.69	1.42	3.39	14.09
1970	2.24	1.48	2.83	12.90
1960	2.20	1.58	2.58	10.85
Change 1960-1970	1.8%	-6.3%	9.7%	18.9%
Change 1970-1973	64.7%	1.2%	19.8%	9.2%
Area in square miles	3,255	5,263	4,487	82,096

Source: U.S. Bureau of Census, Census of Population, 1960, 1970, Utah: Number of Inhabitants, Utah Economic and Business Review, The Bureau of Economic and Business Research, University of Utah, Salt Lake City, Utah.

same period, both Rio Blanco and Uintah Counties experienced a more modest density increase.

The percent of the total population living in rural farm, rural nonfarm, and urban areas for each of the three counties and Utah is shown in Table 5.1.3-2. As this table indicates, Rio Blanco and Duchesne Counties have no urban area. In all three of the counties, the rural farm population is decreasing while the rural nonfarm is increasing. One explanation of this increase in rural nonfarm population may be the increase in trailer hookups to rural water and septic tank outlets. Relative to the state as a whole, the three-county study area has a large rural population.

Table 5.1.3-3 shows the number and percent of the total population of the three counties living in cities and towns. It is significant to note that city and town populations have increased in all three counties between 1960 and 1970, including Rio Blanco where the population declined absolutely. Although (as observed above) there is no urban population in Duchesne County, more than 75 percent of its population live in Duchesne and Roosevelt.

5.1.4 Historic Patterns of Population Growth

As Table 5.1.4-1 indicates, Duchesne experienced an absolute population decline during the forty year period between 1930 and 1970. Uintah County experienced an accelerating increase, as did the state as a whole. Table 5.1.4-2 shows growth rates from 1950 to 1973. Duchesne County population declined 11.7 percent between 1950 and 1960,

TABLE 5.1.3-2

PERCENT OF TOTAL COUNTY POPULATION LIVING IN RURAL FARM, RURAL NONFARM AND URBAN AREAS, 1960 AND 1970

Place	Rural Farm		Rural Nonfarm		Urban	
	1960	1970	1960	1970	1960	1970
Duchesne	33.4	25.5	66.6	74.5	--	--
Rio Blanco	12.9	11.8	87.1	88.2	--	--
Uintah	21.9	16.1	46.5	51.2	51.6	32.7
Utah	7.0	2.4	18.1	17.0	74.9	80.6

Source: U.S. Bureau of the Census, Census of Population, 1960, 1970, Utah Number of Inhabitants.

TABLE 5.1.3-3

NUMBER AND PERCENT OF TOTAL COUNTY POPULATION LIVING IN CITIES AND TOWNS, 1960, 1970, AND 1974

	1960		1970		1974	
	Number	Percent	Number	Percent	Number	Percent
Duchesne (Duchesne)	(770)	10.73	(1,094)	14.99	(3,200)	26.67
Roosevelt (Duchesne)	(1,812)	25.24	(2,005)	27.47	(4,800)	40.00
Rangely (Rio Blanco)	(1,464)	28.45	(1,591)	32.86	N/A	N/A
Vernal (Uintah)	(3,655)	31.56	(3,908)	30.81	(5,000)	32.89

Source: U.S. Bureau of Census, Census of Population, Utah Industrial Development Information System, Bureau of Economic and Business Research, University of Utah, Salt Lake City, Utah, Utah Number of Inhabitants, 1960, 1970.

TABLE 5.1.4-1

PATTERNS OF POPULATION CHANGES IN COUNTIES WITHIN THE STUDY REGION SINCE 1930

Year	Duchesne	Rio Blanco	Uintah	Utah
1930	8,263		9,035	509,000
1940	8,958		9,898	552,000
1950	8,134		10,300	696,000
1960	7,179	5,150	11,582	900,000
1970	7,299	4,842	12,684	1,065,000

Source: Utah Foundation, Statistical Review of Government, 1975 Edition, Salt Lake City, Utah.

TABLE 5.1.4-2 POPULATION GROWTH RATES FOR COUNTIES WITHIN THE STUDY REGION AND THE STATE, 1950-1960, 1960-1970, AND 1970-1973

Area	1950-1960	1960-1970	1970-1973
Duchesne	-11.7	1.6	64.4
Rio Blanco	9.1	-6.0	-4.3
Uintah	13.0	9.5	19.8
Utah	29.3	18.9	9.2

Source: U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 7, and Series P-25, No. 461, Utah Economic and Business Review, Bureau of Economic and Business Research, University of Utah, Salt Lake City, Utah.

but increased 64.4 percent between 1970 and 1973. Its growth rate during the 60's was 1.6 percent. Like Duchesne County, the growth rate of Uintah County during the period of time between 1970 and 1973 significantly exceeds that of the state. The rapid growth of the two Utah counties during this period contrasts sharply with Rio Blanco County, where population continued to decline.

5.2 Ethno-Cultural Groups

The preceding section provides a statistical description of selected demographic characteristics of resident groups of the study area. It will be useful now to supplement this statistical summary with a qualitative characterization of three distinct cultures in the Basin.

5.2.1 The Ute Tribe

5.2.1.1 Historical Background. In October, 1861 President Abraham Lincoln decreed that a reservation should be established in the Uintah Basin. In 1864 Congress passed a law creating the Uintah Reservation. The Uncompahgre Reservation was established by the executive order of President Chester A. Arthur. The Uintah and Uncompahgre Reservations were combined into the present Uintah and Ouray Reservation in 1886. The Reservation had an approximate size of 4,470,914.

The Uintah and Ouray Reservation was thrown open to homesteading in 1905. Much of the reservation was overrun by settlers. Also in 1905 President Theodore Roosevelt withdrew 1,100,000 acres from Ute lands to create the Uintah National Forest. In 1933 Congress awarded each member of the tribe $1,100 to compensate for his losses.

When the Taylor Grazing Act was passed in 1933, the federal government withdrew 429,000 acres from the Uncompaghre section of the Reservation and placed it in the public domain. The justification was the Indians had not filed non-use permits. The Utes have since been able to recover some of this loss. The Judgment Fund was won by the Indians from the government in 1950. The amount of the judgment was $32,000,000 of which $17,000,000 when to Uintah and Uncompaghre groups. The next year Congress authorized the Tribal Business Committee, the duly authorized decision-making body of the tribe, to expend up to 33 1/3 percent of this total on a three-year development program, two immediate results of which were the placing of $3,535 in the hands of each Ute and the closing of the Federal boarding school on the reservation. In 1956, a Ten Year Development Program, based on what was learned during the three-year program, was put into effect. This program involved dividing the tribe and its assests between the full-blood and mixed-blood members of the tribe and the distribution of a $4,500 annual per capita payment through the Family Plan Program. In 1960, the Utes won the Spanish Fork Claim against the U.S. and were awarded an additional $7,000,000, whereupon the Bureau of Indian Affairs authorized the Tribe to replace the ten-year plan with a five-year plan adjustable on an annual basis. Since this time, several Tribal Enterprises have been established, including the Bottle Hollow Resort complex, the Ute Scientific Laboratory, Ute Fabrication, and the Livestock Enterprise.

5.2.1.2 Tribal Political Enviornment. The Ute Tribe adopted the 1937 Indian Reorganization Act. The tribal

Constitution and By-laws stipulate that the governing body of the tribe shall be a Business Committee, comprised of two members from each of the three bands (Uncompaghres, Uintah, and White River) and elected to four-year terms of office. Voter turnout in the elections is consistently low. The powers of the Business Committee are broad, including the powers to negotiate with Federal, state, and local governments; employ legal counsel; approve or veto the disposition of tribal lands, including the assignments of land to tribal members; regulate all tribal economic affairs and enterprises; decide upon the salaries of tribal employees; promulgate and enforce ordinances; and levy taxes upon members of the tribe. The chairman of the Business Committee is elected by its six members.

The Bureau of Indian Affairs at Fort Duchesne reviews Business Committee decisions which involve the expenditure of tribal funds and, in general, acts as the only check on the Committee's use of power. The Bureau also provides support service for the tribal government and ensures that reports and files are maintained.

5.2.1.3 Features of Ute Culture. According to Younger Witherspoon (Cultural Influences on Ute Learning, 1961), "The Ute definition of a good person includes honesty, wisdom, moderate success, non-inquisitiveness, generosity, and non-aggressive behavior. The good person is quiet, minds his own business, does not pry into the affairs of others, and does not give advice unless he is asked." For the Ute, not surprisingly, not all white men live up to this conception.

Witherspoon reports that even though children are expected to respect, listen to, and obey their elders, there is not clearly estab-

lished authority structure and system of social sanctions in Ute society. Quoting Witherspoon (1961:205):

> Even after the Utes acquired the horse and were consolidated into bands, they failed to achieve any overall centralized system of authority. The head of each family continued to handle family problems. The most usual solution of internal problems was the total or partial dissolution of the group. Advice was given but seldom was physical force used to ensure its acceptance. There was not even a well-organized system of social sanctions.
>
> The breakdown of the respect pattern has been accompanied by a reduction in parental or elder authority which was the only real authority which the Ute ever recognized. ...Parents frequently complain that their children refuse to listen to them, but they seem unable to devise any system which would enforce obedience.

In The Ethnohistory and Acculturation of the Northern Ute (1961), J. G. Jorgensen contends that Ute religion has maintained more of its aboriginal integrity than any other "major" aspect of Ute culture. The character of Ute religion may be gleaned from the concluding remarks of Jorgensen's study (1964:35):

> The Sundance and peyote have (since 1880) been added to Ute ritual practices, whereas the rituals associated with birth and puberty have sluffed from use. Once rampant fears of evil-doing sorcerers have now subsided; yet medicine men (puwarat) are still very much active in Ute life, and they still very much "combat" the diseases caused by an imagined plethora of malicious or merely mischievous spirit beings.
>
> ...I have demonstrated that the ubiquitous themes of curing and healing have taken precedence over all other themes in Ute religion. I have also shown, I think, that peyote and the Sun dance became reworked so that curing and healing became their main ostensible functions, whereas they were not the main features emphasized by the people who gave them these rituals. Finally, though the Ute have accepted religious rituals offered to them by their Indian counterparts, they steadfastly rejected Christianity at the same time.

Another important dance of the Ute Indians is the Bear Dance. Heralding the beginning of spring, it is an interpretation of the actions of the bear when spring arrives. The Indians gather and imitate the

scratching of the bear by drawing a notched stick over a surface that gives out a deep scratching and rumbling sound. Songs concerned with the advent of spring are also an important part of the dance. The dance serves as a good vehicle for intercommunity socializing. Since the time of the Bear Dance is determined by weather and other community activities, its time varies from year to year.

According to Witherspoon, analytical thinking, scientific explanation, and the idea of alternatives are alien to the traditional Ute "world view." "Things are as they are," he writes, "and the Ute waste little time on speculation as to how they came to be. The adults believe that the natural objects, plants, and animals were brought into being at the time of creation. Each category received its form and characteristics at that time and has retained them essentially unchanged ever since. The behavior of people are ascribed in a similar way to the innate, perhaps predetermined, characteristics of the particular person." While this orientation toward the world is no doubt changing as a result of the Ute entry into the public school system, it helps explain why Ute school children have experienced some difficulties in school.

Although there are good indications that today's Ute takes pride in his heritage and that the traditional culture is acquiring a new vitality and integrity, it is evident that over a period of many years Ute culture has experienced change and dissolution. The meaning of Ute life 100 years ago was centered around a hunter, food-gathering economy. Existence depended heavily on food supply and weather. Sexual roles in the family were well defined. Responsibility followed close

kinship lines, primarily concerned with the nuclear family. The culture was passed down by example with myths and ritual dances to supplement the experience of daily life. The establishment of the reservation, the loss of hunting grounds to the Mormons, the splintering of the bands into local residence groups and subsequently extended families, the "culture shock" of the Meeker Massacre in 1879, the massacre of wandering Uncompaghres in Colorado in 1886, the loss of Ute lands under the homestead allotment, the custodial presence of the Bureau of Indian Affairs, the assimilation of Ute children in White schools and the adoption of English as a second language, the annual per capita payments resulting from the Colorado Judgment and Spanish Fork Claim, and the success of recent Ute Enterprises have all contributed to dissolution of the traditional Ute meaning of life and family.

The change has predictably not been without social problems. Drinking, parental absence from the home, breakdown in the authority structure, and high unemployment are some of these problems.

5.2.2 The Dominant Anglo Culture

5.2.2.1 Historical Background. In the latter part of the nineteenth century, the Mormons colonized parts of Uintah Basin. The Mormon's high birth rate and the agricultural depression of 1873-1896 combined to produce a continuing need for population outlets away from the Wasatch Front. This colonizing effort was a well-organized group effort by Mormon leaders. Ashley Valley was settled in 1878, and by 1890 much of the good agricultural land had been colonized. During this period basic irrigation systems were developed. By the end of

the nineteenth century the Uintah Basin's White population started to turn their attention to the neighboring lands of the Uintah and Ouray Reservation.

As the policy for opening the reservation was being developed, the government instructed the U.S. Geological Survey to determine the amount of land and water available for possible farming. An experienced hydrographer, Cyrus Cates Bubb, was assigned to survey the reservation. His report proved to be prophetic (U.S. Congress, House Document No. 671, 57th Congress, April 16, 1902:8):

> At present, and for many years in the future, the supply of water on the reservation is enormously in excess of the uses but in the view of future needs of the lands which may be allotted to the Indians, there is not much water which can be appropriated without injury to these prospective wants.

In 1905, when President Theodore Roosevelt opened over one million acres of the former Uintah and Ouray Reservation for homesteading by Whites, there was a large White influx into the Uintah Basin. During this period small farming communities sprang up as hundreds of families staked out claims. The tribulations of one Mormon family during this period are vividly portrayed by Loreen Wahlquist, who moved to a farm near Randlett in 1928 (p. 167):

> Fred (husband) has always spent so much time in some public work (church) that there has never been much time for fixing up around the home ... Fred was ordained Bishop of the ward November 4, 1928 ... The next big struggle Fred has as Bishop was to build our church house ... From 1929-1942 Fred spent two to four months of each year working on the church house ... We have also had quite a hopeless struggle financially. We bought the place for $2,800 and within a few years we couldn't have sold it for a tenth of that.

Eventually, the depression, lack of water, and other hardships caused many settlers to leave the Basin. Fred and Loreen Wahlquist vacated their Randlett farm after World War II.

However, thousands of Whites remained. Today in the Uintah Basin the Church of Jesus Christ of Latter-Day Saints is still the dominant faith. Other religious communities represented are the Catholic, Episcopal, Lutheran, First Baptist, Assembly of God, Church of Christ, and Jehovah Witness.

5.2.2.2 Relations Between the Dominant Culture and the Utes. The Mormon view of the Indians is strongly influenced by their conception of them as "Lamanites." Mormon aims in regard to the Indians have been explicitly stated in many of the Church writings. Talmage (1924:260) writes:

> The Lamanites, while increasing in numbers, fell under the curse of divine displeasure; they became dark in skin and benighted in spirit, forgot the God of their fathers, lived a wild nomadic life, and degenerated into the fallen state in which the American Indians, their lineal descendents, were found by those who rediscovered the western continent.

In keeping with this idea concerning the origin of Indians, the Mormons beleive that it is wrong to destroy the faith of the Indians, which is viewed not a false but a degeneration of the "true" religion.

Active Mormon interest in the Ute Tribe, however, has been somewhat belated. According to O'Neil (Ute People, 1970:48):

> After the removal of 1864 (of the Utes to the Uintah Basin), the Mormons made very little effort to improve the lot of the Indians of the Uintah Basin, wither economically or spiritually. After statehood, the people of Utah largely ignored the problem. The Mormon Church has shown more interest in the Ute and his problems since 1950.

Today there are two Indian Branches of the Mormon Church in the Uintah Basin. One is located at Whiterock and the other at Randlett.

The Episcopal Church took an early interest in the Utes. They are currently the largest Christian sect on the reservation. There

is a recently remodeled Anglican Chapel at Randlett, about five miles down the Uintah River from Fort Duchesne. The church was constructed in the ninteenth century and is on the State list of historic places.

5.2.2.3 Relations Between the Dominant Culture and Large Industry. In its origins, Mormonism was essentially agrarian. Agriculture was regarded as the proper base of Mormon community-building and was the ideal way of life for the Mormon family. Brigham Young opposed the development of mining on a scale beyond the requirements of the domestic territorial needs. As Thomas O'Dea (1965:251)points out:

> It is ironical that, driven by conflict and persecution, the Mormons seek to build agricultural utopia in a region which, from the point of view of farming, was most unpromising, while at the same time was most favorably endowed with mineral wealth.

An interesting sociological comparison of the Mormon agricultural community of St. George and a non-Mormon mining community in the late nineteenth century can be found in Nels Anderson's book Desert Saints.

The urbanization of Utah prior to World War II did little to change the Mormon agrarian outlook. Until recently the lack of large-scale industry left urban life in line with Mormonism's agrarian foundation.

The agrarian suspicion of large-scale industry was seen in Mormon concern over the arrival of the Geneva Steel Company in Utah at the beginning of World War II. Some church leaders felt that an industry of this magnitude would disorganize the rural communities upon which the church had been established. Eventually, however, the church took on a cooperative attitude. According to O'Dea (1965:253):

> The success of Geneva in winning over the Mormon leadership and population was a tribute to the sensitivity of the company executives to the nature of the problem.

5.2.2.4 Features of Mormon Culture. Mormons have always embraced a strong work ethic. It was proverbial among the Mormon pioneers that "there is no excellence without labor." This emphasis on work carried over into church activities, where every Mormon was expected to participate. The Mormon Church has no paid clergy and every active member holds an organizational position. All males over the age of twelve who are in good standing are ordained to the priesthood.

To the Mormons, complete living requires a sound body. This concern for health has been with the church ever since its infancy. In 1833, Joseph Smith, the organizer and first prophet of the religion, reported a revelation that is known among the Mormons as the "Word of Wisdom." This revelation, among other things, forbids smoking and the consumption of alcoholic beverages. This ban has since been interpreted to include coffee and tea.

Recreation is also important to the Mormon community and is seen as support and refreshment for a more effective life, as well as for its own sake. Dancing and theater were important social factors in early Utah and are given a great deal of attention today. In general recreation has become a significant expression of Mormon activism and group solidarity.

As part of the Bicentennial observance, the Mormon Church has recently initiated a worldwide clean-up and beautification campaign. Church leaders have called upon members to clean up and beautify their homes, surroundings, farms, and places of business.

5.2.3 The Culture of the In-migrating Labor Force

The extraction, processing, and distribution of oil shale, oil,

natural gas, and tar sands will involve a large labor force. The size and composition of this labor force will be examined in some detail in Phase II of the study. Suffice it to say here that miners, truck drivers, heavy equipment operators, laborers, and others will be included in the primary labor force. Many or most of the individuals making up this labor force will come from outside the Uintah Basin.

The lifestyles of many of them will differ from those of the Utes and traditional area culture characterized above. Although it is unrealistic to expect that all of the in-migrating workers would have the same cultural orientation, it will be useful, and perhaps not too far off the mark, to assume that many or most of these in-migrants will share the outlook of the "working class" as characterized by Edward C. Banfield (1974:60-61):

> The working-class individual does not "invest" as heavily in the future, nor in so distant a future, as does the middle-class one. He expects to be an "old man" by the time he is fifty, and his time horizon is fixed accordingly. Also, he has less confidence that the middle-class individual in his ability to shape the future and has a stronger sense of being at the mercy of fate, a "power structure," and other uncontrollable forces. For this reason, perhaps, he attaches more importance to luck than does the middle-class individual. He is self-respecting and self-confident, but these feelings are less marked in him than in the middle-class individual, he is little disposed toward either self-improvement or self-expression; "getting ahead" and "enlarging one's horizon" have relatively little attraction for him. In rearing his children, he emphasizes the virtues of neatness and cleanliness, honesty, obedience, and respect for external authority. (As David Riesman has observed, the problem in the working class is not, as in the upper middle class, to stimulate children; rather, it is to control them--"to teach them faith, respect, and obedience, rather than independence of mind and development of talents.") The working-class individual's deepest attachment is to his family. However, his relationship to his wife and children is not as stable or as close--for instance, does not involve as much companionship--as these relationships tend to be in the middle class. Privacy is of less importance to him: he likes to have people around, and the noises and smells that they make seldom bother him (when he goes on vacation it is not to the country, which he finds too quiet and lonely, but to crowded resorts). If his children do not go to college, the working-class individual does not mind much. In his

> relations with others, he is often authoritarian and intolerant, and sometimes aggressive. Violence and brutality are less shocking to him than to middle-class persons; indeed, he regards them--up to a point--as normal expressions of a masculine style. To the working class, the middle class appears somewhat lacking in masculinity, and the upper class--a male member of which may even weep under stress--appears decidedly feminine or "queer."
>
> The sense of sharing a purpose with others is not as important to him as it is to members of the upper classes, and when he joins an organization it is more likely to be for companionship and "fun" than for "service" or civic improvement. His opinions on public matters are highly conventional, and his participation in politics is motivated not by political principles but by ethnic and party loyalties and the appeal of personalities.

The degree to which the new "working class" will mix with members of the other cultural orientations and the kinds of impacts that might be expected will be treated in Phase II. One important variable in this whole picture is whether or not a new community near the oil shale production site will be developed.

5.3 Attitudes Toward the Area and Development

The attitudes of the Basin's residents toward present living conditions and/or additional development are revealed, in part, by two recently completed surveys and an analysis of local newspaper editorials. Before discussing these, it should be remarked that the results of two other surveys will be reported in Phase II of this study. One of the surveys to be reported in the Phase II report is currently being conducted by the Energy Development Consulting Group; the other will be conducted by the Western Environmental Associates. This latter survey will involve an in-depth analysis of the attitudes of persons influential in the area toward oil shale development in the Basin.

5.3.1 Utah State University Department of Economics Survey

This survey was taken in February, 1974, and involved personal interviews of forty randomly sampled residents of the cities of Vernal and Roosevelt. Table 5.3.1-1 summarizes the results of this survey.

Some of the noteworthy results displayed in this table are:

A) All of the response groups (sample strata) are in favor of growth of the area's population and economy.

B) The retired age group is most in favor of growth (86 percent in favor). This same group has the least knowledge of new people who have moved into the area, are the least active in politics, have lived in the area the longest, and are among the least environmentally concerned.

TABLE 5.3.1-1

SUMMARY OF SELECTED RESULTS FROM THE UTAH STATE UNIVERSITY SURVEY

RESPONSE GROUPS	QUESTIONS	Are you in favor of the area's expanding population and economic activities?			Do you know of any people who have moved into this area since 1970?		How much would your income have to increase to seriously tempt you to move to an urban area?			Are you active in local politics?		Do you think that ranchers should be allowed to continue using public lands for livestock grazing?		Do you actively support any environmental groups?		Do you agree that significant portions of various public lands should be designated as wilderness areas?		
	RESPONSES	YES	NO	NEUTRAL	YES	NO	<2000	2-4000	>4000	YES	NO	YES	NO	YES	NO.	YES	NO	NEUTRAL
Residence in Basin for five years or less	Frequency	9	1	2	10	2	3	2	7	1	11	10	2	1	11	9	2	1
	% of Total	75%	8%	17%	83%	17%	25%	17%	58%	8%	92%	83%	17%	33%	67%	75%	17%	8%
Residence in Basin for more than five years	Frequency	18	7	3	22	6	6	5	17	9	19	24	4	3	25	12	11	5
	% of Total	64%	25%	11%	79%	21%	21%	18%	61%	32%	68%	86%	14%	11%	89%	43%	39%	8%
Income of $7825 or less	Frequency	11	2	3	11	5	4	5	8	1	16	16	1	1	16	8	7	2
	% of Total	69%	13%	18%	69%	31%	24%	29%	47%	6%	94%	94%	6%	6%	94%	47%	41%	12%
Income greater than $7825	Frequency	15	6	2	21	2	5	3	15	9	14	19	4	3	20	14	5	4
	% of Total	65%	26%	9%	91%	9%	22%	13%	65%	39%	61%	83%	17%	9%	87%	61%	22%	17%
18-64 age group (labor active)	Frequency	21	7	5	27	6	8	5	20	10	23	28	5	3	30	19	9	5
	% of Total	64%	21%	15%	82%	18%	24%	15%	61%	30%	70%	85%	15%	9%	91%	58%	27%	15%
65 and over age group (retired)	Frequency	6	1	0	5	2	2	1	4	0	7	7	0	1	6	3	3	1
	% of Total	86%	14%	0%	71%	29%	29%	14%	57%	0%	100%	100%	0%	14%	36%	33%	43%	14%
Total Sample	Frequency	27	8	5	32	7	9	8	23	10	30	35	5	4	36	22	12	6
	% of Total	68%	20%	12%	82%	18%	23%	20%	75%	25%	75%	88%	12%	10%	90%	55%	30%	15%

Source: Utah State University, Department of Economics, 1974.

C) Approximately one-third of the new residents in the Basin have strong environmental interests. Only one-tenth of the total population actively express such interest.

One of the questions in this survey asked respondents to indicate what they like most and least about the area. The features thought to be most desirable are the area's quiet rural character (10 votes), its recreational opportunities (4 votes), the fact that it is "home" (3 votes), and its "people" (3 votes). The features of the area thought to be least desirable are cold winters (3 votes), its "run down" appearance (3 votes), the unavailability of good shopping facilities (1 vote), and lack of acceptance of outsiders by local people (1 vote).

In response to the question, "If you were anticipating a move from this area what factor would be most important in your choice of a new location?" seven people referred to a small town rural setting, which supports the conclusion that this factor appears to be highly valued by many or most of the area's residents.

This survey reveals a paradoxical situation. Strong preferences are expressed both for population and economic growth (on the one hand) and the rural character of the area's community life (on the other). Since it would appear that an important trade-off is involved here and that oil shale development would tend to impact positively on the former value but negatively on the latter, it will be important in Phase II of the study to explore further the content of these values, their relative importance for selected groups, and the specific ways in which the oil shale industry might be expected to impact on these values.

5.3.2. Utah Community Progress Survey

This survey was conducted by the Adult Education Center in Roosevelt. Based on a 40 percent mail response of a random sample of more than 1000 Roosevelt residents, Table 5.3.2-1 summarizes responses to five of ten survey questions. Of the respondents expressing an opinion, the first number in parentheses indicate the percentage of individuals who rate the activity or condition in question as excellent or good; the second number, the percentage who rate it as fair or poor.

In relation to the potential impacts of oil shale development, some of the significant results of this survey are:

A) The community perceives a need for more effective and coordinated government, especially in relation to the control of development-induced growth through zoning.

B) Pollution of the area's air and water resource is generally not perceived to be a problem. More "excellent" and "good" ratings were given to air and water quality than almost all of the other items.

C) The availability and quality of housing is preceived by most to be a serious problem. The ratings in this area are lower than those in all other areas.

In response to the question "Would you be willing to pay more taxes if you knew that money would be spent in your community for that particular purpose?"

A) A "yes" was indicated by the majority of respondents for better education, improved water systems, and improved streets and roads, and

TABLE 5.3.2-1

SUMMARY OF SELECTED RESULTS FROM THE UTAH COMMUNITY PROGRESS SURVEY

QUESTION	RESPONSES	
	Perceived by Majority to be Generally Satisfactory	Perceived by Majority to Need Improvement
How would you rank the following planning and development activities in your community or area? (26%-55%)		Qualified leaders willing and able to accept leadership (39%-45%) Effectiveness of local government efforts (32%-56%) Cooperation among organizations (23%-51%) Coordination of organizations and activities (22%-49%) Appearance of the city, as to zoning (22%-66%) Zoning regulations enforcement (19%-55%)
How would you rank the following human relations and cultural achievement conditions in your community or area? (41%-43%)	Vocational educational opportunities (61%-27%) Local newspaper informing the community (59%-38%) Scouts, 4-H, FFA, FHA, and other youth programs (56%-30%) Adult educational opportunities (55%-38%) Overall qualities of educational opportunities (47%-40%)	Opportunities for outdoor sports (43%-48%) Schools (teachers, programs, and facilities) (41%-44%) Utilization of school facilities (35%-39%) Library services (31%-55%) Local and regional parks (36%-59%) TV programs, range, choice, and reception (22%-73%) Opportunities to belong to friendly groups (29%-57%) Opportunities to develop and pursue hobbies (29%-61%) Opportunities in cultural activities (18%-67%) Good year round recreation (20%-67%) Radio programs, range, choice, and reception (22%-73%) Help for persons who need advice and guidance (20%-48%) Interesting and useful activities for retired people (32%-58%)
How would you rank the following economic development activities in your community or area? (25%-59%)	Opportunity for earning a living (34%-41%)	Increasing number of business opportunities (30%-51%) Adequate job opportunities for women who wish to work (25%-60%) Community has good reception and is attractive to tourists (16%-65%) Local government promotes balanced industrial development (12%-53%)
How would you rank the following physical environmental conditions in your community or area? (42%-53%)	Appearance of cemeteries (78%-19%) Air quality (70%-24%) Water quality (66%-35%) Care of public buildings, grounds (51%-48%)	Local government works to improve community attractiveness (35%-49%) Home owners beautifying their homes (34%-64%) Appearance of business district (31%-67%) Cleanliness of the community (24%-76%) Appearance of farmsteads (21%-68%) Improvement of vacant lots (weeds) (7%-84%)
How would you rank the following services in your community or area? (31%-58%)	Veterinary services (48%-34%) Availability of dental personnel (61%-31%) Local banking services (61%-36%) Quality of hospital and medical facilities (58%-39%) Availability of physicians and medical personnel (57%-40%) Community fire protection service (46%-39%) Fund raising services (40%-34%)	Public health services (28%-47%) Effectiveness of law enforcement personnel (41%-49%) Airport facilities (30%-46%) Water system maintenance (21%-48%) Quality of housing for incoming families (12%-79%) Public housing development (13%-65%) Availability of housing (6%-90%) Availability and quality of rental housing for low or moderate income families (4%-90%) Availability of good shopping facilities (15%-83%) Trade and craftsman services (13%-79%) Public transportation (14%-61%) Snow removal (12%-73%) Parking facilities (9%-87%) Roads, highways, and streets (7%-84%)

B) A "no" was indicated by the majority of respondents for finance of low income housing, training for local government officials, and the development of an industrial site.

The survey also involved asking members of the sample to list three projects they think would be most beneficial to their community in the next few years. The projects which were listed with a frequency of five or more are the following (frequencies are given in the parentheses): improve streets and roads (98), better and more water (40), beautification project (30), recreation facilities (29), more local activities for youth (24), shopping conveniences (24), parks and park beautification (14), better or new library (10), better housing (9), baseball complex (8), indoor-outdoor swimming pool (8), mail home delivery (8), zoning or land use planning (8), better sewer (7), law enforcement (6), bowling (5), and senior citizens program (5).

5.3.3. Newspaper Articles and Editorials

One other important source for identifying community attitudes are articles and editorials in the local newspapers. As recently reported in the Vernal Express, the Vernal Area Chamber of Commerce approved the following priorities for development in Uintah County:[a]

A) First priority: "Immediate planning and enforcement of zoning codes, especially in county area."

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[a] Vernal Express, Vol. LXXXIII, No. 13 (Thursday, March 27, 1975).

B) Second priority: "Develop a valley wide sewer system, especially in the Glines and Maeser areas and water development."

C) Third priority: "Road development, especially into new development areas where new community for oil shale activity is likely."

D) Fourth priority: "Improved medical facilities, including new hospital and ... physicians."

E) Fifth priority: "Give the livestock industry needed support."

F) Sixth priority: "Support tourism and recreation development."

As reported in this same article, the Vernal Area Chamber of Commerce approved a motion to support oil and gas depletion allowances. The list of industrial priorities are being submitted to the Uintah County Commissioners in an effort to solicit their cooperation and support.

The "Jack-Straws" column in the Vernal Express is generally supportive of oil shale and other kinds of energy development in the Uintah Basin and urges that the communities of the area prepare themselves now to head off the potential problems and to capture potential benefits of this development, as evidenced by the following:

> If oil companies are willing to spend hundreds of millions of dollars for oil explorations, whether it be shale, sand or drilling for the crude, it falls on the county to provide for some of the demands this industrial growth will require... Specifically we are referring to the new indoor swimming pool, the new medical center, following the master plan development at the municipal airport, and expediting the valley-wide water and sewer study. (February 27, 1975)

The problem of providing services for rapidly increasing populations was the subject of another "Jack-Straws" editorial:

> Everywhere there are cries for new roads, new hospitals, new schools, swimming pools, water and sewer systems and on and on. Add to these maintenance and operation costs of the new facilities and the bill amounts to millions of dollars.
>
> By bonding to the maximum legal level, Uintah County can come up with a little over $200,000 per year. How is this going to pay for all the expensive projects currently being considered?
>
> Because of inflated costs and new regulations many other county and state governments throughout the country are hard pressed for funds just to keep up their current operations.
>
> In a community such as ours, where the potential for growth is present, the need for additional services must somehow be met. Where do we find the revenue to meet the demands of growth? If we cannot find the revenue to provide the services, we won't be ready when the forecasted population growth occurs. (March 13, 1975)

The problem of balancing growth and development with the preservation of traditional rural cutural value was the subject of still another "Jack-Straws" column:

> We only hope the security and the traditional benefits of a small rural town can be preserved in the midst of an industrial booming future.
>
> We are sure change is coming, but think it will be gradual enough that with proper planning the problems will be solved, as they have been in the past, to the satisfaction of the majority of the residents. (March 28, 1975)

Roosevelt's weekly Standard is another important source for assessing the attitudes of residents toward existing conditions and potential development in the area. Although the diversity and range of views expressed in these selections cannot be captured fully here, two additional excerpts from editorials in the Standard are instructive. In one (a letter to the editor), the Duchesne County Commission, in reviewing the water requirements of large-scale energy development and

the plan contained in the Bonneville Unit of the Central Utah Project to transport large quantities of Basin water to central Utah, expressed the following view:

> If we are to become self sufficient energywise as a nation, we must waste no time in developing the energy resources available in such locations as the Uintah Basin. The entire oil industry in this particular area is completely dependent on the amount of available water. The drilling operation cannot be greatly expanded without large amounts of accitional water. Likewise, the various stages of processing cannot be accomplished without extensive amounts of water. If the large deposits of petroleum which are located in the Uintah Basin are to be made available and are to contribute to the resolution of the energy crisis facing us all, those units of the Central Utah Project intended to serve the Uintah Basin must be funded and the construction must commence at the earliest possible date. We further believe that in light of the drastic changes which have taken place in our area since the authorization of the Bonneville Unit, it is now time to re-evaluate the entire Bonneville Unit. We believe that a re-assessment should be made of the amount of water to be taken from our area dn transferred to the Wasatch Front Counties, in light of the comparative needs of the two areas. (March 20, 1975)

After discussing the prospects of obtaining federal funds for financing a new community near the White River Project in Uintah County (based on remarks made by Senator Frank E. Moss at a press meeting), the editors of the Standard expressed the following view:

> Consequently, regardless of what final decision is made, the impact on existing cities will probably require some type of federal assistance if they are to meet the needs of incoming families. With the consideration of oil shale leases west of the present pilot tracts, it is expected that access through the Ouray side of the project will affect the Roosevelt area in much the same manner as the Bonanza access will affect Vernal. For that reason, we feel strongly that studies should center on the possibility of assistance to both Vernal and Roosevelt first, then if necessary a "residence" community could be established nearer the site. Because of the vastness of the shale deposits, however, this becomes a difficult task. (February 20, 1975)

5.3.4 Significance of These Attitudinal Assessments for the Phase II Analysis

Although the above assessments cannot be said to be comprehensive and conclusive implications cannot be drawn from them, they do serve to highlight issues as perceived by various public and interest groups in the Basin. In connection with an analysis of the interviews conducted by the Energy Development Consulting Group as well as the elite interviewing to be conducted by the Western Environmental Associates, these issues will be clarified and further defined during Phase II of the study. In doing so, an effort will be made to assess community attitudes as they relate more specifically to proposed plans for developing an oil shale industry.

5.4 Historical, Archeological, and Paleontological Features

5.4.1 Historical Features

Historical sites of importance are present in the area immediately adjacent to the proposed tracts. These are at the road crossing of the White River (Ignacio Stage Stop and Old Bridge) and the Gilsonite mining area. The sites of the mining camps of Rainbow and Watson, the remains of the narrow-gauge Uintah Railway, which served the area until 1938, and the remains of many abandoned gilsonite workings represent interesting relics of a rare mining activity, and are all adjacent to the south boundary of the development area. The Colorado Historic

Society recognizes the historic significance of the abandoned Uintah Railroad and related sites along the Colorado-Utah State lines.

There are no historic sites listed for Uintah or Duchesne County in the National Register of Historic Places. According to a state official this is because these two counties were settled later than other parts of Utah and because the two counties have not been adequately surveyed.

There are several historic sites in Uintah County in the State Register. These include the Bank of Vernal, Holy Spirit Episcopal Church (Randlett), Uintah Tabernacle (Vernal), Tithing House (Vernal), and Caldwell Village (LaPoint). Numerous potential inclusions in the State Register are to be found throughout the Uintah Basin.

5.4.2 Archeological Features

The Fremont culture flourished in the Uintah Basin between about 800 and 1200 A.D. During this time, they practiced agriculture probably using flood irrigation, and raised corn, beans, and squash. Their villages were small, consisting usually of about 2 to 6 rooms or houses. Villages were usually located on low ridges or knolls.

While there are no archeological sites on the oil shale tracts, there are several areas of interest located near them. Two rock overhangs with evidence of the Fremont culture were found within one-half mile of the White River at the County Bridge Crossing. There may be other evidence, possibly some pithouse village sites, in the rest of the basin canyon and near the mouth of the watered side canyons emptying into the White River.

Petroglyphs executed by the Fremont culture, are located throughout the Uintah Basin. Several motifs are distinguishable. Many of the figures are geometric; others show animals and may well have been produced in conjunction with hunting magic. Other figures are of men, often in elaborate costumes and having trapezoidal bodies and broad shoulders.

Areas containing petroglyphs are included in the State Register. In Duchesne County, there are two important canyon groups, Cottonwood and Nine Mile; in Uintah County, there are the Peltier Ranch and Dry Fork Valley Petroglyphs. The petroglyphs of the Uintah Basin are some of the best found anywhere in the United States. The art style and the workmanship is distinctive. Many of the sites are being destroyed by bullet holes or contemporary graffiti. Many have yielded to this urge and the rock art is becoming obliterated. A. G. Pratt, in his picture booklet entitled Rock Art of the Uintah Basin makes the lighthearted statement, "This add on art usually is not as neatly done and it has a lighter tone than the older art." The expression "aesthetic pain" might more adequately describe the defacing of petroglyphs.

5.4.3 Paleontological Features

During the Eocene period, the Uintah Basin was occupied in large part by a high shallow lake--Uintah Lake. During the 33 million year period, however, the lake was subsiding.

The Eocene epoch is represented in the Uintah Basin by the Green River, Uintah, and Duchesne River formations. Fossil vertebrates are known from all of these formations, but the Uintah is the most important.

The collection of vertebrate fossils from northeastern Utah began with a trip by O. C. Marsh in 1870. In Notice of New Tertiary Mammals (1875), he reported on his excursion to the Uintah Basin as follows (in Kay, 1957:110):

> Crossing the Green River a few miles above the mouth of the Uintah, we passed the White River, over an elevated plateau, which was washed out along its sides into the true "manvaises terree" form of conical buttes, beautifully variegated with alternating chocolates, green and ash-colored layer. An examination of these deposits soon showed that they contained many vertebrate fossils which were weathering out of the cliffs on every side. Farther up the White River, these remains were more numerous and large collections were obtained, including many species of Tertiary mammals, reptiles, and fishes, some of which were undescribed.

The Eocene vertebrate discoveries in the Uintah Basin are discussed by Kay (Eocene Vertebrates of the Uintah Basin, 1957), the work done in Dinosaur National Monument is discussed by Good (Dinosaur National Monument, 1957), and fossil tracks in oil shale rock is discussed by Curry (Fossil Tracks of Eocene Vertebrates, Southwestern Uintah Basin, Utah, 1957).

6.0 INSTITUTIONAL ENVIRONMENT

This chapter will describe the institutional context in which decisions relating to oil shale development are being and will be made. As preparatory material for the Phase II impact analysis, it will identify important legal and institutional constraints on development as well as areas in which development might effect institutional changes. Attention will be given to the revenue timing and distribution problems created by rapid population growth.

6.1 Special Oil Shale-Related Institutions

At the city and county levels of government in the Uintah Basin, there are no new offices or institutions which have been created to deal specifically with energy issues and problems. At the multi-county level, however, in 1974 the Governor established the Planning and Development Advisory Council and a supporting Technical Committee. Under the direction of the Executive Director of the Uintah Basin Association of Governments (UBAG), the Council has been charged with the responsibilities of:

A) Functioning as a clearing house for all oil-related development activities in Daggett, Duchesne, and Uintah Counties;

B) Developing and providing local and state input into the environmental impact statement being prepared by the Bureau of Land Management;

C) Identifying and assisting in securing funding and other resources for planning and development efforts related to oil development projects in the Basin;

D) Directing and/or executing specific planning and development activities, as requested by participating governmental units;

E) Functioning as the liason and communication link between private development corporations and responsible governmental units in the state and three-county region;

F) Implementing a program whereby community input may be received and reviewed by the Council and a continuing public education program is carried out, and

G) Ensuring that there will be adequate housing and other facilities to accommodate development-induced population increase.

The Planning and Development Advisory Council has thirteen members and consists of elected officials from cities and counties of the Basin. To assist the Uintah Basin Association of Governments and the Advisory Council in carrying out the responsibilities described above, Charles Henderson joined the staff of UBAG in April, 1975, and serves as the Association's Energy Coordinator. His office is located in the County Building in Vernal.

The Technical Committee was formed as a means of providing specific data, documents, and studies for the Advisory Council. This committee was recently re-organized to include additional expertise and to create sub-committees in the following areas: socio-economic, environment, transportation, education, finance, water, and community service.

Another important group formed to deal with oil shale development problems is the Department of the Interior Oil Shale Environmental Advisory Panel. This group was established pursuant to a charter issued by the Secretary of the Department of the Interior to assist that department in the performance of supervisory functions associated with the oil shale leases issued pursuant to Section 21 of the Mineral Leasing Act as well as policies annunciated in the National Environmental Policy Act. The purpose of this panel is to advise responsible officials in the Department of the Interior, particularly the Mining Supervisor of the Geological Survey and appropriate District Managers of the Bureau of Land Management, in the protection of the environment, with particular emphasis on the enforcement of the oil shale lease environmental stipulations.

The Department of the Interior Advisory Panel contains some thirty members, including representatives from various Bureaus in Interior, other federal agencies, and representatives from state government in Colorado, and Wyoming.

6.2 Other Institutions Involved in Energy Development and Planning

Numerous federal departments and agencies are either directly or indirectly involved in energy development and planning. Table 6.2-1 lists many of these agencies and briefly describes their functions. The state agencies involved in energy development and planning are listed in Table 6.2-2.

There are three counties in the Uintah Basin area: Daggett, Duchesne, and Uintah. Each of these counties is governed by a Board of County Commissioners which is elected at large by voters in the county. A measure of continuity is provided for the board by the biennial election of two of the commissioners to a four-year overlapping term. The third commissioner is elected for a two-year term.

There are four third class cities (Vernal, Roosevelt, Duchesne, and Myton) and three towns (Manila, Tabioni, and Altamont) in the Uintah Basin area. The four third class cities operate under the mayor-council form of government. In each odd-numbered year a municipal election is held in which either the mayor and two councilmen or three councilmen are elected to office.

TABLE 6.2-1

FEDERAL AGENCIES INVOLVED IN ENERGY DEVELOPMENT AND PLANNING

Agencies	Functions/Responsibilities
Bureau of Land Management	Administers the national public lands under a multiple use planning approach; is responsible for issuing mineral leases, permits, and licenses.
U. S. Geological Survey	Performs surveys and research covering topography, ecology, and water and mineral resources; enforces Department of the Interior regulations applicable to oil, gas, and other mineral leases.
Bureau of Sport Fisheries and Wildlife	Provides for the preservation of land and water environments and the protection of birds, fish, mammals, and other wild animals and vegetation upon which wildlife is dependent.
Bureau of Indian Affairs	Coordinates federal policies and financial programs relating to Indians and Indian Reservations.
Bureau of Mines	Conducts studies related to the development and economic feasibility of mineral operations.
Bureau of Reclamation	Responsible for the irrigation of arid and semi-arid public and private lands, the sale of electric power generated by Bureau projects, and the delivery of water for municipal and industrial purposes.
National Park Service	Promotes and regulates the use of national parks, monuments, and similar reservations in conformity with the 1916 National Park Service Act as amended.
Bureau of Outdoor Recreation	Responsible for the development of programs relating to outdoor recreation.
Office of the Solicitor	Attorney-Advisor for Region VIII Federal agencies.

TABLE 6.2-1 (Con't)

Agencies	Functions/Responsibilities
U.S. Department of Agriculture	Department in which the Forest Service, Economic Research Service, and the Soil Conservation Service function.
U.S. Department of Transportation	Department in which the Office of Pipeline Safety and Interstate Commerce Commission function.
U.S. Department of Commerce	Department in which NOAA, the Bureau of Census, the Office of Economic Development, and the Bureau of Domestic Commerce function.
U.S. Department of Health, Education, and Welfare (HEW)	Department in which the Public Health Service functions.
U.S. Department of Housing and Urban Development (HUD)	Administers the Community Development Act which is a consolidation of programs relating to urban renewal, neighborhood facilities, open space land, water and sewer facilities, and model cities.
Federal Energy Administration	Formed to promote the expansion of usable energy sources and assist in developing policies and plans to meet the energy needs of the nation.
Environmental Protection Agency (EPA)	Established to implement coordinated and effective governmental action to protect the environment; among duties are research, monitoring, enforcement, and review of environmental impact statements prepared by other federal agencies.

TABLE 6.2-2 STATE AGENCIES INVOLVED IN ENERGY DEVELOPMENT AND PLANNING

Agencies	Function/Responsibilities
State Department of Natural Resources	Department in which the following six agencies function.
State Engineer	Responsible for the administration of State's water rights law.
Water and Power Board	Functions with the state engineer for the development and control of the State's water resources.
Division of Water Resources	Administers water conservation and development projects and represents Utah in interstate negotiations involving the state's interstate waters.
Geological & Mineral Survey	Responsible for the collection and distribution of information regarding mineral resources of the state, surveys of geological formations, and investigations of the state's mineral resources.
Oil & Gas Conservation Commission	Makes and enforces whatever regulations are necessary to encourage the development, production, utilization, and conservation of oil and natural gas.
Division of State Lands	Manages and controls all state-owned lands; negotiates disagreements with the federal government over ownership of certain oil shale lands.
Bureau of Environmental Health	Department in which the following agency functions.
Water Quality Section	Administers the State's Water Quality Act and represents Utah's water quality interests in the Colorado River Basin Salinity Forum.

6.3 Legal and Institutional Constraints on Energy Development

Oil shale development must take place in a changing legal and institutional setting. While existing institutional arrangements provide a framework and in many respects facilitate oil shale development, they also serve as important constraints. This section will provide an overview of water- and land-related institutional constraints on development.[a]

6.3.1 Water-Related Constraints.

6.3.1.1 Water Supply. The 1922 Colorado River Compact divided the waters of the Colorado River between the lower and upper Basins. According to this compact, the Lower Basin is entitled to 7.5 million acre feet (maf) per year, or 75 maf over a ten year period. The waters remaining in the system after the Lower Basin entitlement and a 1.5 maf/yr. obligation to Mexico are subtracted are then divided according to a formula worked out in the 1948 Upper Colorado River Basin Compact. This compact allots to Arizona 50,000 acre-feet per annum and, as to the balance of the annual consumptive use available to the Upper Basin, apportions to Colorado, 51.75 percent; New Mexico, 11.27 percent; Utah, 23 percent; and Wyoming, 14 percent. The gross amount of annual

[a] Since the Clean Air Act is significant primarily only to facilities at the production site and is adequately dealt with in the environmental baseline report, it will not be considered in this report.

consumptive use allowable in the Upper Basin, against which these percentages apply, has become less than 7.5 maf with the downward revision of estimates of average river flow. Water available for Upper Basin consumptive use is now projected by the Bureau of Reclamation to from 6.5 to 5.8 maf, the latter being a "conservation hypothesis" used by the Bureau of Reclamation for planning purposes.

Assuming the Bureau's "conservative hypothesis" (5.8 maf), Utah's share of Colorado River water is about 1.323 maf per year. Although Colorado and Utah have agreed that Utah is entitled to 500,000 af/yr from the Yampa River, no such agreement has been reached concerning Utah's entitlement to water from the White River. Since one promising source of water for subsequent development in the Uintah Basin is the White River and the amount of water to which Utah is entitled from this river is not settled, Utah is currently negotiating an agreement with Colorado. Some of the White River may also be claimed by the Ute Tribe under the Winter's Doctrine.

Since the price at which agricultural water users will find it attractive to sell their water rights is a price that oil shale developers can afford to pay, agricultural water should be available if needed. Utah water law should offer no serious obstacles to such transfers of water rights. Restrictions against severing water rights from the land, exclusive reliance on a tribunal (rather than an administrative official) to review the engineering and technical economic questions

involved in transfers, and various other impediments to the market allocation of water resources which exist elsewhere are not features of Utah's water rights law. As noted by Jensen (1971:202-3),

> In a state such as Utah, where most of the water is appropriated, it is generally believed that a realistic and liberal policy on change applications is needed to allow continued development of the state. For example, in many areas of the state new industrial needs can only be met by purchasing old rights to satisfy the new uses. Therefore, a liberal change policy, consistent with protection to other existing rights, is required to meet these new demands. Also such a program will allow for the transfer of less efficient uses to more efficient uses of water. While Utah decisional law on this subject has generally been consistent with this philosophy there are some decisions which seem to narrow the scope of change applications.[a]

The Ute Tribal Business Committee has leased water to the Central Utah Project on a deferred use agreement. More recently, an agreement has been signed by the City of Roosevelt and the Ute Tribe whereby Roosevelt can purchase water from development of Big Springs in Uintah Canyon. Representatives from the Uintah and Central Utah Conservancy Districts are currently negotiating with the Business Committee over the possibility of the use of additional reserved water rights by the White River Shale Oil Project under a fixed-time lease arrangement.

Ute tribal water claims, like those of other American Indians, are based on the Winter's Doctrine, which holds that the right to use water is reserved as an incident of reservation of land. Since the right is not lost by nonuse, it can be maintained indefinitely in an unquantified

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[a]In most instances water rights transfers will involve a change in the place of diversion and use. It is possible, for example, that a different storage reservoir and water release schedule will be involved in the new use, involving the buyer in contractual arrangements with more parties than simply the seller. Much of the irrigation in eastern Utah, where the greatest potential for energy development exists, occurs in federally-sponsored reclamation projects in which the delivery of stored and regulated water is a matter of contract. Individual water rights which are dependent upon deliveries under such contracts may not be readily transferable because most of the federal reclamation projects have either not yet been paid out or are subject to rehabilitation loans.

state. The exact quantity of Ute water rights is not known at this time. One outstanding question is whether Ute rights are reserved exclusively for agricultural development, or whether the reservation of water applies to potential industrial development as well. Another key question is how much land in the Uintah-Ouray Reservation is irrigable. The Ute Tribe has claimed water rights for 129,201 acres of land under the Winter's Doctrine. Assuming that three acre feet of water per acre per year will be allowed for the irrigation of this amount of land, the Ute entitlement for agriculture is over 387,000 af/yr. This figure is a minimum since water loss in conveyance is not taken into account.

The Utah Division of Water Resources estimates that the current depletions from the Colorado River Basin in Utah are approximately 700,000 acre-feet. Assuming that Utah's allotment is about 1.4 maf, this leaves about 700,000 acre-feet which is not currently being used. Of this amount, however, the State Engineer estimates that the exercise of additional approved filings, including those which have been approved for the Central Utah Project, are sufficient to deplete Utah's waters from the Colorado River by another 600,000 acre-feet. In addition to the approved but not yet exercised filings, a substantial number of filings are awaiting action by the State Engineer. Although no definitive tabulation of these unapproved filings have yet been made, they clearly total an amount in excess of Utah's compact entitlement

For all intents and purposes, therefore, Utah's share of Colorado River Basin waters has already been appropriated. As a means of giving the State Engineer more flexibility in making future water

allocations, the 1975 Legislature passed bill S.B. 290, "Application of Water to Beneficial Use," which requires that applications for extensions of time to put water to beneficial use be considered in light of objective standards for determining whether due diligence has been exhibited. Personal difficulties or financial limitations will not justify the relaxation of standards. This amendment will provide the State Engineer with authority to lapse old approved applications where the applicant has failed to place the water in use. The water thus "freed" would be available for reallocation. Vigorous enforcement of the "loss of rights through abandonment" provision of Utah's water rights law is also expected.

Another bill was introduced during the 1975 Regular Session of the Legislature (S.B. 291) which proposed that the State Engineer be given the authority

A) To review applications using a public interest standard (as opposed to the traditional "first in time first in right" standard contained in the doctrine of prior appropriation[a] and,

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[a]S.B. 291 specified that the State Engineer shall consider all relevant aspects of the public interest, and:

> In so doing, he shall give fair consideration to: (1) the public interest aspects and impacts of the economic, social, recreational and environmental values resulting from the proposed use; (2) the benefits to the applicant resulting from the proposed use of water; (3) the benefits to the State, region, and locality resulting directly or indirectly from the economic activity that will result from the proposed appropriation and use of water; (4) alternative future uses of the water sought to be appropriated; and (5) alternative sources of water to satisfy the applicant's needs. After considering, weighing and balancing the various elements of the public interest as above defined, the State Engineer shall approve the application if it is in the general public interest, and shall deny the application if it is not. Provided however, that the State Engineer shall not be required to approve or reject applications in the order of their respective priorities whether filed before or after the effective date of this act.

B) To approve applications for commercial, industrial, power, mining development, or manufacturing purposes for a limited or fixed period of time.

S.B. 291 was defeated in the 1975 Regular Session, but will be re-introduced in the June Special Session and/or subsequent sessions of the Utah Legislature.

6.3.1.2 Water Quality. Pursuant to the Federal Water Pollution Control Act Amendments of 1972, the Environmental Protection Agency (EPA) has issued a regulation requiring the Colorado River Basin states to formulate numeric standards for salinity, consistent with the policy of maintaining salinity in the lower main stem at or below 1972 levels, and to submit a coordinated, basin-wide plan of implementation to EPA not later than October 18, 1975. The Salinity Forum, comprised of three Governor-appointed representatives from each Colorado River Basin state, was authorized to work with EPA in developing these standards and a compliance plan. Since a 1972-based non-degradation salinity policy was endorsed at the Seventh Enforcement Conference in 1972 and again in the 1974 Colorado River Basin Salinity Control Act, it is expected that the Forum will submit and EPA will approve numeric criteria consistent with this non-degradation policy. What is less clear is whether the numeric criteria will be set at state boundaries (as urged by EPA), at Lee's Ferry and the international border, or at still other locations.

The Forum's compliance plan will rely heavily on the salinity control projects authorized in Title II of the Salinity Control Act. It will also incorporate the effluent limitations and permit programs

of the 1972 Water Pollution Control Act Amendments, as well as the irrigation source control program being developed by the Bureau of Reclamation. The latter includes improvements in on-farm irrigation scheduling, on-farm water management, and water conveyance and distribution systems.

However the issues relating to the setting of salinity standards are resolved, the effluent limitation and permit requirements of the 1972 Amendments will apply to the proposed oil shale development project. Effluent limitations for point sources "which shall require the applications of the best practicable control technology as defined by the (EPA) Administrator" are to be achieved by July 1, 1977. Where discharges are made into publicly owned treatment works, effluent limitations containing pretreatment requirements must be achieved by the same date. By July 1, 1983, effluent limitations are to be set on the basis of the "best available technology economically achievable." Performance under the conditions of a discharge permit is reviewed through self-monitoring reports and agency inspections.

The point source effluent limitation requirements for municipalities are different than those for industries. For publicly owned treatment facilities, "effluent limitations based upon secondary treatment as defined by the (EPA) administrator" must be achieved by July 1, 1977. By July 1, 1983, effluent limitations for these facilities shall require application of "best practicable" control technologies.

To date, Utah has not developed a permit system which is acceptable to the Region VIII EPA Administrator. A bill which would have amended Utah's Water Quality Act and which probably would have been approved by

EPA failed to pass in the last legislature. At the present time, therefore, point source discharge permits must be approved by the EPA.

The Phase II impact analysis will involve assessing how oil shale development will impact on the ability of existing communities, support industries, and possibly a new community to qualify for discharge permits and meet the effluent requirements.

6.3.2 Land-Related Constraints

With the failure of the land use and strip mining bills in Congress, federal legislation in the area of land use is not nearly so prominent as in that of water. Likewise, the defeat of the Utah land use bill in the 1974 referendum vote also weakened state control in this area. However, the Mined Land Reclamation Bill (H.B. 323) passed by the 1975 Legislature does give the Board of Oil and Gas Conservation authority to enforce the reclamation of mined lands provisions of this bill.

Land use controls in the towns and cities of the study area and in the non-federally owned portions of the counties are exercised almost exclusively, then, by local agencies. The principal land use planning tool of these sub-state jurisdictions is zoning. Uintah, Duchesne, and Rio Blanco Counties all have zoning ordinances and maps, as do the cities of Vernal, Roosevelt, Duchesne, and Rangely. Duchesne's ordinance is currently being substantially revised.

The Bureau of Land Management, the management agency for most of the public land in the study area, employs a multiple use planning concept and has been engaged in land planning for many decades.

In compliance with Section 208 of the Federal Water Pollution Control Act Amendments of 1972, the Uintah Basin Association of Governments, in cooperation with the Water Quality Section of the Bureau of Environmental Health, is developing an area-wide plan for the Basin. Among other things, the 208 plan calls for the control of non-point sources of pollution, the protection of groundwater, and the regulation of the location and construction of any facilities which may result in water pollution. In effect, Section 208 of the 1972 Amendments calls for the integration of land use and water management planning. The Uintah Basin Association of Governments has recently contracted with Horrock and Associates to prepare a 208 plan for the area.

It should be mentioned, too, that staff in the office of the State Planning Coordinator, working with the Bureau of Business and Economic Research at the University of Utah, are developing a land use projection model for translating economic and demographic projections of the Utah Process model into land use requirements for areas within multi-county planning districts. Areas within the Uintah Basin have been selected for this effort.

6.4 Revenue Timing and Distribution

One of the most serious problems that faces the communities of the Uintah Basin is that of obtaining "front-end" financing for the public works projects that will be required to accommodate rapidly growing populations. In the publication, Tax Lead Time Study (1974:1), this fiscal problem was stated succinctly as follows:

> Based on currently used revenue sources, public revenues are likely to be insufficient in the oil shale region for the first five to eight years after development is initiated. The basic problem is timing and distribution of tax revenues to support new development when and where needed. This problem primarily affects cities, towns, and school districts.

The 1975 Utah State Legislature responded to this problem when it passed the Resource Development Act (S.B. 256), which provides for the prepayment of sales and use taxes by energy development industries in order to provide financial resources to the state at the beginning of a resource development project for building needed roads and schools in the impact area. It is important to note that prepaid taxes "shall be used to finance state-related public improvements, including but not limited to, highways and related facilities and schools and related facilities."

The Uintah Basin Association of Governments has hired a "grantsman" whose primary responsibility is that of identifying available federal grants for local governments and of assisting these governments to prepare grant applications. Considering the complexity of the 1974 Community Development Act and other federal grant-in-aid acts and programs, this service should prove to be invaluable. The Energy Development Policy Group, working in cooperation with UBAG and the Department

of Community Affairs, is also providing this kind of service for local governments.

A similar effort is being contemplated by the Mountain Plains Federal Regional Council. This regional organization of federal agencies is considering forming a "Community Assistance Group" comprised of federal, state, industrial, and academic personnel to assist communities requesting assistance to diagnose problems, identify "front end" funds for financing public works, prepare applications, and in general manage accelerated growth problems.

The Tax Lead Time Study contains two tables which are reproduced here. One (Table 6.4-1) identifies revenue alternatives for local governments and summarizes various features of each. The other (Table 6.4-2) provides a similar analysis of non-monetary fiscal devices for local governments.

Phase II of this study will analyze these various fiscal tools for managing problems associated with rapid growth in the study area. It will involve assessing the efficacy of various combinations of these techniques in the light of unique economic, social, and institutional conditions in the Basin. It will also examine these in relation to a possible new community.

TABLE 6.4-1

Revenue Alternatives For Colorado Local Governments

	GENERAL SALES TAX	SELECTIVE SALES TAX	USE TAX	AD VALOREM PROPERTY TAX	GENERAL OCCUPATION TAX	SPECIFIC OCCUPATION TAX
DESCRIPTION	Excise tax levied on retail sales of tangible personal property (sometimes services) made inside the taxing jurisdiction.	Excise tax levied on retail sales of certain products inside taxing jurisdiction. Most common are tobacco, alcoholic beverages, motor fuel, public utilities, insurance, and restaurants.	Tax on the privilege of storing, distributing, using, or consuming articles of tangible personal property in the taxing jurisdiction and on which no sales tax has been paid. It is generally complementary to sales tax.	Ad valorem tax computed on the assessed valuation of all property, real and personal, located within the territorial limits of the authority levying the tax.	Tax imposed for the privilege of carrying on any of a broad range of occupations within the taxing jurisdiction. Denver's head tax is an example.	Tax imposed for the privilege of carrying on certain occupations within a taxing jurisdiction. Utility occupation (franchise) taxes and beer and liquor occupation taxes are common in Colorado.
YIELD	For 1% tax, state average is $35 per capita annually. Localities vary as much as $120 around state. No important collection lag with respect to economic development.	State Averages: Cigarette tax--10 cents per pack yields $11 per capita annually. Alcoholic beverages--30 cents per gallon yields $8-30.50 per capita annually. Motor fuel--7 cents per gallon yields $43-130 per capita annually. No significant collection lag with respect to economic growth.	Generally about 1/10 the yield of a comparable general sales tax. For 1% tax, the state average is $1 per capita annually. No significant collection lag with respect to economic growth. For local governments, most revenue comes from use of building materials and motor vehicles.	For non-industrialized, but urbanized areas, a levy of 75 mills raises from $150-$225 per capita annually, the higher range for more urbanized areas. Each oil shale retort plant will generate roughly $10 million annually at a mill levy of 75 mills with up to a 2-1/2 year time lag in collection.	The two most productive general occupation taxes in the state, Denver and Durango, raise roughly $20 and $4 per capita annually. May be collection lag with respect to economic growth.	All specific occupation taxes used by Colorado cities and towns together raise less than $3 per capita annually. Collection lag of up to one year is likely.
LEGALITY	Legal for home rule cities, counties, statutory cities and towns. Election required in all but home rule cities (unless charter requires election). 4% maximum cumulative levy for all cities and counties in any one location.	Legal for home rule cities. No statutory authority for counties, statutory cities/towns. Localities with cigarette taxes do not receive cigarette tax distribution from the state.	Legal for home rule cities and statutory cities/towns. No authority for counties. 4% maximum cumulative levy for all cities and towns in any one location.	Legal for home rule cities, counties, and statutory cities/towns subject to extensive charter, constitutional and statutory limitations.	Legal for home rule cities within charter limits. Legal for statutory cities/towns. No authority for counties, districts.	Legal for home rule cities within charter limits. Legal for statutory cities/towns. No authority for counties, districts.
ELASTICITY	Unit elastic (range 0.8-1.1)	Strongly inelastic (range 0.0-0.8)	Unit elastic (range 0.8-1.3)	Moderately inelastic (range 0.4-1.4). Property tax base in Garfield and Rio Blanco counties will be dominated by oil shale facilities, not by local economic conditions.	Strongly inelastic as typically used. Can be structured to be less inelastic.	Strongly inelastic as typically used. Can be structured to be less inelastic.
INCIDENCE	Regressive to income. Neutral to household size. Taxes non-resident visitors. Relief programs can reduce regressivity.	More regressive to income than general sales tax. Neutral to household size. Taxes non-residents and visitors.	Same as general sales tax. Particularly hits purchasers of motor vehicles and construction and building materials.	Regressivity similar to general sales tax. Neutral to household size. Relief programs can reduce regressivity. Oil shale facilities will dominate tax bases in Garfield and Rio Blanco. Much of the tax would be exported out of the region.	Where taxes are levied on firms doing business locally, same as general sales tax. Where tax is on exporting industry, it is exported outside of the region. A flat rate is regressive to individual income above any exemption level. Government employees exempt.	Same as general occupation tax.
CONTROL	High degree of local control for home rule cities. Statutory cities and towns, and counties, must use state form of tax and state collection system.	Where legal, local control is good.	Local use taxes are administered by local government. Good control.	Statutory mill levy limits severely constrain local control in counties, statutory cities and towns, and districts. Oil company decisions will be very important in Garfield and Rio Blanco counties.	Excellent local control.	Excellent local control.
MARKET SIDE EFFECTS	Some incentives for retail business location just outside of taxing jurisdiction.	Some incentives for retail business location just outside of taxing jurisdiction.	Reduces incentives for retail business location just outside of taxing jurisdiction, especially with regard to autos and construction materials.	Disincentive to new market development. Could have an effect on development of oil shale resources.	Significant side-effects unlikely at levels currently used in Colorado.	Heavy specific occupation taxes may discourage affected businesses from locating in the area and/or may result in price increases and negatively affect consumption.
CERTAINTY / PREDICTABILITY	Moderately good predictability in short run. Poor predictability over 1 to 5 year term.	Predictability depends on specific object of taxation. Good for motor fuels, tobacco products, and alcohol.	Same as general sales tax.	Good predictability of residential portion of tax base. Industrial and mining portions are more subject to erratic changes if production is unstable.	Very good predictability.	Very good predictability.
ADMINISTRATIVE COST	Largest administrative cost due to vendor fee. Total administrative cost--3-10% for home rule cities. 4-5% for counties and statutory cities and towns.	Somewhat higher than cost for general sales tax.	High. May approach 10% or more of revenue.	The cost of increasing or decreasing reliance on property tax is extremely small.	Depends on size of tax. At higher levels, the administration cost approximates general sales tax.	Depends on size of tax. At higher levels, approximates selective sales tax.
CITIZEN ACCEPTANCE	Opinions vary with existing level. Has consistently topped property tax in popularity surveys. Exemptions of [illegible] may be preferred at times.	Opinions vary with existing level. High level of taxation on tobacco and alcohol expected. Existing levels throughout Colorado low compared to other states.	Strongly favored by local merchants selling major cost items located inside sales taxing jurisdiction.	Considered regressive and unfairly administered. Frequently comes in last in popularity in research opinion polls.	May engender opposition as "new tax." Will have opposition from business community.	Citizens may feel they are being taxed at every turn. Businesses may argue that they are discriminated against.

	USER FEES	SEVERANCE TAX	LOCAL INCOME TAX	REAL ESTATE TRANSFER TAX	SITE VALUE TAX
DESCRIPTION	Prices charged the consumers of various public services such as water and sewer or charges of recreation program charges. Fees may include charge for capital facilities as well as operating costs.	Tax on the production or extraction of certain minerals. Colorado's oil and gas production tax is a form of severance tax. It is levied on gross income derived from the production of certain types of oil and gas from Colorado deposits.	Tax on the income of resident individuals, estates, and trusts and income of non-residents derived from local sources. Also could apply to the income of corporations located in or doing business in the local area.	Tax levied on the conveyance of real property. The tax is analogous to a sales tax on real property.	Ad valorem tax on assessed valuation of land but not improvements.
YIELD	One-time initial fees (expansion or plant investment fees) and continued use service fees (monthly utility and recreation fees) may be designed to cover all or only a share of the capital facility and its associated operating costs. Collection generally follows initial capital construction but precedes expansion.	Colorado's oil and gas production tax allows a credit against certain ad valorem taxes paid by producers. A 5% severance tax on the gross proceeds from the sale of oil from oil shale is estimated to generate $1-1/2 million annually per 50,000 bbl/day operation, excluding tax credits. Multi-year revenue collection lag expected.	For fiscal year 1972-73, Colorado collected in excess of $109 per capita in personal and corporate income taxes. A 25% local surcharge or a 1/2% flat rate would each raise approximately $25 per capita annually. Income tax collections are subject to multi-year lags from the occurrence of economic activity.	Based on existing documentary fee collections, a 1% real estate transfer tax would produce $10-$15 per capita annually. Tax collections would tend to lead economic development.	15-20% of yield from identical mill levy on all real and personal property. Same time lag problem as with property tax.
LEGALITY	Legal for all types of local governments.	No existing authority for this tax. The General Assembly could enable such a tax at the state, regional, or local level.	A local income tax, levied by the General Assembly at the request of local political subdivisions, may be constitutional but unauthorized by statute.	Counties, statutory cities and towns, and special districts do not have express authority to levy a real estate transfer tax. The tax may be legal for home rule cities, but no court test has been made.	No authorization for statutory political subdivisions. May be legal for home rule cities. Does not appear to be prohibited by constitution.
ELASTICITY	Strongly inelastic with respect to inflation. Unit elastic with respect to population growth and real income growth.	Changes in revenue from severance taxes are not correlated with changes in local economic conditions.	Strongly elastic (range 1.3-1.8).	Generally elastic, yet subject to strong influence of money market conditions.	Same as property tax.
INCIDENCE	Paid by the beneficiary of the service or facility. User fees ignore citizens' ability to pay. User fees can insure growth pays its own way.	Mining companies faced with severance taxes attempt to pass them along to customers or their labor force. In tight labor markets, more taxes will be passed on to consumers, thus exported from the region.	Graduated income taxes (State of Colorado) are strongly progressive with respect to income. Corporate income taxes are exported by export base industries. Income taxes bear lightly on elderly and low income people.	Conditions in real estate markets determine tax incidence. In a soft, buyers market, the seller will bear more tax burden than in a tight sellers market.	Landowners of all types. Less burden on occupants of high density residences.
CONTROL	Excellent local control. Control as a revenue source is enhanced by the fact that increased costs due to increased demand are self-financing.	Very poor local control. The General Assembly sets the rates and non-local factors determine the size of the tax base.	Because of the constitutional requirement that only the General Assembly may levy income taxes, rates would not be locally controlled. In the short run, tax base is outside local control.	Tax rate is subject to local control, but the tax base is influenced by non-local economic developments.	Statutory mill levy limits severely constrain local control in counties, statutory cities and towns, and districts. Oil company decisions will be very important in Garfield and Rio Blanco counties.
MARKET SIDE EFFECTS	Set incentives for the efficient use of public services since users pay for only the amount used. High initial fees for public facilities are reflected in higher housing costs.	Set incentives for the taxed activity to locate outside of taxing jurisdiction or not locate in the area at all. The higher the tax, the stronger the incentive. Efforts can be much broader after mining activity is established in an area.	Significant market side-effects not identified.	Creates incentives to avoid property sales. In a tight market, housing prices will rise to cover tax cost. In a soft market, housing prices will be less affected. Such effects correlate to the tax rate applied.	Creates incentives to put land into its highest and best use allowed by law. Favors full development of area.
CERTAINTY / PREDICTABILITY	At fixed rate levels, good predictability. However, rate variations can be expected to affect consumption as well as costs.	Very poor certainty/predictability.	Moderately good predictability in short run. Poorer predictability over 3 to 5 year term.	Poor certainty/predictability.	Very good predictability.
ADMINISTRATIVE COST	User fee revenue systems may give rise to substantial costs due to rate studies, monitoring, consumption, individual billing, and expanded accounting systems.	Very low.	Very low for state-collected, locally returned local income tax.	Major cost is enforcement in major transactions. Generally low administration cost. Lack of experience with this tax in Colorado suggests unknown administrative problems.	If land is assessed for property tax, little additional cost would result for site value taxation.
CITIZEN ACCEPTANCE	Generally favorable. For low-income citizens, however, use of some public services may fall below a socially desirable level.	May be favorable if citizens feel energy consumers should share development costs and/or because severance taxes are largely exported.	Less favorable than federal income tax. Citizens can be expected to oppose a "new tax."	May engender opposition as "new tax," especially from realtors.	May engender opposition as "new tax" and since large rates are necessary to generate [illegible]

Source: Brieron, Maphis, Murray, and Lamont, Inc., Oil Shale Tax Lead Time Study, prepared for Regional Development and Land Use Planning Subcommittee of the Governor's Committee on Oil Shale Environmental Problems, Denver, Colorado, 1974. This chart is a summary of Section 3 of that study.

TABLE 6.4-2

Non-Monetary Fiscal Devices For Colorado Local Governments

	GENERAL OBLIGATION BONDS	REVENUE BONDS	SPECIAL ASSESSMENT BOND	INDUSTRIAL DEVELOPMENT BONDS	REFUNDING BONDS
DESCRIPTION	Bonds backed by the full faith and credit of the issuing agency. Issuers promise to levy additional property tax to retire debt if necessary. Promise to pay is contractual and unrestricted. These are lowest interest rate bonds.	Bonds issued without backing of full faith and credit of the issuing agency. Bonds usually retired from revenues generated by the project, financed, or more broadly, from revenues from specified sources other than general fund.	Special assessment bonds are issued to pay for public improvements where specific private benefits exist. Payments from private individuals retire the bonds on the basis of benefit conferred.	Also called county and municipality development revenue bonds. Issued to aid industry in financing capital costs. Government incurs no debt, bonds retired by payments from industry. Bonds are tax exempt.	Bonds that are issued to change the form of outstanding debt, to achieve certain advantages. Any type of bond can be refunded.
PURPOSE	Used by local government to finance capital projects when it is felt that the project should be paid for by the entire public, spread over a long period of time.	Originally conceived to provide front-end financing for facilities that could pay for themselves over the long run. Recent applications permit use where self retirement of debt from the project is impossible, but pledge of other revenues permits utilization.	To enable property owners to amortize over a moderate period of years, at a low interest rate, the capital costs associated with constructing various public facilities, i.e., streets, storm drainage, water or sewer.	Must serve a public purpose whether it be attraction of industry to stimulate economic growth or the provision of services in furtherance of the public health or welfare.	Generally, to shorten term of issue, achieve more favorable interest rate, eliminate restrictive covenants of base issue, reorganize the maturity pattern or to consolidate debt.
LEGALITY	The state constitution requires that local government general obligation debt (1) be for a public purpose, (2) except as otherwise provided by a home rule charter, be approved by the electorate, and (3) fall within statutory debt limitations. Debt contracted for the purposes of supplying water is excepted from the above provisions.	Only applicable constitutional requirement is that the debt be issued for a public purpose. Except as provided by home rule charter, no debt limitation or voter approval requirements.	Specific statutory authority exists to permit cities, towns, and counties to create special assessment districts, sometimes called local improvement districts, that may borrow by issuing special assessment bonds.	These avoid the Colorado constitutional requirement that prohibits lending of public funds to any person, company, or corporation. Statute does not require election.	Generally, any bond that can be legally issued can also be legally refunded. Debt limitations are not additive and, therefore, are not a factor.
CITIZEN OR POLITICAL ACCEPTANCE	Due to election requirement, citizens' right to approve or reject is positive and direct on each issue.	Since facility user fees are the principal means of debt retirement, most citizen concern comes from users of facilities and how much they will pay.	Citizens who want a certain public improvement that will result in a direct and specific benefit often support this approach. Most districts are not created without some form of majority consent by the benefiting and, therefore, paying property owners.	Citizen understanding is often a problem. Feeling that issuance of bonds is a public subsidy to a private purpose is common. Full public disclosure of total program is necessary.	Citizen understanding and a clear public purpose are probably the keys to acceptance
ADVANTAGES	Gives local governments the best possible terms. Retired from ad valorem taxation over life of issue. A hedge against inflation. Projects can be financed which do not generate revenue.	No debt limitations. Default on issue does not burden local tax payers. Voter approval not always necessary. Concept of user pays is popular.	Requires little or no capital from the issuing agency. Does not ordinarily affect community debt limits. Formal election is not required. Citizen involvement tends to shape the project into a publicly acceptable form.	May permit small industrial developments to locate in an area where private financing might preclude it. Bonds are not subject to public debt limitations. Debt retirement is by the industry, not the public. Serves as a planning tool for local governments.	Offers opportunities for flexibility in modifying community debt structure. No election required. Issuance costs are low. Net dollar gain can accrue to issuing agency
DISADVANTAGES	Lag time obtaining funds can be very costly. Community debt limitations could restrain logical usage. When paid off with property taxes, costs are not necessarily paid for by the project beneficiaries. Can only be used for certain purposes in counties.	Typically higher interest rates than for general obligation bonds. In case of bond default, moral obligations may result in community obligations. Exposure to litigation is greater than for voter-approved general obligation bonds. Use may be limited to revenue-generating projects.	Special assessment bonds demand interest rates higher than general obligation bonds. Never 100% citizen support. Administrative costs can be high percentage of small project costs. Flexibility of bond issue may be significantly limited by statute.	Necessity for private company to deal with public sector inhibits some applications. Size and application limits restrict use. Local governments hesitate to use because of political problems and fear of hurting credit standing. Interest rates generally highest of all tax-exempt bonds.	Some administrative costs do occur. Therefore, savings must be significant enough to offset this loss.

	LEASING/ INSTALLMENT PURCHASE	NON-PROFIT CORPORATION	SPECIAL DISTRICTS	LOCAL IMPROVEMENT DISTRICTS	GENERAL IMPROVEMENT DISTRICTS
DESCRIPTION	A technique by which local government can acquire equipment or public facilities immediately without the capital funds necessary for outright purchase. Lessor is a private leasing firm or a non-profit corporation.	A relatively new and flexible concept. A non-profit corporation may issue tax-exempt bonds for the purpose of creating public facilities that will eventually become the property of a sponsoring public agency when the bonds are paid.	These quasi-municipal units take several forms. Most are created to deliver a single urban service; e.g., water, sewer, parks. They are governed by a Board of Directors either governmentally appointed or elected by direct vote.	A device by which people in cities and counties can provide certain public improvements in the vicinity of their properties by assessing themselves (thru arms of their government) for the costs of the improvements. It is common for local improvement districts to borrow by issuing special assessment bonds.	A quasi-municipal entity with powers of taxation and borrowing created by a city or town to carry out some public purpose. Governing body of the district is the City Council. Substantial involvement of tax-payers within the district is required. Debt of the district is not a debt of the city.
PURPOSE	Generally used by local governments facing substantial capital outlays who choose (for various reasons) not to pursue traditional forms of debt financing. Can be used to avoid debt limitation requirements.	To provide public facilities for a governmental agency with tax exempt bonds without creating any debt for the agency benefitted.	Purpose is to deliver an urban service that is not being delivered or cannot be delivered by existing general governmental agencies.	To provide a device by which public improvements benefitting specific private properties can be made without significant governmental expenditures. Private lands are assessed according to benefits received. Less than 100% of project costs can usually be assessed, therefore some general government costs are likely.	To create a quasi-municipal agency which permits taxpayers in certain areas to create certain public improvements without payment from the city. Payments from the tax-payers within the district or revenues from facilities created by the district may support tax-exempt borrowing.
LEGALITY	Legal problems exist, care in usage is necessary. Most local governments have the power to lease. Generally, they must (1) only be bound for 1 year, (2) make rental payment out of yearly revenues, (3) be able to "walk away" at the end of any yearly period.	Use of non-profit corporations as a financing device requires careful attention to legality in Colorado. It is possible that in certain applications, the non-profit corporation acts as an agent in acquiring debt on behalf of the local government.	Special districts are creatures of the state and their powers and creation are provided by express state legislation. County approval of special district creation is necessary.	Use in cities has a long history--legality not a question as long as proper procedures are followed and the specific benefit test is met. Use in counties is relatively new; some problems with bond issues.	Statutes permitting creation of these districts are reasonably long standing and application to parking-related projects should cause few problems. Liberal interpretation of what constitutes a public purpose facility under this district could create untested situations
CITIZEN OR POLITICAL ACCEPTANCE	Generally, leasing does not seem to attract much public attention. Leasing may be particularly acceptable in a situation where standard forms of debt-backed purchases are turned down by the voters.	Since there has been little use made of the concept, public reaction is not well established. Concern could arise in the areas of (1) evading governmental debt limitations and (2) no election.	Formations are usually lightly noted by the citizenry at time of creation. Landowners see them as a way to permit more intensive use of their land. Conflicts with broad urban service programs and goals often occur later.	Generally accepted when the facilities built clearly deliver a special benefit. Controversies often occur. Benefits may not always be as direct and positive as some citizens would like.	Should be generally positive if the public purpose facility planned is agreeable to the public. Sufficient tax-payer involvement is required during the procedures setting up the district to gain citizen approval
ADVANTAGES	Impact on community debt limitations can be avoided if properly structured. No vote required. Lease can be custom tailored to specific need. Lessee may still acquire title to facility at end of lease period. Facilities may be acquired faster than with use of debt financing.	Could provide financing for projects otherwise not financible. Permits use of tax-exempt funds. Protects the debt capacity of the public body. Public body control over the entity is adequate to assure achievement of public purpose. Generally affords much greater degree of flexibility in financing public facilities.	Circumvents problems dealing with political boundaries. Economies of scale can be achieved. Broad geographic view of service need is possible. Relatively easy to create. Can function expeditiously if managed properly.	Provisions for public facilities without general fund tax dollars. Public involvement in "their" project is usually good. Projects lacking public support usually do not get built.	A vehicle to create public purpose improvements when other alternatives may not exist. The ad valorem taxing power vested in the district provides sound financial backing. The legislative body of the city is directly involved in the project to assure continuity with city programs. No city funds need to be spent on the project
DISADVANTAGES	Interest rates are usually high. Lack of clear definition still clouds some potential applications. Limit to an annual lease is a problem. Implicit interest costs in some installment purchase agreements do not reflect tax exemption of interest payments.	Time requirement to set up project is significant. Conservative local governments may be reluctant to get involved with such new concepts. IRS ruling of tax exempt status on bonds may not always be easy to obtain if public purpose is not clear and simple. Requires significant guidance from fiscal advisor.	Can dilute the powers of local general governments. Not always politically responsive to public. Optimization of a single urban service may be counterproductive to optimizing a broad spectrum of urban services and goals. Seldom responsive to comprehensive planning efforts of local government.	Administrative requirements are substantial and add to the cost. Lapsed time on a project is usually longer than standard government funded project. Assesses some people who don't want or can't afford the project.	District creation is generally accompanied by red tape and administrative time lags. City government must give time and energy to the district even if no city monies are involved. Although the debt incurred is not a responsibility of the city itself, those who are encumbered to assure payment are less free to support costs of other full city obligation projects later

Source: Briscoe, Maphis, Murray, and Lamont, Inc., Oil Shale Tax Lead Time Study, prepared for Regional Development and Land Use Planning Subcommittee of the Governor's Committee on Oil Shale Environmental Problems, Denver, Colorado, 1974. This chart is a summary of Section 4 of that study.

7.0 POPULATION AND ECONOMIC ACTIVITY: BASE-LINE PROJECTION

In this chapter, a set of base-line or neutral projections of population and selected measures of economic activity are summarized. The objective here is to identify and quantify the future economic environment in the region in the absence of any significant oil shale development. That is, it is necessary to describe the environment under the no-project alternative, an essential part of any socio-economic impact study. These data will also serve as a benchmark or basis for comparison for the predicted impacts of the oil shale development as outlined in the Phase II report.

Two sets of projections series, both developed by public agencies, were considered for use in this study. The first is the series developed by the Bureau of Economic Analysis of the U.S. Department of Commerce (1974), and commonly referred to as the OBERS projections.[a] Not only have these projections been widely used by private and governmental organizations in a wide variety of applications, they are used as base-line data as suggested by the Council on Environmental Quality (1973:200553):

> Agencies should also take care to identify, as appropriate, population and growth characteristics of the affected area and any population and growth assumptions used to justify the project or program or to determine secondary population and growth impacts resulting from

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[a]These data were originally developed to meet the need for basic economic information by public agencies engaged in comprehensive planning for the use, management, and development of the nation's water and related resources. Because of their usefulness in a range of applications, they have been adopted for use in a variety of research projects.

> the proposed action and its alternatives ... In discussing these population aspects, agencies should give consideration to using the rates of growth in the region of the project contained in the projection compiled for the water resources council by the Bureau of Economic Analysis of the Department of Commerce and the Economic Research Service of the Department of Agriculture (the OBERS projection).

The OBERS projections are based on a now-obsolete assumption. That is, it was assumed there would be no significant energy resource development in the Uintah Basin region. As a result, the projections through 1990 indicate a relatively stable population and employment base. Rapid population and employment growth in the Uintah Basin since 1970 have rendered the OBERS data useless for planning purposes. The series is reviewed in Appendix C merely to indicate what the direction of economic growth may have been had there been no energy development.

The projections series adopted as the baseline is that developed by the Office of the State Planning Coordinator, State of Utah, using the Utah Process, an export base forecasting model used by state agencies for contingency planning (Bigler et al., 1972). The projections from that model as reviewed here reflect what has happened at the Uintah Basin since 1970 and assume a continuation of expanded conventional exploration for gas and oil through 1980. As the projections are based on what are now more reasonable assumptions and do reflect current trends, they will be used in this report and in the Phase II report as the base-line or no oil shale project projection of population and economic activity.

In the following, the methodology employed in the Utah Process model will be described, and detailed projections for the three-county area will be outlined and reviewed.

7.1 The "Utah Process"

The base-line projection reviewed here is that developed in the office of the Utah State Planning Coordinator and commonly know as the Utah Process Projections. The model was developed as part of a research project undertaken jointly by the Four-corners Regional Commission, the Office of Regional Economic Coordination in the U.S. Department of Commerce, and the Utah State Planning Coordinator (1971:2).

> The basic objective of the project was, and continues to be, the development and implementation of an effective means for coordinating and planning activities of state agencies, boards, and commissions. Effectiveness was to be judged by the extent to which the coordinated system could anticipate the course of future events, identify the likely impact future events would have upon society, and incorporate into the administrative decision-making process--both with regard to programs and budgets--the consideration of these events and impacts.

7.1.1 Methodology: Utah Process

It was recognized that simple extrapolation of past trends would be an unsatisfactory basis for the forecasting of future economic and demographic activity. The planners then raise the following question: If the characteristics of the future are too uncertain to be based solely on projections of past trends, upon what base can a planning technique be fruitfully established? (Utah State Planning Coordinator, 1971:2)

> The solution to this problem proposed by the Utah Process was to start, not by identifying trends, but by identifying those events which in the judgment of a wide range of planners and policy makers could both (1) occur within the next 10

years, and (2) if they occurred, have a substantial impact on the economy and/or the social institutions of the state whether positive or negative. Once such events were identified, they were combined on the basis of appropriate criteria in the form of "Alternative Futures" and an economic and demographic impact model was designed to project the effects these specific combinations of events would have if they occurred.

The planners divided the state into seven multi-county planning districts (MCD's) of which the Uintah Basin area consisting of Daggett, Duchesne, and Uintah counties is the one of particular interest in this study. Unfortunately, it includes Daggett County, which is not one of the primary impact areas, and does not include Rio Blanco County, which is, of course, under study here. Despite the apparent inconsistency in the region designated for study herein and that selected by the Utah Process planners, the projected data can be adjusted to conform to the region of interest in this report.

The methodology used in making the projections is similar to that adopted in the OBERS projections.[a] That is, the model is essentially an export base concept with the primary determinant of future growth or decline being changes in employment in the basic or export sectors. These are referred to as the driving sectors in the Utah Process description. Once these projections are made, nonbasic or population dependent employment projections are based on a multiplier relationship to the basic employment change. The sum of these two employment components generates total demand for labor.

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[a]See Appendix VII for a detailed summary of the methods used in the OBERS projections model.

Resident labor supplies are generated by adjusting 1970 population data for natural increase factors (i.e., birth rates and death rates). From these population projections are generated estimates of labor supply. The interaction of the demand and supply of labor determines the migration variable which can be either positive or negative. (Negative migration would refer to out-migration from the region.) The population data also feedback on the employment data by influencing population-dependent employment levels.

A first step, already completed, is a projection of population and employment to 1990 for each of Utah's seven multi-county planning districts. These projections were based on recent trends in economic activity and on judgments concerning certain economic trends which are either presently occurring or are deemed to have a high likelihood of doing so (Utah State Planning Office, 1975:2).

> These projections are called "alternative future zero" and served as base-line projections against which the impacts of individual major events or combinations of major events can be measured (for example, oil shale development, power plant construction, etc.). The population and employment impacts of these events, when added to (or in some cases subtracted from) the alternative future zero projections, provide different projections of the state's growth or alternative futures for Utah.

Both the Utah Process and OBERS projections are comprehensive in the sense that they consider not only the direct employment effects (e.g., the increase in employment that might be associated with a large oil shale mining and processing complex) but also the indirect effects associated therewith. These indirect effects include induced industries that may locate within the region because of forward or backward linkages to the export base sector, and the totality of

employment that serves the population in the form of retail, services, and related employment (Bigler, 1972:34).

> As stated previously, the impact of the alternative futures can quite readily be expressed in terms of direct employment effects. But this is not sufficient because changes in population which result from changes in economic opportunity are produced by the total effects--both the direct and indirect effects of changes in the economic base. The model provides a means for estimating the indirect effects and thereby a means of expressing employment opportunity in terms of the regionally-specific demand for labor. Essentially, the relationships employed by the model at this stage are the traditional ones of economic base analyses, in which a distinction is made between basic employment (changes in which, as noted previously, the model treats as specified direct employment figures) and so-called residentiary employment. The distinction is an important one in regional analysis, and is based on this difference: basic employment is engaged in production for export outside the region, while residentiary employment results from servicing the needs of the resident population of the region itself. (For this reason, residentiary employment is sometimes referred to as service or population-dependent employment; and this present model, the preferred terminology is population-dependent.)

7.1.2 Study Area Projections: Utah Process

The Utah Process projections are made for the state and for seven multi-planning districts (MCD's). The revised set of projections used herein was developed in late 1974, and is based on the assumption that expansion of conventional energy service and production activities in the region will continue to about 1980, after which total economic activity will decline modestly through the 1980-1990 decade. Specifically (Weaver, Reeve, and Ellingwood, 1974:81):

> It is presumed that the most likely set of events in the Uintah Basin in the projection period included the continued and expanded petroleum exploration drilling to a peak sometime between 1975 and 1980. After this peak, drilling will decline

for exploration, but basic mining employment will be sustained to some extent by production, rather than exploration. Crude oil will continue to be transported out of the Uintah Basin by tanker truck during the mainly production period following 1980. In Future Zero, no dewaxing plant, oil refinery, or pipeline is included in the component events. On the other hand, neither is a marked reversal in current exploration policies included. Also, no development at all of either tar sand or oil shale deposits is included.

The detailed projections for the two-county area[a] (Duchesne and Uintah Counties) are shown in Table 7.1.2-1. Adjustments are also made in that table to include data for Rio Blanco County.

The population projections for the three-county area show rapid growth from 1970 to 1980, following which population declines modestly through 1990. Population is projected to increase by 73 percent during the 1970-1980 period. During the same interval, total employment more than doubles to a level of almost 18,000 workers. The model projects an unemployment rate of 4 percent in 1975 and 5 percent in the other projections years, 1980, 1985, and 1990.

School age population is also expected to increase significantly, but not in proportion to population. By 1980, it is projected there will be 10,850 school age children in the three-county area compared to less than 9,000 in 1970. The less than proportionate increase in school age population is attributable to two factors:

A) The changing age distribution of the population generally, which results in a smaller proportion of the total in the school age years; and

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[a]The published projections (Weaver, Reeve, and Ellingwood, 1974) also include Daggett County, but data for that county have been subtracted from those reported in Table 7.1.2-1.

TABLE 7.1.2-1

UTAH PROCESS PROJECTIONS OF POPULATION, EMPLOYMENT, AND HOUSING, UINTAH BASIN, 1970-1990

	1970	1975	1980	1985	1990
Duchesne and Uintah Counties					
Population	19,983	34,734	37,413	35,740	33,844
Employment	6,489	14,559	15,451	15,227	14,626
School Age Population	7,186	10,865	9,455	9,679	8,420
Dwelling Units	6,032	9,760	10,947	11,195	10,993
Duchesne, Uintah, and Rio Blanco Counties					
Population	24,825	39,815	42,934	41,444	39,814
Employment	8,467	16,689	17,731	17,657	17,206
School Age Population	8,893	12,454	10,850	11,223	9,954
Dwelling Units	7,500	11,187	12,562	12,982	12,932

Source: Weaver, Reeve, and Ellington, 1974.

B) The selective in-migration process characterized by an above average proportion of mobile workers with small (or no) families.

7.2 Summary

The base-line projection of population and employment on an annual basis for the period 1975-1990 is reported in Table 7.2-1. It should be emphasized that this rapid growth, bringing with it various kinds of growth-related problems, is completely independent of the proposed oil shale development. Area residents, especially those in leadership positions, should be aware of this projected growth and implement those plans and decisions necessary to facilitate it with minimum stress.

Plans for the development of an oil shale complex, if implemented, would superimpose additional population and employment growth on the region. The magnitudes of this impact will be estimated in the Phase II report. It is important, however, to emphasize that

A) Significant growth will occur in the absence of any oil shale activity; and

B) The net effect of an oil shale complex can be identified and needs to be considered separately from the growth associated with conventional oil and gas exploration and production activity.

TABLE 7.2-1 ANNUAL "UTAH PROCESS" PROJECTIONS, THREE COUNTY STUDY AREA, 1970-1990

Year	Population	Employment
1970 (actual)	24,825	8,467
....		
1975	39,815	16,689
1976	40,438	16,817
1977	41,063	16,946
1978	41,686	17,074
1979	42,310	17,203
1980	42,934	17,331
1981	42,636	17,396
1982	42,338	17,461
1983	42,040	17,527
1984	41,742	17,592
1985	41,444	17,657
1986	41,118	17,566
1987	40,792	17,477
1988	40,466	17,386
1989	40,140	17,296
1990	39,814	17,206

Source: Derived from Table 7.1.2-1.

7.3 Other Development Potential in the Uintah Basin

In addition to oil shale development, there is the possibility that other significant economic activities may develop in the Uintah Basin. Although it is impossible to assign probabilities to these developments or to even approximate their quantitative socio-economic impacts, it is essential that the potential developments be identified.

Because of the petroleum production activity in the Basin, consideration is being given to further industrial integration by the development of an oil refinery, a dewaxing plant, and/or a petrochemical complex. A continuation of high oil prices might also give impetus to programs to extract petroleum products from tar sands.

Rapid growth in demand for fertilizer products has driven prices to record levels, and this has stimulated worldwide development of potash and phosphate resources. Expansion of phosphate production in Southeastern Idaho is having a significant economic impact on that area. The potential for expanded phosphate production also exists in the Uintah Basin, and could significantly impact this area.

Full development and construction of the Central Utah Project would impact the Basin in two ways:

A) There would be an expansion of construction activity associated directly with the project; and

B) It would make more water available to the Basin which could influence both agriculture and non-agricultural activities.

Although it is impossible to estimate the impact magnitude of any one or several of these potential events, consideration of the

base-line projection should be done with full realization of the potential for significant deviations from the projected trend-lines associated with the potential developments just reviewed.

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APPENDIX A - Basic Economic Data

TABLE 1

EMPLOYMENT BY SELECTED INDUSTRIAL SECTORS

(749=013= =)
DUCHESNE, UTAH

SEPTEMBER 06, 1974

	1940	1950	1960	1970
TOTAL EMPLOYMENT	2,062	2,556	2,108	2,613
AGRICULTURE,FORESTRY AND FISHERIES	1,257	1,274	591	466
AGRICULTURE	1,252	1,266	574	438
FORESTRY AND FISHERIES	5	8	17	28
MINING	44	77	89	86
CONTRACT CONSTRUCTION	92	126	198	160
MANUFACTURING	91	99	105	137
FOOD AND KINDRED PRODUCTS	41	37	72	50
TEXTILE MILL PRODUCTS	--	--	--	--
APPAREL AND OTHER FABRICATED TEXTILE PRODUCTS	1	1	4	5
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	10	12	--	10
CHEMICALS AND ALLIED PRODUCTS	--	1	--	--
LUMBER AND FURNITURE	37	37	24	45
MACHINERY, ALL	--	6	5	5
MACHINERY EXCEPT ELECTRICAL	--	6	5	5
ELECTRICAL MACHINERY	--	--	--	--
TRANSPORTATION EQUIPMENT	--	1	--	--
MOTOR VEHICLES AND MOTOR VEHICLES EQUIPMENT	--	1	--	--
TRANSPORTATION EXCLUDING MOTOR VEHICLES	--	--	--	--
OTHER MANUFACTURING	2	4	--	22
PAPER AND ALLIED PRODUCTS	--	--	--	--
PETROLEUM REFINING AND RELATED PRODUCTS	--	--	--	18
PRIMARY METALS INDUSTRIES	--	1	--	--
FABRICATED METALS & ORDNANCE	--	--	--	--
MISCELLANEOUS MANUFACTURING	--	3	--	4
TRANSPORTATION,COMM.,&PUB. UTILITIES	44	105	151	158
TRANSPORTATION	26	50	78	68
RAILROAD TRANSPORTATION	--	1	--	--
MOTOR FREIGHT TRANSPORTATION AND WAREHOUSING	22	41	47	28
OTHER TRANSPORTATION SERVICES	4	8	31	40
COMMUNICATIONS	6	8	29	13
ELECTRIC,GAS,AND SANITARY SERVICES	12	47	44	77
WHOLESALE AND RETAIL TRADE	204	340	401	660
WHOLESALE TRADE	21	31	45	15
RETAIL TRADE	183	309	356	645
EATING AND DRINKING PLACES	24	52	39	68
FOOD & DAIRY STORES	44	61	61	98

TABLE 1 (C[illegible])

EMPLOYMENT BY SELECTED INDUSTRIAL SECTORS(PART 2)

749-013-[illegible]
JCHESNE, UTAH

SEPTEMBER 06, 1976

	1940	1950	1960	1970
OTHER RETAIL STORES	115	196	256	319
FINANCE,INSURANCE AND REAL ESTATE	4	18	34	38
SERVICES	249	405	445	648
BUSINESS SERVICES	104	189	101	104
LODGING PLACES AND PERSONAL SERVICES	38	53	37	40
BUSINESS AND REPAIR SERVICES	29	78	21	34
AMUSEMENTS AND REC. SERVICES	6	15	12	9
PRIVATE HOUSEHOLDS	31	43	31	21
PROFESSIONAL SERVICES	145	216	344	544
TOTAL GOVERNMENT	77	114	94	260
PUBLIC ADMINISTRATION	77	110	94	260
FEDERAL MILITARY	--	4	--	--
INDUSTRY NOT REPORTED	12	51	51	94

-- INSUFFICIENT DATA

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REGIONAL ECONOMICS INFORMATION SYSTEM
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TABLE 2

EMPLOYMENT BY SELECTED INDUSTRIAL SECTORS

212

(749-047- -) SEPTEMBER 06, 1974

UINTAH, UTAH

	1940	1950	1960	1970
TOTAL EMPLOYMENT	2,218	3,002	3,489	4,163
AGRICULTURE,FORESTRY AND FISHERIES	1,266	1,151	678	496
AGRICULTURE	1,251	1,136	649	427
FORESTRY AND FISHERIES	15	15	29	69
MINING	114	285	577	715
CONTRACT CONSTRUCTION	110	191	329	270
MANUFACTURING	65	124	179	243
FOOD AND KINDRED PRODUCTS	29	35	38	29
TEXTILE MILL PRODUCTS	--	1	--	--
APPAREL AND OTHER FABRICATED TEXTILE PRODUCTS	1	1	--	37
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	5	13	21	33
CHEMICALS AND ALLIED PRODUCTS	--	1	--	22
LUMBER AND FURNITURE	9	13	42	28
MACHINERY, ALL	1	6	27	24
MACHINERY EXCEPT ELECTRICAL	--	6	27	24
ELECTRICAL MACHINERY	--	--	--	--
TRANSPORTATION EQUIPMENT	--	1	--	--
MOTOR VEHICLES AND MOTOR VEHICLES EQUIPMENT	--	1	--	--
TRANSPORTATION EXCLUDING MOTOR VEHICLES	--	--	--	--
OTHER MANUFACTURING	20	53	51	70
PAPER AND ALLIED PRODUCTS	--	--	--	--
PETROLEUM REFINING AND RELATED PRODUCTS	--	20	10	28
PRIMARY METALS INDUSTRIES	--	--	--	--
FABRICATED METALS + ORDNANCE	--	1	13	5
MISCELLANEOUS MANUFACTURING	--	32	28	37
TRANSPORTATION,COMM.,+PUB. UTILITIES	48	108	219	230
TRANSPORTATION	23	50	96	104
RAILROAD TRANSPORTATION	--	1	--	--
MOTOR FREIGHT TRANSPORTATION AND WAREHOUSING	21	31	74	71
OTHER TRANSPORTATION SERVICES	2	18	22	33
COMMUNICATIONS	10	24	42	46
ELECTRIC,GAS,AND SANITARY SERVICES	15	34	81	80
WHOLESALE AND RETAIL TRADE	209	385	602	966
WHOLESALE TRADE	26	57	51	141
RETAIL TRADE	183	328	551	825
EATING AND DRINKING PLACES	27	45	96	165
FOOD + DAIRY STORES	37	58	59	115

TABLE 2 (Cont.)

EMPLOYMENT BY SELECTED INDUSTRIAL SECTORS(PART 2)

749-047- -)
INTAH, UTAH

SEPTEMBER 06, 1974

	1940	1950	1960	1970
OTHER RETAIL STORES	119	225	396	545
FINANCE,INSURANCE AND REAL ESTATE	22	44	47	100
SERVICES	283	559	708	803
BUSINESS SERVICES	119	284	335	245
LODGING PLACES AND PERSONAL SERVICES	56	111	152	115
BUSINESS AND REPAIR SERVICES	35	112	94	79
AMUSEMENTS AND REC. SERVICES	4	31	17	18
PRIVATE HOUSEHOLDS	24	30	72	33
PROFESSIONAL SERVICES	164	275	373	558
TOTAL GOVERNMENT	101	155	150	340
PUBLIC ADMINISTRATION	101	155	150	340
FEDERAL MILITARY	--	--	--	--
INDUSTRY NOT REPORTED	12	40	75	224

TABLE 3

EMPLOYMENT BY SELECTED INDUSTRIAL SECTORS

(708-103- -)
RIO BLANCO, COLORADO

SEPTEMBER 06, 1974

	1940	1950	1960	1970
TOTAL EMPLOYMENT	948	1,754	2,013	1,980
AGRICULTURE,FORESTRY AND FISHERIES	527	465	351	306
AGRICULTURE	525	460	351	301
FORESTRY AND FISHERIES	2	5	--	5
MINING	28	387	426	280
CONTRACT CONSTRUCTION	35	163	156	152
MANUFACTURING	16	37	53	42
FOOD AND KINDRED PRODUCTS	7	3	--	--
TEXTILE MILL PRODUCTS	--	--	--	--
APPAREL AND OTHER FABRICATED TEXTILE PRODUCTS	--	1	--	6
PRINTING,PUBLISHING AND ALLIED INDUSTRIES	4	6	11	6
CHEMICALS AND ALLIED PRODUCTS	--	1	--	--
LUMBER AND FURNITURE	4	14	--	--
MACHINERY, ALL	1	3	--	--
MACHINERY EXCEPT ELECTRICAL	--	2	--	--
ELECTRICAL MACHINERY	--	1	--	--
TRANSPORTATION EQUIPMENT	--	1	--	--
MOTOR VEHICLES AND MOTOR VEHICLES EQUIPMENT	--	--	--	--
TRANSPORTATION EXCLUDING MOTOR VEHICLES	--	1	--	--
OTHER MANUFACTURING	--	8	42	30
PAPER AND ALLIED PRODUCTS	--	--	--	--
PETROLEUM REFINING AND RELATED PRODUCTS	--	2	33	30
PRIMARY METALS INDUSTRIES	--	--	--	--
FABRICATED METALS + ORDNANCE	--	1	--	--
MISCELLANEOUS MANUFACTURING	--	5	9	--
TRANSPORTATION,COMM.,+PUB. UTILITIES	32	110	157	94
TRANSPORTATION	16	49	91	32
RAILROAD TRANSPORTATION	1	--	--	--
MOTOR FREIGHT TRANSPORTATION AND WAREHOUSING	14	31	43	26
OTHER TRANSPORTATION SERVICES	1	18	48	6
COMMUNICATIONS	7	21	22	--
ELECTRIC,GAS,AND SANITARY SERVICES	9	40	44	62
WHOLESALE AND RETAIL TRADE	83	229	281	294
WHOLESALE TRADE	2	15	50	53
RETAIL TRADE	81	214	231	241
EATING AND DRINKING PLACES	18	70	30	44
FOOD + DAIRY STORES	18	34	51	48

TABLE 5.00P -- INSUFFICIENT DATA

TABLE 3 (Cont.)

EMPLOYMENT BY SELECTED INDUSTRIAL SECTORS(PART 2)

(708-103- -)
RIO BLANCO, COLORADO

SEPTEMBER 06, 1974

	1940	1950	1960	1970
OTHER RETAIL STORES	45	110	150	149
FINANCE,INSURANCE AND REAL ESTATE	11	21	45	56
SERVICES	176	265	463	603
BUSINESS SERVICES	115	163	250	185
LODGING PLACES AND PERSONAL SERVICES	44	57	66	68
BUSINESS AND REPAIR SERVICES	26	71	79	64
AMUSEMENTS AND REC. SERVICES	14	14	29	22
PRIVATE HOUSEHOLDS	31	21	76	31
PROFESSIONAL SERVICES	61	102	213	418
TOTAL GOVERNMENT	40	77	81	153
PUBLIC ADMINISTRATION	40	77	81	153
FEDERAL MILITARY	--	--	--	--
INDUSTRY NOT REPORTED	11	15	111	78

-- INSUFFICIENT DATA

TABLE 4

PERSONAL INCOME BY MAJOR SOURCES
AND EARNINGS BY BROAD INDUSTRIAL SECTOR
(THOUSANDS OF DOLLARS)

(745-007-000-000)
DUCHESNE, UTAH

FEBRUARY 6, 1974

	1950	1959	1962	1965	1966
TOTAL PERSONAL INCOME	6,602	8,715	9,360	8,946	10,378
TOTAL WAGE AND SALARY DISBURSEMENTS 1/	1,567	4,303	4,284	4,268	5,289
OTHER LABOR INCOME	47	156	166	152	197
PROPRIETORS INCOME	3,869	2,709	2,955	2,220	2,079
FARM PROPRIETORS INCOME	2,767	1,927	2,107	1,317	1,144
NONFARM PROPRIETORS INCOME	1,102	782	848	903	935
PROPERTY INCOME	443	868	1,151	1,414	1,871
TRANSFER PAYMENTS	758	834	1,011	1,121	1,276
LESS: PERSONAL CONTRIBUTIONS FOR SOCIAL INSURANCE	82	155	207	229	334
TOTAL EARNINGS 2/	5,483	7,168	7,405	6,640	7,565
FARM EARNINGS	3,060	2,198	2,376	1,585	1,427
TOTAL NONFARM EARNINGS	2,423	4,970	5,029	5,055	6,138
GOVERNMENT EARNINGS	591	1,194	1,472	1,788	2,214
TOTAL FEDERAL	195	345	403	434	716
FEDERAL CIVILIAN	139	285	339	377	648
MILITARY	56	60	64	57	68
STATE AND LOCAL	396	849	1,069	1,354	1,498
PRIVATE NONFARM EARNINGS	1,832	3,776	3,557	3,267	3,924
MANUFACTURING	119	158	208	219	202
MINING	(D)	(D)	(D)	(D)	(D)
CONTRACT CONSTRUCTION	(D)	(D)	(D)	(D)	(D)
TRANS.,COMMUNICATION,AND PUBLIC UTILITIES	74	423	347	268	316
WHOLESALE AND RETAIL TRADE	940	1,537	1,373	1,376	1,487
FINANCE, INSURANCE, AND REAL ESTATE	36	127	124	75	87
SERVICES	282	444	539	766	803
OTHER	(D)	(D)	(D)	(D)	(D)

(D) NOT SHOWN TO AVOID DISCLOSURE OF DATA FOR INDIVIDUAL REPORTING UNITS. DATA ARE INCLUDED IN TOTALS.

1/ PRIMARY SOURCE FOR PRIVATE NON-FARM WAGES: UTAH DEPT. OF EMPLOYMENT SECURITY
2/ EARNINGS IS THE SUM OF WAGES, OTHER LABOR INCOME AND PROPRIETORS' INCOME

TABLE 4 (Cont.)

PERSONAL INCOME BY MAJOR SOURCES
AND EARNINGS BY BROAD INDUSTRIAL SECTOR
(THOUSANDS OF DOLLARS)

(745-007-000-000)
DUCHESNE, UTAH

FEBRUARY 8, 1974

	1967	1968	1969	1970	1971
TOTAL PERSONAL INCOME	13,413	14,680	15,585	18,463	21,012
TOTAL WAGE AND SALARY DISBURSEMENTS 1/	6,798	7,795	7,998	9,656	11,613
OTHER LABOR INCOME	261	314	330	397	487
PROPRIETORS INCOME	2,777	2,497	3,031	3,404	3,534
FARM PROPRIETORS INCOME	1,859	1,666	2,221	2,574	2,589
NONFARM PROPRIETORS INCOME	918	831	810	830	945
PROPERTY INCOME	2,509	2,825	2,890	3,462	3,668
TRANSFER PAYMENTS	1,520	1,754	1,868	2,171	2,475
LESS: PERSONAL CONTRIBUTIONS FOR SOCIAL INSURANCE	452	505	532	627	765
TOTAL EARNINGS 2/	9,836	10,606	11,359	13,457	15,634
FARM EARNINGS	2,114	1,931	2,512	2,872	2,893
TOTAL NONFARM EARNINGS	7,722	8,675	8,847	10,585	12,741
GOVERNMENT EARNINGS	2,723	2,967	3,079	3,575	3,861
TOTAL FEDERAL	1,093	1,199	1,150	1,368	1,636
FEDERAL CIVILIAN	1,018	1,121	1,059	1,265	1,521
MILITARY	75	78	91	103	115
STATE AND LOCAL	1,630	1,768	1,929	2,207	2,425
PRIVATE NONFARM EARNINGS	4,999	5,708	5,768	7,010	8,880
MANUFACTURING	209	254	214	219	270
MINING	(D)	(D)	767	2,462	3,843
CONTRACT CONSTRUCTION	(D)	(D)	1,653	868	544
TRANS,COMMUNICATION,AND PUBLIC UTILITIES	605	579	593	672	710
WHOLESALE AND RETAIL TRADE	1,490	1,578	1,578	1,661	1,978
FINANCE, INSURANCE, AND REAL ESTATE	145	158	169	206	316
SERVICES	730	772	786	870	1,176
OTHER	(D)	8	8	52	43

(D) NOT SHOWN TO AVOID DISCLOSURE OF DATA FOR INDIVIDUAL REPORTING UNITS. DATA ARE INCLUDED IN TOTALS.

1/ PRIMARY SOURCE FOR PRIVATE NON-FARM WAGES; UTAH DEPT. OF EMPLOYMENT SECURITY
2/ EARNINGS IS THE SUM OF WAGES, OTHER LABOR INCOME AND PROPRIETORS' INCOME

TABLE 5

PERSONAL INCOME BY MAJOR SOURCES
AND EARNINGS BY BROAD INDUSTRIAL SECTOR
(THOUSANDS OF DOLLARS)

(745-024-000-000)
UINTAH, UTAH

FEBRUARY 6, 1974

	1950	1959	1962	1965	1966
TOTAL PERSONAL INCOME	10,180	17,457	24,716	22,898	23,828
TOTAL WAGE AND SALARY DISBURSEMENTS 1/	4,287	11,764	17,300	15,836	16,233
OTHER LABOR INCOME	129	356	597	535	581
PROPRIETORS INCOME	4,384	3,062	3,250	2,371	2,518
FARM PROPRIETORS INCOME	3,213	1,436	1,484	456	565
NONFARM PROPRIETORS INCOME	1,171	1,626	1,766	1,915	1,953
PROPERTY INCOME	771	1,595	2,880	3,063	3,400
TRANSFER PAYMENTS	689	1,019	1,248	1,712	1,926
LESS: PERSONAL CONTRIBUTIONS FOR SOCIAL INSURANCE	80	339	559	619	830
TOTAL EARNINGS 2/	8,800	15,182	21,147	18,742	19,332
FARM EARNINGS	3,469	1,786	1,832	963	1,100
TOTAL NONFARM EARNINGS	5,331	13,396	19,315	17,779	18,232
GOVERNMENT EARNINGS	1,411	2,798	3,527	3,812	3,934
TOTAL FEDERAL	767	1,331	1,486	1,584	1,569
FEDERAL CIVILIAN	729	1,235	1,382	1,473	1,438
MILITARY	38	96	104	111	131
STATE AND LOCAL	644	1,467	2,041	2,228	2,365
PRIVATE NONFARM EARNINGS	3,920	10,598	15,788	13,967	14,298
MANUFACTURING	375	872	729	587	601
MINING	1,161	4,43[illegible]	7,179	6,105	5,817
CONTRACT CONSTRUCTION	232	1,002	1,151	1,094	1,324
TRANS,COMMUNICATION,AND PUBLIC UTILITIES	124	408	1,090	577	561
WHOLESALE AND RETAIL TRADE	1,328	2,453	3,279	3,552	3,583
FINANCE, INSURANCE, AND REAL ESTATE	109	194	280	270	347
SERVICES	567	1,168	2,009	1,679	1,957
OTHER	24	63	71	103	108

1/ PRIMARY SOURCE FOR PRIVATE NON-FARM WAGES: UTAH DEPT. OF EMPLOYMENT SECURITY
2/ EARNINGS IS THE SUM OF WAGES, OTHER LABOR INCOME AND PROPRIETORS' INCOME

TABLE 5.00 P

REGIONAL ECONOMICS INFORMATION SYSTEM
BUREAU OF ECONOMIC ANALYSIS

TABLE 5 (Cont.)

PERSONAL INCOME BY MAJOR SOURCES
AND EARNINGS BY BROAD INDUSTRIAL SECTOR
(THOUSANDS OF DOLLARS)

(745-024-000-000) FEBRUARY 8, 1974
UINTAH, UTAH

	1967	1968	1969	1970	1971
TOTAL PERSONAL INCOME	26,027	27,694	30,861	32,924	35,973
TOTAL WAGE AND SALARY DISBURSEMENTS 1/	17,397	18,238	20,421	21,406	23,489
OTHER LABOR INCOME	659	707	832	913	1,123
PROPRIETORS INCOME	2,765	2,857	3,221	3,396	3,631
FARM PROPRIETORS INCOME	852	880	1,406	1,387	1,514
NONFARM PROPRIETORS INCOME	1,913	1,977	1,815	2,009	2,117
PROPERTY INCOME	3,887	4,275	4,748	5,135	5,442
TRANSFER PAYMENTS	2,262	2,624	2,795	3,304	3,705
LESS: PERSONAL CONTRIBUTIONS FOR SOCIAL INSURANCE	943	1,007	1,156	1,230	1,417
TOTAL EARNINGS 2/	20,821	21,802	24,474	25,715	28,263
FARM EARNINGS	1,331	1,379	1,958	1,951	2,090
TOTAL NONFARM EARNINGS	19,490	20,423	22,516	23,764	26,153
GOVERNMENT EARNINGS	4,340	4,519	4,805	5,485	5,469
TOTAL FEDERAL	1,857	1,890	2,002	2,332	2,046
FEDERAL CIVILIAN	1,717	1,751	1,843	2,154	1,848
MILITARY	140	139	159	178	198
STATE AND LOCAL	2,483	2,629	2,803	3,153	3,423
PRIVATE NONFARM EARNINGS	15,150	15,904	17,711	18,279	20,684
MANUFACTURING	662	717	998	1,282	1,617
MINING	6,059	6,104	6,896	6,381	7,048
CONTRACT CONSTRUCTION	1,183	1,266	1,662	1,488	1,238
TRANS,COMMUNICATION,AND PUBLIC UTILITIES	1,067	1,166	1,297	1,425	1,801
WHOLESALE AND RETAIL TRADE	3,524	3,621	3,684	4,044	4,650
FINANCE, INSURANCE, AND REAL ESTATE	412	437	444	480	524
SERVICES	2,144	2,492	2,715	3,076	3,701
OTHER	99	101	15	103	105

1/ PRIMARY SOURCE FOR PRIVATE NON-FARM WAGES: UTAH DEPT. OF EMPLOYMENT SECURITY
2/ EARNINGS IS THE SUM OF WAGES, OTHER LABOR INCOME AND PROPRIETORS' INCOME

TABLE 6

PERSONAL INCOME BY MAJOR SOURCES
AND EARNINGS BY BROAD INDUSTRIAL SECTOR
(THOUSANDS OF DOLLARS)

(744-052-000-000)
RIO BLANCO, COLORADO

FEBRUARY 6, 1974

	1950	1959	1962	1965	1966
TOTAL PERSONAL INCOME	6,309	11,048	12,404	14,486	16,336
TOTAL WAGE AND SALARY DISBURSEMENTS 1/	2,401	5,965	6,502	7,402	8,851
OTHER LABOR INCOME	51	197	201	251	307
PROPRIETORS INCOME	2,028	3,026	3,432	4,377	4,483
FARM PROPRIETORS INCOME	1,091	925	1,070	1,972	1,998
NONFARM PROPRIETORS INCOME	937	2,101	2,362	2,405	2,485
PROPERTY INCOME	1,134	1,449	1,789	1,954	2,231
TRANSFER PAYMENTS	438	595	722	832	911
LESS: PERSONAL CONTRIBUTIONS FOR SOCIAL INSURANCE	43	184	242	330	447
TOTAL EARNINGS 2/	4,480	9,188	10,135	12,030	13,641
FARM EARNINGS	1,509	1,327	1,554	2,415	2,581
TOTAL NONFARM EARNINGS	2,971	7,861	8,581	9,615	11,060
GOVERNMENT EARNINGS	584	1,385	1,817	1,948	2,022
TOTAL FEDERAL	98	192	245	246	276
FEDERAL CIVILIAN	79	147	190	198	218
MILITARY	19	45	55	48	58
STATE AND LOCAL	486	1,193	1,572	1,702	1,746
PRIVATE NONFARM EARNINGS	2,387	6,476	6,764	7,667	9,038
MANUFACTURING	(D)	(D)	(D)	(D)	(D)
MINING	332	1,27 7	1,898	2,242	2,858
CONTRACT CONSTRUCTION	578	1,071	722	1,238	1,434
TRANS,COMMUNICATION,AND PUBLIC UTILITIES	180	1,001	682	712	791
WHOLESALE AND RETAIL TRADE	735	1,410	1,398	1,353	1,420
FINANCE, INSURANCE, AND REAL ESTATE	39	128	151	211	290
SERVICES	450	1,176	1,618	1,665	2,019
OTHER	(D)	(D)	(D)	(D)	(D)

(D) NOT SHOWN TO AVOID DISCLOSURE OF DATA FOR INDIVIDUAL REPORTING UNITS. DATA ARE INCLUDED IN TOTALS.

1/ PRIMARY SOURCE FOR PRIVATE NON-FARM WAGES: COLORADO DIVISION OF EMPLOYMENT
2/ EARNINGS IS THE SUM OF WAGES, OTHER LABOR INCOME AND PROPRIETORS' INCOME

TABLE 5 (CONT.)

PERSONAL INCOME BY MAJOR SOURCES
AND EARNINGS BY BROAD INDUSTRIAL SECTOR
(THOUSANDS OF DOLLARS)

(744-052-000-000)
RIO BLANCO, COLORADO

FEBRUARY 8, 1974

	1967	1968	1969	1970	1971
TOTAL PERSONAL INCOME	16,643	18,637	21,217	23,281	25,652
TOTAL WAGE AND SALARY DISBURSEMENTS 1/	9,061	10,190	11,256	11,701	12,593
OTHER LABOR INCOME	294	345	411	441	685
PROPRIETORS INCOME	4,331	4,821	5,933	7,149	7,971
FARM PROPRIETORS INCOME	1,973	2,341	3,543	4,680	5,466
NONFARM PROPRIETORS INCOME	2,358	2,480	2,390	2,469	2,505
PROPERTY INCOME	2,422	2,658	2,945	3,143	3,344
TRANSFER PAYMENTS	1,054	1,208	1,356	1,566	1,836
LESS: PERSONAL CONTRIBUTIONS FOR SOCIAL INSURANCE	519	585	684	719	777
TOTAL EARNINGS 2/	13,686	15,356	17,600	19,291	21,249
FARM EARNINGS	2,743	3,138	4,443	5,584	6,268
TOTAL NONFARM EARNINGS	10,943	12,218	13,157	13,707	14,981
GOVERNMENT EARNINGS	2,058	2,181	2,331	2,558	2,830
TOTAL FEDERAL	288	291	310	346	387
FEDERAL CIVILIAN	238	233	245	276	311
MILITARY	50	58	65	70	76
STATE AND LOCAL	1,770	1,890	2,021	2,212	2,443
PRIVATE NONFARM EARNINGS	8,885	10,037	10,826	11,149	12,151
MANUFACTURING	(D)	(D)	(D)	(D)	(D)
MINING	2,854	2,975	2,694	3,019	2,915
CONTRACT CONSTRUCTION	1,260	1,477	1,771	1,162	1,602
TRANS.,COMMUNICATION,AND PUBLIC UTILITIES	870	1,012	1,084	1,070	979
WHOLESALE AND RETAIL TRADE	1,364	1,820	2,490	3,282	1,737
FINANCE, INSURANCE, AND REAL ESTATE	241	268	280	270	321
SERVICES	2,064	2,274	2,351	2,120	1,911
OTHER	(D)	(D)	(D)	(D)	(D)

(D) NOT SHOWN TO AVOID DISCLOSURE OF DATA FOR INDIVIDUAL REPORTING UNITS. DATA ARE INCLUDED IN TOTALS.

1/ PRIMARY SOURCE FOR PRIVATE NON-FARM WAGES: COLORADO DIVISION OF EMPLOYMENT
2/ EARNINGS IS THE SUM OF WAGES, OTHER LABOR INCOME AND PROPRIETORS' INCOME

APPENDIX B - Land and Water Data

TABLE 1

SUMMARY OF WATER RELATED LAND USE
BY COUNTY IN UINTA HYDROLOGIC AREA
(All units in acres.)

Classification	Carbon County	Daggett County	Duchesne County	Uintah County	Wasatch County	Total
Irrigated Cropland						
Corn		30	1549	2343		3922
Potatoes			34	42		76
Peas				18		18
Tomatoes			1			1
Truck Crop			1			1
Barley	23	56	7051	7776		14906
Oats			42			42
Wheat			6			6
Alfalfa	219	661	20153	20469	5	41507
Native Grass Hay			18	19		37
Cultivated Grass	82	3029	17275	6043		26429
Pasture	199	3530	58722	36556	42	99049
Wet Land Pasture		2120	10753	3317		16190
Native Grass Pasture			5515	9831	41	15387
Orchard		47	126	122		295
Idle	60	93	6971	8601		15725
Other	16		1848	7291		9155
Subtotal	599	9566	130065	102428	88	242746
Dry Cropland						
Alfalfa			3	13		16
Beans			2			2
Cultd Grasses		30	764	3		797
Fallow			15			15
Other		152	674	30		856
Subtotal		182	1458	46		1686
Other Land Use						
Farmsteads	9	83	1201	1353		2646
Residential Yards		227	1113	952		2292
Urban			389	603		992
Stock or Feed Yd	15	143	617	512		1287
Abandoned Frmst	1	14	62	60		137
Subtotal	25	467	3382	3480		7354
Industrial						
Meat Packing				2		2
Other		9	165	307		481
Subtotal		9	165	309		483
Open Water Surface						
Major Storage			651	1735		2386
Holding Storage	1		633	249		883
Sump Ponds			2			2

TABLE 1 (Continued)

Classification	Carbon County	Daggett County	Duchesne County	Uintah County	Wasatch County	Total
Natural Ponds			58	161		219
Unclassified			1248	3408		4656
Subtotal	1		2592	5553		8146
Phreatophytes[a]						
Cottonwood(P)		4	2844	620		3468
Cottonwood(L)	2		837	2122		2961
Cottonwood(M)	60	128	5436	3737		9361
Cottonwood(D)	50	550	6005	3828		10433
Cottonwood(V)			17	7		24
Salt Cedar(L)			30	206		236
Salt Cedar(M)			201	2262		2463
Salt Cedar(D)			158	1712		1870
Salt Cedar(V)			6	1555		1561
Willows(L)			220	192	1	413
Willows(M)	368	133	2136	1749	5	4391
Willows(D)	188	106	1878	1900		4072
Willows(V)	2		328	86		416
Rushes/Cattail(L)			3	1		4
R/C(M)			174	446		620
R/C(D)		17	1250	912		2179
R/C(V)			123	301		424
Greasewood(L)		22	677	1693		2392
Greasewood(M)	28	180	6769	8860		15837
Greasewood(D)	2	7	2505	3608		6122
Greasewood(V)			2	112		114
Sage/Rbbtbrsh(L)	49	39	1507	515		2110
Sg/Rbbtbrsh(M)	611	50	10892	4896		16449
Sg/Rbbtbrsh(D)	24		954	792		1770
Streamside Brush(L)			760	84		844
Strmsd Brush(M)			1154	1617		2771
Strmsd Brush(D)	54		1060	1616		2730
Strmsd Brush(V)			175	2		177
Grasses(L)		4	1167	304		1475
Grasses(M)		41	4224	1810		6075
Grasses(D)	2	4	4205	3539		7750
Grasses(V)			164	179		343
Other(L)		332	823	144		1299
Other(M)			2009	1274		3283
Other(D)				22		22
Subtotal	1440	1617	60693	52703	6	116459
Total	2065	11841	198355	164519	94	376874

Source: Utah Division of Water Resources, 1971.

[a]Phreatophyte density symbols are:
V=Very Dense, D=Dense, M=Medium, L=Light, P=Precipitation only.

TABLE 2.

SUMMARY OF WATER RELATED LAND USE BY HYDROLOGIC SUBAREAS IN UINTA HYDROLOGIC AREA. (ALL UNITS IN ACRES.)

Classification	Upper Green	Dry Fork	Vernal	Jensen	Green River "A"	Upper Duchesne River	Current Creek	Strawberry River	Lower Duchesne & Lake Fork Uinta	West Green River "B"	East Green River "B"	Total
Irrigated Cropland												
Corn	30	9	972	140	392	23			1828	528		3922
Sugar Beets		1	31	1		14			27	2		76
Potatoes			18									18
Peas						1						1
Tomatoes						1						1
Truck Crop												
Barley	56	86	3082	1257	364	1071	136	64	7663	1033	94	14906
Oats												
Wheat												
Alfalfa	661	422	6505	2894	1326	2266	594	432	23705	2216	426	41507
Nat. Grass Hay						18			19			37
Cult. Grass and Other Hay	3029	172	1450	1097	135	2080	6	198	17685	340	237	26429
Pasture	3530	43	7055	911	994	2718	1089	663	80846	1061	139	99049
Wet Land Pasture	2120	12	2438	349	55	481	1	16	10551	167		16190
Nat. Grass Pasture		234	30		127	1166	97	55	13666	12		15387
Orchard	47	1	108	2	2	7			121	5	2	295
Idle	93	6	785	318	642	291	754	72	12190	498	76	15725
Other		4	274	5	318	19	3		8391	102	39	9155
Subtotal	9566	990	22808	6974	6974	10156	2680	1550	176740	5964	1013	242746
Dry Cropland												
Wheat									3	13		16
Barley									2			2
Beans			3						764			797
Cult. Grasses	30											
Fallow									687			856
Other	152			17								
Subtotal	182		3	17					1471	13		1686

TABLE 2. (Continued)

Classification	Upper Green	Dry Fork	Vernal	Jensen	Green River "A"	Upper Duchesne River	Current Creek	Strawberry River	Lower Duchesne & Lake Fork Uinta	West Green River "B"	East Green River "B"	Total
Other Land Use												
Farmsteads	83	15	726	158	47	191	7	40	1280	84	15	2646
Residential Yards	227		797	9	4	699	3	37	516			2292
Urban			533	12	2	104		20	321			992
Stock Yard of Feed Lot	143	11	237	105	98	81	2	8	533	54	15	1287
Abandoned Farmsteads	14		22	4	20	10		2	55	2	8	137
Subtotal	467	26	2315	288	171	1085	12	107	2705	140	38	7354
Industrial												
Meat Packing			2									2
Other	9	4	240	37	11	34			133	13		481
Subtotal	9	4	242	37	11	34			133	13		483
Open Water Services												
Major Storage			839		896				651			2386
Holding Storage		4	80	33	60	11	7	25	602	60	1	883
Sump Ponds									2			2
Natural Ponds			1	152		8		2	56			219
Other			10		1001	1851		304	986			4656
Subtotal		4	930	1186	2807	523	7	331	2297	60	1	8146
Phreatophytes[a]												
Cottonwood (P)	4	49	479	20	32	1246	1	274	1363			3468
Cottonwood (L)		7	942	56	149	379	9	20	1353	13	33	2961
Cottonwood (M)	128	137	479	204	1567	1069	20	382	5179	157	39	9361
Cottonwood (D)	550	259	541	107	1239	1421	22	473	5672	98	51	10433
Cottonwood (V)				6	1			3	14			24
Salt Cedar (L)			36	18	106			3	72	1		236
Salt Cedar (M)			70	87	1675	8		8	500	11	104	2463

TABLE 2. (Continued)

Classification	Upper Green	Dry Fork	Vernal	Jensen	Green River "A"	Upper Duchesne River	Current Creek	Strawberry River	Lower Duchesne & Lake Fork Uinta	West Green River "B"	East Green River "B"	Total
Salt Cedar(D)			10	251	976				616		17	1870
Salt Cedar(V)				2	465				1094			1561
Willows(L)			147	2	1	95		23	145			413
Willows(M)	133	14	307	419	284	348	2	304	1972	473	135	4391
Willows(D)	106	14	707	103	306	150		297	1845	283	261	4072
Willows(V)			32	46	6		3	27	298	2	2	416
Rushes/Cattail(L)			1			2			1			4
R/C(M)			95	25	271	11		3	192	23		620
R/C(D)	17		77	83	33	24			1628	317		2179
R/C(V)			3	290		4			122		5	424
Greasewood(L)	22		166	385	600	32		35	655	177	320	2392
Greasewood(M)	180		692	1125	2588	181		305	8178	852	1736	15837
Greasewood(D)	7		764	353	602	2		130	2144	734	1386	6122
Greasewood(V)									2		112	114
Sage/Rbbtbrsh(L)	39		319	13	24	169		101	1275	120	50	2110
Sage/Rbbtbrsh(M)	50	97	561	91	918	1472	343	182	11099	1611	25	16449
Sage/Rbbtbrsh(D)		332	359		22	322	58	2	651	24		1770
Streamside Brush(L)			7	12	4	605		7	209			844
Streamside Brush(M)		5	159	8	391	100		36	2072			2771
Streamside Brush(D)		29	410	3	370	340		10	1493	54	21	2730
Streamside Brush(V)				2		2		23	150			177
Grasses(L)	4		7	3	128	629		134	570			1475
Grasses(M)	41		154	36	419	196		172	4481	576		6075
Grasses(D)	4		320	355	1442	71		18	5222	299	19	7750
Grasses(V)				86					164		93	343
Other(L)	332		41	24	40			316	163	383		1299
Other(M)			30	1				101	2023	1128		3283
Other(D)			16		6							22
Subtotal	1617	943	7931	4216	14665	8878	458	3389	62617	7336	4409	116459
Total	11841	1967	34229	12718	22009	20676	3157	5327	245963	13526	5461	376874

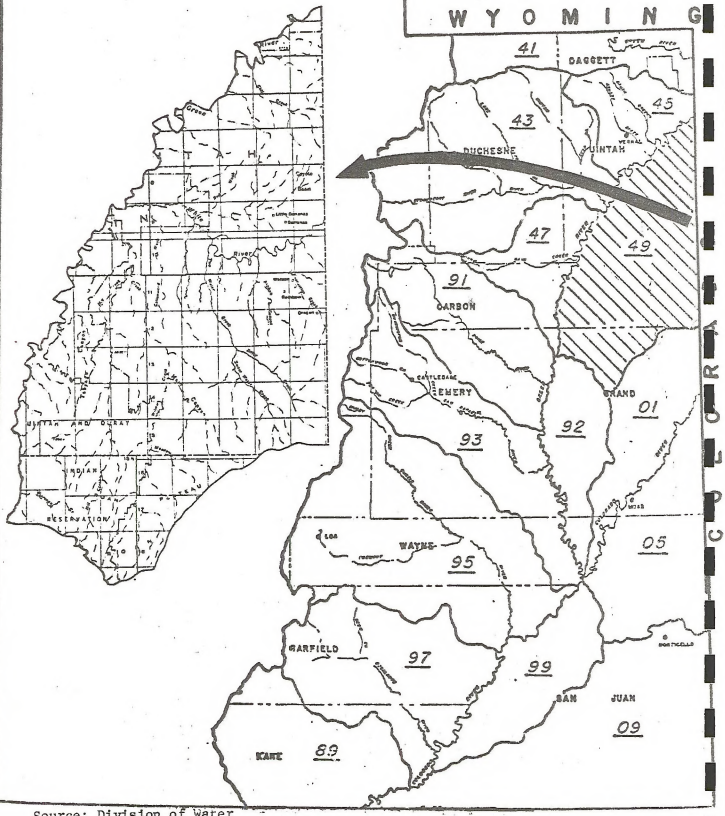
Source: Utah Division of Water Resources, 1971

[a]Phreatophyte density symbols are:V=Very Dense, D=Dense, M=Medium, L=Light, P=Precipitation only.

TABLE 3 INVENTORY OF WATER RIGHTS

AREA 49

SE UINTA BASIN DIVISION



Source: Division of Water Rights-Utah Division of Water Resources, 1974

TABLE 3 (continued) WATER RIGHTS IN COLORADO RIVER DRAINAGE

SE Uinta Basin Division

Area 49

Appl. No.	Claim No.	Applicant	Source	Quantity c.f.s.	Quantity ac.-ft.	Use	Acreage	County	Status
3366 a	6	James C. Nelson	Hill Creek	1.4		I	98.36	Unta.	Cert.
3366 b	7	A. M. Myrup	Hill Creek	1.0		I	81	Unta.	Cert.
3366 d	8	Albert Blank	Hill Creek	1.6		I	100.13	Unta.	Cert.
33071	15	Willis Stevens	Willow Creek	2.0		I	21.6	Unta.	Elec.s
3831	26	A. M. Myrup	Hill Creek	4.5		I	415	Unta.	Cert.
5804	83	Gerret Alger	Hill Creek	1.57		I	96.19	Unta.	Cert.
24849	80	Bureau of Sport Fisheries	Green River	10.0	858.28	I, S	6185.0	Unta.	App.
6420	91	James H. Luster	Willow Creek	1.63		I	113.23	Unta.	Cert.
6672	97	Norman A. Taylor	Hill Creek	1.91		I	133.15	Unta.	Cert.
	100	Orvil A. Dudley	Green River	4.50		I, S	169.0 s	Unta.	Dili.
	101	Orvil A. Dudley	Green River	4.0		I, S	169.0 s	Unta.	Dili.
8109	111	John P. Trujillo	Bitter Creek	1.8		I	127.0	Unta.	Cert.
36979	113	Board of Water Resources	Hill, Willow, White Cks.	350	+250,000	O.S, D		Unta.	Unapp.
8354	115	Ernest Smith	Bitter Creek	1.4		I	98.0	Unta.	Cert.
8760	119	Sprouse Hatch Ranch	Willow Creek	1.01		I	70.6	Unta.	Cert.
8785 a	121	Bown Livestock Co.	Hill Creek	1.43		I	124.4 s	Unta.	Cert.
8845	125	Alton E. Tomlinson	Main Canyon	1.34		I	93.56	Unta.	Cert.
8970	128	Lulu M. King	Rat Hole Canyon	1.66		I	116.0	Unta.	Cert.
8990	129	Willow Creek Ranch	Willow Creek	4.0		I	138.2	Unta.	Cert.
9612	133	Ute Indian Tribe	Willow Creek	7.3		I	508.0	Unta.	Cert.
9792	134	Bown Livestock Co.	Hill Creek	2.82		I	176.0 s	Unta.	Cert.
37111	152	Western Oil Shale Corp.	Green River	16.0		D,OS		Unta.	Unapp.
103716	157	Escalante Ranches	Green River	1.0		I	70	Unta.	Cert.
24668	164	Louis C. Rasmussen	UGW	1.5		I	81.8 s	Unta.	Elec.s
10314	166	Willow Creek Ranch	Willow Creek	1.5		I	20.2	Unta.	Cert.
11538	168	K. Ranch Co.	Trail Creek	3.0		I	20.24	Unta.	Elec.s
11644	169	Andrew Dudley, Jr.	Green River	3.6		I	108	Unta.	Cert.
11725	170	Alton E. Tomlinson	Willow Creek	1.56		I	20.2	Unta.	Cert.
16059	174	Escalante Ranches	Green River	16.58		I	1171.45	Unta.	Cert.

TABLE 3 (continued)

Area 49

Appl. No.	Claim No.	Applicant	Source	Quantity c.f.s.	Quantity ac.-ft.	Use	Acreage	County	Status
18130	175	Escalante Ranches	Green River	4.0		I	150.0	Unta.	Elec.
18131	176	Escalante Ranches	Green River	5.0		I	140.0	Unta.	Elec.
17858	179	Bureau of Sport Fisheries	Green River	2.0	510.16	I	6185.0 s	Unta.	Cert.
17894	180	Douglas Chew	Green River	6.0		I	126.5	Unta.	Cert.
23075	185	James Parks	Green River	1.1		I, D, S	118.0	Unta.	Cert.
24414	190	Bureau of Sport Fisheries	Green River	25.0	4792.68	I, S	6185.0 s	Unta.	App.
24500	192	George A. Chase	UGW	3.0		I, D, S	1920.0	Unta.	Elec.
24688	194	Willis Stevens	Sweet Water Creek	2.0		I	14.31	Unta.	Elec.s
25484	201	Harold Fredrickson	Green River	5.0		I, S	186.25	Unta.	Elec.
25485	202	Howard L. Harmston	Green River	5.0		I	154.54	Unta.	Elec.
25679	203	Ute Indian Tribe	Willow Creek	2.0		I	70.0	Unta.	Elec.
25772	204	Escalante Ranches	Green River	5.0		I	150.0	Unta.	Elec.
26050	205	H. L. Swain	Willow Creek	5.0		I	160.0	Unta.	App.
27344	207	Willis Stevens	Willow Creek	5.0		I	150.0	Unta.	Unapp.
27345	208	Willis Stevens	Willow Creek	5.0		I	33.0	Unta.	Cert.
27994	211	Ute Indian Tribe	Willow Creek	5.0		I	400.0 s	Unta.	Unapp.
27995	212	Ute Indian Tribe	Willow Creek	5.0		I	140.0 s	Unta.	Unapp.
28187	213	Harry Tomlinson	Willow Creek	4.0		I	60.0 s	Unta.	Unapp.
28210	214	Russell H. McClelland	Willow Creek	4.0		I	60.0 s	Unta.	Unapp.
28599	215	Russell H. McClelland	Willow Creek	3.0		I	80.0 s	Unta.	Unapp.
28600	216	Russell H. McClelland	Willow Creek	2.0		I	40.0 s	Unta.	Unapp.
27838	218	Viola Y. Harmston	Green River	5.0		I	136.77	Unta.	Elec.
29105	219	Sohio Petroleum Co.	Green River	5.0		M		Unta.	App.
29909	222	American Gilsonite Co.	UGW	5.0		I, M	20.0	Unta.	App.
31368	225	Utah Shale Land & Minerals	Green River	30.0		O.S., M		Unta.	App.
31746	227	Ute Indian Tribe	Florence Creek	3.0		I, S	80.0	Grand	Elec.
31850	228	Chevron Oil Co.	UGW	1.0		Oil		Unta.	App.
31851	229	Chevron Oil Co.	UGW	1.0		Oil		Unta.	App.
31852	230	Chevron Oil Co.	UGW	1.0		Oil		Unta.	App.
31853	231	Chevron Oil Co.	UGW	1.0		Oil		Unta.	App.
34102	236	Jimmie Martin	Green River	5.0		I, S, D	108.0	Unta.	Elec.

TABLE 3 (continued)

Area 49

Appl. No.	Claim No.	Applicant	Source	Quantity c.f.s.	Quantity ac.-ft.	Use	Acreage	County	Status
34618	243	David R. Rasmussen	Green River	7.0		I, S, D	320.0	Unta.	Unapp.
34950	245	Margaret Franche	Green River	4.0		I, S	171.2	Unta.	App.
35885	248	Nile Holmer	Green River	2.0		I, S	27.4	Unta.	Elec.s
35937	249	Wiley E. Stewart	UGW	2.0		I, S, D	33.0	Unta.	Unapp.
36125	251	Gulf Oil Co.	UGW	1.3		Oil		Unta.	Elec.s
36526	254	Lewis F. Adams	Green River	10.0		I, D, S	321.86	Unta.	App.
36622	255	Howard L. Harmston	UGW	1.0		I, D, S	40.0	Unta.	App.
36702	257	Husky Oil Co.	Green River	33.0		Oil		Unta.	Unapp.
36730	258	Sohio Petroleum Co., et al	White River	15.0		M, O.S.		Unta.	App.
37139	260	Frederick H. Larsen	White River	30.0	21,700	O.S., D		Unta.	Unapp.
37249	263	Louis C. Rasmussen	Green River	3.0		I, S	80.0	Unta.	App.
37270	264	Atlantic Ref. Co.	White River	25	13,000	O.S.,SG		Unta.	Unapp.
37271	265	Atlantic Ref. Co.	Better Creek	15	6,000	O.S.,SG		Unta.	Unapp.
37943	276	Oil Shale Corp.	White River	50		I,D,O.S	160.0	Unta.	Unapp.
34950 a	278	Margaret Franke	Green River	1.0		I	42.6	Unta.	Elec.
40723	288	George K. Powell	Green River	1.0		I, S	30	Unta.	App.
41560	292	Sohio Petroleum Co.	White River	50.0		O.S.		Unta.	Unapp.
43161	293	Oil Shale Corp.	White River	25.0	18,250	I,D,O.S.	19,916.7	Unta.	Unapp.
43210	294	James Ivers, Jr.	White River	10.0		O.S.		Unta.	Unapp.
18716	1676	Bureau of Sport Fisheries	Green River	3.56	453	I	6,185.0 s	Unta.	Elec.s
18773	2070	John Powell	Green River	4 75		I	150.8	Unta.	Cert.
24668	2083	Louis C. Rasmussen	Green River	3.5		I	81.8 s	Unta.	Elec.s
31790	2153	Chevron Oil Co.	Green River	3.0		Oil		Unta.	App.

TABLE 3 (continued)

DECREED RIGHTS

S. E. UINTA BASIN DIVISION

AREA 49

PARTY	SOURCE	QUANTITY		USE	ACREAGE	DECREE
		c.f.s.	ac.ft.			
Bown Livestock Co.	Hill Creek	1.14		I,D,S	80.0	Garrison v. Taylor, et al
A.M. Myrup	Hill Creek	1.14		I,S	80.0	Garrison v. Taylor, et al
J.C. Nelson	Hill Creek	1.40		I	98.36	Garrison v. Taylor, et al

APPENDIX C - The OBERS Projection

1. Methodology: OBERS

The OBERS projections are developed in two phases. In the first, projections of national economic activity by industry are made. In the second, the national totals were distributed regionally, based on projected trends in the regional distribution of economic activities (U.S. Department of Commerce, 1974:9).

> The decision to derive regional projections through the disaggregation of national totals instead of through the independent projection of each component in each region is based on a well established principle that the larger the area economically, the more adequate and reliable are the available statistical measures. Allocation of national totals to regions, using the record of each regions' past contribution to those national totals as the basis for disaggregation, adheres to this principle.

The following list of variables were all projected at the national level through the year 2020: Population; working age population; total labor force; civilian labor force; civilian employment; private civilian employment; hours worked per year per man; private GNP per man per hour; constant dollar private gross output; government gross product; and gross national product. In addition, the following variables were derived from the GNP calculations: personal income and earnings; earnings in each industrial sector; and a set of detailed agricultural projections. All monetary variables are measured in constant 1967 dollars.

The population projections were based on series E of the set of projections developed by the U.S. Bureau of the Census. This series

reflects the secular reduction in the birth rate, and is consistent with the consensus in demographic opinions currently held. Series E projects an approximate 44 percent increase in population between 1971 and the year 2020. It assumes a gradual movement toward a total fertility rate (the sum of age specific fertility rates) of 2,100 per 1,000,000 women by the year 2005. This is approximately the level needed to attain zero population growth. However, because of the age structure of the population, a near-zero growth would not be reached until the middle of the 21st century.

In addition to this population growth assumption, the national projections also assume the following: the unemployment rate will average 4 percent for the nation--this does not imply that there will not be significant regional differentials in that variable; the projections are assumed to be free of the immediate and direct effects of wars; and technological progress and capital accumulation will support growth and private output per man hour of 2.9 percent annually.

The regional projections (i.e., those developed for the multi-county regions) were made using a combination of export base theory and shift-share techniques. First, industries were dichotomized into export and non-export sectors. The export sectors are defined as those for which a significant part of total output is sold to individuals or firms whose source of payment arises from regions outside the one under study. The export industries tend to be concentrated on the agricultural, mining, and manufacturing sectors.

After giving consideration to input-output and linear programming models for projecting export industry employment at the regional level,

the developers of the OBERS projections adopted a shift-share projection methodology. Essentially, this technique disaggregates regional employment change into two components:

A) A proportional growth element that assigns to that regional industry growth in proportion to industry growth at the national level; and

B) A differential growth component which accounts for the difference between actual and proportional growth.

Mathematically the model can be written as follows:

$$(1) \quad E_{ij} = (E^{t}_{io} / E^{x}_{io})E^{x}_{ij} + C^{x-t}_{ij}$$

where E represents employment, the subscripts i, j refer to the ith industry and the jth region, the subscript o refers to a summation over the subscript it has replaced, and the superscripts t and x refer to the terminal and base time periods of the historic period, respectively. The first term on the right hand side of Equation (1) is the proportional shift and the second term is the competitive shift for the difference between the hypothetical level or level predicted by the proportional shift between regional level actually attained in the industry over the same time period. Given a projection of total national employment in industry i for some future year t*, the regional projection for that industry is given by

$$(2) \quad E^{t*}_{ij} = (E^{t*}_{io} / E^{t}_{io})E^{t}_{ij} + C^{t*-t}_{ij}$$

The projected value of the competitive shift is given by

$$(3)\quad C_{ij}^{t^*-t} = E_{io}^{t^*}\left(\Delta\left(E_{ij}^{t} / E_{io}^{t}\right)\right)$$

which is a trend extension of a region's historic percent of the national total of employment in a given industry.

Projections of employment in the non-basic sectors are made using an export base multiplier concept. Although the actual technique used to make the OBERS projection somewhat more complicated, it is based on the following model. Total employment is identically equal to the sum of basic employment ($E_{i,B}$) plus nonbasic employment ($E_{i,NB}$)

$$(4)\quad E_{io} \equiv E_{i,B}^{B} + E_{i,NB}$$

Nonbasic employment is a linear function of basic employment

$$(5)\quad E_{i,NB} = a + b\, E_{i,B}$$

so that if basic employment is estimated for any future time period t*, nonbasic employment can be determined directly from Equation (5).

The regional projections are also based on the following assumptions:

A) Most factors that have influenced historical shifts in regional export industry location will continue in the future with varying degrees of intensity;

B) The trends toward economic area self-sufficiency in local service industries will continue;

C) Workers will migrate to areas of economic opportunity and away from slow growth or declining areas;

D) Regional earnings per worker and income per capita will continue to converge toward the national average;

E) Regional employment/population ratios will tend to move toward the national ratio.

For the Uintah Basin, the projections were based on an implicit assumption of no significant change in the region's industrial structure. In particular, it was assumed that not only would there be no major oil shale development, there would be no conventional development of oil and gas resources. Thus, the projections are in a sense obsolete, but they are useful in depicting a "no energy" growth path for the economy.

2. Study Area Projections: OBERS

Unfortunately, the OBERS system does not project activity on a county basis. The smallest regional units are water resources subareas which typically consist of three to six counties. The two Utah counties under study here are included in a four-county region together with Emery and Carbon Counties (identified as Water Resources Subarea 1403--Lower Green). Rio Blanco, the other county in the study area, is included with Moffat and Routt Counties in Colorado in area 1402--Yampa-White. The complete set of OBERS projections for these two regions are shown in Tables 1 and 2.
individual counties in the study area were made by assuming that the percentage shares of regional population and employment would remain constant through the projections period. It was assumed that growth in county personal income, total earnings, and per capita income would grow at the projected regional rate. The resultant projections for

TABLE 1

Water Resources Subarea 1403 Lower Green

1972-E OBERS Projections

—Population, Employment, Personal Income, and Earnings by Industry, Historical and Projected, Selected Years, 1950–2020

	1950	1962*	1969	1970	1971	1980	1985	1990	2000	2020
Population, midyear	30,153	45,800	40,700	41,215	42,600	40,200	40,400	40,700	39,900	39,000
Per capita income (1967 $)	1,298	1,992	2,270	2,389	2,492	3,300	3,900	4,500	6,100	10,300
Per capita income relative (U.S.=1.00)	.63	.74	.66	.69	.68	.71	.72	.73	.75	.80
Total employment	15,375	.682		13,369		15,000	15,200	15,400	15,800	15,600
Employment/population ratio				.32		.37	.38	.38	.40	.40
					In Thousands of 1967 Dollars					
Total personal income	65,120	85,592	92,381	98,451	102,306	135,900	158,000	183,600	245,500	412,600
Total earnings	53,672	70,332	71,056	77,263		102,100	118,200	136,900	182,300	306,000
Agriculture, forestry and fisheries	12,121a	6,383a	4,867a	5,286	5,052	4,800	5,200	5,700	6,400	8,200
Agriculture						4,800	5,200	5,600	6,300	8,100
Forestry and fisheries						(S)	(S)	(S)	(S)	(S)
Mining	16,979a	22,710a	18,897	21,050	22,587	26,900	29,300	32,000	37,800	51,600
Metal						(S)	(S)	(S)	(S)	(S)
Coal						14,700	15,400	16,200	18,500	24,500
Crude petroleum and natural gas						8,900	10,100	11,600	14,100	19,700
Nonmetallic, except fuels						3,200	3,600	4,000	5,000	7,300
Contract construction	785b	2,185b	4,775a	3,460b	2,484b	3,900	4,800	6,000	9,000	18,000
Manufacturing	1,183	1,900	1,912	2,133a	2,288a	2,400	2,800	3,200	4,200	6,800
Food and kindred products						(S)	(S)	(S)	(S)	(S)
Textile mill products										
Apparel and other fabric products						(S)	(S)	(S)	(S)	(S)
Lumber products and furniture						800	900	1,000	1,300	2,100
Paper and allied products										
Printing and publishing						(S)	(S)	(S)	(S)	(S)
Chemicals and allied products						(S)	(S)	(S)	(S)	(S)
Petroleum refining										
Primary metals						(S)	(S)	(S)	(S)	(S)
Fabricated metals and ordnance						(S)	(S)	(S)	(S)	(S)
Machinery, excluding electrical										
Electrical machinery and supplies						(S)	(S)	(S)	(S)	(S)
Motor vehicles and equipment										
Transportation equip., excl. mtr. vehs.										
Other manufacturing						(S)	(S)	(S)	(S)	(S)
Trans., comm. and public utilities	3,653	5,668	5,509	5,660	6,173	8,600	10,000	11,800	16,300	29,300
Wholesale and retail trade	8,399	11,046	10,536	10,731	11,396	18,600	21,500	25,000	33,700	56,400
Finance, insurance and real estate	798	1,345	1,382	1,354a	1,538	2,100	2,600	3,100	4,400	7,600
Services	3,377	6,219	7,165	7,548	8,225	11,900	14,200	16,900	23,500	41,800
Government	5,723	11,370	15,057	16,681	16,424	22,400	27,100	32,800	46,700	86,100
Federal government	1,768	3,100	4,611	4,846	4,646	5,000	5,700	6,500	8,200	12,900
State and local government	3,639	7,809	9,928	10,706	11,212	16,800	20,700	25,500	37,500	71,600
Armed forces	316	461	516	529	566	(S)	(S)	(S)	(S)	(S)

*Employment is for 1960.
a—represents 80.0 to 99.9 percent of the true value
b—represents 60.0 to 79.9 percent of the true value
c—represents 40.0 to 59.9 percent of the true value
d—represents 20.0 to 39.9 percent of the true value
e—represents zero to 19.9 percent of the true value

TABLE 2

Water Resources Subarea 1402 Yampa-White

1972-E OBERS Projections

—Population, Employment, Personal Income, and Earnings by Industry, Historical and Projected, Selected Years, 1950-2020

	1950	1962*	1969	1970	1971	1980	1985	1990	2000	2020
Population, midyear	19,604	18,330	17,847	18,103	18,600	17,000	16,800	16,600	16,300	16,000
Per capita income (1967 $)	1,712	2,544	3,216	3,380	3,530	4,700	5,300	6,000	8,000	13,200
Per capita income relative (U.S.=1.00)	.83	.98	.94	.97	1.00	.99	.99	.99	.99	1.00
Total employment	7,221	6,699		7,110		7,300	7,200	7,100	7,200	7,000
Employment/population ratio				.39		.43	.43	.43	.44	.44
					In Thousands of 1967 Dollars					
Total personal income	33,570	46,634	57,392	61,193	65,667	81,200	90,600	101,100	131,052	211,600
Total earnings	25,405	37,186	45,904	48,688	52,470	64,600	71,600	79,500	102,300	163,200
Agriculture, forestry and fisheries	8,297a	9,347a	13,269a	14,825a	15,448a	17,800	18,200	18,600	21,900	29,600
Agriculture						17,800	18,200	18,600	21,900	29,600
Forestry and fisheries						(S)	(S)	(S)	(S)	(S)
Mining	2,604	6,171	5,489	5,917	5,977	6,300	6,300	6,300	6,500	7,200
Metal						(S)	(S)	(S)	(S)	(S)
Coal						2,200	2,200	2,300	2,300	2,400
Crude petroleum and natural gas						4,000	4,000	4,000	4,100	4,800
Nonmetallic, except fuels						(S)	(S)	(S)	(S)	(S)
Contract construction	1,533	1,531	3,040	2,624	3,375	3,400	3,700	4,100	5,000	7,100
Manufacturing	512a	664b	806a	836a	861d	3,300	3,700	4,200	5,300	8,000
Food and kindred products						(S)	(S)	(S)	(S)	(S)
Textile mill products										
Apparel and other fabric products										
Lumber products and furniture						(S)	(S)	(S)	(S)	(S)
Paper and allied products										
Printing and publishing						(S)	(S)	(S)	(S)	(S)
Chemicals and allied products						(S)	(S)	(S)	(S)	(S)
Petroleum refining										
Primary metals										
Fabricated metals and ordnance						(S)	(S)	(S)	(S)	(S)
Machinery, excluding electrical										
Electrical machinery and supplies										
Motor vehicles and equipment						1,800	2,100	2,400	3,000	4,500
Transportation equip., excl. mtr. vehs.						(S)	(S)	(S)	(S)	(S)
Other manufacturing										
Trans., comm. and public utilities	1,835	2,422	2,833	3,133	2,998	4,600	5,600	6,700	9,500	17,300
Wholesale and retail trade	5,126	6,170	6,858	7,515	6,300	7,900	9,000	10,200	13,200	20,900
Finance, insurance and real estate	350	589	671b	646b	679c	1,600	1,900	2,300	3,100	5,400
Services	2,326	4,221	5,104	4,889	5,719	7,900	9,300	10,900	15,100	27,200
Government	2,724	5,752	7,435	7,725	8,301	11,300	13,400	15,800	22,200	40,100
Federal government	636	1,184	1,751	1,750	1,917	2,400	2,800	3,300	4,500	8,300
State and local government	1,969	4,357	5,466	5,746	6,146	8,600	10,300	12,200	17,400	31,400
Armed forces	120	211	220	230	240	(S)	(S)	(S)	(S)	(S)

*Employment is for 1960.
a—represents 80.0 to 99.9 percent of the true value
b—represents 60.0 to 79.9 percent of the true value
c—represents 40.0 to 59.9 percent of the true value
d—represents 20.0 to 39.9 percent of the true value
e—represents zero to 19.9 percent of the true value

each of the three counties and for the combined three-county area are shown in Tables 3-6.

Population in both Uintah and Duchesne Counties is projected to decline but only insignificantly. Employment, however, is projected to increase significantly by about 20 percent in both counties, implying a significant increase in the ratio of employment to population. In Rio Blanco County population is expected to decline by more than eight percent by the year 2020, with total employment remaining essentially constant. Again the employment/population ratio would increase. Because of a combination of employment growth and productivity advance, both personal income and total earnings in constant 1967 dollars will more than double by the year 2000 in all three counties. Indeed, per capita income, one measure of average welfare levels, will increase by about 2 1/2 times during the 30-year interval 1970-2000.

In summary, the OBERS projections show a slight decline in population in the three-county area with most of that decline accounted for in Rio Blanco County. Total employment, however, is projected to increase significantly in each of the 10-year projections periods, with all of the employment increase being experienced in the two Utah counties. Average welfare levels are also projected to increase with per capita income reaching levels of about $6,000 in the region by the year 2000. Although this indicator will still be significantly below the national average, the relative measure (i.e., the ratio of regional per capita to that for the nation) will have increased significantly in all three counties.

TABLE 3 POPULATION, INCOME, EMPLOYMENT, AND EARNINGS, 1962, 1970 AND PROJECTIONS FOR 1980, 1990, AND 2000 BASED ON OBERS PROJECTIONS, DUCHESNE COUNTY

	1970	1980	1990	2000
Population	7,299	7,195	7,285	7,142
Per Capita Income (1967$)	2,046	2,823	3,840	5,222
Per Capita Income Relative (US=1.00)	0.59	0.61	0.62	0.64
Total Employment	2,413	2,700	2,750	2,850
Employment/Population Ratio	0.33	0.38	0.38	0.40
	in thousands of 1967 dollars			
Total Personal Income	16,343	22,600	30,500	40,800
Total Earnings	11,928	16,200	21,800	29,000

Source: Derived from data provided in U.S. Department of Commerce, 1974.

TABLE 4

POPULATION, INCOME, EMPLOYMENT, AND EARNINGS, 1962, 1970 AND PROJECTIONS FOR 1980, 1990, AND 2000 BASED ON OBERS PROJECTIONS, UINTAH COUNTY

	1970	1980	1990	2000
Population	12,684	12,500	12,700	12,400
Per Capita Income (1967$)	2,390	3,300	4,500	6,100
Per Capita Income Relative (US = 1.00)	0.69	0.71	0.73	0.75
Total Employment	4,074	4,6[illegible]0	4,750	4,900
Employment/Population Ratio	0.32	0.37	0.37	0.40
	in thousands of 1967 dollars			
Total Personal Income	29,043	40,100	54,200	72,400
Total Earnings	22,730	30,900	41,500	55,200

Source: Derived from data provided in U.S. Department of Commerce, 1974.

TABLE 5

POPULATION, INCOME, EMPLOYMENT, AND EARNINGS, 1962, 1970 AND PROJECTIONS FOR 1980, 1990, AND 2000 BASED ON OBERS PROJECTIONS, RIO BLANCO COUNTY

	1970	1980	1990	2000
Population	4,842	4,600	4,500	4,450
Per Capita Income (1967$)	3,380	4,700	6,000	8,000
Per Capita Income Relative (US = 1.00)	0.97	0.99	0.99	0.99
Total Employment	1,980	2,000	1,950	1,975
Employment Population Ratio	0.41	0.43	0.43	0.44
	in thousands of 1967 dollars			
Total Personal Income	20,500	27,200	33,900	44,000
Total Earnings	17,040	22,600	27,800	35,800

Source: Derived from data provided in U.S. Department of Commerce, 1974.

TABLE 6 POPULATION, INCOME, EMPLOYMENT, AND EARNINGS, 1962, 1970 AND PROJECTIONS FOR 1980, 1990, AND 2000 BASED ON OBERS PROJECTIONS, THREE COUNTY STUDY AREA

	1970	1980	1990	2000
Population	24,825	24,295	24,485	23,392
Per Capita Income (1967$)	2,488	3,442	4,609	6,225
Per Capita Income Relative (US = 1.00)	0.71	0.73	0.76	0.77
Total Employment	8,467	9,350	9,450	9,725
Employment/Population Ratio	0.34	0.38	0.39	0.42
	in thousands of 1967 dollars			
Total Personal Income	65,886	89,900	118,600	157,200
Total Earnings	51,698	69,700	91,100	120,000

Source: Derived from data provided in U.S. Department of Commerce, 1974.