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VERNAL UNIT
CENTRAL UTAH PROJECT

DEFINITE PLAN REPORT

APPENDIX D
AGRICULTURAL ECONOMY
FINANCIAL ANALYSIS

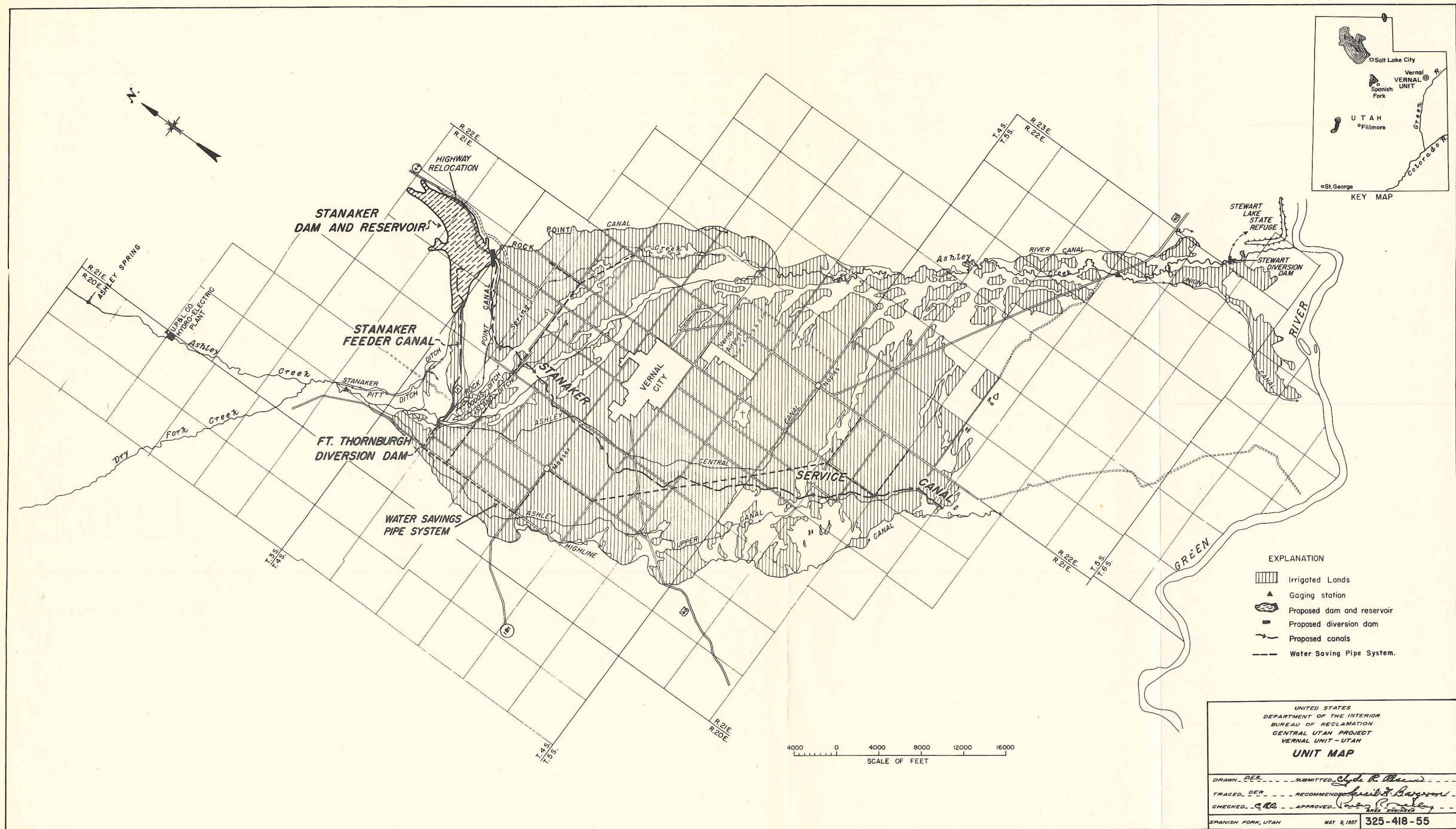
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May 1957

Salt Lake City, Utah

Region 4



Appendixes to the Vernal Unit Definite Plan Report have been issued in four volumes with the data grouped as shown below.

APPENDIX A
PROJECT LANDS
LAND DRAINAGE

APPENDIX B
WATER SUPPLY

APPENDIX C
DESIGNS AND ESTIMATES

APPENDIX D
AGRICULTURAL ECONOMY
FINANCIAL ANALYSIS

SUMMARY SHEETS

Vernal Unit--Central Utah Project

LOCATION: Northeast Utah in Ashley Valley of the Uinta Basin, approximately centered by Vernal, Utah.

AUTHORIZED: Initial phase of the Central Utah project, including the Vernal unit, authorized as a participating project with the Colorado River Storage project by the Act of April 11 1956 (70 Stat. 105).

PLAN

Through storage regulation and water exchanges, the Vernal unit will provide supplemental irrigation water for 14,781 acres of land and 1,500 acre-feet of water annually to supplement the municipal supplies of Vernal, Naples, and Maeser. The unit will also provide benefits to fish and wildlife and recreation. Excess flows of Ashley Creek will be diverted at the Ft. Thornburgh Diversion Dam into the Stanaker Feeder Canal and conveyed to the Stanaker Reservoir. Water stored in the reservoir will be released into the Stanaker Service Canal and delivered to existing irrigation canals and ditches. The water will in part replace Ashley Creek water, including releases from upstream reservoirs. Some of the replaced water will be used on lands above the Stanaker Service Canal and some will be diverted from Ashley Spring on Ashley Creek into the municipal pipeline. Land drains will be provided as needed and some sections of existing canals will be lined to prevent seepage. A pipe system will be constructed for stock-watering purposes during the nonirrigation season to save for unit storage and use water now lost through open canals. Recreational and fishing attractions will be provided at Stanaker Reservoir. Small tracts of land distributed among the unit area will be acquired and developed for upland game, and a pump and pipeline will be installed to deliver water from Green River to the Stewart Lake State Refuge. Repayment of reimbursable construction costs will be completed in 50 years, following a 3-year development period. Irrigation costs that are beyond the repayment ability of the irrigators will be paid from the Upper Colorado River Basin Fund.

SUMMARY SHEETS (Continued)

CONSTRUCTION COSTS

1/\$6,874,000

Stanaker Dam and Reservoir	\$3,870,000
Ft. Thornburgh Diversion Dam	200,000
Stanaker Service Canal	1,060,000
Stanaker Feeder Canal	570,000
Water Savings pipe system	340,000
Stanaker Canal laterals	40,000
Vernal area drainage system	675,000
Recreation	92,000
Fish and wildlife	27,000

1/ Estimated at January 1957 prices.

BENEFITS, ALLOCATIONS, AND REPAYMENT

Unit purpose	Benefits (annual)	Allocations (tentative)	
		Construction costs	Annual O.M. & R. costs
Irrigation	\$253,500	1/\$6,154,000	\$12,700
Municipal water	23,800	2/619,000	1,800
Recreation	14,200	3/92,000	7,100
Fish and wildlife	13,600	3/27,000	1,200
Total	305,100	2/6,892,000	22,800

1/ \$1,500,000 will be repaid by Vernal unit irrigators through the Upper Colorado River Basin Fund and the remaining \$4,654,000 will be paid from other revenues in the basin fund apportioned to Utah.

2/ Includes \$18,000 in interest during construction.

3/ Nonreimbursable

Average annual water costs per acre-foot

	Construction repayment	O.M. & R. costs
Irrigation water	\$1.65	\$0.70
Municipal water	1/	1.20

1/ Municipal water payment will increase from \$12.00 per acre-foot during first 10 years to \$22.13 during last 10 years of 50-year repayment period.

BENEFIT-COST RATIO

1.44 to 1

REPAYMENT ORGANIZATION

The Uintah Water Conservancy District has been organized in accordance with Utah State law and will contract with the United States for the repayment of irrigation and municipal water costs.

SUMMARY SHEETS (Continued)

IRRIGATION

<u>Irrigable area furnished supplemental water</u>		<u>Acres</u>
Class 1		3,286
Class 2		5,357
Class 3		5,801
Unclassified (town site)		337
Total		14,781
Elevation of farm lands (avg. feet msl)		5,300
Frost-free period (avg. days annually)		119
Effective precipitation (avg. inches annually)		3
Diversion requirement (avg. ac.-ft. annually)		51,700
Increase in water supply (avg. ac.-ft. annually)		18,000
Increased depletion of Colorado River from unit operation (avg. ac.-ft. annually)		11,800

UNIT WORKS

Stanaker Dam

Located on offstream Stanaker Draw, 3.5 miles north of Vernal.
 Type rolled earth-fill
 Height above ground 140 ft.
 Height above foundation 145 ft.
 Volume of embankment 1,820,000 cu. yds.
 Spillway capacity (emergency only)
 Outlet capacity (at res. elev. 5,472) 300 sec.-ft.

Stanaker Reservoir

Elevation at normal water
 surface (37,560 ac.-ft.) 5,516.2 ft.
 Active storage capacity 33,200 ac.-ft.
 Inactive storage capacity 4,360 ac.-ft.
 Total storage capacity 37,560 ac.-ft.
 Reservoir surcharge capacity above
 normal water surface elevation 2,170 ac.-ft.

Stanaker Feeder Canal

Length 3.1 miles
 Capacity 400 sec.-ft.

Stanaker Service Canal

Length 11.8 miles
 Capacity at head 300 sec.-ft.

Water Savings Pipe System

Length 17.3 miles
 Capacity at head 289 gal. per min.

SUMMARY SHEETS (Continued)

HYDROLOGY

Ashley Creek at "Sign of the Maine" gage

Drainage area.	241 sq. mi.
Period of record	1940-56
Average runoff, 1940-56	92,800 ac.-ft.
Maximum annual runoff.	142,300 ac.-ft.
Minimum annual runoff.	52,400 ac.-ft.
Maximum daily discharge of record.	2,650 sec.-ft.
Minimum daily discharge of record.	14 sec.-ft.

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AGRICULTURAL ECONOMY APPENDIX

Prepared by LeGrand B. Ward and Elwood H. Clark,
Agricultural Economists, under direction of
Parley R. Neeley, Area Engineer

Technical supervision and review by Paul T. Sant,
Chief, Economics Resources Branch, Regional Project Division
under direction of
Reid Jerman, Regional Project Development Engineer

AGRICULTURAL ECONOMY

CHAPTER I

GENERAL DISCUSSIONS

Introduction

The economic analysis of the Vernal unit has been accomplished in accordance with the manual procedure and directives in regard to a definite plan report. The determination of payment capacity and amortization capacity was accomplished through the farm budget method of analysis. The farm budgets have assumed average managerial ability on the part of the farmers with normal land use, average crop yields, average turn-off rates for livestock feeding rates, fertilization, etc.

Farms with better than average incomes have not been appraised and no attempt has been made to present the most efficient farm organization or farm practices. Data and analyses in addition to those presented here would be needed to establish an educational program relative to improved farm practices.

Primary data used in the farm budgets were obtained from a farm management survey conducted in the Vernal area by the Bureau of Reclamation and the U. S. Department of Agriculture in 1956. There were 58 farm schedules completed on the farms in this area. As many samples as possible were taken within the area where there was an adequate water supply to ascertain the conditions which would exist over the entire area when project storage water is available. Supplemental data were obtained in this survey regarding cultural practices on the various crops produced which was useful in arriving at the man hours and tractor hours required to produce the crops. Local price data, both for prices received and paid, were secured from the various marketing organizations and farm implement establishments within the project area.

Information obtained for the authorizing legislation has been used in this analysis as well as secondary data from various agricultural and economic studies made by the Utah State Agricultural College in the Uintah Basin and published in 1939 and 1943. Considerable use has been made of an economic study conducted in the Vernal area by the Utah State Agricultural College in 1955 of the costs and returns of the different farm enterprises under varying levels of production. Bureau of Reclamation personnel have met with Department of Agriculture and Utah State Agricultural College representatives at various times and agreed on certain basic assumptions as to crop yields, livestock turn-off rates, labor requirements, etc. In this manner these agencies have provided valuable information and trained judgment which has assisted materially in the analysis of the agricultural aspects of this report.

Type of Development

There are 14,781 irrigable acres of classes 1, 2, and 3 lands suitable for irrigation in the unit area as given in Table 1. This is a reduction of over 10,000 acres from the net irrigable area shown in the authorizing report which has been the result of changing the unit boundaries and also using more rigid land classification specifications.

Table 1
Summary of irrigable area
Vernal Unit
(Unit: acres)

Area	Class 1	Class 2	Class 3	Total 1/ Irrigable
Above Stanaker Service Canal	2,272	2,198	932	55,402
Below Stanaker Service Canal	1,074	3,187	4,547	908
River Bottom Area Ditches	17	86	272	375
Subtotal	3,363	5,471	5,851	14,685
Less Service Canal & Drainage R.O.W.	77	114	50	241
Total	3,286	5,357	5,801	14,444

1/ In addition to this total are 337 acres in the Vernal Townsite to receive unit water which results in an overall total of 14,781 acres.

The construction of the Stanaker Dam on the Stanaker Draw will result in an average annual yield of an additional 18,000 acre-feet of usable irrigation water measured at the dam being applied to the above acres during the critical summer months.

The unit area to be served lies at an elevation of approximately 5,300 feet, adjacent to Ashley Creek and surrounding the town of Vernal in eastern Utah. The climate is temperate with a frost-free period of 119 days, extending from May 29 to September 25 and an average rainfall of between 8 and 9 inches, of which about 5 inches occurs during the growing season.

Settlement of the valley began in the 1870's when the settlers diverted water from Ashley Creek to the adjacent land. There are now six canal companies which divide the natural flows of this stream. Like other mountain streams which derive their flows primarily from winter snows there is a high run-off in the springtime resulting in an adequate water supply for the irrigated land; however, by summer there is a severe shortage. It is not contemplated that any new land will be served unit water but to give the presently irrigated lands the much needed water in the summer and early fall months.

It is not anticipated that this increase in usable irrigation water will alter the basic economy of the area. The climate, topography and distance from markets has pretty much relegated the Vernal area to the

production of livestock and livestock products. By providing additional late season water, unit development would permit increased production of feeds and forage crops thus permitting an expansion of the dairy and livestock industries. The surrounding public and private range lands are stocked to capacity. Without unit development the agriculture of this area has little chance for any further development.

In analyzing the payment capacity of the unit land and the agricultural benefits it was determined that since no new land would be irrigated the total irrigable acres per farm either with or without the unit would virtually be the same. The expansion would come about largely through increased yields of crops over those now realized, thus permitting increased numbers of livestock to be raised on the same number of acres of land.

General Economic and Social Conditions

The Uintah Basin has been an area of limited opportunity, of depressed incomes and a relatively low standard of living. The great majority of the young people have been forced to migrate outside the area to find a livelihood.

The economic as well as the social well-being of the people of any area is largely determined by the amount of their available resources in relation to the population. The distribution and also the use of the resources among the population are also conditioning factors. In an agricultural area the economic and social well-being is reflected in a large measure in the construction and condition of the farm dwellings and other buildings, in the farm and home conveniences, and in the kind of roads and other public services. As measured by these standards the general economic and social conditions of the people of the Uintah Basin are unfavorable, certainly below the average for the State. Many of the dwellings are small and cheaply constructed, some are built of unplanned logs. The other farm buildings are equally poor by comparison. For culinary purposes many farms use water from irrigation ditches or haul it for considerable distances.

In 1952 a study of the farm operator family level-of-living for counties of the United States was made by the U. S. Department of Agriculture. This study shows comparisons by means of index numbers, the base of 100 is an average of all counties in the U.S. for 1945.

Table 2
Farm operator level of living index
(Average of all counties in U.S. (1945=100))

Area	1930 Index	1940 Index	1945 Index	1950 Index
State of Utah	87	90	106	133
Uintah County	60	71	92	Not tabulated
Weber County	119	130	150	163

The preceding tabulation indicates the relative depressed position of Uinta County as compared to the State average as well as with one of the more well-to-do counties in the State.

This fact is further substantiated by the following table.

Table 3
Percentage of farms in selected areas having
certain farm facilities

Area	Telephone	Water piped in	Electric lighting
State of Utah	74%	90%	95%
Uintah County	57%	66%	92%
Weber County	85%	95%	98%

Source: Census of Agriculture, 1954.

Economic studies of agriculture made by the Utah State Agricultural College have emphasized the fact that farms in the Uinta Basin have relatively low farm incomes. In the publication "The Future of Utah's Agriculture" there was only one area in Utah which had a lower net cash farm income than the two counties of Uintah and Duchesne. Another factor borne out by college studies is that there has been more farm labor available than could be utilized efficiently on the farms or in the basin area.

There are natural resources in the Uinta Basin, such as oil, phosphate and asphalt deposits, which remain to be developed. Electric power from dams now under construction, on the Upper Colorado River, and increased water supply for both irrigation and culinary purposes, as planned in the construction of this unit of the Central Utah Project, will aid materially in the development of these natural resources. This will increase the incomes, make more efficient use of labor and generally improve the standard of living of all the people in this area. It should also be stated that this general improvement will include the Ute Indians who constitute a considerable segment of the population of the Uinta Basin.

Land Use and Crop Yields

The crops which may be grown in the unit area are fixed to a large extent by the climate, water supply, and distance to markets. The production of feed for livestock predominates in the irrigated area. For all practical purposes it may be said there are no cash crops in the unit area. In some parts of the country alfalfa seed is grown as a cash crop. However, it is not significant to the Ashley Valley.

It should be stated that although there are no cash crops grown here at the present time, the area does have the potential for producing such crops as potatoes, canning corn, canning peas, and pinto beans. These cash crops may be grown in the future with an assured late-season water supply. This means an additional safety factor for the farmer so far as repayment and benefits are concerned because no cash crops have been considered in the farm budgets.

The present land use was determined primarily from the farm management survey. The crops grown and the percentage of land on 20 farms sampled not having an adequate water supply are as follows.

Table 4	
Present land use	
Crops	Percent of land in the crop
Alfalfa hay	48
Other hay	3
Pasture	17
Wheat	7
Barley	8
Oats	10
Corn silage	7
Total	100

With a full supply of water it was the opinion of the County Agriculture Committee that a better utilization of the land would be accomplished with a reduction in the alfalfa acreage and an increase in the amount of pasture. With higher hay yields as a result of more water this could easily be accomplished and would permit more animals to be raised per farm.

In the farm budgets the land use was not altered appreciably in the "with" project conditions from the "without" or present conditions for reasons already stated in this report. However, there were increases in the yields for most of the crops. Table 5 presents the yields for the two conditions on class 2S land. This land class (class 2S) has been used as an example because it typifies the average condition. It represents a mid-position between the extremes of class 1 and class 3.

Table 5
Crop yields per acre on class 2S land

Crop	Unit	With project	Without project
Alfalfa	Ton	3.8	2.9
Pasture	AUM	7	4
Wheat	Bu.	35	30
Barley	Bu.	50	40
Oats	Bu.	55	50
Corn silage	Ton	14	14

It will be observed that the yield of corn silage has not been increased from the "without" to the "with" condition. The reason for this is that the farmers now take water from the alfalfa and grain crops to mature their corn crop. Thus an increase in the water supply may increase the number of acres of corn produced; however, it is not felt it would alter the yield per acre.

Table 6
Crop yields by land class with adequate water supply

Crop	Unit	Class 1	Class 2	Class 3
Alfalfa	Ton	4.2	3.8	3.0
Pasture	AUM	8	7	5
Wheat	Bu.	40	35	30
Barley	Bu.	55	50	40
Oats	Bu.	60	55	50
Corn silage	Ton	17	14	10

From the farm management survey, from consultation and agreement with Department of Agriculture representatives and State Agricultural College personnel, the crop yields in Table 6 were arrived at and are the yields used in the farm budgets in the "with" condition.

Crop surpluses

Public Law 485, which is the authorizing legislation for the Colorado River Storage project and participating projects, stipulates that for a period of ten years from the enactment of this act no water is to be delivered to newly irrigated lands for the production of any basic agricultural commodity which is in surplus.

Because there are no new lands to be irrigated in the Vernal unit this stipulation will be complied with completely. It should also be added that the only crop produced in the unit which could be termed surplus would be wheat and the Vernal area is now a deficit area for all small grains. With additional water and an increase in the per acre yield of grains, it will only tend to reduce the amount which is presently being shipped in.

Size of Farm

Table 7 indicates there is a rather wide dispersion in size of farms in the area. However, most of the smaller farms are owned by part-time farmers who derive only a portion of their income from the farm. In the repayment analysis we have considered only a full-time family-sized farm. The census data as well as the farm management survey shows there is very little tendency for most farms to fall within a relatively narrow range which can be considered as a "typical" sized farm. Furthermore, most of the farms have several land classes within the same ownership boundary.

The results of the farm management survey showed that without regard to land class the average number of irrigated acres per farm was approximately 105 with a total per farm of nearly 160. The 55 acres, or the difference between these two figures, is land primarily classed as dry grazing land usually of a poor quality in this area. There was a tendency for farms of the poorer land classes to contain more acres. This, of course, is necessary to maintain a near comparable standard of living.

An attempt has been made in the farm budgets to reflect a full-time farm requiring a maximum of around 450-500 man work days of 10 hours each. Comparable income and payment capacity per farm within the various land classes has been obtained by enlarging the acreage on the poorer land classes. These units have been set up within certain limitations and assumptions felt to be representative of an economic unit or optimum sized farm for this land class. For a class 1 dairy-sheep farm, a unit of 100 acres has been used, for class 2 a 120-acre farm has been set up, and for class 3 the acreage was set at 160. Farms containing land placed in a land class (repayment) 2 or 3 because of correctable deficiencies would, when improved, require the same acreage as class 1 land.

Table 7
Size of farms, Uintah County

Size of farms (acres)	Number of farms	Percent of farms
Under 3	12	1.4
3 - 9	60	6.9
10 - 29	108	12.4
30 - 49	96	11.1
50 - 69	49	5.7
70 - 99	93	10.7
100 - 139	78	9.0
140 - 179	79	9.1
180 - 219	45	5.2
220 - 259	29	3.3
260 - 499	102	11.8
500 - 999	44	5.1
1,000 acres and over	72	8.3
Total	867	100.0

Source: 1954 Census of Agriculture

Excess lands

Excess land holdings as defined by reclamation law is not a problem in the Vernal unit. A study of the ownership plats within the unit area indicated there were 32 land holders with more than 160 acres and only 8 with more than 320 acres. This, however, is land of all classes, including dry grazing land. An examination of the assessor's records indicated there were only 3 with an irrigated crop-land acreage greater than 160 acres and none with more than 320. The irrigable acreage in farms would be even less since farmers are presently irrigating some class 6 land not included in the project.

Range in size	No. of property ownerships
5 to 50 acres	264
51 to 100 acres	105
101 to 160 acres	54
161 to 320 acres	24
320 acres	8
Total	455

Source: Land ownership plats - Uintah County

Note: Omitted from the above tabulation are 1,600 acres included in the town of Maeser and adjacent to town of Vernal which are divided into city lots and small holdings.

Numbers and Kinds of Livestock

Livestock and livestock products comprise nearly all of the agricultural income of the Vernal area. Because of the distance to markets, livestock and livestock products provide the economical means of disposing of the crops.

The important kinds of livestock are dairy cattle, sheep, and beef cattle. In the recent farm management survey it was found that approximately 85 percent of the farms sampled kept dairy cows. However, on 28 percent of the farms there were only 1 or 2 cows which were maintained for family use. Nearly 40 percent of the farms sold milk on a grade "C" or manufacturing milk basis in which case the price received for butterfat is considerably less than a grade "A" or market milk enterprise. Approximately 65 percent of the farms had a farm flock of sheep varying in size from a few head to over 200. About 45 percent of the farms kept cattle with the average herd size around 50 - 75 head of breeding cows. About 26 percent of the farms sampled possessed public grazing privileges and these were usually on both national forest land and land administered by the Bureau of Land Management. There are only three or four large commercial flocks of chickens in the entire unit area; however, a

majority of the farmers maintain a flock of 50 hens or less for family use. Hogs are unimportant in the area as a major source of income. Only about 25 percent of the farmers reported hogs on their farms and in those cases there were usually just 1 or 2 brood sows.

Significant Farm Types

The census of agriculture for Uintah County indicates that other than miscellaneous farms which are comprised primarily of part-time farms, livestock and dairy farms are the important type of farming. See Table 8. This is further substantiated by the Farm Management Survey which showed that dairy, sheep, and beef farms were the significant types. Approximately 70 percent of the farms were a combination of dairy and sheep, beef and sheep, or dairy, beef, and sheep. Of the dairy farms there were twice as many producing grade "C" or manufacturing milk as there were producing grade "A" or market milk. It is felt that there is even a larger percentage than this producing grade "C" milk over grade "A" because the sampling was such that to find blocks of the various land types resulted in selecting areas where a preponderance of grade "A" farms happened to be located. Of the farms sampled 63 percent kept a farm flock of sheep varying in size from around 10 to 200 head. In this respect the Vernal area is unique as compared to others in the State. Farm flocks of sheep do not have the relative importance elsewhere. The cooperative wool marketing association at Vernal which serves the small producer, the ram sales, the livestock shows are all indicative of the interest in sheep.

In classifying the full-time farms in the unit area as to type by major source of income with the county agent, the following percentages were arrived at.

Farm flock sheep	29 percent
Range sheep	9 "
Grade C dairy	22 "
Grade A dairy	12 "
Beef	28 "
Total	100 percent

The survey indicated nearly all the beef farms sampled had grazing privileges on public grazing lands adjacent to the unit area. However, these lands are stocked to capacity and reductions in the total animal unit months of grazing have been requested from time to time in the past. It appears the only opportunity to expand in the livestock industry in the area must come from increased forage and grain production on the irrigated lands.

From interviews with farmers and agricultural leaders in the county it was determined the most significant increase in the livestock industry

Table 8
Types of farms, Uintah County

Type of farm	Number of farms	Percent of total
Field crop farms	1	0.1
Vegetable farms	-	-
Fruit farms	-	-
Dairy farms	135	14.7
Poultry farms	20	2.2
Livestock farms	278	30.3
General farms <u>1/</u>	101	11.0
Miscellaneous farms <u>2/</u>	382	41.7
Total	917	100.0

Source: Census of Agriculture - 1955.

1/ Classified as any farm on which no one source of income exceeded 50 percent of the value of all farm products sold.

2/ Includes part-time, residential, and abnormal farms. It also includes miscellaneous commercial farms if 50 percent or more of the value was from sale of horticultural products, horses, fur animals, forest products, or bees and honey.

as a result of additional irrigation water would be in the farm flock sheep and dairy enterprises. In the farm budgets a grade "C" dairy and sheep farm, a grade "A" dairy farm, and a beef farm have been considered as typical of the area. The following weights for these farm types have been used to represent the unit area:

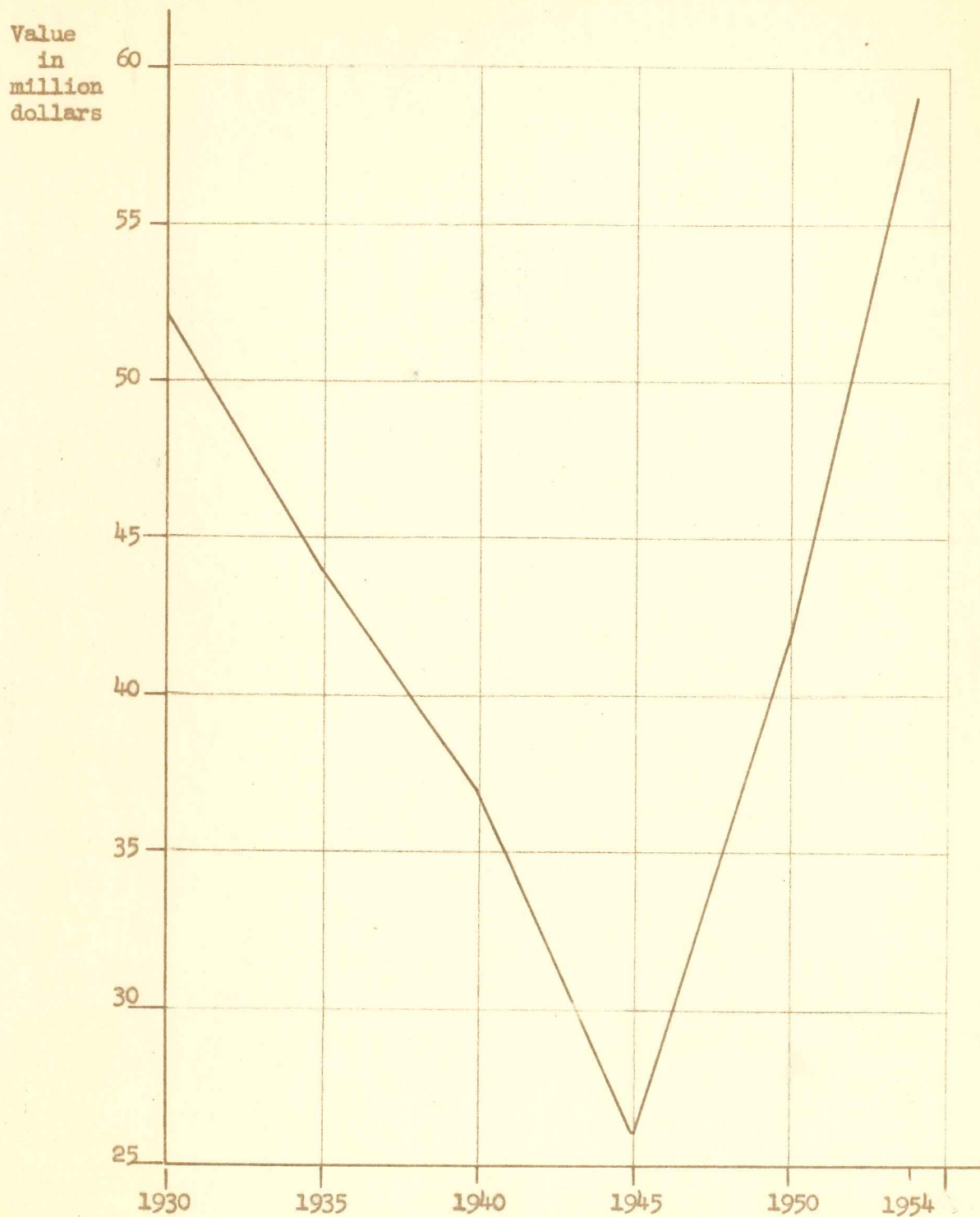
Farm flock sheep and grade "C" dairy	- 50 percent
Grade "A" dairy	- 25 percent
Beef	- 25 percent

Farm Mortgage Indebtedness

The National Farm Loan Association reported there were 40 loans made by that agency in the unit area with \$103,700 outstanding as of January 1957, all in good standing. The Farmers Home Administration reported 6 loans with \$45,800 outstanding as of the same date. Further effort was not made to ascertain the loans made by private individuals, commercial banks, insurance companies, etc., because of the impracticability of obtaining such information. In lieu of a full coverage the above data were correlated with information for the State of Utah to arrive at an estimated total farm mortgage indebtedness of \$800,000 for the Vernal unit area.

Farm mortgage debt is a constantly changing picture with new debts being incurred and old mortgages being retired. However, the Agricultural statistics show there have been definite trends. Figure 1 indicates that the farm mortgage debt for the State of Utah decreased from 1930 to 1945 and since that date has been increasing steadily. It is believed that the Vernal area will follow a similar trend.

Figure 1
FARM MORTGAGE LOANS OUTSTANDING IN UTAH BY YEARS



Source: Ag. Statistics 1951, page 621, table 708
and Ag. Statistics 1954, page 505, table 695.

AGRICULTURAL ECONOMY

CHAPTER II

BASIC INPUT-OUTPUT DATA

Land Values and Development Costs

Land values

The normal agricultural value of a price of property may vary considerably from the actual sale price of the same property. Location of the land, degree of development, water supply, drainage, fertility all have an effect on sale price. Location is probably the most important factor because lands conveniently located for residential development will sell for many times their value for agricultural purposes.

From the farm management survey in 1956 the sale price of class 1 and 2 land was reported to be from \$200 to \$300 per acre, including the farm buildings and improvements.

The assessed values of the various classes of land in the county are presented in Table 9. Most of the unit area would be classified under the Maeser, Ashley and Glines area. It will be noted that the value actually used for assessment purposes is only about 20 percent of the sales price.

Table 9
Assessed values of land, Uintah County

Type of land	Unit	Ashley Glines Maeser	Naples Jensen La Point	Ballard Davis Tridell	Bandlett Ouray
Irrigated land					
Class A	acre	\$50.00	\$40.00	\$32.00	\$26.00
B	acre	40.00	32.00	26.00	20.80
C	acre	30.00	24.00	19.20	15.60
D	acre	20.00	16.00	12.80	10.40
E	acre	13.20	10.80	8.80	6.80
Dry improved land					
Class A	acre	4.80	4.80	4.80	4.80
B	acre	3.20	3.20	3.20	3.20
Dry unimproved land					
Class A	acre	4.00	4.00	4.00	4.00
B	acre	2.40	2.40	2.40	2.40
C	acre	1.20	1.20	1.20	1.20
Pasture					
Class A	acre	24.00	24.00	24.00	24.00
B	acre	18.00	18.00	18.00	18.00
C	acre	10.00	10.00	10.00	10.00
Grazing					
Class A	acre	3.00	3.00	3.00	3.00
B	acre	2.00	2.00	2.00	2.00
C	acre	1.00	1.00	1.00	1.00

Source: Uintah County Assessor's Records.

In this analysis the market value of land has not been considered, but rather the investment cost. In this way the economic value of water is not capitalized into land values as it is in sales price and here we are attempting to answer the problem of the value of water. Table 10 illustrates the difference in investment costs as compared to sales price and what the two costs are comprised of.

Table 10
Land investment costs and market value
of land per acre

Item	Class 2S land	
	With project	Without project
Raw land value	\$20.00	\$20.00
Acre development cost	40.00	35.00
Investment cost	60.00	55.00
Economic value of water ^{a/}	180.00	105.00
Total with water	240.00	160.00
Inventory value of bldgs. & impl. ^{b/}	50.00	45.00
Market value	290.00	205.00
Value of livestock ^{c/}	45.00	35.00
Total	\$335.00	\$240.00

a/ Payment capacity of class 2 land with adequate water supply = \$9.00 per acre capitalized at 5% interest in perpetuity = \$180.00.
And $\$180 \div 3.7 \times 2.2 = \105 .

b/ Value of farm buildings in class 2 Grade C dairy and sheep budget = $\$5,996 \div 120 \text{ acres} = \50.00 . And $\$5,383 \div 120 = \45.00 .

c/ Inventory value of livestock in class 2 budget = $\$5,400 \div 120 = \45.00 . And $\$4,260 \div 120 = \35.00 .

Land development costs

Land development costs are the estimated costs necessary to properly distribute the water on the land. These development operations are usually performed by the operator or under his direction and consist of one or more of the following: land clearing, land leveling, establishing farm ditches and structures, costs of farm drainage, and increased costs incident with the gradient of the land.

The costs incident to bringing the present land (present class) to its potential productiveness (potential class) have been appraised in the field and these costs, when deducted from the potential class, leave a residual which represents the repayment capabilities (repayment class) of this land after necessary development costs have been met. These development factors as appraised in the Vernal land classification and as applied in the economic analysis of this report, show that within any one area lands of different classes vary in ability to pay for water and that within a repayment class this ability is generally the same for all parcels of land in the class even though there may be differences in investment costs, operating costs, or gross income. Although the final product

of land classification is economic in nature, both physical and economic standards are required and have been set up for the guidance of field personnel in examining the land and mapping the various land classes of the project. Standards and procedures used in arriving at repayment land classes used in this report are discussed in detail in the land classification section. Basic land development costs used in farm budget analysis of this report are shown in table 11.

Table 11
Land development costs per acre

Land class	Raw land value	Land Development costs		Investment with project		
		Min.	Max.	Min.	Max.	Avg.
1	25	25	50	50	75	65
2s	20	25	50	45	70	60
2	-	-	-	-	115	-
3s	15	25	50	40	65	55
3	-	-	-	-	170	-

In the "without" situation the land development costs have been considered to be \$5.00 per acre less than the "with" situation. It is assumed this much additional will be spent for turn-outs, some land planning, ditching, etc. with the additional water to be supplied.

Prices Received and Paid by Farmers

In this analysis a departure has been made in the price level from the 215 index for both prices received and paid by farmers with resulting parity ratio of 100. It was felt a more realistic index would be one which was less than 100 since such a favorable ratio has only been reached during short periods in the past and then it was usually under the stress of war conditions. The price and cost projections used in this study are tied to an all-product index of 235 for prices received by farmers (1910-14=100) and an index of 250 for prices and rates paid by farmers. This results in a parity ratio of 94.

The price level proposed by the Department of the Interior to the Department of Agriculture in the form of a letter from the Commissioner of the Bureau of Reclamation to Mr. D. A. Williams, Administrator, Soil Conservation Service, dated September 6, 1956, is essentially the same as used in this report.

In this letter a 247/265 price relationship was recommended. Table 12 indicates that such a level or a level of 250/265 would not alter appreciably the results obtained in the 235/250 analysis.

The projections used represent the level of prices that may be expected to prevail over an extended period of years under assumptions of

Table 12
Comparison of 235/250 and 247/265 Price Levels
Vernal Unit

Farm Budget Items	Indices	Indices	Percent Change	Class 2 Land				Class 2 Land				Class 2 Land			
	Used In	Recommended		Grade A Dairy Farm				Grade C Dairy & Sheep Farm				Beef Farm			
	Basic	In 9/6/56		With		Without		With		Without		With		Without	
	Computation	Letter		235/250	247/265	235/250	247/265	235/250	247/265	235/250	247/265	235/250	247/265	235/250	247/265
Receipts:															
Crop Sales	207	217	105	\$ 588	\$ 617	\$ 357	\$ 375	\$ 1534	\$ 1611	\$ 655	\$ 688	\$ 1017	\$ 1067	\$ 834	\$ 876
Livestock Sales	290	304	105	12322	12938	1001	1051	7955	8353	1793	1883	8032	8434	6621	6952
Livestock Product Sales	260	273	105			8648	9080			4491	4715	310	326	310	326
Value of Farm Privileges															
Food	260	273	105	295	310	295	310	265	278	265	278	257	270	257	270
Rental	250	265	106	428	454	428	454	428	454	428	454	428	454	428	454
Total Receipts				13633	14319	10729	11252	10182	10696	7632	8018	10044	10551	8450	8878
Farm Investment:															
Land	250	265	106	6000	6360	5500	5830	7200	7632	6600	6996	7200	7632	6600	6996
Bldgs. & Improvements	330	350	106	6931	7347	6682	7083	5996	6356	5383	5706	4258	4513	4088	4333
Machinery & Equipment	290	310	107	9424	10084	9348	10002	8886	9508	8886	9508	9465	10128	9465	10128
Livestock	290	300	103	6530	6726	5090	5243	5400	5562	4260	4388	17595	18123	14505	14940
Feed & Supplies	210	220	105	1038	1090	881	925	988	1037	857	900	1349	1416	1170	1228
Dwelling	330	350	106	5000	5300	5000	5300	5000	5300	5000	5300	5000	5300	5000	5300
Total Farm Investment				34923	36907	32501	34383	33470	35395	30986	32798	44867	47112	40828	42925
Farm Expenses:															
Taxes	250	265	106	429	455	404	428	445	472	418	444	506	536	474	502
Feed	210	220	105	120	126	70	74	31	33	31	33	185	194	207	217
Livestock Expense	235	250	106	437	463	348	369	512	543	401	425	696	738	580	615
Motor Supplies	150	160	107	493	528	449	480	535	572	472	505	602	644	562	601
Farm Machinery	290	310	107												
Repairs															
Bldgs. & Fences	410	430	105	239	251	234	246	219	230	209	219	186	195	183	192
Machinery & Equipment	390	410	105	308	323	307	322	297	312	297	312	304	319	304	319
Depreciation															
Buildings	330	350	106	116	123	112	119	115	122	103	109	105	111	101	107
Machinery & Equipment	290	310	107	517	553	515	551	497	532	497	532	517	553	517	553
Contract Labor	290	310	107	394	422	377	403	435	465	344	368	405	433	342	366
Hired Labor	490	510	104	2249	2339	1325	1378	972	1010	414	431	184	191	51	53
Farm Supplies	235	250	106	81	86	62	66	93	99	71	75	116	123	106	112
Seed	210	220	105	108	113	108	113	130	136	122	128	131	138	123	129
Range Fees	290	300	103									126	130	126	130
Items used in Production	235	248	106	193	205	186	197	178	189	172	182	137	145	137	145
Fertilizer	135	145	107	77	82	77	82	88	94	80	86	106	113	117	125
Miscellaneous	250	265	106	115	123	91	96	91	96	73	77	86	91	79	84
Total Farm Expenses				5876	6192	4665	4924	4638	4905	3704	3926	4392	4654	4009	4250
Net Farm Income				7757	8127	6064	6328	5544	5791	3928	4092	5652	5897	4441	4628
Interest on Investment				1746	1845	1625	1719	1674	1770	1549	1640	2243	2356	2041	2146
Living Allowance	240	256	107	3800	4066	3200	3424	3200	3424	2187	2340	2800	2996	2208	2363
Payment Capacity				2211	2216	1239	1185	670	597	192	112	609	545	192	119
Less Payment Capacity under Without Conditions				1239	1185			192	112			192	119		
Increased Payment Capacity				972	1031			478	485			417	426		
Increased Payment Capacity/acre				9.72	10.31			3.98	4.04			3.48	3.55		

relatively high employment, peaceful conditions, continued population and economic growth and a stable general price level. The projections imply some improvement over the present (1956) cost-price relationship which has been in the neighborhood of 83. However, present prices reflect the existence of rather large surpluses of some commodities which it is not felt will always be present over the repayment period for the unit. Furthermore, an improvement reflects the possibility for some easing in industrial prices which could come from an enlarged industrial capacity and increasing competition. The projections also take account of the recent changes that have occurred in supply and requirement expectation of particular crops.

The indexes of prices received and paid by farmers are as follows:

<u>Commodity</u>	<u>Index (1910-14=100)</u>
<u>Prices received</u>	
All products	235
All crops	207
Food grains	181
Feed grains	207
All fruits	183
Commercial vegetables	177
All livestock and products	260
Meat animals	290
Dairy products	253
Poultry and eggs	204
<u>Prices paid</u>	
All commodities	250
Prices used in production	235
Feed	210
Livestock	290
Motor supplies	150
Motor vehicles	340
Farm machinery	290
Buildings and fences	330
Farm supplies	235
Fertilizer	135
Seed	210
Wage rates	490
Wholesale lumber	350
Living index (estimated)	240

Prices received

The prices received by farmers are based largely on a projection of the 1955-56 prices. The base prices used were either local or State of Utah, adjusted when necessary to reflect local conditions. In the case of livestock the prices are those quoted on the Ogden livestock market for

Table 12
Prices received by farmers

Item	Unit	Prices received 235 price level	Source of data
<u>Crops</u>			
Alfalfa - Baled hay	Ton	\$21.00	State Price Data - U.S.D.A.
Pasture <u>1/</u>	A.U.M.	4.50	Feeding equivalent of alfalfa hay
Barley	Bu.	1.06	State Price Data - U.S.D.A.
Oats	Bu.	.86	" " " "
Wheat	Bu.	1.50	" " " "
Corn silage	Ton	7.24	Feeding equivalent of alfalfa hay
<u>Dairy cows</u>			
Butterfat Grade C	Lb.	.83	Arden Sunfreeze Creameries-Vernal
Butterfat Grade A	Lb.	1.32	" " " "
Cull dairy cows <u>2/</u>	Cwt.	12.85	Union Stock Yards, Ogden, Utah
Dairy Heifers <u>3/</u>	Cwt.	17.98	" " " "
Calves, vealers <u>4/</u>	Cwt.	18.62	" " " "
<u>Beef Cattle</u>			
Cull cows <u>3/</u>	Cwt.	15.07	Union Stock Yards, Ogden, Utah
Steers <u>5/</u>	Cwt.	20.69	" " " "
Heifers <u>5/</u>	Cwt.	17.18	" " " "
<u>Sheep</u>			
Cull ewes	Cwt.	5.87	Union Stock Yards, Ogden, Utah
Feeder lambs <u>6/</u>	Cwt.	17.96	" " " "
Fat lambs <u>6/</u>	Cwt.	19.87	" " " "
Wool	Lb.	.48	State Price Data - U.S.D.A.
<u>Chickens</u>			
Eggs	Doz.	.46	State Price Data - U.S.D.A.
Poultry	Lb.	.22	" " " "
<u>1/</u> Estimated on the basis of the value of hay less harvesting costs.			
<u>2/</u> Utility grade.			
<u>3/</u> Commercial grade.			
<u>4/</u> Commercial and good grade			
<u>5/</u> Medium and good grade stocker and feeder cattle.			
<u>6/</u> Good and choice grade.			

the various grades. The long-term price projections on the 235 level for the various commodities sold by farmers in the project area are presented in Table 12.

Prices paid

The prices paid by farmers and used in this analysis are derived from local and secondary sources and adjusted to the 250 anticipated price level. For this reason prices paid by farmers for items used in production are shown and discussed with each topic of farm expense.

Farm Wage Rates

Wages for hired labor by month, day and hour

The wage rates for hired labor are based on the average wage rate for the intermountain area 1946-50, projected to the 250 price level. These rates were verified to be comparable to those in the Vernal area by the Utah State Department of Employment Security and also from the farm management survey.

Table 13
Farm wage rates for Utah

Item	1946	1947	1948	1949	1950	1946-50	Projected 250 price level
<u>Per month</u>							
With board and room	123	135	144	134	139	135	158
Without board and room	150	158	174	-	-	-	194
With hours				154	163		180
<u>Per day</u>							
With board	5.10	5.60	5.80				6.60
Without board	6.00	6.40	6.90	6.60	6.70	6.52	7.60
<u>Per hour</u>							
Without board and room (8 hour day)							.95

Source: Agricultural statistics USDA.

Rates for custom work

Rates for custom work commonly performed in the unit area are shown in Table 15. With custom work the farmer hires someone else who furnishes the labor, power, machinery and supervision.

Table 15
Rates for custom work

Item	Unit	Cost per unit
		projected price 250 level
Flowing stubble ground	acre	3.60
Plowing alfalfa	acre	5.30
Raking hay	hour	2.70
Baling hay	ton	3.60
Baling straw	ton	4.50
Plant small grains	acre	1.10
Plant corn	acre	1.10
Combining grain	acre	5.30
Chopping corn silage	acre	10.70
Truck hire for hauling silage	hour	3.60 ^{1/}
Spraying alfalfa (weevil)	acre	1.80 ^{1/}
Rolling small grains	cwt.	.18
Hauling livestock (Ogden stockyards)	cwt.	.65

^{1/} Includes cost of spray material. When spray material is furnished by the farmer the cost is \$1.00 per acre.

Farm labor available

The amount of hired labor required on a family-sized farm depends to a great extent upon the size of the operator's family and also the ages of the children. The size of the family also determines the amount and value of the family living obtained from the farm. The typical farm family within the unit area consists of approximately four persons--the operator, his wife, and two children. This is concluded from information obtained from the agricultural census 1945 as shown in the following table.

Table 16
Persons per farm dwelling, Uintah County

Distribution	Number persons	Persons per dwelling	
		Number	Percent
Total	4,291	4.22	100.0
Under 14 years	1,768	1.74	41.2
Boys	931	.91	21.7
Girls	837	.82	19.5
Age 14 and over	2,523	2.48	58.8
Men and boys	1,270	1.25	29.6
Women and girls	1,253	1.23	29.2

Source: U. S. Census of Agriculture, 1945.

Available family labor

A MAN WORK UNIT (M.W.U.) as used in this report, is the average amount of farm work accomplished by one man in ten hours at the usual farm tasks under ordinary conditions. Labor performed by the farm wife or by the

children is also measured in terms of Man Work Units. For purposes of prorating the labor throughout the year, it is assumed the operator can and will work a maximum of 290 days during the year, with a maximum of 26 days for any one month.

The amount of labor that can be performed by the family is 80 days per year. During the summer months when the children are out of school the maximum family labor would be 10 days a month and during the school months, the maximum family labor would be 5 days a month.

Labor Requirements

Estimates of labor requirements for crops and livestock, which were used for farm budgeting analysis, are presented in this section. The method of presentation is intended to show the influence that various factors have on these requirements. Some of the factors referred to above are: Land class, yield, number of livestock and size of equipment. Managerial ability, size of field, degree of mechanization, and cultural practices are considered only as they affect the average.

The estimated labor requirements used in this study are, for the most part, based on secondary data. An unpublished study, made recently in the Vernal area by Utah State Agricultural College was used extensively along with material prepared by the Bureau of Agricultural Economics, and Problem No. 2 from the Columbia River Basin Joint Investigations. Information from experiment stations around the country was also considered. The advice of staff members at Utah State Agricultural College, agricultural leaders, and farmers in the Vernal area was used as a guide in arriving at the final conclusions.

All man labor is based on a tractor farm with mechanized equipment.

Crop labor requirements

Original data obtained from the survey was used to determine the size of equipment, the cultural practices, and the number of times over for each operation. The time necessary to perform the various operations was taken from secondary sources already cited in this section. An estimate of man and tractor hours per acre of crop harvested is contained in Table 17.

Livestock labor requirements

Labor requirements for livestock were taken primarily from secondary sources. Requirements were varied per livestock unit for all types of livestock according to size of flock or herd. In the case of dairy cows labor requirements are varied according to butterfat production as well as herd size. Because of the wide variation found in studies pertaining

Table 17
Monthly Distribution of Labor for Crops and Livestock

Item	Land Class	Yield	Hours per Head or Acre		Percent Seasonal Distribution of Man Work Hours											
			Man	Tractor	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Alfalfa	1	4.2	18.8	10.2				4.0	9.0	28.8	6.5	26.8	22.9			
Alfalfa	2	3.8	18.7	8.9				3.8	9.5	26.6	6.9	26.6	26.6			
Alfalfa	3	3.0	18.3	7.5				3.4	8.8	24.8	7.2	31.0	24.8			
Small Grains	1	40-60	10.7	5.7			11.2	23.0	13.6	13.6	13.6	12.5	12.5			
Small Grains	2	35-55	11.4	5.6			10.4	21.3	13.3	20.2	13.3	11.0	10.5			
Small Grains	3	30-50	12.2	5.5			9.6	19.7	13.0	19.6	19.6	9.0	9.5			
Corn Silage	1	17	21.6	13.7				10.8	19.3	16.7	8.6	8.6	36.0			
Corn Silage	2	14	22.2	12.9				11.2	23.3	16.2	8.5	8.5	32.3			
Corn Silage	3	10	22.5	12.4				10.0	22.0	16.0	16.0	8.0	28.0			
Rotation Pasture	1	8	7.9	1.7			3.6	14.6	12.2	12.2	17.7	27.5	12.2			
Rotation Pasture	2	7	9.5	1.7			3.0	12.2	11.1	11.1	26.7	24.8	11.1			
Rotation Pasture	3	5	11.3	1.7			2.5	10.2	10.2	20.3	24.2	22.5	10.1			
Garden	All		20.4	.3			2.5	2.5	19.5	19.5	24.3	24.3	7.4			
Livestock:	Number															
Dairy Cows Gr. "C"	16	300 lb.	108.0		10.0	10.0	10.0	10.0	8.0	7.0	6.0	7.0	7.0	7.0	8.0	10.0
Dairy Cows Gr. "C"	20	300 lb.	105.0		10.0	10.0	10.0	10.0	8.0	7.0	6.0	7.0	7.0	7.0	8.0	10.0
Dairy Cows Gr. "C"	24	300 lb.	100.0		10.0	10.0	10.0	10.0	8.0	7.0	6.0	7.0	7.0	7.0	8.0	10.0
Dairy Cows Gr. "A"	25	300 lb.	110.0		10.0	10.0	10.0	10.0	8.0	7.0	6.0	7.0	7.0	7.0	8.0	10.0
Dairy Cows Gr. "A"	32	300 lb.	100.0		10.0	10.0	10.0	10.0	8.0	7.0	6.0	7.0	7.0	7.0	8.0	10.0
Sheep	25-49		4.5		13.0	12.0	15.0	13.0	6.0	3.0	2.0	4.0	4.0	7.0	9.0	12.0
Sheep	50-74		3.5		13.0	12.0	15.0	13.0	6.0	3.0	2.0	4.0	4.0	7.0	9.0	12.0
Sheep	75-100		3.0		13.0	12.0	15.0	13.0	6.0	3.0	2.0	4.0	4.0	7.0	9.0	12.0
Beef Cows	60-69		16.0		14.0	14.0	14.0	12.0	5.0	5.0	2.0	2.0	3.0	4.0	10.0	15.0
Beef Cows	70-79		15.0		14.0	14.0	14.0	12.0	5.0	5.0	2.0	2.0	3.0	4.0	10.0	15.0
Beef Cows	80-89		14.0		14.0	14.0	14.0	12.0	5.0	5.0	2.0	2.0	3.0	4.0	10.0	15.0
Chickens	Less than 50	10 doz.	3.3		9.0	8.0	9.0	9.0	9.0	8.0	8.0	8.0	7.0	8.0	8.0	9.0
Misc. Labor	Unit															
Hauling Manure	Ton		.4	.4	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	25.0	10.0
Fence Repair	100 Rd.		4.0	1.0					50.0					25.0	25.0	
Machinery Repair	0-3300	per \$100	2.3		10.0	12.0	13.0	8.0	7.0	6.0	6.0	6.0	6.0	6.0	10.0	10.0
"	3600-7000	per \$100	1.5		10.0	12.0	13.0	8.0	7.0	6.0	6.0	6.0	6.0	6.0	10.0	10.0

Table 18
Farm Calendar
Vernal Unit

Month	Beef Cattle	Farm Flock Sheep	Crops & Misc.
January			Building & Machinery repair
February	Calving		Building & Machinery Repair
March	Calving	Shed Lambing	Plowing - Fence repair
April	Calving, castrate, brand, dehorn, vaccinate	Shear ewes, dock and castrate lambs	Spray alfalfa, prepare seed bed. Plant small grains.
May	Turn on public grazing lands	Market wool	Irrigate alfalfa and small grains. Plant corn - fence repair.
June	Salt cattle on range. Transfer cattle from Taylor Grazing to Forest Service lands	Treat for parasites	Cultivate corn, irrigate corn, harvest 1st crop hay, irrigate grain.
July			Irrigate alfalfa, irrigate corn.
August	Salt cattle on range		Harvest 2nd crop alfalfa; Harvest small grains.
September			Irrigate alfalfa; Harvest 3rd crop hay; harvest silage.
October	Remove cattle from Forest Service lands. Market long yearlings, wean calves.	Market feeder lambs Turn runs with ewes	Manure hauling Fence repair - plow
November	Dehorn, brand & vaccinate summer calves		Fence repair - manure hauling
December			

Note: Dairy Cattle are not included because their care is primarily a daily routine.

to the labor involved in milk production it was necessary to use informed judgment in setting up dairy requirements. All information was adapted to the facilities assumed in the farm budget for the care of the milking herd. For example: the farm budget shows investments for an 8-stanchion milk room with a loafing shed and a two-unit milking machine. Labor requirements based on a three or one unit milking machine should not be applied to the situation just described unless adjustments are made. Labor requirements for various types of livestock are shown in Table 17. All figures include replacements.

Miscellaneous labor requirement

Considerable amounts of labor are expended in normal farm operations for indirect or miscellaneous labor items such as hauling manure, repairing machinery and repairing fences. It is estimated that .4 of a man hour will be required per ton to haul manure. Fence repair is estimated at 4 man hours per 100 rods. Machinery repair per \$100 original investment varies with the amount of money invested. As the investment increases, the time spent per \$100 decreases.

Machinery repair

Investment	Man hours per \$100 investment
Up to 3,500	2.3
3,600 - 7,000	1.5
7,100 -10,500	1.1
Over 10,600	.6

Tractor hours

The tractor time involved in performing the various farm tasks is based on a wheel tractor with sufficient power to draw a two bottom plow. Factors that have been considered in determining tractor hours are: yield, number of operations, and size of equipment.

Livestock Production Rates, Death Losses and Replacement Rates

Information regarding livestock production rates was obtained from the farm management survey and also from several published sources with modifications to fit local conditions. Furthermore, the data in this section were prepared in consultation with the staff of the Animal Husbandry and dairy departments of the Utah State Agricultural College.

It should be kept in mind that livestock production rates, death losses, etc. are a direct result of feeding and other management practices. When animals are better cared for it can be expected there will be higher production, higher birth rates, and less death loss. In this

analysis every attempt has been made to carefully consider such relationships between inputs and turn-off rates.

Dairy cattle

It is estimated that dairy cows will be kept in the herd until about 7 to 8 years old after having been milked 5 to 6 years. Considering cows which are disposed of because of breeding difficulties, mastitis, abortion and other reasons one cow out of every 7, or 14 percent of the herd, is sold annually. Death losses are estimated at 3 percent.

For each 100 cows it is estimated 90 calves will be born, of which 54 will be sold as day-old calves and 26 will be held for replacements as heifers. It is not the general practice in the area to keep dairy bulls but to use artificial insemination as a means of breeding the cows. Where good sires are used by the breeding association this practice will tend to improve the production rates and quality of the herds in an area over the practice of each herd having its own sire.

Table 19
Dairy cows: estimated annual turn-off rates,
calf crop, death loss per 100 cows

Item	Beginning inventory	No. born	No. died	Annual turnoff			Ending inventory
				No.	Avg. weight	Total weight	
Cows 2 yrs. and over	100		3	14	1,200	16,800	100
Heifers under 2 yrs.	23			8	800	6,400	25
Heifers under 1 yr.	26		1		300		26
Calves under 1 yr.		90	10	54	Sold as day-old calves		
Butterfat				300		30,000	

The average butterfat production per cow for the State of Utah in 1943 was 222 according to the agricultural statistics. This production rate has been consistently increasing over the years, in 1952 the average per cow was 246 pounds. This figure is exclusive of milk sucked by calves and includes all cows milked on farms, whether of a dairy breed or not. The records of the Dairy Herd Improvement Association which is an organization of the more progressive and above average dairy farmers who actually keep records and are striving for higher production shows the average production for their members in Uintah County for 1955 to be 424 pounds of butterfat. Since the budgets used in this study are set up with dairying being the primary enterprise, and all butterfat produced is considered including that sucked by calves, since the rate is constantly increasing over the years, and in light of the achievements by the DHIA members, it was felt an average rate of 300 lbs. of butterfat would be a conservative figure to use in the budgets in both the "with" and "without" unit situations.

Farm flock sheep

The Vernal area is somewhat unique compared to other areas in Utah in the fact that farm flocks of sheep are very common. The practice is to cross a Columbia or other wool-type ewe with a Hampshire, Suffolk or other mutton-type ram, thus producing sheep that yield relatively high both in wool and meat.

From the farm management survey it was found that the average wool clip per animal was 10 pounds, that the average lamb crop at docking time is 120 percent and that the average weight of the lambs sold in the fall of the year as feeders is 85 pounds. With this information and after consultation with the Animal Husbandry Department of the Utah State Agricultural College, Table 20 was prepared.

Table 20
Farm flock sheep: estimated annual turn-off rates,
lamb crop and death loss per 100 ewes

Items	Beginning inventory	Number docked	No. died	Annual turnoff		Ending inventory
				No.	Avg. weight	
Breeding ewes	100		8	12	130	100
Young ewes	21		1		100	21
Lambs		120	6	93	85	
Rams	3					3
Wool				124	10	

It is estimated that for each flock of 100 ewes 12 will be culled out and sold annually as old ewes. It is estimated that of the 120 lambs which survive until docking time 21 females will be kept as replacement ewes, 6 will die the first summer, and 93 lambs will be sold as feeders weighing 85 pounds each. There will be 3 rams used for breeding purposes for which an amount for depreciation has been calculated in another section of this report.

Beef cattle

Estimated death losses and turn-off rates for beef cattle in the unit area present the following assumptions: 80% calf crop, 3% death loss among calves, 3% death loss among cows, and 17% yearly replacement of breeding stock. Although public grazing is utilized, the beef herd is maintained on the home ranch during most of the year. This fact, along with a heavy culling program and better than average feeding practices, explains the rather high calf crop of 80%. It is assumed that young stock will be sold as long yearlings averaging 700 pounds.

Chickens

Although there are a few commercial flocks of chickens in the project area, chickens are raised primarily for the eggs and meat they produce for

the farm family. This results in a dual-purpose chicken being the most popular with the average farm flock of 50 hens or less. Old hens are almost entirely replaced by pullets each year. It is estimated that to maintain the farm flock it would require 250 chicks for each 100 hens in the flock in the late fall. All replacements will be purchased. The annual turn-off rates per 100 hens is estimated to be: 100 cull hens and pullets at 4.5 pounds each, 25 cockerals at 4.0 pounds each, 25 fryers at 3.7 pounds each, 50 broilers at 1.5 pounds each. The egg production per hen is estimated at 10 dozen per hen.

Table 21
Estimated average annual calf crop, death loss
and turnoff rates per 100 beef cows

Item	Begin- ning inven- tory	Born	Died	Annual turnoff		Ending inven- tory
				No.	Weight Total weight	
Cows 2 yrs. and over	100		3	14	1900	100
Repl. heifers over 1 yr.	19		1	1	800	19
Calves & long yrllings.	77	80	3	58	700	77
Bulls	3					3

It is assumed that a calf born in the spring will run with its mother through the summer, feed through the winter so as to gain $\frac{3}{4}$ to 1 lb. per day, then pastured or placed on the range the following summer and sold in the fall as a long yearling weighing approximately 700 pounds.

Amount of fertilizer produced by livestock

The quantity of manure produced per animal which could be recovered will vary among other things with the weight of the animal, feeding practices, and time spent on roads, pastures and fields. It is estimated that for the Vernal unit the following amounts, per livestock unit, would be recovered annually and ready for field application.

Dairy cows - 6 tons
Ewes - 0.2 tons
50 hens - 1 ton

Markets and Marketing Costs

The Vernal area is located on U. S. Highway 40. This is one of the main east-west highways through the United States and is open practically at all times. However, the area is isolated so far as rail transportation is concerned. The nearest railhead to the east is Craig, Colorado - 120 miles distant and to the west is Heber, Utah, which is approximately 130 miles. This comparative isolation places the project area in somewhat of a disadvantage so far as marketing is concerned and is one of the reasons

why most of the farm products are marketed in a concentrated form such as meat and livestock products.

There is only one dairy in the unit area which is at the present time only a receiving station. The milk is trucked to Altamont and to Roosevelt 30 miles to the west where it is processed into cheese and powdered milk. The grade "A" market milk is shipped daily into the Salt Lake City area in tank trucks.

From information obtained through the farm survey it was observed that the large majority of the project farmers sell their livestock on the Ogden and Salt Lake markets. However, there are some who ship to Denver. There is a local auction yard where those with only a few animals can find a buyer.

In the budgets the prices received for livestock are those quoted at the Ogden Union stock yards for the various grades and the following are the costs incident to those prices.

Table 22
Marketing costs per head of livestock
250 price basis

Kind of livestock	Fire insurance	Yardage	Commission	Feed	National meat fund	Total
Cattle	.01	.75	.95	.47	.02	2.20
Calves	.01	.47	.57	.24	.01	1.30
Hogs	2/5¢	.29	.45	.10	.01	.85
Sheep	2/5¢	.14	.25	.10	4/5	.50
Hauling charges for all livestock from Vernal to Ogden 65¢ per cwt.						

Source: Ogden Union Stock Yards.

Miscellaneous Livestock Expense

Expense items for livestock

Miscellaneous expense items for livestock enterprises are presented in Table 23. These account for such items as artificial insemination, veterinary services, milk room supplies, shearing, and replacement costs where no replacements are raised on the farm.

Table 23
Estimated miscellaneous livestock expenses
(250 price level)

Item	Unit	Cost per unit
Dairy expense:		
Artificial insemination	Cow	\$5.60
Milk room supplies, veterinary	Cow	4.80
Salt <u>1/</u>	Cow	.60
Total	Cow	<u>11.00</u>
Beef expense:		
Veterinary, vaccination, spray	Cow	1.00
Salt	Cow	.60
Bull depreciation <u>2/</u>	Cow	<u>1.65</u>
Total	Cow	<u>3.25</u>
Horse depreciation <u>3/</u>		15.00
Sheep expense:		
Shearing and sacks	Ewe	.45
Salt and dipping	Ewe	.25
Ram depreciation <u>4/</u>	Ewe	.50
Total	Ewe	<u>1.20</u>
Farm flock chickens	Chick	.20

1/ Based on 50 pounds for cow and replacements.

2/ It is assumed that bulls will be bought at 6 months of age at 375 dollars. After 3 years they will be sold for 210 dollars which amounts to 55 dollars depreciation per year. On the basis of 3 bulls for 100 cows the depreciation would amount to \$1.65 per cow.

3/ Riding horse purchased for \$110; used for 7 years and sold for \$10.

4/ The useful life of a ram is assumed to be 3 years. A ram purchased for \$60.00 kept 3 years and sold for approximately \$10.00 would amount to \$17.00 depreciation per ram per year. On the basis of 3 rams per 100 head of ewes the depreciation would amount to approximately 50 cents per ewe.

Inventory value of livestock

The estimated average inventory value of livestock as used in the farm budgets is shown in the following table.

Table 24
Inventory value of livestock

Type of livestock	Inventory value
Dairy cows	\$180.00
Replacements	90.00
Beef cows	140.00
Yearlings	90.00
Bulls	300.00
Sheep, Ewes	10.00
Replacements	10.00
Rams	30.00
Chickens	1.00

Source: Prices paid producers in Utah for farm products, Utah Agricultural Experiment Station Mimeograph Series 376.

Inventory value of feed and supplies

The inventory of farm produced feed and seed is placed at one-fourth of the total amount fed or used on the farm. The feed produced on the farm is inventoried at farm prices.

Livestock Feed Requirements

This section contains the feeding requirements for various kinds and ages of livestock necessary for farm budgeting analysis. These requirements have been prepared from feeding standards as determined by livestock feeding experiments conducted at Utah State Agricultural College, and as set forth by Morrison's "Feeds and Feeding". Problem No. 2, Columbia Basin Joint Investigations, was also used freely. In all cases except chickens, farm-grown feeds are used exclusively. In all calculations, replacement stock, young stock and male breeding stock are included as a part of the animal unit unless otherwise stated. Feeds used are assumed to be of good quality with percentages of total digestible nutrients as follows: alfalfa 50%, grains 75%, corn silage 17.5% and one animal unit month of pasture 420 lbs. of TDN. All feeding standards are based on 5 months of good pasture with the exception of mature dairy stock which is based on $4\frac{1}{2}$ months good pasture. Wastage is included in the feed requirements at the rate of 5 percent for grain and 10 percent for silage, hay, and pasture.

Dairy cattle

Feeding standards for dairy cattle are based on a 1,200 lb. cow producing 300 lb. of butterfat per year. Each dairy animal unit is composed of 1.00 mature dairy cow, .26 dairy heifers under one year old, and .25 dairy heifers over one year old. No dairy bull is included; it is assumed that artificial insemination will be used. Excess dairy calves are disposed of shortly after birth.

The basic ration for dairy cattle in the project area is composed of alfalfa hay, corn silage, pasture, and grain. Feed requirements used in the farm budgets for dairy cattle are found in Table 25.

Farm flock sheep

The feeds most commonly used for farm flock sheep are alfalfa, hay, grain, and pasture. Rations are calculated on the assumption that replacement ewes will be raised, and lambs will be sold as feeder stock at 85 lbs. An animal unit consists of 1.00 ewes, 1.20 lambs, .21 growing ewes and .03 rams. Feed requirements for sheep are found in Table 26.

Beef cattle

The average length of time necessary to winter beef cattle in the Vernal area is estimated to be 200 days. Alfalfa hay is fed almost exclusively during the winter months. During the summer and fall months beef cattle are pastured on fields, adjacent public grazing lands, and irrigated pasture. Table 27 shows the estimated feed requirements for beef cattle under the conditions described.

Chickens

For small farm flocks of chickens it is assumed that most of the feed will consist of farm-grown grains and farm waste. Only a small amount of protein concentrate will be purchased for the growing chicks and laying hens. Feeding standards are based on a low producing dual-purpose bird. Poultry feeding requirements are shown in Table 28.

Feed substitution rates

Feed substitution rates used in this report are as follows:

1 lb. alfalfa	=	2.9 lbs. of corn silage
1 AUM pasture	=	840 lbs. of alfalfa
100 lbs. alfalfa	=	0.119 AUM pasture
1 lb. of mash	=	12 lbs. of skim milk

Table 25
Estimated Feed Requirements for Dairy Cattle
Central Utah Project, Vernal Unit

Kind of Cattle	Management Period	Grain				Alfalfa				Corn Silage				Pasture			
		Days	Per Head Per Day (Lbs.)	Total Lbs.	TDN	Days	Per Head Per Day (Lbs.)	Total Lbs.	TDN	Days	Per Head Per Day (Lbs.)	Total Lbs.	TDN	Days	Per Head Per Day (Lbs.)	TDN	Total TDN
Cow, 2 yr. & over 1200# 300 lb. butterfat	Winter	230	4.5	1035	776	230	15.0	3450	1725	230	39	8970	1570				4071
	Summer	70	2.0	140	105									70	16.0	1225	1225
	Dry Period													65	8.5	552	552
Subtotal		300		1175	881	230		3450	1725			8970	1570	135		1672	5848
Heifers, under 1 year 300#	Winter	215	1.5	322	241	215	4.8	1032	516	215	10	2150	376				1133
	Summer													150		840	840
	Subtotal	215		322	241	215		1032	516	215		2150	376	150		840	1973
Heifers, over 1 year 800#	Winter					215	10.0	2150	1075	215	30	6450	1129				2204
	Summer													150	10.0	1500	1500
	Subtotal					215		2150	1075	215		6450	1129	150		1500	3704
Feed per Livestock Unit 1/				1259	944			4256	2128			11142	1950			2265	7287
Total Feed Requirement 2/				1322	922			4682	2341			12256	2145			2491	7969

Note: Excess calves disposed of at birth

1/ Based on 25 heifers over one year, 26 heifers under one year per 100 cows.

2/ Includes feed required for normal growth and production plus spoilage and wastage at the rate of 105 for grain, 110 for silage, 110 for hay, and 110 for pasture.

Note: Percentages of T.D.N. in the various feeds are as follows: Alfalfa 50%, Grain 75%, Corn Silage 17.5%, and pasture 420 lbs. of T.D.N. per A.V.M.

Table 26
Estimated Feed Requirements for Farm Flock Sheep
Central Utah Project - Vernal Unit

Kind of Sheep	Management Period	Grain				Alfalfa				Pasture			
		Days	Per Head Per Day (Lbs.)	Total Lbs.	TDN	Days	Per Head Per Day (Lbs.)	Total Lbs.	TDN	Days	Per Head Per Day (Lbs.)	TDN	Total TDN
Breeding Ewes 130#	Wintering	20	.7	14	10.5	180	3.6	648	324				324
	Lambing	20	.7	14	10.5	20	3.6	72	36				46
	Lambing to Pasture	15	1.0	15	11.2	15	3.6	54	27				38
	Summer									150	2.8	420	420
Subtotal		35		29	21.7			774	387	150		420	828
Lambs Sold at 85#	Lambing to Pasture	20	.1	2.0	1.5								1.5
	Summer									90	1.2	108	1080
	Subtotal	20		2.0	1.5					90		108	110
Growing Ewes	Wintering					215	3.0	645	322				322
	Summer									150	1.6	240	240
	Subtotal					215	3.0	645	322	150		240	562
Rams	Wintering					215	4.0	860	430				430
	Summer									150	2.5	375	375
	Breeding season	30	1.0	30	22.5								22
	Subtotal	30		30	22.5	215		860	430	150		375	827
Feed per Livestock Unit <u>1/</u>				32	24			935	467			611	1102
Total Feed Requirements <u>2/</u>				34	26			1028 (.5 ton)	514			672 ^{3/} (1.6 AUM)	1212

1/ Based on 120 lambs, 21 growing ewes, and 3 rams per 100 ewes.

2/ Includes feed required for normal growth plus spoilage and wastage at the rate of 105, 110 and 110 respectively.

3/ Percentages of T.D.N. for feeds are assumed to be 50% for alfalfa, 75% for grains, and 420 lbs. of T.D.N. for pasture.

Table 27
Estimated Feed Requirements for Beef Cattle

Kind of Cattle	Management Period	Alfalfa				Pasture			Total TDN
		Days	Per Head per Day	Total Pounds	TDN	Days	Per Head Per Day	TDN	
Cows 2 yrs. and over 1,000#	Wintering	200	17	3,400	1,700				
	Pasture					165	10.0	1,650	
Heifers over 1 year 800#	Wintering	200	15	3,000	1,500				
	Pasture					165	8.2	1,353	
Yearlings ^{1/}	300# Pasture					165	4.0	660	
	450# Wintering	200	12	2,400	1,200				
	650# Pasture					165	6.2	1,023	
Bulls 1,400#	Wintering	200	24	4,800	2,400				
	Pasture					165	14.0	2,310	
Feed per Livestock Unit ^{2/}				5,602	2,801			3,151	5,952
Total Feed Requirements ^{3/}				6,162	3,081			3,466	6,547

^{1/} Assuming calves are wintered and sold as long yearlings weighing 200 lbs.

^{2/} A Livestock Unit consists of 1.00 cow, .19 heifers over 1 yr., .82 calves, .62 yearlings, and .03 bulls.

^{3/} Includes 10% wastage for pasture and hay.

Table 28
Annual Feed Requirements for Poultry ^{1/}

Size of Flock	Grain		Alfalfa Hay ^{2/}		Protein ^{2/} Concentrate		Total T.D.N.
	Lbs.	T.D.N.	Lbs.	T.D.N.	Lbs.	T.D.N.	
1 Hen ^{3/}	92	69	22	11	11	8	88
25 Hens	2,300	1,725	550	275	275	200	2,200
50 Hens	4,600	3,450	1,100	550	550	400	4,400
75 Hens	6,900	5,175	1,650	825	825	600	6,600
100 Hens	9,200	6,900	2,200	1,100	1,100	800	8,800

^{1/} For medium breed farm flock not kept for commercial production. Includes feed for cockerels and replacements.

^{2/} An allowance of 10% was included to account for loss and wastage of feed.

^{3/} Production per hen is assumed to be 10 dozen per year.

Note: The percentages used in figuring T.D.N. are as follows: Alfalfa 50%, Grain 75%, Protein Concentrate 72%.

Farm Machinery and Equipment

Although there are still some draft horses in the Vernal area they are rapidly becoming obsolete. The shift toward mechanization in farming has occurred in the Vernal area just as it has generally throughout the United States. This has permitted a substantial reduction in the man hours required to produce an acre of the various crops and also the man hours per livestock unit. However, this mechanization has greatly increased the capital investment in farm machinery and equipment.

The farm management survey was the basis for determining the types and the amount of farm machinery and equipment used in the farm budgets. From this survey it was found that practically all farms, regardless of type or size, had certain essential types of machinery such as tractors and those used in seed bed preparation whereas, a corn silage chopper, a combine and other items were found where the acreage was large enough to justify the investment in these more costly items. Exceptions to this are those situations where there is joint ownership of a piece of equipment by two or more farmers, usually they are close neighbors. Table 29 indicates the assumptions regarding ownership of farm machinery.

Prices of machinery and equipment

The prices of farm machinery and equipment used in this report were obtained from retail dealers in Vernal for the year 1956 and were adjusted to a 250 price level by the use of index numbers of trends in farm machinery prices. These prices are shown in Table 30.

Annual expense for machinery and equipment

The annual expense for machinery consists of depreciation, repairs, taxes and shelter costs, plus the operating costs of gasoline, oil and grease. Depreciation is based on a 5 percent sinking fund over the useful life of the item and is based on the original cost less salvage value. This method, plus interest on the original cost, is greater than the straight line depreciation on original cost less salvage value and interest on the inventory value. Repair rates vary with the different items and are calculated on an annual basis in terms of the original cost. Taxes of machinery and equipment are based on inventory value and included with other personal property. Shelter costs are included with farm building costs.

Tractor operating costs

The annual farm operation costs of any item of power or transportation equipment are dependent upon the hours or miles of use, the amount

Table 29
Assumptions concerning ownership of farm machinery

Items of Equipment	Individually owned	Joint Ownership Rent or Custom Hire
Seed bed preparation		
Tractor	always	
Plow	always	
Spike tooth harrow	always	
Spring tooth harrow	infrequent	
Disc. tandem	usually	rent or hire
Leveler	always	
Corrugator	always	
Manure spreader	over 100 tons	usually rent
Ditcher	usually	joint ownership
Manure loader	over 125 tons	joint ownership
Hay		
Mower	always	
Side rake	always	
Pickup baler	over 100 tons	custom hire
Grain		
Drill	over 20 acres	custom hire or
Combine	over 50 acres	joint ownership
Corn		
Planter	over 25 acres	custom hire or
		joint ownership
Cultivator	over 5 acres	rent
Field chopper	over 30 acres	custom hire
Misc. Equipment		
Milking machine	10 cows or more	
Wagon or trailer	usually	
Sprayer	infrequent	custom hire
1½ or 2 ton truck	infrequent	custom hire

Table 30
Farm Machinery and Equipment Prices
250 Price Level

Item	Original	Original	Inven- tory Value	Annual		Annual 1/ Depreciation	
	Cost 1/ 250 Level	Cost Less Salvage Value		Rate	Repairs Amount	Years Life	Amount
Tractor 2 plow	1836	1652	1102	3.0	55.08	12	103.80
Tractor 3 plow	2283	2511	1370	3.0	66.83	12	157.77
Automobile	2186	1967	1312	5.0	109.30	10	156.38
Pickup $\frac{1}{2}$ ton	1771	1594	1063	5.0	88.55	10	126.72
Plow 2 bottom 14"	175		105	3.0	5.25	15	8.11
Plow single 16"	120		72	3.0	3.60	15	5.56
Harrows spike tooth	62		37	1.0	.62	15	2.87
Harrows spring tooth	178		107	1.0	1.78	15	8.25
Disc. tanden 6 $\frac{1}{2}$ '	208		125	3.0	6.24	20	6.29
Float home made	31		19	1.0	.31	10	2.46
Leveler	208		125	2.0	4.16	16	8.79
Corrugator	75		45	2.0	1.50	20	2.27
Cultivator, 2-row corn	201	181	121	2.5	5.02	15	8.39
Grain Drill 8'	559	503	335	1.5	8.38	15	23.31
Planter, 2-row, corn	179	161	107	2.5	4.48	15	7.46
Mower 6'	283	255	170	2.0	5.66	14	13.01
Mower 7'	287	258	172	2.0	5.74	14	13.16
Side delivery rake	348	313	209	2.0	6.96	15	14.50
Dump rake	123		74	1.5	1.84	15	5.70
Hay baler w/motor	1974	1777	1184	3.0	59.22	14	90.66
Field Chopper w/motor	1969	1772	1181	3.0	59.07	14	90.41
Combine harvester 6'	1918	1726	1151	3.0	57.54	15	79.98
Ditcher	232		139	1.0	2.32	20	7.02
Wagon rubber tire	137	123	82	1.5	2.06	12	7.73
Manure spreader	358	322	215	1.0	3.58	15	14.92
Manure loader	314	283	188	2.5	7.85	12	17.78
Power sprayer, 24' boom	168		101	3.0	5.04	15	7.78
Electric fence control	37		22	5.0	1.85	10	2.94
Milking machine 2/w	372	335	223	6.0	22.32	10	26.63
Dairy Water heater	64	58	38	2.0	.64	18	2.06
Milk cooler 4 cans 6" 8"	365 439 512			2.0		18	
Milk cans	10		6				

1/ Based on 5% sinking fund and calculated from original cost less salvage value.

of fuel, oil and grease consumption and the unit cost. The number of tractor hours required for the various crops is shown in Table 17. The consumption of fuel, oil, grease for the tractor, auto and pick-up has been adapted from the Farm Management Crop Manual, University of California, and a study of power machinery performance under irrigated conditions in South Dakota. The unit costs of gasoline and oil are those in the project area. A reduction of 2 cents per gallon of gasoline has been allowed on tractor and baler costs because of the Federal refund to farmers for those machines not using the highways.

The cost per hour of operating a 2-plow tractor is shown below:

		Cents per hour
Gasoline consumption - 1.8 gals. per hr. at .24	=	43.2
Crankcase oil - 0.77 gals. per 10 hrs. at .92	=	7.1
Grease		0.7
Total operating cost per hour		51.0

Cost of operating hay baler

		Cents per hour
Gasoline consumption - 1.5 gals. per hr. at .24	=	36.0
Crankcase oil - 18.8 qts. per 100 hrs. at .92	=	4.3
Grease - 8.4 lbs. per 100 hrs. at .20	=	1.7
Total operating cost per hour		42.0

Baler Twine

From various farmers who do custom work it was estimated that one bale of twine would tie 400-425 bales of hay weighing approximately 65 pounds per bale, or $13\frac{1}{2}$ tons. Baling twine at the 250 price level would amount to \$8.17 per bale, or 61 cents per ton of hay. This amount has been included as a cost in the budgets.

Cost of operating auto or pick-up

The operating cost of an auto or $\frac{1}{2}$ -ton pick-up has been estimated at 2.1 cents as shown below:

		Cents per hour
Gasoline consumption - 15 mi. per gal. at .26	=	1.733
Crankcase oil - at .92	=	.002
Greasing		.003
Tire depreciation		.400
Total operating cost per mile		2.137

Farm share of auto and pickup

Part of the total annual mileage of the family automobile is used for strictly farm purposes and part is for personal and nonfarm use, while nearly all the mileage on the pickup truck is in connection with the farming operation.

The estimated farm share of the annual mileage for the pickup truck is 4,000 miles and for the auto is 2,000 miles.

Annual cost of auto insurance

Insurance rates for public liability and property damage were found to be \$18.20 per year. With 50 percent of this amount being chargeable against the farm for the auto and 90% of this amount for the pickup, the total annual farm cost would amount to \$25.00.

Miscellaneous Farm Expenses

Electricity expense

The farm share of electricity costs is dependent upon the kind and amount of electrically operated equipment found on the farm.

Table 31 lists the type of equipment expected to be found on the representative farm, the estimated annual farm use of the equipment in kilowatt hours, the annual kilowatt-hours cost, and the total estimated annual cost.

Table 31
Annual farm share of electricity

Farm operation	Farm use	Energy used (kw./hrs.)	Annual kw./hrs. of use	Rate per kw./hr.	Annual cost
Water heating	12 gals./day	$\frac{1}{4}$ per 4 gals.	1,095	.0125	13.69
Farm chore motor	$\frac{1}{2}$ hr. per wk.	$\frac{3}{4}$ per hr.	20	.03	.60
Lighting	--	15 per mo.	180	.03	5.40
Milking machine	16 cow herd	$2\frac{1}{2}$ per cow	480	.03	14.40
	20 cow herd	per mo.	600	.03	18.00
Brooder	125 chicks	$\frac{1}{2}$ per chick for 6 weeks	63	.03	1.89

Telephone expense

Based on annual telephone rates on the project area, it is estimated the annual cost would amount to \$40.00, of which $\frac{1}{2}$ or \$20.00 would be chargeable to the farm.

Miscellaneous farm expenses

An allowance of 2 percent of the total farm expenses has been included in the budgets for minor items which usually occur in a farming operation but which are not readily identifiable. It can be considered as a contingency factor.

Fertilizer, Spraying, and Seed Requirements

Fertilizer requirements

Information regarding the amount and kind of fertilizer to be used in the farm budget analysis was obtained primarily from the farm management survey. In general the amount of fertilizer increases with the intensification of the cropping pattern and in the Vernal unit the cropping pattern is rather extensive with a livestock, dairy economy. The manure produced on the farm is considered ample to supply the requirements of the crops produced with the exception of alfalfa and corn where some additional phosphate and nitrogen is applied. It was concluded from the survey that approximately 25% of the alfalfa acreage and 20% of the corn acreage receive an application of commercial fertilizer, per acre, annually. For the alfalfa crop super phosphate is used almost exclusively while ammonium sulphate is the predominate commercial fertilizer for the corn crop supplying additional amounts of nitrogen.

Spraying

Spraying alfalfa for control of weevil is general in the project area. Nearly 100 percent of the crop is sprayed annually. Therefore, an allowance was made for this practice in the budgets. On a custom basis this operation costs \$1.80 per acre. See Table 15.

Seed requirements

The seeding rates per acre and the annual costs are presented in Table 32.

Table 32
Seeding rates for principal crops

Crop	Unit	Seed per acre	Unit price	Seeding interval	Annual cost per acre
Alfalfa	lb.	15	.32	4 years	1.20
Pasture	lb.	16	.43	6 years	1.15
Corn silage	lb.	12	.24	annually	2.90
Barley	bu.	2.2 ^{1/}		annually	farm produced
Oats	bu.	2.5		annually	farm produced
Wheat	bu.	2.0		annually	farm produced
Potatoes	cwt.	10.0	3.57	annually	36.00
Garden	garden				8.00

^{1/} When barley is used as a nurse crop, 1.2 bushels per acre is advisable.

Farm Buildings and Improvements

The requirements for the farm buildings and improvements have been based on the farm survey of the area with an expression of what is anticipated in the future both with and without the project. The estimated cost of constructing farm buildings and other improvements is based on the long-term price projection of 250 (1910-14=100).

Dairy barn

Most of the barns in the project area are of the inexpensive type of construction. This is especially true of those farms producing grade "C" milk. The barns are usually built of native lumber and are not painted. The trend is toward an open shed type of housing for dairy cows with a milking parlor where only a part of the herd is confined while being milked and fed their ration of grain. The milking parlor also houses the milking machine, the hot water heater for washing the utensils, the cooler, if one is used, plus other associated equipment. In addition to the loafing shed and milking parlor the necessary improvements for a dairy herd include a corral and feed manger. The estimated costs of these buildings and improvements are presented in Table 33.

Sheep shed

Some protection is required for the farm flocks of sheep during the winter months and especially in the early spring months when lambing is in process. The sheds are of rough poles and native lumber, from the mills in the Uintah Basin; therefore, they are relatively inexpensive to build. The costs for the various-sized herds used in the farm budgets are shown in Table 33.

Poultry house

The housing cost for chickens is based on a shed roof type house of frame construction. The size of house is based on a poultry flock of 50 hens of a dual purpose breed.

Garage, shop, and implement shed

This building provides housing for the family car or pickup plus room for some of the more expensive farm machines which are subject to rust and deterioration. The estimated cost of this building is shown in Table 33.

Granary

To store the necessary grain for the size of livestock farm contemplated would require a granary large enough to store 1,000 bushel. A steel granary of such size would be relatively inexpensive and would be adequate for the needs of such a farm. The cost of such a unit is presented in Table 33.

Table 33
Estimated Cost of Constructing Farm Buildings
250 Price Level

Item	Capacity	Cost of Materials 250 Price Level	Man Labor		Total Projected Costs
			No. of Hours	Cost 1/ 250 Price	
Grade C Dairy					
Milking Stable (18'x 28')	16 cows	592)	524	655	1,517
Loafing Shed (48'x 28')	16 cows	270)			
Milking Stable (18 x 40')	20 cows	679)	662	828	1,815
Loafing Shed (40'x 40')	20 cows	308)			
Corral & Feed Manger	16 cows	93	68	85	178
Corral & Feed Manger	20 cows	107	85	106	213
Grade "A" Setup					
Milking Unit (8 stanchion)	20-40 cows	1510	457	571	2,081
Open Shed (26'x 36')	18 cows	703	248	310	1,013
Open Shed (26'x 48')	25 cows	834	291	364	1,198
Open Shed (26'x 60')	31 cows	966	333	416	1,382
Open Shed (26'x 72')	37 cows	1097	376	470	1,567
Corral & Feed Manger	18 cows	232	81	101	333
	25 cows	276	98	122	398
	31 cows	319	115	144	463
	37 cows	362	132	165	527
Sheep Shed	75 ewes	292	151	189	481
Sheep Shed	100 ewes	427	195	244	671
Beef Shed	65 cows				1,040
Corrals & Chutes	80 cows				1,210
Combination shop, garage, and implement shed		690	359	449	1,139
Chicken Coop	50 hens	385	157	196	581
Granary (steel)	1000 bu.				348
Pit, silo	85 tons				128
Pit, silo	150 tons				220
Farm Fences					
4 Strand Barbed Wire	100 rods	114	42	42	156
Woven Wire	100 rods	165	48	48	213

1/ For ordinary farm work the hourly wage rate was determined to be 95¢ - \$1.00. Since some skilled labor at a much higher hourly rate is desirable in some cases for construction of farm buildings, an average rate of \$1.25 per hour is used in determining the cost of farm buildings.

Farm dwelling

The cost of a 5-room frame dwelling is estimated at \$5,000. This includes electricity and plumbing facilities and provides better farm housing than that which has prevailed during past years. This price does not include the value of the land on which the house is located, value of the domestic water supply, fences or garage, all of which are shown separately. If such costs were included the value would approximately be \$7,000. All farm costs associated with the farm dwelling are included as rental value and added as part of the gross farm income.

Culinary and stock water

Source of stock water now comes from irrigation canals which operate all year long.

The farmers in the Maeser, Vernal, and Naples area now obtain domestic water from a municipal water system. The estimated number of farmers located in these three areas would be about 50 to 60% of the total farmers in the project area.

The farmers pay \$3.00 per month for their domestic water which is used primarily for culinary and stock-watering purposes. However, some is used for the watering of lawns.

The remaining farmers, except for a few who obtain water from wells or springs, haul their water from the municipal supply and fill their cisterns. Some of the farmers obtain their drinking water from custom haulers who charge \$2.25 per 1,000 gallons for filling a cistern.

The cistern is a concrete tank holding between 1,000 and 4,000 gallons. Some farms have an electric pump for a pressure system and others have hand pumps. Those cisterns with hand pumps are about 1,000 gallon capacity and those with electric are about 3,000. A cistern with a 3,000 or 4,000 capacity is estimated to cost \$400.00 or \$500.00 plus a hand pump worth \$65.00 or an electric pump worth \$225.00. Thus, the minimum investment for a farmer with a hand pump would be \$465.00. The annual charge of interest and depreciation at 8% ($5\% + 3\%$) = \$37.00, or \$3.00 per month. The maximum at \$725.00 = \$5.00 per month. The \$3.00 charge plus hauling would range from \$5.00 to \$7.00 per month per farmer for culinary water.

In the "without" budget we have used an average of \$6.00 since cistern and hauling charges have been charged against the farm as an expense item.

In the "with" budget and the proposed system it is assumed the farmer will have to pay an estimated \$400.00 to connect to the main trunk line of the proposed pipe line distribution. Assuming the farmer can make a \$400.00 loan for 20 years at 5% would be \$3.00 per month.

If the cost of the closed system averages \$1,600.00 per farm, this amount paid out over 50 years without interest amounts to about \$3.00 per month. Therefore, we have assumed a cost of \$6.00 per month, \$3.00 of which is for the proposed system and \$3.00 for connecting onto the main line. Thus, the farmer will get a much-improved water system.

Farm fences

Because of the livestock kept on the farms in this area, fencing is rather an important consideration. With sheep it is necessary to have even better fences than with cattle. For budgeting purposes it is assumed that the farm boundary will be enclosed by a permanent 4-strand barbed wire fence except that the pasture and the farmstead will be enclosed with a woven wire because of the sheep.

The number of rods of fence required depends upon the size and shape of the farm. The following assumptions have been made regarding the number of rods of fence necessary for the Grade C Dairy and Sheep farms for the various sizes.

No. of acres	Rods of barbed wire	Rods of woven wire	Total
100	280	213	493
120	266	280	546
160	400	253	653

For those farms where no sheep are kept no woven wire was included. However, the total was considered all barbed wire.

The estimated costs of constructing farm fences are presented in Table 33.

Farm building expense

The normal expenses of buildings are depreciation, repairs, interest on the investment, taxes, and insurance. Depreciation is based on a 5 percent sinking fund over the useful life of the various buildings and improvements. The estimated useful life has been taken largely from Bulletin F published by the Bureau of Internal Revenue. Repairs for farm buildings are estimated at 2 percent of the original cost and interest on investment is based on 5 percent of the first cost. Taxes are based on 40 percent of the inventory value and a tax levy of 41 mills. A charge of .5 percent of the original cost of the building has been included to cover fire insurance.

Value of Family Living from Farm

Amount and value of farm-grown food used in the home

The contribution of the farm toward the family living expenses varies from farm to farm depending upon the type of farm as well as the size of the farm family. Each type contributes whatever is produced for sale. However, most farms, whether dairy farms or not, keep 1 or 2 cows and a small flock of chickens for home use. This is especially true where there are children in the family. The principal items of farm-furnished food consist of garden vegetables, dairy products, meat and poultry products.

Table 34 serves as a standard in determining the amount of farm grown food used by the average farm family of four persons (2 adults and 2 children) in the Vernal area.

Table 34
Farm grown food used by typical farm family
per year--Vernal unit--235 price level

Item	Unit	Quantity	Price	Total value
Dairy products	Lbs. of B.F.	100	.83	83.00
Poultry products				
Eggs	doz.	150	.46	69.00
Poultry	lbs.	120 ^{1/}	.23	28.00
Mutton	lbs.	130 ^{1/}	.06	8.00
Garden	acre	.3	200.00	60.00

^{1/} Live weight basis.

Value of farm housing

The annual rental or occupancy value of a farm dwelling is assumed to be equal to all annual expenses incurred on the house, including repairs, depreciation, insurance, interest on investment and taxes. For a \$5,000 house assumed for project farms, the annual expenses would amount to \$428.00 as shown below:

Item	Amount	Basis
Repairs	\$100.00	2 percent of original cost
Depreciation	14.00	5 percent sinking fund over useful life (60 years)
Insurance	15.00	0.5 percent of inventory value
Interest	250.00	5 percent of original cost
Taxes	49.00	41 mills times 40% of inventory value
Total	\$428.00	

Taxation

Assessed values

The normal assessed values for real and personal property for the Vernal area were obtained from the County Assessor and are presented in Table 35. These values are considered representative for the long-term price level.

Mill levy rates

It will be noted from Table 36 that in addition to the regular county mill levies there are special ones on sheep and cattle for disease and predatory animal control. These have been considered in the farm budgets. To the estimated long-term levy of 40 mills under "without" conditions has been added an additional mill to cover the one mill conservancy district charge in the farm budgets under the "with" conditions.

Table 35
Assessed Values Used for Taxation
Vernal Unit

Item	Unit	Assessed Value
Irrigated Land:		
Class I	Acre	\$50.00
Class 2S	Acre	40.00
Class 3S	Acre	30.00
Livestock:		
Dairy Cattle		
Cows 2 yrs. and over	Each	32.00
Heifers 1 hr. to 2 yrs.	Each	18.00
Yearlings 6 mo. to 1 yr.	Each	12.00
Range Cattle		
Cows 2 yrs. and over	Each	20.00
Animals 1 yr. - 2 yrs.	Each	15.00
Yearlings 6 mo. - 1 yr.	Each	12.00
Sheep		
Lambs and young ewes	Each	3.50
Old ewes	Each	2.00
Chickens	Each	0.20
Machinery and Improvements		40% of Inventory Value

Source: Assessor's Records, Uintah County

Table 36
Mill Levy Rate
Uintah County

Year	County Total	Special Levies 1/			
		Bounty - All Sheep	Livestock Inspection All Sheep	Disease Control All Cattle	Disease Control All Cattle
1945	35.0	25.0	0.5	3.0	3.0
1946	37.5	25.0	0.5	3.0	3.0
1947	41.0	25.0	0.5	3.0	3.0
1948	40.0	25.0	0.5	3.0	3.0
1949	39.0	25.0	0.5	3.0	3.0
1950	39.0	25.0	0.5	3.0	3.0
1951	39.0	25.0	0.5	4.5	3.0
1952	34.0	25.0	0.5	4.5	3.0
1953	37.0	25.0	0.5	4.5	3.0
1954	36.0	25.0	0.5	4.5	3.0
1955	47.7	30.0	0.5	5.5	3.0
1956	43.9				
Estimated Long Term Level	41.0 2/	25.0	0.5	3.0	3.0

Source: Uintah County Assessor

1/ These levies are added to the regular county total when assessing cattle or sheep.

2/ A levy of 40.0 mills is considered representative of the future taxation rate, plus 1 mill for conservancy district.

AGRICULTURAL ECONOMY

CHAPTER III

IRRIGATION REPAYMENT

Operation, Maintenance, and Replacement Costs

There are six major irrigation companies in the area which have developed the water through private initiative. The average operation and maintenance costs for the past six years have been summarized in Table 38. With the project will come additional operation and maintenance costs estimated at \$14,500 of which \$12,700 is allocated to irrigation annually, or \$.90 per acre when computed on the 14,781 acres of classes 1, 2, and 3 to be served. These anticipated operation, maintenance, and replacement costs are shown in Table 37. These costs represent the estimated costs of operating Bureau constructed facilities. The facilities already in use today will be required to carry a larger volume of water than at present, thereby increasing the total O. & M. costs of operating the facility, but because of the greater volume of water handled the cost per acre-foot will be less than at present.

Table 37
Summary of anticipated operation, maintenance,
and replacement costs

	Irrigable acreage served	Increased water provided		Annual O. & M. and replacement costs		
		Total	Per acre	Total	Per acre	Per acre- foot
Unit total	14,781	18,100	1.22	\$12,700	.90 (rounded)	.70

The long-term projection of operation, maintenance and replacement costs has been based on the price level for the three calendar years-- 1954, 1955, and 1956. The E.N.R. construction index for this three-year period is 666 with 1913 index at 100.

Method of Analysis

To determine the ability of the farmers on the various land classes to repay construction costs it is necessary to analyze their economic position as it is now with a shortage of irrigation water or "without" the project and what it would be "with" unit development. This has been accomplished by the farm budget method of analysis. The farm budget method of analysis provides for the systematic outlining of the organization and operation of representative farms including the anticipated income and expenditures in detail for a normal year. Payment capacity is derived by deducting the allowance for family living costs from the net farm income.

Table 38Average Annual Operation and Maintenance Costs
of Major Canal Companies, Vernal Unit

Irrigation Company	Acres Served	Annual Operation and Maintenance Average 1950 - 1955				Long Term Projected Per Acre ^{2/}
		Main Canal	Lateral	Total	Per Acre	
Rock Point	1,845	2,519		2,519	1.36	
Ashley Upper	9,799	8,697	1,920	10,617	1.08	
Ashley Central	7,107	6,185	1,939	8,124	1.14	
High Line	1,834	3,428		3,428	1.87	
Island Ditch	874	336		336	.38	
Total	21,459	21,165	3,859	25,024	1.17	
Ashley Valley Res. Co. ^{2/}	22,492	6,066		6,066	.27	
Total for Area					1.44	1.60

1/ The average ENR construction index for 1950-1955 = 585 (1913=100). The long term projected index based on the three preceding calendar years = 666; therefor, a factor of 1.1 has been applied to the 1950-1955 costs.

2/ The O&M costs of the Ashley Valley Reservoir Company is added to the weighted average of all the canal companies because it serves water to these same companies in addition to approximately 1,000 acres not included here.

In this analysis an effort has been made to determine a fair and equitable rate yet be conservative enough that the rate recommended would not work a hardship on the water users in making the prescribed payments. Several procedures and basic assumptions used in this analysis are considered to be conservative. Among them are:

- (1) The crop yields and livestock production rates under "with" project conditions are conservative. It is not uncommon at the present where the farmers have a full supply of water to obtain yields of 5 and 6 tons of alfalfa per acre on the better land classes.
- (2) Labor requirements are estimated for farm operators with current average efficiency. The average farmer can reduce the cost by more efficient use of his time than allowed for in the farm budget analysis.
- (3) No credit has been taken for crop aftermath which on many irrigated farms provides a substantial amount of fall feed. This would result in a savings in feed costs for the average farmer.
- (4) The sinking fund method of calculating depreciation based on new costs, less salvage value, plus interest on original cost, results in building up a revenue fund somewhat greater than is normally allowed by applying straight line methods of calculating depreciation on original cost less salvage value and interest on the inventory value. This reserve may be applied on interest or debt retirement and capital accumulation or saving.

Development Period

Some benefit from the use of project water can be immediately realized on all the land to be served by the project. Since this is a supplementary water project where benefits can be realized with very little change in type of farming and only small land development costs, it is anticipated that a development period of 3 years would be sufficient.

Local Support

The shortage of irrigation water during the summer months has plagued this area practically ever since it was settled. Consequently, there has been considerable interest and activity on the part of the farmers and civic leaders for the construction of this unit as well as for the entire Upper Colorado River project.

Meetings have been held with groups of farmers organized under the various canal companies to discuss water supply and repayment problems. The method of arriving at payment capacity has been explained to these groups and although the exact amount of the cost of the water was not known they have expressed a willingness to pay a reasonable amount. To date the figure from the authorizing report has been used in these discussions; however, these groups have been cautioned that such a figure would change with a more detailed report. As evidence of such interest there has already been formed a conservancy district enveloping this area which will be the contracting entity in the negotiations between the Bureau of Reclamation and the Water Users' Association.

Water Supply

With development of the Vernal Unit the lands will be supplied an additional 18,000 acre-feet annually. The estimated annual water shortage will be 4% and the maximum 45% (Table 39). During the 27-year period of analysis (1930 through 1956) there were 10 years of shortages. However, in only 4 of the 10 were the shortages above 5%. In 1934 there was a 45% shortage; 1936 a 25% shortage; and in 1955 a 19% shortage.

Table 39
Water supply within ideal demand
Vernal Unit

Unit acreage	
Irrigable	14,781
Productive	14,041
Diversion Requirements (Total)	
Total ^{1/}	52,000
Per productive acre	3.70
Present water supply	
Total ^{1/}	32,000
Per productive acre	2.28
Average annual increase provided by project	
Total	18,000
Per productive acre	1.28
Shortages	
Average A/F per acre	.14
Average percent	4
Maximum percent	45
^{1/} Weighted averages.	

Farm Budgets

By the use of farm budgets the average payment capacity for the various land classes and types of farming has been determined for conditions both "with" and "without" unit development.

Grade C dairy-sheep farms without unit development

One farm budget has been prepared to determine the payment capacity on class 2 land under "without" conditions.

The farm organization and cropping system as set up for the 120-acre dairy-sheep farm is based on present crop yields and land use found in the area with some informed judgment being used as a result of consultation with authorities from Utah State Agricultural College, Department of Agriculture and Bureau of Reclamation technicians, working in the field. The cropping system is built around an 8 to 10 year rotation with small grains being planted 2 years. The second year the small grain acts as a nurse crop to alfalfa or pasture seeding, and 6 to 8 years of alfalfa and pasture. At the present time the farmers hesitate to shorten their rotation period on alfalfa; because of a lack of late-season irrigation water it is difficult to obtain a good stand of new alfalfa seedlings. This tends to lower the over-all yield of alfalfa.

The net income of this farm is not sufficient to provide an adequate family living allowance and have funds available for saving or debt retirement.

Grade C dairy-sheep farms with unit development

Under the anticipated or "with" conditions, three budgets have been set up, one for each land class. The same source of basic material and informed judgment has been used in arriving at yields and land use as those under the "without" condition. In each case some of the farm labor will have to be hired to help in the harvesting of hay, grain, and corn silage. Also, some custom labor must be hired to complete the operations requiring specialized machinery not owned by the average farmer. The children on a typical farm are usually under 16 years of age. Therefore, the labor performed by the farm family, exclusive of the operator, is estimated at eighty 10-hour days, the main portion of their labor being used in the care of chickens, washing dairy utensils, helping with farm chores, etc.

In each budget the rotation period for alfalfa has been shortened to 4 years because there will not be the difficulty with an adequate late-season water supply to obtain a good stand of new alfalfa seedling.

For land classes 1, 2, and 3 with an average per farm acreage of 100, 120, and 160 acres respectively, it is anticipated there will be sufficient payment capacity to provide an adequate standard of living to pay the increased operation and maintenance and replacement costs and for classes 1 and 2 to make an annual payment on the overall construction cost of the project. Class 3 will be able to repay its share of the operation and maintenance charges plus a small amount toward repaying construction charges.

Grade "A" dairy

Two budgets have been prepared for a grade "A" dairy on class 2 land. Budget No. 7 represents the situation without additional water and Budget No. 4 with additional water. A farm consisting of 100 acres appears to be adequate in size for this more intensive type of farming. The only anticipated change in the cropping pattern with additional water is an increase in the acreage of corn silage. The yield of alfalfa hay, pasture and small grain has been increased under the "with" condition. With this additional production it was found the dairy herd could be increased from 25 to 32 milk cows on the same farm.

Some of the principal items of investment in a grade A dairy set-up are the loafing shed, milk house, milk coolers, and the related equipment necessary to pass the sanitation requirements. These items have been included in the budget with the increases necessary for the larger-sized herd. Because most of the grade "A" milk must be trucked into Salt Lake area for marketing, which is a distance of approximately 175 miles, the hauling charges are rather high.

In both situations the total amount of milk produced has not been sold at a grade "A" price which is substantially higher than the grade "C" price. Instead there has been used a weighted average price on the basis of 65 percent of the milk being sold at the grade "A" price and 35 percent at the grade "C" price. These percentages were obtained from the dairy and are an average for all grade "A" producers in the area.

Beef

As with the grade "A" dairy budgets, two beef budgets have been set up for class 2 land -- one "with" and one "without" unit construction. In both situations the same number of animal unit months of grazing on public grazing lands has been assumed. The increased yields of hay, pasture and small grains with additional irrigation water permits an increase in the size of the beef herd by 15 cows on a 120 acre farm.

There are principally two systems of beef operation in the Vernal area; one is the cow-calf operation and the other is the long yearling. In the cow-calf operation the offspring are sold each fall as calves weighing from 350 to 400 pounds each. When long yearlings are produced

Budget No. 1
 Land class 1
 Acres 100

Table 40
 Farm Budget Summary

Type of farm: Grade C Dairy and Sheep
 Condition: With

Crops and livestock	Acres or Number	Irrigation		Man work days	Production		Disposal of products grown			Current farm expenses	
		Water require-ment (ac.-ft.)	Times irri-gated		Yield or Unit weight	Total pro-duction	Sold Amount	Price	Farm use Value	Taxes, property	
Alfalfa	33.0		4	62.0	ton	4.2 132	42	\$21.00	\$882	\$2,037	\$453
Rotation pasture	32.0		6	25.3	AUM	8 256		4.50	1,152	Insurance, farm	46
Wheat	5.0		3	5.4	bu.	40 200	113	1.50	170	Depreciation and repairs	
Barley	8.0		3	8.6	bu.	55 440		1.06	466	Buildings and improvements	329
Oats	7.0		3	7.5	bu.	60 420	115	.86	99	Equipment	794
Corn silage	9.0		3-4	19.4	ton	17 153		7.24	1,108	Fuel, oil, and grease	316
Garden	.3			.6	value	60			60	Utilities, farm share	60
Farmstead and waste	5.7									Seed	111
Subtotal	100.0			128.8					1,151	Fertilizer	73
Livestock & L.S. prod.										Other crop expense	85
Dairy cows	20			210	lb.	1,200 24,000	3,360	.13	437	Hired labor	
Butterfat					lb.	300 6,000	5,880	.83	4,880	Contract	333
Heifers over 1 year	5				lb.	800 4,000	1,280	.18	230	Day labor	323
Excess calves	11				ea.			8.00	88	Rolling or chopping grain	48
Ewes	100			30	lb.	130 13,000	1,430	.06	86	Feed purchased	31
Lambs	93				lb.	85 7,905	7,905	.18	1,423	Other livestock expense	512
Wool	124				lb.	10 1,240	1,240	.48	595	Domestic water	72
Chickens	50			16.5	lb.	7.2 360	240	.23	55	Milk hauling	412
Eggs					doz.	10 500	350	.46	161	Farm share auto and pick-up	151
Subtotal				256.5					7,955	Baler	42
Average farm investment										Miscellaneous farm expense	84
Land	\$6,500									Total current expense	4,275
Farm buildings and improvements	5,913										
Machine and equipment	8,886										
Dwelling	5,000										
Livestock	5,400										
Feed and supplies	994										
Total		32,693									
Total											

1/ Expenses exclude and income includes return to water.

Budget No. 2
 Land class 2
 Acres 120

Table 41
 Farm Budget Summary

Type of farm: Grade C Dairy and Sheep
 Condition: With

Crops and livestock	Acres or Number	Irrigation		Man work days	Production		Disposal of products grown			Current farm expenses	
		Water requirement (ac.-ft.)	Times irrigated		Unit	Yield or weight	Total production	Sold	Farm use	Taxes, property	
								Amount	Price	Value	
Crops											
Alfalfa	40.0		5	74.8	ton	3.8	152	56	\$21.00	\$1,176	\$2,016
Rotation Pasture	38.0		7	36.1	AUM	7	266		4.50		1,197
Wheat	7.0		3-4	8.0	bu.	35	245	154	1.50	231	136
Barley	9.0		3-4	10.3	bu.	50	450		1.06		477
Oats	8.0		3-4	9.1	bu.	55	440	148	.86	127	251
Corn Silage	10.5		4	23.3	ton	14	147		7.24		1,064
Garden	.3			.6	value		\$60				60
Farmstead and waste	7.2										
Subtotal	120.0									1,534	
Livestock & L.S.Prod.											
Dairy cows	20			210.0	lb.	1,200	24,000	3,360	.13	437	100
Butterfat					lb.	300	6,000	5,880	.83	4,880	
Heifers over 1 yr.	5				lb.	800	4,000	1,280	.18	230	
Excess calves	11				ea.				8.00	88	8
Ewes	100			30.0	lb.	130	13,000	1,430	.06	86	
Lambs	93				lb.	85	7,905	7,905	.18	1,423	
Wool	124				lb.	10	1,240	1,240	.48	595	
Chickens	50			16.5	lb.	7.2	360	240	.23	55	28
Eggs					doz.	10	500	350	.46	161	69
Subtotal										7,955	
Average farm investment		Farm work		Family living		Financial summary					
Land	\$7,200	Item	Days	Net farm income 1/		\$5,544		Receipts:			
Farm buildings and improvements	5,966	Crops	162	Less debt service 3%		1,004		Crop sales			
Machine and equipment	8,886	Livestock	257	Less payment capacity		670		Livestock and livestock product sales			
Dwelling	5,000	Miscellaneous	14	Available to family		3,870		Total cash farm receipts			
Livestock	5,400	Total	433	Payment capacity				Value of farm privileges			
Feed and supplies	988	Work by:		Net farm income		5,544		Gross farm income			
		Operator	282	Less investment allowance 5%		1,674		Current farm expense 1/			
		Family	80	Less family living allowance		3,200		Net farm income 1/			
		Hired	59	Payment capacity				Interest on investment 4%			
		Custom	12	Total		670		Direct benefits			
				Per Acre		5.58		Total			
Total	33,470							Per Acre			

1/ Expenses exclude and income includes return to water.

Budget No. 3
Land class 3
Acres 160

Table 42
Farm Budget Summary

Type of farm: Grade C-Dairy & Sheep
Condition: With

Crops and livestock	Acres or Number	Irrigation		Man work days	Production		Disposal of products grown			Current farm expenses	
		Water requirement (ac.-ft.)	Times irrigated		Unit	Yield or weight	Total production	Sold	Farm use	Taxes, property	
								Amount	Price	Value	
Crops											
Alfalfa	53.0		6	97.0	ton	3.0	159	54	\$21.00	\$1,134	\$2,205
Rotation pasture	51.0		8	57.6	AUM	5	255		4.50		1,148
Wheat	9.0		4	11.0	bu.	30	270	175	1.50	262	142
Barley	13.0		4	15.9	bu.	40	520		1.06		551
Oats	11.0		4	13.4	bu.	50	550	346	.86	299	174
Corn silage	13.0		4-5	29.2	ton	10	130		7.24		941
Garden	0.4										
Farmstead & waste	9.6					.8 value	\$60				
Subtotal	160.0									1,695	
Livestock & L. S. Prod.											
Dairy cows	20			210.0	lb.	1,200	24,000	3,360	.13	437	
Butter fat					lb.	300	6,000	5,880	.83	4,880	100
Heifers over 1 year	5				lb.	800	4,000	1,280	.18	230	
Excess calves	11				ea.				8.00	88	
Ewes	100			30.0	lb.	130	13,000	1,430	.06	86	8
Lambs	93				lb.	85	7,905	7,905	.18	1,423	
Wool	124				lb.	10	1,240	1,240	.48	595	
Chickens	50			16.5	lb.	7.2	360	340	.23	55	28
Eggs					doz.	10	500	350	.46	161	69
Subtotal										7,955	
Average farm investment		Farm work		Family living		Financial summary					
Land	\$8,800	Item	Days	Net farm income 1/		\$4,916		Receipts:			
Farm buildings and improvements	6,147	Crops	225	Less debt service 3%		1,077		Crop sales			
Machine and equipment	9,558	Livestock	256	Less payment capacity		471		Livestock and livestock product sales			
Dwelling	5,000	Miscellaneous	16	Available to family		3,368		Total cash farm receipts			
Livestock	5,400	Total	497	Payment capacity				Value of farm privileges			
Feed and supplies	995	Work by:		Net farm income		\$4,916		Gross farm income			
		Operator	283	Less investment allowance 5%		1,795		Current farm expense 1/			
		Family	80	Less family living allowance		2,650		Net farm income 1/			
		Hired	125	Payment capacity				Interest on investment 4%			
		Custom	9	Total		471		Direct benefits			
				Per Acre		2.94		Total			
Total	35,900							Per Acre			

1/ Expenses exclude and income includes return to water.

Budget No. 4
Land class 2
Acres 100

Table 43
Farm Budget Summary

Type of farm: Grade A Dairy
Condition: With

Crops and livestock	Acres or Number	Irrigation		Man work days	Production			Disposal of products grown				Current farm expenses		
		Water require-ment (ac.-ft.)	Times irri-gated		Unit	Yield or weight	Total pro-duction	Sold			Farm use	Taxes, property Insurance, farm Depreciation and repairs		
								Amount	Price	Value				
Crops														
Alfalfa	35		5	65.4	ton	3.8	133	28	\$21.00	\$588	\$2205	Buildings and improvements	355	
Rotation pasture	30		7	28.5	AIM.	7	210		4.50		945	Equipment	825	
Wheat	6		3-4	6.8	bu.	35	210		1.50		315	Fuel, oil, and grease	307	
Barley	9		3-4	10.3	bu.	50	450		1.06		562	Utilities, farm share	70	
Oats	6		3-4	6.8	bu.	55	330		.86		284	Seed	108	
Corn silage	8		4	17.8	ton	14	112		7.24		811	Fertilizer	77	
Garden	.3			.6	value		60				60	Other crop expense	81	
Farmstead & waste	5.7											Hired labor		
Subtotal	100.0									588		Contract	318	
Livestock and live-stock products												Day labor	950	
Dairy cows	32			320.0	lb.	1,200	38,400	5,380	.13	699		Rolling or chopping grain	76	
Butter fat					lb.	300	9,600	9,480	1.15	10,902	138	Feed purchased	120	
Heifers over 1 yr.	8				lb.	800	6,400	2,050	.18	369		Other livestock expense	437	
Excess calves	17				each				8.00	136		Domestic water	72	
Chickens	50			16.5	lb.	7.2	360	240	.23	55	28	Milk hauling	1,299	
Eggs					doz.	10	500	350	.46	161	69	Farm share auto and pick-up	151	
Subtotal										12322		Baler	35	
												Miscellaneous farm expense	115	
												Total current expense	5,876	
Average farm investment		Farm work			Family living						Financial summary			
Land	\$6,000	Item		Days	Net farm income 1/				\$7,757		Receipts:			
Farm buildings and improvements	6,931	Crops		136	Less debt service 3%				1,048		Crop sales		\$588	
Machinery and equipment	9,424	Livestock		337	Less payment capacity				2,211		Livestock and livestock product sales		12,322	
Dwelling	5,000	Miscellaneous		17	Available to family				4,498		Total cash farm receipts		12,910	
Livestock	6,530	Total		490	Payment capacity								Value of farm privileges	723
Feed and supplies	1,038	Work by:			Net farm income				\$7,757		Gross farm income		13,633	
		Operator		300	Less investment allowance 5%				1,746		Current farm expense 1/		5,876	
		Family		80	Less family living allowance				3,800		Net farm income 1/		7,757	
		Hired		100	Payment capacity						Interest on investment 4%		1,397	
		Custom		10	Total				2,211		Direct benefits			
						Per Acre				22.11		Total		6,360
Total	34,923											Per Acre		63.60

1/ Expenses exclude and income includes return to water.

Budget No. 5
Land class 2
Acres 120

Table 44
Farm Budget Summary

Type of farm: Beef
Condition: With

Crops and livestock	Acres or Number	Irrigation		Man work days	Production		Disposal of products grown			Current farm expenses	
		Water require-ment (ac.-ft.)	Times irri-gated		Unit	Yield or weight	Total pro-duction	Sold Amount	Price	Farm Value use	Taxes, property Insurance, farm Depreciation and repairs Buildings and improvements Equipment Fuel, oil, and grease Utilities, farm share Seed Fertilizer Other crop expense Hired labor Contract Day labor Rolling or chopping grain Feed purchased Other livestock expense Domestic water Milk hauling Farm share auto and pick-up Baler Miscellaneous farm expense Total current expense
Crops											
Alfalfa	50.0		5	93.5	ton	3.8	190		21.00	3,990	\$506
Rotation pasture	28.0		7	26.6	AUM	7.0	196		4.50	882	37
Wheat	7.0		3-4	8.0	bu.	35.0	245	154	1.50	231	291
Barley	9.0		3-4	10.3	bu.	50.0	450	413	1.06	438	821
Oats	8.0		3-4	9.1	bu.	55.0	440	405	.86	348	401
Corn silage	10.5		4	23.3	ton	14.0	147		7.24	1,064	28
Garden	.3			.6	value					60	131
Farmstead and waste	7.2										106
Subtotal	120.0			171.4						1,017	116
Livestock & L.S. prod.											
Butterfat				14.4	lb.	300	300	180	.83	149	100
Beef cows	80			112.0	lb.	1,000	80,000	11,200	.15	1,688	185
Long yearlings	46				lb.	700	32,200	32,200	.195	6,289	696
Chickens	50			16.5	lb.	7.2	360	240	.23	55	72
Eggs					doz.	10	500	350	.46	161	13
Subtotal				145.9						8,342	151
Average farm investment		Farm work		Family living		Financial summary					
Land	\$7,200	Item	Days	Net farm income 1/		\$5,652		Receipts:			
Farm buildings and improvements	4,258	Crops	171	Less debt service 3%		1,346		Crop sales			
Machine and equipment	9,465	Livestock	146	Less payment capacity		609		Livestock and livestock product sales			
Dwelling	5,000	Miscellaneous	20	Available to family		3,697		Total cash farm receipts			
Livestock	17,595	Total	337	Payment capacity				Value of farm privileges			
Feed and supplies	1,349	Work by:		Net farm income		\$5,652		Gross farm income			
		Operator	226	Less investment allowance 5%		2,243		Current farm expense 1/			
		Family	80	Less family living allowance		2,800		Net farm income 1/			
		Hired	31	Payment capacity:				Interest on investment 4%			
		Custom		Total		609		Direct benefits			
				Per Acre		5.07		Total			
Total	44,867							Per Acre			

1/ Expenses exclude and income includes return to water.

Budget No. 6
Land class 2
Acres 120

Table 45
Farm Budget Summary

Type of farm: Grade C Dairy-Sheep
Condition: Without

Farm Budget Summary										Condition: Without			
Crops and livestock	Acres or Number	Irrigation			Production			Disposal of products grown			Current farm expenses		
		Water require-ment (ac.-ft.)	Times irri-gated	Man work days	Unit	Yield or weight	Total pro-duction	Sold		Farm use			
								Amount	Price				Value
Alfalfa	40		3	56.4	Ton	2.9	116	16	\$21.00	\$336	\$2100	Taxes, property	\$ 418
Rotation pasture	42.5		4	27.6	AUM	4	170		4.50		765	Insurance, farm	44
Wheat	7		2-3	7.0	BU.	30	210	118	1.50	178	136	Depreciation and repairs	
Barley	9		2-3	9.0	BU.	40	360		1.06		382	Buildings and improvements	312
Oats	8		2-3	8.0	BU.	50	400	164	.86	141	203	Equipment	794
Corn Silage	6		4	13.3	Ton	14	84		7.24		608	Fuel, oil, and grease	291
Garden	.3			.6	Value		100				60	Utilities, farm share	56
Farmstead & Waste	7.2											Seed	122
Sub total	120.0										655	Fertilizer	80
Livestock & L.S. Products												Other crop expense	71
Dairy Cows	16			172.8	Lb.	1200	19,200	2688	.13	349		Hired labor	
Butterfat					Lb.	300	4,800	4680	.83	3884	100	Contract	306
Heifers over 1 yr.	4				Lb.	800	3,200	1024	.18	184		Day labor	86
Excess Calves	9				Each			9	8.00	72		Rolling or chopping grain	38
Ewes:	75			22.5	Lb.	130	9,750	1040	.06	62	8	Feed purchased	31
Lambs	70				Lb.	85	5,950	5950	.18	1071		Other livestock expense	401
Wool	93				Lb.	10	930	930	.48	446		Domestic water	72
Chickens	50			16.5	Lb.	7.2	360	240	.23	55	28	Milk hauling	328
Eggs					Doz	10	500	350	.46	161		Farm share auto and pick-up	151
Sub total												Baler	30
Average farm investment												Miscellaneous farm expense	73
Land	\$6,600											Total current expense	3,704
Farm buildings and improvements	5,383												
Machine and equipment	8,886												
Dwelling	5,000												
Livestock	4,260												
Feed and supplies	857												
Total	30,986												
					</								

1/ Expenses exclude and income includes return to water.

Budget No. 7
Land class 2
Acres 100

Table 46
Farm Budget Summary

Type of farm: Grade A. Dairy
Condition: Without

Farm Budget Summary												Condition:		Without			
Crops and livestock	Acres or Number	Irrigation		Man work days	Production			Disposal of products grown				Current farm expenses					
		Water requirement (ac.-ft.)	Times irrigated		Unit	Yield or weight	Total production	Sold			Farm use						
								Amount	Price	Value							
Crops:																	
Alfalfa	35.0		3	49.4	Ton	2.9	102	17	21.00	357	1,785	Taxes, property				\$404	
Rotation Pasture	30.0		4	19.5	AUM	4.0	120		4.50		580	Insurance, farm				50	
Wheat	6.0		2-3	6.0	Bu.	30	180		1.50		270	Depreciation and repairs					
Barley	9.0		2-3	9.0	Bu.	40	360		1.06		380	Buildings and improvements				846	
Oats	6.0		2-3	6.0	Bu.	50	300		.86		258	Equipment				822	
Corn Silage	8.0		4	17.8	Ton	14	112		7.24		811	Fuel, oil, and grease				272	
Garden	.3			.6	Value		60				60	Utilities, farm share				64	
Farmstead and Waste	5.7											Seed				108	
Subtotal	100.0			108.3								Fertilizer				77	
Livestock and Live-stock Products												Other crop expense				62	
Dairy Cows	25			275.0	Lbs.	1,200	30,000	4,200	.13	546	138	Hired labor					
Butterfat					Lbs.	300	7,500	7,380	1.15	8487		Contract				318	
Heifers over 1 yr.	6				Lbs.	800	4,800	1,600	.18	288		Day labor				314	
Excess Calves	14				Ea.			14	8.00	112		Rolling or chopping grain				59	
Chickens	50			16.5	Lbs.	7.2	360	240	.23	55	28	Feed purchased				70	
Eggs					Doz.	10	500	350	.46	161	69	Other livestock expense				348	
Subtotal				291.5						9649		Domestic water				72	
Average farm investment												Milk hauling				1,011	
Land	\$5,500											Farm share auto and pick-up				151	
Farm buildings and improvements	6,682											Baler				26	
Machine and equipment	9,348											Miscellaneous farm expense				91	
Dwelling	5,000											Total current expense				4,665	
Livestock	5,090																
Feed and supplies	881																
Total	32,501																
Average farm investment		Farm work		Family living		Financial summary											
Item		Days		Net farm income 1/		\$ 6,064		Receipts:									
Crops		108		Less debt service 3%		975		Crop sales								\$357	
Livestock		292		Less payment capacity		1,239		Livestock and livestock product sales								9,649	
Miscellaneous		15		Available to family		3,850		Total cash farm receipts								10,006	
Total		415		Payment capacity				Value of farm privileges								723	
Work by:				Net farm income		\$6,064		Gross farm income								10,729	
Operator		292		Less investment allowance 5%		1,625		Current farm expense 1/								4,665	
Family		80		Less family living allowance		3,200		Net farm income 1/								6,064	
Hired		33		Payment capacity:				Interest on investment 4%								1,300	
Custom		10		Total		1,239		Direct benefits									
				Per Acre		12.39		Total								4,764	
								Per Acre								47.64	
1/ Expenses exclude and income includes return to owner																	

Budget No. 8
Land class 2
Acres 120

Table 47
Farm Budget Summary

Type of farm: Beef
Condition: Without

[illegible]

1/ Expenses exclude and income includes return to water.

Table 48
Summarized data from representative farm budgets

	Grade A dairy farm:		Beef farm		Grade C dairy-sheep farm			
	Without:		Without:		Without:			
	unit	With unit	unit	With unit	unit	With unit	With unit	
Land class	Class 2:	Class 2	Class 2:	Class 2	Class 2:	Class 1:	Class 2:	Class 3
Size of farm	: 100 :	100	: 120 :	120	: 120 :	100	: 120 :	160
Receipts:	:	:	:	:	:	:	:	:
Crops	: 357 :	588	: 834 :	1,017	: 655 :	1,151	: 1,534 :	1,695
Livestock	: 9,649 :	12,322	: 6,931 :	8,342	: 6,284 :	7,955	: 7,955 :	7,955
Privileges	: 723 :	723	: 685 :	685	: 693 :	693	: 693 :	693
Total	: 10,729 :	13,633	: 8,450 :	10,044	: 7,632 :	9,799	: 10,182 :	10,343
Expenses: ^{1/}	:	:	:	:	:	:	:	:
Taxes	: 404 :	429	: 474 :	506	: 418 :	453	: 445 :	454
Depreciation	: 1,168 :	1,180	: 1,105 :	1,112	: 1,106 :	1,123	: 1,128 :	1,188
Other	: 3,093 :	4,267	: 2,430 :	2,774	: 2,180 :	2,699	: 3,065 :	3,785
Total	: 4,665 :	5,876	: 4,009 :	4,392	: 3,704 :	4,275	: 4,638 :	5,427
Net Farm Income	: 6,064 :	7,757	: 4,441 :	5,652	: 3,928 :	5,524	: 5,544 :	4,916
Investment allowance at 5%	: 1,625 :	1,746	: 2,041 :	2,243	: 1,549 :	1,635	: 1,674 :	1,795
Family living allowance	: 3,200 :	3,800	: 2,208 :	2,800	: 2,187 :	3,200	: 3,200 :	2,650
Payment capacity per farm	: 1,239 :	2,211	: 192 :	609	: 192 :	689	: 670 :	471
Payment capacity per acre	: 12.39 :	22.11	: 1.60 :	5.07	: 1.60 :	6.89	: 5.58 :	2.94
Increased payment capacity ^{2/}	: -- :	7.30	: -- :	2.60	: -- :	--	: 3.00 :	^{3/} 1.20

^{1/} Expenses exclude irrigation, operation, and maintenance costs.

^{2/} Provides for a contingency of 25%.

^{3/} Weighted to include Grade A dairy and beef farms.

the calves are fed one winter and sold the following fall weighing around 700 pounds. It is the latter system which has been analyzed in both beef budgets.

The beef budgets for a 120 acre farm show less labor used than the other types of farming. Also, there is less payment capacity per acre with this type of farming.

Family Living Allowance

In the establishment of a family-sized farm the Bureau of Reclamation has adopted a family living allowance of \$2,250 as a Bureau objective. This allowance was based on the 215 price level (1910-14=100). Included in this amount are the family labor income, the value of farm-produced food consumed by the family, value of rent, and other farm privileges furnished by the farm.

The family living index for the 215 price level is 210. For the 250 price level it is estimated at 240 or a 14 percent increase which amounts to \$2,565 which has been rounded to \$2,600. This level of living adopted by the Bureau of Reclamation was based on several studies of consumer purchases, home accounts, and other studies. Most investigations indicate that the family living expenditures increase with income but at different rates. For this reason and because the Bureau optimum amount of \$2,600 is not applicable to all areas, several methods of determining the family living allowance are considered in establishing the amount to be used in each farm budget in this study. In addition to Bureau optimum, one approach is the family living expenditures in relation to farm income which was determined from a curve based on data from 948 Oregon-Washington farm schedules considered representative of conditions on irrigated farms in the western states. This information was indexed to the 250 price level. Another approach was the labor management wage. Here the operator and family is allowed the going wage rate plus a return to management in the amount of 10 percent of net farm income. The three methods, together with the level finally adopted, are tabulated in Table 49 of this report.

Summary of Payment Capacity, Amortization Capacity, and Recommended Annual Rate

A summary of the increased payment capacities, amortization capacities and the recommended annual rate is shown by land classes and types of farming in Table 50. The payment capacities were estimated with full recognition being given to the average annual shortages of 5 percent in the project water supply.

Table 49
Level of Living for Representative Farms

Budget No.	Type of Farm and Condition	Land Class	Operator & Family M.U.'s	Family Labor Value ^{1/}	Net ^{2/} Farm Income	O. & M. per Acre	Family Living Allowance Before O. & M.	After Bureau O. & M. Optimum	Adopted Level of Living
1	Dairy - Sheep With	1	354	3752	3889	260	3080	3000	3200
2	Dairy - Sheep With	2	362	3926	3570	312	3060	2900	3200
3	Dairy - Sheep With	3	363	3760	3121	416	2720	2490	2650
4	Grade A Dairy With	2	380	4211	6011	260	3490	3550	3800
5	Beef With	2	306	3243	3409	312	2850	2680	2800
6	Dairy - Sheep Without	2	329	3353	2379	192	2250	2200	2100
7	Grade A Dairy Without	2	372	3976	4439	160	3250	3230	3200
8	Beef Without	2	279	2890	2400	192	2260	2210	2200

^{1/} Based on \$9.50 per day plus 10% of Net Farm Income.

^{2/} Net income to farm operator and family labor and to irrigation water.

Table 50
Amortization capacity and recommended annual installment

Type of farm	Irrigable acreage (acres)	Unit water supply (acre-feet)	Increased payment capacity per acre	Increased O, M, and R costs per acre	Amortization capacity		Recommended annual rate	
					Per acre	Per acre-foot of unit water	Per acre-foot	Total
Class 1								
Subtotal or average	3,286	3,600	--	--	--	--	2/ \$3.00	\$10,800
Class 2								
Grade A Dairy	1,340	1,600	\$7.30	\$0.90	\$6.40	\$5.30		8,500
Grade C Dairy - sheep	2,680	3,220	3.00	.90	2.10	1.70		5,500
Beef	1,337	1,600	2.60	.90	1.70	1.40		2,200
Subtotal or average	5,357	6,420					2.50	16,200
Class 3								
Subtotal or average	5,801	7,600	1.20	.90	.30	.25	.25	1,900
Vernal Townsite	337	380					3/ 3.00	1,100
Unit total	14,781	18,000		\$12,700	--	--	1.65	30,000

1/ Based on additional diversion of 1.1 a/f per acre for class 1; 1.2 a/f for class 2; and 1.3 for class 3.

2/ Based on 120% of class 2.

3/ Considered to be the same as class 1 repayment.

The increased amortization capacity is the increased payment capacity less the increased operation and maintenance costs. The recommended annual rate is the increased amortization capacity less a contingency factor of 25 percent then rounded to the nearest cents per acre-foot of water. This contingency factor is used in order to be conservative and to allow for any possible inconsistencies in the economic data used in the farm budgets.

There were no budgets set up for class 1 land in the "without" condition; therefore, to arrive at a rate for this class the relationship of net farm income per acre of class 1 to class 2 under the "with" condition was determined to be approximately 120 percent. This percentage was then applied to the class 2 recommended annual rate. Class 3 can pay its proportionate share of the increased O & M plus a small amount toward repayment of construction costs. This is not felt too serious a problem because class 3 lands are interspersed with 1 and 2. There are very few, if any, farms composed completely of class 3 lands. Therefore, no farmer on class 3 land will be burdened with a class 1 or 2 repayment rate.

An overall unit repayment rate of \$30,000 is recommended which amounts to approximately \$1.65 per acre-foot of increased water supplied as a result of the construction of Stanaker Dam and related works. This amount is a weighted average of the various land classes as well as the various types of farming.

Irrigation water in this area as well as most other parts of Utah is distributed through mutual nonprofit irrigation companies and is not appurtenant to the land. The water, expressed in terms of shares of stock, can be bought and sold or rented and used on various lands without restriction. Under such a system of ownership and operation assessments or water charges are based on shares of water stock and not acres of land. To assess water charges on an acreage basis would require extensive changes in the organization and operation of existing irrigation companies as well as the establishment of individual acreage water allotments wherein water would be made appurtenant to the land. Aside from the difficulty and disadvantages of changing the organization of the existing irrigation companies in making water appurtenant to the land, desirable operational flexibility would be lost. For these reasons irrigation water made available by the Vernal unit will be sold in acre-feet through the vehicle of shares of stock and will not be appurtenant to the land. This means each share of stock will be assessed the same, regardless of the class of land the water will be used on. It will be the responsibility of the contracting entity which in this case will be the conservancy district to collect the sum annually to be repaid to the U. S. Government.

Variable Repayment Plan

Inasmuch as the farm budgets have been based on average long-term prices as well as average water supply, crop yields, and farm production, the actual repayment ability for the specific year may vary from the average because of changes in the farm prices or other factors from year to year. For this reason a variable repayment plan should be incorporated into the payment contract with the conservancy district and the farmers. It is suggested that the rate be tied to the U. S. Farm parity ratio.

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FINANCIAL ANALYSIS APPENDIX

Prepared by LeGrand B. Ward and Elwood H. Clark,
Agricultural Economists, under direction of
Parley R. Neeley, Area Engineer

Technical supervision and review by Paul T. Sant,
Chief, Economics Resources Branch, Regional Project Division,
under direction of
Reid Jerman, Regional Project Development Engineer

FINANCIAL ANALYSIS

CHAPTER I

BENEFIT-COST ANALYSIS

A benefit-cost analysis has been made of the Vernal unit to determine whether or not the proposed unit is economically justified. The benefit-cost analysis recognizes the widespread effects of reclamation which are not incorporated in other studies. Consideration is given to all project effects, beneficial or adverse, to whomsoever they may accrue, locally, regionally, or nationally. Such effects are evaluated as completely as possible on comparable bases, so that the analysis approaches full coverage from a public or national viewpoint. The measurement of benefits involves an estimate of differences between future conditions with and without the project. All non-Federal costs incurred in creating benefits are deducted from the benefits side so the benefits are expressed as a net in the ratio. Such an evaluation of benefits is made in monetary terms so far as possible. Consideration has also been given to the intangible or unmeasurable benefits in reaching a final judgment on the unit.

The effects of the Vernal unit comprising increases in available goods and services are converted to monetary terms by the use of market prices expected to prevail at the time when costs are incurred and benefits received. Unit construction costs are based on current prices and average long-term prices are used for irrigation benefits, for irrigation unit operation and maintenance costs, and for private investment. Average long-term prices used in the benefit-cost analysis are based on the assumption that the period of analysis is characterized by an expanding economy in which increasing amounts of goods and services will be required to meet the needs of an expanding population and from rising levels of living. A long-term agricultural price index averaging 235 for prices received by farmers and 250 for prices paid by farmers (using average prices for 1910-14 as 100) has been used in this study. Little or no difference would result from the use of a 250/265 price level since the parity level is the same in both cases.

The period of analysis begins with the initial operation of the unit and extends for 100 years as the economic life of the unit. For the purpose of comparison with benefits in the benefit-cost ratio, costs are converted to an average annual equivalent basis.

Benefits

Four classes of benefits have been identified as resulting from the construction of the Vernal unit; these benefits are:

- (1) Direct benefits which are derived from the increased production of farm products; provision for municipal water, improvement of recreation and conservation of fish and wildlife.
- (2) Indirect irrigation benefits resulting from increases in goods and services flowing through the various channels of trade.
- (3) Public benefits.
- (4) Intangible benefits.

Irrigation benefits

Irrigation benefits have been recognized in this study as benefits resulting from the increase in production of goods and services attributable to the increased supply of supplemental water to the unit lands. These benefits have been evaluated as direct, indirect, public and intangible.

Direct Irrigation Benefits

Direct irrigation benefits have been calculated from summaries of farm budget data representing conditions with and without unit development. The evaluation of direct irrigation benefits is derived as follows:

Class A benefits.--Class A benefits represent the increase in family living. This includes the value of farm-produced foods consumed by the family, rental value of farm dwelling, and cash allowance for family living expenditures.

Class B benefits.--Class B benefits represent the increased payment capacity. This is derived by deducting from the gross farm income all farm expenses and the family living allowance.

Class C benefits.--Class C benefits represent the increased equity in the farm investment.

All of these items are derived from detailed farm budget analyses prepared for estimating irrigation repayment, as shown in the agricultural economy appendix.

Indirect Irrigation Benefits

The indirect irrigation benefits have also been calculated from summaries of farm budget data representing conditions with and without unit development. The evaluation of indirect irrigation benefits is derived as follows:

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BENEFIT-COST ANALYSIS

Class A benefits.--Class A benefits comprise the increases in profits of local retailers and wholesalers from handling the sale of farm products consumed locally without processing.

Class B benefits.--Class B benefits comprise the profits of all other enterprises between the farm and the final consumer due to handling, processing and marketing of increased farm production.

Class C benefits.--Class C benefits comprise the profits of all enterprises supplying increased goods and services for family living and farm production expenses.

In arriving at the value of the indirect irrigation benefits, specific factors have been applied to the increases or decreases in the sale value of individual commodities. These factors are shown in the following analysis of indirect irrigation benefits.

Public Benefits

Public benefits from the Vernal unit are considered to be the increase or improvement in the community facilities and stabilization of economy.

Community facilities.--An increase in the usable irrigation water will result in an increase in the present tax base and thus in an increase in real and personal property taxes. The increased taxes are considered to represent that portion of improved community facilities and services attributable to irrigation development.

Stabilization of economy.--Providing a dependable late season water supply will make a real contribution in raising and stabilizing the economy for both the farmers and the businessmen in the Vernal area. An arbitrary benefit amounting to ten percent of direct farm benefits has been credited the unit for this purpose.

Summary of Irrigation Benefits by Types of Farming

Tables, No. 1 to 9, are based on the farm budgets used to determine the repayment ability of the irrigators, present the tangible benefits attributable to irrigation. It should be recognized that the farm budgets have not been developed for all of the minor types of farming found within the area. However, it is assumed that the benefits from these minor types would be represented by the major types presented. Table 10 is a summary of the irrigation benefits by types of farming.

Table 1
Direct Irrigation Benefits--Grade A Dairy

Item	With Project	Without Project	Increase		Direct Benefits Per Acre
			Per Farm	Per Acre	
Land Class 2					
No. Acres per Farm	100	100			
Farm Products Sold	\$12,910	\$10,006	\$2,904		
Value of Farm Privileges	723	723	0		
Gross Farm Income	13,633	10,729	2,904		
Production Expenses	5,876	4,665	1,211		
Family Living Allowance ^{1/}	3,800	3,200	600	\$6.00 "A"	\$6.00
Payment Capacity	2,211	1,239	972	9.72 "B"	9.72
Farm Investment	34,923	32,501	2,422	24.22 "C"	.24 ^{2/}
Total A, B, & C Benefits					\$15.96
	Direct Benefits per acre	Number of Acres			Total Direct Benefits
Land Class 1 = 120% of 2 ^{3/}	\$19.15	906			\$17,300
Land Class 2 =	15.96	1339			21,400
Land Class 3 = 70% of 2 ^{3/}	11.17	1450			16,200
Total					\$ 54,900

^{1/} Family Living Allowance includes rental value of dwelling plus value of farm products consumed in the home.

^{2/} Equal to 1 percent of increase in farm investment.

^{3/} Based on per acre relationship of net farm income.

Table 2
Direct Irrigation Benefits -- Grade C Dairy & Sheep

Item	With Project	Without Project	Increase		Direct Benefits Per Acre
			Per Farm	Per Acre	
Land Class 2					
No. Acres per Farm	120	120			
Farm Products Sold	\$9,489	\$6,939	\$2,550		
Value of Farm Privileges	693	693	0		
Gross Farm Income	10,182	7,632	2,550		
Production Expenses	4,638	3,704	934		
Family Living Allowance ^{1/}	3,200	2,187	1,013	\$8.44 "A"	\$8.44
Payment Capacity	670	192	478	3.98 "B"	3.98
Farm Investment	33,470	30,986	2,484	20.70 "C"	.21 ^{2/}
Total A, B, & C Benefits					\$12.63
	Direct Benefits per acre	Number of Acres			Total Direct Benefits
Land Class 1 = 120% of 2 ^{3/}	\$15.16	1,811			\$27,500
Land Class 2	12.63	2,679			33,800
Land Class 3 = 70% of 2 ^{3/}	8.84	2,901			25,600
Total All Land Classes					\$86,900

^{1/} Family living allowance includes rental value of dwelling plus value of farm products consumed in the home.

^{2/} Equal to 1 percent of increase in farm investment.

^{3/} Based on per acre relationship of net farm income.

Table 3
Direct Irrigation Benefits--Beef Cattle

Item	With Project	Without Project	Increase		Direct Benefits Per Acre
			Per Farm	Per Acre	
Land Class 2					
No. Acres per Farm	120	120			
Farm Products Sold	\$9,359	\$7,765	\$1,594		
Value of Farm Privileges	685	685	0		
Gross Farm Income	10,044	8,450	1,594		
Production Expenses	4,392	4,009	383		
Family Living Allowance ^{1/}	2,800	2,208	592	\$4.93 "A"	\$4.93
Payment Capacity	609	192	417	3.48 "B"	3.48
Farm Investment	44,867	40,828	4,039	33.66 "C"	.34 ^{2/}
Total A, B, & C Benefits					\$8.75
	Direct Benefits per acre	Number of Acres			Total Direct Benefits
Land Class 1 = 120% of 2 ^{3/}	\$10.50	906			\$9,500
Land Class 2 =	8.75	1,339			11,700
Land Class 3 = 70% of 2 ^{3/}	6.12	1,450			8,900
Total					\$30,100

^{1/} Includes rental value of dwelling plus value of farm products consumed in the home.

^{2/} Equal to 1 percent of increase in farm investment.

^{3/} Based on per acre relationship of net farm income.

Table 5
Indirect Irrigation Benefits--Grade C Dairy & Sheep Farm

Item	With Project	Without Project	Increase		Factor	Indirect Benefits Per Acre
			Per Farm	Per Acre		
Land Class 2						
No. Acres per Farm	120	120				
Sales to Local Wholesale & Retail Business						
Hay & Forage	\$1,176	\$ 336	\$840	\$7.00	5	\$.35
Subtotal Benefit "A"						.35
Sales for Local and Non-local Processing, Mktg., etc.						
Grain	358	319	39	.32	48	.15
Livestock (meat)	2,264	1,738	526	4.38	11	.48
Dairy Products	4,880	3,884	996	8.30	7	.58
Poultry Products	216	216	0	0	6	0
Wool	595	446	149	1.24	78	.97
Subtotal Benefit "B"						\$2.18
Purchases for Family Living and Production Expenses						
Direct farm benefit A ^{1/}				8.44		
Less increased Perquisite ^{2/}				--		
Increased purchases for family living				8.44		
Increased farm production expenses				7.78		
Subtotal Benefit "C"				\$16.22	18	\$2.92
Total Indirect Benefits "A", "B", & "C"						\$5.45

	Indirect Benefits Per Acre	Number of Acres	Total Indirect Benefits
Land Class 1 = 120% of 2 ^{3/}	\$6.54	1,811	\$11,800
Land Class 2	5.45	2,679	14,600
Land Class 3 = 70% of 2 ^{3/}	3.82	2,901	11,100
Total all Land Classes			\$37,500

^{1/} Increased family living allowance.

^{2/} Increased products consumed in the home plus increased rental value of dwelling.

^{3/} Based on per acre relationship of net farm income.

Table 4
Indirect Irrigation Benefits--Grade A Dairy

Item	With Project	Without Project	Increase		Factor	Indirect Benefits Per Acre
			Per Farm	Per Acre		
Land Class 2						
No. Acres per Farm	100	100				
Sales to Local Wholesale and Retail Business						
Hay and Forage	\$ 588	\$ 357	\$ 231	\$ 2.31	5	\$.12
Subtotal Benefit "A"						.12
Sales for Local and Non-local Processing, Mktng., etc.						
Livestock (meat)	1,204	946	258	2.58	11	.28
Dairy Products	10,902	8,487	2415	24.15	7	1.69
Poultry Products	216	216	0	0	6	0
Subtotal Benefit "B"						\$1.97
Purchases for Family Living and Production Expenses						
Direct Farm Benefit "A" ^{1/}				6.00		
Less increased perquisites ^{2/}				--		
Increased purchase for Family Living				6.00		
Increased Farm Production Expenses				<u>12.11</u>		
Subtotal Benefit "C"				18.11	18	3.26
Total Indirect Benefits "A", "B", & "C"						\$5.35

	Indirect Benefits Per Acre	Number of Acres	Total Indirect Benefits
Land Class 1 = 120% of 2 ^{3/}	\$6.42	906	\$5,800
Land Class 2 =	5.35	1,339	7,200
Land Class 3 = 70% of 2 ^{3/}	3.74	1,450	5,400
Total all Land Classes			\$18,400

^{1/} Increased family living allowance.

^{2/} Increased products consumed in the home plus increased rental value of dwelling.

^{3/} Based on per acre relationship of net farm income.

Table 6
Indirect Irrigation Benefits--Beef Cattle

Item	With Project	Without Project	Increase		Factor	Indirect Benefits Per Acre
			Per Farm	Per Acre		
Land Class 2						
No. Acres per Farm	120	120				
Sales to Local Wholesale and Retail Business						
Hay and Forage	--	--	--	--	--	--
Subtotal Benefit "A"	--	--	--	--	--	--
Sales for Local & Non-Local Processing, Mktg., etc.						
Grain	\$1,017	\$ 834	\$ 183	\$ 1.52	48	\$.73
Livestock (meat)	7,977	6,566	1,411	11.76	11	1.29
Dairy products	149	149				
Poultry products	216	216				
Subtotal Benefit "B"						\$2.02
Purchases for Family Living and Production Expenses						
Direct Farm Benefit "A" ^{1/}				4.93		
Less increased perquisites ^{2/}				--		
Increased purchases for Family Living				4.93		
Increased Farm Production Expenses				3.19		
Subtotal Benefit "C"				8.12	18	1.46
Total Indirect Benefits "A", "B", & "C"						\$3.48

	Indirect Benefits Per Acre	Number of Acres	Total Indirect Benefits
Land Class 1 = 120% of 2 ^{3/}	\$ 4.18	906	\$3,800
Land Class 2	3.48	1,339	4,700
Land Class 3 = 70% of 2 ^{3/}	2.44	1,450	3,500
Total all Land Classes			\$12,000

^{1/} Increased Family Living Allowance.

^{2/} Increased products consumed in the home plus increased rental value of dwelling.

^{3/} Based on per acre relationship of net farm income.

Table 7
Public Irrigation Benefits--Grade A Dairy

Class 2 Land				
Item	With Project	Without Project	Increase Per Farm	Increase Per Acre
Stabilization of Economy <u>1/</u>				\$1.60
Community Facilities & Services				
Property Tax	\$429	\$404	\$25	.25
Total				\$1.85

	Public Benefits Per Acre	Number of Acres	Total Public Benefits
Land Class 1 = 120% of 2 ^{2/}	\$2.22	906	\$2,000
Land Class 2	1.85	1,339	2,500
Land Class 3 = 70% of 2 ^{2/}	1.30	1,450	1,900
Total			\$6,400

1/ 10% of direct benefits on partially irrigated lands.

2/ Based on per acre relationship of net farm income.

Table 8
Public Irrigation Benefits--Grade C Dairy & Sheep

Class 2 Land				
Item	With Project	Without Project	Increase Per Farm	Increase Per Acre
Stabilization of Economy <u>1/</u>				\$1.26
Community Facilities & Services				
Property Tax	\$445	\$418	\$28	.22
Total				\$1.48

	Public Benefits Per Acre	Number of Acres	Total Public Benefits
Class 1 = 120% of <u>2/</u>	\$1.78	1,811	\$3,200
Class 2	1.48	2,679	4,000
Class 3 = 70% of <u>2/</u>	1.04	2,901	3,000
Total			\$10,200

1/ 10% of direct benefits on partially irrigated lands.

2/ Based on per acre relationship of net farm income.

Table 9
Public Irrigation Benefits--Beef Cattle

Class 2 Land				
Item	With Project	Without Project	Increase Per Farm	Increase Per Acre
Stabilization of Economy <u>1/</u>				\$.87
Community Facilities & Services				
Property Tax	\$406	\$474	\$32	.27
Total				\$1.14

	Public Benefits Per Acre	Number of Acres	Total Public Benefits
Land Class 1 = 120% of 2 ^{2/}	\$1.37	906	\$1,200
Land Class 2	1.14	1,339	1,500
Land Class 3 = 70% of 2 ^{2/}	.80	1,450	1,200
Total			\$3,900

1/ 10% of direct benefits on partially irrigated lands.

2/ Based on per acre relationship of net farm income.

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Table 10
Summary of Annual Irrigation Benefits with Full Development
By Types of Farming

Type of Farm	Direct Benefits	Indirect Benefits	Public Benefits	Total Benefits
Grade C dairy and sheep	\$86,900	\$37,500	\$10,200	\$134,600
Grade A dairy	54,900	18,400	6,400	79,700
Beef	30,100	12,000	3,900	46,000
Total	171,900	67,900	20,500	260,300

Development Period

Some benefits from the use of unit water can be immediately realized from all the land served by the unit. However, before full benefits can be obtained from an increased water supply, some farm improvements must be effected. These improvements would consist of additional farm laterals and farm turnouts, some additional land leveling or planing. It will require the purchase or building up of additional breeding stock of cows and sheep to enlarge their size of herd. It is not anticipated that a development period longer than three years will be required before full benefits can be obtained. To allow for this three-year development period, a factor of 97.4 percent has been applied to the annual irrigation benefits when fully developed.

Summary of Annual Irrigation Benefits

Table No. 11 summarizes the tangible irrigation benefits on a per acre basis, a per acre-foot basis, and also the total average annual benefits adjusted for the 3-year development period.

Table 11
Summary of average annual equivalent irrigation benefits

	Irrigable acres ^{1/}	Unit water supply	Irrigation benefits			
			Direct	Indirect	Public	Total
Benefits per acre	14,781		\$11.33	\$4.47	\$1.35	\$17.15
Benefits per acre-foot		18,000	9.30	3.67	1.11	14.08
Unit Irrigation benefits			171,900	67,900	20,500	260,300
Average Annual equivalent irrigation benefits ^{2/}			167,400	66,100	20,000	253,500

^{1/} Total irrigable acreage less 241 acres in unit right-of-way.

^{2/} Adjusted for a 3-year development period.

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Municipal water benefits

Annual benefits derived from providing a municipal water supply are considered to be the amortized value of the construction costs for the lowest cost, single-purpose alternative for 100 years at $2\frac{1}{2}$ percent interest plus the annual charges of operation, maintenance and replacement. The lowest cost single-purpose alternative is discussed in a later chapter of this appendix. In this case the cheapest alternative would be to purchase Oaks Park Reservoir water (by condemnation) which is presently developed for irrigation.

Cost of Oaks Park water	\$820,000
Present worth of Operation, Maintenance & Replacement Costs (\$1,400 annually)	<u>51,300</u>
	871,300
Rounded	871,000
Average annual equivalent $2\frac{1}{2}\%$ for 100 years	23,800

Recreational benefits

Recreation would be provided at Stanaker Reservoir with the development of picnicking and boating facilities along with the necessary parking areas. It is estimated by the National Park Service that at least 15,000 people will use these facilities during a season.

An estimate in monetary terms for the purpose of comparison of recreation values of the Stanaker Reservoir and its development costs has been made by the National Park Service. The estimate is based on the assumption that the benefits are equal to the specific cost of the recreational development including the operation and maintenance costs.

Annual Costs - Development, Operation and Maintenance, \$7,100.00, capitalized for 100 years at $2\frac{1}{2}\%$	\$259,959.40
Existing Recreation Values Destroyed.	<u>None</u>
Net benefits arising specifically from development of facilities	259,959.40
Benefits arising from joint use of Reservoir.	<u>259,959.40</u>
Total Recreation Benefits	\$519,918.80
Rounded to:	\$520,000.00
Average Annual Equivalent $2\frac{1}{2}\%$ for 100 years	14,200.00

Fish and wildlife benefits

The Fish and Wildlife Service has estimated that there will be no reduction in fishing as a result of the operation of the unit and that an annual benefit of \$11,000 will result from fishing at the Stanaker Reservoir. With the purchase and development of land interspersed in the unit area this agency estimates a net benefit of \$2,950 annually will result from the additional hunting of upland game. The hunting of migratory birds will also result in a net benefit of \$750 annually with the purchase of a pump and pipe to pump water into Stewart Lake refuge. A net loss of \$50 and \$1,100 annually is estimated for fur bearing animals and big game, respectively. A summary of the annual net Fish and Wildlife benefits and costs follows:

Fish and wildlife benefits (Fish and Wildlife Report of May 1957)					
Wildlife resources	Average annual benefit or loss (-) from Vernal unit		Cost of recommended facilities		
	Without specific fish and wildlife facilities	With recommended fish and wildlife facilities	Total	Capital Annual equivalent ^{1/}	Annual operation and maintenance
Fishery	\$11,000	\$11,000	--	--	<u>2/</u>
Big game	-1,100	-1,100	--	--	--
Upland game	-300	2,950	\$22,100	\$610	\$760
Fur animals	-50	-50	--	--	--
Waterfowl	-850	750	4,500	125	400
Total	9,700	13,550	26,600	735	1,160
Rounded	9,700	13,600	27,000	700	1,200

^{1/} Amortized capital costs for 100 years at 2½ percent interest
^{2/} Costs of stocking and operating Stanaker Reservoir were not reported by the Fish and Wildlife Service.

Intangible and incidental benefits

In addition to the tangible benefits discussed above there are intangible benefits resulting from unit development that have not been evaluated in monetary terms. In the Agricultural Economy Appendix is discussed the fact that Uintah County has been a relatively depressed area insofar as agricultural incomes and a standard of living are concerned. An increased municipal water supply plus power from nearby Flaming Gorge will facilitate the development of the natural resources of oil shale deposits and phosphate. This development will provide more employment and, coupled with a more stable agriculture as a result of a regulated irrigation water supply, will produce a better balanced economy and place the entire area on a more healthy economic basis.

With the unit development incidental benefits are expected to be realized from reduced flood flows along Ashley Creek.

Summary of unit benefits

The annual direct, indirect and public benefits of the project have been evaluated in monetary terms and are summarized in the following table.

Purpose	Average annual benefits			
	Direct	Indirect	Public	Total
Irrigation	\$167,400	\$66,100	\$20,000	\$253,500
Municipal water	23,800			23,800
Recreation	14,200			14,200
Fish and wildlife	13,600			13,600
Total	219,000	66,100	20,000	305,100

Costs

Construction costs

The construction costs of the unit are based on January 1957 prices and include costs of items of labor, materials, supplies, rights-of-way, relocating facilities, expenditures for replacement or damages, and costs of investigations.

Interest during construction

Interest at $2\frac{1}{2}\%$ during the period of construction of each project feature has been determined and included in the benefit-cost study in the amount shown in Table No. 12.

Interest during construction is also included in the repayment analysis of municipal water costs.

Present worth of terminal salvage value

Under Bureau criteria the period of analysis of benefit-cost comparison is 100 years. Salvage value at the end of the period, limited to value of land in reservoir area, is not significant and has not been included in the analysis.

Annual operation, maintenance, and replacement costs

The operation, maintenance and replacement costs are those expenditures for materials, labor, supplies, etc., necessary to operate the unit, once constructed, and to make repairs and replacements necessary to maintain the unit works. These costs were based on a price level for the previous three years (1954-1956). The Engineering News Record index for this three-year period is 666 with 1913 index at 100.

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In addition to the unit annual costs, recreation annual costs are estimated by the National Park Service at \$2,100 for operation and maintenance and \$5,000 for replacement. The Fish and Wildlife Service has estimated an annual operation and maintenance cost of \$1,200.

Summary of costs

Table No. 12 shows the construction cost, the estimated construction period, and the cost of interest during construction for each unit feature. Table No. 13 shows the annual expense for operation, maintenance and replacements.

Cost attributable to stream depletion

Costs of the Colorado River Storage project's regulatory features would be paid by revenues of the storage project. A pro-rated share of the cost of these regulatory features are, however, assigned for the purpose of benefit-cost analyses to future water-consuming projects in the upper basin since development of such projects is dependent on the regulation that would be provided by the storage project. This cost was developed in the storage project report and amounts to \$0.40 an acre-foot of increased annual consumptive use of water by the Vernal unit.

Average annual equivalent unit costs

The Federal unit costs are used in computing annual equivalent costs for comparison with the annual project benefits. These include the estimated costs of construction amortized at $2\frac{1}{2}\%$ over the 100-year period. Interest during construction is added to the capital costs. Past investigation costs, having no bearing on the justification (benefit-cost comparison), are deducted from the capital costs. Annual operation, maintenance and replacement costs are also included in arriving at the annual equivalent costs along with costs attributable to stream depletion. Table 14 presents the average annual equivalent costs for the unit. All purposes of the Vernal unit (irrigation, municipal water, fish and wildlife and recreation), are justified in that they provide benefits in excess of the allocated costs.

Benefit-Cost Ratio

The overall benefit-cost ratio is the quotient of the total annual net benefits divided by the annual equivalent Federal costs. The total annual net benefits are \$305,100 and the annual equivalent Federal cost is \$211,600 as presented in Table 14 which gives a benefit-cost ratio of 1.44 to 1.

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Table 12
Construction Costs

Feature	Construction Cost ^{1/}	Construction Period	Interest during Construction ^{2/}
Stanaker Dam & Reservoir	\$3,870,000	3	\$145,000
Ft. Thornburg Diversion Dam	200,000	1	--
Stanaker Feeder Canal	570,000	2	14,000
Stanaker Service Canal	1,060,000	3	40,000
Water Saving Pipe System	340,000	1	--
Drainage System	3/ 675,000	3	22,000
Stanaker Canal Laterals	40,000	1	--
Recreation Costs	92,000	1	--
Fish and Wildlife Costs	27,000	1	--
Total	6,874,000		221,000

^{1/} Includes past and future investigation costs, less past expenditure from nonreimbursable Colorado River Development Funds of \$82,000.

^{2/} At 2½ percent.

^{3/} Includes \$100,000 of canal rehabilitation completed within a one-year construction period.

Table 13
Annual Operation, Maintenance & Replacement Costs

Purpose	O. & M.	Replacement	Total
Irrigation & Municipal Water	\$15,000	300	\$15,300 ^{1/}
Recreation	2,100	5,000	7,100
Fish and Wildlife ^{2/}	1,200		1,200
Total	18,300	5,300	23,600

^{1/} This estimate is at current prices. When based on a long term projected price level it amounts to \$14,500.

^{2/} O&M only.

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TABLE 14
Average Annual Equivalent Benefits and Costs

Item	Irrigation	Municipal water	Recreation	Fish & Wildlife	Total
<u>Costs</u>					
Construction Cost	\$6,154,000	\$601,000	\$92,000	\$27,000	\$6,874,000
Interest During Construction	205,000	16,000	--	--	221,000
Less Cost of Past Investigations	-315,000	-35,000	--	--	-350,000
Project Investment	6,044,000	532,000	92,000	27,000	6,745,000
Annual Cost of Amortizing Project Investment ^{1/}	165,000	15,900	2,500	700	184,100
Annual Operation and Maintenance Costs	12,500	1,700	2,100	1,200	17,500
Annual Replacement Costs	200	100	5,000		5,300
Annual Colorado River Storage Cost at 40¢ per A.F. (11,800 A.F.)	4,300	400	--	--	4,700
Total Annual Equiv. Costs	182,000	18,100	9,600	1,900	211,600
<u>Benefits</u>					
Annual Benefits					
Direct	167,400	23,800	14,200	13,600	220,100
Indirect	66,100				66,100
Public	20,000				20,000
Total Annual Benefits	253,500	23,800	14,200	13,600	305,100
Benefit-Cost Ratio	1.39:1	1.31:1	1.48:1	7.16:1	1.44:1

^{1/} 2½ percent for 100 years

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CHAPTER II

COST ALLOCATIONS

The objective of a cost allocation study is to distribute or assign construction and operational costs incurred on multiple-purpose projects. The Vernal unit provides benefits to irrigation, municipal water, recreation and fish and wildlife. The costs of irrigation and municipal water are reimbursable, whereas allocations to recreation and fish and wildlife are nonreimbursable. The specific costs of recreation features in the amount of \$92,000 and for fish and wildlife of \$27,000 have been allocated as nonreimbursable in accordance with Public Law 485.

Method of Analysis

Several methods of cost allocation can be used; however, the method currently preferred by the Department of the Interior is the "Separable Costs-Remaining Benefits Method." Separable costs of facilities which serve but one purpose have been allocated in their entirety to that purpose. The cost of joint facilities has been allocated so as to permit each purpose to share in the economy of the multiple-purpose project. No purpose has been allocated less than the incremental costs of adding that purpose or more than the present worth of the benefits or single purpose alternative, whichever is least. Results of cost allocation by this method are shown in Table 17.

Basic Costs Used in Cost Allocation

The separable costs-remaining benefits method of cost allocation requires estimates of the cost of the selected multiple-purpose development, the cheapest alternative single-purpose cost of each of the unit purposes, and the determination of the separable or incremental cost of each purpose. The operation, maintenance and replacement costs are included as part of the costs mentioned above.

Alternative single-purpose irrigation costs

The most economical single-purpose unit planned and designed to serve only irrigation would be to construct a dam at the Stanaker site sufficient in size and reservoir capacity to serve this purpose. Other facilities would be required as identified and included in the multiple-purpose unit. The costs of the single-purpose irrigation unit are shown on the following page.

Single-purpose Irrigation Unit

<u>Feature</u>	<u>Total estimated cost</u>	<u>Interest during construction^{1/}</u>
Stanaker Dam and Reservoir	\$3,500,000	\$131,000
Stanaker Feeder Canal	570,000	14,000
Ft. Thornburg Div. Dam	200,000	--
Stanaker Service Canal	1,060,000	40,000
Water Savings Pipe system	340,000	--
Drainage system	675,000	22,000
Stanaker Canal laterals	40,000	--
Total	6,385,000	207,000

1/ At $2\frac{1}{2}$ percent.

In addition to the above costs there would be an annual charge for operation, maintenance and replacement costs of \$14,170.

Alternative single-purpose municipal water costs

In formulating the multiple-purpose unit plan and in determining the amount of the costs justifiably allocable to each unit purpose, studies have been made of alternative single-purpose plans or means of providing equivalent benefits to those provided by the multiple-purpose unit. Several alternative single-purpose means of providing 1,500 acre-feet of municipal and industrial water have been investigated and are presented in the following paragraphs. Additional water could be made available to the municipalities by either of two general procedures, (1) construction of storage and appurtenant facilities, or (2) by purchasing presently developed irrigation water through processes of condemnation.

Several physical opportunities exist in the area whereby additional municipal water could be developed by the construction of storage and related facilities. These include (1) construction of a small dam and reservoir at the Stanaker site, (2) construction of a dam and reservoir on Trout Creek, (3) construction of a feeder canal and enlargement of the Oaks Park Dam and Reservoir and (4) construction of a dam and reservoir on Ashley Creek near Maeser. The estimated costs are shown on the following page.

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Alternative single-purpose municipal water costs			
Alternative possibility	Reservoir capacity	Construction cost (Jan. '57 prices)	Annual O&M&R costs (Current prices)
(1) Dam and reservoir at the Stanaker site			
Dam and Reservoir	2,400	\$948,000	\$3,000
(2) Trout Creek Dam and Reservoir			
Dam and Reservoir	2,000	934,000	1,500
(3) Oaks Park Dam enlargement and feeder canal			
Dam and Canal	2,000	960,000	2,500
(4) Dam and reservoir at the Maeser or Ashley Creek			
Dam and Reservoir	2,000	1,400,000	1,700

The most likely alternative possibility of developing additional municipal and industrial water would be to construct a dam and reservoir on Trout Creek. General data as to capacities and costs are outlined as follows:

Trout Creek Reservoir	
Active capacity	2,000 acre-feet
Dead storage	0 acre-feet
Total capacity	2,000 acre-feet
Spillway capacity	2,500 c.f.s.
Outlet capacity	15 c.f.s.
Height Dam	68 feet
Total est. cost Jan. 1957 index	\$934,000 ^{1/}
^{1/} Reconnaissance estimate taken from curves found in the Bureau Manual special-ist Supplement #1, Part 8, Vol X.	

The municipalities would certainly investigate the costs of purchasing (through condemnation) water presently developed for irrigation. The most suitable and likely source would be the water in the Oaks Park Reservoir. This dam and reservoir was constructed in about 1940 with a capacity of approximately 5,700 acre-feet. The yield of this reservoir in most years averages about 4,900 acre-feet. It would, of course, be lower in drought years and in years such as 1934 when the reservoir yield would approximate only about 2,100 acre-feet, which at the intake of the municipal water facilities, would be further reduced by about 10% or to approximately 1,900 acre-feet. The cost of this dam when constructed in 1940 was approximately \$144,000; on prices as of January 1957, but with no change in design, the cost would be approximately \$390,000. The book value of the water permits, reservoir site, etc., as recorded by the Ashley Valley Reservoir Company as of 1942, is approximately \$251,000, which on present values is estimated to approximate \$630,000. The present value of

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COST ALLOCATIONS

the Oaks Park Reservoir water rights and associated facilities is estimated to total about \$1,020,000. It would be necessary to purchase approximately 80 percent of the total capacity in order to obtain a firm yield of 1,500 acre-feet. Thus the cost of purchasing needed capacity in the Oaks Park Reservoir would approximate \$820,000. This portion of the reservoir would require annual payments to cover operation, maintenance and replacement equal to about \$1,400 at current prices.

Thus it appears that the most economical alternative means of providing 1,500 acre-feet of municipal and industrial water would be to purchase water in the Oaks Park Reservoir.

Joint and specific costs

Cost of municipal water including interest during construction is to be repaid with interest under terms of Public Law 485. In construction of the unit facilities interest during construction will be computed on specific and joint municipal water facilities. For this reason specific and joint costs by facilities are identified in table 15.

Table 15
Determination of joint and specific costs

Facilities	Joint costs	Specific costs			
		Irriga- tion	Munic- ipal	Recre- ation	Fish & Wildlife
Stanaker Dam & Reservoir	\$3,870,000				
Fort Thornburgh Div. Dam	200,000				
Stanaker Feeder Canal	570,000				
Stanaker Service Canal		\$1,060,000			
Water Savings Pipe System	340,000				
Drainage system		675,000			
Stanaker Canal laterals		40,000			
Recreational facilities				\$92,000	
Fish & Wildlife facilities					\$27,000
Total	4,980,000	1,775,000		92,000	27,000

Separable or incremental costs

The separable cost for each purpose is the difference between the cost of the multiple-purpose unit and the cost of the unit with the purpose omitted. Table 16 shows the derivation of separable costs for irrigation and municipal water purposes. Table 17 gives the total allocation for all purposes.

Allocation of operation, maintenance and replacement costs

Annual operation, maintenance and replacement costs were apportioned to irrigation and municipal water as determined by the separable costs remaining benefits method as shown in Table 17.

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Table 16
Derivation of separable costs for irrigation
and municipal water purposes

Unit total ^{2/}	Total estimated cost	Interest during construction ^{3/}	Operation, maintenance, & replacement ^{1/}
Stanaker Dam and Reservoir	\$3,870,000	\$145,000	
Stanaker Feeder Canal	570,000	14,000	
Ft. Thornburg Diversion Dam	200,000	--	
Stanaker Service Canal	1,060,000	40,000	
Water Savings pipe system	340,000	--	
Drainage system	675,000	22,000	
Stanaker Canal laterals	40,000	--	
Total	<u>6,755,000</u>	<u>221,000</u>	<u>\$531,000</u>
Costs with municipal water excluded			
Stanaker Dam and Reservoir	3,500,000	131,000	
Stanaker Feeder Canal	570,000	14,000	
Ft. Thornburg Diversion Dam	200,000	--	
Stanaker Service Canal	1,060,000	40,000	
Water Savings pipe system	340,000	--	
Drainage system	675,000	22,000	
Stanaker Canal laterals	40,000	--	
Total	<u>6,385,000</u>	<u>207,000</u>	<u>520,000</u>
Separable municipal water	<u>370,000</u>	<u>14,000</u>	<u>11,000</u>
Costs with irrigation water excluded			
Stanaker Dam and Reservoir	780,000	20,000	
Stanaker Feeder Canal	128,000	--	
Ft. Thornburgh Diversion Dam	40,000	--	
Total	<u>948,000</u>	<u>20,000</u>	<u>146,000</u>
Separable irrigation costs	<u>5,807,000</u>	<u>201,000</u>	<u>385,000</u>
Remaining joint costs	<u>578,000</u>	<u>6,000</u>	<u>135,000</u>

^{1/} Present worth of annual costs for 100 years at $2\frac{1}{2}$ percent interest.

^{2/} Excludes expenditures for recreation and Fish and Wildlife facilities.

^{3/} Based on $2\frac{1}{2}$ percent interest.

Table 17
Unit allocation
Separable cost-remaining benefits method

	Irrigation	Municipal water	Subtotal	Recreation	Fish and Wildlife	Total unit costs
Benefits ^{1/}	\$9,282,000	\$871,000	\$10,153,000	\$520,000	\$500,000	\$11,173,000
Alternative single purpose cost						
Construction costs	6,385,000	820,000	7,205,000	--	--	7,205,000
Interest during construction	207,000	--	207,000			207,000
Operation and maintenance costs ^{2/}	509,000	44,000	553,000			553,000
Replacement costs ^{2/}	11,000	7,000	18,000			18,000
Total alternative costs ^{3/}	7,112,000	871,000	7,983,000			7,983,000
Benefits limited by alternative costs	7,112,000	871,000	7,983,000	520,000	500,000	9,003,000
Separable costs						
Construction costs	5,807,000	370,000	6,177,000	92,000	27,000	6,296,000
Interest during construction	201,000	14,000	215,000	--	--	215,000
Operation and maintenance costs ^{2/}	377,000	10,000	387,000	77,000	44,000	508,000
Replacement costs ^{2/}	8,000	1,000	9,000	183,000		192,000
Total separable costs	6,393,000	395,000	6,788,000	352,000	71,000	7,211,000
Remaining benefits	719,000	476,000	1,195,000			
Percent remaining benefits	60	40	100			
Allocation of joint costs						
Construction costs	347,000	231,000	578,000			
Interest during construction	4,000	2,000	6,000			
Operation and maintenance costs ^{2/}	80,000	53,000	133,000			
Replacement costs ^{2/}	1,000	1,000	2,000			
Total joint costs	432,000	287,000	719,000			
Total allocation						
Construction costs	6,154,000	601,000	6,755,000	92,000	27,000	6,874,000
Interest during construction	205,000	16,000	221,000	--	--	221,000
Total construction cost including interest during construction	6,359,000	617,000	6,976,000	92,000	27,000	7,095,000
Operation and maintenance costs ^{2/}	457,000	63,000	520,000	77,000	44,000	641,000
Replacement costs ^{2/}	9,000	2,000	11,000	183,000		194,000
Total allocation	6,825,000	682,000	7,507,000	352,000	71,000	7,930,000
Annual operation and maintenance costs	12,500	1,700	14,200	2,100	1,200	17,500
Annual replacement costs	200	100	300	5,000		5,300
Total annual costs	12,700	1,800	14,500	7,100	1,200	22,800

^{1/} Present worth of annual benefits for 100 years at $2\frac{1}{2}$ percent interest.

^{2/} Present worth of annual costs for 100 years at $2\frac{1}{2}$ percent interest.

^{3/} Costs include construction costs and interest during construction plus the present worth of the operation and maintenance and replacement costs over a 100-year period at $2\frac{1}{2}$ percent interest.

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CHAPTER III

REPAYMENT

The plan of the Vernal unit is multiple-purpose, providing benefits to irrigation, municipal water, recreation, and fish and wildlife. The costs properly allocated to recreation and fish and wildlife are nonreimbursable, whereas, those costs allocated to irrigation and municipal water are repaid over a long-term repayment period. Irrigation repayment is based on a 50-year interest-free period, while municipal water repayment is based on a 50-year period with interest at 2-7/8 percent. The municipal water allocation is completely repaid from municipal water revenues while the costs allocated to irrigation that cannot be repaid by farmers or district organizations over a 50-year period are paid from Upper Colorado River Basin Funds.

Irrigation Repayment

Irrigation interests would pay their operation, maintenance, and replacement costs of \$12,700 and would pay toward construction costs in accordance with their ability for 50 years with no interest on their allocated costs. As discussed in the Agricultural Economy Appendix, their payments toward construction costs would amount to about \$30,000 each year. Thus, in 50 years their payments would amount to \$1,500,000. The remaining portion of the irrigation allocation, amounting to \$4,654,000, would be paid from credits in the Upper Colorado River Basin Fund apportioned to Utah. Construction cost payments would be started after a development period of 3 years.

Municipal Water Repayment

The municipal water construction allocation, including interest during construction when based on 2-7/8% interest, amounts to \$619,000. In addition to the construction cost allocation the municipal water users are allocated an annual Operation and Maintenance and Replacement Cost of \$1,800.

A summary of municipal water repayment is shown on the following page.

	Allocation	Annual Repayment	
		Per acre- foot ^{1/}	Per 1,000 gal. ^{1/}
Construction Cost	\$601,000		
Interest during construction	18,000		
Subtotal	619,000	\$12.00-22.13	\$.0372-.0635
Annual O&M&R	1,800	1.20	.0037
Total		13.20-23.33	.0409-.0722

^{1/} Based on a water supply of 1,500 acre-feet for Vernal, Maeser, and Naples area.

The interest based on 2-7/8% amounting to \$663,225 would be returned to the Federal Treasury.

It is recommended that a stepped repayment plan be adopted in order to make repayment more equitable. There will be more need for municipal water in the latter part of the repayment period and also more people to pay for it. This plan would have five steps of ten years each with equal interval, except for the fifth step which would be increased to make the final payment. The payment excluding \$1,800 Operation and Maintenance costs would start at \$18,000 annually and end with \$33,200. See Figure 1 and Table 19.

Summary of Cost Allocation and Unit Repayment

The allocation of project costs and the repayment of these costs are summarized in Table 18. Costs included are: construction costs, costs of past investigation chargeable to the unit, interest during construction on municipal water features, and nonreimbursable recreation and fish and wildlife features.

Table 18
Summary of cost allocations and repayment

Item	Irrigation	Municipal water	Recreation	Fish and wildlife	Total
Cost Allocation					
Construction Cost	\$6,154,000	\$601,000	\$92,000	\$27,000	\$6,874,000
Interest during construction		18,000	--	--	18,000
Total	6,154,000	619,000	92,000	27,000	6,892,000
Repayment					
Investment repayment	1,500,000	619,000	^{1/}	^{1/}	2,119,000
Upper Colorado River Basin Fund	4,654,000	--	--	--	4,654,000
Total	6,154,000	619,000	--	--	6,773,000
Payment of interest during repayment period		663,000			663,000

^{1/} Recreation and fish and wildlife allocations are nonreimbursable.

Payout Schedule

The payout schedule Table 19 shows, in a condensed form, the entire repayment of the unit. It shows the economic feasibility of the unit as well as providing a basis for preliminary negotiations between water users and the United States. It also shows a summary of unit costs and allocations, together with the payout period, probable repayment and probable time of completion of the unit.

Municipal water repayment is based on a stepped repayment of five ten-year periods to more nearly approach the increase in water demand.

The repayment revenues have been presented as average annuals for the periods shown and should at a later date, prior to completion of contract negotiations, be modified to reflect changes encompassed in any comparable repayment plan. The estimates of plant in service will be modified where necessary to reflect actual construction costs and schedules.

Construction Program

With features being constructed at different times, it is necessary to determine the plant in service in order to evaluate the costs that have been allocated to each purpose at any specific time. A facility is not considered in service until water is delivered or is available for delivery from that facility. The construction schedule is shown in the Designs and Estimates Appendix, making adjustments for anticipated appropriations or construction funds, so as to bring in features systematically and economically.

Repayment Organization

The repayment organization as prescribed in Public Law 485 will be the Uintah Water Conservancy District which was organized December 18, 1956. The Uintah Water Conservancy District encompasses the entire county of Uintah except for a small portion in the western part of the county. There are 7 voting districts with boundaries as shown on Drawing No. 66-418-1028.

The 1956 total assessed value of Uintah County is \$15,151,058. Assuming a one-mill assessment rate, the district revenues would approximate \$15,000 annually which is about equal to the district operational costs. The district has no outstanding indebtedness.

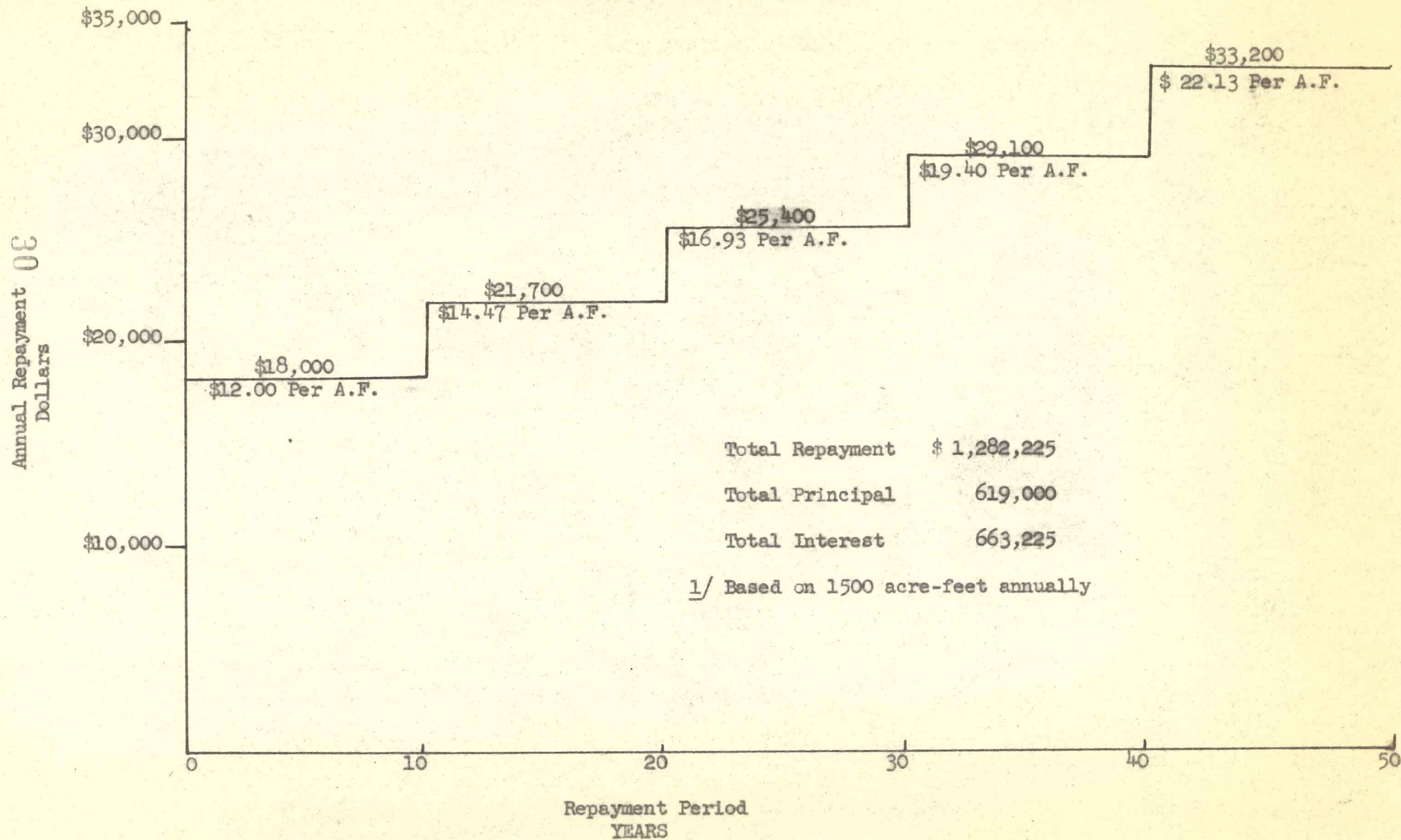
Table 19
Payout schedule

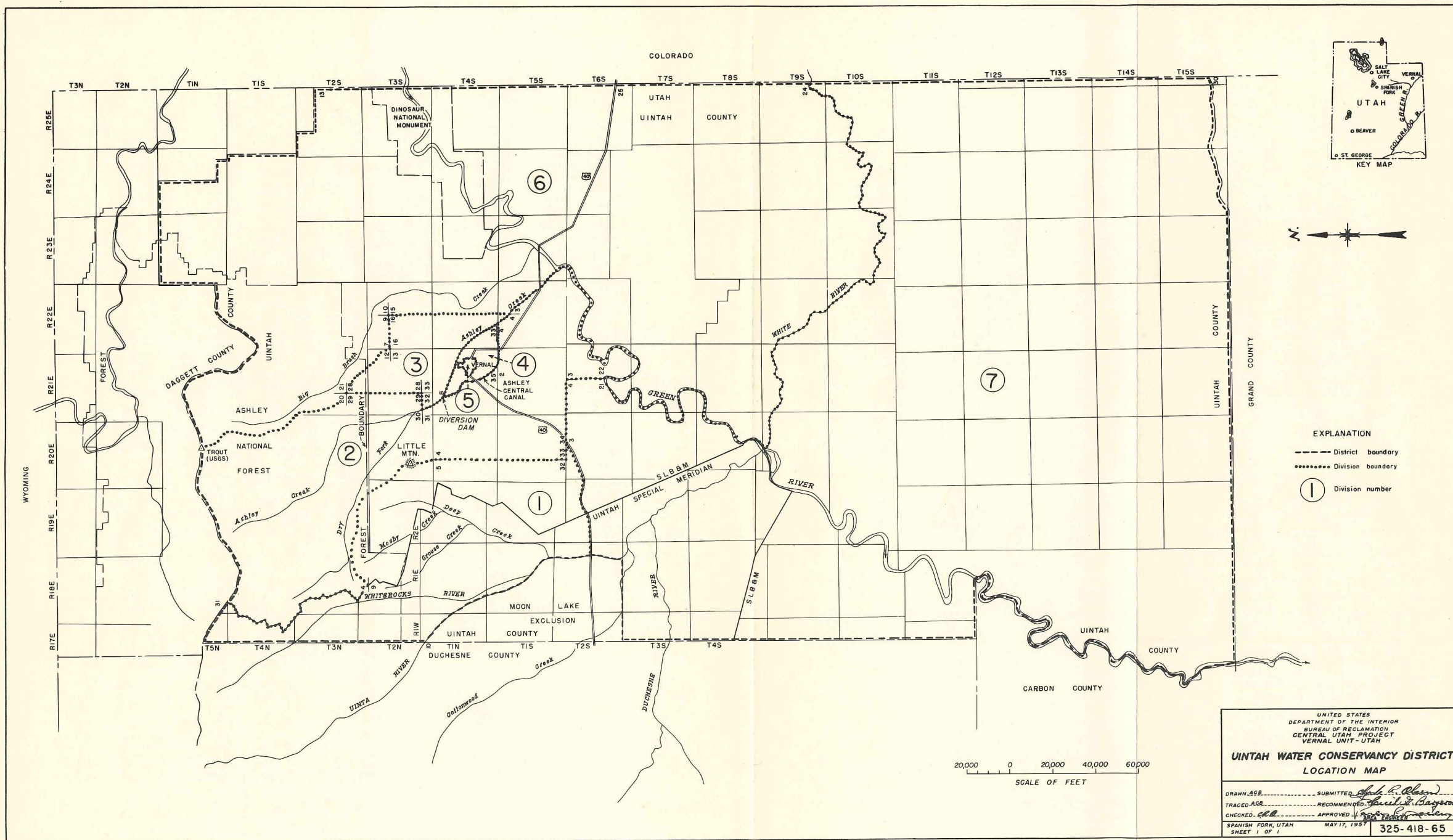
Year of study (1)	Fiscal year (2)	Preliminary estimates of Utah's cumulative Upper Colorado River Basin Fund credits				Operation, maintenance, and replacement costs (7)	Irrigation			Irrigation plant in service (11)	Interest-free balance to be paid (12)	Total revenue (13)	Revenue applied to			Municipal plant in service (17)	Balance to be paid (18)	Total operation, maintenance, and replacement costs (19)	Total revenue applied to repayment (20)	Total plant in service (21)	Total balance to be paid (22)	Year of Study (23)
		Total (3)	Previous commitments (4)	Vernal unit commitment (5)	Balance (6)		Repayment accomplished from						Operation, maintenance, and replacement costs (14)	Interest on investment at 2 7/8% (15)	Principal (16)							
							Irrigation water users (8)	Upper Colorado River Basin Fund credits (9)	Total (10)													
0	1961	0	0	0	0			0		\$5,579,000	\$5,579,000				\$619,000	\$619,000	\$14,500		\$6,198,000	\$6,198,000	0	
1	62					\$12,700	0				5,579,000	5,579,000	\$19,800	\$1,800	\$17,796	\$204	618,796		\$204	6,198,000	6,197,796	1
2	63						0				5,579,000	5,579,000			17,790	210	618,586		210	6,198,000	6,197,586	2
3	64						0				5,579,000	5,784			17,784	216	618,370		216	6,198,000	6,197,370	3
4	1965						\$30,000		\$30,000	5,579,000	5,749,000			17,778	222	618,148			30,222	6,398,000	6,367,048	4
5	66									6,094,000	6,094,000			17,772	228	617,920			30,228	6,711,920	6,711,920	5
6	67									6,064,000	6,064,000			17,765	235	617,685			30,235		6,681,685	6
7	68									6,034,000	6,034,000			17,758	242	617,443			30,242		6,651,443	7
8	69									6,004,000	6,004,000			17,751	249	617,194			30,249		6,621,194	8
9	1970									5,974,000	5,974,000			17,744	256	616,938			30,256		6,590,938	9
10	71									5,944,000	5,944,000	19,800		17,737	263	616,675			30,263		6,560,675	10
11	72									5,914,000	5,914,000	23,500		17,729	3,971	612,704			33,971		6,526,704	11
12	73									5,884,000	5,884,000			17,615	4,085	608,619			34,085		6,492,619	12
13	74									5,854,000	5,854,000			17,498	4,202	604,417			34,202		6,458,417	13
14	1975									5,824,000	5,824,000			17,377	4,323	600,094			34,323		6,424,094	14
15	76									5,794,000	5,794,000			17,253	4,447	595,647			34,447		6,389,647	15
16	77									5,764,000	5,764,000			17,125	4,575	591,072			34,575		6,355,072	16
17	78									5,734,000	5,734,000			16,993	4,707	586,365			34,707		6,320,365	17
18	79									5,704,000	5,704,000			16,858	4,842	581,523			34,842		6,285,523	18
19	1980									5,674,000	5,674,000			16,719	4,981	576,542			34,981		6,250,542	19
20	81									5,644,000	5,644,000	23,500		16,576	5,124	571,118			35,124		6,215,118	20
21	82									5,614,000	5,614,000	27,200		16,428	5,272	562,446			35,272		6,176,446	21
22	83									5,584,000	5,584,000			16,270	5,420	553,216			35,420		6,137,216	22
23	84									5,554,000	5,554,000			16,105	5,569	543,721			35,569		6,097,721	23
24	1985									5,524,000	5,524,000			15,932	5,768	533,953			35,768		6,057,953	24
25	86									5,494,000	5,494,000			15,751	5,968	523,904			35,968		6,017,904	25
26	87									5,464,000	5,464,000			15,562	6,195	513,566			36,195		5,977,566	26
27	88									5,434,000	5,434,000			15,365	6,439	502,931			36,439		5,936,931	27
28	89									5,404,000	5,404,000			15,155	6,695	491,990			36,695		5,895,990	28
29	1990									5,374,000	5,374,000			14,932	6,953	480,735			36,953		5,854,735	29
30	91									5,344,000	5,344,000	27,200		14,699	7,218	469,156			37,218		5,813,156	30
31	92									5,314,000	5,314,000	30,900		14,453	7,483	457,544			37,483		5,767,544	31
32	93									5,284,000	5,284,000			14,199	7,748	445,061			37,748		5,721,483	32
33	94									5,254,000	5,254,000			13,932	8,013	432,483			38,013		5,674,961	33
34	1995									5,224,000	5,224,000			13,651	8,278	420,964			38,278		5,627,964	34
35	96									5,194,000	5,194,000			13,365	8,553	407,391			38,553		5,580,478	35
36	97									5,164,000	5,164,000			13,070	8,828	394,813			38,828		5,532,489	36
37	98									5,134,000	5,134,000			12,765	9,103	382,220			39,103		5,483,983	37
38	99									5,104,000	5,104,000			12,450	9,378	369,627			39,378		5,434,945	38
39	2000									5,074,000	5,074,000			12,125	9,653	357,034			39,653		5,385,360	39
40	01									5,044,000	5,044,000	30,900		11,790	9,928	344,436			39,928		5,335,212	40
41	02									5,014,000	5,014,000			11,445	10,203	331,883			40,203		5,280,364	41
42	03									4,984,000	4,984,000			11,080	10,478	319,315			40,478		5,224,843	42
43	04									4,954,000	4,954,000			10,705	10,753	306,737			40,753		5,168,567	43
44	2005									4,924,000	4,924,000			10,320	11,028	294,159			41,028		5,111,536	44
45	06									4,894,000	4,894,000			9,935	11,303	281,581			41,303		5,053,728	45
46	07									4,864,000	4,864,000			9,540	11,578	269,003			41,578		4,995,120	46
47	08									4,834,000	4,834,000			9,145	11,853	256,425			41,853		4,935,690	47
48	09									4,804,000	4,804,000			8,750	12,128	243,847			42,128		4,875,414	48
49	2010									4,774,000	4,774,000	35,000		8,355	12,403	231,270			42,403		4,814,267	49
50	11	\$2,048,000			\$2,048,000					4,744,000	4,744,000	43,225		7,960	12,678	218,692			42,678		4,744,000	50
51	12	7,224,000			7,224,000					4,714,000	4,714,000			7,565	12,953	206,114			42,953		4,714,000	51
52	13	12,382,000			12,382,000					4,684,000	4,684,000			7,160	13,228	193,536			43,228		4,684,000	52
53	2014	17,525,000		\$4,654,000	12,871,000	12,700	30,000	\$4,654,000	4,684,000	6,154,000	6,154,000	0	1,800	0	619,000	0	14,500	4,684,000	6,773,000	0	0	53
Total		17,525,000	0	4,654,000	12,871,000	673,100	1,500,000	4,654,000	6,154,000	6,154,000	1,377,525	95,400	663,225	619,000	619,000	0	768,500	6,773,000	6,773,000	0	0	

1/ Excludes conservancy district administrative costs which are paid from revenues obtained from the ad valorem tax.

FIGURE 1

MUNICIPAL WATER REPAYMENT ^{1/}
VERNAL UNIT





UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL UTAH PROJECT
VERNAL UNIT - UTAH

**UINTAH WATER CONSERVANCY DISTRICT
LOCATION MAP**

DRAWN *AGB*..... SUBMITTED *Edw. P. Olson*
 TRACED *AGB*..... RECOMMENDED *Paul E. Peterson*
 CHECKED *AGB*..... APPROVED *Paul E. Peterson*

SPANISH FORK, UTAH MAY 17, 1957 325-418-65
 SHEET 1 OF 1

INTERIOR - RECLAMATION, S.C. UTAH