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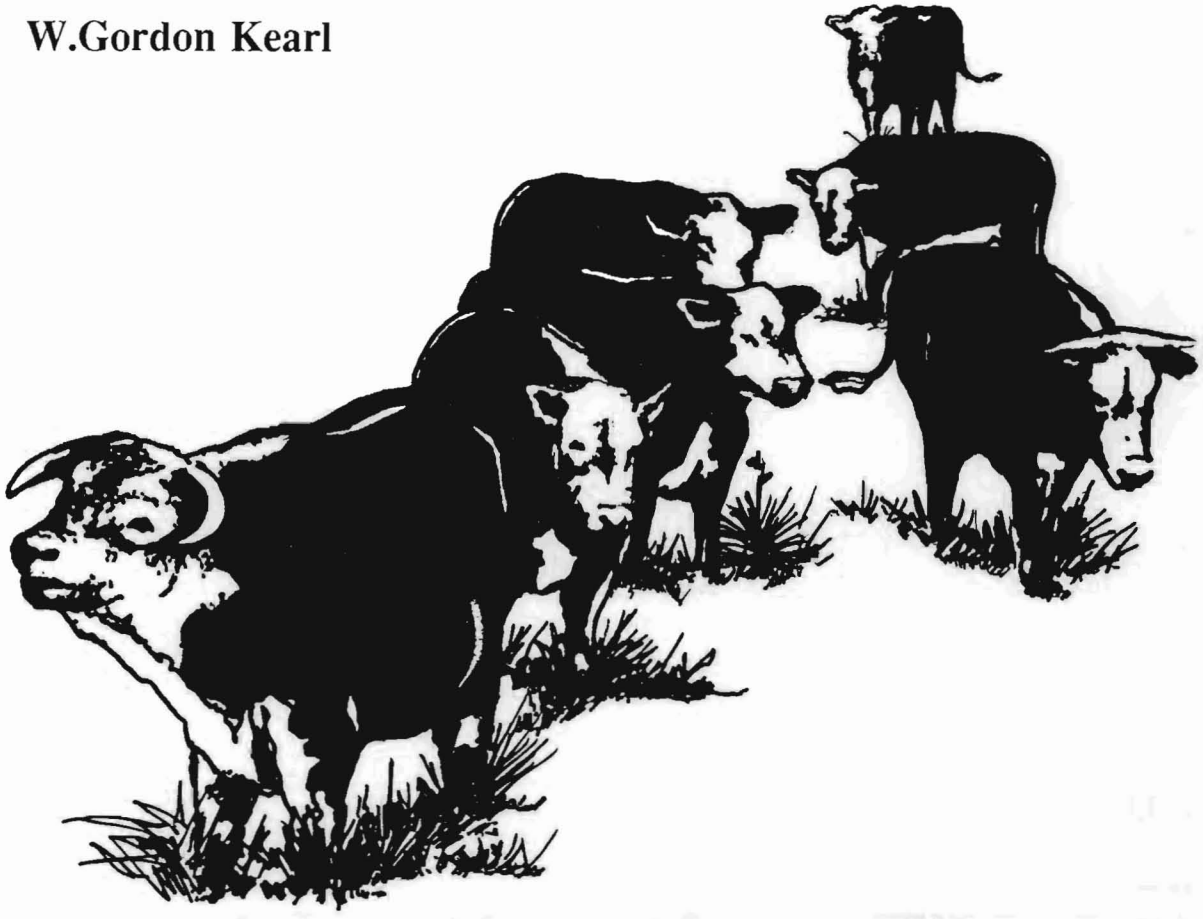
Timing of Cull Cow Marketing

W.Gordon Kearl



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TIMING OF CULL COW MARKETING

by

W. Gordon Kearl [1/]

Introduction

Questions occasionally arise from ranchers regarding the best time of year for marketing cull cows. Specific questions relate to marketing cull cows in May, if they fail to have a live calf, compared to November, the normal peak month of cow marketing in Wyoming, or perhaps marketing in August or September.

An average of about 140,000 cows are marketed from Wyoming each year. About half are marketed in the months of October-December. The other 50% of marketings are distributed quite evenly through the other nine months. At 1,000 lb. each and prices of the recent past, cull cow sales have been valued at about $45 million, so small percentage changes can be quite important.

This report is concerned with marketing cull cows from ranges. The possibility of feeding cull cows and marketing later than November is not considered.

Prices of Slaughter Cows

Average monthly prices of cutter and utility cows at Torrington for May-November 1986 are shown in Table 1. The 1986 prices are slightly below 1975-1986 averages in May and June; they are above the 1975-1986 averages for July-November. Individual years and year-to-year changes are shown in Appendix Tables 1 and 2, and will be discussed later. Because of pecularities

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of an individual year such as 1986, the 1975-1986 averages give a better idea of the alternative marketing possibilities. About 20% of the May-November decline occurs between May and August, and about 80% of the decline occurs from August-November.

Table 1. Average May-November Prices for Utility and Cutter Cows, 1975-1986 Averages and 1986, Torrington, Wyoming, (Dollars per Cwt.).

	1986		1975-1986 Averages	
Month	Utility	Cutter	Utility	Cutter
May	$36.83	$33.71	$38.99	$35.77
June	37.74	34.29	38.66	35.59
July	39.20	36.02	37.98	35.28
August	37.19	34.96	37.95	35.12
September	38.72	35.50	37.33	34.16
October	36.74	34.44	35.82	33.05
November	36.93	33.60	34.22	31.33

Source: Kearl, 1985, and Monthly Market Reports, Federal-State Livestock Market News Service, Torrington, Wyoming.

Grade is also important if marketing at different times could result in marketing different grades. For instance, the cull cow may sell as a cutter grade in May, but grade utility in August. If so, the price per cwt. that could be received in August would probably be greater than the price in May. One would not expect the grade to decrease from utility in May to cutter in August. However, because of a decrease in both availability and quality of range forage and a loss of weight, the grade could change from utility in August to cutter in November. If that happened, there would be a corresponding large change in price. The prices can be identified in Table 1, and are

also shown below for easier comparison:

	1975-1986 Prices	
Month	Utility	Cutter
May	$38.99	$35.77
August	37.95	35.12
November	34.22	31.33

For the period 1975-1986, price changes within either grade are about -$1 or less for May-August and almost -$4 for August-November. If upgrading from cutter to utility occurs between May and August, the change is about +$2. If downgrading from utility to cutter occurs from August-November, the change is about -$6.50 to -$7.

Table 2 presents information on individual years in the form of percentage changes between the months and within or between the grades. The entire time period for which prices are available, 1968-1986, is shown. Although prices were much lower in the earlier years, the percentage price changes in 1968 and 1969 were very similar to those in recent years.

By examining these data, one can note the following points with respect to May-August changes within the utility grade:

1. there were four years of significant reductions in price per cwt.;
2. 12 of the changes were in the range of plus or minus 6.5%, which translates to about plus or minus $2.50 per cwt. or less at current prices; and
3. there were three years of significant increases.

If the grade would increase from cutter to utility between May and August:

1. there are only three years of price declines and two of them are very small; and
2. price increases of 10-26% occur in nine of the 19 years if there is upgrading.

When considering the August-November period within the utility grade:

1. there are only two years when prices increase, and only one year of significant increase; and
2. decreases are in the range of 10-23% in nine of the 19 years.

Table 2. Percentage Price Differentials for Price Changes From May-August and August-November, Eastern Wyoming and Western Nebraska, 1968-1986.

	Percent Differentials Within Utility Grade		Percent Differentials Among Grades [a] and Months	
Year	May to Aug.	Aug. to Nov.	May Ct. to Aug. Ut.	Aug. Ut. to Nov. Ct.
1968	-0.61	-10.13	13.15	-19.87
1969	0.85	-14.92	14.48	-19.93
1970	-4.92	1.94	1.98	-8.82
1971	-1.62	-0.80	6.57	-1.98
1972	3.28	-2.76	16.84	-14.94
1973	13.67	-22.58	25.80	-30.58
1974	-13.82	-21.09	0.24	-36.89
1975	-4.52	-6.97	16.26	-20.96
1976	-11.75	-22.13	-1.62	-29.64
1977	-6.03	-7.07	2.92	-15.53
1978	-6.21	8.06	1.29	0.52
1979	-10.88	-8.46	-5.08	-15.02
1980	12.96	-8.22	19.34	-13.82
1981	8.71	-16.61	15.49	-24.47
1982	-1.89	-17.32	5.67	-23.53
1983	-6.30	-16.09	3.19	-22.30
1984	-0.73	-12.75	10.66	-21.28
1985	-8.21	-8.44	-0.21	-16.17
1986	0.97	-0.70	10.32	-9.65
1968-1986 Average	-1.95	-9.85	8.27	-18.15

Source: Kearl, 1985, and Monthly Market Reports, Federal-State Livestock Market News Service, Torrington, Wyoming.

[a] Grades are cutter (Ct.) and utility (Ut.).

If the grade decreases from utility to cutter between August and November, then:

1. there is only one year of very slight increase, +.52%;
2. price decreases of -20% to -37% occur in eight years; and,
3. decreases in the -10% to -20% range occur in an additional seven years.

Data from the Billings market through the 1960-1986 period are similar to these, but changes in the negative direction average a little stronger there than at Torrington (Appendix Tables 3 and 4).

Seasonal Gains

Information on seasonal gains available from various locations can be useful in conjunction with prices for evaluating marketing alternatives. Effects of stocking rates on range vegetation and beef cattle production in the Northern Great Plains was a subject of one long-term (10 years) study (Houston and Woodward, 1966). Gains of cows on heavy utilization and moderate and light rates of utilization averaged together are shown in Table 3. The difference in weight between the heavy, moderate and light rates indicate the life-long effect of differing grazing intensities on mature size. From a marketing strategy standpoint, the expected month-to-month changes in weight are very important.

Nursing ("wet") cows and dry cows were weighed at 28-day intervals through the year for the 10-year time period. "Wet" or dry refers to the status at the end of the production year, October 31. Those which were dry did not nurse calves through the previous grazing season. The "wet" cows nursed calves during the production cycle ending October 31.

The dry cows show some weight loss through the winter, reaching their lowest weight in April prior to the grazing season in which they were dry. Rapid gains occur in spring and summer, and the dry cows reach their peak weight by early August on the heavy rate of utilization and are approaching

peak weight on the moderate and light stocking rates. Subsequently, dry cows tend to maintain their weight or gain slightly to the end of October on moderate or light stocking rates, but lose weight on the heaviest stocking rate.

Table 3. Average Year-long Weights of Dry and Nursing Cows, by Average Stocking Rates and Weighing Dates, Miles City, Montana.

Date	Dry Cows - Stocking Rates		Nursing Cows - Stocking rates	
	Heavy [a]	Moderate and Light [b]	Heavy [a]	Moderate and light [b]
	(Lb.)	(Lb.)	(Lb.)	(Lb.)
Winter Average [c]	862	972	968	1,037
April 18	833	944	906	971
May 16	872	984	856	928
June 13	963	1,090	943	1,012
July 11	981	1,132	1,013	1,082
August 8	1,061	1,182	1,036	1,117
Sept. 5	1,029	1,192	1,006	1,106
October 3	1,031	1,200	979	1,097
October 31	985	1,206	922	1,044

Source: Derived from Houston and Woodward, 1966.

[a] 2.54 acres per AUM.
[b] 3.92 acres per AUM. There was little difference in animal weights or monthly gains between the moderate and light stocking rates.
[c] November 1 - March 21 average weight.

The "wet" cows show relatively constant weights through the winter. A weight loss between March 21 and May 16 is associated with calving. The nursing cows gain rapidly, reach peak weights by early August, as did the dry cows, then lose weight, as the forage is inadequate for maintenance and lactation requirements. The largest losses occur on the heaviest stocking rate.

The data presented in Table 3 are averages. Due to differences in forage supply, there are year-to-year variations in weights and amount of gain, and

some variation in seasonality of gains. However, seasonal gains are mostly related to the stage of growth and quality of forage. That is indicated by the fact that an abundance of forage remaining after August at lightest rates of utilization still does not produce much gain, even on dry cows.

Klipple (1953) reported on gains of cows nursing calves on shortgrass ranges in northeastern Colorado:

Time Period	Pounds of Gain
May-July	158
August	0
September	-6
October	-38

The pattern is similar to that of the Northern Plains, with the peak weight reached in August. The 158 lb. May-July gain compares with 189 lb. May 16-August 8 gain shown in Table 3, and there would probably be a little more gain into early or mid-August. The weight loss (-44 lb.) is a little less severe in September and October than reported from the Northern Plains (-73 lb.), however, the time period is also three weeks less.

Cattle weight gains were also studied through 1961-65 at the eastern end of the Uinta Mountains in Utah at an elevation of approximately 8,000 feet (Laycock and Conrad, 1981). Gains were as shown below:

Time Period	Pounds of Gain
June 2-July 4	77
July 4-August 11	83
August 11-October 5	28

Gains are similar to those shown for the plains areas, with high rates of gain into August and much slower rates after that. The 0.5 lb. average daily gain August 11-October 5 probably consists of good rates of gain through August and little or no gain through much of September.

Typically, average livestock inventories on ranches are held relatively constant from year to year. Forage production varies from year to year due to weather and other factors. With constant inventories the percentage utilization of forage varies inversely with production. A ranch moderately

stocked in relation to longer-term average forage production will be heavily stocked in years when forage production is much below average, and gains will suffer. That should be recognized in making marketing decisions.

Marketing Strategies

Cows are usually readily accessible in the spring of the year at calving or branding time. It may be feasible to identify cull cows and sell them at that time instead of the peak marketing month of November. Under certain circumstances, cattle could also be culled and sold in August or September when near their peak weights, and when prices are still relatively strong. The discussion which follows will use prices in May, August and November in conjunction with weights and other factors to consider marketing decisions for culling cows.

Projected Receipts from Cull Cows

This analysis will consider marketing dry cows in May, which is sometimes suggested, in August, or in November. One source mentioned above (Table 3) suggests dry cow gains of 200 lb. during the May-August period, and an additional 20 lb. gain from August-November. The 12-year average prices shown in Table 1 are near current levels and will be used. The assumptions are implicit in the calculations shown in Table 4.

If cows are sold early, the receipts could earn interest, be used for payment on a loan or reduce borrowing necessary to meet expenses. That is considered another revenue source.

Costs to carry the cows would vary depending on circumstances. Variable costs for carrying the cows would be negligible if there is an abundance of feed. If feed is scant, or must be leased then costs to carry cows could be a consideration.

Table 4. Comparison of Receipts per Head Possible if Marketing Dry Cows in May, August or November.

Item	Cutter Grade	Utility Grade		
	May	May	Aug.	Nov.
Weight (Lb.)	980	980	1,180	1,200
Price/cwt. [a/]	$36	$39	$38	$34
Value [a/]	$353	$382	$448	$408
Interest Acc. [a/] [b/]	21	23	13	-
Total value [a/]	$374	$405	$461	$408
Costs to carry	--	--	?	?

[a/] Rounded to the even dollar.
[b/] Interest accruing at 12% per annum rate, or 1% per month from month sold until November.

Disregarding costs, the advantages calculated for marketing in August compared to either May or November are as follows:

Utility grades
August over May ..... plus $56
August over November ..... plus $53
If grade increases, cutter to utility
August over May ..... plus $87

Prices used are approximate monthly average prices for 1975-1986. There could be variations in results due to variations within a month, or year-to-year. Such variations could just as easily enlarge the advantage as reduce it.

Calculations using prices from Billings, Montana, rounded to the whole dollar, reduce the advantage of August over May by $10, but produce the same August-November comparisons.

Marketing as early as May, although suggested and used by some ranchers, doesn't seem to be an attractive alternative. Ranchers should try to hold dry cows in a location where they can be gathered for marketing in August. Sale could also be in September with only about a $1 per cwt. or $12 per head reduction from August sales.

Depending upon the breeding season and management practices, it may be possible to:

1. breed the dry cows early with the yearling heifers, perhaps allowing only a 45-60 day breeding season;
2. pregnancy test these cows and heifers sometime in the mid-August to mid-September period; and,
3. gain some advantages from marketing dry cull cows and heifers in August-September, instead of November.

The advantage of marketing in August-September may be even greater in years of below-normal range conditions, because of heavy utilization of available forage.

The possibility of changing the marketing program for cows which do produce a live calf raises a number of additional questions. The May marketing alternative can probably be dismissed. Table 5 presents some calculations and implicit assumptions about marketing in August or November.

Table 5. Comparison of Receipts per Head Possible if Marketing Wet Cows in August or November.

Item	Utility Grade		Cutter Grade
	August	November	November
Weight (Lb.)	1,110	1,040	1,040
Price per cwt. (Dols.)	$38	$34	$31
Value	$422	$354	$322
Interest accrued	13	-	-
Total value	$435	$354	$322
Cost to carry	-	?	?
Costs to early wean	?	-	-
Reduction from August		-$81	-$113

Assuming a utility grade, a 70 lb. reduction in weight, and a $4 reduction in price per cwt., there is a difference of $81 between August and November.

Dry cull cows maintaining their weight from August-November are not likely to decline from utility to cutter grades. However, weight loss of the nursing cow between August and November may also reduce the grade from utility to cutter. That is especially true if feed is scant, forage utilization is heavy, and weight reduction is much greater than that used in these calculations. If there is a reduction to cutter grade, then there is a difference of $113 per head between August and November at the weights used. If weight loss is greater, the monetary loss is also greater. Again, the prices are monthly averages based on 1975-1986, and also close to current levels. If variations within months and over the years are considered, the differences in any year could be less, or considerably larger based on percentage changes in prices shown in Table 2.

Calculations using prices from Billings, Montana, rounded to the whole dollar, produce identical results.

Other Considerations

Costs to carry the cows from August-November may be negligible, or quite significant, depending upon fall range or crop aftermath available in the particular situation.

A more significant cost would relate to early-weaning of calves in August or September. Through the last five years about 65% of the calf crop has been born by mid-April. The youngest of that portion would be four to five months old by mid-August to mid-September and older calves are in the six to seven months range.

The sources referenced previously for information on cow weights and gains also indicate that English breed calves still nursing can gain 1.6-1.7 lb. per day through September and around 1.0 lb. per day, through October. Calf prices typically do not decline greatly from August into November, so increasing weight with only slightly declining price would not suggest selling calves much earlier than is typical at present.

The management practices, feed required and costs to maintain calf gains through September and October would be important considerations in time of marketing "wet" cows. If calf gains were not maintained, then reduced value of calf sales for those marketing calves would be a consideration.

When calves are to be carried over for marketing as yearlings, costs of maintaining some gains on early-weaned calves or the reduced weight at normal weaning time need to be considered. There may also be some additional problems and costs of wintering the calves. Value of yearling sales may be slightly reduced. This is a subject that requires further study and research.

In spite of the early-weaning questions, ranchers might consider marketing the "wet" cows earlier than is typically done. If some cows can be identified in the spring as definite candidates for culling because of age or unsoundness perhaps they could be held to be accessible when near peak weight and condition in August-September. Ranchers who breed in May-June might also consider pregnancy testing of the cow herd about as early as possible to identify other "wet" cows that should be culled and marketed a little earlier than normal.

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4. Laycock, W.A. and P.W. Conrad, 1981. "Responses of Vegetation and Cattle to Various Systems of Grazing on Seeded and Native Mountain Rangelands in Eastern Utah." Journal of Range Management, Vol. 34, No. 1, January.

Appendix Table 1. Average Prices for Various Grades of Cull Cows--May, Aug. and Nov.-- Eastern Wyoming and Western Nebraska Auction Markets, 1968-1986 (dollars per cwt.). (Torrington, Wyoming auction, prior to 1976.)

Year	Utility			Cutter		
	May	Aug.	Nov.	May	Aug.	Nov.
1968	18.18	18.07	16.24	15.97	16.27	14.48
1969	21.09	21.27	18.10	18.58	19.05	17.03
1970	22.17	21.08	19.47	20.67	19.42	19.22
1971	21.62	21.25	21.08	19.94	19.75	18.74
1972	25.60	26.44	25.71	22.63	23.44	22.49
1973	34.75	39.50	30.58	31.40	35.15	27.42
1974	28.50	24.56	19.38	24.50	21.62	15.50
1975	23.44	22.38	20.82	19.25	19.75	17.69
1976	30.31	26.75	20.83	27.19	24.31	18.82
1977	27.69	26.02	24.18	25.28	23.65	21.98
1978	40.07	37.58	40.61	37.10	35.40	37.75
1979	55.15	49.15	44.99	51.78	45.38	41.77
1980	42.22	47.69	43.77	39.96	44.31	41.10
1981	42.60	46.31	38.62	40.10	42.81	34.98
1982	43.48	42.66	35.27	40.37	40.62	32.62
1983	44.58	41.77	35.05	40.48	38.42	32.43
1984	41.08	40.78	35.58	36.85	37.52	32.10
1985	40.42	37.10	33.97	37.18	34.23	31.10
1986	36.83	37.19	36.93	33.71	34.96	33.60

Appendix Table 2. Price Differentials Among Various Months and Grades of Cull Cows, Eastern Wyoming and Western Nebraska, 1968-1986 (dollars per cwt.). (Torrington, Wyoming auction, prior to 1976.)

	Differentials Within Utility Grade			Differentials Among Grades[a] and Months			Percent Differentials Within Utility Grade			Percent Differentials Among Grades[a] and Months		
Year	May to Aug.	May to Nov.	Aug. to Nov.	May Ct. to Aug. Ut.	May Ct. to Nov. Ut.	Aug. Ut. to Nov. Ct.	May to Aug.	May to Nov.	Aug. to Nov.	May Ct. to Aug. Ut.	May Ct. to Nov. Ut.	Aug. Ut. to Nov. Ct.
	(Dols.)	(Dols.)	(Dols.)	(Dols.)	(Dols.)	(Dols.)	(Pct.)	(Pct.)	(Pct.)	(Pct.)	(Pct.)	(Pct.)
1968	-0.11	-1.94	-1.83	2.10	0.27	-3.59	-0.61	-10.67	-10.13	13.15	1.69	-19.87
1969	0.18	-2.99	-3.17	2.69	-0.48	-4.24	0.85	-14.18	-14.92	14.48	-2.58	-19.93
1970	-1.09	-2.70	-1.61	0.41	-1.20	-1.86	-4.92	-12.18	1.94	1.98	-5.80	-8.82
1971	-0.35	-0.54	-0.17	1.31	1.14	-2.51	-1.62	-2.50	-0.80	6.57	5.72	-1.98
1972	0.84	0.11	-0.73	3.81	3.08	-3.95	3.28	0.43	-2.76	16.84	13.61	-14.94
1973	4.75	-4.17	-8.92	8.10	-0.82	-12.08	13.67	-12.00	-22.58	25.80	-2.61	-30.58
1974	-3.94	-9.12	-5.18	0.06	-5.12	-9.06	-13.82	-32.00	-21.09	0.24	-20.90	-36.89
1975	-1.06	-2.62	-1.56	3.13	1.57	-4.69	-4.52	-11.18	-6.97	16.26	8.16	-20.96
1976	-3.56	-9.48	-5.92	-0.44	-6.36	-7.93	-11.75	-31.28	-22.13	-1.62	-23.39	-29.64
1977	-1.67	-3.51	-1.84	0.74	-1.10	-4.04	-6.03	-12.68	-7.07	2.92	-4.35	-15.53
1978	-2.49	0.54	3.03	0.48	3.51	0.17	-6.21	1.35	8.06	1.29	9.46	0.52
1979	-6.00	-10.16	-4.16	-2.63	-6.79	-7.38	-10.88	-18.42	-8.46	-5.08	-13.11	-15.02
1980	5.47	1.55	-3.92	7.73	3.81	-6.59	12.96	3.67	-8.22	19.34	9.53	-13.82
1981	3.71	-3.98	-7.69	6.21	-1.48	-11.33	8.71	-9.34	-16.61	15.49	-3.69	-24.47
1982	-0.82	-8.21	-7.39	2.29	-5.10	-10.04	-1.89	-18.82	-17.32	5.67	-12.63	-23.53
1983	-2.81	-9.53	-6.72	1.29	-5.43	-9.34	-6.30	-21.38	-16.09	3.19	-13.41	-22.30
1984	-0.30	-5.50	-5.20	3.93	-1.27	-8.68	-0.73	-13.39	-12.75	10.66	-3.45	-21.28
1985	-3.32	-6.45	-3.13	-0.08	-3.21	-6.00	-8.21	-15.96	-8.44	-0.21	-8.63	-16.17
1986	0.36	0.10	-0.26	3.48	3.22	-3.59	0.97	0.27	-0.70	10.32	9.55	-9.65

[a] Grades are Cutter (Ct.) and Utility (Ut.).

Appendix Table 3. Average Spring, Summer and Fall Prices of Utility, Cutter & Canner Cows: 1960-1984, Billings, Montana (dollars per cwt.).

Year	Utility			Cutter			Canner		
	May	August	November	May	August	November	May	August	November
1960	16.42	13.70	13.31	15.33	12.90	11.50	13.90	11.92	10.06
1961	15.40	14.41	14.36	13.94	13.14	13.00	12.56	11.39	11.65
1962	15.22	15.20	13.85	14.15	14.15	12.88	12.63	12.65	11.62
1963	14.75	15.00	12.86	13.60	14.05	11.74	12.30	13.00	10.50
1964	13.55	13.24	11.66	12.35	12.39	10.51	11.12	10.84	9.26
1965	14.48	14.82	13.35	13.58	13.16	11.33	11.91	11.88	9.70
1966	18.88	17.83	15.51	18.02	16.78	14.65	16.34	15.52	12.89
1967	17.77	17.92	15.24	17.01	17.22	14.60	14.52	15.42	12.80
1968	19.17	19.69	17.25	17.98	18.12	16.20	15.78	16.78	14.60
1969	22.37	21.77	18.63	20.44	20.77	17.25	17.58	18.78	15.12
1970	22.77	21.53	19.40	21.66	20.44	18.42	19.67	18.46	16.69
1971	22.80	22.25	21.10	21.47	20.39	19.13	19.06	18.34	17.46
1972	27.35	27.18	25.58	25.11	25.55	23.85	22.26	22.74	21.88
1973	35.26	40.72	30.99	33.93	37.15	28.39	30.47	33.60	25.94
1974	28.62	25.47	17.87	26.14	24.02	15.31	23.26	21.97	12.87
1975	24.30	21.38	20.91	21.08	19.35	18.31	17.48	16.97	15.22
1976	30.79	27.10	21.53	28.32	25.40	19.69	25.40	23.42	16.89
1977	27.88	26.57	24.58	25.75	24.69	22.60	22.74	22.17	19.46
1978	39.90	40.40	40.33	37.38	37.12	38.82	33.73	33.75	36.05
1979	58.75	49.18	45.80	56.03	45.05	42.81	52.28	40.60	40.00
1980	43.60	48.00	43.91	41.00	42.47	40.47	37.00	-	37.76
1981	44.14	46.81	37.09	41.32	42.69	33.09	37.66	38.53	28.54
1982	44.72	43.25	34.80	41.10	39.12	31.56	36.66	36.28	29.00
1983	44.12	41.53	34.37	41.37	38.41	31.15	38.00	35.50	28.38
1984	42.50	41.55	34.24	38.98	37.83	30.76	35.53	35.13	26.98
1985	40.45	36.70	32.30	37.55	34.56	29.76	34.79	30.38	26.55
1986	37.62	38.41	34.10	34.50	36.05	32.70	30.60	34.40	28.77

Appendix Table 4. Price Differentials Among Various Months and Grades of Cull Cows: 1960-1984, Billings, Montana (dollars per cwt.).

Year	Differentials Within Utility Grade			Differentials Among Grades[a] and Months			Percent Differentials Within Utility Grade			% Differentials Among Grades[a] and Months		
	May to Aug.	May to Nov.	Aug. to Nov.	May Ct. to Aug. Ut.	May Ct. to Nov. Ut.	Aug. Ut. to Nov. Ct.	May to Aug.	May to Nov.	Aug. to Nov.	May Ct. to Aug. Ut.	May Ct. to Nov. Ut.	Aug. Ut. to Nov. Ct.
	(Dols.)	(Dols.)	(Dols.)	(Dols.)	(Dols.)	(Dols.)	(Pct.)	(Pct.)	(Pct.)	(Pct.)	(Pct.)	(Pct.)
1960	-2.72	-3.11	-0.39	-1.63	-2.02	-2.20	-16.57	-18.94	-11.90	-10.63	-13.17	-16.06
1961	-0.99	-1.04	-0.05	0.47	0.42	-1.41	-6.43	-6.75	-0.35	3.37	3.01	-9.78
1962	-0.02	-1.37	-1.35	1.05	-0.30	-2.32	-0.13	9.00	-8.88	7.42	-2.12	-15.26
1963	0.25	-1.89	-2.14	1.40	-0.74	-3.26	1.69	-12.81	-14.26	10.29	-5.44	-21.73
1964	-0.31	-1.89	-1.58	0.89	-0.69	-2.73	-2.29	-13.95	-11.93	7.20	-5.59	-20.62
1965	0.34	-1.13	-1.47	1.24	-0.23	-3.49	2.35	-7.80	-9.92	9.13	-1.69	-23.35
1966	-1.05	-3.37	-2.32	-0.19	-2.51	-3.18	-5.56	-17.85	-13.01	-1.05	-13.93	-17.83
1967	0.15	-2.53	-2.68	0.91	-1.77	-3.32	0.84	-14.24	-14.96	5.34	-10.41	-18.53
1968	0.52	-1.92	-2.44	1.71	-0.73	-3.49	2.71	-10.02	-12.39	9.51	-4.06	-17.72
1969	-0.60	-3.74	-3.14	1.33	-1.81	-4.52	-2.68	-16.72	-14.42	6.50	-8.86	-20.76
1970	-1.24	-3.37	-2.13	-0.13	-2.26	-3.11	-5.45	-14.80	-9.78	-0.60	-10.43	-14.44
1971	-0.55	-1.70	-1.15	0.78	-0.37	-3.12	-2.41	-7.46	-5.17	3.63	-1.72	-14.02
1972	-0.17	-1.77	-1.60	2.07	0.47	-3.33	-0.62	-6.47	-5.89	8.24	1.87	-12.25
1973	5.46	-4.27	-9.73	6.79	-2.94	-12.33	15.48	-12.11	-23.89	20.01	-8.66	-30.28
1974	-3.15	-10.75	-7.60	-0.67	-8.27	-10.16	-11.01	-37.56	-29.84	-2.56	-3.16	-39.89
1975	-2.92	-3.39	-0.47	0.30	-0.17	-3.07	-12.02	-13.95	-2.20	1.42	-0.81	-14.36
1976	-3.69	-9.26	-5.57	-1.22	-6.79	-7.41	-11.98	-30.07	-20.55	-4.31	-23.98	-27.34
1977	-1.31	-3.30	-1.99	0.82	-1.17	-3.97	-4.70	-11.84	-7.49	3.18	-4.54	-14.94
1978	0.50	0.43	-0.07	3.02	2.95	-1.58	1.25	1.07	-0.17	8.08	7.89	-3.91
1979	-9.57	-12.95	-3.38	-6.85	-10.23	-6.37	-16.29	-22.04	-6.87	-12.23	-18.26	-12.95
1980	4.40	0.31	-4.09	7.00	2.91	-7.53	10.09	0.71	-8.52	17.07	7.09	-15.69
1981	2.67	-7.05	-9.72	5.49	-4.23	-13.72	6.05	-15.97	-2.08	13.28	-10.24	-29.31
1982	-1.47	-9.92	-8.45	2.15	-6.30	-11.69	-3.29	-22.18	-19.54	5.23	-15.33	-27.03
1983	-2.59	-9.75	-7.16	0.16	-7.00	-10.38	-5.87	-22.10	-17.24	3.87	-16.92	-24.99
1984	-0.95	-8.26	-7.31	2.57	-4.74	-10.79	-2.24	-19.44	-17.59	6.59	-12.16	-25.97
1985	-3.75	-8.15	-4.40	-0.85	-5.25	-6.94	-9.23	-20.15	-11.99	-2.26	-13.98	-18.91
1986	0.79	-3.52	-4.31	3.91	-0.40	-5.71	2.10	-9.36	-11.22	11.33	-1.16	-14.87

[a] Grades are Cutter (Ct.) and Utility (Ut.).