



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

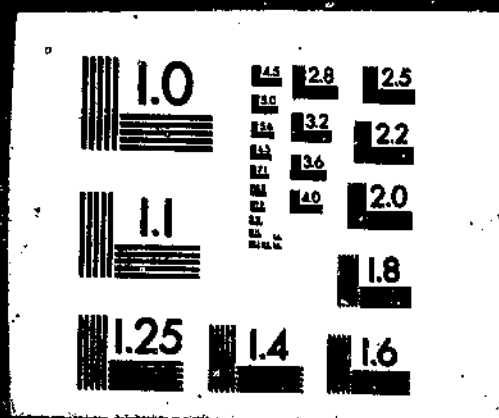
## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.

PB81-238859

ESS-13 CATTLE REPORTS: A HANDBOOK ON SURVEYING AND ESTIMATING PROC  
EDURES. ECONOMICS AND STATISTICS SERVICE, WASHINGTON, DC. CROP RE  
PORTING BOARD. JUL 81 63P

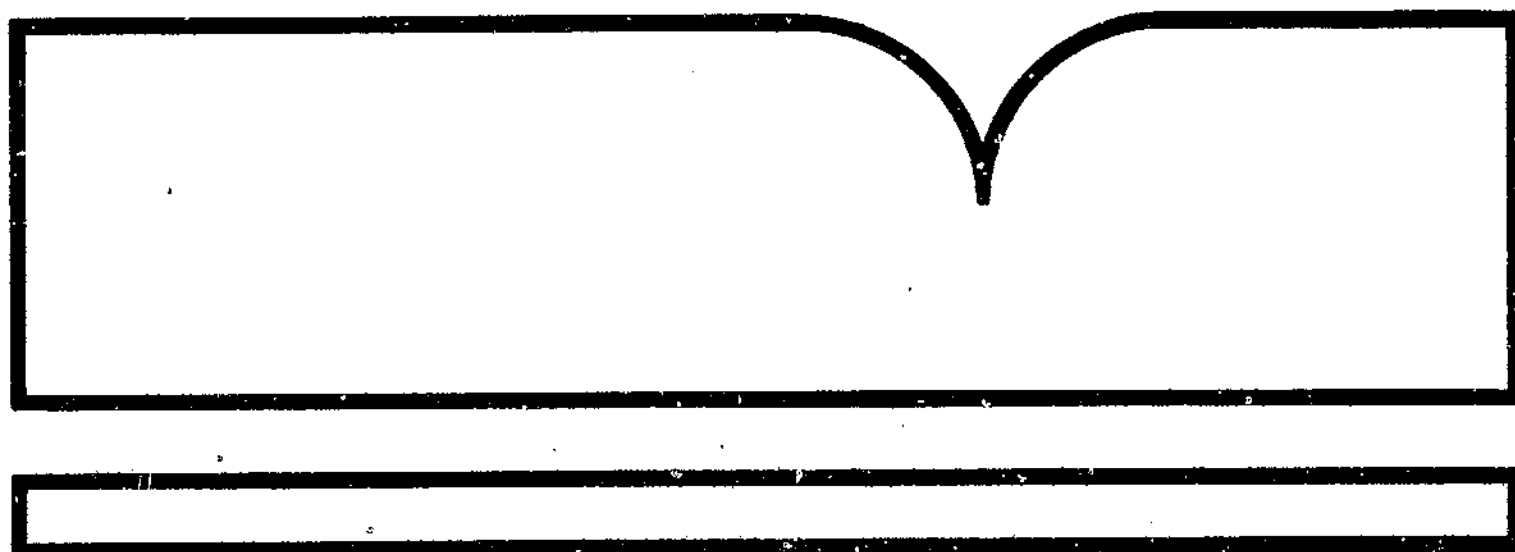
OF 11  
PB 81  
238859



Cattle Reports: A Handbook on Surveying and  
Estimating Procedures

(U.S.) Economics and Statistics Service  
Washington, DC

Jul 81



U.S. Department of Commerce  
National Technical Information Service  
**NTIS**

20372-101

<b>REPORT DOCUMENTATION PAGE</b>		<b>1. REPORT NO.</b> ESS-13	<b>2.</b>	<b>P881-238859</b>																								
<b>4. Title and Subtitle</b> Cattle Reports: A Handbook on Surveying and Estimating Procedures			<b>5. Report Date</b> July 1981																									
<b>7. Author(s)</b>			<b>6.</b>																									
<b>8. Performing Organization Name and Address</b> Crop Reporting Board Estimates Division Statistical Reporting Service U.S. Department of Agriculture Washington, D.C. 20250			<b>9. Performing Organization Rept. No.</b> ESS-13																									
<b>12. Sponsoring Organization Name and Address</b>			<b>10. Project/Task/Work Unit No.</b>																									
			<b>11. Contract(s) or Grant(s) No.</b> (C) (G)																									
			<b>13. Type of Report &amp; Period Covered</b>																									
<b>15. Supplementary Notes</b>			<b>14.</b>																									
<b>16. Abstract (Limit: 200 words)</b>  The Crop Reporting Board regularly publishes estimates of cattle and calf inventories, births, and cattle on feed. This handbook, directed at producers, analysts, and economists who regularly use these estimates, explains how data for these estimates are collected, discusses how estimates are made, comments on their accuracy, and suggests ways the estimates can be used.																												
<table border="0"> <tr> <td><b>17. Document Analysis</b></td> <td><b>a. Descriptors</b></td> <td></td> </tr> <tr> <td>Beef</td> <td>Feeding stuffs</td> <td>Surveys</td> </tr> <tr> <td>Birth</td> <td>Handbooks</td> <td></td> </tr> <tr> <td>Cattle</td> <td>Inventories</td> <td></td> </tr> <tr> <td>Estimating</td> <td>Statistical analysis</td> <td></td> </tr> <tr> <td colspan="3"><b>b. Identifiers/Open-Ended Terms</b></td> </tr> <tr> <td colspan="3">Calf</td> </tr> <tr> <td colspan="3"><b>c. GOSAT Field/Group</b> 12-A</td> </tr> </table>					<b>17. Document Analysis</b>	<b>a. Descriptors</b>		Beef	Feeding stuffs	Surveys	Birth	Handbooks		Cattle	Inventories		Estimating	Statistical analysis		<b>b. Identifiers/Open-Ended Terms</b>			Calf			<b>c. GOSAT Field/Group</b> 12-A		
<b>17. Document Analysis</b>	<b>a. Descriptors</b>																											
Beef	Feeding stuffs	Surveys																										
Birth	Handbooks																											
Cattle	Inventories																											
Estimating	Statistical analysis																											
<b>b. Identifiers/Open-Ended Terms</b>																												
Calf																												
<b>c. GOSAT Field/Group</b> 12-A																												
<b>18. Availability Statement</b> Available from: National Technical Information Service 5285 Port Royal Road, Springfield, VA 22161			<b>19. Security Class (This Report)</b>	<b>20. No. of Pages</b>																								
			<b>23. Security Class (This Page)</b>	<b>22. Price</b>																								

(See ANSI-Z39.18)

See Instructions on Reverse

OPTIONAL FORM 272 (4-77)  
(Formerly N718-35)  
Department of Commerce

**CATTLE REPORTS: A HANDBOOK ON SURVEYING AND ESTIMATING PROCEDURES.** Crop Reporting Board, Estimates Division, Statistical Reporting Service, U.S. Department of Agriculture. ESS-13.

**ABSTRACT**

The Crop Reporting Board regularly publishes estimates of cattle and calf inventories, births, and cattle on feed. This handbook, directed at producers, analysts, and economists who regularly use these estimates, explains how data for these estimates are collected, discusses how estimates are made, comments on their accuracy, and suggests ways the estimates can be used.

**KEYWORDS:** Data collection, surveys, estimate, inventories beef, statistical analysis, cattle, calves

**ACKNOWLEDGMENTS**

Contributors to this handbook include Robert W. Cole, Robert L. Freie, James P. Kreber and Doug E. Murfield.

**CONTENTS**

	<u>Page</u>
INTRODUCTION . . . . .	1
SURVEY SAMPLING . . . . .	2
Area Frame Sampling . . . . .	3
Multiple Frame Sampling . . . . .	4
Cattle on Feed Survey . . . . .	7
FORMING THE ESTIMATES . . . . .	8
DATA RELATIONSHIPS . . . . .	10
ACCURACY OF THE ESTIMATES . . . . .	17
THE CATTLE CYCLE . . . . .	26
Mechanism of the Cycle . . . . .	26
Types of Enterprises . . . . .	30
Past Indicators of Overexpansion . . . . .	31
FORECASTING FED CATTLE MARKETINGS . . . . .	40
CHARTING FUTURE BEEF SUPPLIES . . . . .	43
REACTION OF CATTLE PRICES TO RELEASE OF CATTLE ON FEED REPORTS . . . . .	53
INSTANT MARKET NEWS DIRECTORY . . . . .	56

# Cattle Reports

## A Handbook on Surveying and Estimating Procedures

### INTRODUCTION

The Crop Reporting Board publishes regularly scheduled series of reports on cattle and cattle on feed to provide data users with basic statistics on beef production.<sup>1/</sup> The semiannual series of cattle inventory for January 1 and July 1 are released to the public between the 25th and 30th of the month. The inventory items estimated are all cattle; all cows including separate estimates of beef and milk cows; all heifers 500 pounds and over including separate estimates of beef replacement, milk replacement, and other heifers; steers over 500 pounds; bulls over 500 pounds; and calves under 500 pounds. An estimate for the annual calf crop is also published. The January 1 release provides a national estimate and separate estimates for all States. The July 1 report provides estimates for 34 States individually, a composite estimate for the remaining 16 States, and the 50-State total. The January 1 report also includes value of inventory, number of cattle and milk cow operations, and percent of inventory and operations by size.

Quarterly cattle on feed reports are issued for 23 major cattle feeding States as of January 1, April 1, July 1, and October 1. They are released from about the 16th to the 20th of each quarterly month. These reports show by State the number of cattle and calves placed on full feed in feedlots, the number marketed from feedlots for slaughter and other disappearance for the immediate past quarter, and an estimate of number of cattle on feed expected to be marketed during the next 3 months. The number on feed as of the survey date is further separated by the number of steers, heifers, cows, and others. Size groups by weight ranges are shown for five weight groups of steers (under 500 pounds, 500-699 pounds, 700-899 pounds, 900-1,099 pounds, and 1,100 pounds and over) and four weight groups of heifers (same as steers except top range is 900 pounds and over). These 23 States account for approximately 95 percent of the total number on feed in the United States.

---

<sup>1/</sup> For example, see Cattle (LvGn 1 (1-80)), released January 30, 1980, 3 p.m., E.T., Crop Reporting Board, ESS-Statistics, U.S. Dept. of Agriculture



Estimates in the 27 States reporting annually are limited to an inventory total on feed as of January 1.

Seven States are now in the monthly cattle on feed estimating program.<sup>2/</sup> These States account for approximately 75 percent of the 23 States total number on feed. Placements, marketings, and other disappearance data are released for the immediate past month and the number on feed as of the first of each month. Monthly cattle on feed reports for the seven monthly States are released between the 13th and the 16th of nonquarterly months.

These estimates represent the combined efforts of the State SRS statistical offices and the Washington, D.C. office. The State offices follow prescribed procedures to select the sample; collect, review, and edit the data; summarize to the State level; and submit recommendations and comments pertaining to their estimates to Washington. In Washington, the State data are summarized into major regions and national totals. The SRS Crop Reporting Board members review the various data and establish national and regional estimates. State recommendations are then reviewed and adjusted, if necessary, to conform with national and regional estimates.

State and national estimates are released to the public in Washington, D.C. at 3:00 p.m. on scheduled dates; the State offices then issue reports and press releases for local distribution. Strict security measures are employed in the State statistical offices and by the Crop Reporting Board to prevent disclosure of estimates prior to the scheduled release time.

#### SURVEY SAMPLING

SRS has made many adjustments in survey techniques and estimating procedures to keep abreast of changes in agriculture and to satisfy increased data needs, especially in the cattle industry. For years, surveys consisted of questionnaires mailed to informed cattle producers, asking about livestock inventories, marketings, and deaths and other losses. Today, scientific probability surveys are used to select producers to be asked specific questions about cattle on their farms and ranches.

Basic requirements for probability surveys are a suitable sampling frame which includes all cattle producers and a means of selecting a sample from this frame with known probabilities. Probability sample surveys and estimating procedures have the property of being unbiased and can provide measures of the precision and reliability of the resulting survey estimates.

---

<sup>2/</sup> Arizona, California, Colorado, Iowa, Kansas, Nebraska, and Texas.

### Area Frame Sampling

Investigation into the use of area frame sampling for current agricultural statistics began in 1954. A program was developed and expanded to include the 48 contiguous States by 1967 in a system of surveys for obtaining agricultural information including data on cattle inventories. The area sampling frame conceptually divides all land area into small identifiable units (segments) which may be sampled. The area frame is complete in that all farming operations can be associated with the segments comprising the frame. The use of an area frame is also dictated by the fact that a complete list of current farm operators in the United States is not available and would be prohibitively expensive to compile and impossible to maintain.

During development of area frame surveys, an early modification was the use of a supplementary list of very large livestock farms. The farms on the list were removed from the area frame sample, enumerated, and added to the expansions from the adjusted area frame. Later, the size of the list of farms was increased and then sampled, with all list operations deleted from the area frame sample.

Today, area sampling units or segments are selected by strata based on land use. The stratification can be described in four broad categories: (1) intensively cultivated land, (2) extensive agricultural areas such as land used primarily for grazing, (3) highly developed land found in cities, and (4) nonagricultural land, such as parks and other recreational areas. A segment usually is a square mile in areas of cultivated land; it is smaller in cities, but much larger for grazing or rangeland. The number of sample segments averages about 350 for a Midwest State and ranges up to 900 for a State like California where agriculture is much more diversified.

Area frame sampling is conducted in the 48 contiguous States in June and December each year. The sample consists of 15,700 segments and includes a little over one-half of 1 percent of the total U.S. land area. This survey provides a reliable measure of operator entry and exit from the cattle business. The area frame is not susceptible to the errors, omissions, and duplications commonly found with lists.

All operators with land inside the boundaries of the segments are asked about their cattle inventory. Operators that live within the segment are also asked additional questions on cattle numbers, calf crop, the number of cattle on feed, farm slaughter, and deaths on their entire operation including land outside the segment.

Because of the relatively low sampling rates used with the area frame, the presence or absence of large livestock producers has an undue influence on survey results. Therefore, a list of

An example of a segment



large cattle operators in each State is used to supplement the area frame sample and improve the reliability of estimates. These large operations are sampled at a high rate and account for over 20 percent of the total cattle inventory in the United States.

Large cattle ranches, feedlots, and dairies will, in a few instances, be in the area frame sample as well as on the list of cattle operators. This duplication must be eliminated by deleting data for these cattle operations from the area frame. After this step, the sample data from the area frame and the list frame are expanded, then added together to provide survey estimates representing all cattle operators.

Multiple Frame  
Sampling

This methodology, in its simplest form, is an outgrowth and extension of using the large operator list to supplement the area sample mentioned above. Necessary conditions for the underlying theory to hold are: (1) that all the sampling units in the universe be included in at least one of the frames and (2) that it be possible to identify the frames containing each

sampling unit. In the case of an area frame and a list frame, the first condition is met because the area frame is complete. The second condition requires determining whether or not a farm in the area sample is also contained in the list frame. In practice, this matching process is sometime difficult because of minor differences in names and addresses between the list and those obtained from respondents in the area sample, and because of changes in farms and operators since the list was made up. Fortunately, with a reasonably current list, the doubtful cases are few and can usually be resolved by inquiry.

The technique is relatively simple. Samples are allocated and drawn independently from the two frames. Then, all farm operators from the area frame sample are placed into two categories or domains; those included in the list frame (overlap) and those not covered by the list (nonoverlap). The list sample and the nonoverlap portion of the area sample are expanded independently and added together for the multiple frame estimate.

The principal advantages of multiple frame sampling are that relatively inexpensive means of data collection (mail and telephone) may be used, and that subpopulations of specialized farms may be sampled much more efficiently than with area frame sampling alone. The principal disadvantage is that it requires considerable and continuous effort to develop and maintain good lists. Also, information on the relative size of each list operation is needed for effective stratification. A variety of sources are used for lists, including tax assessor records, brand lists, Agricultural Stabilization and Conservation Service (ASCS) lists, and lists of farm trade organization members. County and local officials of ASCS, cooperative extension services, and other USDA agencies have provided valuable assistance in list maintenance efforts.

Cattle surveys using multiple frame sample methodology are being conducted in all States. Principal differences between States are in the size and extent of list coverage. In major cattle-producing States, an extensive list of farm operators is used with the list frame sample for each cattle survey consisting of about 2,000 farm operators per State. Mailed questionnaires collect responses from 20 to 25 percent of the sample, phone interviews about 50 percent, and the balance by personal interview.

The tabulation below illustrates a list sampling frame which typifies size group and sampling information for a major cattle State. For example, stratum 30 consists of all known farm operations on this State's list having approximately 50 to 99 cattle. The list population is 17,870 for this stratum. The sample is the number of cattle operations selected from the

population. The sample count for stratum 30 is 510 and the sampling interval is 35.039. This means cattle reported by each of the 510 sample cattle producers will be multiplied by 35.039 and summed to obtain the survey expansion for stratum 30. The sum of all strata provides the State expansion for the total list. Finally, since the list does not include all current operations, the nonoverlap expansion from the area frame survey must be added to arrive at the multiple frame survey estimate for the State. For major States, the list expansion accounts for 80 to 90 percent of the State estimate.

Stratum code	Strata boundary	Population size	Sample size	Interval
		Number		
10	0	20,200	150	134.667
20	1-49	52,180	420	124.238
30	50-99	17,870	510	35.039
40	100-199	10,560	580	18.207
50	200-499	3,220	300	10.733
60	500-999	600	200	3.000
70	1,000+	210	210	1.000
List total	N.A.	104,840	2,370	N.A.

N.A. = Not applicable.

The sample size of 2,370 represents 2.3 percent of the producers on the list. Sampling rates average 3 to 5 percent of the producers at the U.S. level. However, the survey will collect sample cattle data equal to about 12 to 15 percent of the estimated cattle herd, because the sampling rate increases as the size of operation increases.

State sample sizes depend on available resources, the level of detail required in the statistical estimates, the precision desired, the variability of data being sampled, and the size of the universe or population.

Cattle on Feed  
Survey

All States coordinate the monthly/quarterly cattle on feed (COF) surveys with the multiple frame surveys on January 1 and July 1. The COF list is an integral part of the cattle list sampled for the probability surveys.

Most States have very complete coverage of cattle feeding operations, especially where nearly all the cattle feeding is in large feedlots with capacities of 1,000 head or more. In States where farm feeders account for the major portion of the State's estimate, COF operators are sampled. The tabulation below illustrates size group and sampling information for cattle feeding operations in a State with many small farm feeders.

Stratum code	Strata boundary	Estimated population	Sample size	Interval
<u>Number</u>				
10	1-49	17,500	1,000	17.5
20	50-99	4,800	400	12.0
30	100-299	2,200	400	5.5
40	300-699	800	200	4.0
50	700-999	300	300	1.0
60	1,000-1,999	150	150	1.0
70	2,000+	10	10	1.0
List total	N.A.	27,760	2,460	N.A.

N.A. = Not applicable.

In those States with a large number of farm feeders, considerable effort is required to keep the list current. List building work in an SRS State statistical office is a continual process. Respondent burden in the small strata with large populations can be aided by periodic sample rotation but the larger operations are included in each survey since these operators control a significant percentage of the number on feed. Usually, more than two-thirds of the estimated cattle on feed are actually reported in any survey. Telephone calls and per-

sonal interviews play an important part in maintaining an ongoing survey program.

Monthly cattle on feed surveys are conducted in seven States (Arizona, California, Colorado, Iowa, Kansas, Nebraska, and Texas) which generally have 75 percent of the 23-State total cattle on feed. Another 16 States are currently in the quarterly cattle on feed program and account for approximately 95 percent of the U.S. total. Cattle on feed questions are also asked on the area frame and multiple frame surveys which provide an annual U.S. estimate of cattle on feed.

#### FORMING THE ESTIMATES

Samples are drawn and survey data are collected, summarized, and analyzed in the State SRS statistical offices. State statisticians prepare recommendations (preliminary estimates) for their States and transmit them to Washington, D.C. for review and publication.

In Washington, the State survey data and recommendations are summarized to totals by major regions or State groupings and for the United States. These data are then reviewed by Crop Reporting Board members to set national and regional estimates. The board members use survey data, a national balance sheet as described below, and any other available information. State recommendations prepared in the field offices are reviewed and changed, if necessary, to bring State recommendations to the established level of national and regional estimates.

Survey expansions along with available check data, are utilized by field office and Washington statisticians for reviewing and revising preliminary estimates, if necessary. Check data include State inshipments of feeder cattle, outshipments, State farm census data, and commercial cattle slaughter. At periodic intervals, U.S. Census of Agriculture figures are available to provide additional check data.

At the time of each major cattle inventory report, a U.S. balance sheet is constructed for use by the Crop Reporting Board. The balance sheet used to review the January 1, 1981, cattle inventory estimates was:

Item	: 1976	: 1977	: 1978	: 1979	: 1980
	:	:	:	:	:
	: Million head				
January 1 inventory	: 128.0	122.8	116.4	110.9	111.2
Calf crop and imports	: 48.4	47.1	45.1	43.3	46.0
Total supply	: 176.4	169.9	161.5	154.2	157.2
Slaughter	: 48.7	48.1	44.3	36.9	36.8
Deaths and exports	: 5.4	6.1	5.9	5.7	5.5
Total disappearance	: 54.1	54.2	50.2	42.6	42.3
Residual (See text)	: .5	.7	(.4)	(.4)	.1
January 1 inventory (End of year)	: 122.8	116.4	110.9	111.2	115.0

The balance sheet provides an additional check on survey inventory estimates. The residual figure is the amount needed to bring the balance sheet into complete agreement. This residual, whether positive or negative, is a measure of consistency for the balance sheet items. The Crop Reporting Board makes the maximum use of the survey data for setting the estimates of inventory and calf crop and still maintain the residual at a minimum level. Estimates of the balance sheet components of inventory, births, and deaths are subject to sampling variability. For this reason, no attempt is made to "force" the estimates to achieve a perfect balance. The component estimates are also subject to nonsampling errors such as omissions, duplications, and mistakes in reporting, recording, and processing. These nonsampling errors are minimized through quality controls in the data collection process.

Perhaps the most important data available in preparing any livestock estimate is the number of cattle slaughtered since the previous report. The cattle inventory balance sheet indicates that slaughter is the largest item of total disappearance. Slaughter data and comparisons are shown in more detail in other sections of the handbook but a brief description here will emphasize its importance.

Each monthly livestock slaughter release includes a table showing the classification of cattle slaughtered in federally inspected plants. Since the federally inspected cattle slaughter is nearly 95 percent of total commercial slaughter, the class percentages multiplied times the monthly total commercial



cattle slaughter provides a useful estimate of the monthly slaughter by class. These class totals, such as for steers and heifers, can then be compared with marketings from the cattle on feed reports. For example, during the April-June quarter of 1979, the July 1 cattle on feed report for 23 States shows preliminary marketings of 6,110,000. These would be virtually all steers and heifers. Since the 23 States account for 95 percent of the U.S. total, we can divide the 6,110,000 by 0.95 which gives 6,432,000. The commercial steer and heifer slaughter for these 3 months total 6,525,000. Therefore, 6,525,000 minus 6,432,000 leaves 93,000, which would be considered the number of nonfed steers and heifers slaughtered during the quarter.

#### DATA RELATIONSHIPS

Cattle inventory estimates as of January 1 and July 1 are prepared and published each year. Statisticians review many relationships when setting cattle inventory estimates, one of these is cows as a percentage of all cattle. Table 1 shows this relationship on January 1 and July 1 for the past 9 years. During this time, the percentage of cows to total cattle on January 1 has varied by only 0.8 percent ( $43.5 - 42.7 = 0.8$ ) even though there has been a variation of over 20 million head of cattle in the total inventory. There is more variation in the July 1 series primarily because of the influence on total inventory of calves born during the first half of the year and also due to the first calf heifers calving and being classed as cows by July 1. The stability of this relationship is a primary indicator carefully reviewed at the State, regional, and national level. Tables 2, 3, and 4 also show the influence of all cows.

The annual calf crop and the calving ratios to all cows for January 1 and July 1 (see table 5) are major items because the calf crop is the largest item added to the existing cattle herd in working through the balance sheet. The first estimate of the annual calf crop is made on July 1. During 1971-79, the July 1 calving ratio varied from 0.86 to 0.92, a very stable relationship with July 1 cows. At the end of a year when the January 1 inventory is estimated, the calf crop for the previous year is reviewed in relation to the number of cows currently on hand. This ratio has only varied from 0.89 to 0.93 for the past 8 years. To detect and minimize the influence of various expansion or liquidation periods in the cattle cycle on calving ratios, the relationship of the calf crop to the average number of cows on hand at the beginning of the year and July 1 should also be reviewed. This ratio has varied from 0.87 to 0.93 during this period.

While the calf crop has a steady relationship with the all cow number, a further comparison of calf crop can be made with the next largest item in the cattle inventory--steers, heifers, and

Table 1--All cows as a percentage of all cattle,  
January 1 and July 1, United States, 1971-81

Year	January 1			July 1 <sup>1/</sup>		
	All cattle	All cows	Cows as percentage of all cattle	All cattle	All cows	Cows as percentage of all cattle
	- 1,000 head -		Percent	- 1,000 head -		Percent
1971	114,578	49,786	43.5	N.A.	N.A.	N.A.
1972	117,862	50,585	42.9	N.A.	N.A.	N.A.
1973	121,539	52,553	43.2	131,467	54,037	41.1
1974	127,788	54,478	42.6	139,378	56,960	40.9
1975	132,028	56,931	43.1	140,201	58,053	41.4
1976	127,980	54,971	43.0	133,659	53,938	40.4
1977	122,810	52,441	42.7	130,255	52,190	40.1
1978	116,375	49,635	42.7	121,695	48,413	39.8
1979	110,864	47,852	43.2	118,437	47,815	40.4
1980	111,192	47,865	43.0	123,071	50,111	40.7
1981	115,013	49,856	43.3			

N.A. = Not available.

<sup>1/</sup> July 1 series started in 1973.

Table 2--Comparison of January 1 and July 1 all cattle and all cows,  
United States, 1971-81

Year	January 1				July 1 <sup>1/</sup>			
	All cattle	Percentage change	All cows	Percentage change	All cattle	Percentage change	All cows	Percentage change
	1,000 head	Pct.	1,000 head	Pct.	1,000 head	Pct.	1,000 head	Pct.
1971	114,578	N.A.	49,786	N.A.	N.A.	N.A.	N.A.	N.A.
1972	117,862	103	50,585	102	N.A.	N.A.	N.A.	N.A.
1973	121,539	103	52,553	104	131,467	N.A.	54,037	N.A.
1974	127,788	105	54,478	104	139,378	106	56,960	105
1975	132,028	103	56,931	105	140,201	101	58,053	102
1976	127,980	97	54,971	97	133,659	95	53,938	93
1977	122,810	96	52,441	95	130,255	97	52,190	97
1978	116,375	95	49,635	95	121,695	93	48,413	93
1979	110,864	95	47,852	96	118,437	97	47,815	99
1980	111,192	100	47,865	100	123,071	104	50,111	105
1981	115,013	103	49,856	105				

N.A. = Not available. <sup>1/</sup> July 1 series started in 1973.

Table 3--Comparison of January 1 and July 1 cattle inventory,  
United States, 1973-81

Year	All cattle <u>1/</u>		Jan.-July	July-Jan.	Annual	Inventory
	January 1	July 1	gain	decline	net	change
	<u>1,000 head</u>		<u>Percent</u>			
1973	121,539	131,467	+8.2	-3.2	+5.0	+3.1
1974	127,788	139,378	+9.1	-5.3	+3.8	+5.1
1975	132,028	140,201	+6.2	-8.7	-2.5	+3.3
1976	127,980	133,659	+4.4	-8.1	-3.7	-3.1
1977	122,810	130,255	+6.1	-10.7	-4.6	-4.0
1978	116,375	121,695	+4.6	-8.9	-4.3	-5.2
1979	110,864	118,437	+6.8	-6.1	+ .7	-4.7
1980	111,192	123,071	+10.7	-6.5	+4.2	+ .3
1981	115,013					+3.4

<sup>1/</sup> July all cattle not available prior to 1973.

Table 4--Comparison of January 1 and July 1 all cow inventory,  
United States, 1971-81

Year	All cows		Jan.-July change	July-Jan. change	Annual net change	January 1 inventory change
	January 1	July 1				
	- - - 1,000 head - - -		- - - - - Percent - - - - -			
1971	49,786	50,652	+1.7	-0.1	+1.6	--
1972	50,585	51,783	+2.4	+1.5	+3.9	+1.6
1973	52,553	54,037	+2.8	+ .8	+3.6	+3.9
1974	54,478	56,960	+4.6	- .1	+4.5	+3.7
1975	56,931	58,053	+2.0	-5.3	-3.3	+4.5
1976	54,971	53,938	-1.9	-2.8	-4.7	-3.4
1977	52,441	52,190	- .5	-4.9	-5.4	-4.6
1978	49,635	48,413	-2.5	-1.2	-3.7	-5.4
1979	47,852	47,815	- .1	+ .1	0	-3.6
1980	47,865	50,111	+4.7	- .5	+4.2	0
1981	49,856					+4.2

-- = Not applicable.

Table 5--All cows that calved compared with  
calf crop, United States, 1971-80

Year	All cows that calved			Calf crop	:Ratio to average :	:Ratio :	:Ratio to
	January 1	July 1	:January 1 and: :July 1 average:		: cows Jan. 1 :beginning of year: : and July 1	: Ratio to July 1	:January 1 :following year
	- - - - - 1,000 head - - - - -				- - - - - Ratio - - - - -		
1971	49,786	50,652	50,219	46,738	0.93	0.92	0.92
1972	50,585	51,785	51,185	47,682	.93	.92	.91
1973	52,553	54,037	53,295	49,194	.92	.91	.90
1974	54,478	56,960	55,719	50,873	.91	.89	.89
1975	56,931	58,053	57,492	50,183	.87	.86	.91
1976	54,971	53,938	54,455	47,384	.87	.88	.90
1977	52,441	52,190	52,316	45,931	.88	.88	.93
1978	49,635	48,413	49,024	43,818	.89	.91	.92
1979	47,852	47,815	47,834	42,603	.89	.89	.89
1980	47,865	50,111	48,988	45,354	.93	.91	.91
1981	49,856						

bulls under 500 pounds (see table 6). This ratio of calf crop to the following January 1 calf inventory has varied from a low of 0.62 on January 1, 1979, to a high of 0.71 as of January 1, 1975. However, since January 1, 1975, was the peak of the cattle cycle and the 1974 calf crop a record high of 50.9 million, a higher than usual ratio would be expected. The ratio of calf crop to the July 1 calf inventory has shown just about the same variability, with 0.78 being the low and 0.85 the high. The high ratio also occurred when the July 1, 1975, cattle inventory reached its current record number for the series.

Changes that occur within the breeding herd can alert the data user to future increases or decreases in the cattle inventory. Thus, the relationship of all cows plus beef and milk replacement heifers over 500 pounds to bulls over 500 pounds has shown very little variation since January 1, 1971 (see table 7). The average number of cows and heifers per bull of breeding age tells whether or not the breeding herd is in normal balance or if the "female stock" or "male stock" is increasing or decreasing at a faster rate than the other. An unchanged average would say that both are changing in the same direction at the same rate while a buildup of cows and heifers without an increase in bulls would be shown by an increase in the average per bull. If the number of bulls declines but the female herd remains essentially unchanged, an increase in the average per bull would be expected. The long-time trend of this series is an increase in the average per bull as the number of bulls declines due to growth in the use of artificial insemination.

Table 6--Comparisons of calf crop and steers, heifers, and bulls under 500 pounds, United States, January 1 and July 1, 1971-81

Year	Calf crop	January 1 <sup>1/</sup>		July 1	
		Steers, heifers, and bulls under 500 pounds		Steers, heifers, and bulls under 500 pounds	
		Number	Ratio to calf crop	Number	Ratio to calf crop
		--- 1,000 head ---		1,000 head	
1971	46,738	31,688	0.68	N.A.	N.A.
1972	47,682	32,229	.68	N.A.	N.A.
1973	49,194	33,922	.69	38,504	0.78
1974	50,873	36,291	.71	41,952	.83
1975	50,183	34,531	.69	42,793	.85
1976	47,384	32,360	.68	39,361	.83
1977	45,931	29,643	.65	38,329	.83
1978	43,818	27,263	.62	34,807	.79
1979	42,603	26,590	.65	33,758	.79
1980	45,354	29,123	.64	35,911	.79
1981					

N.A. = Not available. <sup>1/</sup> January 1 following year.

Table 7--Total breeding stock and average per bull 500+ pounds, United States, January 1 and July 1, 1971-81

Year	January 1			July 1		
	All cows plus beef and milk replc. heifers	Bulls 500+	Average per bull	All cows plus beef and milk replc. heifers	Bulls 500+	Average per bull
	--- 1,000 head ---			1,000 head		
	Number			Number		
1971	60,293	2,328	25.9	N.A.	N.A.	N.A.
1972	61,400	2,377	25.8	N.A.	N.A.	N.A.
1973	63,859	2,467	25.9	65,181	2,647	24.6
1974	66,612	2,643	25.2	68,740	2,913	23.6
1975	69,902	2,985	23.4	69,359	3,068	22.6
1976	66,120	2,845	23.2	64,413	2,760	23.3
1977	62,855	2,664	23.6	62,036	2,687	23.1
1978	59,379	2,538	23.4	57,753	2,459	23.5
1979	57,311	2,403	23.8	57,700	2,456	23.5
1980	57,962	2,492	23.3	60,348	2,613	23.1
1981	60,398	2,556	23.6			

N.A. = Not available

Several other relationships that should be of value to the user are shown in tables 8 to 10. The feeder cattle supply deserves some explanation because it alerts the producer as well as the finisher or feedlot operator to the total potential supply of feeders for the next 12 months. The calculations are relatively easy and readily available when the cattle inventory estimate is released. To illustrate this point, here are calculations of the feeder cattle supply following the July 1 inventory report:

Item	: July 1 :		: Change
	: 1978 :	: 1979 :	: from
			: previous
			: year
	: - 1,000 head -		: Percent
Calves <500 pounds on farms:	34,807	33,758	-3
Minus: Calves <500 pounds on feed :	688	583	-15
Equals: Feeder supply <500 pounds :	34,119	33,175	-3
Steers and heifers			
500+ pounds on farms :	26,676	24,523	-8
Minus: Steers and heifers			
500+ pounds on feed :	10,754	10,223	-5
Equals: Feeder supply, 500+ pounds :	15,922	14,300	-10
Total feeder supply	50,041	47,475	-5

This total feeder cattle supply is down 5 percent from 1978. The largest part of this total, calves under 500 pounds, is down 3 percent from the previous year. These lightweight animals are included in the total supply because, with normal gains, they can be expected to weigh over 500 pounds by fall and winter. The immediate supply of feeders over 500 pounds, 14.3 million head, is 10 percent less than 1978. This means third and fourth quarter placements are likely to be well below a year earlier. This in turn would indicate that potential beef marketings in the first half of 1980 could be substantially under the first and second quarters of 1979. The expansions for steer and heifer calves under 500 pounds are taken from the July 1 cattle on feed report which shows 321,000 steers and 233,000 heifers on feed under 500 pounds. The total of 554,000 is divided by 0.95 since the 23 cattle-on-feed States have 95 percent of the U.S. total. Thus, 554,000 divided by 0.95 yields 583,000 used in the above example.

Table 8—Feeder cattle supply, United States, 1973-80

Item	1973	1974	1975	1976	1977	1978	1979	1980
<u>1,000 head</u>								
Jan. 1 feeder cattle supply:								
Calves, 500 lbs.—								
On farms	32,229	33,922	36,291	34,531	32,363	29,643	27,263	27,590
On feed <u>1/</u>	2,048	1,594	992	1,325	1,355	1,617	1,333	1,218
Total	30,181	32,328	35,299	33,206	31,005	28,026	25,930	26,372
Steers and heifers								
500+ lbs.— <u>2/</u>								
On farms	22,985	24,612	22,851	24,485	24,932	24,817	23,887	23,149
On feed <u>1/</u>	12,473	11,021	9,062	11,571	11,153	11,807	11,933	10,996
Total	10,512	13,591	13,789	12,914	13,779	13,010	11,954	12,153
Total supply	40,693	45,919	49,088	46,120	44,784	41,036	37,884	38,525
July 1 feeder cattle supply:								
Calves, 500 lbs.—								
On farms	38,504	41,952	42,793	39,361	38,329	34,807	33,758	35,911
On feed <u>1/</u>	944	438	404	443	535	688	583	394
Total	37,560	41,514	42,389	38,918	37,794	34,119	33,175	35,517
Steers and heifers								
over 500 lbs.— <u>2/</u>								
On farms	25,135	25,773	24,981	27,125	27,203	26,676	24,523	24,199
On feed <u>1/</u>	12,407	10,086	8,528	10,080	9,701	10,754	10,223	9,692
Total	12,728	15,687	16,453	17,045	17,502	15,922	14,300	14,507
Total supply	50,288	57,201	58,842	55,963	55,296	50,041	47,475	50,024

1/ Estimated U.S. steers and heifers (23-State total divided by 0.95).

2/ Not including heifers for cow replacement.

Table 9--Cattle inventory and cattle on feed comparisons,  
United States, January 1, 1965-81

Year	All Cattle	Cattle on feed	
		Total <sup>1/</sup>	Percentage of cattle inventory
	- - - 1,000 head - - -		Percent
1965	109,000	9,979	9.2
1966	108,862	10,582	9.7
1967	108,783	11,268	10.4
1968	109,371	11,417	10.4
1969	110,015	12,534	11.4
1970	112,369	13,190	11.7
1971	114,578	12,770	11.1
1972	117,862	13,912	11.8
1973	121,539	14,432	11.9
1974	127,788	13,643	10.7
1975	132,028	10,170	7.7
1976	127,980	12,941	10.1
1977	122,810	12,580	10.2
1978	116,375	13,472	11.6
1979	110,864	13,274	12.0
1980	111,192	12,223	11.0
1981	115,013	11,598	10.1

<sup>1/</sup> 39 States, 1965-71; 50 States beginning 1972.

The 0.95 factor is also used for steers and heifers over 500 pounds on feed July 1. Table 8 shows the feeder cattle supply for January and July, 1973-1980. Table 9 shows the U.S. annual inventory of all cattle and the percent of January 1 inventory that is on feed for slaughter market. Table 10 shows the 23-State quarterly inventories of steers and heifers on feed.

#### ACCURACY OF THE ESTIMATES

Estimates based on probability surveys are subject to sampling variability. Cattle estimate reports released in Washington, D.C., include the following statement on reliability and estimating procedures.

"Primary data used in making cattle estimates were obtained from probability surveys. Nationally, these surveys included information from about 49,000 farmers and ranchers sampled from livestock lists plus farm and ranch



Table 10--Steers and heifers on feed, by quarters,  
23 States, 1971-81

Year	January 1				
	Steers	Heifers	Total steers	Percentage of total	
	on	on	and heifers	Steers	Heifers
	feed	feed	on feed		
	- - - - 1,000 head - - - -			- - Percent - -	
1971	8,749	3,404	12,153	72.0	28.0
1972	9,322	3,947	13,269	70.3	29.7
1973	9,878	3,917	13,795	71.6	28.4
1974	9,486	3,498	12,984	73.1	26.9
1975	6,909	2,642	9,551	72.3	27.7
1976	8,276	3,975	12,251	67.6	32.4
1977	7,813	4,069	11,882	65.8	34.2
1978	8,343	4,410	12,753	65.4	34.6
1979	8,507	4,095	12,602	67.5	32.5
1980	7,893	3,710	11,603	68.0	32.0
1981	7,491	3,535	11,026	67.9	32.1
	April 1				
	Steers	Heifers	Total steers	Percentage of total	
	on	on	and heifers	Steers	Heifers
	feed	feed	on feed		
	- - - - 1,000 head - - - -			- - Percent - -	
1971	8,215	3,459	11,674	70.4	29.6
1972	8,953	3,821	12,774	70.1	29.9
1973	9,469	3,795	13,264	71.4	28.6
1974	9,027	3,204	12,231	73.8	26.2
1975	5,999	2,412	8,411	71.3	28.7
1976	7,325	3,509	10,834	67.6	32.4
1977	7,047	3,524	10,571	66.7	33.3
1978	7,414	4,283	11,697	63.4	36.6
1979	7,333	3,695	11,028	66.5	33.5
1980	6,821	3,338	10,159	67.1	32.9
1981	6,583	3,126	9,709	67.2	32.2

Continued--

Table 10--Steers and heifers on feed, by quarters,  
23 States, 1971-81--Continued

Year	July 1				
	Steers	Heifers	Total steers	Percentage of total	
	on feed	on feed	and heifers on feed	Steers	Heifers
	- - - - 1,000 head - - - -			- - Percent - -	
1971	7,631	3,226	10,857	70.3	29.7
1972	8,702	3,712	12,414	70.1	29.9
1973	8,988	3,696	12,684	70.9	29.1
1974	7,306	2,694	10,000	73.1	26.9
1975	5,701	2,782	8,483	67.2	32.8
1976	6,607	3,390	9,997	66.1	33.9
1977	6,378	3,346	9,724	65.6	34.4
1978	6,858	4,012	10,870	63.1	36.9
1979	6,818	3,448	10,266	66.4	33.6
1980	6,302	3,279	9,581	65.8	34.2
1981					
	October 1				
	Steers	Heifers	Total steers	Percentage of total	
	on feed	on feed	and heifers on feed	Steers	Heifers
	- - - - 1,000 head - - - -			- - Percent - -	
1971	7,677	2,956	10,633	72.2	27.8
1972	8,452	3,282	11,734	72.0	28.0
1973	8,754	3,247	12,001	72.9	27.1
1974	6,706	2,396	9,102	73.7	26.3
1975	6,218	2,937	9,255	68.3	31.7
1976	5,914	3,327	9,241	64.0	36.0
1977	6,319	3,438	9,757	64.8	35.2
1978	7,486	3,825	11,311	66.2	33.8
1979	6,696	3,203	9,899	67.6	32.4
1980	6,863	3,061	9,924	69.2	30.8
1981					

operations in 15,700 small area segments. Information was collected by mail, telephone, and personal interview. Since all operations with cattle were not included in the sample, survey estimates are subject to sampling variability. This variability, as measured by the relative standard error, is less than 1 percent of the total cattle and calves at the national level. This means that chances are approximately 95 out of 100 that the survey estimate will be within 2 percent of the complete coverage value if the same procedures were used to survey all producers.

"The sampling variability of sampling estimates on all cows and calf crop is slightly larger than that for inventories. More important, the final calf crop may differ some from the preliminary calf crop because of changing economic and environmental conditions.

"Survey estimates are also subject to nonsampling errors such as omissions, duplications, and mistakes in reporting and recording. These errors cannot be measured directly, but they are minimized through rigid quality controls on the data collection process and a careful review of all reported data for consistency and reasonableness.

"In setting the inventory estimates, the Crop Reporting Board used survey indications of inventory numbers, births, and deaths. These survey estimates were combined with reliable check data from other sources on slaughter, imports, and exports to construct a national balance sheet, which provides an additional check on survey inventory estimates" (see example on page 9).

The current number or estimate of each regularly scheduled release of a cattle inventory or cattle on feed report is a preliminary estimate and is subject to change or revision for a specified time period, usually 1 year. After this time, the estimate remains unchanged until the next 5-year review period which coincides with the availability of data from the U.S. Census of Agriculture. After this 5-year review, the estimates become final. Revisions are generally the result of additional check data becoming available after the estimate has been published. Check data can be of several different types but annual State farm census, tax assessments, inshipments, and brand inspection data are generally used. Cattle on feed estimates may be revised due to the opening of new cattle feedlots which may be operational for a short period before being placed on the list. Of course, the closing of a large feedlot may also necessitate revisions if it ceases to operate suddenly and remains empty for a period of time. Inshipment data are used as a check on cattle on feed placements in States where such data specify the class and weight of the feeder cattle.

Tables 11-19 show the preliminary or original estimate and the latest estimate, the difference, and the percentage change from the original estimate. Changes for January 1 and July 1 inventory estimates were minor during the time period shown. A change of 0.8 percent for July 1, 1974, was the greatest change. All cow numbers were equally steady, with the largest change also 0.8 percent.

For the four quarterly cattle on feed reports, the largest change was 0.7 percent. The calf crop for 1975 was revised by 3.1 percent because of the high cow slaughter during the year. January 1, 1975, was the record high cattle inventory number in this cattle cycle, and it was this change in direction that made the calf crop revision necessary. See the following section for more details on cattle cycles.

Table 11--All cattle inventory: Comparison of preliminary and latest estimates, United States, January 1, 1971-81

Year	Preliminary estimate number	Latest estimate		
		Deviation from prelim. estimate		
		Number	Number	Percentage change
		1,000 head		
				Percent
1971	114,568	114,578	+10	0
1972	117,916	117,862	-54	-0.1
1973	121,990	121,539	-451	-.4
1974	127,540	127,788	+248	+.2
1975	131,826	132,028	+202	+.2
1976	127,976	127,980	+4	0
1977	122,896	122,810	-86	-.1
1978	116,265	116,375	+110	+.1
1979	110,864	110,864	NC	0
1980	110,961	111,192	+231	+.2
1981	115,013			

NC = No change.

Table 12--All cattle inventory: Comparison of preliminary and latest estimates, United States, July 1, 1973-81

Year	Preliminary estimate number	Latest estimate		
		Number	Deviation from prelim. estimate	Percentage change
		Number	Number	Percent
		1,000 head		
1973	130,665	131,467	+802	+0.6
1974	138,318	139,378	+1,060	+0.8
1975	140,056	140,201	+145	+0.1
1976	133,459	133,659	+200	+0.1
1977	130,565	130,255	-310	-0.3
1978	121,575	121,695	+120	+0.1
1979	118,487	118,437	-50	0
1980	123,221	123,071	-150	-0.1
1981				

Table 13--All cows inventory: Comparison of preliminary and latest estimates, United States, January 1, 1971-81

Year	Preliminary estimate number	Latest estimate		
		Number	Deviation from prelim. estimate	Percentage change
		Number	Number	Percent
		1,000 head		
1971	50,002	49,786	-216	-0.4
1972	51,004	50,585	-419	-0.8
1973	52,753	52,553	-200	-0.4
1974	54,157	54,478	+321	+0.6
1975	56,637	56,931	+294	+0.5
1976	54,834	54,971	+137	+0.2
1977	52,395	52,441	+46	+0.1
1978	49,677	49,635	-42	-0.1
1979	47,843	47,852	+9	0
1980	47,794	47,865	+71	+0.1
1981	49,856			

Table 14--All cows inventory: Comparison of preliminary and latest estimates, United States, July 1, 1971-81

Year	Preliminary estimate number	Latest estimate		
		Number	Deviation from prelim. estimate	Percentage change
		Number	Number	Percent
		1,000 head		
1971	50,531	50,652	+121	+0.2
1972	51,664	51,785	+121	+0.2
1973	53,788	54,037	+249	+0.5
1974	56,488	56,960	+472	+0.8
1975	58,049	58,053	+4	0
1976	53,821	53,938	+117	+0.2
1977	52,282	52,190	-92	-0.2
1978	48,482	49,413	+931	+1.9
1979	47,733	47,915	+182	+0.4
1980	50,148	50,111	-37	-0.1
1981				

Table 15--Cattle on feed: Comparison of January 1 preliminary and latest estimates, 23 States, 1971-81

Year	Preliminary estimate number	Latest estimate		
		Number	Deviation from prelim. estimate Number	Percentage change
	- - - - 1,000 head	- - - -	- - Percent	- -
1971	12,203	12,209	+6	+0.1
1972	13,250	13,330	+80	-.6
1973	13,920	13,861	-59	-.4
1974	13,062	13,070	+8	+.1
1975	9,619	9,622	+3	0
1976	12,296	12,328	+32	+.3
1977	11,928	11,948	+20	+.2
1978	12,809	12,811	+2	0
1979	12,665	12,681	+16	+.1
1980	11,739	11,713	-26	-.2
1981	11,105			

Table 16--Cattle on feed: Comparison of April 1 preliminary and latest estimates, 23 States, 1971-81

Year	Preliminary estimate number	Latest estimate		
		Number	Deviation from prelim. estimate Number	Percentage change
		1,000 head		Percent
1971	11,731	11,712	-19	-0.2
1972	12,792	12,820	+28	+0.2
1973	13,414	13,322	-92	-.7
1974	12,310	12,314	+4	0
1975	8,452	8,478	+26	+0.3
1976	10,872	10,900	+28	+0.3
1977	10,618	10,619	+1	0
1978	11,716	11,741	+25	+0.2
1979	11,074	11,074	0	0
1980	10,203	10,203	0	0
1981	9,758			

Table 17--Cattle on feed: Comparison of preliminary and latest estimates, 23 States, July 1, 1971-81

Year	Preliminary estimate number	Latest estimate		
		Number	Deviation from prelim. estimate Number	Percentage change
		1,000 head		Percent
1971	10,881	10,889	+8	+0.1
1972	12,455	12,457	+2	0
1973	12,732	12,732	0	0
1974	10,047	10,049	+2	0
1975	8,542	8,550	+8	+0.1
1976	10,036	10,054	+18	+0.2
1977	9,750	9,765	+15	+0.2
1978	10,920	10,924	+4	0
1979	10,309	11,309	0	0
1980	9,619	9,635	+16	+0.2
1981				

Table 18--Cattle on feed: Comparison of preliminary and latest estimates, 23 States, October 1, 1971-81

Year	Preliminary estimate number	Latest estimate		
		Number	Deviation from prelim. estimate Number	Percentage change
	- - - - 1,000 head	- - - -	- -	Percent - -
1971	10,661	10,666	+5	+0.1
1972	11,764	11,774	+10	+1
1973	12,082	12,054	-28	-.2
1974	9,149	9,157	+8	+1
1975	9,301	9,306	+5	+1
1976	9,264	9,282	+18	+2
1977	9,777	9,793	+16	+2
1978	11,345	11,347	+2	0
1979	9,928	9,938	+10	+1
1980	9,986	9,965	-21	-.2
1981				

Table 19--Calf crop: Comparison of preliminary and latest estimates, United States, 1971-81

Year	Preliminary estimate number	Latest estimate		
		Number	Deviation from prelim. estimate	
			Number	Percentage change
		1,000 head		Percent
1971	47,092	46,738	-354	-0.8
1972	48,445	47,682	-763	-1.6
1973	50,000	49,194	-806	-1.6
1974	50,969	50,873	-96	-.2
1975	51,809	50,183	-1,626	-3.1
1976	46,905	47,384	+479	+1.0
1977	46,086	45,931	-155	-.3
1978	44,138	43,818	-320	-.7
1979	43,458	42,603	-855	-2.0
1980	45,525	45,354	-171	-.4
1981				



## THE CATTLE CYCLE

The cattle cycle occurs because of the biologic time lag in the production process, coupled with the production decisions of various types of producers in reaction to economic forces. If only internal factors--cattle prices and inventory levels--affect the cycle, the degree of cyclical adjustment is usually minor. But the additional impact of external forces, especially if they occur in combination, can lead to sharp inventory adjustments.

Eight cattle cycles have occurred since 1867 (see fig. 1), when annual cattle numbers first became available; three since 1949. The resulting fluctuation in prices has caused a 50-percent variation in the value of the inventory of cattle and calves since World War II in today's dollars. Consumer expenditures for beef have varied about the same. While some market participants can benefit from such variability, many could operate more efficiently with less risk, and consumers would be assured of a more stable supply of beef for purchase with a constant share of their income.

The change in the number of cattle slaughtered has varied from +13 to -15 percent from year to year over the last 25 years; the total cattle inventory varied 7 percent. Inventories peaked just prior to major liquidation; slaughter peaked during liquidation. But, per capita beef production has varied from only +8 to -10 percent over this period.

Beef production can be maintained to a degree during years when fewer cattle are available because a greater percentage of the available feeder cattle supply usually goes on feed when herd buildup is occurring. Cattle can be fed to heavier weights. Also, placing lighter weight calves on feed reduces the time from weaning to slaughter, as does feeding a higher concentrate ration. Finally, minimal culling rates for cows reduce the number of heifers needed for replacement of culled animals.

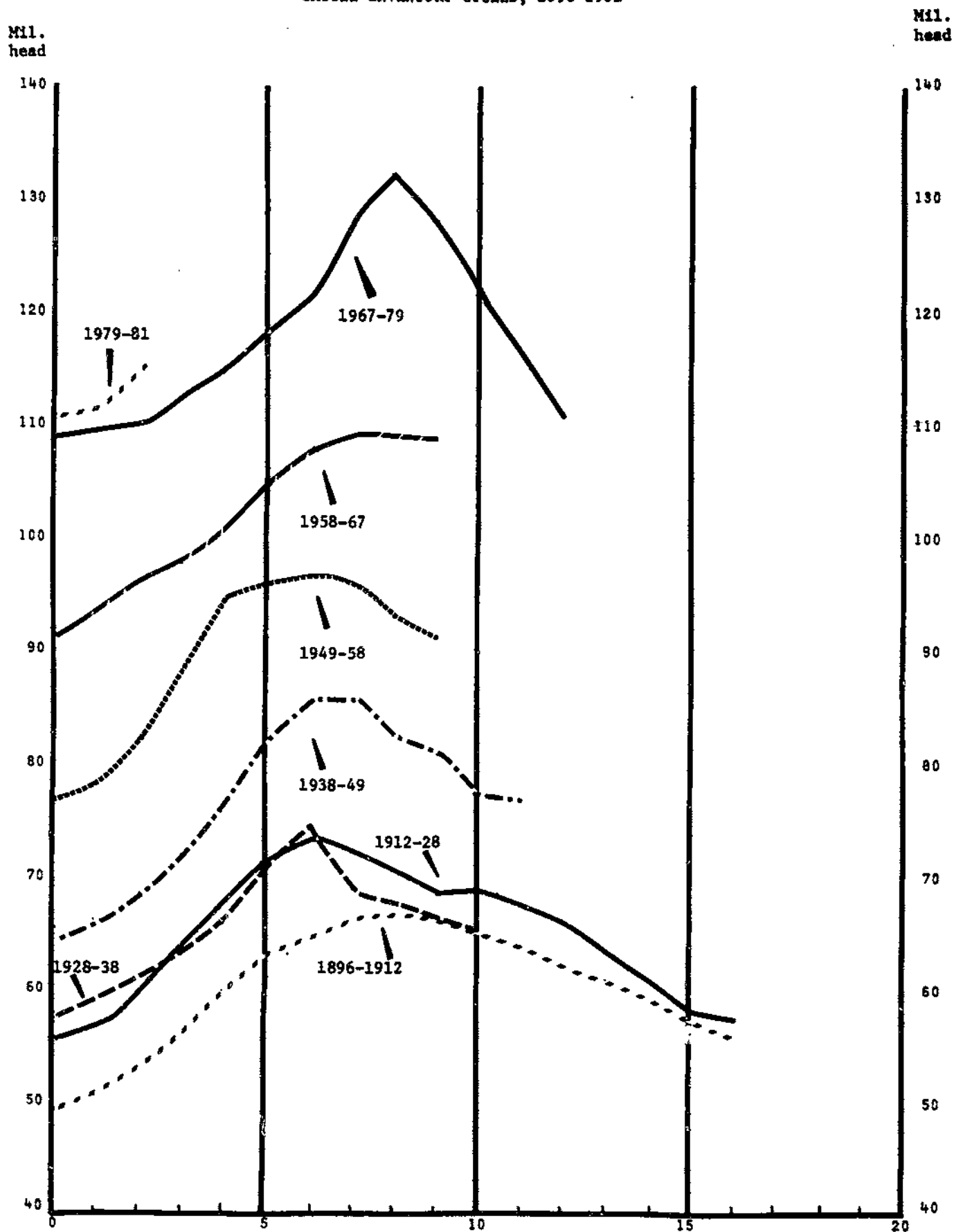
The cattle cycle reached its most recent low point on January 1, 1979. Drought in 1980 curtailed the expansion somewhat, but some expansion is still taking place.

### Mechanism of the Cycle

First, consider the biologic time lag that exists once stronger prices encourage herd expansion. The gestation (pregnancy) period for a beef cow is 9 months. Heifers are usually bred at 14 to 24 months of age. The calf is born 9 months later. The time for a calf to reach slaughter weight from birth is 17 to 19 months or longer, depending on the individual calf's rate of gain and the feeding program. Herd building shifts heifers from the feedlot to the breeding herd, lowering cattle slaughter, which contributes to further price increases, leading producers to expand herds even more.

Figure 1

CATTLE INVENTORY CYCLES, 1896-1981



Several sequences of events are possible. From the time a heifer is bred until her offspring reaches slaughter weight can be about 27 months. Furthermore, if the first calf is retained to further increase the herd rather than going to slaughter, it could be about 5½ years from the time the first calf is retained to increase output until that heifer's offspring reaches slaughter. Thus, beef production continues to increase well beyond the time when price signals change. This happened in the 1974-76 period. Beef production kept increasing despite the lower cattle prices and the large financial losses to cattlemen.

If the adjustment in the cattle cycle is affected by only changes in cattle prices and inventories as a result of the biologic lag in the production process, the degree of cyclical adjustment is usually minor. Such was the case in the mid-sixties when the growth of the cattle herd was stabilized, but liquidation was negligible. Also, population growth usually tempers the liquidation phase of the cycle in such circumstances.

Supplies and prices of competing meats, principally pork and poultry, can have a stabilizing or destabilizing affect. In 1974, the hog cycle peaked with the cattle cycle, which contributed to herd liquidation. The hog cycle peaked again in 1979-80, so the supply of pork tempered the rise in beef prices which may have retarded expansion of the cattle herd somewhat in 1981.

The extent of cattle herd liquidation usually depends on the number and severity of the impacts of changes in outside factors. Combinations of negative outside factors led by widespread drought caused a major herd liquidation in the mid-fifties and a record liquidation in the midseventies. In fact, the apparent existence of a 20- to 22-year drought cycle and severe liquidation during every other 10-year cattle cycle may be more than coincidence.

Whenever the current cattle cycle peaks and liquidation is commenced, it is likely that the extent of the liquidation will be determined by the number and combination of outside influences which impact the industry at that time. All of the following factors exerted some negative influence on the cattle cycle during the seventies. The probability of all of these factors having a negative impact again at the same time is low. Thus, while it is impossible to project the exact nature of the liquidation of cattle numbers, it is fairly safe to conclude that the liquidation, as a percent of the peak inventory, may be less than it was in the seventies.

Weather: Major or widespread droughts are often the trigger of the turning point in cattle cycles. Major droughts influenced

the turn of the cattle cycle in the midfifties and again in the midseventies. The extent to which drought is centered in major cow-calf areas, such as the central and southern Great Plains, determines the extent of drought effects on the entire industry. While cutbacks in grain production because of dry weather also affected feed grain exports and feed prices, the primary effects of drought stem from reduced forage production.

Feed grain exports: In recent years, exports have claimed a higher share of domestic feed grain production relative to livestock use. Exports have become an important part of our balance of payments, and have trended upward. Therefore, in the midseventies, the demand for feed grain exports has limited livestock production. A substantial demand for feed grain exports is expected throughout the eighties.

Feed prices: Feed prices are affected by export demand, domestic livestock use, and production, which is also an effect of weather. However, the recent initiation of farm-held grain reserves should lessen the impact of abrupt changes in supply and demand in the future. A substantial increase in feed grain prices in the early seventies, coupled with the drought-induced supply reduction and foreign demand, was a major negative factor in livestock production at that time.

Consumer income and expenditures: Since consumer expenditures for meat tend to be a rather stable, but declining, percentage of income, forecasts of consumer income levels are one of the principal components of demand analysis for beef. Consumer incomes are expected to continue upward, but perhaps at a somewhat slower rate than in the recent past. As incomes rise, a smaller percentage of income is used for food purchases.

Inflation: The unprecedented rate of inflation in the early seventies is deemed to be one of the prime reasons for the large liquidation of the cattle herd during the decade just ended. Grain prices more than doubled, as did many input prices, including energy. Although rising in terms of current dollars, many livestock prices in real dollars actually fell in the late seventies to their lowest levels ever.

Changing consumer preference: Most industry observers agree that the consumer preference for beef has been on the upswing since World War II. Supplies of meats available have altered consumption levels at times; however, this cannot be confused with a change in the basic demand structure. Although supplies available for consumption can change greatly over the expansion or liquidation phase of a cycle, consumer preferences change more slowly over time.

### Types of Enterprises

The change in total cattle inventories from year to year is the result of independent actions taken by managers of various types of enterprises. The pattern of cattle numbers over a cycle may vary considerably by type of enterprise. Dairy farmers contribute to beef production by culling their herds.

Dairy cows are culled on a more regular basis than beef cows since milk is the primary product, although culling of marginal cows may increase when cow prices increase. Three types of beef cow enterprises are also considered.

Small beef cow herds on forage land which cannot be cultivated: Small herds are often supplemental enterprises ranging from a few to perhaps as many as 50 cows. The stocking rate is primarily based on the carrying capacity of the pastureland. Thus, weather is the predominant factor affecting the change in cattle numbers for this type of enterprise. If it is considered a supplemental enterprise by the producer, prices must decrease below direct cash costs to affect production decisions; no overhead or investment costs need to be considered. The majority of such operations are located in the Southeast and the Corn Belt.

Producers have the option of shifting from cow-calf production to a stocker operation. Alternatively, the pastureland can be rented to other producers.

Larger herds on forage land which cannot be cultivated: Such operations are most likely to be found in the Southwest, Great Plains, and western range country. They are often the only enterprise or part of a beef cow-grain combination. The economic incentive to produce in any one year exists as long as cash costs, including general farm overhead plus family labor, are covered. In the longer term, investment costs for facilities, equipment, and breeding stock must be covered.

Leasing the pasture or rangeland or shifting to a stocker operation is an alternative. However, once the cow herd is liquidated, reinvestment costs probably would be substantial.

Since the land is not suitable for cropland, cattle production is likely to be maintained. Weather will be the prime factor in varying the stocking rate.

Larger herds on pasture which can be converted to cropland: A substantial portion of the beef cow herd, located principally in the Northern Plains, Corn Belt, and Southeast, is carried on pastureland which can be plowed up for row crops. Since these beef herds are a major enterprise, price expectations in the short run must exceed cash costs plus family labor, long-

term prices must be expected to cover investment costs, and expected net returns per acre of forage must equal or exceed those from cropping.

Changes in cattle numbers from this type of enterprise can be much greater than for either the supplementary enterprise or the larger cow-calf enterprise with no viable land use alternative.

#### Past Indicators of Overexpansion

Seven indicators have been developed which signaled significant changes in a cattle cycle in previous years. While no single indicator can identify when cattle numbers are becoming excessive, these seven statistics taken together may indicate when low prices and liquidation will come. These indicators are not infallible since they are mechanical statistics, but they should help cattle producers understand cycles better.

The basic data used to compute the seven indicators since 1950 are shown in table 20. All seven indicators are shown for the past three cycles in table 21. The first three indicators pertain to the annual rate of change in cattle numbers, while the other four compare slaughter rate to total supplies available for slaughter each year.

The data in parentheses in table 21 represent warning indicators; that is, an excessive buildup is underway. The seven indicators charted in figures 2 to 8 have lines placed at those years (1952, 1963, and 1973) showing the most indication of trouble ahead. When most indicators showed trouble ahead, cattle prices were either at their high or had reached their high a year earlier. When most indicators moved outside the limits of the parentheses, cattle prices bottomed and started to rise. For example, in the recent cattle cycle, prices peaked in 1973 when all indicators were flashing a warning signal. In 1976, when no indicators were flashing a warning signal, cattle prices started moving upward.

Each indicator, along with the annual cattle prices received by farmers, is shown on an accompanying chart.

Indicator 1: Annual expansion in all cattle numbers (fig. 2).  
When the growth rate exceeded 2 percent per year, price problems were not far away. In the past, an annual inventory growth rate of 2 percent was absorbed by rising beef demand and, consequently, could maintain price levels. Figure 2 and table 21 show that price problems followed periods of excessive buildup in the inventory.

Indicator 2: Annual expansion in all cow numbers (fig. 3).  
Whenever the cow herd growth sustained more than

Table 20--Cattle inventories and annual cattle slaughter,  
1950-81, United States

Year	January 1 inventory				Commercial slaughter				
	All Cattle	All cows and heifers that have calved <sup>1/</sup>	Beef and milk replacement heifers 500 lbs.+	Annual calf crop	Total cattle and calves including farm slaughter	Total cattle	Steers	Heifers	Cows
Thousands									
1950	77,963	37,739	N.A.	34,899	29,115	17,901	9,488	1,898	5,836
1951	82,083	39,255	N.A.	35,825	25,986	16,376	8,516	1,654	5,519
1952	88,072	41,098	N.A.	38,273	28,013	17,856	9,732	1,911	5,553
1953	94,241	44,016	N.A.	41,261	36,665	23,606	12,652	2,738	7,483
1954	95,679	46,132	N.A.	42,601	39,159	25,017	12,584	3,352	8,456
1955	96,592	46,341	N.A.	42,112	39,451	25,723	12,552	3,601	8,977
1956	95,900	45,549	N.A.	41,376	40,754	26,862	13,726	3,788	8,811
1957	92,860	44,177	N.A.	39,905	39,421	26,232	13,509	4,013	8,158
1958	91,176	42,801	N.A.	38,860	34,106	21,555	13,144	3,934	6,077
1959	93,322	42,653	N.A.	39,938	31,795	22,931	12,704	4,861	5,045
1960	96,236	43,308	N.A.	39,416	34,644	25,224	13,722	5,373	5,776
1961	97,700	44,062	N.A.	40,180	34,554	26,635	14,330	5,794	5,178
1962	100,369	45,141	N.A.	41,441	34,771	26,083	14,685	5,660	5,451
1963	104,488	46,475	N.A.	42,268	35,278	27,232	15,713	6,046	5,228
1964	107,903	47,966	N.A.	43,809	39,314	30,818	17,659	6,287	6,503
1965	109,000	48,780	10,480	43,922	40,963	32,347	16,400	7,375	8,087
1966	108,862	47,990	10,210	43,537	41,039	33,727	17,100	8,567	7,555
1967	108,783	47,495	10,115	43,803	40,410	33,869	17,883	8,738	6,774
1968	109,371	47,685	10,190	44,315	41,037	35,026	18,178	9,457	6,830
1969	110,015	48,040	10,140	45,177	40,586	35,237	18,182	9,549	6,906
1970	112,369	48,780	10,311	45,871	39,559	35,087	18,926	9,456	6,125
1971	114,578	49,786	10,507	46,738	39,730	35,651	19,292	9,335	6,386
1972	117,862	50,585	10,815	47,682	39,335	35,842	19,721	9,472	6,004
1973	121,539	52,553	11,306	49,194	36,506	33,687	18,325	8,439	6,246
1974	127,788	54,478	12,133	50,873	40,528	36,812	19,682	8,795	7,515
1975	132,028	56,931	12,970	50,183	46,870	40,911	17,818	10,438	11,557
1976	127,980	54,971	11,148	47,384	48,726	42,654	18,879	12,158	10,619
1977	122,810	52,441	10,414	45,931	48,073	41,856	19,341	11,748	9,864
1978	116,375	49,635	9,744	43,818	44,272	39,552	18,526	11,756	8,472
1979	110,864	47,852	9,459	42,603	36,932	33,678	17,373	9,746	5,931
1980	111,192	47,865	10,097	45,354	36,795	33,807	17,149	9,596	6,337
1981	115,013	49,856	10,542						

N.A. = Not available.

<sup>1/</sup> Cows and heifers 2 years old and over for the period 1950 to 1964 were adjusted to cows and heifers that have calved using the published data for the series for the 1965-70 period. The adjustment factor: Cows and heifer calves =  $-4.15905 + .98811$  (cows and heifers 2 years old and over) +  $.03569$  (year).

Table 21--Combined warning indicators

Year	Inventory indicators			Slaughter rate indicators					Prices received by farmers	
	Annual growth rate of total inventory	Annual growth rate of cow herd	Replacement heifers as percentage of cow herd	Percentage of Jan. 1 inventory slaughtered	Slaughter as percentage of prev. year's calf crop	Cow slaughter as percentage of cow herd	Female slaughter as percentage of steer slaughter		Cattle	Calves
	(1)	(2)	(3)	(4)	(5)	(6)	(7)			
				Percent					Dollar/cwt.	
1950				37		15	82		23.30	26.30
1951	(+5)	(+4)		(32)	(74)	14	84		28.70	32.00
1952	(+7)	(+5)		(32)	(78)	14	(77)		24.30	25.80
1953	(+7)	(+7)		39	96	17	(81)		16.30	16.00
1954	+2	(+5)		41	95	18	94		16.00	16.50
1955	+1	0		41	93	19	100		15.60	16.80
1956	-1	-2		42	97	19	92		14.90	16.10
1957	-3	-3		42	95	18	90		17.20	18.70
1958	-2	-3		37	85	14	(76)		21.90	25.30
1959	+2	0		(34)	(82)	(12)	(78)		22.60	26.70
1960	(+3)	+2		36	89	(13)	(81)		20.40	22.90
1961	+2	+2		(35)	88	(12)	(77)		20.20	23.70
1962	(+3)	+2		(35)	87	(12)	(76)		21.30	25.10
1963	(+4)	(+3)		(34)	85	(11)	(72)		19.90	24.00
1964	(+3)	(+3)		36	93	14	(72)		18.00	20.40
1965	+1	+2	21	38	94	17	94		19.90	22.10
1966	0	-2	21	38	93	16	94		22.20	26.00
1967	0	-1	21	37	93	14	87		22.30	26.30
1968	+1	0	21	38	94	14	90		23.40	27.60
1969	+1	+1	21	37	92	14	91		26.20	31.50
1970	+2	+2	21	(35)	88	(13)	82		27.10	34.50
1971	+2	+2	21	(35)	87	(13)	(81)		29.00	36.40
1972	(+3)	+2	21	(33)	(84)	(12)	(78)		33.50	44.70
1973	(+3)	(+4)	(22)	(30)	(76)	(12)	(80)		42.80	56.60
1974	(+5)	(+4)	(22)	(32)	(82)	14	83		35.60	35.20
1975	(+3)	(+5)	(23)	36	92	20	123		32.20	27.20
1976	-3	-3	20	38	97	19	121		33.70	34.10
1977	-4	-5	20	39	101	19	111		34.40	36.90
1978	-5	-5	20	38	96	17	109		48.50	59.10
1979	-5	-4	20	(33)	(84)	(12)	90		66.10	88.70
1980	0	0	21	(33)	86	(13)	93		62.40	76.80
1981	(+3)	(+4)	21							

Warning indicators in parentheses.

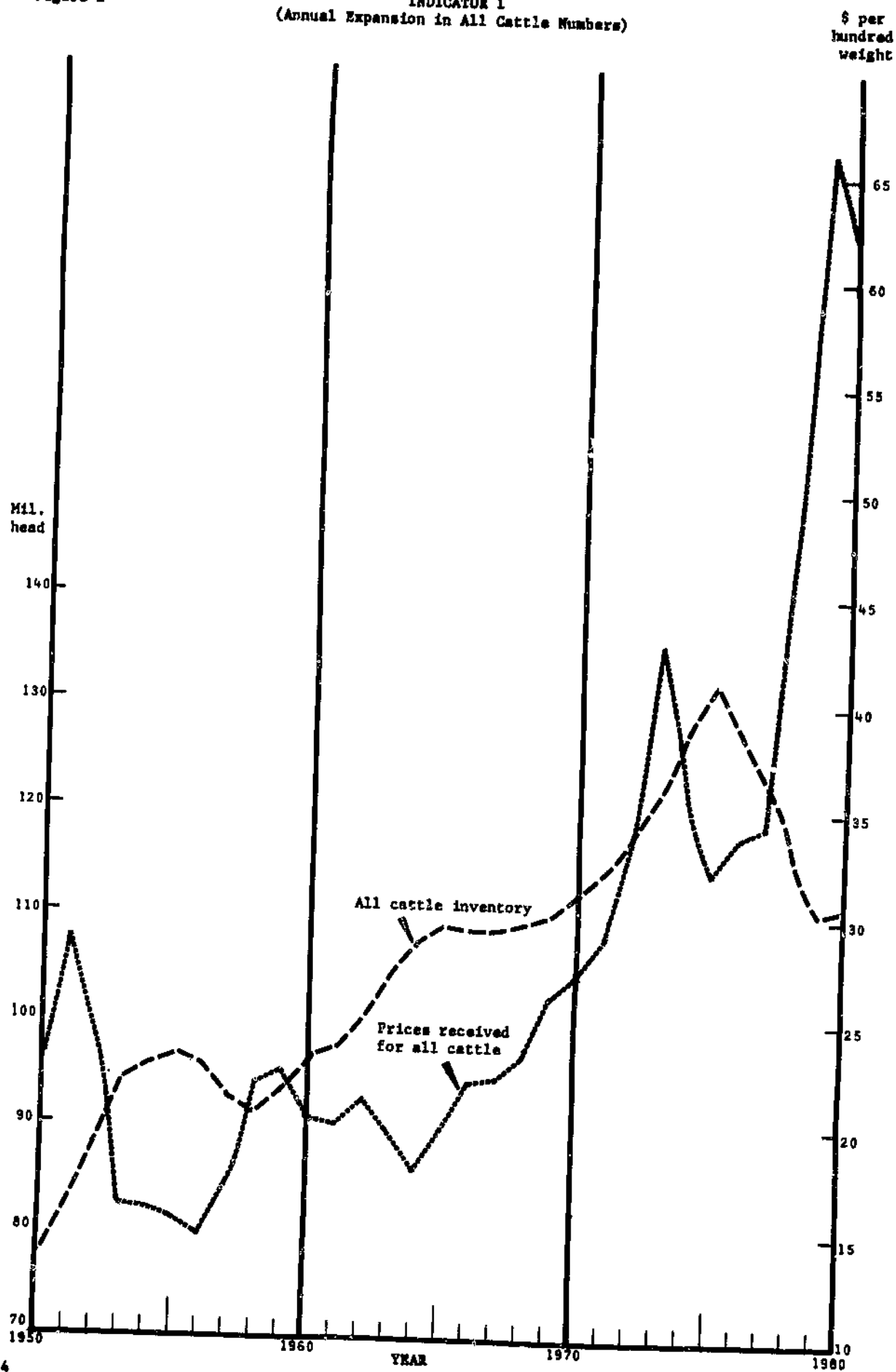
- (1) Growth rate above 2 percent.  
 (2) Growth rate above 2 percent.  
 (3) Replacement heifers over 21 percent.  
 (4) Less than 36 percent of inventory slaughtered.

- (5) Slaughter less than 85 percent.  
 (6) Less than 14 percent of cow herd slaughter.  
 (7) Female slaughter less than 82 percent.



Figure 2

INDICATOR 1  
(Annual Expansion in All Cattle Numbers)



a 2-percent increase each year, numbers increased faster than demand and the industry overproduced. The 1975 price depression was preceded by 6 years of growth rates of 2 to 4 percent per year in the cow herd.

Another indicator involving the growth in the cow herd worth noting is the number of cows per 100 people. This ratio relates potential beef supplies to growth in demand. Many analysts consider a ratio of 24 cows per 100 people as an equilibrium level. This ratio reached 26.8 in 1975 when cattle prices reached their low. The ratio dropped to 21.8 on January 1, 1979, the lowest level since 1950. Substantial reduction in nonfed slaughter (cows, steers, and heifers) in 1979 played a major role in limiting beef supplies to 108 pounds per person, 10 percent less than in 1978 and 16 percent below the record in 1976.

Indicator 3: Ratio of replacement heifer inventory to all cows (fig. 4). Numbers on replacement heifers have been available only since 1965. Normal retention of replacement heifers has been about 21 percent of the cow herd. A retention rate greater than 21 percent usually resulted in excessive growth in the cow herd. For example, the number of replacement heifers as a percentage of the total cow herd remained near 21 percent from 1965 to 1973. The rate then increased to 23 percent in 1975 and the cow herd grew too fast.

Indicator 4: Ratio of annual cattle and calf slaughter to January 1 inventory (fig. 5). When this ratio was less than 36 percent, the cattle herd increased too fast, especially if the ratio stayed below 36 percent for several years. For the cattle herd to grow about 2 percent per year, the industry killed about 36 percent of the inventory each year.

Indicator 5: Ratio of annual cattle and calf slaughter to previous year's calf crop (fig. 6). When a year's slaughter was less than 85 percent of the previous year's calf crop, such as in 1972-74, the cattle herd was building too fast. A percentage of 85 or greater indicated cattle producers were liquidating their herds.

Figure 3

INDICATOR 2  
(Annual Expansion in All Cow Numbers)

\$ per  
hundred  
weight

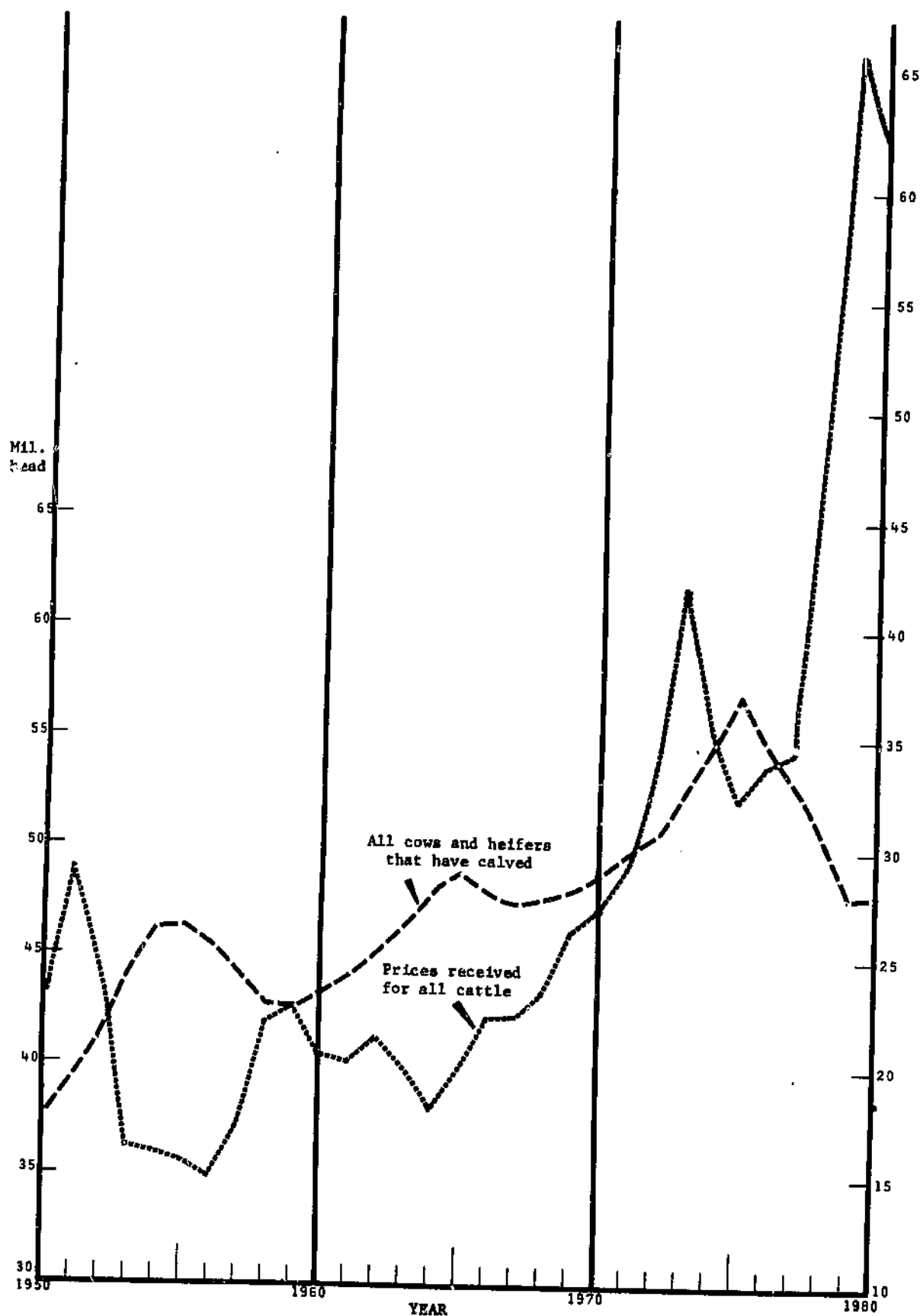


Figure 4

INDICATOR 3  
(Ratio of Replacement Heifer inventory to All Cows)

\$ per  
hundred  
weight

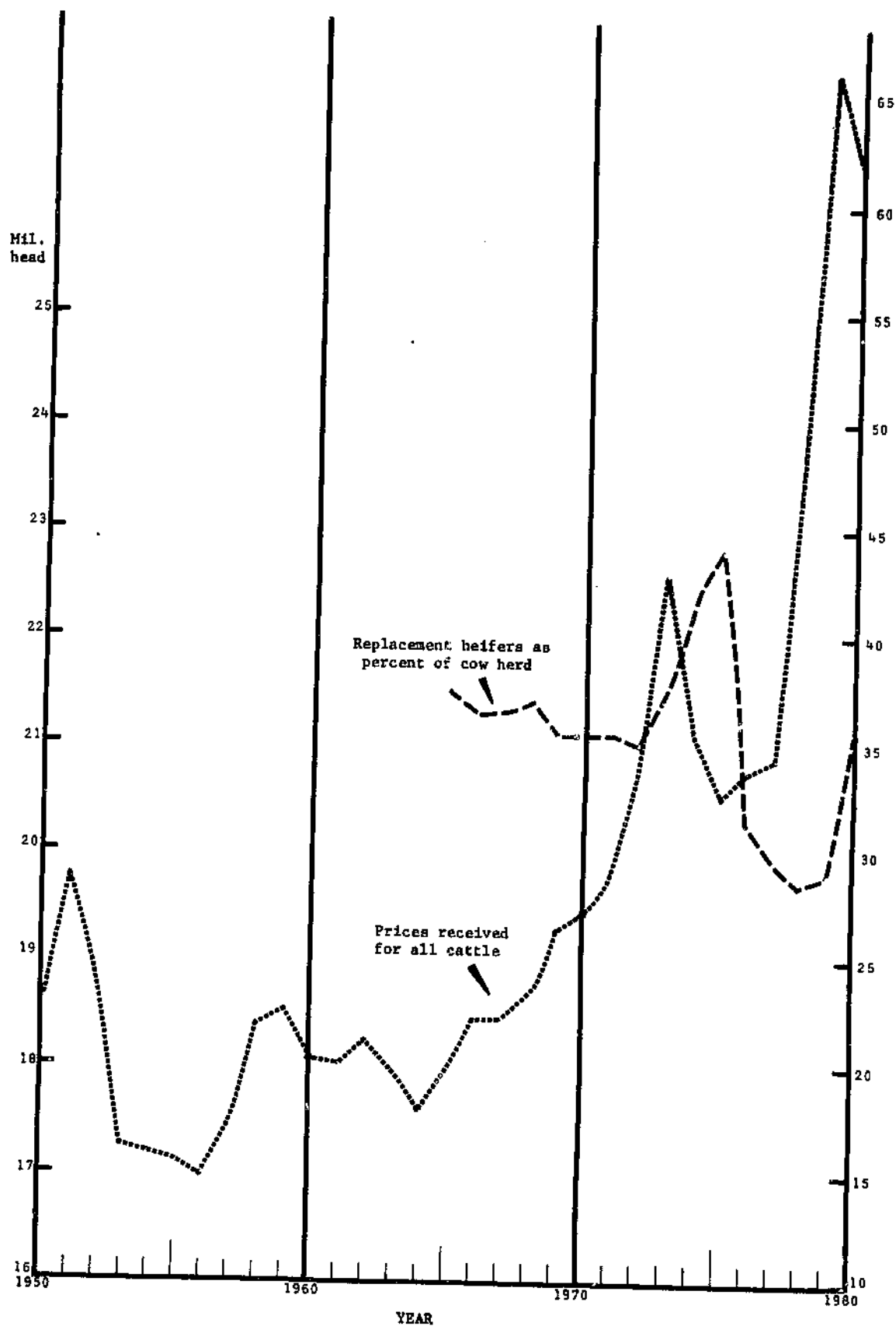


Figure 5

INDICATOR 4  
(Ratio of Annual Cattle and Calf Slaughter to January 1 Inventory)

\$ per  
hundred  
weight

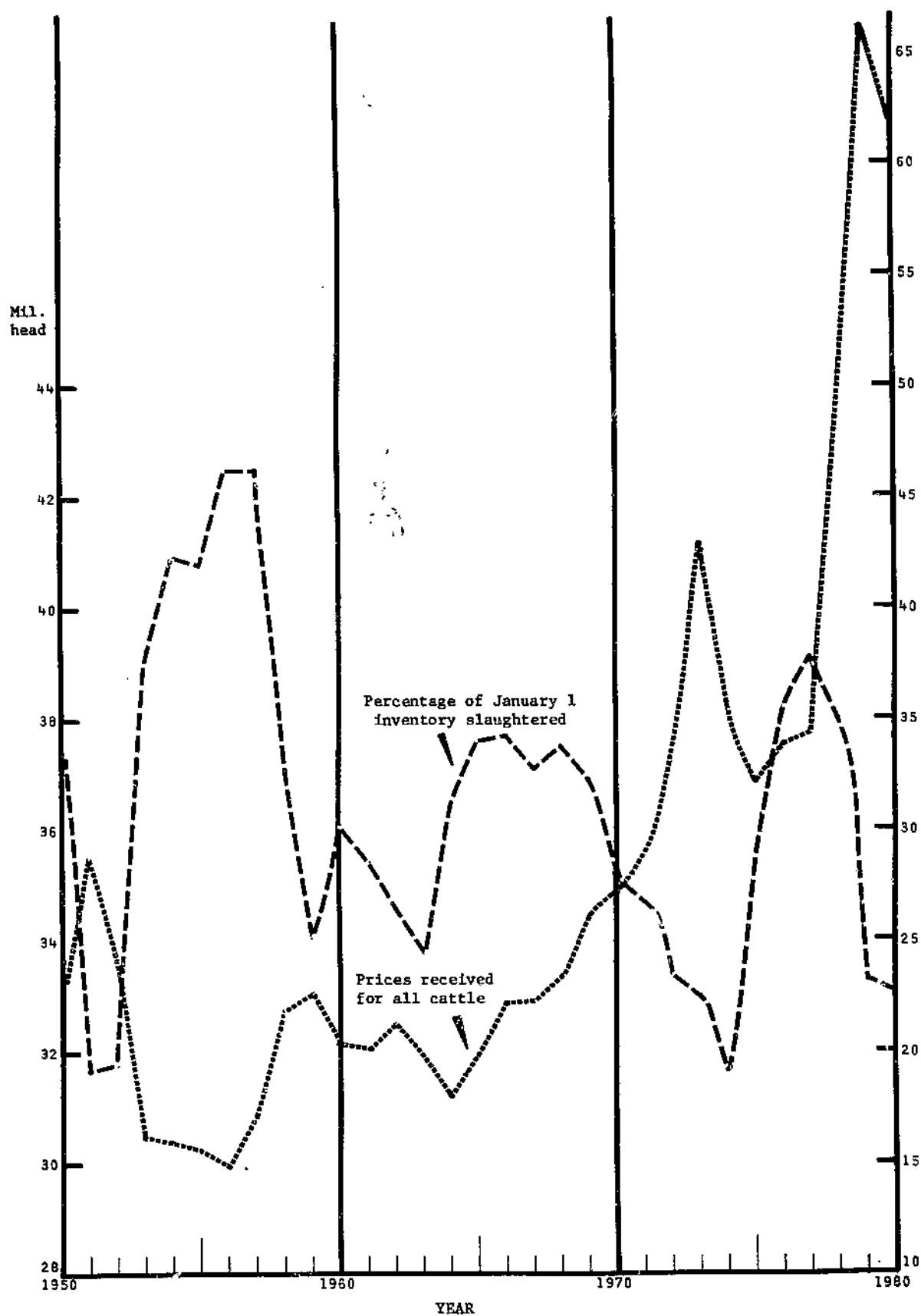
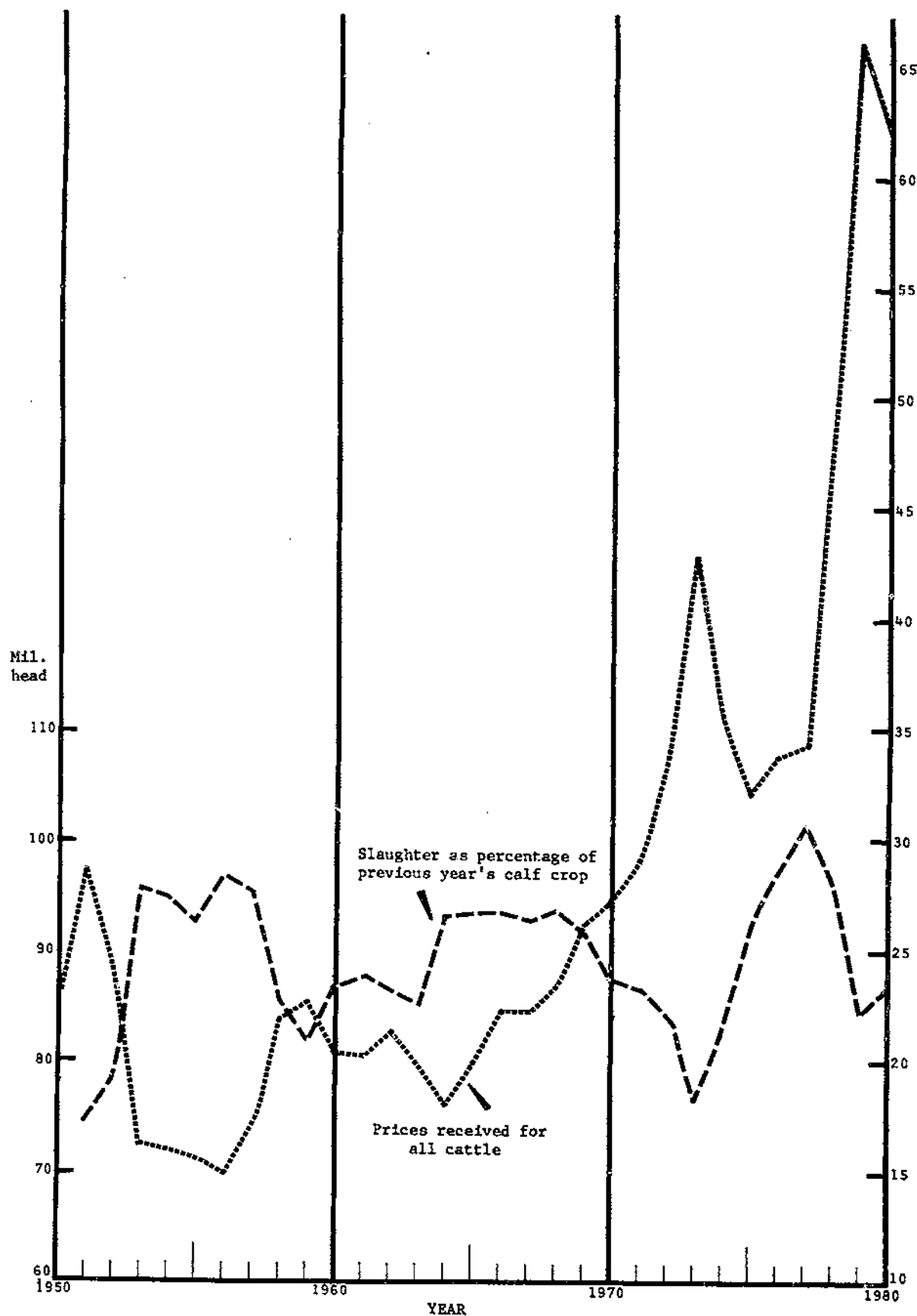


Figure 6

INDICATOR 5  
(Ratio of Annual Cattle and Calf Slaughter to Previous Year's Calf Crop)

\$ per  
hundred  
weight



Indicator 6: Ratio of annual cow slaughter to January 1 all cow inventory (fig. 7). Cow slaughter below 14 percent of the cow herd has indicated expansion; a percentage below 13 usually has indicated over-expansion. This indicator varied more than the others during the previous cattle cycles.

Indicator 7: Ratio of cow and heifer slaughter to steer slaughter (fig. 8). Cow and heifer slaughter was not greater than 81 percent of steer slaughter when the cow herd was not expanding too fast. When female slaughter was less than 82 percent of steer slaughter (such as 79 percent rate in 1972), the cow herd was building too fast.

#### FORECASTING FED CATTLE MARKETINGS

The cattle on feed reports provide the necessary information for forecasting future supplies of fed cattle on a monthly, quarterly, and semi-annual basis. Net placements are used to forecast monthly slaughter primarily because movement back to pastures, to other feedlots, and deathloss is deducted from the total. The following data give the comparison period for each month. A 60- to 180-day time period is used in this series. If we assume that the placements average 600 pounds when put on full feed and a daily average gain of 3 pounds per head per day, the 180 days multiplied by 3 would be 540 pounds of gain (600 pounds plus 540 = 1,140 pounds, the projected market weight for slaughter).

#### Average Net Placements During--

August-October  
September-November  
October-December  
November-January  
December-February  
January-March  
February-April  
March-May  
April-June  
May-July  
June-August  
July-September

#### Marketed for Slaughter During--

January  
February  
March  
April  
May  
June  
July  
August  
September  
October  
November  
December

These data are the primary tools used by analysts in forecasting beef supplies; livestock producers also use the data in making production and marketing decisions. Cattle on feed data available for longer projections of beef slaughter utilize the quarterly cattle on feed reports covering 23 major States and the weight groups of steers and heifers on feed.

Figure 7

INDICATOR 6  
(Ratio of Annual Cow Slaughter to January 1 All Cow Inventory)

\$ per  
hundred  
weight

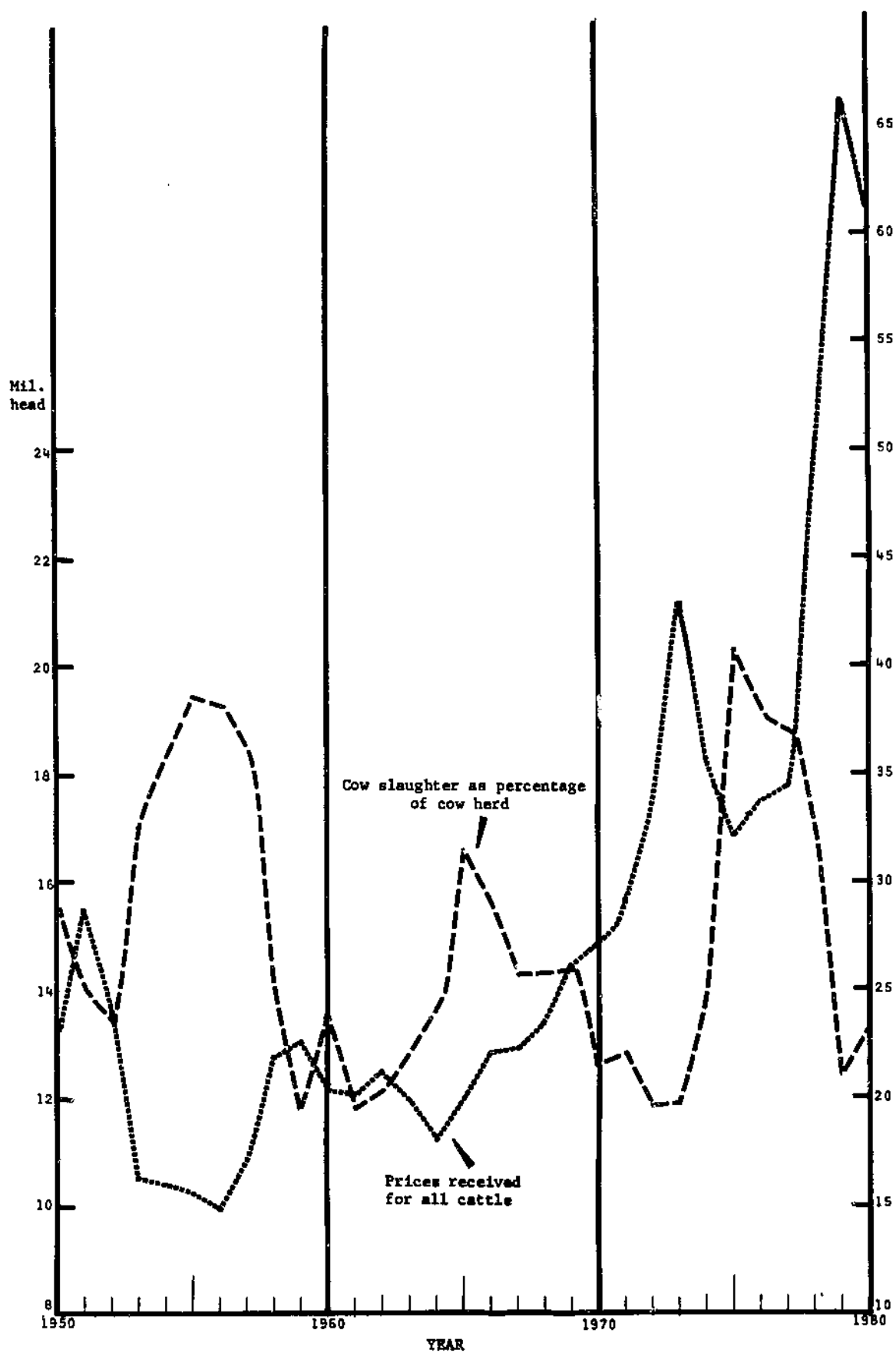
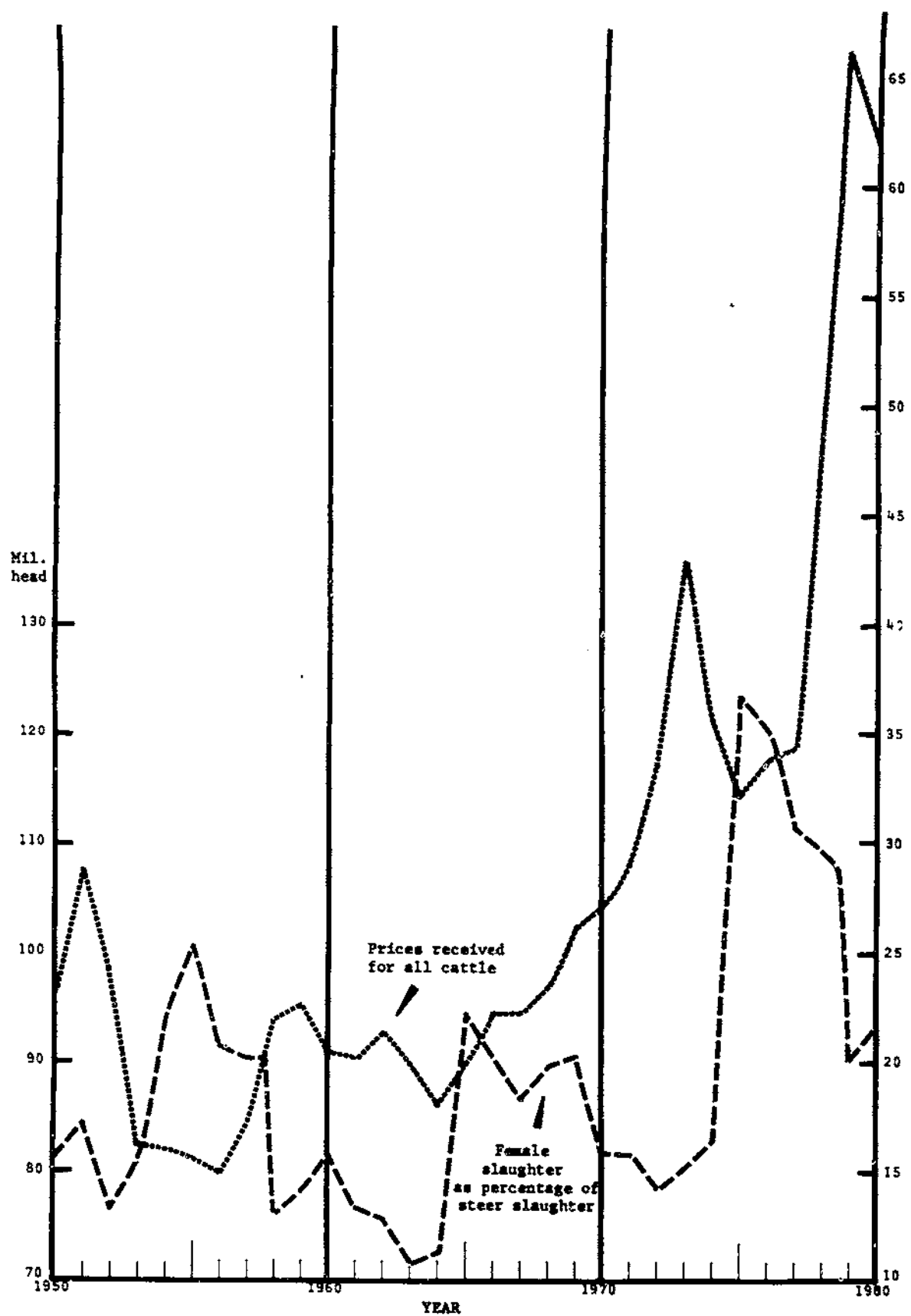




Figure 8

INDICATOR 7  
(Ratio of Cow and Heifer Slaughter to Steer Slaughter)

\$ per  
hundred  
weight



<u>Report</u>	<u>Slaughter Period</u>
January 1: Heavyweight steers and heifers Lightweight steers and heifers	January-March April-June
April 1: Heavyweight steers and heifers Lightweight steers and heifers	April-June July-September
July 1: Heavyweight steers and heifers Lightweight steers and heifers	July-September October-December
October 1: Heavyweight steers and heifers Lightweight steers and heifers	October-December January-March

The formula for heavyweight cattle is half of the steers 700-899 pounds, plus all steers over 900 pounds and all heifers over 700 pounds. The lightweight cattle on feed are half of the steers 700 to 899 pounds plus all steers and heifers under 700 pounds.

#### CHARTING FUTURE BEEF SUPPLIES

This section shows the step-by-step procedures for estimating future slaughter supplies on a monthly, quarterly, and semi-annual basis. All the data needed are from three reports issued by the SPS Crop Reporting Board:

- \* "Cattle," released in January and July showing the number of cattle and calves on hand as of the first of those months;
  - \* "Cattle on feed," released each month (eight reports show monthly data for seven States on number on feed, placements, marketings, and disappearance while the January 1, April 1, July 1, and October 1 issues carry similar data plus weight groupings for the 23 major States); and
  - \* "Livestock slaughter," a monthly release showing number of animals slaughtered and total red meat production.
- These three reports provide most information needed to forecast beef supplies following examples and charts in this section.

To project the cattle slaughter for the next 3 months, use the number of heavyweight cattle in feedlots given in cattle on feed reports. To illustrate the procedures, this report uses the July 1, 1979, report to project what the cattle slaughter will be during the July-September quarter.

Step 1: Calculate total heavyweight steers and heifers on feed.

	<u>1,000 head</u>
Steers 700 to 899 lbs. (2,483 ÷ 2)	1,242
Steers 900 to 1,099 lbs.	2,429
Steers 1,100+ lbs.	560
Total steers	4,231
Heifers 700 to 899 lbs.	1,597
Heifers 900+ lbs.	561
Total heifers	2,158
Total heavyweight steers and heifers	6,389

This procedure uses only half the steers in the 700 to 899 lbs. weight group because those at the low end of the weight range will probably not be slaughtered within the next 3 months. Now that the heavyweight cattle on feed for July 1 has been determined, go to the July-September chart (fig. 11) which shows the historical relationships between the July 1 heavyweight cattle on feed in the 23 States and the number of fed cattle marketed during July-September.

Read this chart by pinpointing the total--6,389,000--on the bottom scale and drawing a vertical line to the diagonal. Determine the reading from the left side scale; the reading is about 6.3 million.

Step 2: Estimate U.S. fed slaughter.

Since the 23 States produce 95 to 97 percent of total fed cattle marketings, the chart reading from step 1 can be expanded to the U.S. level by dividing 6.3 million by 0.96. The answer is 6.6 million.

Step 3: Estimate U.S. steer and heifer slaughter.

With the estimate of fed slaughter, the next step is to project this to a total steer and heifer slaughter for the July-September quarter. Refer to table 22. This table shows that for the previous two quarters, the fed share of total slaughter has been 98.2 to 97.5 percent. Use 97 percent since the percentage has always been a little lower for the July-September quarter. Divide the 6.6 million fed steers and heifers estimated in step 2 by 0.97. This gives 6.8 million head.

Step 4: Estimate U.S. cow and bull slaughter.

Refer once again to table 22 to determine the range of July-September cow and bull slaughter. Note that for the first two quarters of 1979 the number dropped sharply from the level during 1978.

The estimate will depend in part on what the cattle reports indicate about the cattle cycle. The sharp increase in beef and milk replacement heifers over 500 pounds in the July 25, 1979, release indicate that replacement heifers are being held for breeding and will go into the cow herd. The decline in cow slaughter during the first half of 1979 further confirms that fewer cows are being slaughtered so they may stay in the cow herd longer which, in turn, means more calves to be born. Assume that cow and bull slaughter will continue to decline in the July-September quarter by the same rate of decline from the first to the second quarter. This would give an estimate of 1.3 million for the third quarter of 1979.

Step 5: Add estimates to a total.

Class:	<u>Estimated total</u>
Steer and heifer slaughter (from step 3)	(1,000 head) 6.8
Cow and bull slaughter (from step 4)	<u>1.3</u>
July-September 1979 estimated total	8.1

This estimate is 84 percent of the total commercial cattle slaughter during this quarter of 1978. A reduction of this size indicates that beef marketings during this quarter would be well below a year earlier.

By using the latest quarterly cattle on feed report, one can forecast the next quarter's supply by using the appropriate data and charts in figures 9-12 to follow the same steps shown above.

If a longer range prediction is desired, say 4 to 6 months ahead, use the formula for lightweight cattle on feed and charts in figures 13-16. As an example, the July 1 lightweight cattle

Table 22--U.S. slaughter trends

Year and quarter	Steer and heifer slaughter				Cow and bull slaughter	Total commercial slaughter
	Fed		Total	Fed share of total		
	23 States	Expanded 1/				
		- - - 1,000 head - - -		Percent	- - 1,000 head - -	
1975: Jan.-Mar	5,507	5,797	7,300	79.4	2,433	9,733
Apr.-June	5,024	5,288	6,857	77.1	2,693	9,550
July-Sept.	5,019	5,283	7,103	74.4	3,436	10,539
Oct.-Dec.	4,950	5,211	6,996	74.5	4,093	11,089
Year	20,500	21,579	28,256	76.4	12,655	40,911
1976: Jan.-Mar.	6,345	6,679	7,925	84.3	2,988	10,913
Apr.-June	5,941	6,254	7,579	82.5	2,591	10,170
July-Sept.	6,200	6,526	8,035	81.2	2,874	10,909
Oct.-Dec.	5,684	5,983	7,498	79.8	3,164	10,662
Year	24,170	25,442	31,037	82.0	11,617	42,654
1977: Jan.-Mar.	6,462	6,802	7,719	88.1	2,747	10,466
Apr.-June	6,147	6,471	7,806	82.9	2,387	10,193
July-Sept.	6,159	6,483	7,987	81.2	2,642	10,629
Oct.-Dec.	6,085	6,405	7,577	84.5	2,991	10,568
Year	24,853	26,161	31,089	84.1	10,767	41,856
1978: Jan.-Mar.	6,781	7,138	7,707	92.6	2,502	10,209
Apr.-June	6,621	6,969	7,516	92.7	2,360	9,876
July-Sept.	6,523	6,866	7,542	91.0	2,201	9,743
Oct.-Dec.	6,740	7,095	7,517	94.4	2,207	9,724
Year	26,665	28,068	30,282	92.7	9,270	39,552
1979: Jan.-Mar.	6,747	7,102	7,182	98.9	1,715	8,897
Apr.-June	6,146	6,469	6,527	99.1	1,516	8,043
July-Sept.	5,976	6,291	6,747	93.2	1,501	8,248
Oct.-Dec.	5,756	6,059	6,663	90.9	1,827	8,490
Year	24,625	25,921	27,119	95.6	6,559	33,678
1980: Jan.-Mar.	6,145	6,468	6,530	99.1	1,616	8,146
Apr.-June	5,630	5,926	6,645	89.2	1,548	8,193
July-Sept.	5,731	6,033	6,805	88.7	1,810	8,615
Oct.-Dec.	5,677	5,976	6,765	88.3	2,088	8,853
Year	23,183	24,403	26,745	91.2	7,062	33,807
1981: Jan.-Mar.						
Apr.-June						
July-Sept.						
Oct.-Dec.						
Year						

1/ 23-State quarterly total divided by 0.95.

Figure 9—January 1 heavyweight cattle on feed versus January-March fed cattle marketings, 23 States

Year	January 1 heavyweight cattle on feed X axis	January-March marketings Y axis
--- 1,000 head ---		
1975	5397	5507
1976	6445	6345
1977	6233	6462
1978	6351	6781
1979	7031	6747
1980	6605	6378

NOTE: The above values are plotted on the accompanying chart. For example, 715 in the chart represents the plotting point for 1975.

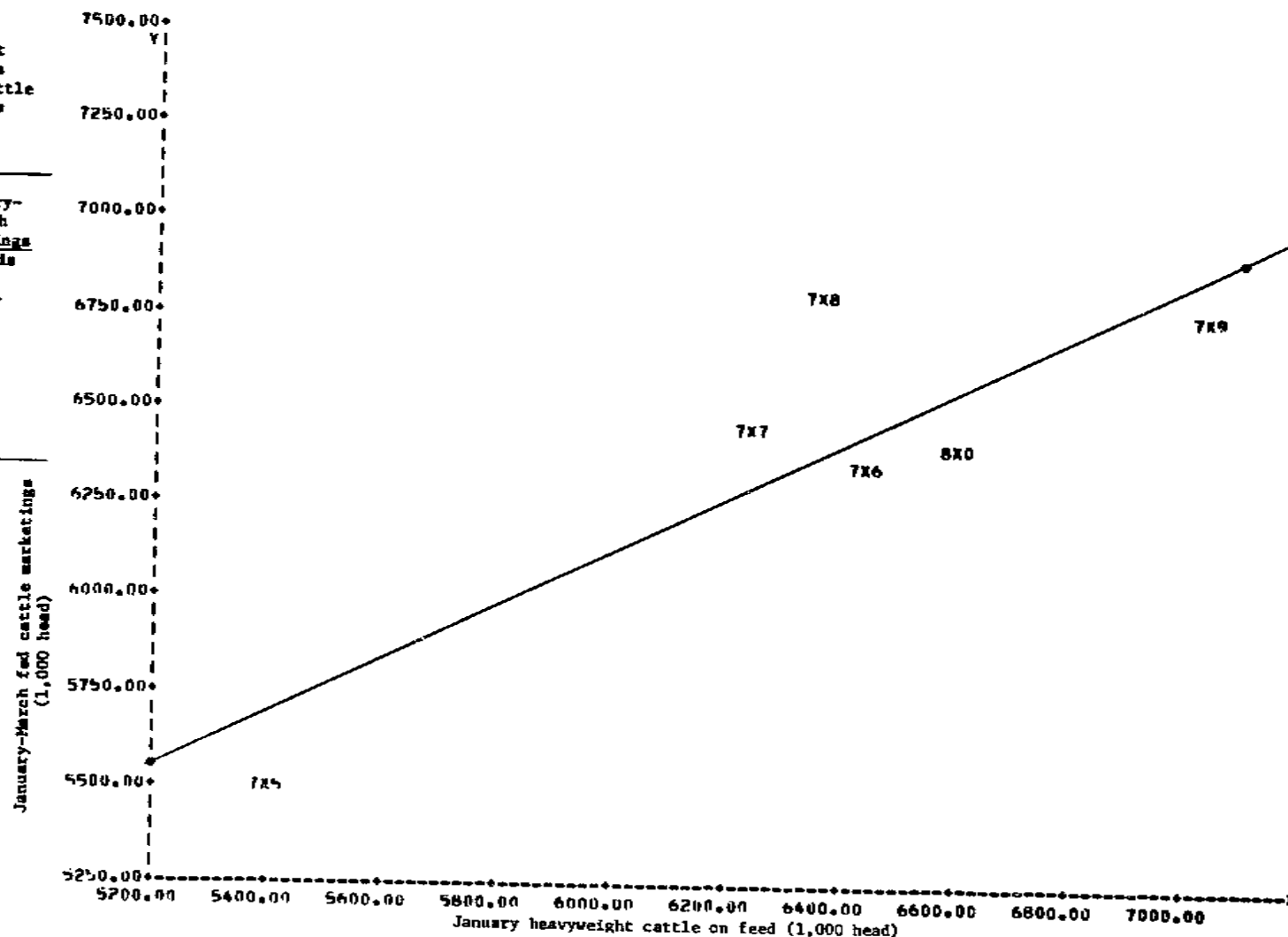


Figure 10—April 1 heavyweight  
cattle on feed versus  
April-June fed cattle  
marketings, 23 States

Year	April 1 heavyweight cattle on feed X axis	April- June marketings Y axis
--- 1,000 head ---		
1975	4293	5024
1976	5705	5941
1977	5552	6147
1978	6072	6621
1979	6063	6146
1980	5879	5630

NOTE: The above values are  
plotted on the accompanying  
chart. For example, 7X5 in  
the chart represents the  
plotting point for 1975.

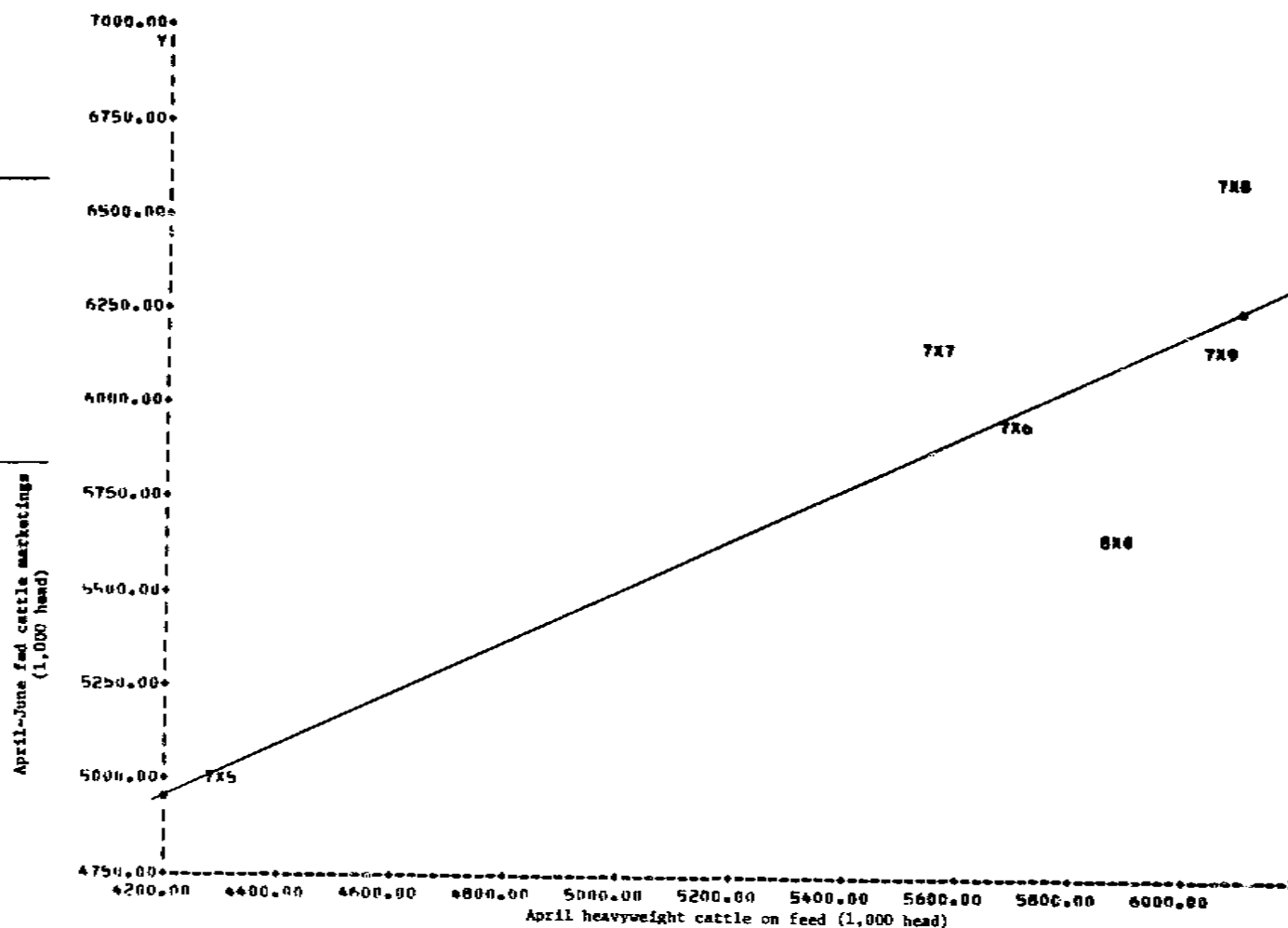


Figure 11--July 1 heavyweight cattle on feed versus July-September fed cattle marketings, 23 States

Year	July 1 heavyweight cattle on feed X axis	July-September marketings Y axis
	--- 1,000 head ---	
1975	4903	5019
1976	6155	6200
1977	5958	6159
1978	6389	6523
1979	6393	5976
1980	6163	5731

NOTE: The above values are plotted on the accompanying chart. For example, 7X5 in the chart represents the plotting point in 1975.

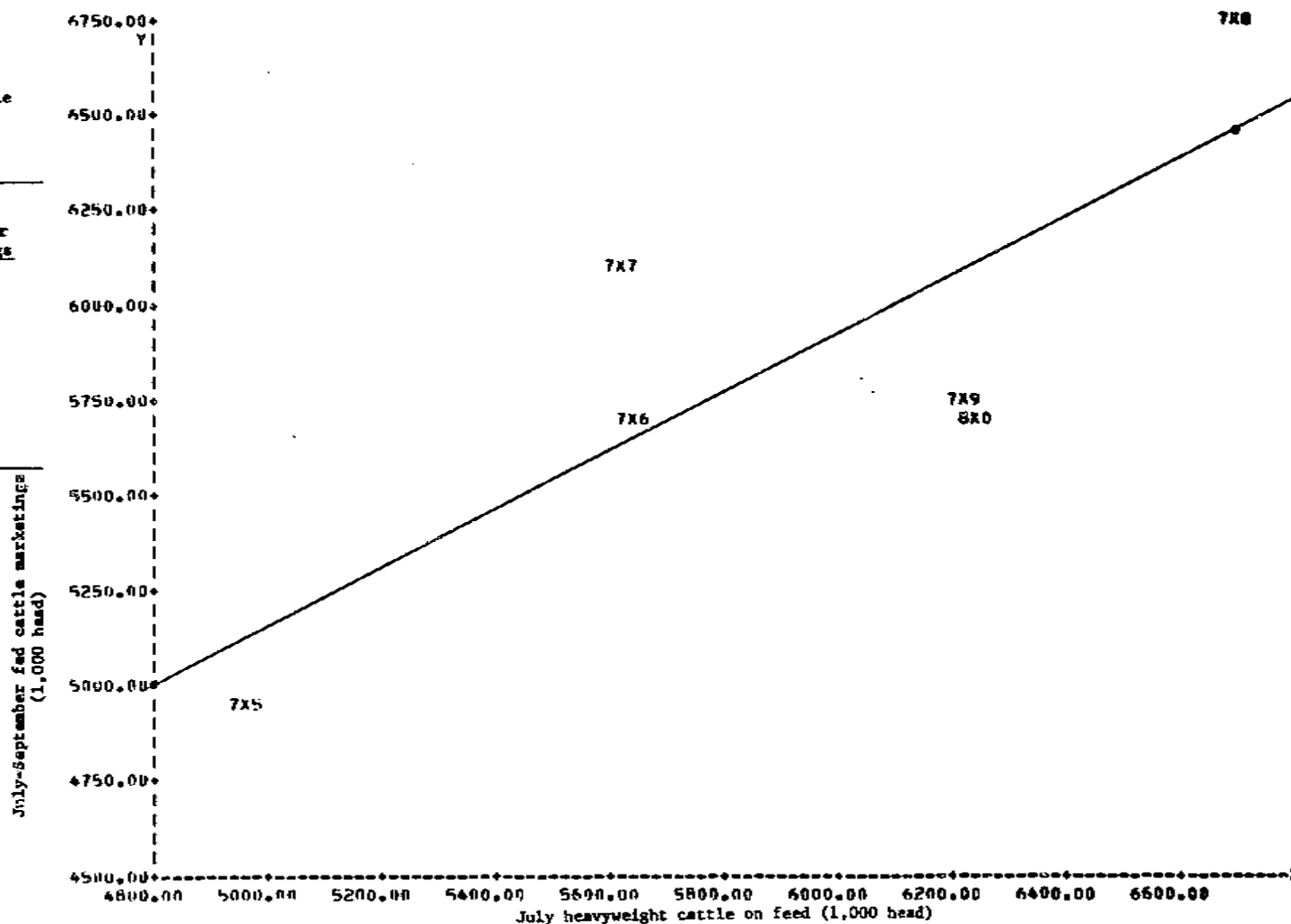




Figure 12--October 1 heavyweight cattle on feed versus October-December fed cattle marketings, 23 States

Year	October 1 heavyweight cattle on feed X axis	October-December marketings Y axis
--- 1,000 head ---		
1975	4956	4950
1976	5630	5684
1977	5615	6085
1978	6703	6740
1979	6226	5756
1980	6236	5677

NOTE: The above values are plotted on the accompanying chart. For example, 7X5 in the chart represents the plotting point for 1975.

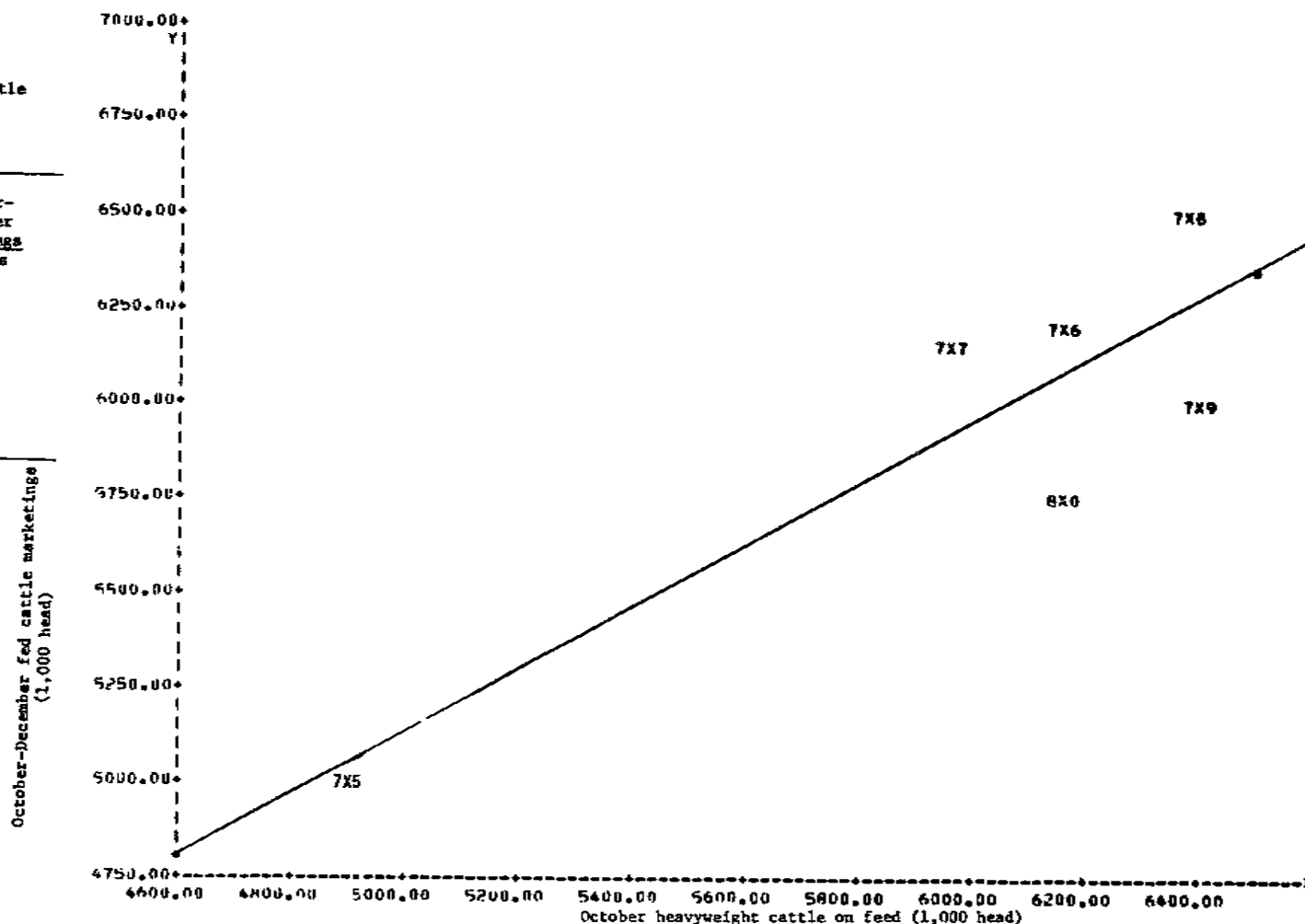


Figure 13--January 1 lightweight cattle on feed versus April-June fed cattle marketings, 23 States

Year	January 1 lightweight cattle on feed X axis	April- June marketings Y axis
--- 1,000 head ---		
1975	4154	5024
1976	5806	5941
1977	5649	6147
1978	6395	6621
1979	5557	6146
1980	5023	5630

NOTE: The above values are plotted on the accompanying chart. For example, 7X5 in the chart represents the plotting point for 1975.

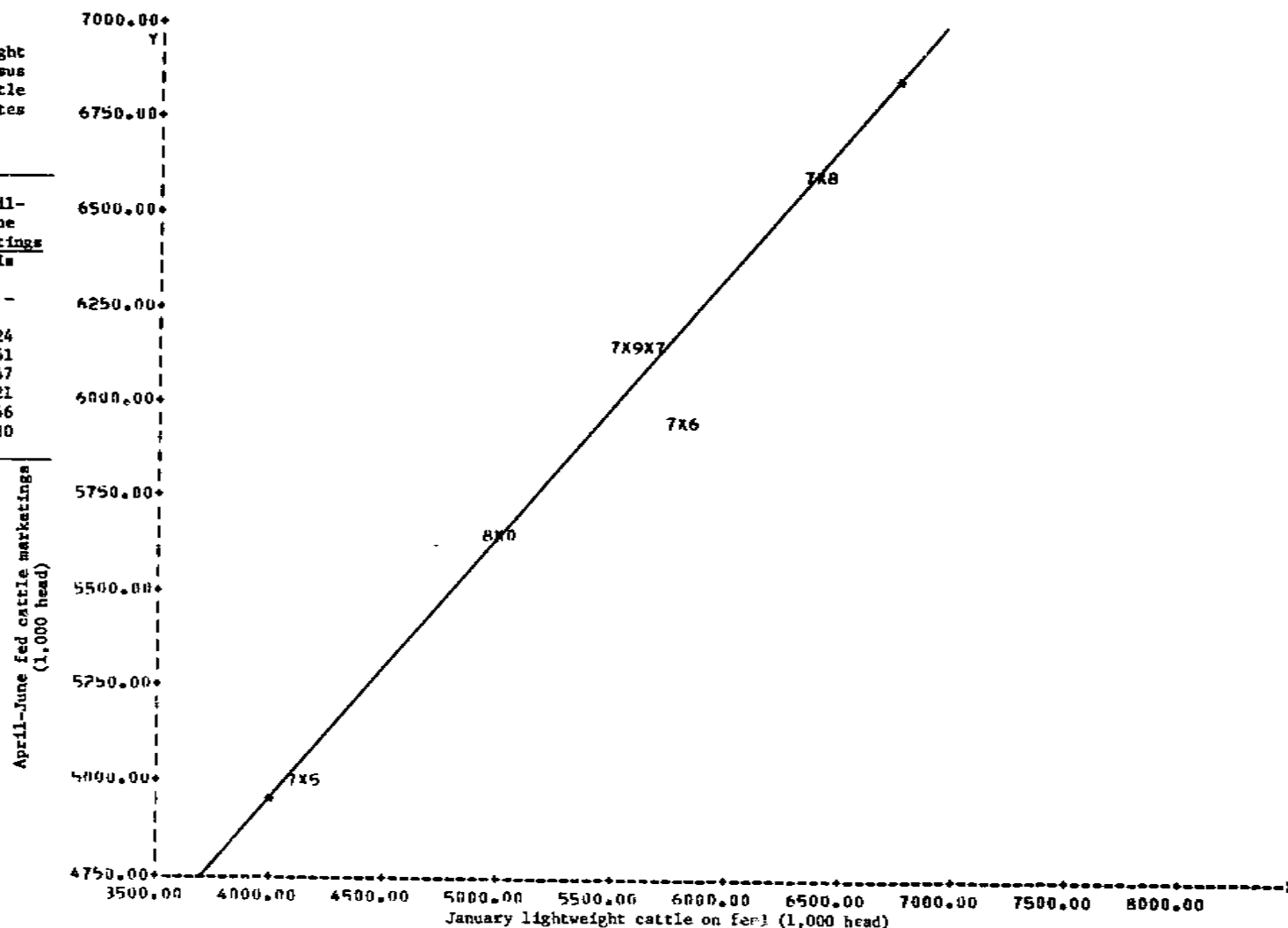
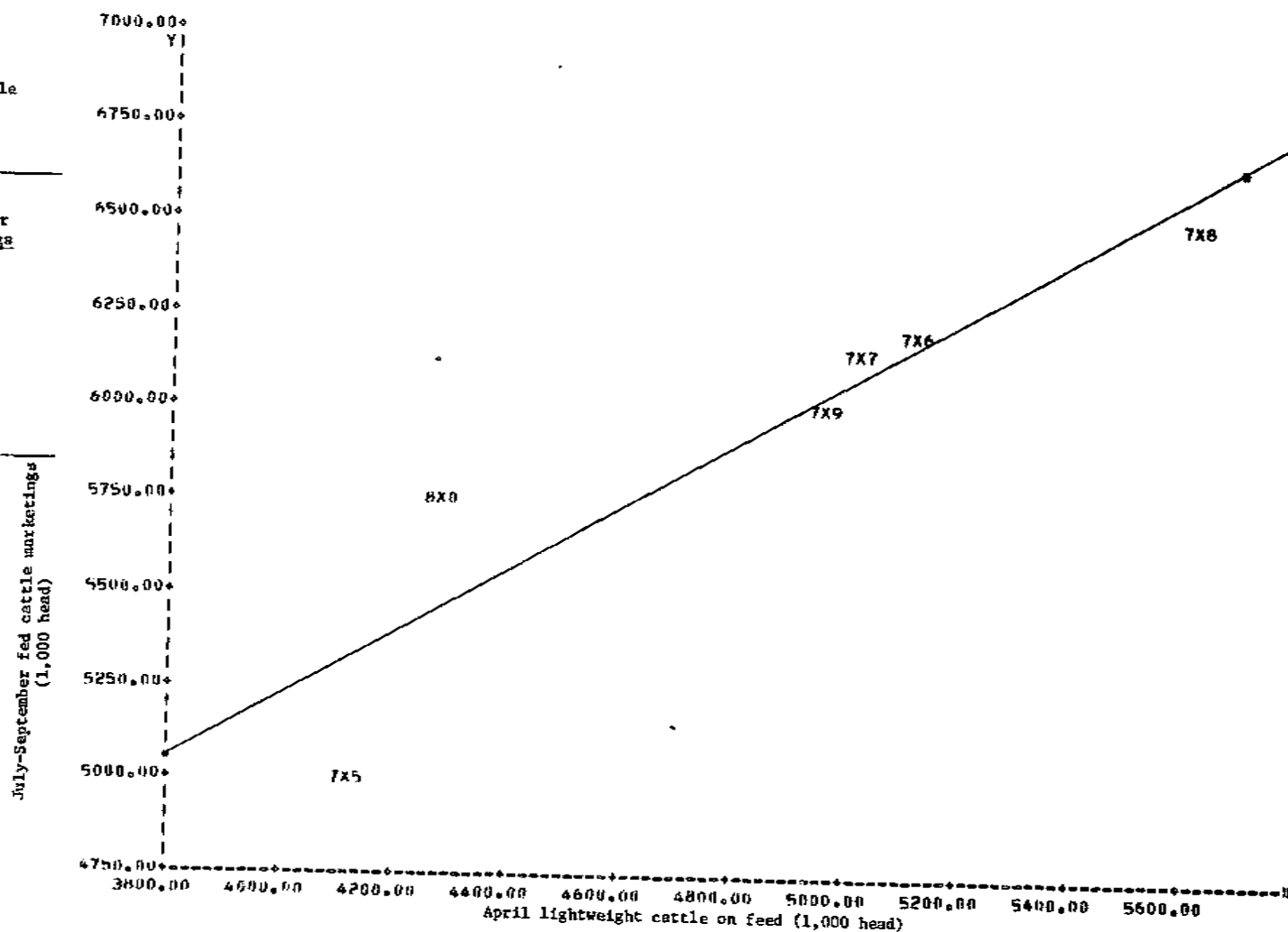


Figure 14--April 1 lightweight  
cattle on feed versus  
July-September fed cattle  
marketings, 23 States

Year	April 1 lightweight cattle on feed X axis	July- September marketings Y axis
--- 1,000 head ---		
1975	4118	5019
1976	5129	6200
1977	5019	6159
1978	5625	6523
1979	4965	5976
1980	4280	5731

NOTE: The above values are  
plotted on the accompanying  
chart. For example, 7X5 in  
the chart represents the  
plotting point for 1975.



on feed number is used as an indicator for October-December slaughter. Use the October-December lightweight chart (fig. 15) table 22, and then proceed through steps one to five for an estimate of the fourth quarter cattle slaughter.

Another series of net placement charts and slaughter can be constructed from the monthly cattle on feed reports using the data from the seven monthly States. The seven State charts are available from: Livestock Section, SRS-Statistics, U.S. Department of Agriculture, Washington, D.C. 20250.

#### REACTION OF CATTLE PRICES TO RELEASE OF CATTLE ON FEED REPORTS

The large number of important indicators, the fact that different factors may be more important at different times, the variety of information sources available to market participants, and the so-called "psychology" of the market all make it difficult to interpret the impact of specific sources or types of information.

Any information contributing to the overall picture--including cattle on feed numbers, placements, and marketings--can affect the relative bargaining positions of cattle buyers and sellers.

Day-to-day fluctuations in cattle prices probably reflect slaughter plant capacities and needs as much as anything else. Over a period of time, cattle prices respond to current and prospective supplies of beef--and competing meats--as well as to the strength of consumer demand.

Even though the 1979 record presented in table 23 and figure 17 clearly show Omaha steer prices rising more often, and by a greater dollar amount, than they dropped following the cattle on feed reports, the relationship between prices and market information is actually much more complex.

The price reaction after cattle on feed reports does not appear to follow a logical pattern. Prices sometimes move in the opposite direction of cattle on feed numbers. That does not mean that the reports have no effect on the market.

To keep a record of the price response, monitor weekly average cash prices per 100 pounds (cwt.) for Choice steers at Omaha. Compare the average price for the week before each report was released with the prices for the week of release and the week following release.

Weekly prices are used because they average out the daily price fluctuations due to weather, holidays, and other factors

Figure 15--July 1 lightweight cattle on feed versus October-December fed cattle marketings, 23 States

Year	July 1 lightweight cattle on feed X axis	October- December marketings Y axis
--- 1,000 head ---		
1975	3583	4950
1976	3842	5684
1977	3766	6085
1978	4481	6740
1979	3875	5756
1980	3402	5677

NOTE: The above values are plotted on the accompanying chart. For example, 7X5 in the chart represents the plotting point for 1975.

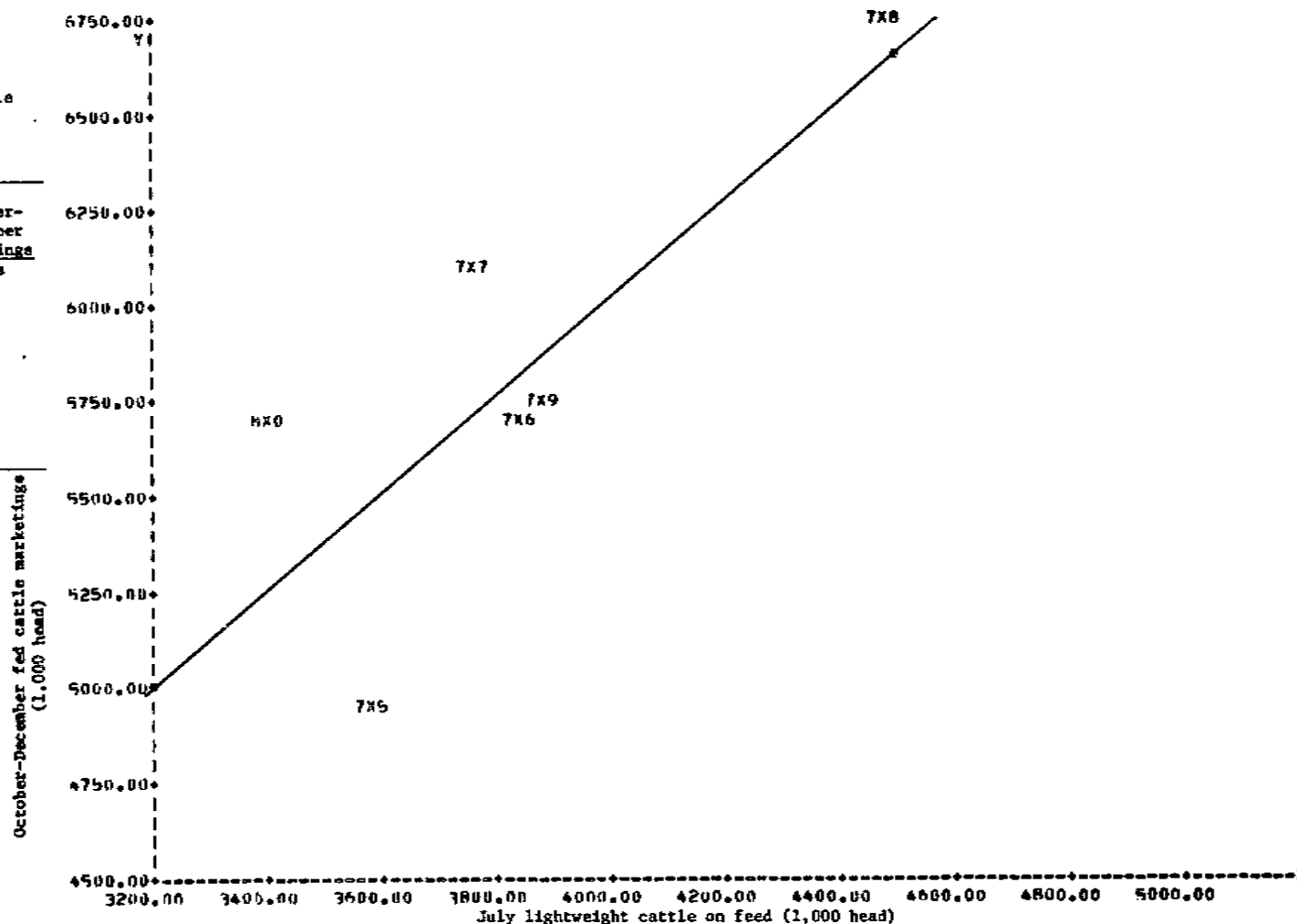
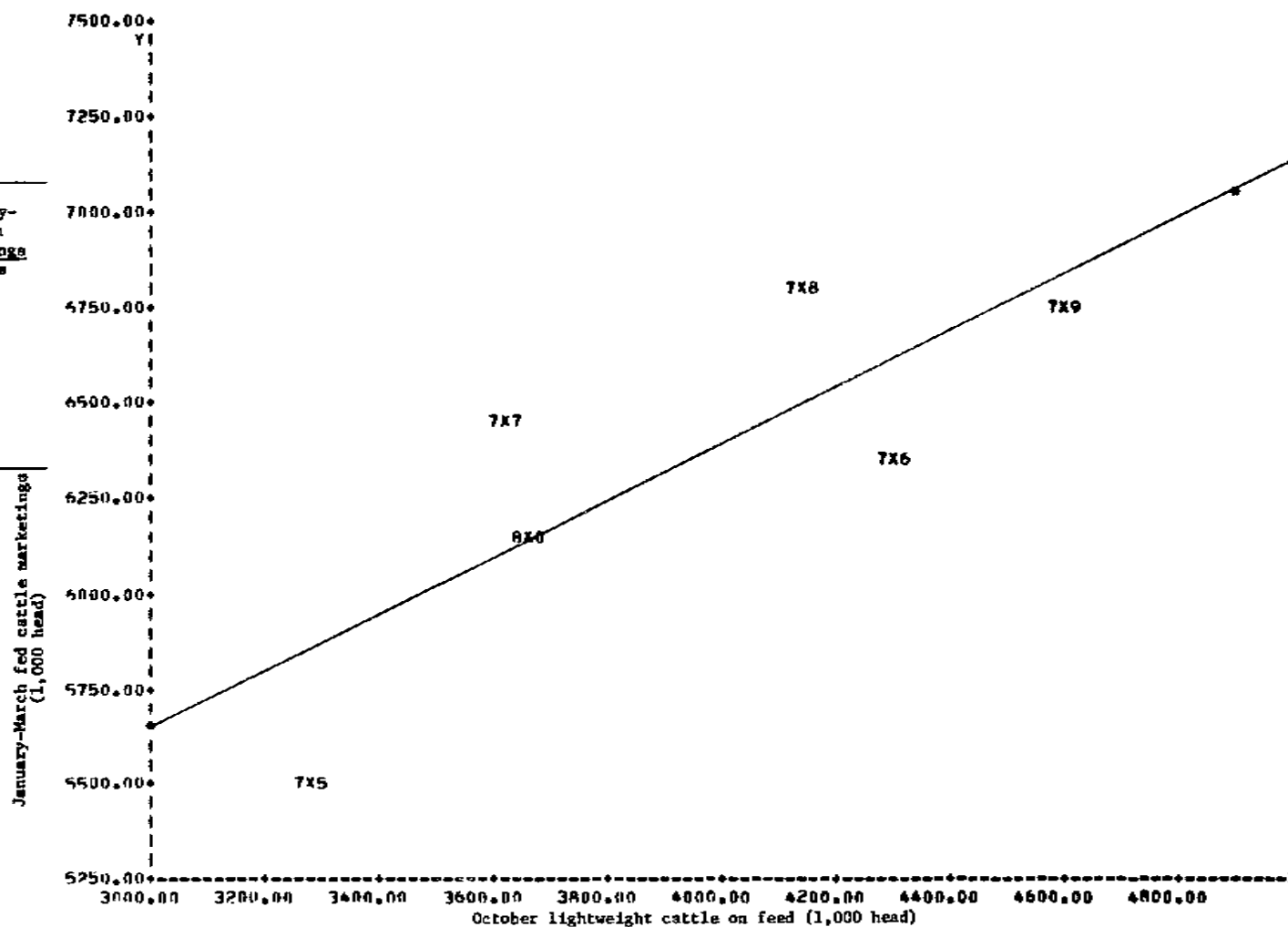


Figure 16--October 1 lightweight cattle on feed versus January-March fed cattle marketings, 23 States

Year	January 1 lightweight cattle on feed X axis	January- March marketings Y axis
	--- 1,000 head ---	
1975	3288	5507
1976	4299	6345
1977	3611	6462
1978	4142	6781
1979	4608	6747
1980	3663	6145

NOTE: The above values are plotted on the accompanying chart. For example, 7X5 in the chart represents the plotting point for 1975.



not relevant to the release of the Crop Reporting Board's reports.

Figure 17 combines the 5 years from 1975 to 1979, indicating the number of price changes up and down as well as net dollar changes for different groups of cattle on feed reports. For all 60 monthly reports issued during the 5 years, prices increased 36 times and declined 24 times for both week-to-week periods. The net dollar change for all the reports combined was an increase of \$11.81 for the first week-to-week period and \$7.71 for the second.

Furthermore, the absence of any clear relationship between the direction of change in reported cattle on feed numbers and the direction of price change is just as apparent as it was in looking at 1979 alone.

Thirty-one of the reports showed an increase in cattle on feed numbers, and 28 showed a decrease (one indicated no change). For both groups of reports and for both week-to-week periods, prices rose more often than they dropped, and all four net dollar changes were positive.

Of the 20 quarterly reports (which cover 23 States) issued from 1975 to 1979, prices increased as often as, or more than, they dropped in both week-to-week periods. The net dollar change was positive for the first week-to-week period and negative for the second (this is not the rule, because the exact reverse was true at the end of the 1975-78 period).

#### INSTANT MARKET NEWS DIRECTORY

The latest livestock market information is now available from an automatic telephone answering device. Producers and others who need up-to-the-minute market news can get this service by dialing a number any time of the day or night. Most of the machines are sponsored by producer organizations or commercial concerns. The reports are updated from two to five times daily, depending on the area services. All reports offer a variety of the most current information on livestock and meat prices, federally inspected slaughter, salable receipts, and futures trading. The following directory lists 96 services now in operation in 34 States.

Table 23--Price reaction of choice steer prices following monthly cattle on feed reports, 1979 <sup>1/</sup>

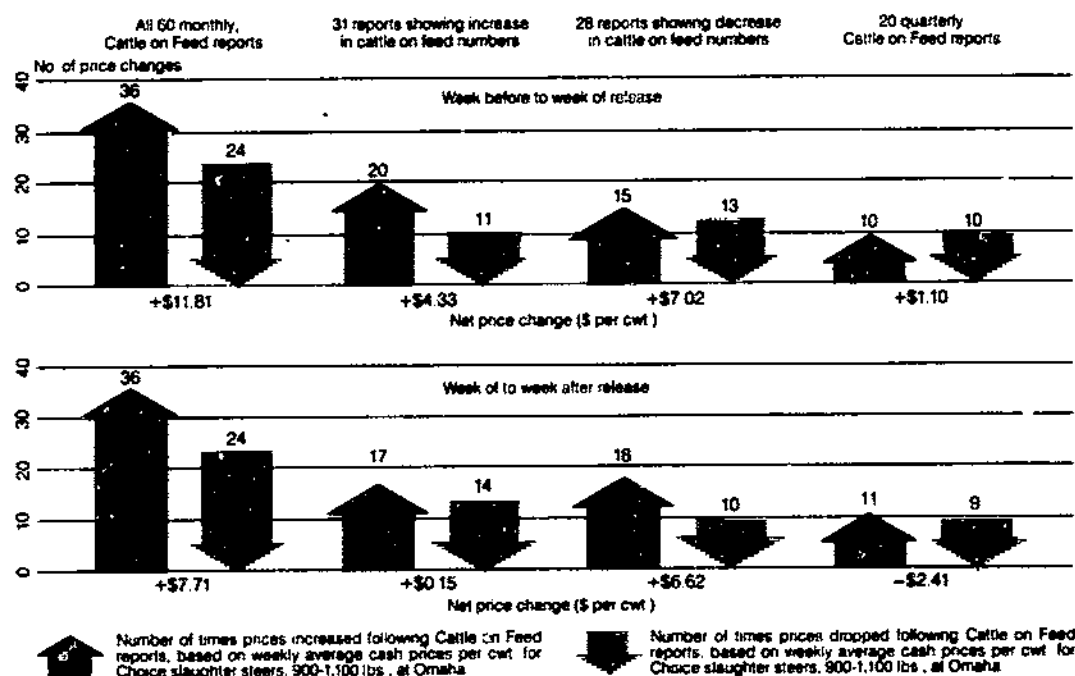
Release date of report	Change in cattle on feed numbers from previous year	Weekly average price:			Change from:	
		Week before	Week of release	Week after	Week before to week of release	Week of release to week after
	Percent	Dollars per cwt.				
Jan. 19	- 1	59.58	60.88	61.72	+1.30	+0.84
Feb. 13	+ 1	63.38	64.55	65.22	+1.17	+0.67
March 13	+ 1	69.72	69.80	73.30	+0.08	+3.50
April 19	- 6	74.38	77.00	75.95	+2.62	-1.05
May 14	- 2	75.65	72.85	72.80	-2.80	-0.05
June 12	- 4	68.35	69.68	68.10	+1.33	-1.58
July 19	- 6	67.92	67.72	64.70	-0.20	-3.02
Aug. 14	- 8	58.28	63.32	65.90	+5.04	+2.58
Sept. 14	-13	66.84	68.35	68.82	+1.51	+0.47
Oct. 18	-13	67.15	64.62	64.88	-2.53	+0.26
Nov. 14	-14	64.85	67.32	68.00	+2.47	+0.68
Dec. 14	-11	67.30	67.38	67.72	+0.08	+0.34

No. of times prices increased: 9 8  
No. of times prices decreased: 3 4

Annual net change (\$ per cwt.): +\$10.07 +\$3.64

<sup>1/</sup> Weekly average cash prices per cwt. for Choice slaughter steers, 900-1,100 pounds, at Omaha. (Source: AMS Market News)

Figure 17--Choice steer price changes, 1975-79





ALABAMA

## Montgomery:

5 p.m.-8 a.m. C-(800) 392-5804

5 p.m.-8 a.m. H-(800) 392-5801

C-Cattle H-Hogs

ARKANSAS

Ft. Smith (501) 785-3892

Little Rock (501) 372-3933

ARIZONA

Phoenix (602) 275-7972

CALIFORNIA

Bell (213) 268-8020

El Centro (714) 352-8160

Redding (916) 246-8480

Stockton (209) 466-3085

Visalia (209) 733-3750

COLORADO

Brush (303) 842-2249

Denver 1-(800) 332-9548

FLORIDA

Bonifay (904) 547-2016

Fort Pierce (305) 465-6216

Mango (813) 621-4241

Monticello (904) 997-3081

Tallahassee (904) 488-0274

Trenton (904) 463-2427

Winter Park (305) 628-0412

GEORGIA

Thomasville (800) 342-1440

ILLINOIS

Chicago (312) 922-1253

Joliet (815) 423-5026

Peoria (309) 676-8811

National Stock

Yards (618) 874-1900

Springfield (217) 525-4019

IOWA

Ames (515) 294-6899

(515) 294-4347

Des Moines (515) 282-6870

Durant (319) 785-6032

Sioux City (712) 252-2100

KANSAS

Dodge City (316) 225-1311

Wichita (316) 267-7992

KENTUCKY

Frankfort (502) 564-4958

Louisville (502) 584-6617

MICHIGAN

Lansing (517) 373-6330

MINNESOTA

So. St. Paul (612) 451-3692

MISSOURI

Jefferson City (314) 636-4203

Joplin (417) 781-9451

Kansas City (816) 421-7694

Mexico (314) 581-6250

Not available 8:30-9:15 and 11:30-12 a.m.

Sikeston (314) 472-1564

So. St. Joseph (816) 238-1203

Springfield (417) 866-4986

West Plains (417) 256-9631

MONTANA

Billings (406) 252-1480

NEBRASKA

Aurora (402) 694-3183

Beatrice (402) 223-5231

Beemer (402) 528-3654

Columbus (402) 564-1133

Grand Island (308) 384-5101

Kearney (308) 237-5908

Lincoln (402) 477-3336

Omaha (402) 731-5355

Superior (402) 879-4600

Tekamah (402) 374-1667

York (402) 362-6623

West Point (402) 372-5650

IDAHO

Burley (208) 678-2424  
Pocatello (800) 632-9494

INDIANA

Indianapolis (800) 382-1567  
(Indiana only)

NEW MEXICO

Clovis (505) 763-3030

NEW YORK

Central (315) 495-6562  
Eastern (518) 457-6672  
Northern (315) 788-2590  
Western (716) 343-0678

NORTH DAKOTA

West Fargo (701) 282-4593

OHIO

Chillicothe (614) 772-1431  
Columbus (614) 466-6484  
London (614) 852-2311  
Washington (614) 335-5100

OKLAHOMA

Oklahoma City (405) 236-5491  
Tulsa (918) 437-0740

OREGON

Corvallis (503) 754-2037

PENNSYLVANIA

New Holland (717) 354-7288

SOUTH CAROLINA

Columbia (803) 799-5568  
Walterboro (803) 549-5232

SOUTH DAKOTA

Rapid City (605) 342-1833  
Sioux Falls (605) 336-7765

TENNESSEE

Jackson (901) 423-2080  
Knoxville (615) 525-3211  
Nashville (615) 833-4046  
Nashville (800) 342-8206

TEXAS

Amarillo (806) 372-3494  
Forth Worth (817) 624-7451  
Corsicana (214) 872-4001  
San Angelo (915) 655-2358  
San Antonio (512) 223-4100  
Sealy (713) 885-2050

UTAH

No. Salt Lake (801) 524-5001  
5:00 p.m.-7:30 a.m.  
Salina (801) 529-7000

WASHINGTON

Moses Lake (509) 765-0311  
Yakima (509) 575-0377

WEST VIRGINIA

Charleston (304) 348-8883  
Not available 11 a.m.-2 p.m.

WISCONSIN

Madison (608) 266-9444

WYOMING

Cheyenne (307) 777-7959  
Torrington (307) 532-7200