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## Carcass Trait Trends for Steers and Heifers Finished Through the Tri-County Steer Carcass Futurity Cooperative from 2002 Through 2018

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# Carcass Trait Trends for Steers and Heifers Finished Through the Tri-County Steer Carcass Futurity Cooperative from 2002 Through 2018

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*E.D. McCabe, M.E. King, K.E. Fike, M. Groves,<sup>1</sup> and K.G. Odde*

### Abstract

The objective was to evaluate trends in carcass characteristics for steers and heifers finished through the Tri-County Steer Carcass Futurity Cooperative (Lewis, IA). Data analyzed included 74,207 steers and 33,529 heifers harvested from 2002 through 2018. Carcass trait trends evaluated for steers and heifers included calculated yield grade score, fat thickness, hot carcass weight, kidney, pelvic, heart fat percentage, marbling score, and ribeye area. Calculated yield grade score increased slightly from 2002 through 2018 for steers and heifers. Fat thickness increased 0.08 in for steers and 0.07 in for heifers, both peaking in 2017. Hot carcass weight increased slightly. Kidney, pelvic, and heart fat percentage did not change for steers and heifers. Marbling score increased from 422 to 456 for steers and 449 to 493 for heifers. Ribeye area slightly increased. Corresponding with increases in fat thickness and minimal to no improvement in ribeye area, yield grade scores increased over the past 17 years. Genetic selection pressure on marbling within the beef industry is evident from these data.

### Introduction

The Tri-County Steer Carcass Futurity Cooperative is a consortium of custom feed-yards in southwest Iowa whose primary objective is to provide feedlot performance, average daily gain, and carcass data for use in management and marketing decisions for producers participating in the program. From 2002 through 2018, an average of 6,638 head of cattle were finished annually. This dataset allowed the opportunity to evaluate long-term trends in beef carcass traits to include calculated yield grade score, fat thickness, hot carcass weight, kidney, pelvic, heart fat percentage, marbling score, and ribeye area.

### Experimental Procedures

Information describing factors about steers and heifers finished through the Tri-County Steer Carcass Futurity Cooperative (Lewis, IA) was obtained in an electronic

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<sup>1</sup> Tri-County Steer Carcass Futurity Cooperative, Lewis, IA.

format. These data were collected for steers and heifers from 2002 through 2018. Detailed requirements for the program are available at [www.tcscf.com](http://www.tcscf.com).

Carcass characteristics were collected at the harvest facility. Steers and heifers were harvested in Denison, IA from 2002 through 2014, then in Dakota City, NE, from 2015 through 2018. Data began to be collected from instrument grading starting in 2015.

To depict potential changes in mean carcass trait variables over the 17-year period, data were plotted and linear regression trend lines fit within Microsoft Excel.

### Results and Discussion

Data analyzed included 74,207 steers and 33,529 heifers finished at the Tri-County Steer Carcass Futurity Cooperative and harvested from 2002 through 2018. Steers and heifers were harvested at live weights of  $1,235.0 \pm 119.8$  lb and  $1,124.2 \pm 106.7$  lb, respectively.

Calculated yield grade increased from 2002 through 2018 for both steers and heifers (Figure 1). Fat thickness increased 0.08 in for steers and 0.07 in for heifers, both peaking in 2017 at 0.55 and 0.59 in, respectively (Figure 2). Hot carcass weights ranged from 727 to 780 lb for steers and increased over the 17-year period (Figure 3). Hot carcass weights for heifers ranged from 671 to 711 lb and increased slightly from 2002 through 2018 (Figure 3). Kidney, pelvic, and heart fat percentage did not change over time for steers or heifers (Figure 4). Marbling score increased from 422 to 456 for steers and 449 to 493 for heifers (Figure 5). Ribeye area appeared to increase slightly for steer carcasses while decreasing slightly for heifers (Figure 6).

The cattle represented in these data were harvested at lighter weights than the industry average. Focus on Feedlots compiles data from nine feedlots in Kansas (Kansas State University, 2018). Data from Focus on Feedlots showed an increasing trend in live weight for both steers and heifers from 2002 through 2018. Steers had a mean live weight of 1,344 lb and heifers 1,215 lb. The U.S. Department of Agriculture Economic Research Service (2020) historical data also showed an increasing trend during this time in mean live weight for cattle ranging from 1,235 lb to 1,366 lb with a mean of 1,299 lb.

Hot carcass weights in the present study were lighter than other industry averages. The U.S. Department of Agriculture Economic Research Service (2020) also reported an increase in hot carcass weight from 2002 through 2018. The USDA reported a range of 746 lb to 829 lb with a mean hot carcass weight of 788 lb. The National Beef Quality Audit from 2011 and 2016 provides insight into industry changes between these periods of time (Moore et al., 2011; Boykin et al., 2017). In 2011, the mean hot carcass weight was 819 lb (Moore et al., 2011). In 2016, Boykin et al. (2017) reported a mean hot carcass weight of 868 lb. This was a 49-lb increase in hot carcass weight in a five-year period. The hot carcass weights in the present study had an average of 732 lb in 2011 and 738 lb in 2016, an increase of six pounds.

While fat thickness increased, calculated yield grade increased from 2002 through 2018 as well. This observation aligns with noted changes in these variables from the 2011 and

2016 National Beef Quality Audits (Boykin et al., 2017). Ribeye area likewise increased for steers but actually decreased slightly for heifers over time. It appears the expected increase in ribeye area required for corresponding increases in hot carcass weights did not occur to the proportion expected and with simultaneous increases in fat thickness, yield grade scores rose over time.

Marbling scores in these data increased over time with mean scores falling within the Choice quality grade. The National Beef Quality Audit, in both 2011 and 2016, reported mean marbling scores (Moore et al., 2011; Boykin et al., 2016). In 2011, the mean marbling score was 449 (Moore et al., 2011) and 475 in 2016 (Boykin et al., 2016). In the present study, the mean marbling score in 2011 was 451 and 487 in 2016. Marbling scores in these data were numerically slightly greater but all mean scores fell within the Choice quality grade.

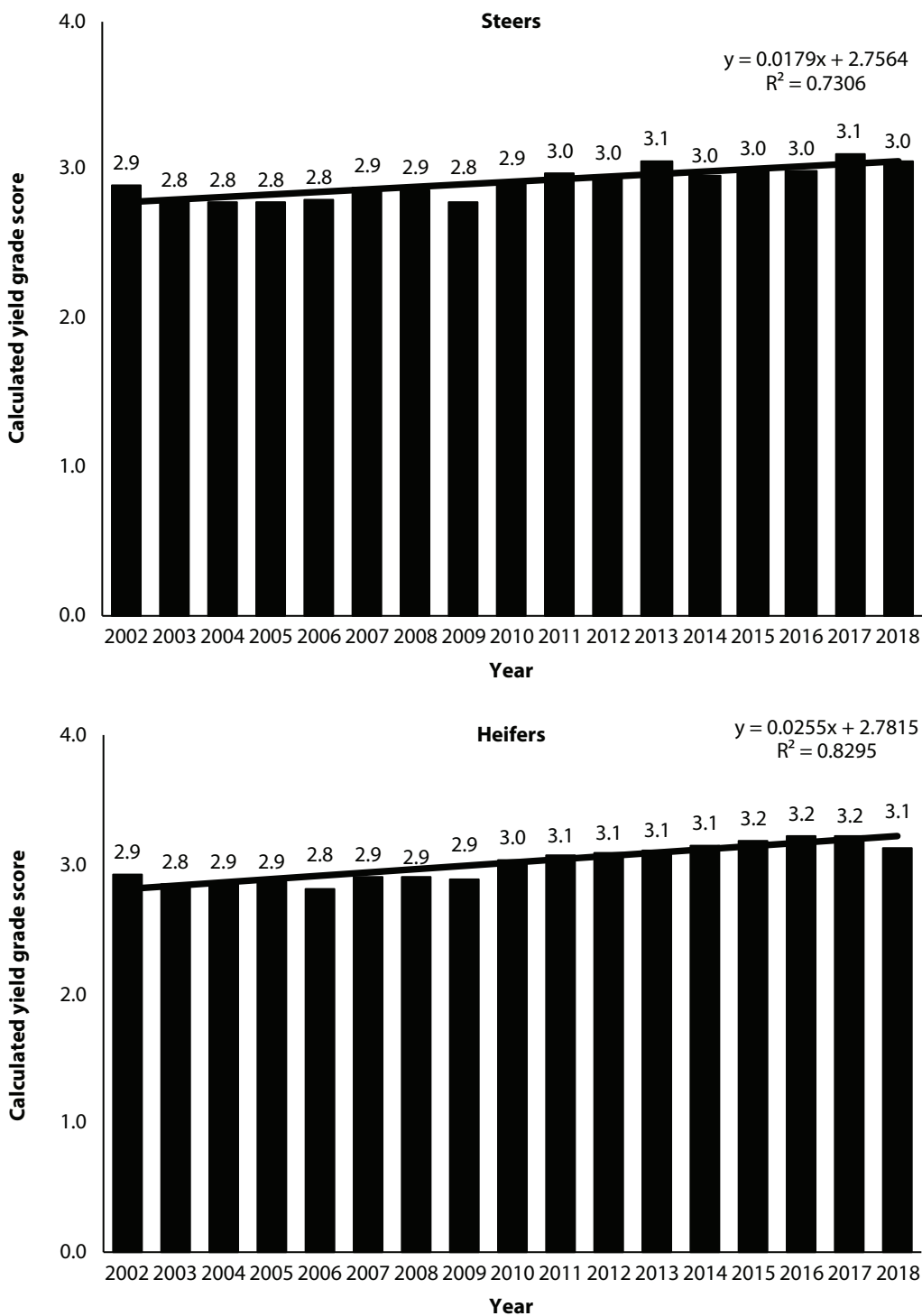
## Implications

Corresponding with increases in fat thickness and minimal to no improvement in ribeye area, yield grade scores increased over the past 17 years. Genetic selection pressure on marbling within the beef industry is evident from these data. Lighter hot carcass weights than industry average in these data correspond with lighter mean live weights at time of harvest.

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**Figure 1. Trend of mean calculated yield grade score for steers and heifers finished through Tri-County Steer Carcass Futurity Cooperative from 2002 through 2018.**

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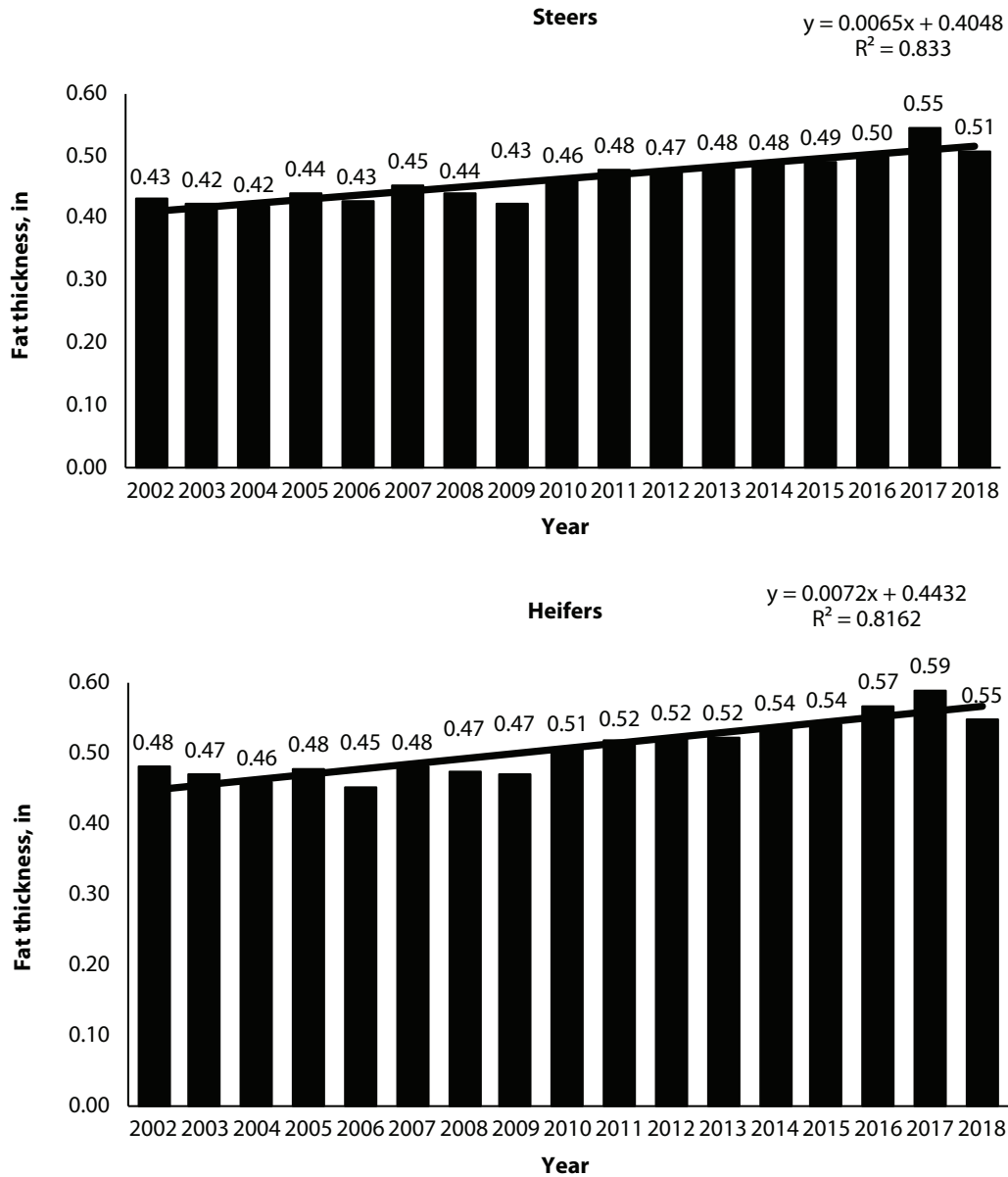


Figure 2. Trend of mean fat thickness for steers and heifers finished through Tri-County Steer Carcass Futurity Cooperative from 2002 through 2018.

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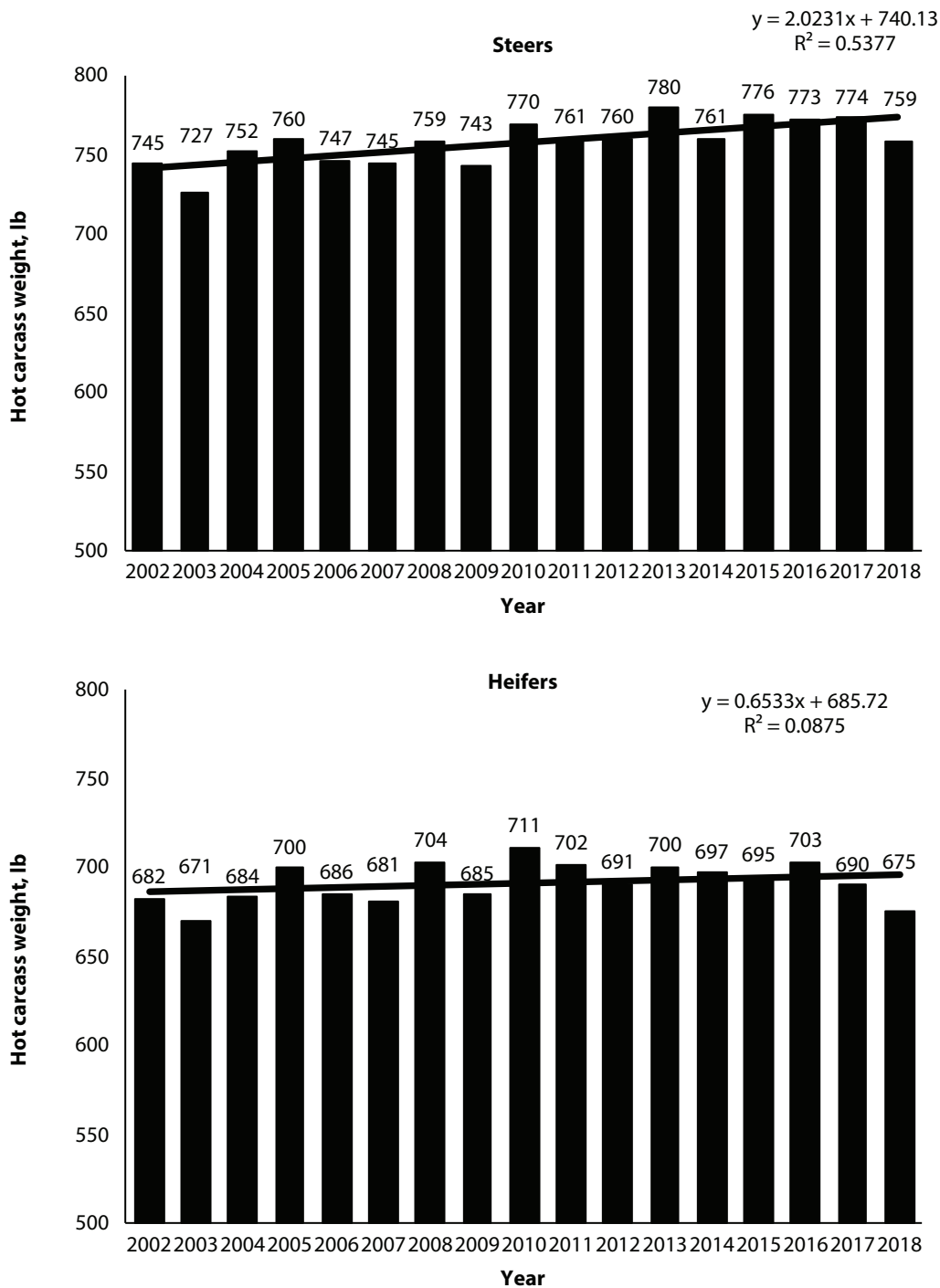


Figure 3. Trend of mean hot carcass weight for steers and heifers finished through Tri-County Steer Carcass Futurity Cooperative from 2002 through 2018.



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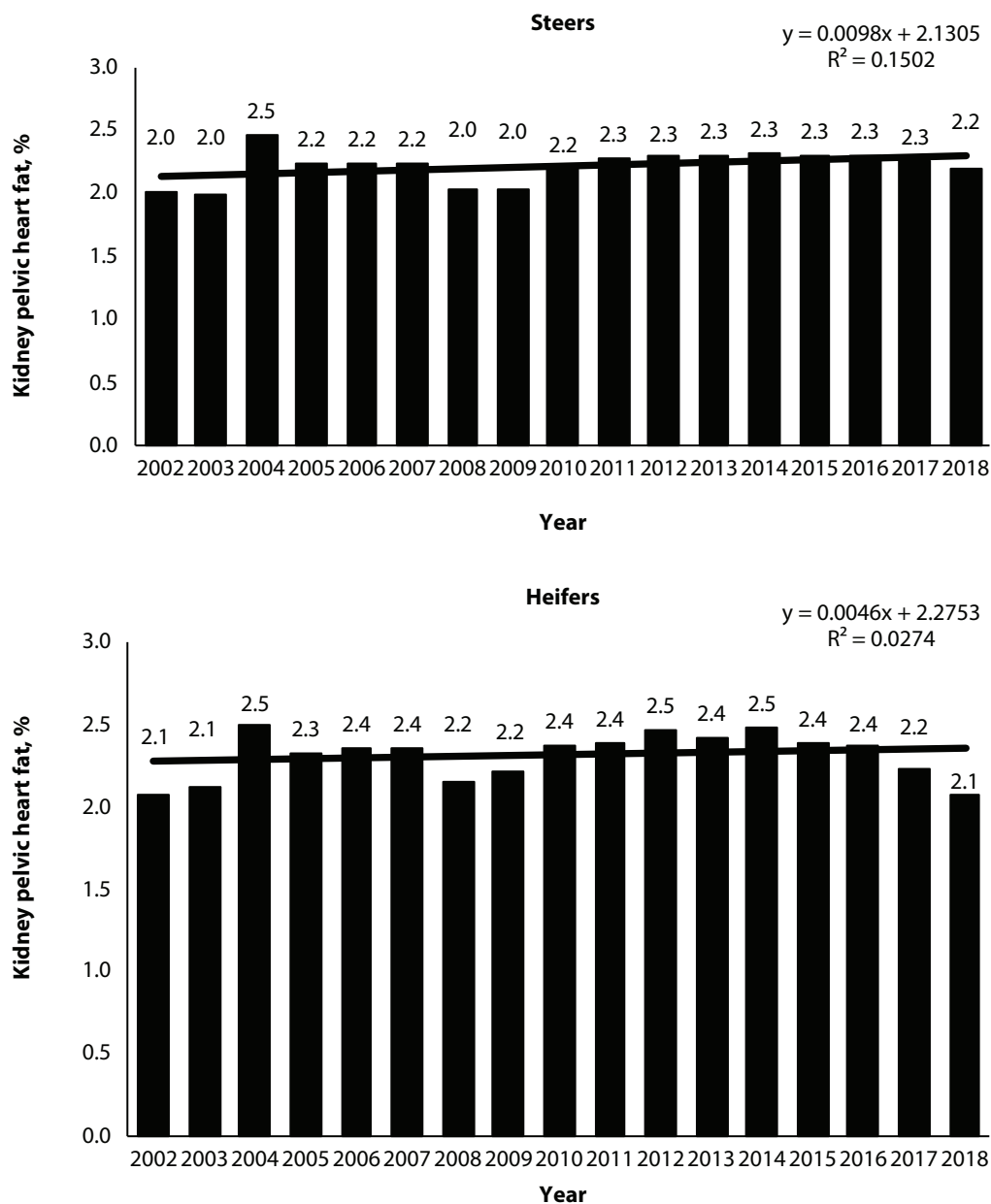
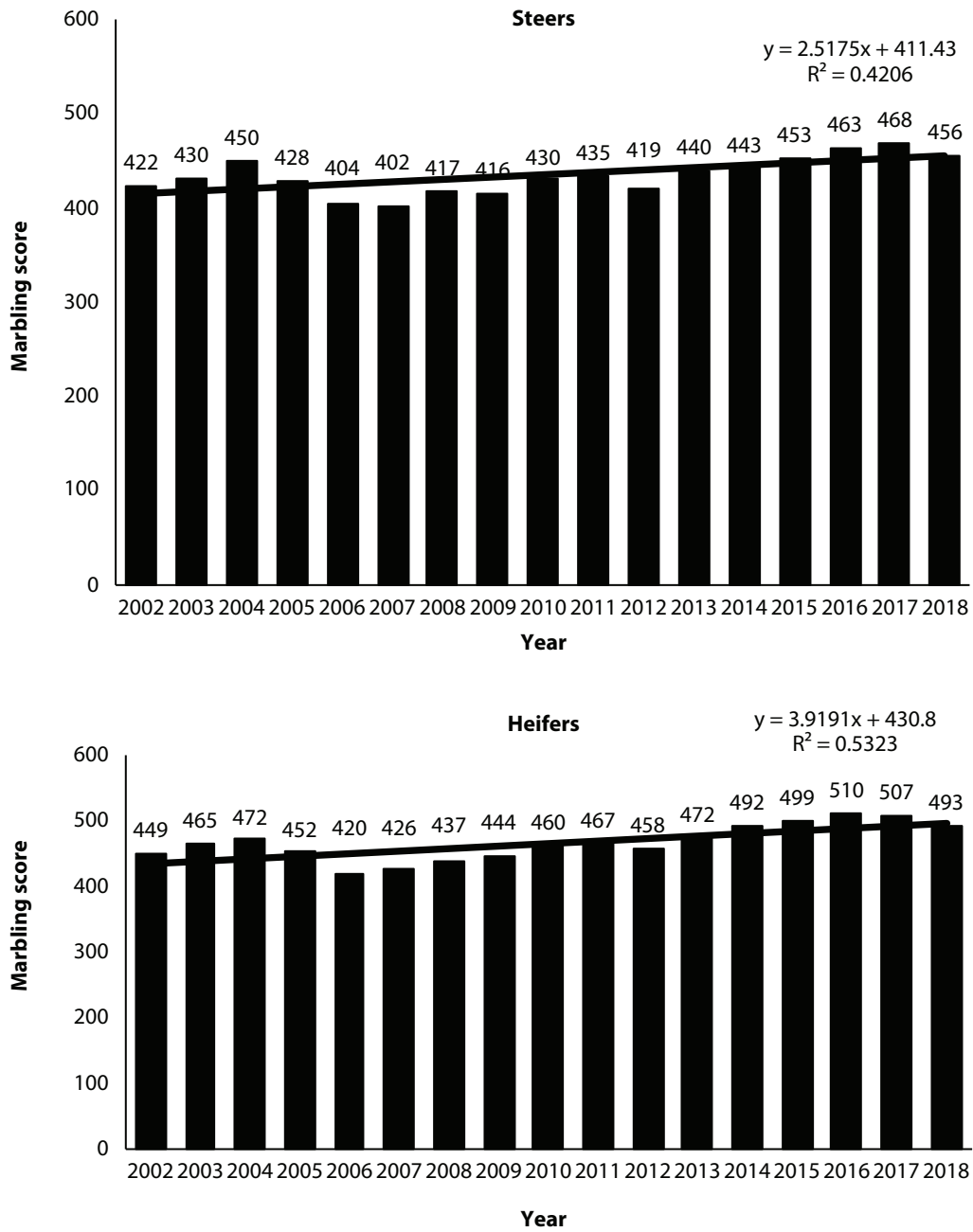


Figure 4. Trend of mean kidney, pelvic, and heart fat for steers and heifers finished through Tri-County Steer Carcass Futurity Cooperative from 2002 through 2018.

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**Figure 5. Trend of mean marbling score<sup>1</sup> for steers and heifers finished through Tri-County Steer Carcass Futurity Cooperative from 2002 through 2018**

<sup>1</sup>100 = Practically devoid<sup>00</sup>; 300 = Slight<sup>00</sup>; 400 = Small<sup>00</sup>; 500 = Modest<sup>00</sup>; 700 = Slightly Abundant<sup>00</sup>; 900 = Abundant<sup>00</sup>.

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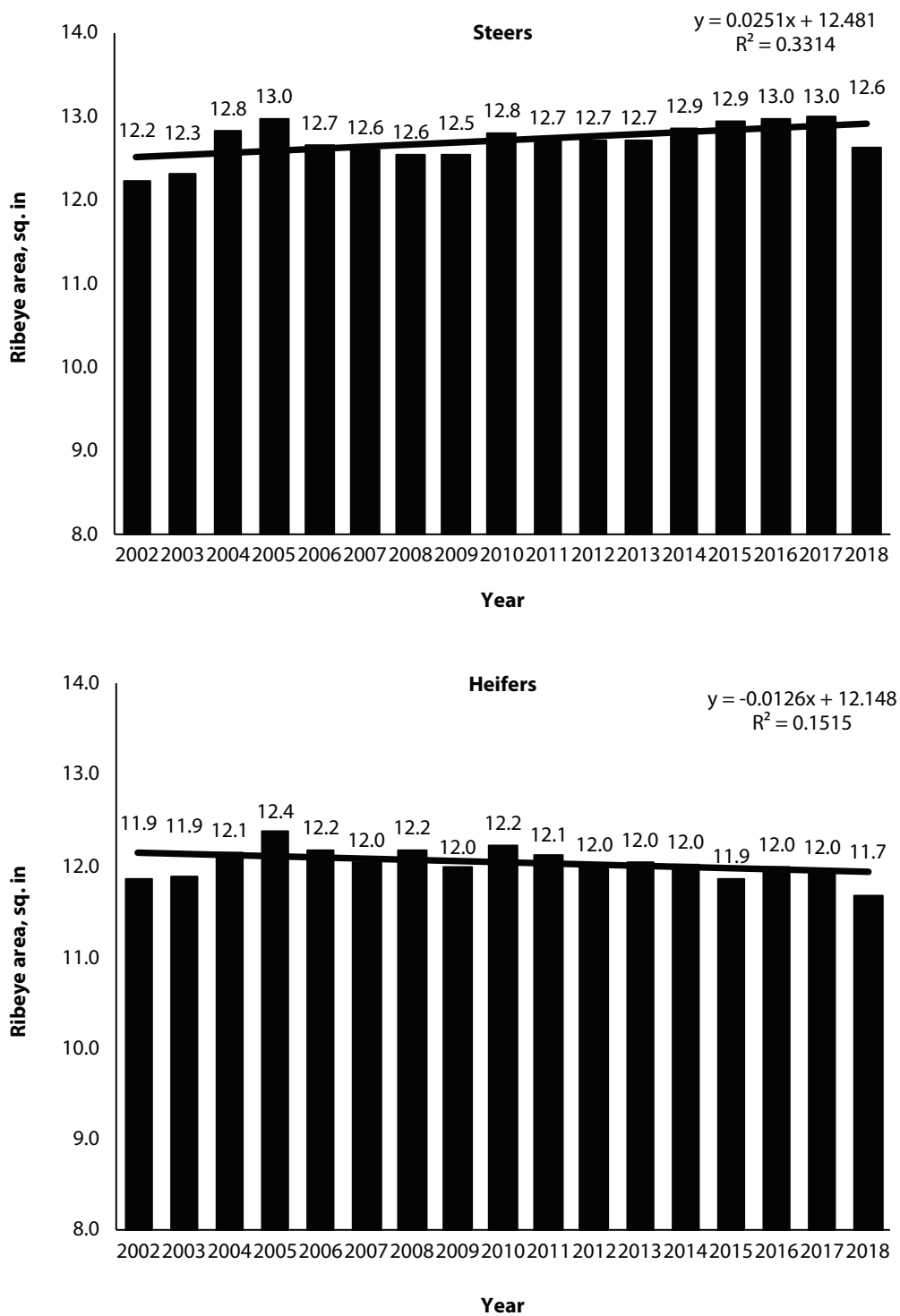


Figure 6. Trend of mean ribeye area for steers and heifers finished through Tri-County Steer Carcass Futurity Cooperative from 2002 through 2018.