



Kansas State University

Field Day

September 24, 2015

Kansas State University

Manhattan, Kansas



Charting the Course in Choppy Waters

Glynn Tonsor
Dept. of Agricultural Economics
Kansas State University



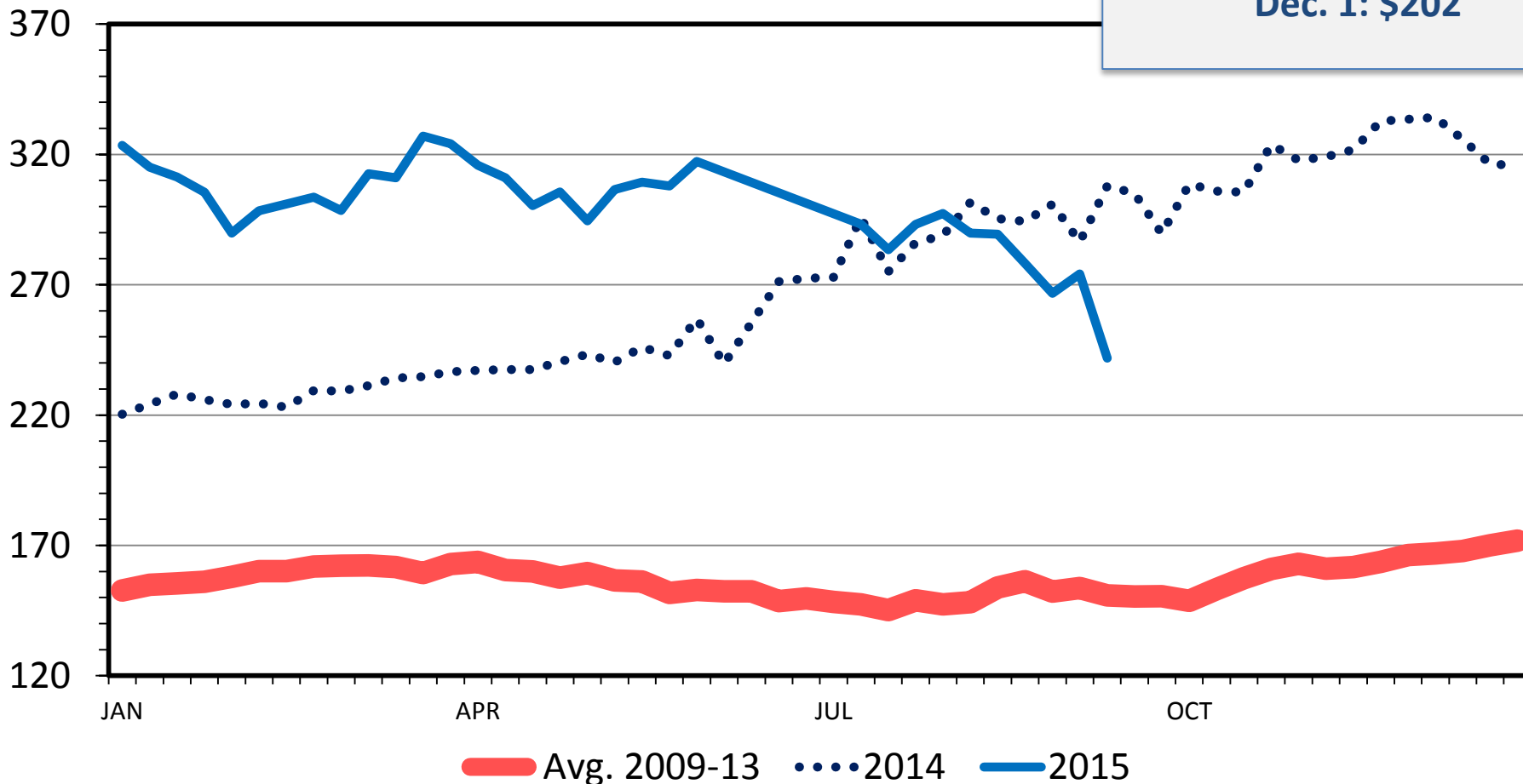
Overarching Beef Industry Economic Outlook

- Supplies
 - Historically tight
 - Substantial expansion well underway ...
- Demand
 - Confusing yet largely positive thru Q2
 - Market increasingly concerned ...
- Combined
 - Heartburn or excitement depending on perspective
 - “choppy waters” are in the eyes of the beholder ...

MED. & LRG. #1 STEER CALF PRICES

400-500 Pounds, Southern Plains, Weekly

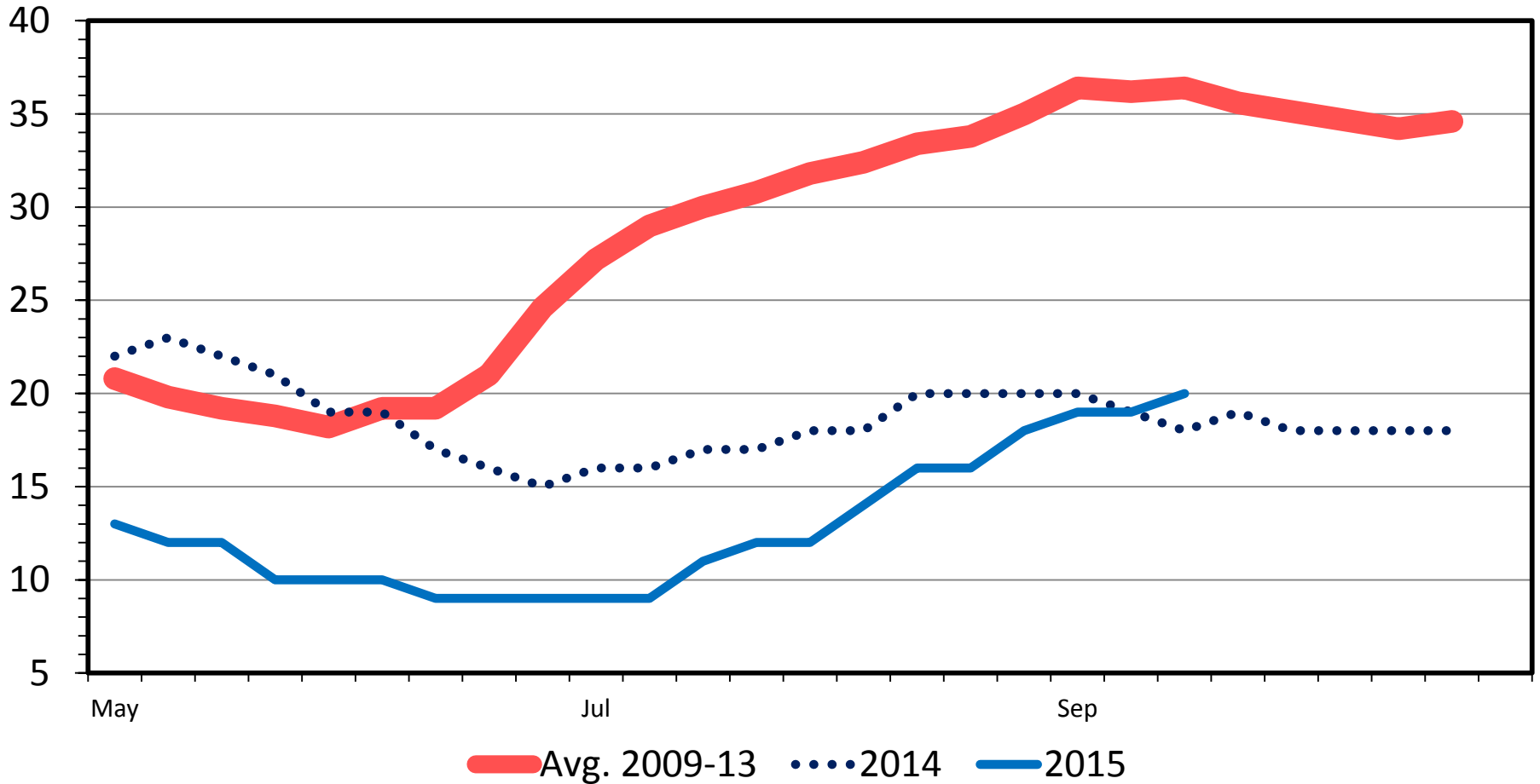
\$ Per Cwt.



US RANGE AND PASTURE CONDITION

Percent Poor and Very Poor, Weekly

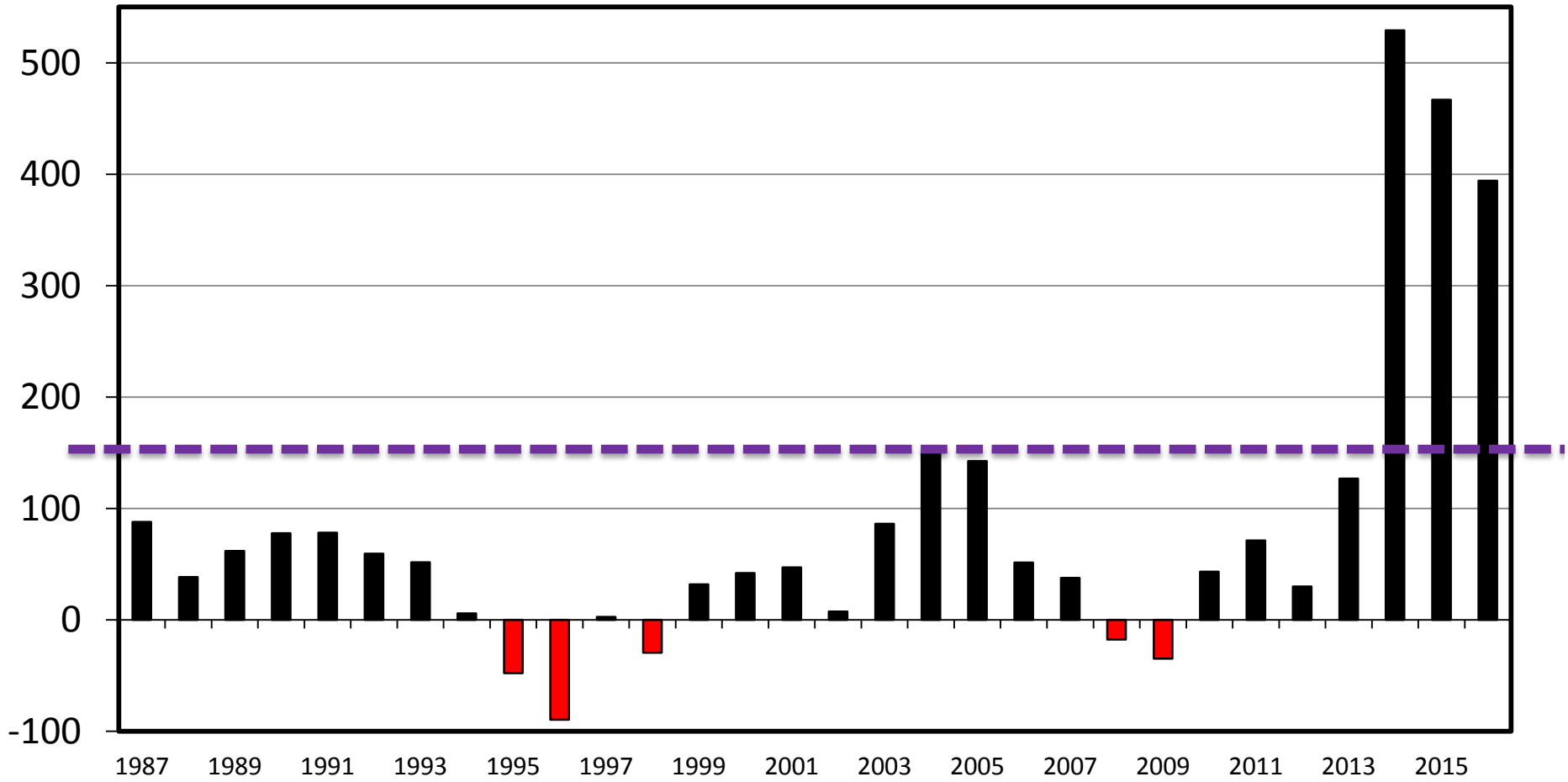
Percent



ESTIMATED AVERAGE COW CALF RETURNS

Returns Over Cash Cost (Includes Pasture Rent), Annual

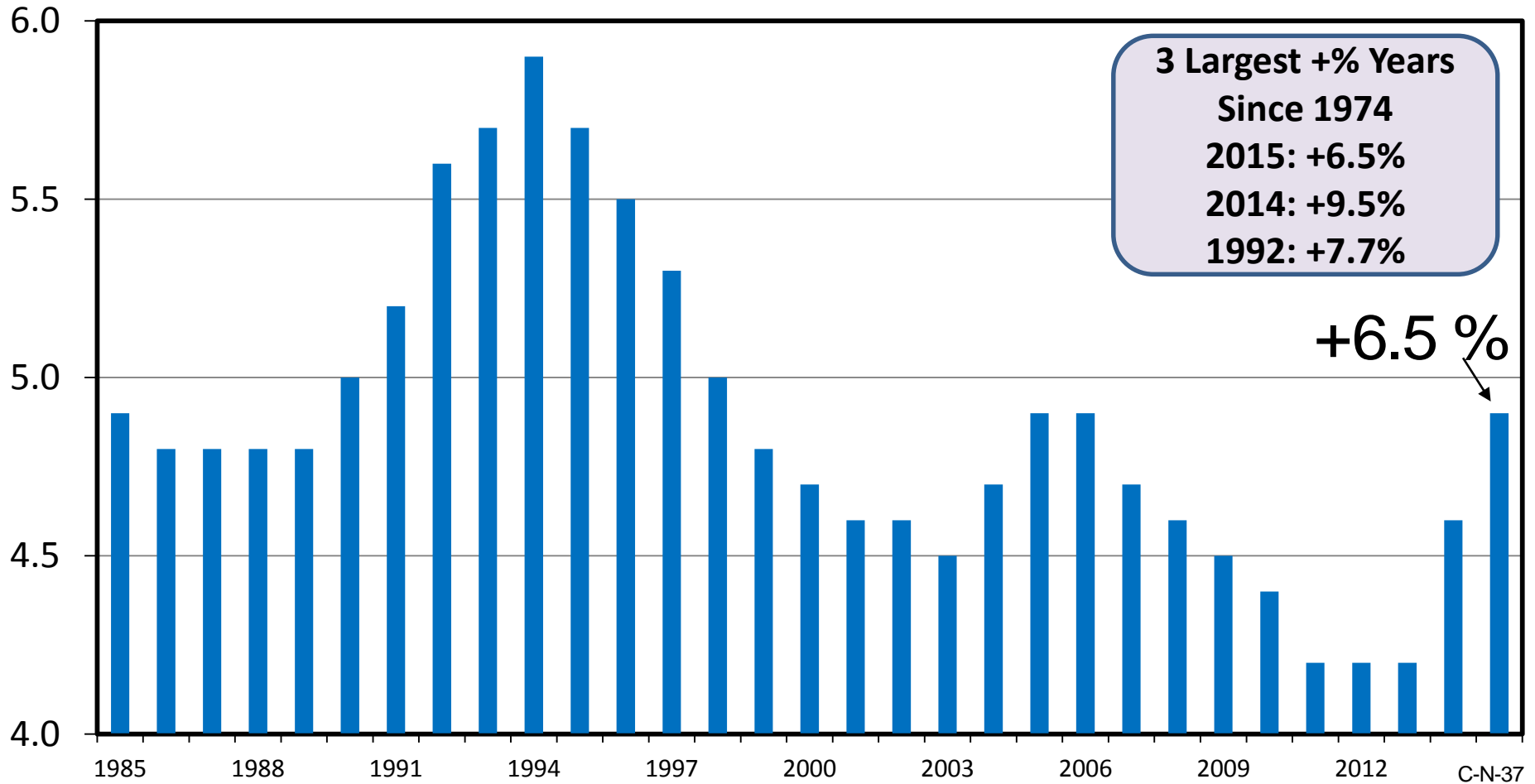
\$ Per Cow



HEIFERS HELD AS BEEF COW REPLACEMENTS

July 1, U.S.

Mil. Head



**3 Largest +% Years
Since 1974**
2015: +6.5%
2014: +9.5%
1992: +7.7%

+6.5%

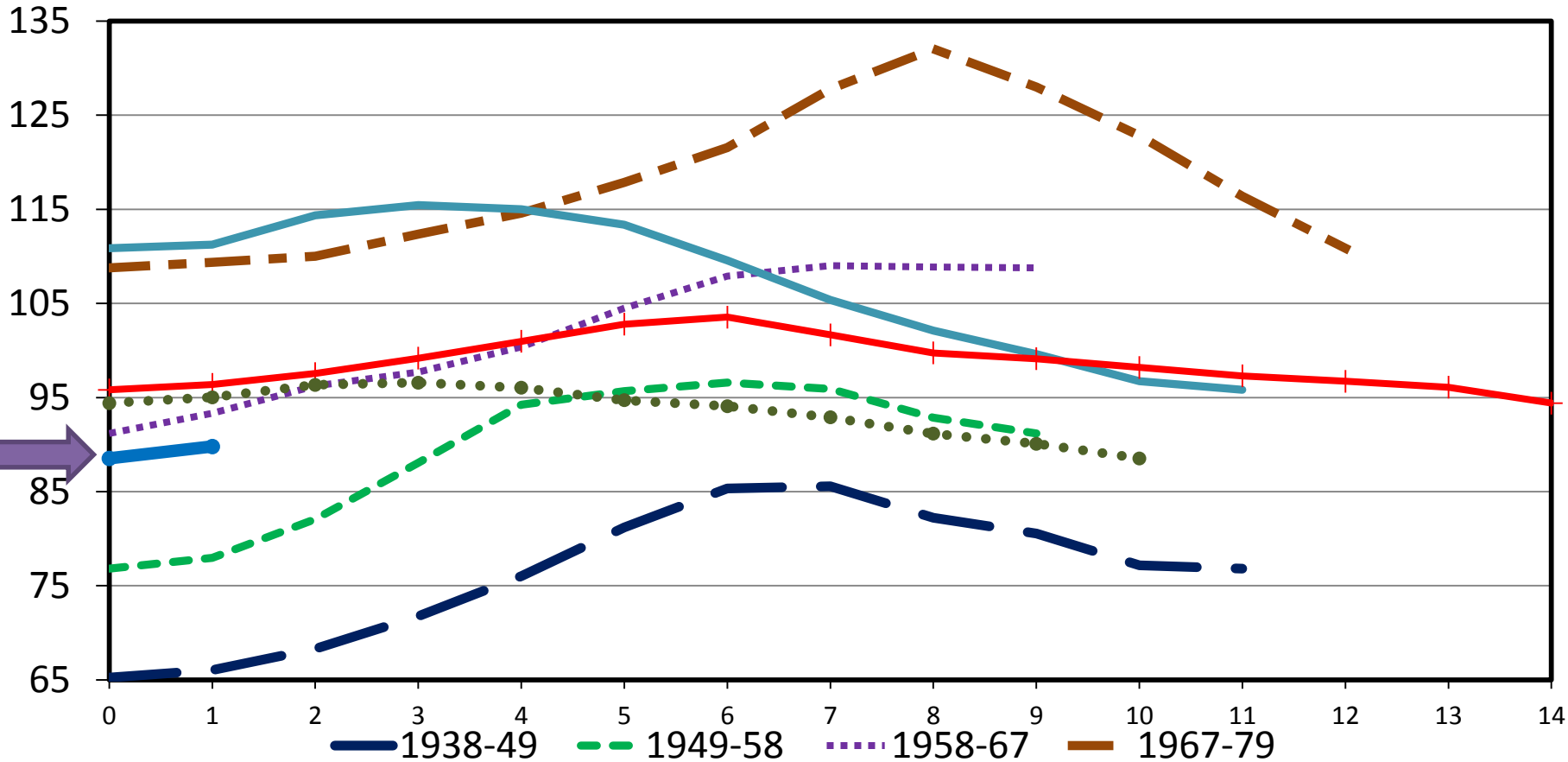
Data Source: USDA-NASS Livestock Marketing Information Center

C-N-37
07/28/15

TOTAL CATTLE INVENTORY BY CYCLE

U.S., January 1

Mil. Head



Data Source: USDA-NASS

Livestock Marketing Information Center

—●— 1938-49
 - - - 1949-58
 - · - · - 1958-67
 - - - 1967-79
— 1979-90
 —+— 1990-04
 · · · 2004-14
—●— 2014-15

C-N-40
07/28/15

MED. & LRG. #1 FEEDER STEER PRICES

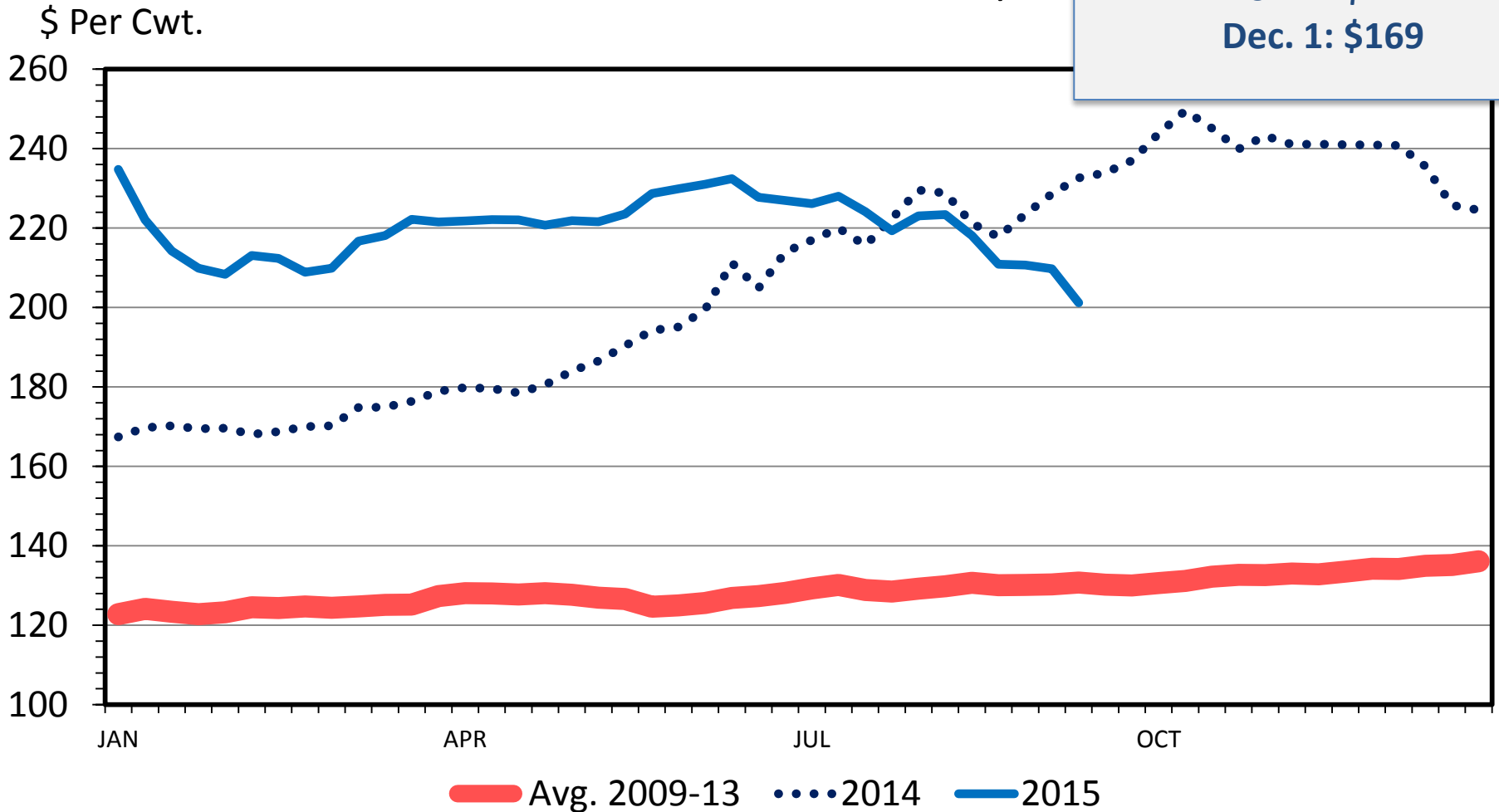
700-800 Pounds, Southern Plains, Weekly

**Beef Basis, Salina KS
Projections (as of 9/24):**

Oct. 1: \$177

Nov. 2: \$174

Dec. 1: \$169



Economic Outlook Overview: Stockers

<http://www.beefbasis.com/ForecastingTools/ValueofGain/tabid/1132/Default.aspx>

- Salina, KS 9/24/15 situation:
 - Buy 575 lb steer on 10/14/15 (\$190)
 - Sell 800 lb steer on 02/01/16 (\$164) {2.03 ADG}
 - VOG: \$97/cwt
 - IF COG \$80/cwt THEN Exp. Profit = +/- \$38/hd

Stocker - Feeder Cattle Output Price Hedging Considerations (as of 9/23/15)

- Salina, KS 9/23/15 situation:
 - Plan to sell 250 steers @ 800 lbs on 2/1/16
 - Current Exp. Price = \$169/cwt
 - Interested in downside price protection

–USE:

FeederCattleRiskMgmtTool.xlsx

<http://www.agmanager.info/Tools/default.asp#LIVESTOCK>

Stocker - Feeder Cattle Output Price Hedging Considerations (as of 9/23/15)

- Sell 800 lb steers on 2/1/16
- Compare alternatives:
 - 250 hd on LRP:
 - Coverage Price \$161.01 & Premium of \$3.114
 - 4 FC Futures Contracts (+/- 63 hd per contract)
 - MAR FC @ \$176 & Exp. Basis: -\$7.42
 - 4 FC Options Contracts (+/- 63 hd per contract)
 - MAR Put @ \$168 & Premium of \$5.525
 - Cash
 - Expected Price of \$169/cwt

<http://www.agmanager.info/Tools/default.asp#LIVESTOCK>
(*FeederCattleRiskMgmtTool.xlsx*)

Stocker - Feeder Cattle Output Price Hedging Considerations (as of 9/23/15)

	Futures	LRP	Put	Call	Put	Call
Number of contracts	4	250	4	4	4	4
Strike price(s), \$/cwt		\$161.01	\$168.00	\$180.00	\$168.00	\$178.00
Premium, \$/cwt		\$3.114	\$5.525	\$6.750	\$5.525	\$7.675

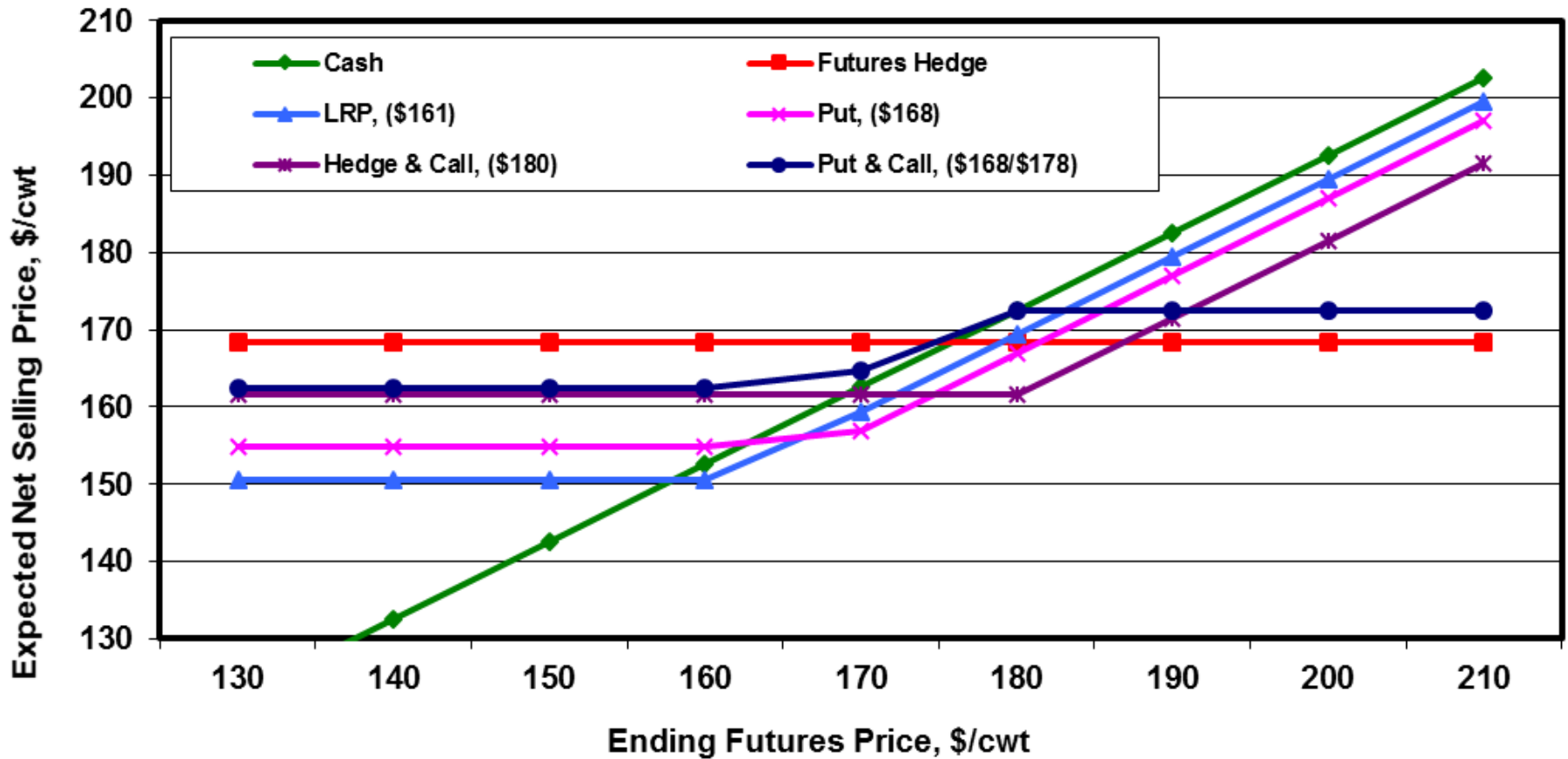
Expected Net Selling Prices

Futures price	Cash	Hedge	LRP	Put	Hedge & Call	Put & Call
\$130.00	\$122.58	\$168.41	\$150.48	\$154.94	\$161.60	\$162.55
\$140.00	\$132.58	\$168.41	\$150.48	\$154.94	\$161.60	\$162.55
\$150.00	\$142.58	\$168.41	\$150.48	\$154.94	\$161.60	\$162.55
\$160.00	\$152.58	\$168.41	\$150.48	\$154.94	\$161.60	\$162.55
\$170.00	\$162.58	\$168.41	\$159.47	\$157.00	\$161.60	\$164.61
\$180.00	\$172.58	\$168.41	\$169.47	\$167.00	\$161.60	\$172.55
\$190.00	\$182.58	\$168.41	\$179.47	\$177.00	\$171.54	\$172.55
\$200.00	\$192.58	\$168.41	\$189.47	\$187.00	\$181.54	\$172.55
\$210.00	\$202.58	\$168.41	\$199.47	\$197.00	\$191.54	\$172.55
\$10.00	<= futures price increment				Signifies maximum price in row	

<http://www.agmanager.info/Tools/default.asp#LIVESTOCK>
 (*FeederCattleRiskMgmtTool.xlsx*)

Stocker - Feeder Cattle Output Price Hedging Considerations (as of 9/23/15)

Comparison of Alternative Expected Net Selling Prices



<http://www.agmanager.info/Tools/default.asp#LIVESTOCK>
(FeederCattleRiskMgmtTool.xlsx)

Stocker Research of Note: Emily Mollohan's MS Thesis

- 1993-2013 Calf (500#) and Yearling (700#) Prices
- 1% increase in corn price:
 - Drops Calf-Yearling price spread by 0.37%
- 1% increase in expected fed cattle price:
 - Expands Calf-Yearling price spread by 1.17%

Stocker Research of Note: Emily Mollohan's MS Thesis

- 1993-2013 Calf (500#) and Yearling (700#) Prices
- +1% corn price: -0.37% price spread
- +1% expected fed cattle price: +1.17% price spread
- Consider 9/1 to 9/24 Changes:
 - Dec. C: +3.3% (\$3.80 vs. \$3.68) = -1.2% calf-yearling spread
 - Feb. LC: -5.6% (\$135 vs \$143) = -6.5% calf-yearling spread
 - 9/1 to 9/18 KS (Combined Auctions) 500-550 vs 700-750:
 - -\$6.93/cwt (\$32 vs \$39)

Stocker Research of Note: Shelby Hill's MS Thesis

- National survey w/ BEEF magazine in Sep-Oct 2014
 - 554 usable by mail (response rate of 27.7%)
 - 222 usable by email (response rate of 1.1%)
- “Most common” stocker operation:
 - Duration cattle are owned/managed: 141 days
 - Targeted ADG: 1.90
 - Place multiple sets per year
 - Source from auction markets w/o info on source ranch

Stocker Research of Note: Shelby Hill's MS Thesis

- Perceived ADG & Net Returns of Placing 500 lb steers in OCT for about 120 days:
 - ADG over past 10 years
 - Average across all lots/groups: 1.77
 - Worst lot/group: 1.07
 - Best lot/group: 2.31
 - Net Return (\$/hd) over past 10 years
 - Average across all lots/groups: \$76.57
 - Worst lot/group: -\$13.65
 - Best lot/group: \$193.43

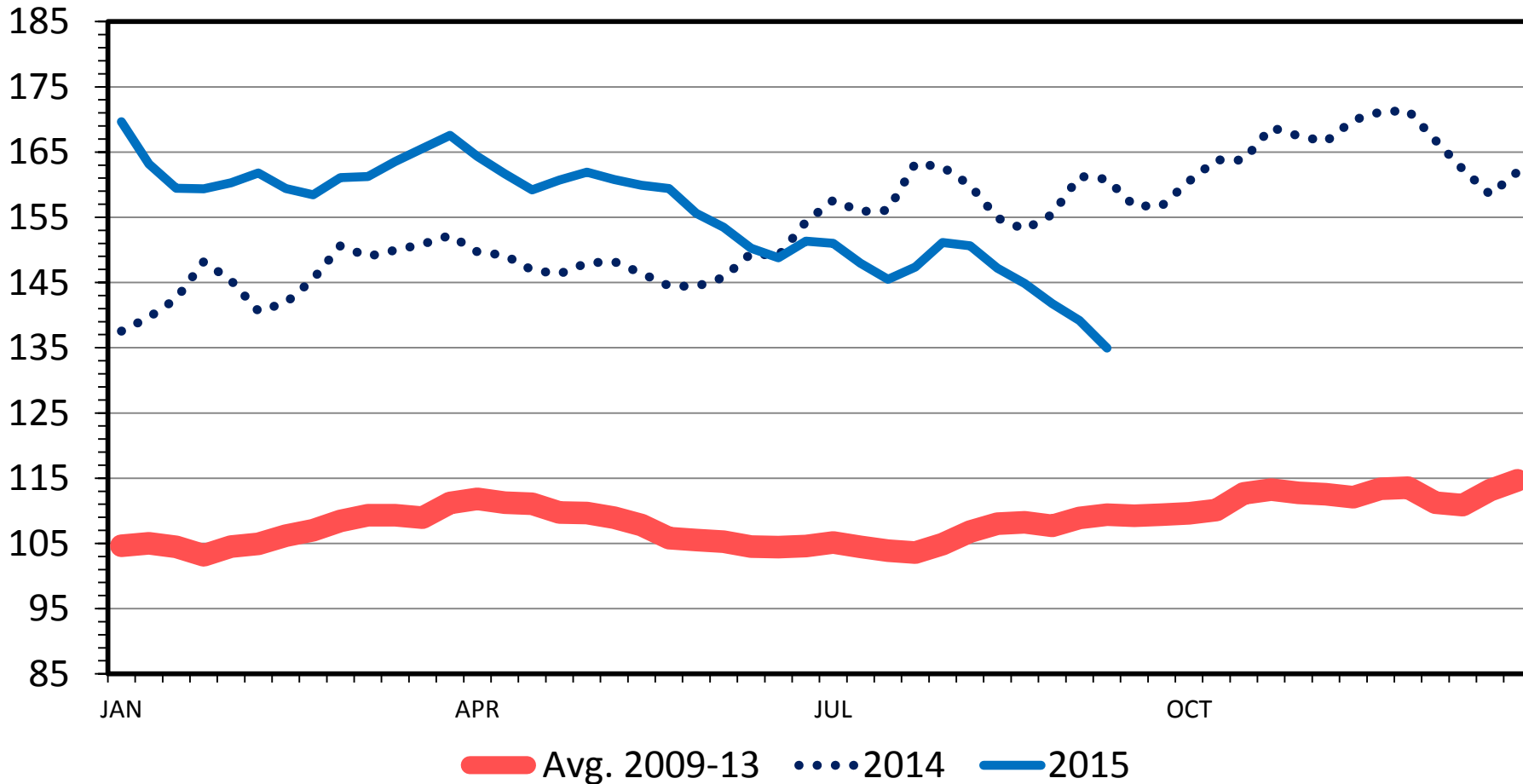
Economic Outlook Overview: Feedlots

- 2015 cash returns continue to worsen
- Structural concerns persist:
 - Excess capacity
 - Heifer Retention, Plant Closures, MCOOL, ...

SLAUGHTER STEER PRICES

5 Market Weighted Average, Weekly

\$ Per Cwt.



Data Source: USDA-AMS

Livestock Marketing Information Center

09/21/15

Historical and Projected Kansas Feedlot Net Returns (as of 9/10/15')

(<http://www.agmanager.info/livestock/marketing/outlook/newsletters/FinishingReturns/default.asp>)

July 15': -\$156/steer

Table 1. Projected Values for Finishing Steers in Kansas Feedyards*

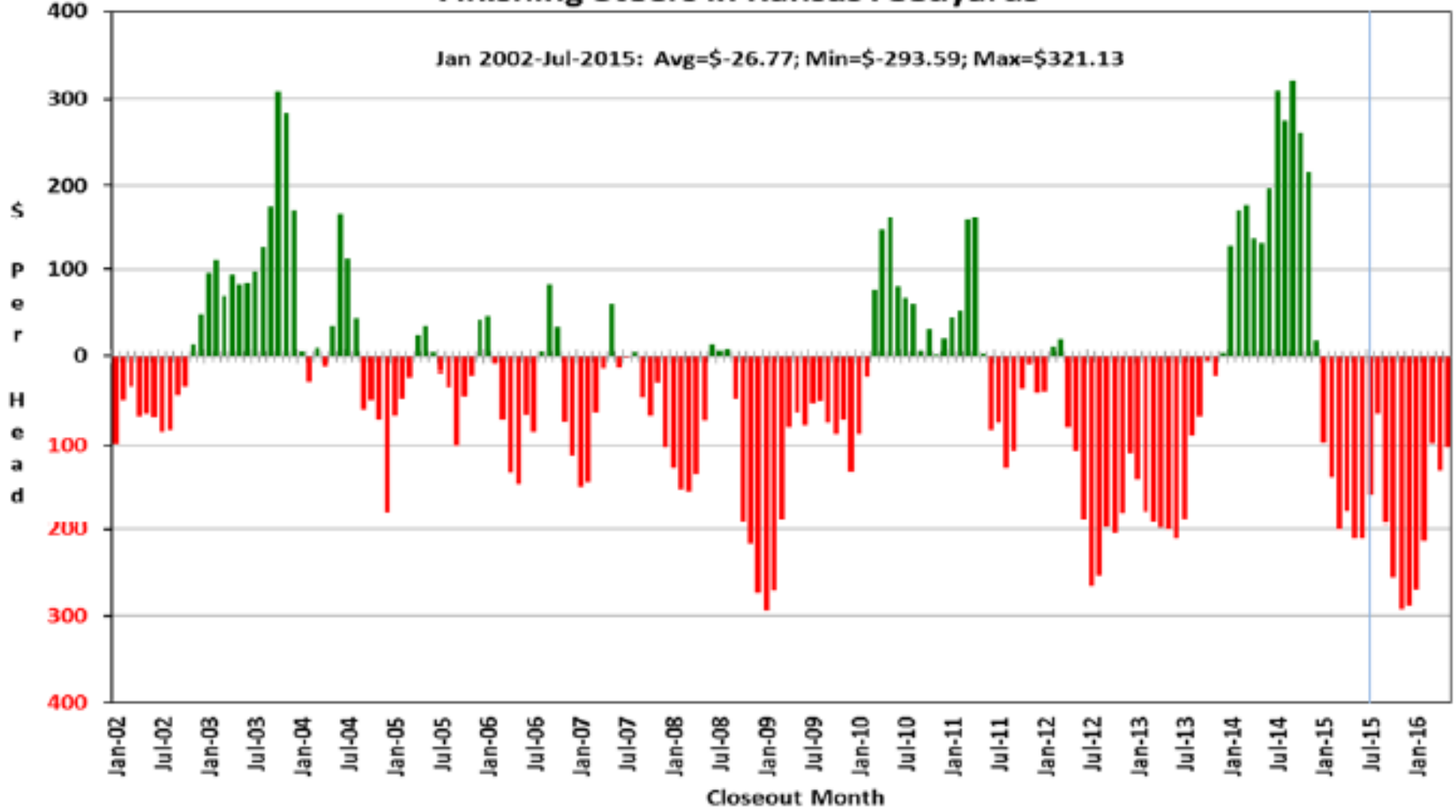
Closeout Mo-Yr	Net Return	FCOG**	Fed Price	Feeder Price	Breakeven FCOG**	Breakeven Fed Price	Breakeven Feeder Price
Aug-15	-63.20	83.21	149.08	202.11	72.85	153.52	194.32
Sep-15	-194.60	83.68	143.64	208.72	52.04	157.29	184.71
Oct-15	-255.72	85.81	146.99	215.84	42.73	164.78	185.55
Nov-15	-292.19	85.95	145.98	218.69	36.14	166.52	183.75
Dec-15	-288.17	87.56	146.08	213.84	37.38	166.08	180.59
Jan-16	-269.92	88.72	147.34	210.68	39.38	166.34	179.79
Feb-16	-214.05	89.45	147.04	209.10	52.80	162.23	183.16
Mar-16	-96.61	88.66	147.79	194.08	71.11	154.76	182.53
Apr-16	-128.22	87.15	140.06	190.12	65.28	149.25	174.27
May-16	-102.09	87.27	142.05	187.97	69.41	149.35	175.62

Representative Barometer for Trends in Profitability

Historical and Projected Kansas Feedlot Net Returns (as of 9/10/15')

(<http://www.agmanager.info/livestock/marketing/outlook/newsletters/FinishingReturns/default.asp>)

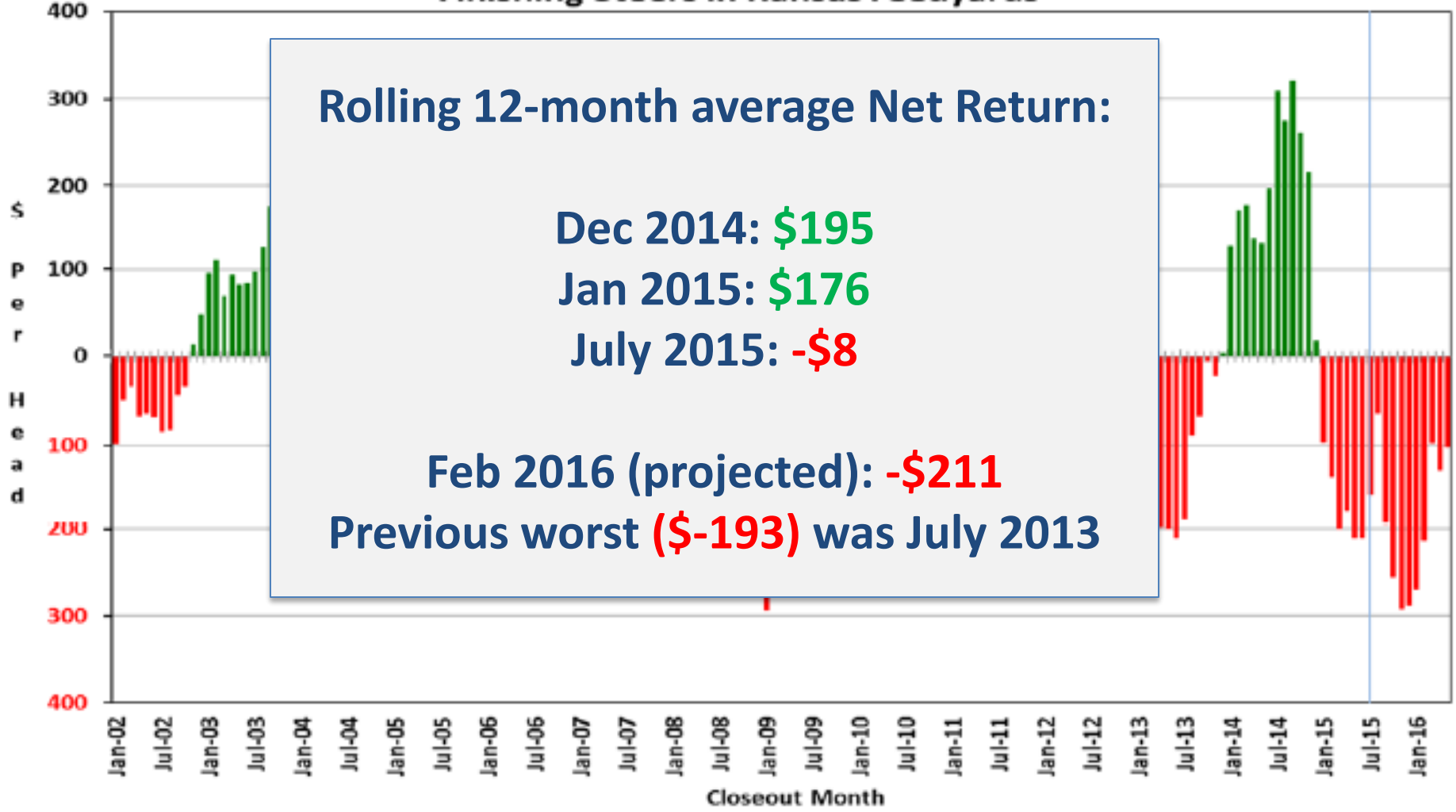
Figure 1. Historical & Projected Average Net Returns for Finishing Steers in Kansas Feedyards



Historical and Projected Kansas Feedlot Net Returns (as of 9/10/15')

(<http://www.agmanager.info/livestock/marketing/outlook/newsletters/FinishingReturns/default.asp>)

Figure 1. Historical & Projected Average Net Returns for Finishing Steers in Kansas Feedyards



Cattle on Feed (9/18 report)

- Sept 1 On Feed: +3%
 - Vs. +3.7% pre-report est. (+2.2%, +4.0%)
 - KS: Flat @ 100% of last year
 - Aug. Placements: -5%
 - Vs. +0.3% pre-report est. (-2.3%, +3.2%)
 - KS: -10% vs. last yr; largest drop of 3 main states
 - Aug. Marketings: -6%
 - Vs. -6.2% pre-report est. (-6.6%, -3.7%)
 - KS: -10% (NE: -4%, TX -7%)
- KS #s consistent w/ “heavy cattle stacking up” in Aug-Sep

Quarterly Forecasts (LMIC: 9/4/15)

Year Quarter	Comm'l Slaughter	% Chg. from Year Ago	Average Dressed Weight	% Chg. from Year Ago	Comm'l Beef Production	% Chg. from Year Ago
2014						
I	7,374	-5.2	795.7	0.3	5,868	-5.0
II	7,837	-5.9	789.0	0.9	6,184	-5.1
III	7,632	-8.3	809.6	1.9	6,179	-6.5
IV	7,326	-8.8	821.8	2.8	6,021	-6.3
Year	30,170	-7.1	803.8	1.5	24,252	-5.7
2015						
I	6,967	-5.5	813.0	2.2	5,664	-3.5
II	7,227	-7.8	810.1	2.7	5,855	-5.3
III	7,299	-4.4	829.4	2.4	6,054	-2.0
IV	7,356	0.4	828.6	0.8	6,095	1.2
Year	28,849	-4.4	820.4	2.1	23,668	-2.4
2016						
I	7,122	2.2	822.2	1.1	5,856	3.4
II	7,382	2.1	813.2	0.4	6,003	2.5
III	7,557	3.5	834.7	0.6	6,308	4.2
IV	7,430	1.0	832.2	0.4	6,183	1.4
Year	29,491	2.2	825.7	0.6	24,350	2.9

Quarterly Forecasts (LMIC: 9/4/15)

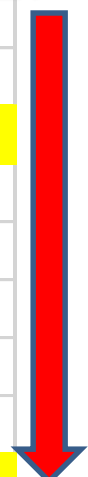
Year Quarter	Live Sltr.	% Chg.	Feeder Steer Price	
	Steer Price	from	Southern Plains	
	5-Mkt Avg	Year Ago	7-800#	5-600#
2014				
I	146.34	16.6	171.77	209.30
II	147.82	18.3	193.16	227.67
III	158.49	29.6	225.93	263.14
IV	165.59	26.6	239.81	285.63
Year	154.56	22.8	207.67	246.44
2015				
I	162.43	11.0	215.87	276.14
II	158.11	7.0	225.29	279.32
III	147-148	-6.9	216-218	251-254
IV	152-154	-7.6	204-207	245-249
Year	154-156	0.3	214-218	262-266
2016				
I	153-156	-4.9	201-205	249-255
II	152-156	-2.6	202-208	249-257
III	146-151	0.7	196-203	244-253
IV	150-156	0.0	193-201	239-249
Year	151-154	-1.6	199-203	247-252



Quarterly Forecasts (LMIC: 9/4/15)

Year Quarter	Live Sltr. Steer Price	% Chg. from Year Ago	Feeder Steer Price Southern Plains	
	5-Mkt Avg		7-800#	5-600#
2014				
I	146.34	16.6	171.77	209.30
II	147.82	18.3	193.16	227.67
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I	153-156		201-205	249-255
II	152-156		202-208	249-257
III	146-151		196-203	244-253
IV	150-156		193-201	239-249
Year	151-154		199-203	247-252

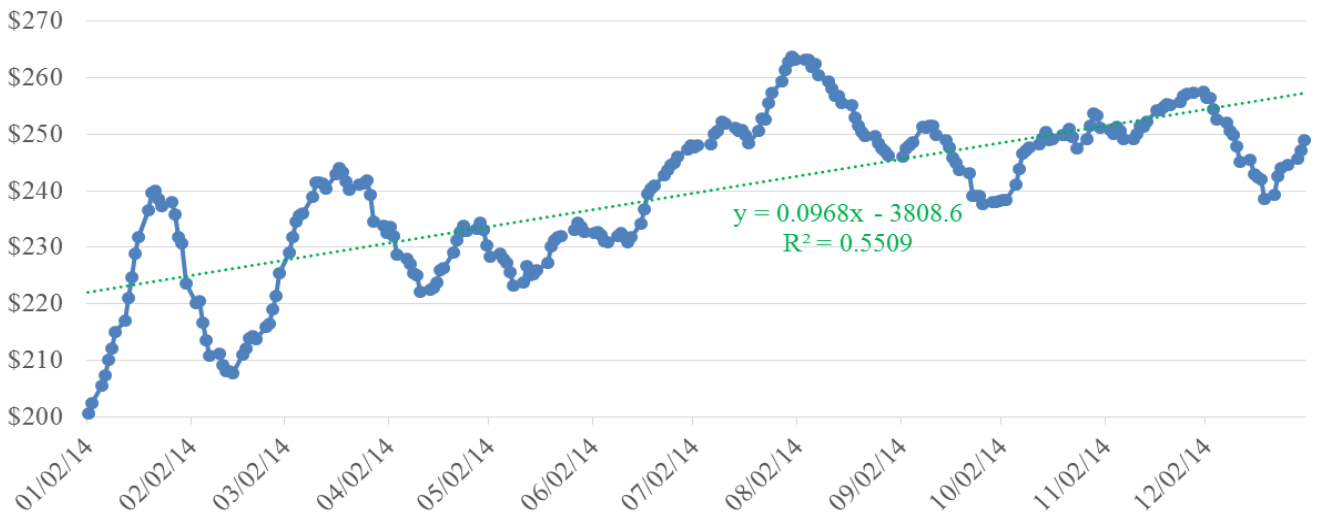
Reduce by
\$10-\$15/cwt
given
declines
since 9/4?



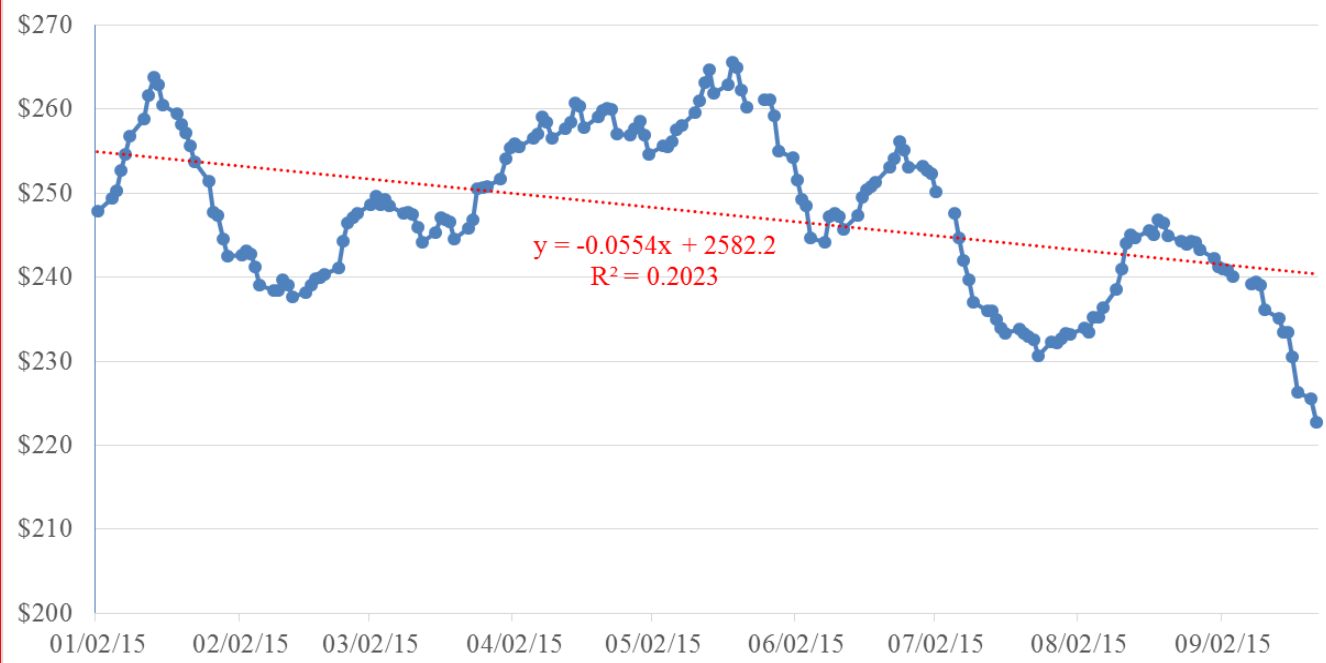
Cutout, Trade, & Other Meat Supplies

2015 To-Date & 2014 Choice Cutout Values

Choice Cutout Value - 2014



Choice Cutout Value - 2015 To-Date



Source: USDA
LM_XB403, LMIC,
Tensor Analysis

2015 To-Date & 2014 Choice Cutout Values

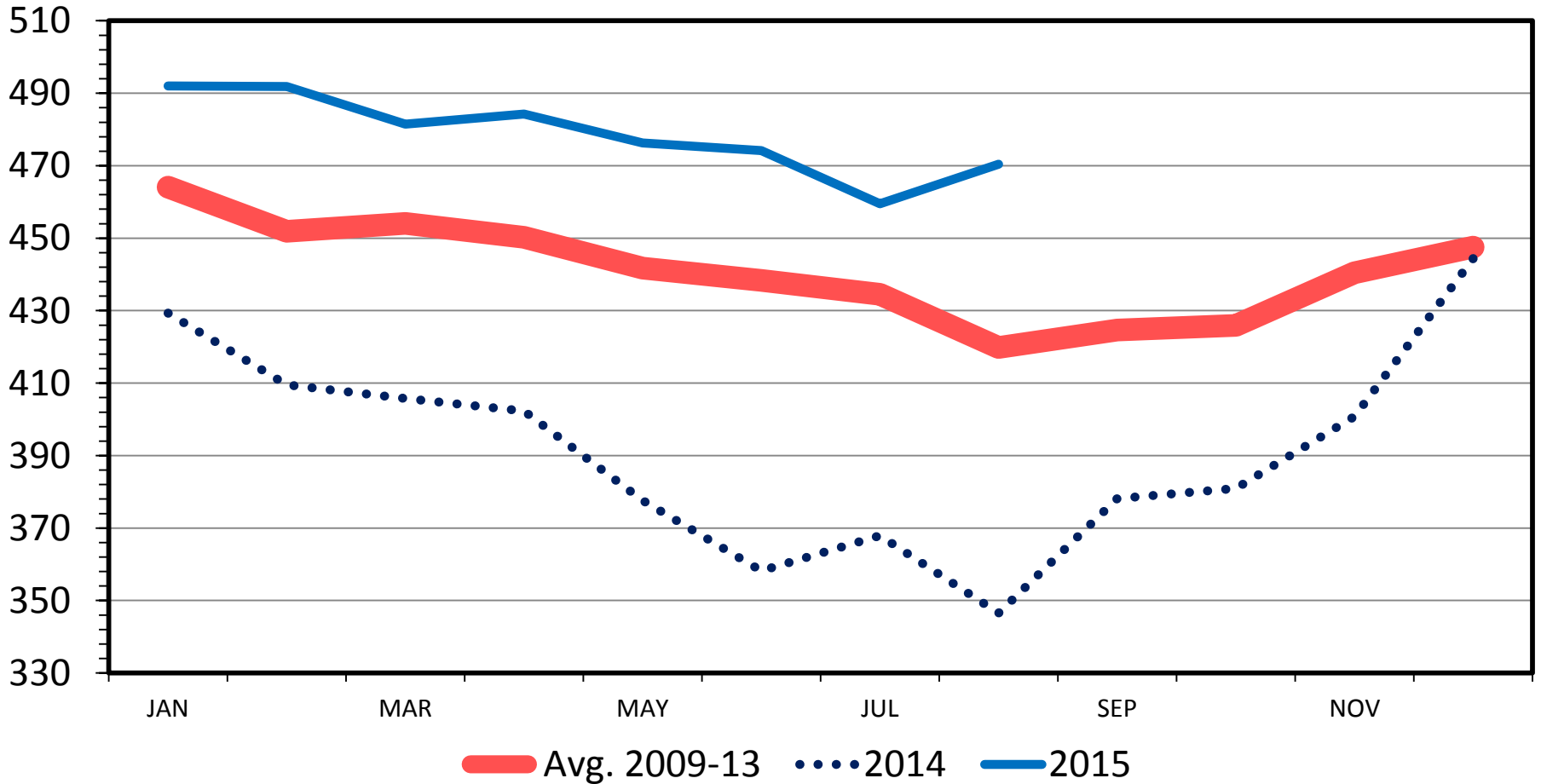
Choice Cutout Value Changes (as of 9/22/15)								
	CUTOUT						SHORT	
	VALUE	RIB	CHUCK	ROUND	LOIN	BRISKET	PLATE	FLANK
Since 9/1/15:	-\$18.44	-\$34.21	-\$13.24	-\$14.17	-\$27.19	-\$12.13	-\$6.58	-\$17.71
	-8%	-10%	-7%	-7%	-8%	-7%	-4%	-13%
Since 7/1/15:	-\$29.52	-\$44.89	-\$26.61	-\$26.67	-\$30.08	-\$13.66	-\$34.74	-\$30.65
	-12%	-13%	-12%	-12%	-9%	-8%	-20%	-21%
Since 1/2/15:	-\$25.06	-\$25.40	-\$35.20	-\$35.90	\$10.75	-\$64.54	-\$33.02	-\$13.86
	-10%	-8%	-16%	-15%	4%	-29%	-19%	-11%
9/22/15 Values:	\$222.77	\$307.33	\$186.58	\$202.67	\$307.12	\$156.99	\$143.13	\$117.02

Source: USDA
LM_XB403, LMIC,
Tonsor Analysis

BEEF IN COLD STORAGE

End of the Month

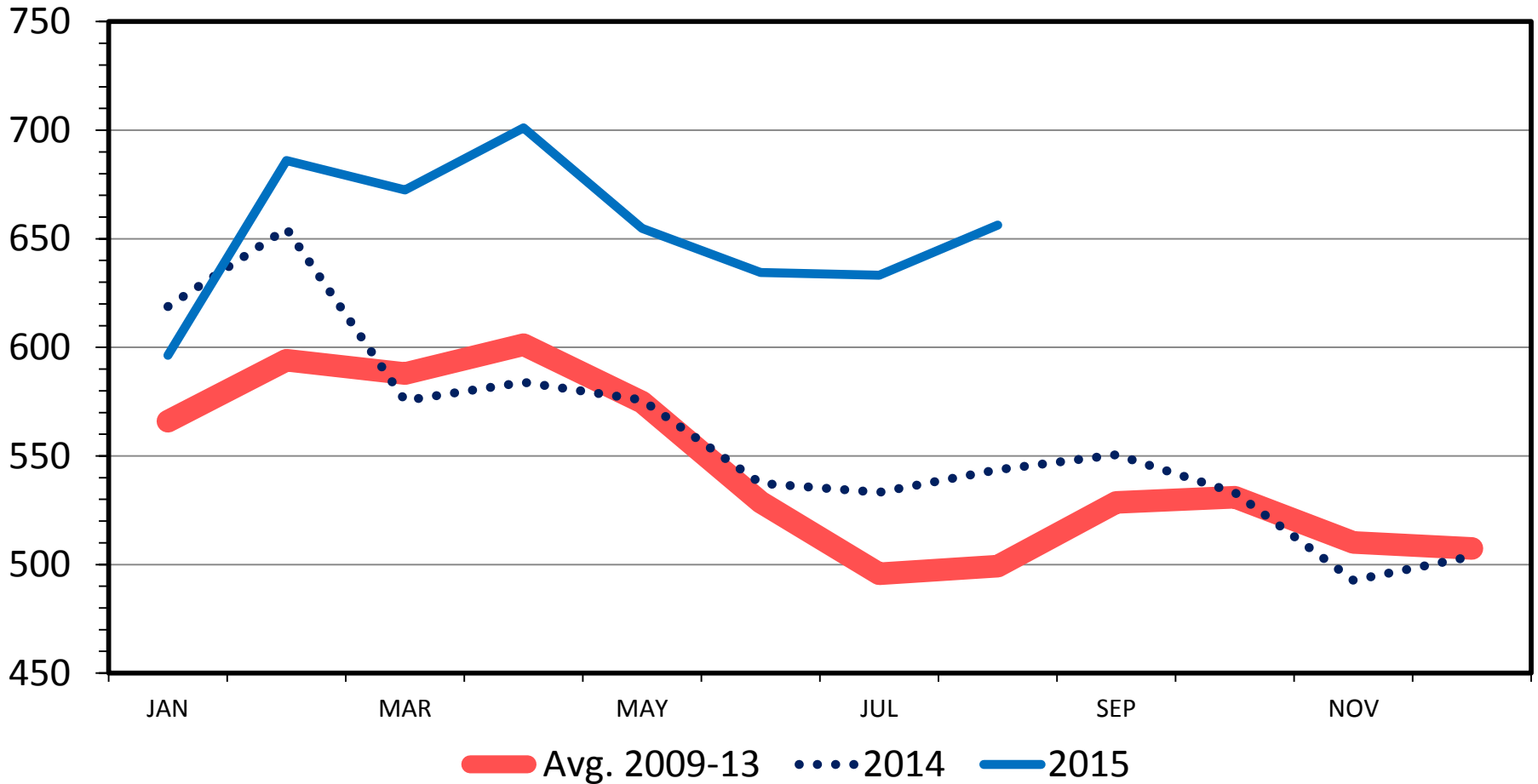
Mil. Pounds



PORK IN COLD STORAGE

Frozen and Cured, End of the Month

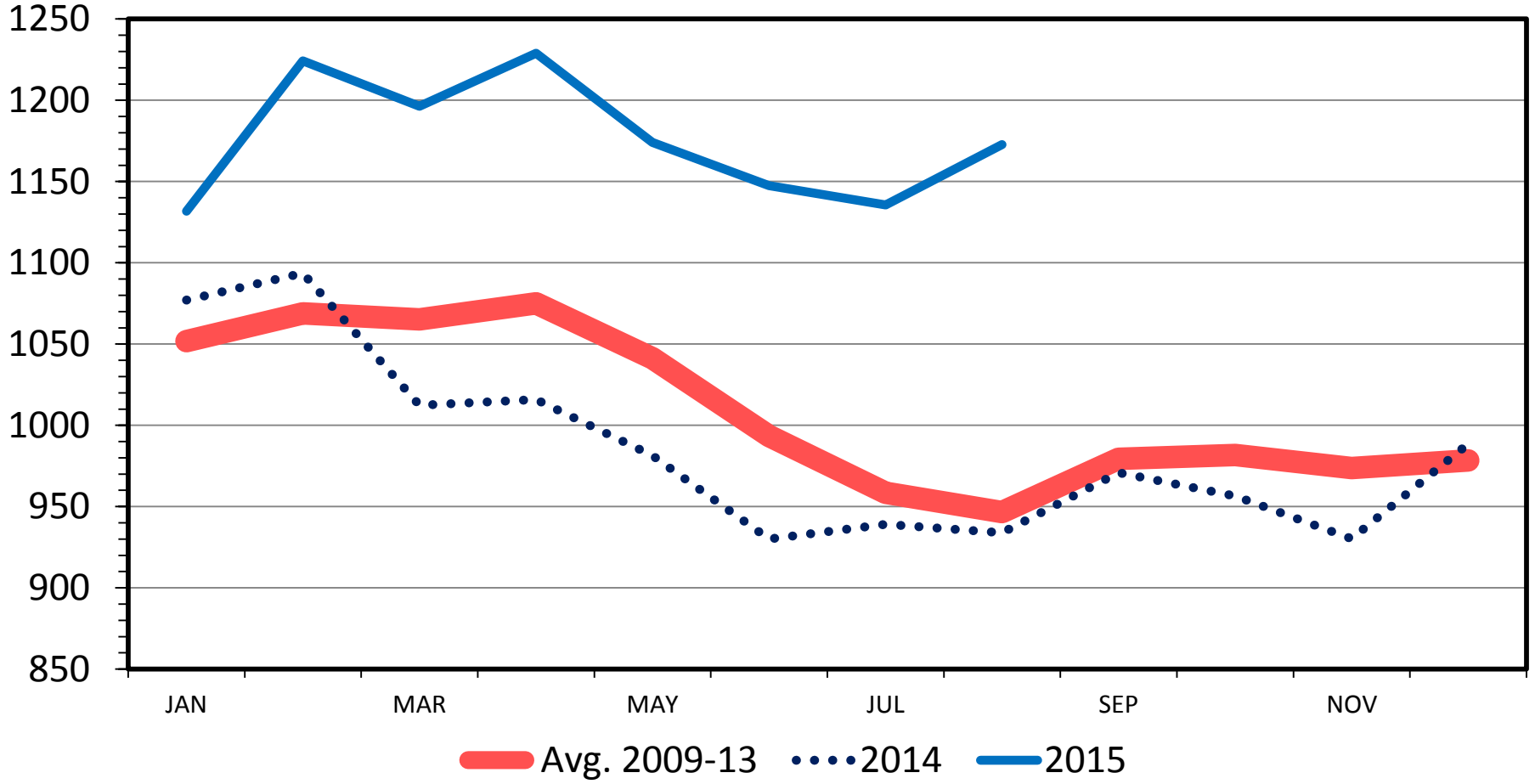
Mil. Pounds



TOTAL RED MEAT IN COLD STORAGE

End of the Month

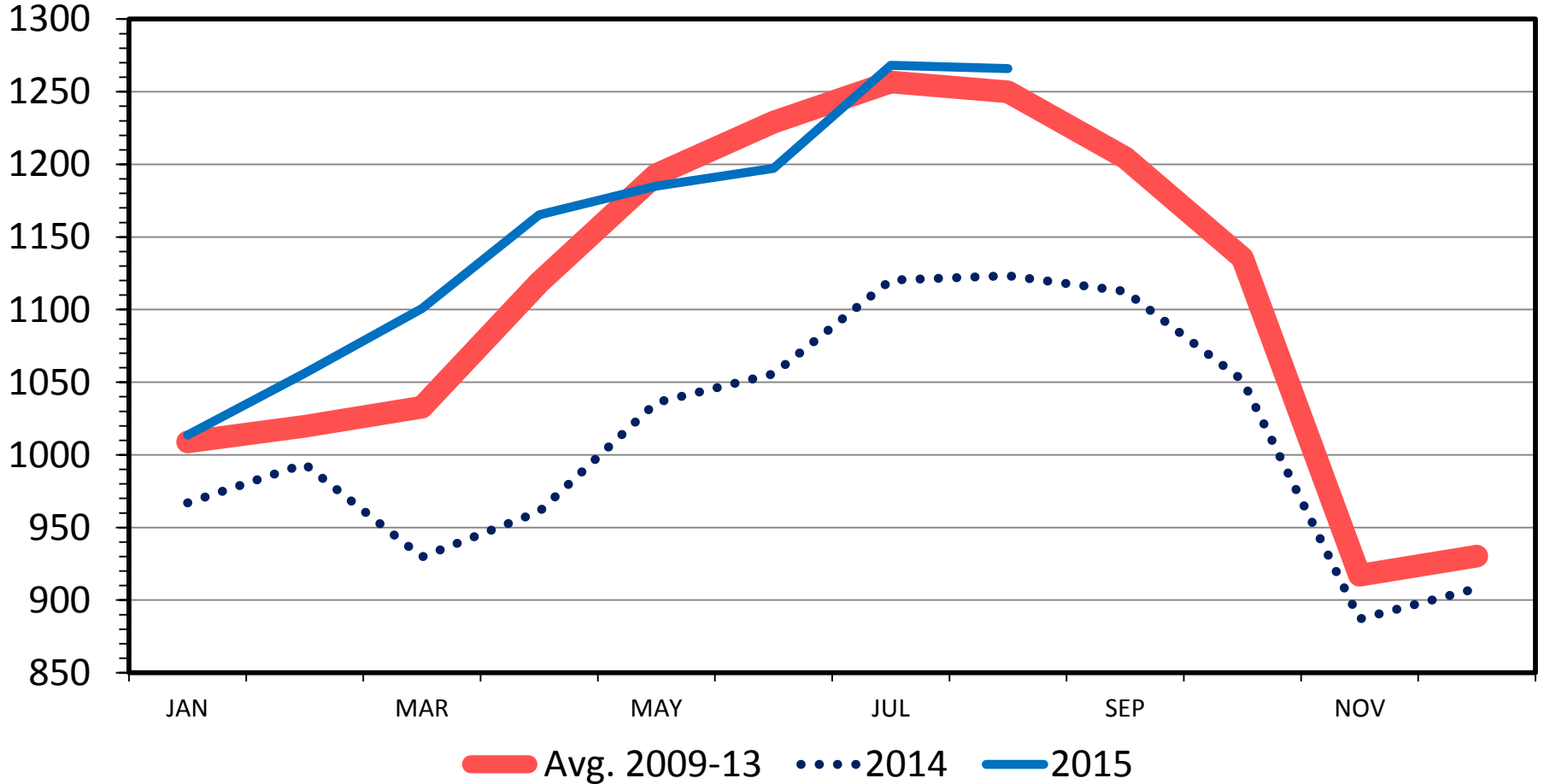
Mil. Pounds



TOTAL POULTRY IN COLD STORAGE

End of the Month

Mil. Pounds



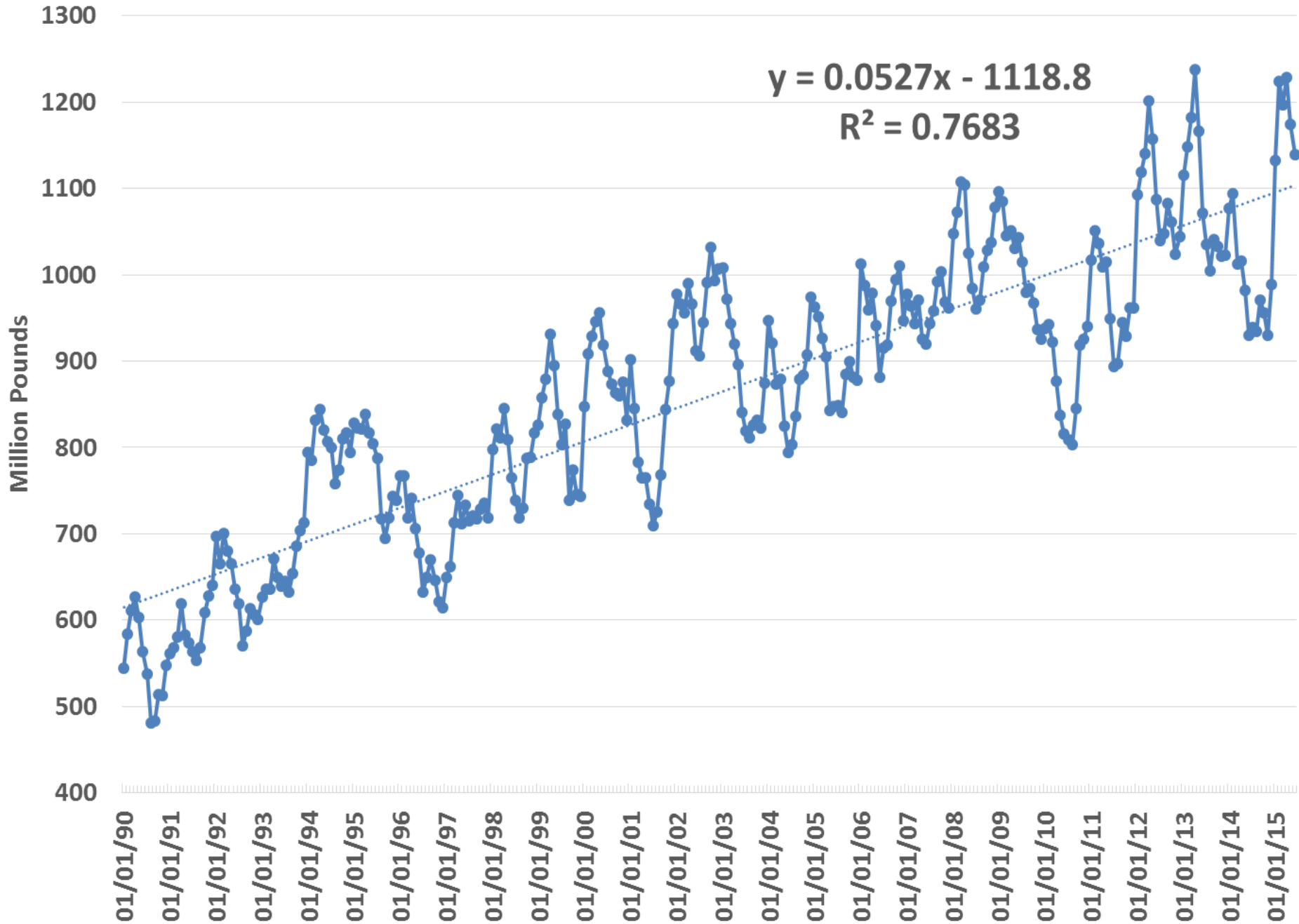
Data Source: USDA/NASS

Livestock Marketing Information Center

P-S-03

09/22/15

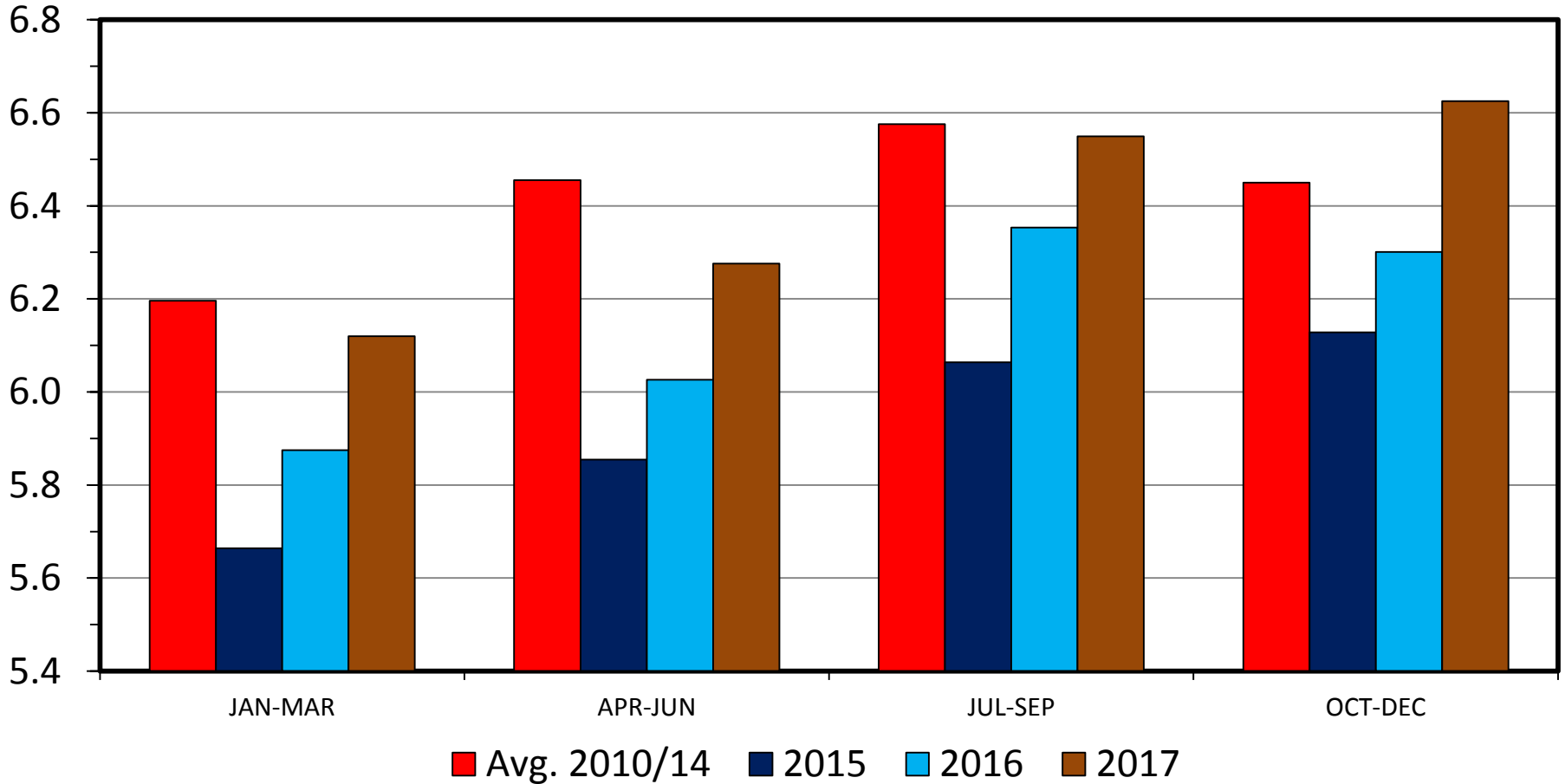
Total Red Meat in Cold Storage (End of Month)



COMMERCIAL BEEF PRODUCTION

US, Quarterly

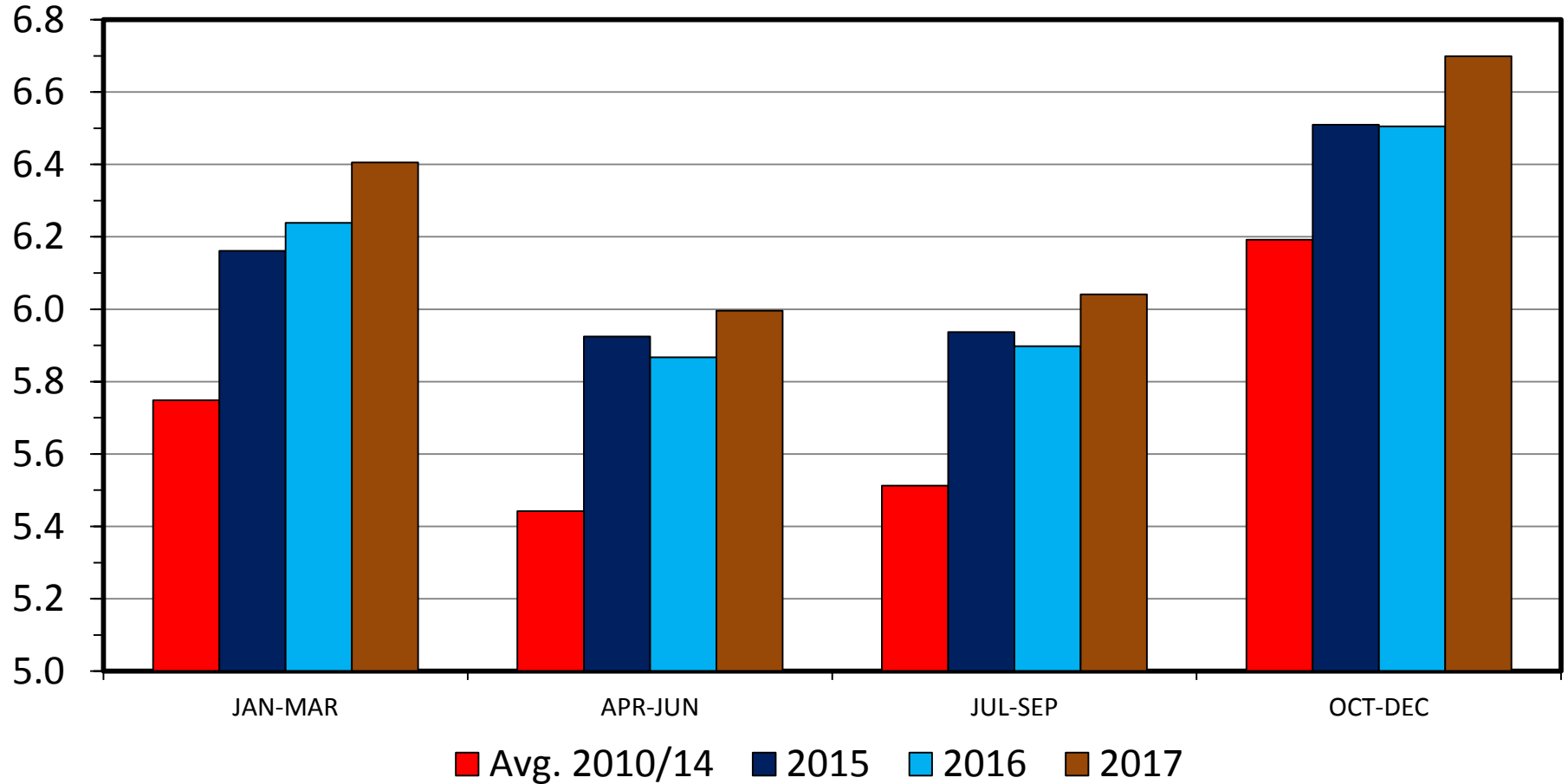
Bil. Pounds



COMMERCIAL PORK PRODUCTION

US, Quarterly

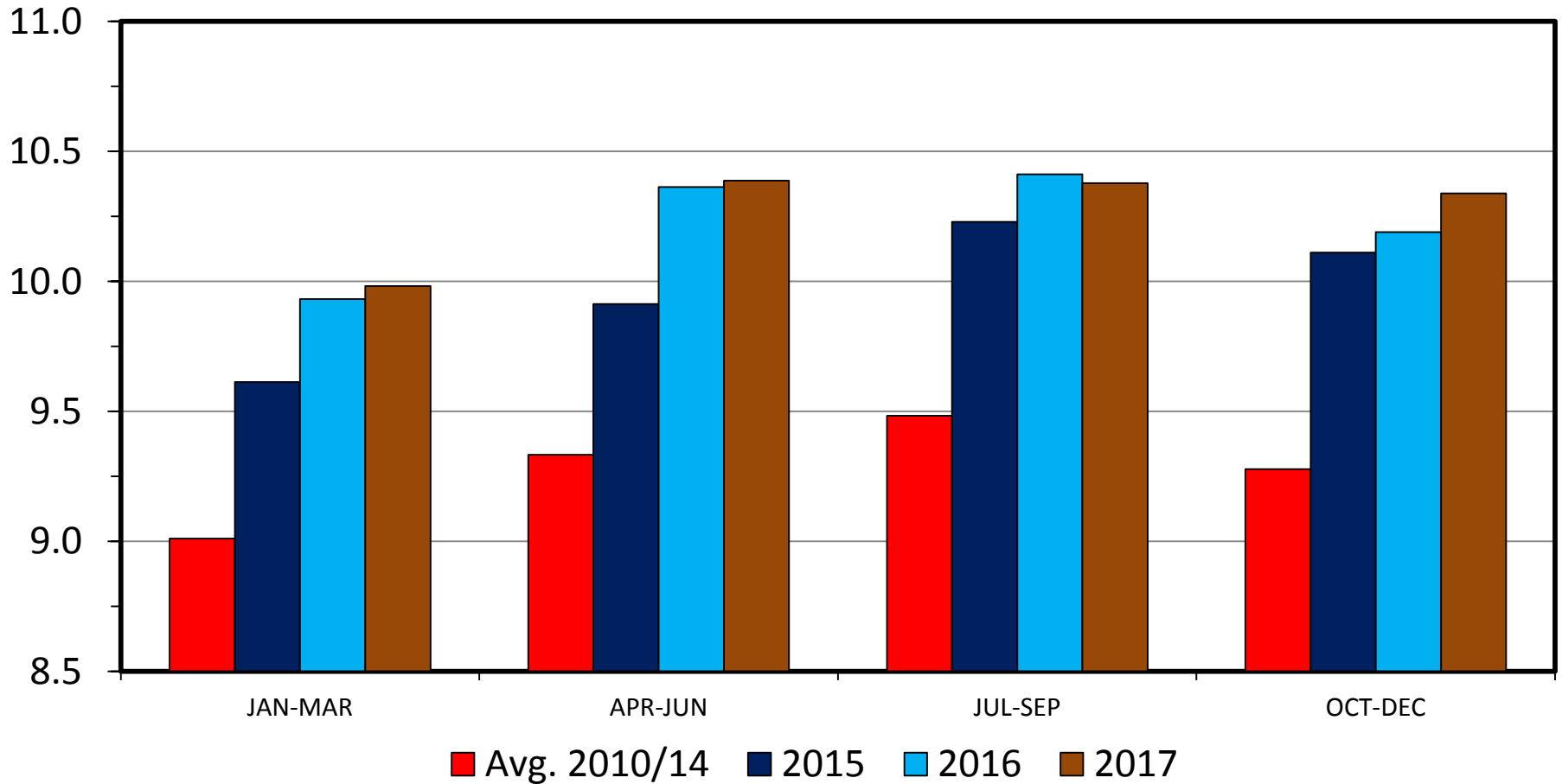
Bil. Pounds



RTC BROILER PRODUCTION

US, Quarterly

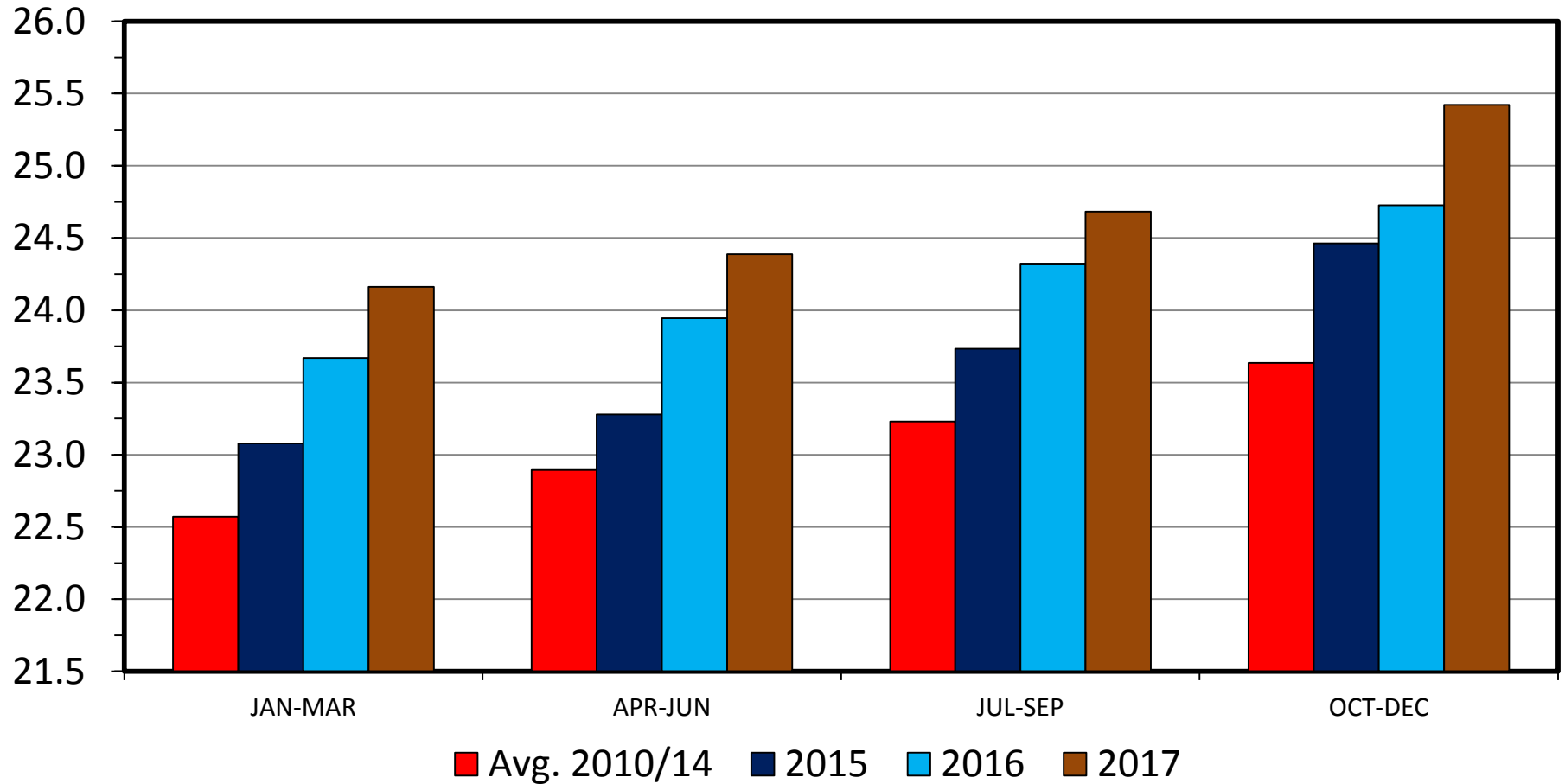
Bil. Pounds



TOTAL RED MEAT & POULTRY PRODUCTION

US, Quarterly

Bil. Pounds



USDA Long-Term projections (2015-2024)

Feb. 11, 2015 report (<http://www.usda.gov/oce/commodity/projections/index.htm>)

Recent

NEXT 5 YEARS

10 Yrs Out

Per capita meat consumption, retail weight

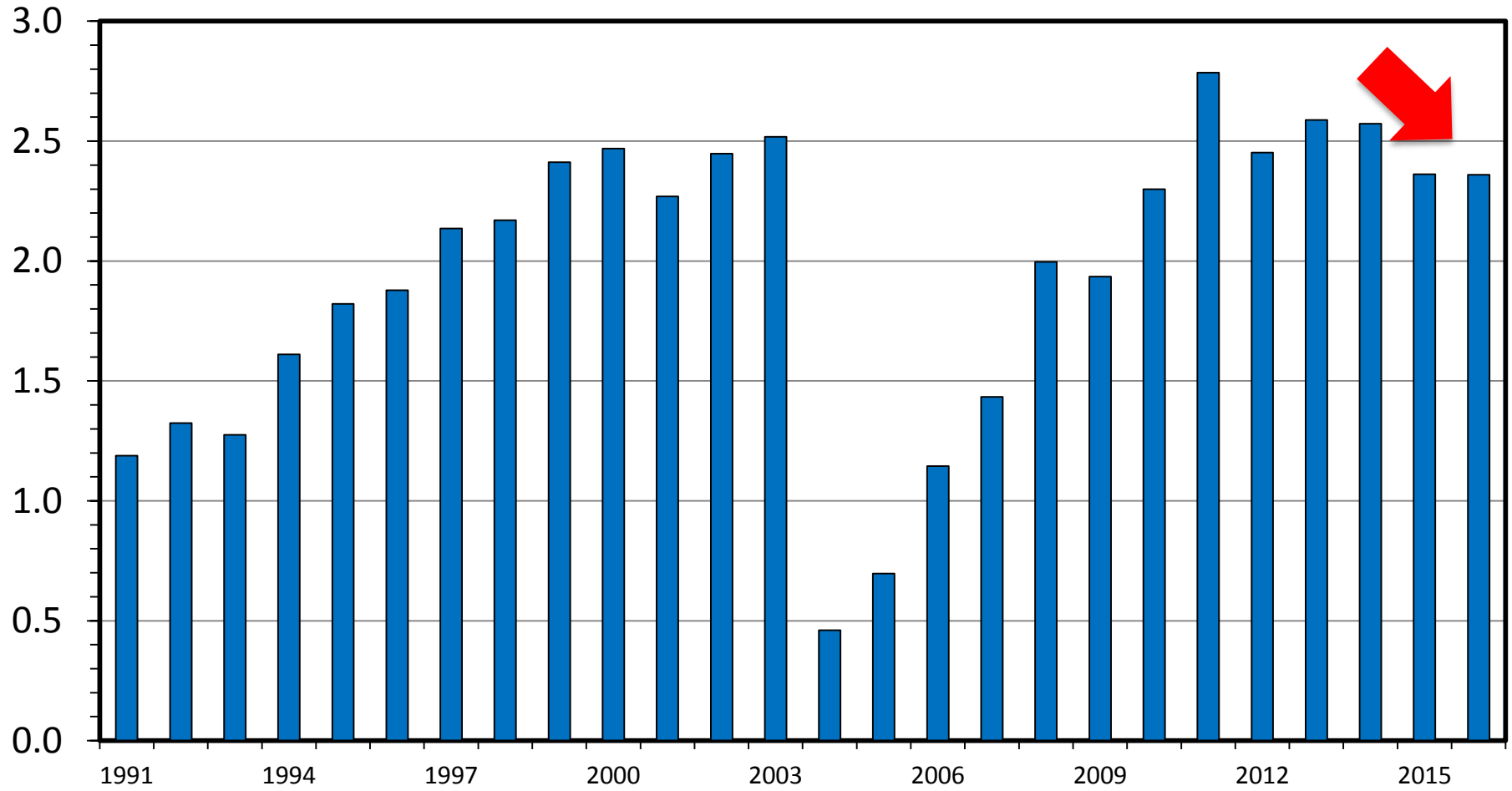
	Red Meat	Poultry	Total
1995	120	87	208
2008	113	103	216
2013	104	99	204
2014	102	100	202
2015	105	105	210
2024	103	112	215

**2024 (215 lbs) <
2008 (216 lbs)**

US BEEF AND VEAL EXPORTS

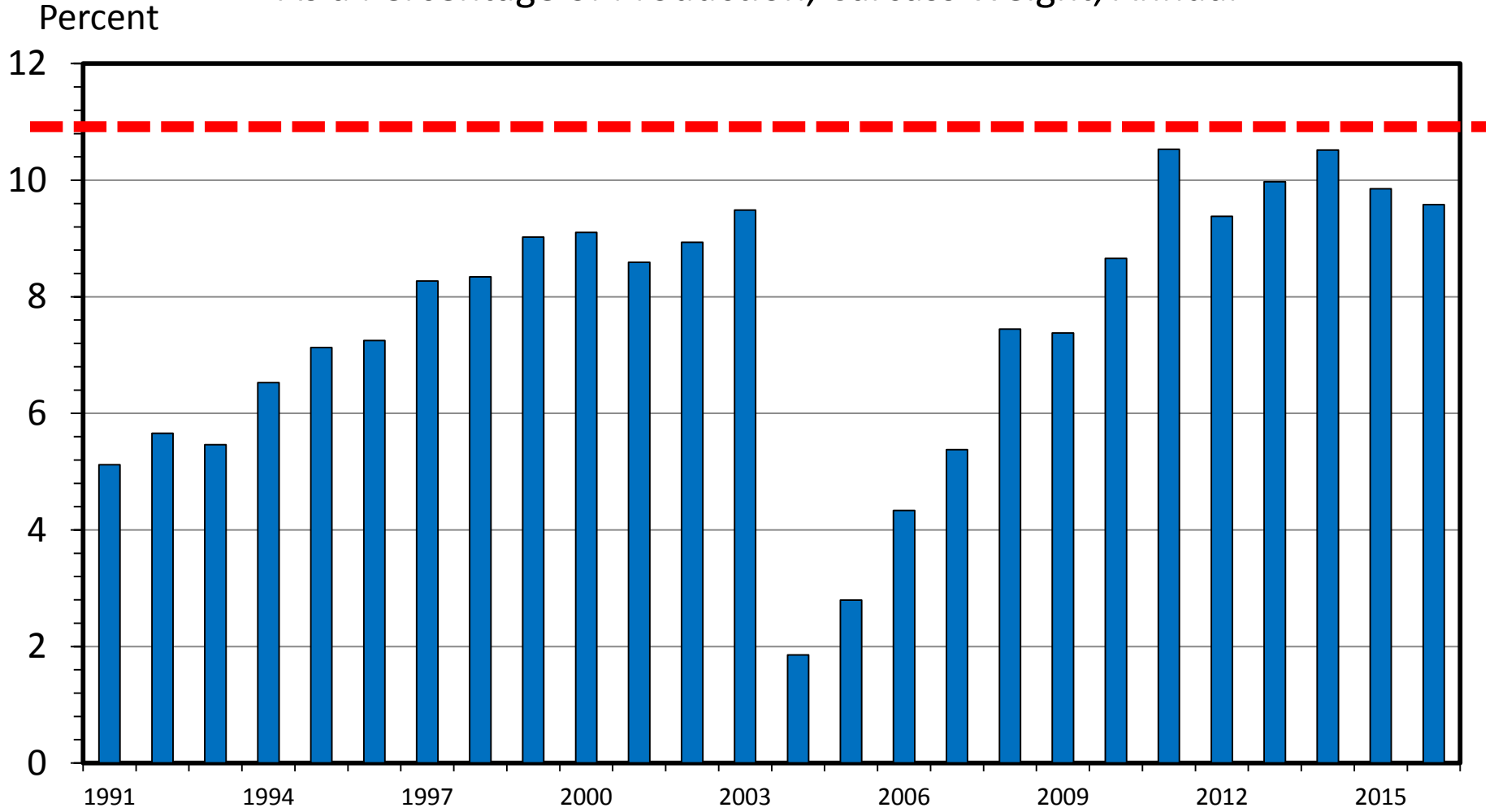
Carcass Weight, Annual

Bil. Pounds



US BEEF AND VEAL EXPORTS

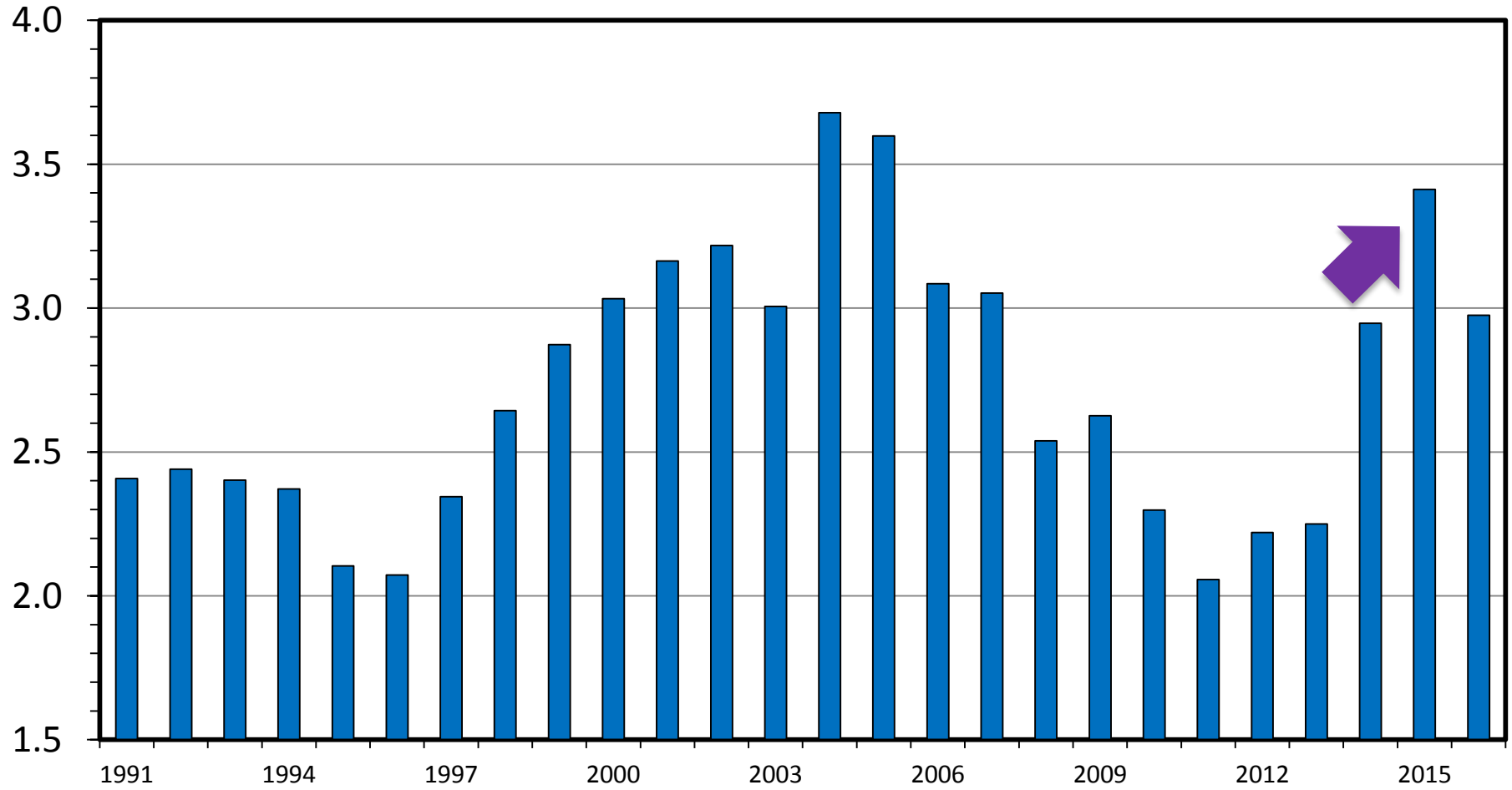
As a Percentage of Production, Carcass Weight, Annual



US BEEF AND VEAL IMPORTS

Carcass Weight, Annual

Bil. Pounds

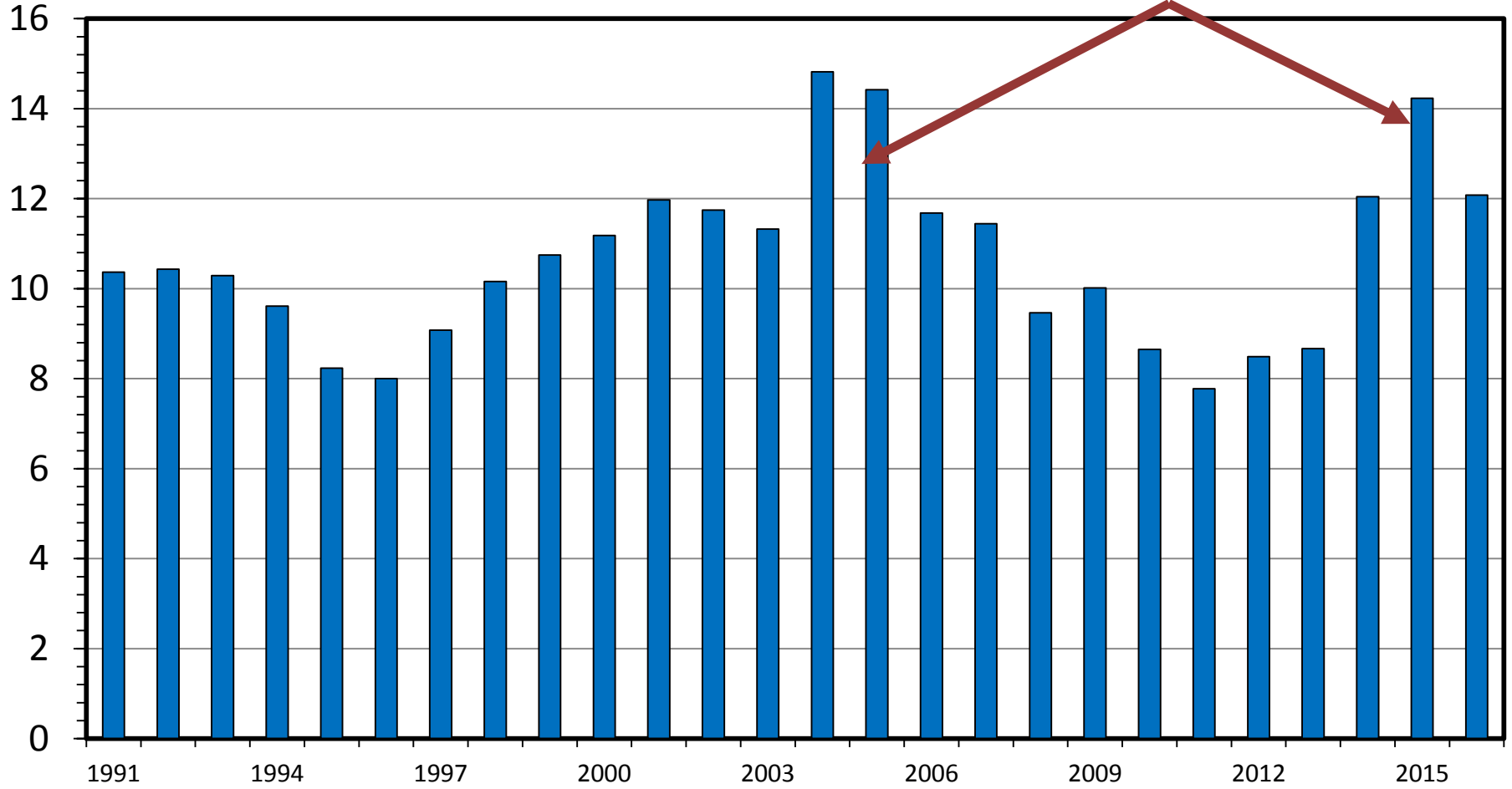


Note Imports (as % of Prod.) at times of strong heifer retention...

US BEEF AND VEAL IMPORTS

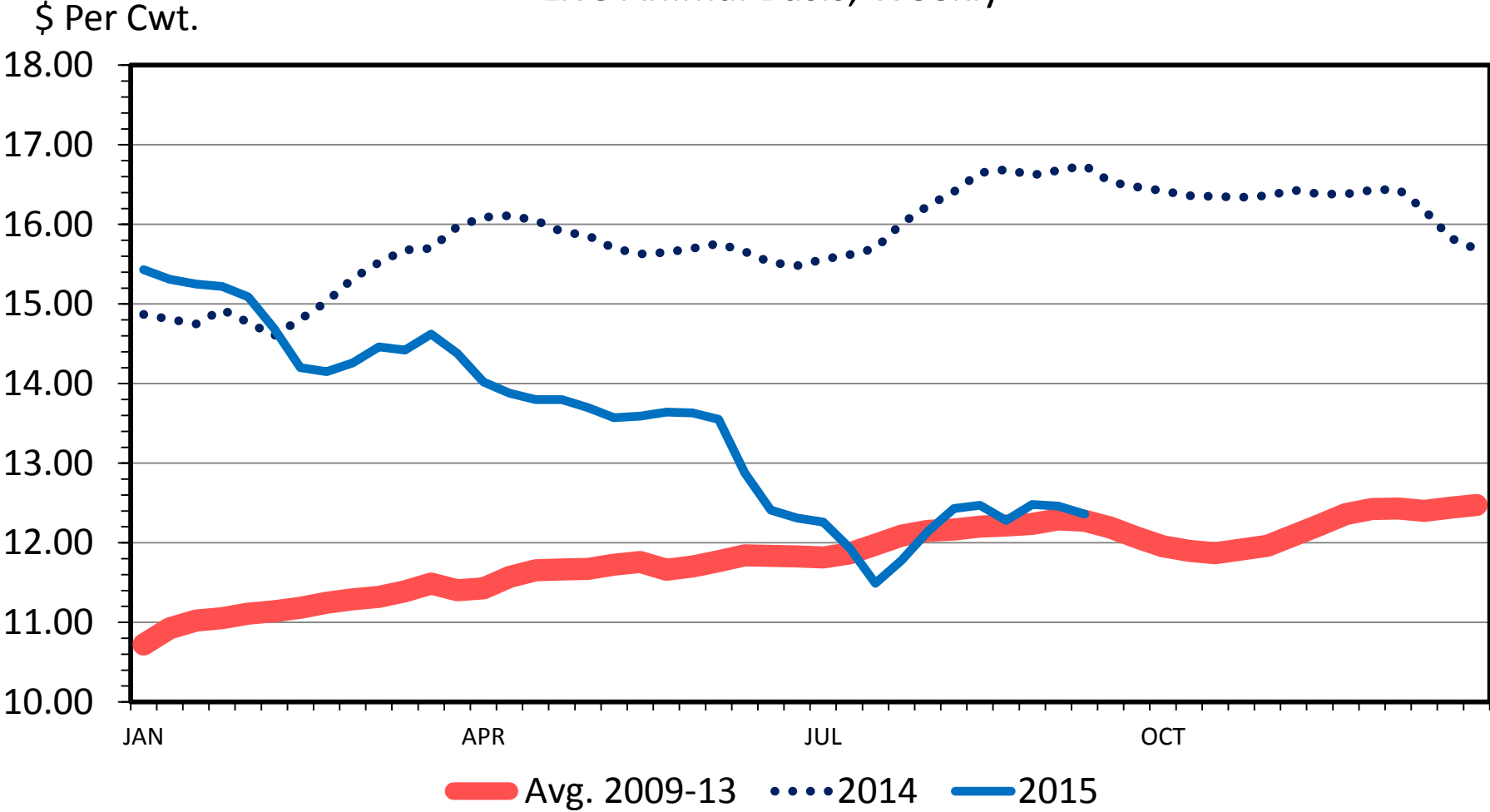
As a Percentage of Production, Carcass Weight, Annual

Percent



STEER HIDE AND OFFAL VALUE

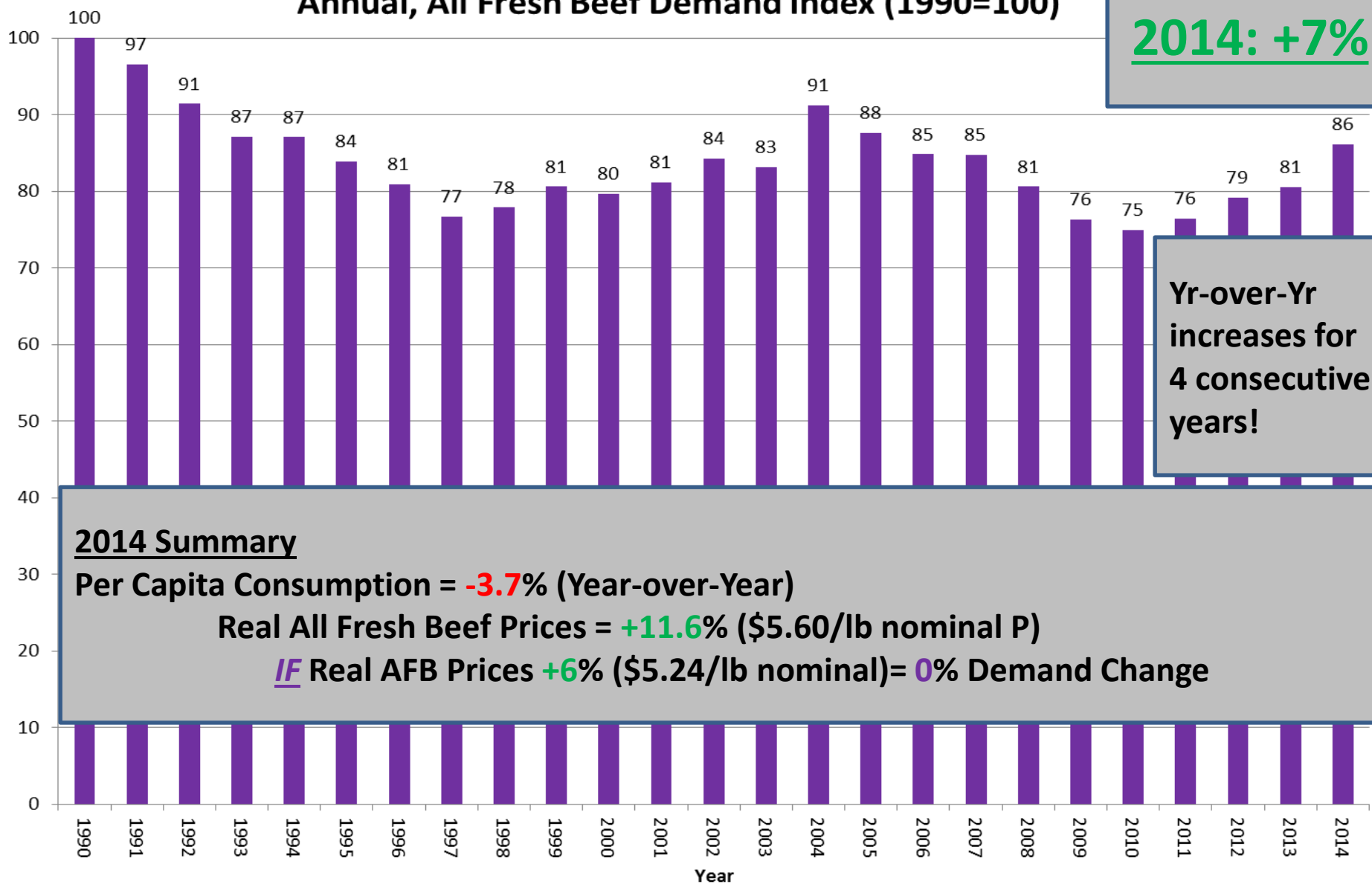
Live Animal Basis, Weekly



Annual, All Fresh Beef Demand Index (1990=100)

2014: +7%

Demand Index (1990=100)

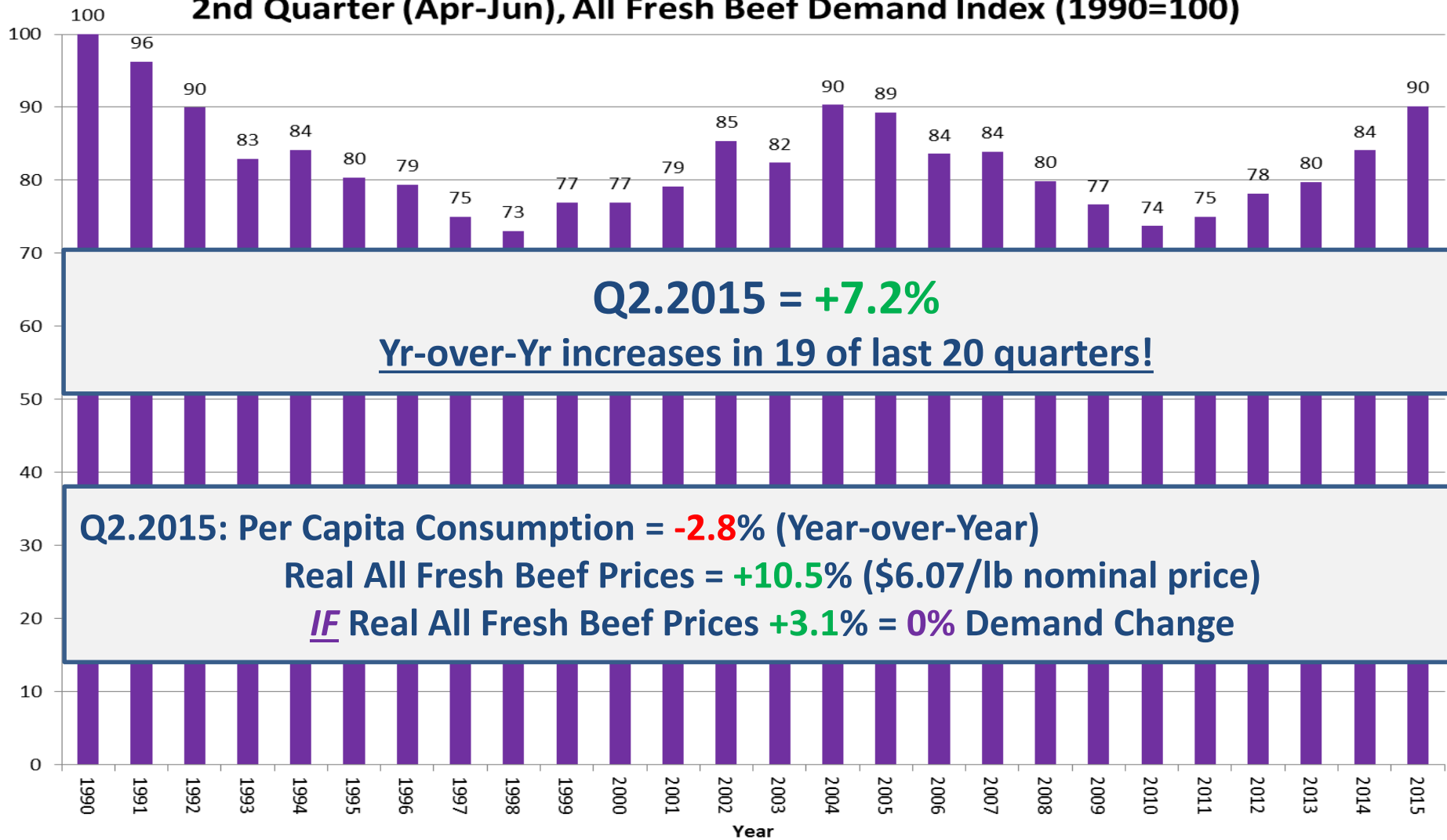


Yr-over-Yr increases for 4 consecutive years!

2014 Summary
 Per Capita Consumption = **-3.7%** (Year-over-Year)
 Real All Fresh Beef Prices = **+11.6%** (\$5.60/lb nominal P)
IF Real AFB Prices **+6%** (\$5.24/lb nominal) = **0%** Demand Change

Source: Glynn T. Tonsor, Kansas State University, Jan. 2015

2nd Quarter (Apr-Jun), All Fresh Beef Demand Index (1990=100)



Source: Glynn T. Tonsor, Kansas State University, July 2015

<http://www.agmanager.info/livestock/marketing/Beef%20Demand/default.asp>

2015 (To-Date) vs. 2014 Retail Prices

	All			
Old Series	Fresh Retail	Pork Retail	Broiler Retail	Turkey Retail
Beef	Beef	Price	Price	Price
2015				
Q1	602.1	393.5	154.7	147.6
Q2	606.5	372.3	151.2	151.8
Q3 thru Aug	612.3	380.2	145.8	155.7
2014				
Q1	522.1	377.2	152.6	171.5
Q2	548.5	405.5	153.0	160.6
Q3 thru Aug	567.5	416.4	153.4	162.3
2015 vs. 2014 (\$/cwt)				
Q1	80.1	16.3	2.1	-23.9
Q2	58.0	-33.2	-1.7	-8.8
Q3 thru Aug	44.9	-36.2	-7.6	-6.6
2015 vs. 2014 (%)				
Q1	15%	4%	1%	-14%
Q2	11%	-8%	-1%	-5%
Q3 thru Aug	8%	-9%	-5%	-4%

Source: USDA/ERS

Take-Home Summary Points

- Industry has passed tipping point on role of tight supplies
- **Demand's role will become clearer going forward**
 - http://www.agmanager.info/livestock/marketing/Beef%20Demand/BeefDemand_08-28-15.pdf
- Identifying & acting upon comparative advantage will increasingly be key!

More information available at:



This presentation will be available in PDF format at:

<http://www.agmanager.info/about/contributors/individual/tonsor.asp>

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New Pen Construction

CONSIDERATIONS, REQUIREMENTS AND COSTS

Considerations

- KDHE, regulatory requirements
- Existing Structure
 - Have a place for demolished buildings and materials
 - Necessary adjustments to meet future needs and requirements for new construction
- Expansion according to scale, for one truck load
 - Larger mixer wagon
- Water source
- Pen cleaning and maintenance
 - Ability to access pens with machinery
- Embankment stabilization
 - Spread top soil, seeds, mulching
- Budget
- Weather Delay



Requirements

Run off regulations

Environmental survey

• Will Boyer-KSU extension

Equipment-demolition equipment, surveying instruments, dirt moving machinery (skid steer, grader, compaction, scraper, backhoe/excavator for pipelines), concrete tools (chop saw, hand tools, screed, rebar, forms, form pins)

Utilities-electric and water

Materials-concrete, pipe, sucker rod, waterers, feed bunks, gravel, conduit, wiring, outlets, power supply, breaker panel, waterline, valves, utility access housing



Site Preparation

Preparing for concrete, surveying, pack and level ground

Costs

12,000 square feet of pen space

Surveying-\$180

Dirt grading-\$2,000

Pipe/steel-\$6,000

Concrete-\$3,000

Labor-\$18,000

Equipment-\$5,000

Bunks-\$5,984

Total=\$47,394

Welding materials-\$1,020

Waterers (8)-\$3,000

Electric-\$2,000

Waterline (PVC)-\$1,000

Fuel-\$1,210

• \$2.35/gal



Pouring Concrete
Culverts, setting posts

Dealing With Old World Bluestem

Walter H. Fick
Department of Agronomy
Kansas State University

Outline of presentation

- Native bluestems
- Old World Bluestems
- Previous research
- Ongoing research
- Control options

Big Bluestem (*Andropogon gerardii*)



Little Bluestem (*Schizachyrium scoparium*)



Silver bluestem (*Bothriochloa laguroides*)



- Native, warm-season, perennial bunchgrass
- 2-4 ft tall
- Silver-colored seedheads
- Crooked stems
- Nodes with flattened hairs
- Also called silver beardgrass

Old World Bluestems

- Caucasian bluestem (*Bothriochloa bladhii*)
- Yellow OWB (*Bothriochloa ischaemum*)

Planted in central and southern Great Plains

- Ease of establishment
- Production potential
- Available seed
- Cost

Caucasian bluestem (*Bothriochloa bladhii*)



Photo by Mike Haddock

- Introduced South Asia and Australia
- 2-3 ft tall
- Stems glabrous
- Usually with long hair at base of leaf blade
- Leaves smell like terpinene when crushed
- Also called Australian bluestem

Yellow bluestem (*Bothriochloa ischaemum*)

- Introduced from China, Africa, Eurasia, Mediterranean
- Up to 3 ft tall
- Stems decumbent at base, grooved on one side, glabrous to short-hairy at nodes
- Also called King Ranch Bluestem, Turkestan Bluestem
- Major identifying characteristic is digitate inflorescence

Characteristics of Old World Bluestems

- More abundant on heavy textured soils
- Reproduces by seed and roots
- Invades disturbed areas, waste ground abandoned fields, roadsides, and pastures
- Less palatable than most native grasses

Comparison of seedheads

Silver bluestem



Photo by Mike Haddock

Caucasian bluestem



Photo by Mike Haddock

Yellow bluestem



Previous Research

- Medlin et al. 1998. Weed Tech.12:286-292
 - glyphosate < 72% control yellow OWB
 - disk and plow 87-100% control
- Harmony et al. 2004. Weed Tech. 18:545-550 (single applications at V4 stage)
 - 9 WAT: 3 lbs/acre glyphosate 94% control; 1.25 lbs/acre imazapyr 100% control yellow OWB
 - 1 YAT: OWB frequency 8-25% in imazapyr-treated plots; 93-95% frequency in glyphosate treatment

Previous Research

- Harmony et al. 2007. Weed Tech. 21:573-577
 - Two applications: 4-5 leaf stage and 8 weeks later
 - 1 lbs/acre glyphosate at each application only treatment to reduce frequency and tiller density; 0.25 lbs/acre imazapyr at each application also reduced frequency of Caucasian bluestem 1 YAT
 - Both herbicides also controlled remnant native vegetation on plots



Objectives

- Determine the efficacy of glyphosate and imazapyr for control of Caucasian bluestem
- Determine the impact of these herbicides on associated species

Caucasian bluestem at 4-5 leaf stage



**% Control of Caucasian Bluestem
June 1, 2006**

Herbicide	Rate (lbs/A)	4 MAT	1 YAT
Glyphosate	2	42	76
Glyphosate	3	75	94
Glyphosate	4	66	77
Imazapyr	1	99	99
Imazapyr	1.25	100	96
Check	--	0	1

LSD_{0.05} = 17 20

3 lbs/acre Glyphosate – 4 days after treatment



3 lbs/acre Glyphosate – 4 months after treatment



3 lbs/acre Glyphosate – 1 year after treatment



**% Control of Caucasian Bluestem
June 5, 2007**

Herbicide	Rate (lbs/A)	4 MAT	1 YAT
Glyphosate	2	91	88
Glyphosate	3	96	97
Glyphosate	4	96	93
Imazapyr	1	100	99
Imazapyr	1.25	99	100
Check	--	0	4

LSD_{0.05} = 4 8

1 lbs/acre Imazapyr – 4 months after treatment



1 lbs/acre Imazapyr – 1 year after treatment



**Warm-season grass response (% change)
to herbicides applied June 1, 2006**

Herbicide	Rate (lbs/A)	4 MAT	1 YAT
Glyphosate	2	-100	-93
Glyphosate	3	-100	-100
Glyphosate	4	-100	-99
Imazapyr	1	-62	-32
Imazapyr	1.25	-22	+10
Check	--	-35	+15

LSD_{0.05} = 59 83

**Warm-season grass response (% change)
to herbicides applied June 5, 2007**

Herbicide	Rate (lbs/A)	4 MAT	1 YAT
Glyphosate	2	-100	-99
Glyphosate	3	-100	-100
Glyphosate	4	-100	-100
Imazapyr	1	-29	-21
Imazapyr	1.25	-74	-78
Check	--	+23	-43

LSD_{0.05} = 48 35

Remnant native grass 4 MAT with Imazapyr



Summary (Fick, 2009)

- Caucasian bluestem control - 2006
 - Imazapyr provided nearly 100% control and glyphosate 42-75% control 4 MAT
 - Glyphosate at 2 lbs/acre provided only 76% control 12 MAT
- Caucasian bluestem control – 2007
 - All treatments provided > 88% control 4 and 12 MAT

Summary (Fick, 2009)

- Warm-season grass response
 - Native w-s grasses were negatively impacted by all treatments in both years, but were more tolerant to imazapyr

Ropewick Study by Keith Harmony at Hays, KS

- 50:50 mixture of glyphosate with water
- Spray 2 lbs/acre broadcast
- Applied at head emergence

	Y1	Y2	Y3
Ropewick, 1 pass	31	69	65
Ropewick, 2 pass	64	91	91
Spray	93	99	98

Fire/Mowing plus herbicides for control of Old World Bluestem (Robertson, 2009 Oklahoma St. Univ.)

- Used single, double, or triple applications of glyphosate with and without mowing or burning
- Burning or mowing prior to a single herbicide application improved OWB control compared to herbicide alone
- Burning or mowing with 2 herbicide applications provided control similar to triple herbicide application

Chase County – June 13, 2014



Chase County – July 15, 2014 (0.25 lb/A Imazapyr)



Chase County – 2014

(% Composition after treatment with imazapyr)

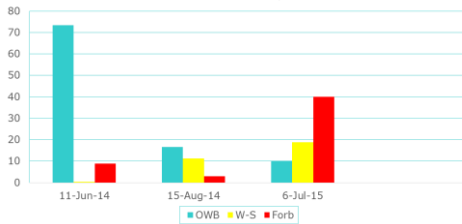
Category	June 15	August 15	September 15
OWB	47	20	5
Warm-season	24	41	67
Cool-season	1	7	7
Forbs	28	31	21
Bare ground	10	16	21
Litter	1	22	29

Chase County – September 15, 2014

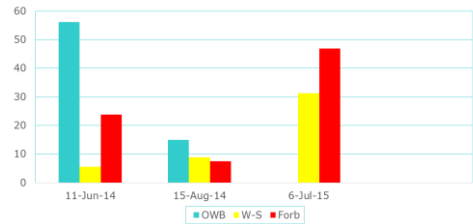
(1 or 2 applications of 0.25 lb/A imazapyr)



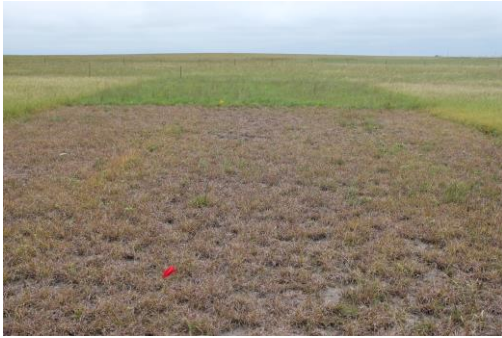
Vegetative Cover With 0.25 lbs Arsenal Chase County



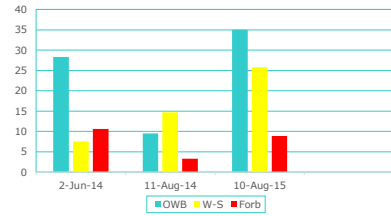
Vegetative Cover With 0.25 lbs Arsenal Applied Twice Chase County



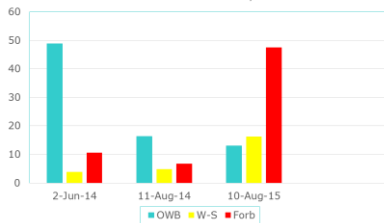
Greenwood County – September 12, 2014
(1 or 2 applications of 0.25 lb/A Imazapyr)



Vegetative Cover With 0.25 lbs Arsenal
Greenwood County



Vegetative Cover With 0.25 lbs Arsenal Applied Twice
Greenwood County



Chase County – 2014 Rate Study
(% composition after treatment with imazapyr – September 15)

Category	0	0.25	0.5	0.75	1
OWB	56	12	4	12	2
Warm-season	28	69	87	77	88
Cool-season	5	6	6	5	6
Forbs	11	13	3	6	4
Bare ground	11	12	16	20	18
Litter	10	11	16	25	24

Chase County – 0.25# Imazapyr 3 MAT



Chase County – 0.5# Imazapyr 3 MAT



Chase County – 0.75# Imazapyr 3 MAT



Chase County – 1.0# Imazapyr 3 MAT



**Chase County – 2014 Rate Study (0-1 lb/acre imazapyr)
(% cover 1 year after treatment)**

Category	0	0.25	0.5	0.75	1
Old World Bluestem	30	10	8	13	4
Warm-season grass	19	30	41	30	35
Cool-season grass	1	5	4	2	2
Forbs	21	16	18	22	20
Bare ground	14	21	18	30	28
Litter	3	3	2	2	2

Old World Bluestem in Riley County



**Riley County – 2014 Rate Study (0-1 lb/acre imazapyr)
(% cover 1 year after treatment)**

Category	0	0.25	0.5	0.75	1
Old World Bluestem	44	27	23	12	1
Warm-season grass	7	8	3	7	2
Cool-season grass	3	5	2	3	6
Forbs	28	37	43	44	43
Bare ground	9	23	39	44	52
Litter	12	3	6	4	8

Old World Bluestem Control Options

- Spot treatment with glyphosate
- Wiping or wicking glyphosate
- Tillage and planting Roundup Ready crop
- Burn or mow prior to herbicide application
- Imazapyr treatment



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