2018 EVALUATION OF BEEF CHECKOFF PROGRAMS
A REPORT FROM THE CHECKOFF EVALUATION ADVISORY COMMITTEE
MAKING SMART INVESTMENTS TO GROW THE BEEF INDUSTRY
The Cattlemen’s Beef Promotion & Research Board (CBB) is dedicated to improving producer profitability, expanding consumer demand for beef, and strengthening beef’s position in the marketplace. To fulfill this mission, CBB collects checkoff dollars from producers which are used to increase and protect the demand for beef through export growth, building consumer trust, driving beef to being the number one preferred protein, and improving the overall business climate for the industry. Specifically, CBB funds Authorization Requests that are intended to drive the mission forward to achieving the beef industry’s goals. The Evaluation Committee determines how effective checkoff-funded programs have been at achieving measurable objectives stated in the Authorization Requests (ARs) approved by the Beef Promotion Operating Committee. This report provides that evaluation.

Specifically, the goals of this report are to determine:

• How well did contractors perform against the goals of the ARs they were awarded?

• What roles did each AR play in driving current and future demand for beef?

• How were materials developed in ARs used by state beef organizations (Qualified State Beef Councils) to leverage national expenditures at the state level?

• What was learned this year that can help guide future funding decisions by the Operating Committee?
Authorization Requests Included

Within each of the six areas of funding, here are the contractors whose work is evaluated in this report:

**Promotion**
- National Cattlemen’s Beef Association (NCBA)
- North American Meat Institute (NAMI), for both veal and processed beef

**Research**
- National Cattlemen’s Beef Association (NCBA)
- North American Meat Institute (NAMI)

**Consumer Information**
- American Farm Bureau Foundation for Agriculture (AFBFA)
- Meat Importers Council of America (MICA)
- National Cattlemen’s Beef Association (NCBA)

**Industry Information**
- National Cattlemen’s Beef Association (NCBA)
- National Livestock Producers Association (NLPA)
- North American Meat Institute (NAMI)

**Foreign Marketing**
- United States Meat Export Federation (USMEF, as a subcontractor to NCBA)

**Producer Communications**
- Cattlemen’s Beef Board (CBB): Note that while CBB is the contractor here to ensure communications back to producers of how their dollars are used is most effective, most of this work is done by external agencies. And, the team preparing this evaluation report is different and separate than the one overseeing the producer communications agencies.
Each individual program-evaluation summary includes:

• An overview of performance against each program tactic; contractor remarks for all objectives
• A brief evaluation summary of program evolution, highlights and PEM results, if applicable
• Graphic representation of QSBC feedback about programs that state councils used during the fiscal year
• Delivery of the Performance Efficiency Measures of how many consumers had the opportunity to view checkoff-funded messages (Reach), how many consumers took an action through likes, shares, comments, retweets, etc. with the content (Engagement), and the number of influencers or key opinion leaders (KOL) the program had validated contact with to extend checkoff messages (Voice or KOL).
• Key learnings that will benefit the checkoff program in the future

Evaluations are presented first by AR, then by each program committee area. The first approach is intended to help inform future Operating Committee decisions, while the second is to help facilitate the work of the five program committees and one working group who establish funding priorities – Investor Relations, Consumer Trust, Export Growth, Innovation, Nutrition and Health, and Safety

**DISCLAIMER:** the majority of information provided here comes from the contractors themselves. This should not be considered a thorough review and evaluation of the results, but instead primarily a summary report from contractors that has been reviewed by CBB staff and an external consultant.
**2018 ARs**

**BY THE NUMBERS**

- **13 ARs**
- **66 Committee-Specific Tactics**
- **$29.8M Total Spent**

**PROGRESS TOWARD GOALS**

- **115 Program Objectives Met**
- **7 Program Objectives Still in Progress**
- **91 Program Objectives Exceeded**
- **5 Program Objectives Not Achieved**

**JANUARY 2018 PRODUCER ATTITUDES:**

- **43%** have seen, read or heard of check-off, down from **60%** in 2015
- **76%** agree check-off contributes to consumer demand, down from **81%** in 2015
- **61%** believe check-off is managed well, down from **66%** in 2015

**Essential uses of check-off funds (5 on a 5-point scale):**
- Advertising/promotion: 53%
- Promotion outside U.S.: 56%
- Response to misinformation: 59%
- Build consumer confidence: 60%
- Research: 33%
- Producer communications: 31%

**Q4, FY18 CONSUMER ATTITUDES**

- **66%** Positive Perception of beef
- Weekly consumption stable at **69%**
- **37%** Positive Perception of how cattle are raised vs. 23% negative

**Consumers say taste is top reason to eat beef, health is top reason to not eat beef**
<table>
<thead>
<tr>
<th>AR Number</th>
<th>Authorization Request Name</th>
<th>Amount Resourced</th>
<th>Amount Executed as of 11/30/18</th>
<th>Percent Executed</th>
<th>Current Project End Date</th>
<th>Total Number of Program Objectives</th>
<th>Program Objectives Exceeded</th>
<th>Program Objectives Achieved</th>
<th>Program Objectives Not Achieved</th>
<th>Program Objectives in Progress</th>
<th>Total QSBC Surveys Received for AR out of 42 Total</th>
<th>QSBCs would recommend to another QSBC</th>
<th>QSBCs say work is improving</th>
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</thead>
<tbody>
<tr>
<td>1800-P</td>
<td>Promotion (NCBA)</td>
<td>$9,300,000</td>
<td>$7,791,331</td>
<td>83.7%</td>
<td>9/30/19</td>
<td>7</td>
<td>3</td>
<td>3</td>
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<td>38</td>
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<td>81%</td>
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<td>1801-P</td>
<td>Processed Beef Promotion (NAMI)</td>
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<td>9/30/18</td>
<td>15</td>
<td>11</td>
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<td>Veal Promotion (NAMI)</td>
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<td>9/30/18</td>
<td>19</td>
<td>6</td>
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<td>1810-R</td>
<td>Research (NCBA)</td>
<td>$8,350,000</td>
<td>$5,582,468</td>
<td>66.8%</td>
<td>9/30/20</td>
<td>19</td>
<td>9</td>
<td>6</td>
<td>0</td>
<td>4</td>
<td>29</td>
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<td>1811-R</td>
<td>Post-Harvest Beef Safety Research (NAMI)</td>
<td>$500,000</td>
<td>$229,634</td>
<td>45.9%</td>
<td>9/30/19</td>
<td>2</td>
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<td>1820-CI</td>
<td>Consumer Information (AFBFA)</td>
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<td>Northeast Consumer Information (MICA)</td>
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<td>9/30/18</td>
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<td>9/30/19</td>
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<td>82%</td>
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<td>Industry Information (NCBA)</td>
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<td>78%</td>
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<td>100%</td>
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<td>N/A</td>
<td>N/A</td>
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<td>9/30/18</td>
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<td>1</td>
<td>100%</td>
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<tr>
<td>1840-FM</td>
<td>Foreign Marketing (USMEF, subcontractor to NCBA)</td>
<td>$7,360,919</td>
<td>$5,525,429</td>
<td>75%</td>
<td>9/30/18</td>
<td>84</td>
<td>24</td>
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<td>23</td>
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<td>Producer Communications (CBB)</td>
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<td>9/30/18</td>
<td>4</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>25</td>
<td>36%</td>
<td>36%</td>
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</tbody>
</table>
**Key Learnings**

The biggest challenge in executing this AR was the navigation through the ever-changing world of social media.

The state and national partnership between NCBA, as a contractor to the beef checkoff, and the Federation of State Beef Councils helped leverage checkoff dollars. This was achieved through the development of content and assets to be extended at the state level in their local marketing efforts. The effort also included providing states ready-to-use video content, and planning and execution of YouTube and paid Google search campaigns.

Social media changes daily both positively and negatively including when Chloe Kim, an Olympic snowboarder said that she wanted to eat a burger after winning her gold medal.

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**Accomplishments & Results**

- Developed a multi-faceted story about beef focused on taste, people and production process, cooking beef, and nutritional strength.
- A new creative platform under ‘Nicely done, beef’ which included ‘Nicely done, beef. You prove that meat substitutes are just that – substitutes,’ and ‘Nicely done, beef. You keep the land optimized and fertilized.
- Talked about the people behind Beef. It’s What’s For Dinner. – the farmers, ranchers, feedyard operators, packing plant workers and retailers – who ultimately bring beef from pasture to plate including a series of videos, challenging consumers to Rethink the Ranch.
- Season 10 of NBC’s American Ninja Warrior communicated messages about the people who raise beef, and how beef is a food for strength, on broadcast television, as Idaho cattle producer and seasoned cowboy ninja Lance Pekus competed on the popular program, with more than 6 million viewers per episode on NBC.

The brand relaunch, with more than 160 million consumer touchpoints this year, included:

- Nearly 60 million video views this year, including:
  - Lance Pekus videos – 15+ million video views
  - Nicely Done videos – 33+ million video views
  - Rethink the Ranch videos – 10+ million video views
- 11+ million website visitors this year – 96% increase year-over-year
- 7,000+ Google keywords associated with beef running constantly
- 18 state beef council logo re-designs that more closely align with the Beef. It’s What’s For Dinner. Brand.
QSBC Ratings

QSBCs use AR materials (yes/no): 38/4

Considered a “go to” resource
8.6 out of 10

Improves state programs
8.3 out of 10

How do QSBC extend the AR results?
Extend all AR messaging and creative through multiple channels including video, social media, and websites

Would recommend to another QSBCs:
Yes (8-10): 83.3%
No (1-4): 11.1%
Maybe (5-7): 5.6%

AR work is improving:
Agree (8-10): 80.6%
No (1-4): 16.6%
Maybe (5-7): 2.8%
**Purpose:** This was the first year for an Authorization Request strictly devoted to promoting prepared beef products. This included specific promotions and outreach efforts with KOLs in the Registered Dietician and health practitioner communities, providing scientific evidence to refute much of the misinformation concerning processed beef products.

**Accomplishments & Results**

The impact of this AR can best be summed up by a message from an official of a major processed beef manufacturer. “The Institute’s efforts in support of beef bologna had a measurable impact on demand for our beef bologna products and proved that effective communication and promotion translates into meaningful demand growth.” Specific activities included:

- A National Bologna Day social Promotion was completed in October (Achieved over 25 million impressions).
- A December Bologna promotion was conducted with the NFL’s Jacksonville Jaguars that resulted in 400 media stories generating 350 million impressions. The promotion was covered in many national outlets including ESPN, Fox Sports, CBS Sports, NBC Sports, Associated Press and USA Today.
- The Beefshi promotion achieved a reach more than 9.9 million.
- The National Deli-Meat Month promotion achieved a reach of over 11.7 million.
- National Pastrami Day promotion achieved a reach of over 23.7 million.
- The Kid Pleaser promotion was distributed on line and through Family Features (achieved 126 print placements, more than 308 million reach and 1.5 million engagements to date).
- The Jerky Day promotion achieved over 8.5 million reach and 2.1 million engagements.
- The Beef Up the Lunch Box campaign, including videos, recipes and photos achieved over 8.0 million reach and over 159 thousand engagements.

**Key Learnings**

Education and outreach to KOLs must be a key component of this AR going forward. There are also a number of serious macro-market threats to processed beef consumption including:

- Progressive impact of negative media
- Millennials do not have a strong emotional attachment to processed meats
- A considerable negative connotation of the name “processed meats.”
- Concern that these meats have a negative impact on health because of belief that they are high in sodium, nitrites, nitrates, coloring agents, fillers and other unknown ingredients.
- Controversy based on weak and inconsistent data that prepared meat products are linked to cancer.
QSBC Ratings

QSBCs use AR materials (yes/no): 8/33

Considered a “go to” resource – 6.4 out of 10

Improves state programs – 6.3 out of 10

How do QSBC extend the AR results – limited, Beefshing program, International Chef Seminar

Would recommend to another QSBCs:
Yes (8-10): 50.0%
No (1-4) 37.5%
Maybe (5-7): 12.5%

AR work is improving:
Agree (8-10): 37.5%
No (1-4): 25%
Maybe (5-7): 37.5%
**Purpose:** This AR creates promotional content for veal including recipes, photography, nutritional marketing messages, cooking videos, social media calendar posts, industry and consumer newsletters and promotions with a heavy emphasis on digital communications and the millennial audience.

**Accomplishments & Results**

The AR built interest in veal among consumers and attacked macro-market barriers such as lack of awareness and understanding of how to prepare veal, restaurants that do not feature veal, limited nationwide distribution at retail supermarkets, and the price point of veal. Specifically,

- 10 new recipes, photography and videos were developed for veal. These recipes provide for appealing and nutritious presentations, are relatively easy to prepare with minimal ingredients, and address the price barrier by using veal as the protein in combination with other ingredients to reduce the overall cost.
- Executed two seasonal promotions: Eat Better Eat Veal and Summer Grilling. The promotions resulted in over 1880 participating retailers and distribution of over 90,000 on-pack recipe labels. Retailer participation increased by 10.5 percent over similar campaigns in fiscal year 2017 and sales 8-12 percent.
- Over 500 registered dietitians/nutritionists (RDs) were reached via eblasts with veal nutritional information, new recipes, photography and videos. Thirty-six Culinary Schools were reached on a quarterly basis via eblasts with veal recipes, nutritional information and how-to videos.
- The fifth annual Veal Summit was conducted in April 2018 and attended by producers, packers, processors, distributors, retailers, food service operators, nutritionists and State Beef Council partners.
- The four year partnership with The Mushroom Council provided funding and extended veal’s reach and engagement through social media properties and email deployment.
QSBC Ratings

QSBCs use AR materials (yes/no): 4/37

Considered a “go to” resource – 5.7 out of 10

Improves state programs – 5.3 out of 10

How do QSBC extend the AR results – use veal messages and work with local producers

Would recommend to another QSBCs:
Yes (8-10): 75%
No (1-4): 0%
Maybe (5-7): 25%

AR work is improving:
Agree (8-10): 50%
No (1-4): 0%
Maybe (5-7): 50%

TOTAL PEM RESULTS

- Voice:
  - Goal: 5,920
  - Actual: 12,261

- Reach:
  - Goal: 1.6 MM
  - Actual: 20.5 MM

- Engagement:
  - Goal: 269 K
  - Actual: 829 K

HAVE YOU HEARD WHAT THEY ARE SAYING ABOUT VEAL TODAY?

“It’s OK to Eat Veal (and Not Feel Bad About It)”

Portland Press Herald

Veal can be the green meat to eat

The industry has long played the part of the villain, but more and more small farms are demonstrating that veal calves can be raised humanely.
Purpose: This AR focused on gathering, analyzing and sharing consumer and influencer behaviors and attitudes specific to beef and competing proteins. These insights supported a number of checkoff program efforts ensuring decisions used in the development of beef demand driving efforts were supported by sound data, resulting in the most efficient use of checkoff resources (e.g., checkoff website consolidation-ongoing usability assessments, Rethink the Ranch video/promotion, relaunch of BIWFD, Nicely Done video development, taste/strength/responsible campaign development and tracking, etc.). This AR also includes foundational research to more directly drive beef demand and/or make beef the number one protein such as nutrition research on the Mediterranean diet.

Accomplishments & Results

- Revision and considerable enhancement of the consumer beef tracker to inform key checkoff programming decisions. Key improvements include continuous (weekly) surveying and a blended panel approach.
- Development of a comprehensive beef consumer segmentation of consumers into very definable groups based on lifestyle behaviors, psychographics and other defining attributes to enhance the efficiency of effectively developing impactful consumer messages.
- A meat substitute analysis about the market share of these products to develop a strategic perspective on how they should be considered.
- Market research for the Nicely Done ads/commercials and Lance Pekus (Ninja Warrior) video.
- Pre-harvest Beef Safety Research shared with more than 140 food safety professionals at the International Assoc. Food Protection annual meeting in Salt Lake City, Utah, in a session titled “Antimicrobial Resistance: Current Knowledge and Steps Toward Understanding the Relative Role of Food and Other Resistance Sources.”
- A new publication discussing beef’s role in a healthy, sustainable diet in the July/August 2018 issue of Nutrition Today that had 4,310 full text views and 205 pdf downloads. The publication reported: “it ranks in the 99th percentile for journal articles of a similar age.”
- To increase cutout value by separating the rib/chuck between the 4th and 5th ribs, the fact sheet, “Quality Impacts When Changing the Forequarter Break Point,” explores the complexities and impacts of differing forequarter breakpoints.
- Chefs from National Cattlemen’s Beef Association partnered with the Research Chefs Association (RCA) to host a webinar for 70 attendees on new beef cuts including Sirloin Bavette, Petite Tender, Coulotte, and Tri-Tip, to give customers more beef dish choices.
Learnings: Key learnings include insights gained via the development of the enhanced consumer beef tracker through improved sample management and survey-execution that benefit Promotion, Research and Consumer Information ARs. Another evolution has been our ability to bring smaller studies in house using the products that have become more available in recent years (e.g., Toluna’s survey/panel platform).

A priority area had to be eliminated from the AR when budgets were reduced. For example, pre-harvest research on *Salmonella* reduction had to be eliminated (6A) as well as cancer research (2A) with reduced budgets.

QSBC Ratings

QSBCs use AR materials (yes/no): 29/11

Considered a “go to” resource – 8.7 out of 10

Improves state programs – 8.6 out of 10

How do QSBC extend the AR results – research shared widely, extend to events, food seminars, health professional outreach

Would recommend to another QSBCs:
Yes (8-10): 86.2%
No (1-4): 10.3%
Maybe (5-7): 3.5%

AR work is improving:
Agree (8-10): 79.3%
No (1-4): 10.3%
Maybe (5-7): 10.4%

*PEM does not apply to Research ARs*
**Key Learnings**

Post-harvest beef safety research ensures scientifically proven best practices for pathogenic intervention with in-plant food safety professionals. FSIS sampling results show a reduction in the prevalence of Shiga toxin-producing *Escherichia coli* (STEC) O157:H7 contamination in ground beef and raw materials. The threat posed by pathogens is not static, rather it is constantly emerging and antimicrobial interventions and other process controls must be constantly upgraded to address these emerging threats.

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**Accomplishments & Results**

The primary accomplishment of this AR in fiscal year 2018 was continuing to build the body of science available to meat packers, processors and others in the marketing chain to ensure the safety of the beef products they produce. The return is the reduced prevalence of pathogenic contamination in beef raw materials and ground beef over the past five years:

- A reduction of 52 percent (from 0.19 percent in 2012 to 0.09 percent positive in 2018) for ground beef.
- A reduction of 62 percent (from 1.48 percent to 0.56 percent positive in 2018) for ground beef raw materials.

Also, active outreach with food safety professionals was undertaken:

- Two sessions were presented at the Pathogen Control in Beef Processing Conference (September 5-6, 2018) in Chicago.
- Checkoff-funded research shared at two sessions at the International Association of Food Protection Conference and Beef Safety Summit.
- Research findings were shared through the FMPRE newsletter. The newsletter was received by 1492 recipients with an open rate of 39.2 percent.
A list of research studies and research organizations supported through this AR may found in its appendix and year-end report.

**QSBC Ratings**

QSBCs use AR materials (yes/no): 6/34

Considered a “go to” resource – 8.8 out of 10

Improves state programs – 8.4 out of 10

How do QSBC extend the AR results – provide research to processors and producers in states

Would recommend to another QSBCs:
Yes (8-10): 83.3%
No (1-4): 0%
Maybe (5-7): 16.7%

AR work is improving:
Agree (8-10): 83.3%
No (1-4): 0%
Maybe (5-7): 16.7%

*PEM* does not apply to Research ARs
Purpose: This AR funded two types of On The Farm events focused on Science, Technology, Engineering, and Math (STEM), and Health. Each highlighted the principles and processes imbedded in the beef industry specific to STEM and Health education. Three events were held, two STEM and one Health, that targeted district curriculum coordinators, educational organization leaders, university teacher educators, extension educators, etc. On The Farm STEM events were held in Texas and Oregon with a combined 75 influencers with the potential reach of over 20,000 teachers and 3.8 million students.

Accomplishments and Results

Pre and post assessments administered to On The Farm participants indicate the following changes in perception after attending the event:

a. **51.4%** increase in response that the “positives strongly outweigh the negatives of how cattle are raised”.
   i. Pre-event to Post-event: 34% to 81.5% = +46.87% (STEM)
   ii. Pre-event to Post-event: 23% to 78.9% = +55.87% (Health)

b. **44.9%** decrease in those concerned with antibiotic use in beef production.
   i. Pre-event to Post-event: 65.34% to 17.46% = -47.88% (STEM)
   ii. Pre-event to Post-event: 76.93% to 35% = -41.92% (Health)

c. **42.7%** increase in those that agree/strongly agree that the “beef industry openly shares information”.
   i. Pre-event to Post-event: 50.67% to 85.72% = +35.05% (STEM)
   ii. Pre-event to Post-event: 34.62% to 85% = +50.38% (Health)

d. **27%** increase in those who plan to eat more beef than they currently do, after attending an event.
   i. Collected Post-event data only

Key Learnings

Immersive experiences, focused on purposeful content for the desired target audience, like the On The Farm STEM and Health events, change perception of the industry positively. For example, four months after the On The Farm experiences, participants were given the option to request additional True Beef DVDs, produced and owned by the Texas Beef Council, and Beef Ag Mags, produced and owned by the American Farm Bureau Foundation for Agriculture, to distribute to educators they influence. 195 True Beef DVDs and 1,830 Beef Ag Mags were sent for distribution.
QSBC Ratings

QSBCs use AR materials (yes/no): 9/30
Considered a “go to” resource – 6.7 out of 10
Improves state programs – 6.4 out of 10

How do QSBC extend the AR results –
Educator/influencer outreach, STEM events, teachers

Would recommend to another QSBCs:
Yes (8-10): 66.3%
No (1-4): 11.1%
Maybe (5-7): 22.2%

AR work is improving:
Agree (8-10): 66.3%
No (1-4): 22.2%
Maybe (5-7): 11.1%

TOTAL PEM RESULTS
- Voice:
  - Goal: 1,555
  - Actual: 4,804
- Reach:
  - Goal: 265.1 K
  - Actual: 1,612.2 K
- Engagement:
  - Goal: 11.8 K
  - Actual: 57 K
Purpose: AR programming positioned beef as the number one protein in the diet among our Northeast consumers and influencers by expanding the reach and engagement of nationally-developed Beef Checkoff content and messaging to new consumer and influencer audiences through both consumer events and education regarding veal production. The northeast is a unique region, home to nearly 23% of our nation’s population and housing four of the top ten metro cities in the U.S. But, there are only 3 active state beef councils in this 13-state region.

Accomplishments & Results

The primary program goal is education surrounding beef; in all facets, such as cookery, nutritional claims and beef production. This year, across 8 different consumer-focused events/programs this AR generated 12.4 million impressions and over 1.8 million engagements, sharing a variety of beef-centric messages at the following events:

- The 4th of July Beef Burger Campaign with East coast online retail giant, Fresh Direct, retailer reported results included beef unit sales increased 217% compared to the same period last year as well as a 14.2% increase in beef unit sales when compared to an identical period length prior to the campaign.

- The East Coast Ibotta beef campaign drove over 43,000 units of beef through the retail channel and enabled 2.8 million beef offer views to take place along with over 139,000 confirmed engagements with Checkoff content.

- Participation in the DC Burger Week ensured the consumption of beef in trendy, urban DC restaurants for the 7-day period and of the restaurants who provided post-campaign metrics, at least 3,740 beef burgers were consumed during the Burger Week timeframe.

The AR also provided foodservice and nutrition influencers with a first-hand look at how veal is raised during the ‘Raising Today’s Veal’ tour hosted in September. Pre-event surveys revealed a 30% negative/neutral opinion about veal and post event surveys concluded a 100% positive opinion.
QSBC Ratings

QSBCs use AR materials (yes/no): 6/33

Considered a “go to” resource: 9.8 out of 10

Improves state programs: 9.7 out of 10

How do QSBC extend the AR results – provide additional funding, social media

Would recommend to another QSBCs:
Yes (8-10): 100%
No (1-4): 0%
Maybe (5-7): 0%

AR work is improving:
Agree (8-10): 100%
No (1-4): 0%
Maybe (5-7): 0%
**Name of Contractor:** NCBA  
**AR #:** 1822-CI  
**Program Manager:** Mandy Carr Johnson, Season Solorio, & Chris Barnes  
**Total Spent (as of 11/30/18):** $5,505,711

**Purpose:** This AR reaches multiple audiences of influencers, supply chain and media to share information about beef ultimately to the consumer. This includes:
- Creating experiences that facilitate first-hand exposure to beef’s benefits
- Training and engagement of key influencers on cooking and healthy meal preparation
- Facilitating long-term relationships with supply chain partners – retail, foodservice, manufacturers, packers, processors and distributors
- Driving media coverage on the benefits of beef

**Accomplishments & Results**

- The Strength Summit, held in September 2018 for 43 top tier nutrition researchers and influencers in San Antonio, TX. The summit reached 812,944 people through social media.
- Worked with American Foods Group the manufacturer that supplies to top US retail supermarkets to develop and help promote a series of five beef meal kits. Year-to-date sales exceed more than 1 million pounds of beef.
- A retail digital pilot test with Instacart that enables shoppers to shop from their local grocery stores and get same day delivery. Based on results to date, each week that there was a beef banner ad on the Instacart site, there was a beef sales increase of $100,000.
- Placed two positive stories in the Wall Street Journal, one focusing on the relaunch of the *Beef. It’s What’s For Dinner.* campaign and the other about how transparency in matters of animal welfare, land stewardship and sustainability meet consumer desire for information about how their food is produced.
- A cooking segment on Fox & Friends leveraging an influencer from tactic 2A capped off a successful earned media campaign about beef in a Mediterranean style diet that yielded 97 million consumer media impressions across multiple platforms.

**Key Learnings**

In today’s environment, pay to play is the name of the game. Often, influencers expect to be paid for helping “promote” your product to consumers and followers. The bigger the reach and influence they have, sometimes the higher the price tag. All of the influencers addressed in this authorization request recognize that they have influence over the consumer in one way or another – and other foods and trade associations also recognize these influencers as well. The cost of influencer engagement is likely to continue to rise and will need to be a budgeting consideration for this AR moving forward.
**QSBC Ratings**

QSBCs use AR materials
(yes/no): 39/1

Considered a “go to” resource – 8.4 out of 10

Improves state programs – 8.2 out of 10

How do QSBC extend the AR results – Strategic partnerships, use content, engage dieticians and other health professionals, outreach to consumers

Would recommend to another QSBCs:
Yes (8-10): 89.5%
No (1-4): 7.9%
Maybe (5-7): 2.6%

AR work is improving:
Agree (8-10): 81.6%
No (1-4): 10.5%
Maybe (5-7): 7.9%

**TOTAL PEM RESULTS**

- **Voice**:
  - Goal: 2,075
  - Actual: 131,905

- **Reach**:
  - Goal: 413 MM
  - Actual: 759.2 MM

- **Engagement**:
  - Goal: 300.4 K
  - Actual: 895.1 K
**Purpose:** This AR covers three program areas related to issues and crisis management, building a core of informed and trained industry advocates, and enhancing beef quality and safety as follows:

**Issues & Crisis Management and Planning (ICMP)** -- This function influences understanding, awareness and attitudes, and allay concerns about, beef when issues and crises emerge that threaten brand and industry reputation.

**Beef Advocacy Training & Engagement (BATE)**– The Masters of Beef Advocacy program develops and equips beef advocates to share their stories and address questions and concerns about beef and raising cattle to drive awareness and acceptance among consumers about the role of beef in a healthy diet and lifestyle.

**Beef Quality Assurance (BQA)** – BQA is a foundational program that connects farm level production practices with beef safety and quality.

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### Accomplishments & Results

**ICMP** – The issues management team handled multiple issues though the year, including the International Agency for Research on Cancer (IARC) report update, the World Cancer Research Fund report and a New York Times antibiotics investigation.

**BATE** – Trained 9,106 advocates and spokespeople at 67 events, workshops and presentations. There are 11,000 MBA alumni at the end of FY 2018.

**BQA** – Increased BQA and BQA equivalent (dairy and youth programs) certifications. Sharing successes and areas for improvement in the industry through continued dissemination of the National Beef Quality Audit. In FY 2018 the program increased verified certifications by 89% year over year. The BQA Transportation (BQAT) training platform was launch with a FY 2018 goal for certifications set at 900 and actual certifications achieved at 1506.

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### Key Learnings

**ICMP** – The NCBA Digital Command Center, an on-site facility equipped with state-of-the-art news and social media monitoring tools and leveraging resources in the Research (AR 1810- R) and Promotion ARs to monitor and compare trends in consumer sentiment related to beef issues and concerns created more timely and efficient responses.

**BATE** – Continue to improve investment in states by introducing State Top Advocate training workshops in partnership with State Beef Councils.

**BQA** – Continue to see increased efficiency of checkoff dollars invested over time with the culmination of new online training and certification modules, a new partnership with the dairy Farmers Assuring Responsible Management program, the collaborative development of the multi-species Youth for the Quality Care of Animals, and the diligent efforts of state BQA coordinators.
**TOTAL PEM RESULTS**

- **Voice:**
  - Goal: 6,650
  - Actual: 37,895

- **Reach:**
  - Goal: 8.1 MM
  - Actual: 8.3 MM

- **Engagement:**
  - Goal: 214.0 K
  - Actual: 483.6 K

**AR work on beef issues and crisis is improving:**
- Agree (8-10): 77.1%
- No (1-4): 14.3%
- Maybe (5-7): 8.6%

**AR work on MBA is improving:**
- Agree (8-10): 74.3%
- No (1-4): 14.3%
- Maybe (5-7): 11.4%

**AR work on BQA is improving:**
- Agree (8-10): 82.9%
- No (1-4): 5.7%
- Maybe (5-7): 8.6%

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**QSBC Ratings**

QSBCs use AR materials (yes/no):
- 35/4

How do QSBC extend the AR results:
- BQA training, MBA resources, extend to state producers

Considered a “go to” resource:
- Issues and Crisis: 8.9 out of 10
- MBA: 8.5 out of 10
- BQA: 8.7 out of 10

Improves state programs:
- Issues and Crisis: 8.6 out of 10
- MBA: 8.3 out of 10
- BQA: 8.7 out of 10

Would recommend to another QSBCs:
- Beef issues and Crisis:
  - Yes (8-10): 85.7%
  - No (1-4): 8.6%
  - Maybe (5-7): 5.7%
- MBA:
  - Yes (8-10): 85.3%
  - No (1-4): 2.9%
  - Maybe (5-7): 11.8%
- BQA:
  - Yes (8-10): 88.6%
  - No (1-4): 5.7%
  - Maybe (5-7): 5.7%
Name of Contractor: NLPA  
AR #: 1831-11  
Program Manager: Katie Ambrose  
Total Spent (as of 11/30/18): $53,150

Purpose: This AR supports the National Institute for Animal Agriculture’s *Antibiotic Stewardship: Collaborative Strategy for Animal Agriculture & Human Health* that took place on October 31-November 2 with approximately 150 attendees. This was the 7th year of this symposium which provides the beef industry an opportunity to be with their counterparts from the One Health Community (animal, human and environment) and share best practices, knowledge, experience and expertise around antimicrobial resistance. This AR connected key players from the beef community with others from the One Health world (animal health, human health and environmental health) in ways that facilitated solid relationship-building and cross-industry knowledge, sharing, and connectivity. The best examples are the relationships that have been fostered over the years with the Centers for Disease Control and their elite team of zoonotic experts.

### Accomplishments & Results

The key accomplishment for this work continues to be the strong relationships being built between the diverse stakeholders working on resistance. High-engagement from public health officials, government, academia, etc., is a critical driver of success, due to the complexity of the issue and the multi-stakeholder environment it influences. Part of the funding received from the Beef Checkoff allowed the opportunity for 10 beef producers to attend a day and half meeting at the Centers for Disease Control in Atlanta, GA. The producers shared their antibiotic stewardship efforts, which was new for our CDC colleagues.

### TOTAL PEM RESULTS

- **Voice:**
  - Goal: 3,260
  - Actual: 3,638

- **Reach:**
  - Goal: 134.8 K
  - Actual: 140.4 K

- **Engagement:**
  - Goal: 2.9 K
  - Actual: 3.3 K

### Key Learnings

The appetite to expand antibiotic-focused activities within One Health audiences is high. Multiple events could be executed across the country with new audiences. Additional resources could expand the infrastructure needed to receive continued education (CE) credits for participating in One Health focused work to engage a wider range of doctors, nutritionists, dieticians, and others in the human health fields.
**Purpose:** The VQA program is recognized by packers, processors, distributors and other channel marketers as the gold-standard for calf care. Confidence in the supply chain drives demand for veal. The Veal Quality Assurance (VQA) program provides producer education and certification to ensure veal calves receive quality care through every stage of life and are raised using ethical production practices that result in a safe, wholesome, quality product that meets or exceeds regulatory and customer expectations. The Center for Food Integrity’s (CFI) latest research reveals that a near-record 60 percent of consumers strongly agree with the following statement: “If animals are treated decently and humanely I have no problem eating meat and eggs.”

**Accomplishments & Results**

Key results in FY18 include:

- Implemented revisions to the VQA program to incorporate updated animal well-being industry best practices.
- Achieved 95% of the milk-fed veal produced in the United States was under the VQA program, an increase from approximately 50 percent in FY 14 to the current year’s 95 percent.

The Center for Food Integrity’s (CFI) latest research reveals that a near-record 60 percent of consumers strongly agree with the following statement: “If animals are treated decently and humanely I have no problem eating meat and eggs.”

**Key Learnings**

The FY 18 funding for AR-1832-II provided only for a bare-bones maintenance level. Any further funding reductions will result in erosion of the VQA program’s ability to deliver meaningful results. With a secure and stable funding source, the VQA program could be strengthened and provide an even greater return on investment for veal producers.
Key Learnings

The outstanding performance of U.S. beef exports in 2018 was especially encouraging at a time of high U.S. production (and high prices) and volatile trade climate. Through all the uncertainty, international customers remained committed to U.S. beef. If current trade challenges persist and/or competitive pressures from other beef producers intensify, a stronger focus could be placed on defensive strategies to protect the U.S. brand instead of now utilizing resources for displacement of competing beef suppliers.

Accomplishments & Results

In nearly every sector reached by checkoff-funded marketing programs, U.S. beef attracted new customers with a wider range of cuts and menu items. This AR built demand by understanding the cultures and culinary traditions of each market, emerging trends, connecting buyers with suppliers, and communicating these key traits to consumers. Results included:

- Despite a 38.5 percent duty disadvantage and the negative effects of pulling out of the TPP, U.S. beef still excelled in Japan, its top volume market due to a recent merchandising innovation introduced in 2018, dubbed the “pound steak,” a 16-ounce thick-cut piece of American beef a departure from the traditional-sized thin sliced beef normally sold in Japan.

- In Korea, Costco’s conversion to 100 percent U.S. beef in 2017 was a major breakthrough selling more than 100 mt of beef per store per month, ultimately recording a 34 percent year-on-year increase by the end of calendar year 2017.

- USMEF’s work in Taiwan was a key strategy to maintaining U.S. beef in this market. In 2018, key cuts were U.S. brisket and chuck rib eye to expand their U.S. beef experiences and featured U.S. tri tip and involved more than 100 restaurants.

- Grew beef demand in Latin America by bringing buyers and sellers together with merchandising strategies to maximize profitability. An example was Tottus stores in Peru launched a new private branded line of U.S. beef (no-roll) in 12 outlets.
1840-FM
CONTINUED

**QSBC Ratings**

QSBCs use AR materials
(yes/no): 23/15

Considered a “go to” resource – 8.5 out of 10

Improves state programs – 8.2 out of 10

**How do QSBC extend the AR results** – Contribute funds, market intelligence, industry updates

**Would recommend to another QSBCs:**
Yes (8-10): 91.3%
No (1-4): 8.7%
Maybe (5-7): 0%

**AR work is improving:**
Agree (8-10): 91.3%
No (1-4): 8.7%
Maybe (5-7): 0%

*PEM N/A for this AR*
Accomplishments & Results

Through FY18’s efforts, 36 million impressions targeted producers, generating a quarter of a million engagements or interactions with content.

This year there was also more effort to work seamlessly with State Beef Councils, so that messaging could be extended and customized with local producers. This collaboration included providing art design and production services, and coordination and outreach for the monthly e-newsletter.

This AR also funds a Producer Attitude Survey that contributes quantitative insights to the producer communications program relating to stakeholder knowledge of, expectations for, and support of programs funded by the beef checkoff.

Key Learnings

FY18 was a year of many learnings for the PC program in part due to an external review of the program driven by downward trends reported in the Producer Attitude Survey:

- Producer recall for seeing, hearing, or reading about the program is on a downward trend – 43% in 2018 versus a high of 60% in 2015
- Awareness of who manages their checkoff is low – only 5% selected CBB
- Distrust in the checkoff being managed well has grown from 11% in 2015 to 19% in 2018

The downward trends correlated with a shift that had been made to focus paid media efforts on a primarily digital buy. Due to how our demographic relates to media, we know that FY19 needs to have more of a concerted effort on balancing digital with traditional print/broadcast placements. After a painful agency transition, the CBB will look at implementing some guards to mitigate any future transfer of agency responsibilities.
PERCENT OF PRODUCERS WHO RECALL SEEING, READING, OR HEARING ABOUT PROGRAM

QSBC Ratings

QSBCs use AR materials (yes/no): 25/13

Considered a “go to” resource:
6.6 out of 10

Improves state programs:
6.3 out of 10

How do QSBC extend the AR results:
Local advertisements, annual report in regional magazine, customized newsletter

AR work is improving:
Agree (8-10): 36.0%
No (1-4): 44.0%
Maybe (5-7): 20.0%

Would recommend to another QSBCs:
Yes (8-10): 36.0%
No (1-4): 36.0%
Maybe (5-7): 28.0%
### Contractor: NAMI

<table>
<thead>
<tr>
<th>AR</th>
<th>QSBC AR Recommendation Score</th>
<th>Objective</th>
<th>Tactics Achieved</th>
<th>Accomplishments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1801-P</td>
<td>50%</td>
<td>1A 4/4</td>
<td></td>
<td>• A December Bologna promotion was conducted with the NFL’s Jacksonville Jaguars that resulted in 400 media stories generating 350 million impressions. Beefshi promotion achieved over 9.9 million impressions. National Pastrami Day promotion achieved over 23.7 million impressions.</td>
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<tr>
<td></td>
<td></td>
<td>1B 6/7</td>
<td></td>
<td>• Sponsored and attended the 2018 Foodfluence Conference and interacted with 30 U.S. KOLs for food.</td>
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<td></td>
<td></td>
<td>1C 4/4</td>
<td></td>
<td>• Developed a processed beef marketing and merchandising kit including videos, facts sheets and infographics was distributed to 32 corporate supermarket buyers/category managers.</td>
</tr>
<tr>
<td>1832-II</td>
<td>100%</td>
<td>1A 4/4</td>
<td></td>
<td>• FY 18 slaughter estimates 95.73% of U.S. produced milk-fed veal production was VQA certified.</td>
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<td>• The participants at the Veal Summit rated the VQA presentation at 53% Excellent; 41% Good and 6% Satisfactory in an attendee survey instrument.</td>
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### Contractor: NCBA

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<thead>
<tr>
<th>AR</th>
<th>QSBC AR Recommendation Score</th>
<th>Objective</th>
<th>Tactics Achieved</th>
<th>Accomplishments</th>
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<tbody>
<tr>
<td>1800-P</td>
<td>83%</td>
<td>1B 3/3</td>
<td></td>
<td>• “Always on” marketing helped surpass goals, resulting in reaching more than 20 million consumers in the 20-44 age group with more than 161 million total consumer touchpoints. Exceeded content engagement goal of 40 million, garnering 118 million social engagements.</td>
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<tr>
<td>1810-R</td>
<td>86%</td>
<td>1A 2/3</td>
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<td>• 15 presentations on how beef is sustainably raised today were delivered in Q4.</td>
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<td>3D 2/2</td>
<td></td>
<td>• Six research briefs were posted to Beefresearch.org in Q4.</td>
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<tr>
<td>1822-Cl</td>
<td>90%</td>
<td>2C 4/4</td>
<td></td>
<td>• New Consumer Beef Tracker (CBT) which replaces the former Consumer Beef Index launched in June.</td>
</tr>
<tr>
<td>1830-II</td>
<td>86%</td>
<td>1A 3/5</td>
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<td>• Sponsored the FOOD &amp; WINE Classic in Aspen.</td>
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<td>1B 3/3</td>
<td></td>
<td>• Placed two stories in the Wall Street Journal, one in the Chicago Tribune and one in Newsweek.</td>
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<td>1C 3/3</td>
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<td>• Secured a morning cooking segment on Fox &amp; Friends on the FOX Network.</td>
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<td>• Open rate average was 48% for 6 Beef Issues FYIs sent in FY18.</td>
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<td>• Three state issues/crises exercises workshops have been completed.</td>
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<td>• Participation in MBA campaigns was up 13.5% from FY17.</td>
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<td>• Conducted 67 media-training sessions in FY18.</td>
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<td>• A total of 183,268 verified BQA certifications, an increase of 89%.</td>
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### Contractor: MICA

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<tr>
<th>AR</th>
<th>Objective</th>
<th>Tactics Achieved</th>
<th>Accomplishments</th>
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</thead>
</table>
| 1821-CI| 1A        | 5/5              | • 6 total meetings/channel programs were conducted.  
• Regional chef training was hosted on May 9, 2018 in Harrisburg, PA with 8 regional chefs in attendance.  
• 100% positive opinion rating of beef following Regional Chef Media Training event and “Meat Your Beef” chef’s beef tour. |
| 1B     |           | 3/4              | • Exhibited/sponsored 6 consumer outreach events/campaigns, garnering 12,664,593 impressions overall.  
• Consumer favorable rating was measured through an onsite questionnaire at five consumer events. Of those polled, 87.4% stated ‘the positives of beef strongly or somewhat outweighed the negatives,” achieving a beef favorability rating above 71%. |

### Contractor: AFBFA

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<tr>
<th>AR</th>
<th>Objective</th>
<th>Tactics Achieved</th>
<th>Accomplishments</th>
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</thead>
</table>
| 1820-CI| 1A        | 6/6              | Engaged Oregon and Texas State Beef Councils to train STEM professionals. Pre- and post- assessment results are below:  
• 23% increase in participants indicating the positives of beef strongly outweigh the negatives after attending the event.  
• 47% increase in participants indicating the positives of how cattle are raised strongly outweigh the negatives.  
• 48% decrease in concern with antibiotic use in beef cattle.  
• 19% of participants plan to Eat More Beef after attending the event. |
|        | 1B        | 6/6              | 29 participants and guests attended the Pennsylvania On the Farm event. Pre- and post- assessment results from participants are below:  
• 50% increase in participants indicating the positives of beef strongly outweigh the negatives after attending the event.  
• 56% increase in participants indicating the positives of how cattle are raised strongly outweigh the negatives.  
• 57% decrease in concern with animal welfare in the beef industry.  
• 57% decrease in concern with food safety in the beef industry. |
|        | 1C        | 6/6              | We have achieved this goal. AFBFA was selected by the National Science Teacher’s Association to facilitate a workshop at the NSTA National Conference on the educational value of the On the Farm Beef STEM events. Chris Schau, instructional leader from Clark County Schools in Nevada (Las Vegas), a former On the Farm STEM event participant, facilitated the workshop.  
• 7 classrooms visited through YFR True Beef Pilots. |
<p>|        | 1D        | 4/4              | AFBFA hosted the 2nd annual Beef Education Stakeholders Summit in Phoenix, with 36 attendees. |</p>
<table>
<thead>
<tr>
<th>AR</th>
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<th>Tactics Achieved</th>
<th>Accomplishments</th>
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<tbody>
<tr>
<td>4A</td>
<td>4/4</td>
<td>An important aspect was showing chefs how to take a U.S. beef cut and use it in several different ways in several different kinds of dishes which resulted in an increase in usage (especially alternative value cuts) and ultimately increased sales.</td>
<td></td>
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<tr>
<td>4B</td>
<td>2/2</td>
<td>U.S. beef/bvm exports to the ASEAN through August 2018 were up 11 percent in volume to 29,261 mt, with value up 23 percent to $160.6 million.</td>
<td></td>
</tr>
<tr>
<td>4C</td>
<td>3/3</td>
<td>For U.S. beef at retail, USMEF aggressively defended and expanded the share for new cuts and product innovations by helping targeted retailers make refreshed and upgraded presentations of U.S. beef in their markets.</td>
<td></td>
</tr>
<tr>
<td>4D</td>
<td>2/2</td>
<td>U.S. beef/bvm exports to the Caribbean through August 2018 were up 10 percent in volume to 13,164 mt, with value up 3 percent to $74.9 million.</td>
<td></td>
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<tr>
<td>4E</td>
<td>3/3</td>
<td>Shared impactful ideas to strengthen U.S. beef demand through HRI training programs carried out with targeted importers/distributors in the region. Through these efforts, fortified U.S. beef’s quality brand image and helped expand the number of cuts and concepts being promoted.</td>
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<tr>
<td>4F</td>
<td>3/3</td>
<td>U.S. beef/bvm exports to Central America (including the Dominican Republic) through August 2018 were 13,689 mt (16 percent), valued at $87.6million (12 percent).</td>
<td></td>
</tr>
<tr>
<td>4G</td>
<td>3/3</td>
<td>USMEF in China/Hong Kong maintained its focus on core educational tactics that showcase the variety of U.S. cuts and U.S. beef’s superior attributes.</td>
<td></td>
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<tr>
<td>4H</td>
<td>2/2</td>
<td>Importer education, including activities like the “U.S. beef secondary cuts” training sessions of cutting and cooking applications for foodservice and retail settings helped users maximize utilization and push demand for a wider assortment of cuts, especially underutilized value cuts.</td>
<td></td>
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<tr>
<td>4I</td>
<td>5/5</td>
<td>Expansion into newer markets in Central and Eastern Europe where U.S. beef’s presence had been limited.</td>
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<tr>
<td>4J</td>
<td>2/2</td>
<td>U.S. beef/bvm exports to Europe through August 2018 were down 14 percent in volume (13,793 mt) and value ($149.7 million).</td>
<td></td>
</tr>
<tr>
<td>4K</td>
<td>7/7</td>
<td>USMEF partnered with HRI and retail accounts in Japan to sell larger volumes of U.S. chilled branded and more highly graded beef. Positioned USDA Prime beef as an affordable alternative to domestic beef which was at record market prices.</td>
<td></td>
</tr>
<tr>
<td>4L</td>
<td>2/2</td>
<td>USMEF worked to increase U.S. beef usage in bento boxes, prepared meals and snacks sold at CVS stores and “deli” chains in Japan.</td>
<td></td>
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<tr>
<td>4M</td>
<td>6/6</td>
<td>U.S. beef/bvm exports to Japan through August 2018 were up 7 percent in volume to 224,785 mt, with value up 11 percent at $1.42 billion.</td>
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</tbody>
</table>

**Contractor:** NCBA/USMEF

**Export Growth Committee**
<table>
<thead>
<tr>
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<th>Accomplishments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1840 FM</td>
<td>QC AR Recommendaton Score</td>
<td>91%</td>
<td>4N</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>• Supporting decisions made by targeted retail chains to sell only USDA Choice and higher beef, along with the other chains’ implementing USDA graded beef programs, USMEF carried out several point-of-sale marketing campaigns.</td>
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<td></td>
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<td>• U.S. beef/bvm exports to Mexico through August 2018 were up 1 percent in volume to 158,496 mt, with value up 8 percent at $693.8 million.</td>
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<td>• USMEF’s beef tutorials, master classes, workshops and live cutting/cooking demos locked down regular purchases of U.S. beef by numerous hotels and restaurants.</td>
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<td></td>
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<td>• USMEF stimulated further and ongoing introduction of new U.S. beef cuts and enhanced consumption in the sector by supporting menu promotions, theme nights and festivals at targeted restaurants and hotels across the region.</td>
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<td>• U.S. beef/bvm to the Middle East through August 2018 were down 5 percent in volume to 53,973 mt, with value up 6 percent at $138.3 million.</td>
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<td>• USMEF’s demonstration to target accounts that U.S. beef is not just about expensive cuts like ribeyes but also about budget-friendly, high-quality alternative cuts, with a much heavier focus on promoting these cuts to penetrate HRI and retail outlets that had never considered U.S. beef before. This helped sustain regular shipments of U.S. beef and a growing presence on the menus of almost all top-end restaurants in the targeted markets of Ukraine, Uzbekistan and Kazakhstan.</td>
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<td></td>
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<td>• USMEF’s efforts in Russia included ongoing interaction with and observation of the local meat industry to determine its potential impact on the global markets.</td>
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<td></td>
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<td></td>
<td>• Working with the trade in the key markets (Chile, Peru, Colombia), USMEF optimized supply distribution and channel development, especially with the introduction of more underutilized cuts.</td>
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<td></td>
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<td>• USMEF worked with the leading importer/distributors in targeted markets to identify downstream users with the best potential for incremental growth. These chefs and foodservice owners were targets for customized training programs adapted to specific operational levels and category types.</td>
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<tr>
<td></td>
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<td>• USMEF’s use of regional cuisine in these presentations made U.S. beef more approachable and was a powerful tool for introducing affordable cuts.</td>
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<td></td>
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<td>• U.S. beef/bvm exports to South America through August 2018 were up 3 percent in volume to 19,358, with value up 9 percent at $88.4 million.</td>
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<td></td>
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<td>• The U.S. continued to be the largest supplier of beef to Taiwan in 2018 and held 74 percent (up from 72 in 2017) of the country’s chilled beef market, the highest of any Asian destination.</td>
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<td></td>
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<td>• Promoting U.S. beef tri tip as a new steak cut for the Taiwan market and working to increase U.S. beef sales for the country’s foodservice operators, USMEF organized “2018 Steaklicious U.S. Beef Steak Month” involving more than 100 restaurants. Participants’ sales of the U.S. steaks grew two to three times during the promotion.</td>
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<tr>
<td></td>
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<td></td>
<td>• U.S. beef/bvm exports to Taiwan through August 2018 were up 36 percent in volume to 38,923 mt, with value up 40 percent at $359.9 million.</td>
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**Innovation Committee**

<table>
<thead>
<tr>
<th>AR</th>
<th>QSBAR Recommendation Score</th>
<th>Objective</th>
<th>Tactic Achieved</th>
<th>Accomplishments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor: NAMI</td>
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<tr>
<td>1802-P</td>
<td>75%</td>
<td>3A 19/19</td>
<td></td>
<td>• Veal partnered with the Mushroom Council on the Summer Grilling promotion for the 4th consecutive year. The sweepstakes generated over 195,000 entries.</td>
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<td>• Ten new recipes, photography and videos were developed for veal.</td>
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<td>• Executed 2 seasonal promotions: Eat Better Eat Veal and Summer Grilling with 1880+ participating retailers.</td>
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<tr>
<td>Contractor: NCBA</td>
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</tr>
<tr>
<td>1800-P</td>
<td>83%</td>
<td>1A 3/4</td>
<td></td>
<td>• Chuck Knows Beef, the only all-knowing beef expert powered by Google Artificial Intelligence, was recently soft launched.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1B 3/3</td>
<td></td>
<td>• “Always on” marketing helped surpass goals, resulting in reaching more than 20 million consumers in the 20-44 age group with more than 161 million total consumer touchpoints.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3A 2/3</td>
<td></td>
<td>• Seven research projects have been selected for funding and contracted.</td>
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<td></td>
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<td>3B 2/2</td>
<td></td>
<td>• Over 100 photos were taken over the last year and a new Digital Asset Management system made it possible for state and industry partners to pull photography easily from the system, rather than request them from the Culinary team.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3C 1/1</td>
<td></td>
<td>• The Culinary Team provided support to over 35 state partner events and/or projects.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3D 2/2</td>
<td></td>
<td>• Responded to 60 data requests.</td>
</tr>
<tr>
<td>1810- R</td>
<td>86%</td>
<td>3A 2/3</td>
<td></td>
<td>• Completed analysis and summary of meat and dairy substitutes at retail.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3B 2/2</td>
<td></td>
<td>• The Culinary Team provided support to over 35 state partner events and/or projects.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3C 1/1</td>
<td></td>
<td>• Responded to 60 data requests.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3D 2/2</td>
<td></td>
<td>• Written first monthly article on top cuts for BIWFD.com.</td>
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<td></td>
<td>3E 2/2</td>
<td></td>
<td>• A new Consumer Beef Tracker (CBT) which replaces the former Consumer Beef Index launched in June.</td>
</tr>
<tr>
<td>1822- CI</td>
<td>90%</td>
<td>2B 4/4</td>
<td></td>
<td>• The online survey has been completed and scores were maintained. FY 2018 mean respondent scores showed an 7.9 score with 10 being the highest possible score in terms of “value of beef checkoff information and resources,” and an 8.3 score on the “likelihood to recommend beef checkoff information and resources.”</td>
</tr>
</tbody>
</table>

**Investor Relations Working Group**

<table>
<thead>
<tr>
<th>AR</th>
<th>QSBAR Recommendation Score</th>
<th>Objective</th>
<th>Tactic Achieved?</th>
<th>Accomplishments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor: NCBA</td>
<td></td>
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<tr>
<td>1850-PC</td>
<td>36%</td>
<td>5A 2/3</td>
<td></td>
<td>• Able to work with over 19 states to provide resources and materials for their local efforts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5B 1/1</td>
<td></td>
<td>• The Producer Attitude Survey was launched in December.</td>
</tr>
</tbody>
</table>
### Nutrition & Health Committee

<table>
<thead>
<tr>
<th>AR</th>
<th>OSBC AR Recommendation Score</th>
<th>Objective</th>
<th>Tactics Achieved</th>
<th>Accomplishments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contractor: MICA</strong></td>
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<tr>
<td>1821-CI</td>
<td>100%</td>
<td>1B</td>
<td>3/4</td>
<td>- Exhibited/sponsored 6 consumer outreach events/campaigns, garnering 12,664,593 impressions overall. &lt;br&gt;- Consumer favorable rating was measured through an onsite questionnaire at five consumer events. Of those polled, 87.4% stated <em>the positives of beef strongly or somewhat outweighed the negatives</em>, achieving a beef favorability rating above 71%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2A</td>
<td>4/5</td>
<td>- A comprehensive review on beef’s role in a healthy, sustainable diet was completed and was published in the July/August 2018 issue of Nutrition Today. &lt;br&gt;- Across the three immersion events/tours conducted, the average opinion rate of beef was measured at 84%. Post event survey results at the School Nutrition Association of PA meeting and Raising Today’s Veal tour revealed a 100% positive opinion rating of beef.</td>
</tr>
<tr>
<td><strong>Contractor: NCBA</strong></td>
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<tr>
<td>1800-P</td>
<td>83%</td>
<td>1B</td>
<td>3/3</td>
<td>- “Always on” marketing helped surpass goals, resulting in reaching more than 20 million consumers in the 20-44 age group with more than 161 million total consumer touchpoints. &lt;br&gt;- Exceeded content engagement goal of 40 million, garnering 118 million social engagements.</td>
</tr>
<tr>
<td>1810-R</td>
<td>86%</td>
<td>2A</td>
<td>2/3</td>
<td>- A comprehensive review on beef’s role in a healthy, sustainable diet was completed and was published in the July/August 2018 issue of Nutrition Today.</td>
</tr>
<tr>
<td>1822-CI</td>
<td>90%</td>
<td>2A</td>
<td>4/4</td>
<td>- The Strength Summit was held in September 2018 for 43 top tier nutrition researchers and influencers in San Antonio, TX. &lt;br&gt;- After the Med Diet Webinar, 96% of attendees reported an increased level of comfort with recommending lean beef as a part of a Mediterranean-style eating pattern. &lt;br&gt;- After the Sustainability webinar, 90% of attendees reported that the positives of beef either strongly or somewhat outweigh the negatives of beef.</td>
</tr>
<tr>
<td>AR</td>
<td>OSBC AR Recommendatio n Score</td>
<td>Objective</td>
<td>Tactics Achieved</td>
<td>Accomplishments</td>
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</table>
| 1811-R | 83%                           | 6A        | 1/2             | • Developed and prepared post-harvest beef safety research priorities for Foundation for Meat and Poultry Research and Education annual request for proposals.  
  • Solicited proposals on Post-Harvest Beef Safety Research and immediate research needs to comply with Appendices A & B.  
  • Seven ongoing research projects are under management. |
| 1810-R | 86%                           | 6A        | 2/3             | • Fifteen web content pieces have been developed to date and posted to [www.beefresearch.org](http://www.beefresearch.org).  
  • Beef safety research was showcased at four scientific conferences. |
| 1830-II | 86%                           | 1C        | 3/3             | • 183,268 producers were BQA certified, an increase of 89% (86,286).  
  • Two “in-person” meetings and two webinars have been conducted with 36 states represented and 67 state coordinators and/or educators. |
| 1831-II | NA                            | 6A        | 1/2             | • 147 stakeholders attended the Symposium.                                                                                                           |
|       |                               | 6B        | 3/3             | • 8 producers participated in the symposium including representatives from cow-calf, seed-stock, feedyard, dairy, and veterinarian arenas.  
  • Post-Symposium, beef producers traveled to Atlanta, Georgia to visit the Centers for Disease Control. |
|       |                               | 6C        | 1/1             | • One comprehensive digital symposium white paper was produced with highlights from the symposium.  
  • Nine digital images with messages around responsible use of antibiotics were delivered and one digital reference guide with tips for producers engaging around resistance was designed. |
FOR FURTHER INFORMATION AS WELL AS THE APPENDICIES FOR EACH AR, CONTACT:

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David Rockland  
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Emily Peet  
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APPENDIX

1800-P

Contractor: NCBA
Program Manager: Season Solorio
YE Summary from contractor

For more than 25 years, NCBA, on behalf of the beef checkoff, has managed the Beef. It’s What’s For Dinner. brand and continues to educate consumers and inspire them to purchase, prepare and enjoy beef. From checkoff market research, we know that consumers are continuing to evolve. Today’s consumers are not an “or” generation – they’re an “and” generation, meaning that they don’t just eat one protein, they eat a variety of proteins. Consumers no longer see production issues, such as sustainability or animal care, as being separate from beef, the finished product. They expect and want to know more about all things beef – from how beef is raised, to what cuts to choose, to why beef’s nutritional value is misunderstood.

This Authorization Request refreshed and re-launched the long-loved Beef. It’s What’s For Dinner. brand. Beef. It’s What’s For Dinner. today focuses on promoting beef’s greatest strengths: the unbeatable taste of beef, the people and production process behind beef, the variety and ease of cooking beef, and the nutritional strength that beef provides. These are unique attributes that beef has compared to any other protein and moving forward, the program will promote these attributes collectively, under one cohesive Beef. It’s What’s For Dinner. brand, with the goal of setting a benchmark to make beef the number one protein in the United States.

The Beef. It’s What’s For Dinner. brand reaches more consumers, more often, at various critical points in their day – whether that’s when they’re at home watching digital/online television, creating their shopping lists for the week, listening to digital radio at work, or searching for meal and menu inspiration online.
Ratings from 2018 SBC Evaluation Survey

- QSBCs use AR materials (yes/no): 38/4
- Considered a “go to” resource – 8.6 out of 10
- Improves state programs – 8.3 out of 10
- How do QSBC extend the AR results – extend all AR messaging and creative through multiple channels including video, social media, and websites
- Would recommend to another QSBC:
  - Yes (8-10): 83.3%
  - No (1-4): 11.1%
  - Maybe (5-7): 5.6%
- AR work is improving:
  - Agree (8-10): 80.6%
  - No (1-4): 16.6%
  - Maybe (5-7): 2.8%
<table>
<thead>
<tr>
<th>Tactic</th>
<th>Measurable Objectives</th>
<th>Exceeded</th>
<th>Achieved</th>
<th>Not Achieved</th>
<th>Ongoing Under Approved Extension</th>
<th>Contractor Comments</th>
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</thead>
<tbody>
<tr>
<td>1A</td>
<td>Benchmark consumer-directed content assets extended by stakeholders and credible third parties via downloads from the digital asset manager and API (application programming interface) as assets and API’s are updated with the new website and brand re-fresh.</td>
<td>X</td>
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<td>Ongoing tracking shows that beef cut and preparation PDFs (cut charts and 3 Easy Steps documents) continue to be the most downloaded assets on the website, while social and video creative dominates on state use through the digital asset management system (The Wrangler).</td>
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<tr>
<td>1A</td>
<td>Execute a marketing pilot to test cutting-edge approaches to helping revolutionize the meat shopping experience, such as artificial intelligence or augmented reality tools. Goal of reaching a minimum of 150,000 consumers.</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>Chuck Knows Beef, the only all-knowing beef expert powered by Google Artificial Intelligence, was recently soft launched. Soft launch will run through end of November, by which point we have a goal to reach a minimum of 150,000 consumers.</td>
</tr>
<tr>
<td>1A</td>
<td>Establish new benchmarks for BeefItsWhatsForDinner.com, gauging success of updated website consolidation (visits, visitors, page views, asset downloads) and continue to track, analyze and optimize performance in real-time and year-over-year.</td>
<td>X</td>
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<td>Site traffic continues to outpace year over year growth, with more than 11.2 million visits by end of fiscal year. Recipes and cuts are the most popular sections, and we’re tracking trends for time spent on topical sections such as Nutrition and Raising Beef with noted comparisons for site behavior based on point of entry (open search vs. paid social).</td>
</tr>
<tr>
<td>1A</td>
<td>Establish a benchmark to measure perceptions of beef as the number one protein in the United States.</td>
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<td>X</td>
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<td>A benchmark was established in the first month of FY 2018 that among consumers 20-44 years of age, 50%</td>
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<tr>
<td>1B</td>
<td>Execute an “always on” media campaign ensuring favorable beef messaging and resources are present year-round, reaching an average of 20 million people within the 20-44 age group on a quarterly basis.</td>
<td>X</td>
<td>A strategic and efficient “always on” marketing mix, including video, audio, search, social and display helped surpass original goals, resulting in reaching more than 20 million consumers in the 20-44 age group, with a total of more than 161 million consumer touchpoints this year.</td>
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<tr>
<td>1B</td>
<td>Generate more than 40 million content engagements on “Beef. It’s What’s For Dinner” and partner social media platforms (includes video views, shares, re-pins, comments).</td>
<td>X</td>
<td>We have exceeded our content engagement goal of 40 million, garnering 118 million social engagement this year.</td>
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<tr>
<td>1B</td>
<td>Measure and benchmark the effectiveness of consumer messaging in building brand awareness and purchase intent, in partnership with market research.</td>
<td>X</td>
<td>Aided awareness of Beef. It’s What’s For Dinner. remained steady in FY2018. Additionally, over the course of the year when major campaigns were in market, we measured percentage of consumers who said that beef was a food that gives them strength; beef provides a pleasurable eating experience and tastes good; and beef is responsibly raised and they trust the people who raise beef. Across the board, there is a consistent pattern showing a widening gap in beef perceptions between those aware and unaware of BIWFD, suggesting that those who are aware of BIWFD have more positive perceptions of beef.</td>
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DISCLAIMER: Links to third-party websites within this document should not be considered an endorsement by the Beef Checkoff
APPENDIX

1801-P

Contractor: NAMI

Program Manager: Bill Sessions
YE Summary from contractor

The impact on driving demand for beef can best be summed up by a message we received from an official of a processed beef manufacturer. “The Institute’s efforts in support of beef bologna had a measurable impact on demand for our beef bologna products and proved that effective communication and promotion translates into meaningful demand growth.” The message was referring to the Meat Institute’s prepared beef promotional efforts on behalf of the Beef Checkoff.

This was the first year for an Authorization Request strictly devoted to promoting prepared beef products. As such the programs had to be built from a new foundation. Based upon feedback from prepared beef processors and others, we strongly believe we created new demand for beef. In addition, through our outreach efforts with Key Opinion Leaders in the Registered Dietician and health practitioner communities, we were able to provide scientific evidence to refute much of the negative information concerning processed meats.

By developing new beef items such as Beefshi and kid pleasers, we were able to engage the retail and food service channels with new ideas. These efforts will result in increased demand over time.

The North American Meat Institute was recognized by two national advertising and public relations organizations for its innovative marketing and promotion of prepared beef products. We won a platinum Hermes Creative Award for December’s Jacksonville Jaguars bologna promotion done in conjunction with the National Hot Dog and Sausage Council (NHDSC) on behalf of the Beef Checkoff. In addition, we won the Thoth Award from the Public Relations Society of America for the best Integrated Media Relations campaign with a budget under $25,000 for the Bologna Day Promotion.

The continued promotion of prepared beef products is critical to the bottom line of cattle producers. Our most recent retail data indicates that the processed meat category represents over $34 billion in sales. Beef alone has approximately $5.9 billion in sales. The negative macro-market forces must be met and overcome by positive, robust promotion and informational campaigns where the prepared beef category can continue to grow and provide a net return to producers.
Ratings from 2018 SBC Evaluation Survey

- QSBCs use AR materials (yes/no): 8/33
- Considered a “go to” resource – 6.4 out of 10
- Improves state programs – 6.3 out of 10
- How do QSBC extend the AR results – limited, Beefshi program, International Chef Seminar
- Would recommend to another QSBC:
  Yes (8-10): 50.0%
  No (1-4) 37.5%
  Maybe (5-7): 12.5%
- AR work is improving:
  Agree (8-10): 37.5%
  No (1-4): 25%
  Maybe (5-7): 37.5%
<table>
<thead>
<tr>
<th>Tactic</th>
<th>Measurable Objective</th>
<th>Exceeded</th>
<th>Achieved</th>
<th>Not Approved</th>
<th>Contractors Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>Develop four (4) consumer infographics to illustrate the variety of healthful processed beef choices and to counteract the current negative perceptions.</td>
<td>X</td>
<td></td>
<td></td>
<td>Created three protein comparative infographics (roast beef, pastrami, and corned beef vs. other proteins) plus three individual protein infographic/fact sheets</td>
</tr>
<tr>
<td>1A</td>
<td>Create four (4) engaging YouTube style videos showcasing a variety of beef product options.</td>
<td>X</td>
<td></td>
<td></td>
<td>Videos were developed and ARMS approved for Beefshi, Kid Pleaser/Beef-up the lunch box beef items and Jerky Day promotions. Forty short videos were developed and ARMS approved to promote National Hot Dog day activities.</td>
</tr>
<tr>
<td>1A</td>
<td>Create and execute four (4) themed social media campaigns using a consumer promotion (achieve 1mm media impressions).</td>
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<td>X</td>
<td></td>
<td>National Bologna Day social Promotion was completed (Achieved over 25 million impressions). A December Bologna promotion was conducted with the NFL’s Jacksonville Jaguars that resulted in 400 media stories generating 350 million impressions. The promotion was covered in many national outlets including ESPN, Fox Sports, CBS Sports, NBC Sports, Associated Press and USA Today. Also, there were 5 million twitter impressions from 960 tweets including tweets from the Jaguars and ESPN reporters. Beefshi promotion was completed (achieved over 9.9 million impressions). National Deli-Meat</td>
</tr>
</tbody>
</table>
Month promotion was completed (achieved over 11.7 million impressions). National Pastrami Day promotion was completed (achieved over 23.7 million impressions).

Kid Pleaser promotion completed and distributed on line and through Family Features (achieved 126 print placements, more than 308 million reach and 1.5 million engagements to date). Jerky Day promotion completed (achieved over 8.5 million reach and 2.1 million engagements). Kid Pleaser photography to support print media and social media distributions were completed and ARMS approved. Beef Up the Lunch Box campaign, including videos, recipes and photos completed (achieved over 8.0 million reach and over 159 thousand engagements). The hot dog videos achieved a reach of over 168 thousand and an engagement of over 60 thousand. The North American Meat Institute won a platinum Hermes Creative Award for December’s Jacksonville Jaguars bologna promotion done in conjunction with the National Hot Dog and Sausage Council (NHDSC) on behalf of the Beef Checkoff.
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<tbody>
<tr>
<td><strong>1A</strong></td>
<td>Conduct a nationwide survey of 2,000 consumers to measure their knowledge and attitudes about processed beef nutrition.</td>
<td>X</td>
</tr>
<tr>
<td><strong>1B</strong></td>
<td>Sponsor the 2018 Foodfluence Conference to reach key U.S. Food influencers. Provide key facts and information on processed beef to the 30 KOLs attending this conference.</td>
<td>X</td>
</tr>
<tr>
<td><strong>1B</strong></td>
<td>Create key opinion leader focused content: Three (3) fact sheets that highlight the nutritional value of beef and highlight low and reduced sodium options Three (3) infographics that compare the variety of processed beef products vs. other common consumable products.</td>
<td>X</td>
</tr>
</tbody>
</table>
| 1B | Create a processed beef monthly eblast and deliver to health experts which includes process beef infographics, research and nutritional information. (minimum of 500 sent monthly with approximately 20% open rate). | X | Monthly eblasts with distribution quantities and open rates are listed below:

- Feb: Beefshi Nutrition Leaders (253, 38.9%)
- Mar: Nitrites (373, 35%)
- Apr: Nitrites Wave 2 (202, 19.1%)
- Apr: Protein Comparative (559, 33.5%)
- Apr: Prepared Meats & Protein: A Nutrition Perspective (555, 30.2%)
- May: Kid Pleasers (549, 28.8%)
- Jun: Prepared Meats & Sodium: A Nutrition Perspective (542, 27.8%) |
<p>| 1B | Host a New York City media briefing event featuring experts showcasing how products are made, and why they are safe and nutritious to a minimum of 25 attendees. | X | NYC media event conducted on June 13th. Attendees totaled 27. Nationally recognized meat scientist provided the keynote address. |
| 1B | Create partnerships with five (5) active lifestyle bloggers who have a minimum reach of 20,000 each. | X | Bloggers with Sunday Supper: Soulfully Made - Salami Babs Reach: 72,000 Recipe For Perfection - Jerky Trail Mix Reach: 43,000 Caroline’s Cooking - Meaty Cheesy Pinwheels Reach: 70,600 My Life Cookbook - Beef Jerky Lunch Box Makeover Reach: 165,524 That Skinny Chick Can Bake – Beefshi Reach: 117,965 |</p>
<table>
<thead>
<tr>
<th></th>
<th>Tactic</th>
<th>Activity</th>
<th>X</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1B</td>
<td>Distribute processed beef infographics at least once a year to school food service operators through the School Nutrition Association program. Reach approximately 8,000; Engagement: approximately 800</td>
<td>X</td>
<td>Attended SNA conference and distributed processed beef infographics. SNA Conference Reach—8293 SNA Conference Engagement—134 Follow-up SNA Engagements—670</td>
<td></td>
</tr>
<tr>
<td>1C</td>
<td>Provide infographics developed in Tactic 1B to (ten) 10 corporate registered dietitians/nutritionists of national supermarket chains along with other health/science-based materials.</td>
<td>X</td>
<td>Infographics distributed to 39 retail RDs with national chains.</td>
<td></td>
</tr>
<tr>
<td>1C</td>
<td>Develop marketing and merchandising collateral for 10 (ten) corporate supermarket buyers/category managers.</td>
<td>X</td>
<td>Developed a processed beef marketing and merchandising kit that included 3 fact sheets and 7 infographics on processed beef along with a flash drive that included videos, facts sheets and infographics and distributed to 32 corporate supermarket buyers/category managers</td>
<td></td>
</tr>
<tr>
<td>1C</td>
<td>Attend NAMI/FMI Meat Conference to promote processed beef products and conduct fifty (50) surveys to gauge channel marketer current perceptions.</td>
<td>X</td>
<td>Beefshi food service recipes were developed and distributed to channel marketers. Press Release announcing the development and availability of Beefshi food service recipe brochure was issued. 55 surveys 350+ reach</td>
<td></td>
</tr>
<tr>
<td>1C</td>
<td>Distribute all checkoff-funded processed beef information to two hundred (200) processors including infographics, nutrition and research information.</td>
<td>X</td>
<td>Distributed a processed beef marketing and merchandising kit to 206 processors. The processed beef marketing and merchandising kit included 3 fact sheets and 7 infographics on process beef along</td>
<td></td>
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</tbody>
</table>
with a flash drive that included videos, facts sheets and infographics.

**DISCLAIMER:** Links to third-party websites within this document should not be considered an endorsement by the Beef Checkoff.
APPENDIX

1802-P
Contractor: NAMI
Program Manager: Bill Sessions
YE Summary from contractor

The checkoff-funded veal promotion program builds awareness and understanding of cookery with consumers, retailers, and foodservice partners to keep veal top of mind. In fiscal 2018, the integrated marketing strategy focused on digital communication targeting millennial parents. The strategy included relationships with key opinion leaders to maximize reach through compelling content including new recipes, cooking videos, nutrition messaging, newsletters, promotions and partnerships to engage veal consumers. Success continued with the fifth annual veal summit, and a fourth-year partnership with the Mushroom Council. The veal summit was attended by veal producers, packersprocessors, distributors, retailers, foodservice operators, nutritionist, and other interested parties.
Ratings from 2018 SBC Evaluation Survey

- QSBCs use AR materials (yes/no): 4/37
- Considered a “go to” resource – 5.7 out of 10
- Improves state programs – 5.3 out of 10
- How do QSBC extend the AR results – use veal messages and work with local producers
- Would recommend to another QSBC:
  - Yes (8-10): 75%
  - No (1-4): 0%
  - Maybe (5-7): 25%

- AR work is improving:
  - Agree (8-10): 50%
  - No (1-4): 0%
  - Maybe (5-7): 50%
<table>
<thead>
<tr>
<th>Tactic</th>
<th>Measurable Objectives</th>
<th>Exceeded</th>
<th>Achieved</th>
<th>Not Achieved</th>
<th>Ongoing Under Approved Extension</th>
<th>Contractor Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A</td>
<td>Partner with a minimum of one (1) consumer brand/product for a channel and digital marketing promotion to extend veal’s reach.</td>
<td>X</td>
<td>Veal partnered with the Mushroom Council on the Summer Grilling promotion for the 4th consecutive year. The sweepstakes generated over 195,000 entries; Extended veal’s reach through the Mushroom Councils digital outreach: reach: 99,000+, engaged 39,000+</td>
<td></td>
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<tr>
<td>3A</td>
<td>Execute one (1) seasonal/themed retail promotion supported by social media.</td>
<td>X</td>
<td>Executed 2 seasonal promotions: Eat Better Eat Veal and Summer Grilling – 1880+ participating retailers, 90,000+ on-pack recipe labels distributed. Website sessions: 370,000+; Pageviews: 804,000+ sweepstakes entries: 293,000+.</td>
<td></td>
<td></td>
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<tr>
<td>3A</td>
<td>Provide monthly updates to the VealMadeEasy website with recipes, photography, videos, blog and seasonal promotions.</td>
<td>X</td>
<td>Monthly content updates to the VME site were completed. The number of website sessions (reach): 423,000+ unique Sessions (engagement): 131,600+</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 3A | Distribute monthly consumer email outreach featuring veal recipes to a minimum of 500 consumers. | X | Distributed 12 consumer e-newsletters  
  Consumer Newsletter Open Rates  
  October 2017 21.7%  
  November 2017 21.4%  
  December 2017 18.1%  
  January 2018 20.9%  
  February 2018 20.2%  
  March 2018 20.0%  
  April 2018 19.8%  
  May 2018 20.2%  
  June 2018 20.1%  
  July 2018 22.2% |
| 3A | Attend one (1) consumer focused event with a minimum audience of 5,000 to provide veal samples and distribute veal recipes with nutritional information. Conduct a minimum of fifty (50) consumer intercepts to gauge consumer attitudes toward veal. | X | Attended the Pennsylvania Farm Show. Conducted 50 onsite questionnaires and distributed 500 veal branded materials. Reached 5,000+ consumers and engaged with 500+ during Veal and Beef day where veal and beef samples were distributed. |
| 3A | Utilize veal’s digital platforms with weekly updates to drive consumers to the VealMadeEasy website, the hub of the veal digital ecosystem. | X | Weekly updates to the veal social media platforms have been completed (Facebook, Twitter, YouTube, Pinterest and Instagram). Total reach for social media platforms was: 19,293,594. Total engagement was: 385,759 |
| 3A | Produce veal/beef checkoff cutting mats to distribute to consumers and key opinion leaders. | X | Completed. Cutting mats were distributed to State Beef Councils, Industry Leadership, PA Farm Show, Center of the Plate training. |
| 3A | Provide monthly email outreach including updates to communicate program | | Distributed 12 veal industry enewsletters |

| | Industry Newsletter Open Rates |
| | October 2017 28.6% |
| | November 2017 28.2% |

- August 2018 21.2%
- September 2018 16.4%

A total of 18,760 newsletters were sent (reach) and the open number was 3,129 (engagement), click through: 248
|   | progress and results to Industry Leadership including state beef councils’ and CBB partners’ staff/personnel. |   | December 2017 | 25.0%  
|   |   |   | January 2018 | 27.9%  
|   |   |   | February 2018 | 27.2%  
|   |   |   | March 2018 | 20.3%  
|   |   |   | April 2018 | 24.6%  
|   |   |   | May 2018 | 30.5%  
|   |   |   | June 2018 | 26.0%  
|   |   |   | July 2018 | 25.0%  
|   |   |   | August 2018 | 25.5%  
|   |   |   | September 2018 | 28.0%  
|   | A total of 3,855 newsletters were sent to the industry (reach) with an engagement of 955 (open rate). |   |   |   

| 3A | Provide quarterly industry updates via mail to industry partners that do not have access to the internet. | X | Completed quarterly mailings to 143 industry stakeholders who do not have access to the internet; newsletters were sent via USPS mail. |

| 3A | Engage with a minimum of one (1) food blogger creating new recipe(s) to amplify veal’s reach. | X | The Daring Gourmet, food blogger, completed a healthy veal recipe to support our Eat Better Eat Veal promotion. The recipe, Thai Lettuce Wraps with Veal can be found on the Veal Made Easy website. ([https://vealmadeeasy.com/recipes/thai-lettuce-wraps-veal/](https://vealmadeeasy.com/recipes/thai-lettuce-wraps-veal/)) The blogger reach was 60,000+ with an engagement of 7,000+ |

| 3A | Conduct 1 Veal Summit to engage industry stakeholders. | X | The 2018 Veal Summit was held in Pennsylvania where more than 30 industry stakeholders attended. Surveys were completed to assist in the evaluation of the content and overall meeting. All summit presentations can be found on the Veal Foodservice website. |
| 3A  | Provide sponsorship for the Center of the Plate Conference. | x | Sponsorship was provided to the Center of the Place conference along with veal printed/branded materials. |
| 3A  | Identify five (5) corporate registered dietitians/nutritionists of national supermarket chains and provide nutritional information, recipes, nutritional infographic, photography and videos. | x | Over 500 registered dietitians/nutritionists were reached via eblasts with veal nutritional information, new recipes, photography and videos. Feb 2018 open rate: 27%, May 2018 open rate of 21%. A total of 798 eblasts sent with 169 opens. |
| 3A  | Provide support to the New York Beef Industry Council’s Veal Tour in October 2017. | x | Provided support and veal branded materials for 35 who attended the New York State Beef Council Beef & Veal Tour. |
| 3A  | Identify at least four (4) culinary schools to distribute veal materials, recipes and nutritional information on a quarterly basis. | x | Thirty-six Culinary Schools were reached on a quarterly basis via eblasts with veal recipes, nutritional information and how-to videos. Dec 2017 open rate 20%, Feb 2018 open rate 16.7%, May 2018 open rate 20% and May 2018 open rate 26.5%. |
| 3A  | Create a Veal Industry brochure providing a printed Checkoff Program update to be distributed to producers, packers, state beef councils and other industry partners. | x | Veal industry brochures were created and distributed to industry leadership, state beef councils as well as conferences like center of the plate, CBB winter and summer meetings. |
| 3A | Develop two (2) infographics (one for foodservice and one for retail) to promote veal’s value proposition including nutritional benefits, versatility and innovative recipes. | X | Four infographics were created; Foodservice (versatility and nutrition) and Retail (versatility and nutrition). The infographics were shared with State Beef Councils, Culinary schools and are available on the [veal made easy website](http://www.vealmadeeasy.com). |

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Appendix

AR: 1810-R
Contractor: NCBA
Program Managers: Mandy Carr Johnson & Rick Husted
YE Summary from contractor

Pre-harvest Safety Research
The checkoff is a valuable resource to the industry providing foundational science the industry can use to further research to develop practical applications and interventions to reduce safety challenges. The pre-harvest safety research program continues to be a catalyst for information sharing and education through meetings like the Beef Industry Safety Summit and others. Research was presented at a minimum of four scientific engagements this year. Information dissemination through online platforms included 15 safety-related resources on www.beefresearch.org.

Nutrition Research
The interpretation that a healthy dietary pattern is low in red and processed meat continues to challenge beef. While research gaps have been identified and future research requirements are certain, the evidence to support beef’s role in a healthy diet remains strong. This program has been able to share and support the activation of science through the research community, among health professionals and other thought leaders as well as to the beef consumer. Conducting the high quality scientific research will continue to be the foundation of this program. In addition, outreach to scientific audiences and acceptance of evidence to support beef’s role in health will continue to be opportunities for growth. This year, more than 45 of the top 100 Nutrition Science Influencers were reached through this program.

Product Research
Checkoff-funded product quality research fills a unique need to revolutionize beef and explore better carcass utilization and fabrication to increase beef’s value proposition. Work on flavor has built on research findings from previous checkoff-funded work and is gaining recognition in scientific and industry communities. A feature session at the 2018 Reciprocal Meats Conference highlighting checkoff-funded research was one of the most attended sessions at the conference. Product education, cutting demonstrations and alternative cut presentations are an important part of this program and were conducted this year for industry audiences.

Culinary
This program develops a portfolio of new beef inspirations as recipes, new recipe photography, or reshoots of outdated but popular recipe photography, that address healthy, innovative, and on-trend beef meals in collaboration with other checkoff programs. This year over 100 photos were taken for new or current recipes shared on Beef. Its What’s For Dinner. Additionally, this program provides support to other checkoff programs and state beef council partners showcasing beef in a culinary venue. This year the team provided support to over 35 state partner events and 25 consumer, supply chain or influencer events/projects.

Channel Intelligence
Audiences want an accurate and reliable source for information about beef and competing proteins in the retail and foodservice channels. The beef checkoff is a resource for a broad cross-section of audiences that include media, retailers, foodservice operators, processors,
distributors, universities, consultants, analysts, state beef councils, the Cattlemen’s Beef Board, internal checkoff project teams, strategic planning and account managers, as well as other beef checkoff contractors. Retail scanner data, menu trends and other data subscriptions supply information that enables the checkoff to be a respected voice of the beef industry. In fiscal 2018, these data subscriptions enabled response to almost 200 data requests (16 requests/month) from the above-mentioned audiences. Through these requests and additional use of these resources and other sources, data, insight and context were provided to further understanding of beef’s performance in the retail and foodservice channels.

**Market Research**

The checkoff’s market research programs work to gather necessary data to inform program decisions, and track results. Consumer and industry partner perspectives are critical inputs. The research efforts continue to evolve with new methodologies including Toluna and other ad hoc research panels, to provide greater flexibility in how the work is conducted. Toluna allows the team to quickly measure opinions as communications unfold. The work conducted is wide ranging, providing insights on nutrition, taste, and production related subjects. Work that will inform channel partners and influencers on beef’s strengths is integral to the team’s efforts. The results are packaged for internal teams, for state partners, and for the media and other industry stakeholders.

**Sustainability Research**

Checkoff-funded beef sustainability research provides science-based evidence to inform and engage industry stakeholders. This program also supports scientific advancement in the life cycle assessment (LCA) benchmark to measure beef sustainability using a balanced approach that includes social, economic, and environmental indicators. Research results demonstrate the industry’s commitment to improving beef’s sustainability and identify opportunities across the beef value chain to build and improve consumer trust in today’s beef, from pasture to plate.
Ratings from 2018 SBC Evaluation Survey

- QSBCs use AR materials (yes/no): 29/11
- Considered a “go to” resource – 8.7 out of 10
- Improves state programs – 8.6 out of 10
- How do QSBC extend the AR results – research shared widely, extend to events, food seminars, health professional outreach
- Would recommend to another QSBC:
  - Yes (8-10): 86.2%
  - No (1-4): 10.3%
  - Maybe (5-7): 3.5%
- AR work is improving:
  - Agree (8-10): 79.3%
  - No (1-4): 10.3%
  - Maybe (5-7): 10.4%
All research objectives achieved.

Note: Checkoff Nutrition Research and Scientific Affairs research projects (and the budgets approved for them) span multi-fiscal-year periods; therefore, reporting on specific efforts is grouped by the following areas:

- Outcome summaries of research projects completed in the 2018 fiscal year
- Table of ongoing research in the fiscal year
- Summary of dissemination of research efforts
- Report on other AR tactics

Outcomes of Projects Completed in Fiscal Year 2018
The following projects were completed in Fiscal Year 2018, but may have been funded out of previous years’ authorization requests.

The dose-response effects of lean beef in a Mediterranean-style dietary pattern on cardiovascular disease risk factors
Subcontractor: Pennsylvania State University
Expected Outcome: The Mediterranean Diet recommends that red meat be consumed less than 2 servings per week, with an emphasis on lean cuts. In this study, the researchers will evaluate the effects of different quantities of lean beef (0.5, 2.5 and 5.5 oz. per day) on blood pressure, in the context of a modified Mediterranean dietary pattern that is representative of foods typically consumed in the United States. It is anticipated that lean beef can be included in different amounts in heart healthy diets proposed in study and elicit similar endpoint effects.

Objective Achieved: Decreases in diastolic blood pressure were noted for all Mediterranean-style diets, demonstrating that it is unnecessary to restrict lean beef in the Mediterranean dietary pattern, but rather consumers can enjoy lean beef in the context of a Mediterranean-style dietary pattern.

Protein quality early in life: potential mechanisms of impact on growth and later obesity development
Subcontractor: University of Colorado Denver, School of Medicine
Expected Outcome: In a previous checkoff funded research, growth data of formula-fed infants age 5-12 months, showed that a dairy-based complementary diet led to slower linear growth and increased risk for being overweight, while a meat-based complementary diet led to increased linear growth without additional risk of rapid weight gain. Infants randomized to the meat-based diet also had an increase of blood biomarkers for bone growth, which is consistent with findings in weight and length. In this study, researchers will conduct two follow-up
assessments at 18 and 24 months to evaluate growth for the first 24 months of life, a critical period for proper growth and development. It is anticipated that the infants in the meat group will continue to have greater linear growth and a less obesogenic microbiome profile at 18 and 24 months, compared with infants in the dairy group.

**Objective Achieved:** The retention rate at 24 months was 84% for the Meat group and 81% for the Dairy group, with equivalent total protein intake, comparable to the estimates of U.S. population intake. At 24 months, weight-for-age Z score (WAZ) did not differ significantly between groups and was similar to that at 12 months. Length-for-age Z score (LAZ) remained significantly higher in the Meat group compared to the Dairy group, and the average length was 1.9 cm greater in the Meat group. Weight-for-length Z score (WLZ) also did not differ significantly between groups. Total protein intake from complementary foods during infancy has important implications for growth.

**Beef protein intake, physical activity, and muscle quality in middle-aged women**

*Subcontractor: North Dakota State University*

**Expected Outcome:** Millions of American women may not be meeting protein intake recommendations nor maintaining muscle quality, which can lead to an unnecessary impairment to their daily living. In this study, researchers will evaluate the relationships amongst dietary beef protein intake, physical activity, and markers for muscle loss and health in free-living middle-aged women. It is hypothesized that animal-based protein intake would have a positive relationship with measures of muscle function and muscle mass and that physical activity would strengthen these relationships.

**Objective Achieved:** As expected, total protein intake, as a percentage of daily calories, was related to increased size, strength, and endurance of the muscle of the thigh. However, contrary to expectations, no significant correlations were found between animal based-protein intake and any other variables – thus with no significant association, the proposed modulating effects of physical activity on these relationships could not be observed.

**A randomized, controlled-feeding, crossover trial to assess the effects of increasing lean beef consumption within a healthy dietary pattern on insulin sensitivity in men and women with risk factors for diabetes mellitus**

*Subcontractor: MB Clinical Research and Consulting, LLC*

**Expected Outcome:** Dietary guidance has suggested that Americans should move toward dietary patterns that increase consumption of plant foods and reduce consumption of animal-based foods, including red meat/beef. Observational studies show a positive association between red meat intake and increased risk of Type 2 Diabetes (T2D), but it remains unclear whether this increased risk is due to adverse physiological effects of red meat consumption or other diet and lifestyle factors that are often associated with higher red meat intake. In this study, the researchers will conduct a randomized, crossover study to compare the effects of two low saturated fatty acid diets; a healthy USDA-style diet and a USDA-style diet that incorporates about 150 g/d of lean beef in place of starches and refined CHO (USDA-LB), on insulin sensitivity in men and women with risk factors for diabetes mellitus. It was anticipated that the inclusion of lean beef will have no adverse effects on insulin sensitivity and other determinants of glucose tolerance.
**Objective Achieved:** The results of this trial indicate that intake of an additional 150 g lean beef each day, as part of a low saturated fat diet (with minimal red meat content), did not have statistically significant adverse effects on insulin sensitivity or other assessed cardiometabolic parameters compared with a USDA healthy American dietary pattern.

**Beef intake and muscle strength, cardiometabolic health and fatigue in women with breast cancer**

**Subcontractor:** The Ohio State University

**Expected Outcome:** While cancer survival rates continue to improve, devastating side effects from chemotherapy lead to damaged muscle tissues, weakness, cardiometabolic disease risk and fatigue. The loss of skeletal muscle mass coincides with an increased risk for cardiometabolic diseases, imposing a dramatic burden on cancer patients both during and after treatments end. Loss of muscle mass is a key predictor for breast cancer recurrence and early mortality. In this cross-sectional study, the researchers evaluated the relationship of beef intake with lean mass and grip strength, cardiometabolic markers of health, fatigue, sleep quality and mood in newly diagnosed breast cancer patients. The overall hypothesis is that higher beef intake is protective against muscle loss, muscle weakness, cardiometabolic disease risk and fatigue in women with a current diagnosis of breast cancer.

**Objective Achieved:** Preliminary results suggest that red and processed meat intake (as a marker for beef intake) had no associations with muscle mass, strength, cardiometabolic markers, fatigue or sleep quality. Similarly, animal protein intake (as a marker for beef intake) had no associations with muscle mass, strength, cardiometabolic markers or fatigue. Additionally, there were no associations of reported iron, zinc or vitamin B12 with muscle mass, strength, cardiometabolic markers or fatigue. However, there was a significant association between reported iron intake with the Framingham risk score for heart disease when age, cancer stage were included in the model. Reported intake of fatty acids unique in ruminant dietary sources (15:0, 17:0, 18:2,c9t11) were positively associated with lean mass even after adjusted for age and cancer stage. And lean mass was positively correlated with grip strength. Biomarkers of beef intake may be associated with enhanced muscle strength in women who are newly diagnosed with breast cancer.

**Are the “Ounce-equivalents” in the Protein Foods Groups really equivalent?**

**Subcontractor:** University of Arkansas Medical Sciences

**Expected Outcome:** The recent Dietary Guidelines for Americans (DGA) include specific advice to “vary your protein” and the resultant “ounce equivalents” (oz-eq) guidance was developed in the protein foods group. However, animal proteins have much higher Digestible Indispensable Amino Acid Score (a measure of protein quality) than plant proteins, often by as much as two-fold. In this study, the protein density and quality will be directly measured by the anabolic response (i.e., protein synthesis minus breakdown) as well as muscle protein synthesis following the consumption of 2 oz of cooked 85% lean sirloin, 2 oz 85% cooked lean ground beef and 1/2 cup (2 oz-eq) of cooked kidney beans by healthy adults. It is expected the beef items will have greater anabolic response compared to the beans, with an even greater response for the ground beef.

**Objective Achieved:** Whole body anabolic response was greater for the both beef groups compared to the kidney beans; with greater response in sirloin (whole muscle cut) than ground beef. This was caused by a modest increase in whole body protein synthesis and a substantial
reduction in whole body protein breakdown. The kidney beans had a smaller reduction in protein breakdown and little effect on protein synthesis. Additionally, the beef groups led to higher plasma essential amino acids concentrations than the kidney beans. These results demonstrate the “ounce equivalents” proteins in the DGA guidelines were not equivalent in terms of functional responses and plasma essential amino acids concentration.

**Systematic review of the classification and consumption of meat in relation to human health**

**Subcontractor:** Colorado State University

**Expected Outcome:** The term “Meat” is a vague term and there is a lack of consistency and specificity in the definition and characterization of meat by nutrition scientists versus meat scientists. The objective of this review was to compare literature regarding various definitions of muscle foods and discuss how these variations have created discrepancies in interpreting the current body of literature.

**Objective Achieved:** The research team concluded that inconsistent muscle group categorizations, along with methodological limitations, lead to different intake estimates in nutrition research. The various definitions and categorizations of meat and muscle foods lead to inconsistent conclusions about the effect of consuming meat on human health. Researchers who classify muscle foods into these groups do not consistently consider nutrient content, in turn leading to implications of scientific conclusions and dietary recommendations. Consequentially, these factors demonstrate a need for a more universal muscle food classification system. Adding further specification to the classification systems utilized by researchers would improve the accuracy of characterizing muscle foods in research. This task would appropriately be accomplished by convening an expert panel and using a systematic review protocol of previous literature.

**Digestible indispensable amino acid score (DIAAS) for ground beef and beef ribeye**

**Subcontractor:** North Dakota State University

**Expected Outcome:** The Digestible indispensable amino acid score (DIAAS) is a scoring method that is based on true ileal amino acid digestibility determined for each amino acid individual and recommended by the FAO in 2011 to replace the previous protein quality method, Protein Digestibility Corrected Amino Acid Score (PDCAAS). To contribute beef related DIAAS data, the researchers will use a swine model to determine the DIAAS score for beef ribeye steaks cooked rare, medium and well done and for cooked ground beef.

**Objective Achieved:** [The research project has been completed, and final report from the researchers is due October 31, 2018.]

**Effects of incorporating red meat into a Mediterranean-style dietary pattern on cardiometabolic well-being: novel insights from foodomics, microbiota, and plasma metabolomics profiling**

**Subcontractor:** Purdue University

**Expected Outcome:** It is unclear which specific dietary components of a Mediterranean-style eating pattern containing beef are responsible for improvements in cardiometabolic disease risk factors. This research will catalog the dietary components consumed by our participants and determine how those components predict changes in cardiometabolic disease risk factors. This will be achieved via a novel approach of comparing stool and plasma metabolomics to the dietary components consumed (“foodomics”). Further, we will assess how these food
components affect the microbiome in a subset of participants that provided stool samples during pre- and post-intervention testing.

**Objective Achieved:** [The research project has been completed, and final report from the researchers is due October 31, 2018.]

The role of beef in optimal protein and feeding strategies to accelerate muscle mass and functional recovery from Anterior Cruciate Ligament (ACL) repair

*Subcontractor: University of Connecticut*

**Expected Outcome:** There is limited evidence that higher protein intake throughout physical rehabilitation for knee surgery patients is beneficial to changes in muscle size and strength or to length of recovery and return to routine exercise, sport or physical activity. This project will use novel stable isotope techniques for proteomic analysis of muscle protein synthesis, and molecular assessments of skeletal muscle atrophy and remodeling to examine the efficacy of higher protein intake and post-therapy protein (beef) supplementation pre-surgery and throughout rehabilitation on skeletal muscle function in response to anterior cruciate ligament (ACL) repair in physically active adults.

**Objective Achieved:** [The research project has been completed, and final report from the researchers is due October 31, 2018.]

The influence of regular beef consumption and protein density of the diet on training induced gains in muscle strength and performance in healthy adults

*Subcontractor: University of Illinois, Urbana-Champaign*

**Expected Outcome:** The loss of muscle and strength especially in older adults can lead to health problems and impair their ability to remain physically independent. Weight lifting and proper nutrition can help alleviate these health issues. In this study, healthy but sedentary adults (40-65y) will follow a regimen of resistance exercise and consuming higher quality protein (in the form of beef). Researchers will evaluate if the regimen has a positive effect on muscle strength and performance/function. Cognitive tasks and neurophysiological assessment will also take place. It is anticipated that the individuals who consume higher protein ~1.6-1.8 g protein/kg/d will have greater improvements in muscle strength, muscular performance, and cognitive function, compared to individuals in normal protein group (~0.8-1.0 g protein/kg/d).

**Objective Achieved:** [The research project has been completed, and final report from the researchers is due October 31, 2018.]
<table>
<thead>
<tr>
<th>Project Title</th>
<th>Contracting Institution</th>
<th>AR #</th>
<th>Tactic #</th>
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<tbody>
<tr>
<td>Effects of higher consumption of protein-rich animal foods with the USDA Healthy U.S.-Style Eating Pattern on sleep quality and cardio-metabolic health in overweight/obese adults during diet induced weight loss</td>
<td>Purdue University</td>
<td>1704-R</td>
<td>2A</td>
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<td>Beef as a component of a healthy dietary pattern in cancer survivors</td>
<td>The Ohio State University</td>
<td>1704-R</td>
<td>2A</td>
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<td>Characterization of DNA adducts of meat carcinogens in the human colorectum</td>
<td>University of Minnesota</td>
<td>1704-R</td>
<td>2A</td>
</tr>
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<td>Do associations of meat consumption with cardiometabolic risk factors depend on associations with overall dietary quality?</td>
<td>University of Massachusetts Lowell</td>
<td>1704-R</td>
<td>2A</td>
</tr>
<tr>
<td>Is beef from cattle fed wheat gluten free?</td>
<td>Texas A&amp;M University</td>
<td>1704-R</td>
<td>2A</td>
</tr>
<tr>
<td>The role of beef ingestion in supporting exercise-derived benefits for the muscle-brain interconnect</td>
<td>University of Illinois at Urbana-Champaign</td>
<td>1704-R</td>
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<td>Influence of fresh and lean beef consumption on diet quality and functional limitations among American older adults, 1999-2016</td>
<td>University of Illinois at Urbana-Champaign</td>
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<td>Beef as a unique source of healthy Branched Fats</td>
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<td>Impact of beef’s unique food matrix on human health – Cholesterol metabolism and voluntary nutrient intake in men consuming low-fat and high-fat ground beef</td>
<td>Texas A&amp;M University</td>
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<td>Exploring relationships among habitual beef consumption, plasma TMAO and risk factors for cardiovascular disease</td>
<td>USDA, ARS, Western Human Nutrition Center</td>
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<td>Phase II - Analytical phase of the dose-response effects of lean beef in a Mediterranean-Style dietary pattern on cardiovascular disease risk factors</td>
<td>USDA, ARS, Beltsville Human Nutrition Center</td>
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<td>A meal-based comparison of protein quality, complementary proteins and muscle anabolism</td>
<td>University of Texas Medical Branch</td>
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<td>Nutrition, vision, and cognition in sport study: Beef (IONSport-Beef)</td>
<td>Texas A&amp;M University</td>
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<td>The effects of including beef in a plant-based eating pattern on cardiometabolic disease risk factors and overall consumer satisfaction</td>
<td>Purdue University</td>
<td>1810-R</td>
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</tbody>
</table>
Summary of Nutrition Research and Scientific Affairs Dissemination

The dissemination of research results, technical summaries and fact sheets on key nutrition research topics is a continuous process. Materials with beef nutrition research information are developed for specific audiences and strategically disseminated to ensure utilization by multiple stakeholders. The following information summarizes the diverse efforts to spread beef nutrition research information to the appropriate audiences.

Internal Audiences

Beef nutrition research data plays a key role in the development of the checkoff's nutrition education and communication messages for consumers. This foundation of science allows the communication professionals to develop evidence-based messages that will resonate with consumers and reinforce their confidence in the nutritional value and health benefits of beef products. New information is shared with industry spokespeople to ensure they are equipped with the latest data when contacted by the media for interviews. In addition, the monitoring of emerging nutrition and health issues assists management staff in targeting key beef-related concerns, misinterpretations and controversies and preparing for them.

External Audiences

Results from nutrition research projects funded by the beef checkoff are presented in published abstracts and manuscripts, which is the best method to disseminate beef nutrition information to the scientific community. Twelve checkoff funded research manuscripts were published in FY18. Several more manuscripts have been submitted for publication or are in development. Beef checkoff funded nutrition research projects are also presented by scientists at multiple scientific meetings including American Society for Nutrition, Academy of Nutrition and Dietetics, ObesityWeek, and the Institute of Food Technologists. These presentations reach thousands of scientists from around the world.

Executive summaries of published results of the studies are posted on www.beefresearch.org for utilization by the beef industry and other external audiences.

Report on Other Measurable Objectives

Tactic 2A: Nutrition Research and Scientific Affairs

All tactic objectives achieved. See Tactic Tracking Spreadsheet

- Conduct a minimum of two original human nutrition research trials on healthy diets across the life span, where beef is used as the primary source of dietary protein.
  - Three human nutrition research trials with beef as the primary source of dietary protein are currently being conducted (funded with FY18 budget), including one new investigator. An additional research proposal is in the final stages of review. The projects are anticipated to be completed by the end of this AR on September 30, 2020.
- Develop and submit for publication at least one comprehensive scientific paper on beef's role in a healthy, sustainable diet.
A comprehensive review on beef’s role in a healthy, sustainable diet was completed and was published in the July/August 2018 issue of Nutrition Today.

- Increase engagement from 40% in 2017 to 45% in 2018 of the top 100 Nutrition Science Influencers (as identified by historical data monitoring).
  - In FY18, 45% of the top 100 U.S. Nutrition Science Influencers were contacted about beef checkoff research priorities and program. In addition, all top 100 U.S. Nutrition Science Influencers were contacted via email about the publication of the checkoff co-funded study on fresh lean red meat in a Mediterranean-style eating pattern.
Final Program Evaluation for Work Completed in Fiscal Year 2018
Product Quality Research and Technical Expertise

Contractor: National Cattlemen’s Beef Association (Bridget Wasser, program manager)

All research objectives achieved.

Note: Checkoff product quality research projects (and the budgets approved for them) span multi-fiscal-year periods; therefore, reporting specific efforts is grouped by the following areas:

- Outcome summaries of research projects completed in the 2018 fiscal year
- Table of ongoing research in the fiscal year
- Summary of dissemination of research efforts
- Report on other AR tactics

Outcomes of Projects Completed in Fiscal Year 2018
The following projects were completed in Fiscal Year 2018 but may have been funded out of a previous year’s authorization request.

Time and Temperature Kinetics for the Development of Volatile and Non-Volatile Flavor Compounds in Steaks
Subcontractor: Texas A&M Agrilife Research

Expected Outcome(s): The objectives were to 1) determine the impact of different grill surface temperatures on trained sensory panel scores, volatile aroma compounds and non-volatile compounds; 2) develop predictors of trained sensory panel scores using cooking parameters and volatile aroma compounds; and 3) develop a novel and innovative method for measuring non-volatile flavor factors using metabolomics.

Objective(s) Achieved: Increasing the grill surface temperature when cooking USDA Select beef strip loin steaks increases many of the positive trained sensory panel attributes and volatile aroma compounds important to the acceptance of beef but decreases beef tenderness. Additionally, cooking parameters along with volatile aroma compounds account for as much as 65% of the variation in positive beef flavor traits. The increase in grill temperature positively influences beef flavor and the metabolites that are precursors to flavor compounds in lean beef. Also, cooking at a temperature of 400°F may maximize umami, beef identity, and roasted flavors.

The Influence of Retail Display Lighting and Packaging System on Beef Flavor
Subcontractor: Texas A&M Agrilife Research

Expected Outcome(s): The objective was to evaluate the effect of package type (vacuum roll-stock, high oxygen modified atmosphere package (MAP), traditional over-wrap and traditional over-wrap stored in master bag containing 0.4% CO gas and retail display lighting system (fluorescent vs. light emitting diode) on objective and subjective measures of beef flavor of the triceps brachii (9chuck), longissimus lumborum (rib), psoas major (tenderloin), gluteus medius (sirloin) and semimembranosus (round) muscles.

Objective(s) Achieved: Most of the consumers in this study generally preferred vacuum roll-stock packaged steaks stored in the dark as evidenced by more desirable flavor, juiciness,
tenderness and overall liking scores and acceptability scores. Packages containing 80% O2 and 20% CO2 were associated with negative flavor attributes, while samples stored in the dark were generally preferred over steaks displayed under fluorescent or LED retail display lighting. Results from this study can be used to make tailored recommendations to retailers, purveyors and foodservice personnel regarding the ideal packaging and storage conditions for various beef cuts in order to maximize palatability and consumer acceptability, resulting in a more desirable and consistent eating experience for consumers who purchase these beef cuts.

Studies in Cookery and Beef Flavor Development

Subcontractor: Texas Tech University

Expected Outcome(s): The objectives of this study were to: 1) evaluate the influence of dry heat cookery method on beef flavor development of beef steaks of two different quality grades and 2) determine the influence of dry heat cookery on beef flavor development of multiple beef muscles.

Objective(s) Achieved: These data indicate that cooking method and muscle effects are independent of one another, which indicates that various dry heat cookery methods can be applied to different muscles with equal success. Additionally, high quality muscles, such as the psoas major (tenderloin) and the infraspinatus (chuck) can provide the consumer with a quality eating experience, regardless of cooking method. Ultimately, this research indicates that consumers have significant influence on their palatability experience. Cut selection and cookery method can enhance or reduce palatability. Thus, there exists opportunity to empower consumers with information which will increase their likelihood of having a positive beef eating experience.

Evaluating the Effects of Commonly Used Antimicrobial Intervention Spray Combinations on the Flavor Profile of Beef

Subcontractor: Colorado State University

Expected Outcome(s): The objective of this study was to determine the influence of a combination of commonly used chemical interventions on the flavor profile of beef. Harvest floor and cold product interventions were included to identify differences in flavor. Treatments including Lactic Acid (LA), peroxyacetic acid (PAA), and lactic/citric acid blends (LAC) were applied to beef briskets.

Objective(s) Achieved: The findings of this study suggest that the flavor performance of beef that has been treated with chemical interventions is not a result of a combination of treatments on the hot and cold sides of the harvest process, rather, the impact of hot and cold interventions is independent of one another. The only statistically significant differences for flavor attributes among ground beef samples treated with intervention chemicals were found among the hot interventions. The cold interventions did not statistically influence the flavor profile of the ground beef samples. Treating warm trimmings sources with lactic acid resulted in the greatest intensity of sour and chemical notes. Beef trimmings treated hot with LA resulted in the greatest magnitude of difference in sour flavor intensity versus the control samples (10.56 vs. 7.57). While chemical flavor intensities were statistically higher for LA samples than PAA and control samples, the quantitative measure represented a low-level intensity for all samples. Interestingly, browned flavor ratings were the greatest for ground
beef samples treated hot with PAA. There were no differences in the intensity of beef flavor ID, roasted, metallic, fat-like, sour, rancid, warmed over, or liver-like among the hot intervention treatments. The findings of this study suggest that chemical interventions applied to a hot, un-chilled surface have the greatest influence on beef flavor performance, while chemical interventions applied to a chilled product have little to no effect on flavor performance. Additionally, in this study, chemical interventions did not influence the fatty acid profile of beef samples.

**Discovering the Capabilities of Rapid Evaporative Ionization Mass Spectrometry (REIMS) as a Novel Mass Spectrometry Method to Characterize Beef**

*Subcontractor: Colorado State University*

**Expected Outcome(s):** The objective of this study was to evaluate the ability of rapid evaporative ionization mass spectrometry (REIMS) as a novel method to predict various components of beef quality, including carcass type, sensory attributes, and objective tenderness measurements. REIMS technology has the ability to collect and analyze highly accurate molecular information from muscle tissue within a matter of seconds.

**Objective(s) Achieved:** This study showed that REIMS has the ability to accurately predict carcass type, shear force tenderness classifications, and sensory attributes. When predicting five carcass type classes (Select/Low Choice, Top Choice/Prime, Dark Cutter, Grass-fed, and Wagyu), samples were accurately predicted 83.93% of the time. This shows that even beyond marbling score, REIMS can identify carcasses with different production backgrounds that are commonly associated as high-quality products. Furthermore, samples were classified as either positive or negative based on an overall flavor score as determined by a trained sensory panel. REIMS predicted flavor class with 80.70% accuracy, showing the ability to segregate high and low performing samples, even without the consideration for quality grade or carcass type. Finally, based on slice shear force values, tender samples were identified from tough samples with 75.44% accuracy. Although the various models were predicted with relatively high accuracy, model prediction was somewhat inhibited by overlapping samples between classes. These results still show a very promising ability for REIMS to predict various beef quality characteristics and its potential utilization in the marketing and segregating of beef carcasses.

**Beef Flavor Myology – Round Two: Collaborator I**

*Subcontractor: Texas A&M Agrilife Research*

**Expected Outcome(s):** The objectives of this study were to evaluate the effects of USDA Quality grade, cut thickness, cooking method, internal temperature or time of cook and marination on the flavor and texture of beef bottom, eye of round and inside bottom round cuts. Volatile aromatic compounds were also evaluated. The intent was to understand flavor and texture of these cuts and then provide information that can be used to develop a tool for consumers to maximize flavor called the Beef Flavor Myology tool.

**Objective(s) Achieved:** USDA Quality grade affected tenderness of inside round steaks, but USDA Quality grade had no effect on the flavor and texture of eye of round and outside round cuts. This is not surprising as connective tissue amount from these high use muscles affect tenderness to a greater extent and connective tissue amount in meat from young animals has
not been shown to be affected by Quality grade. Cooking method and cut thickness affected sensory attributes of round cuts. Thin round cuts that were marinated and cooked either one or three hours were tender, however, the sour flavor of the lemon marinate had a negative effect on flavor. This negative flavor effect would most likely be masked by the use of other ingredients when this product was used for a stew or a component of the recipe. These data are available for use in prediction equations for predicting consumer liking and can be used to develop an on-line tool for consumers and the foodservice industry to maximize the flavor and tenderness of beef round cuts.

**Beef Flavor Myology – Round Two: Collaborator II**

*Subcontractor: Colorado State University*

**Expected Outcome(s):** The objective of this study was to evaluate the effects of quality grade, final internal temperature, and cooking method on sensory profile of five beef muscles: *rectus femoris* (round), *gluteus medius* (sirloin), *infraspinatus* (chuck), *triceps brachii* (chuck), and *teres major* (chuck) to characterize sensory characteristics of these cuts.

**Objective(s) Achieved:** Degree of doneness had the greatest impact across all muscles evaluated. Higher final temperatures were related to higher beef ID, browned and roasted notes, but decreased tenderness. Additionally, sensory panelists detected greater amounts of bloody/serumy, metallic, and sour flavors in samples cooked to lower end-point temperatures. Cooking method affected flavor ratings for all muscles, with oven roasting producing increased cardboardy, earthy/musty, and sour flavors. Perhaps the most evident difference related to cooking method was the more intense bitter and burnt flavors associated with pan grilling. Quality grade had a minimal impact on the muscles included in the study, but Top Choice samples of *triceps brachii* (chuck) did present higher tenderness ratings than those from the Select grade. These results highlight the importance of understanding the properties of individual cuts in order to best use them to create a positive eating experience. In combination with previous research, this data will be used to develop a resource that characterizes sensory characteristics of lesser-utilized beef cuts. Foodservice operations as well as in-home cooks may be able to use this information to purchase more affordable items without sacrificing eating satisfaction.

**Modeling Beef Flavor**

*Subcontractor: Texas A&M Agrilife Research*

**Expected Outcome(s):** The objectives of this study were to use five existing consumer beef studies to develop a model to understand the relationships between consumer overall liking and trained beef descriptive flavor attributes, volatile aromatic compounds and meat chemical attributes in whole muscle and ground beef.

**Objective(s) Achieved:** Nine prediction equations were developed and can be used by industry, academics or government to predict beef consumer liking using either trained sensory panel flavor and/or texture attributes, volatile aromatic compounds or raw chemical analysis. These are the first equations that have moderately strong prediction power to understand consumer overall liking, especially as it relates to beef flavor, using different cooking methods, degree of doneness, quality grades and cuts. Consumer overall liking of ground beef was also predicted as slightly different factors impact consumer liking of ground beef. As a result of this
research, the beef industry has a much greater understanding of factors in beef that drive consumer liking and these results can be used in the development of instrumentation for automated evaluation of beef flavor.
# Ongoing Research in Fiscal Year 2018

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Contracting Institution</th>
<th>AR</th>
<th>Tactic #</th>
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<tr>
<td>Metabolomics: The latest technology to predict flavor potential</td>
<td>Texas A&amp;M University</td>
<td>1810-R</td>
<td>3A</td>
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<td>Determination of packaging type influence on proteolysis, beef flavor</td>
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<td>Understanding the influence of increasing carcass weight on chilling rate,</td>
<td>South Dakota State University</td>
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<td>Evaluating Rapid Evaporative Ionization Mass Spectrometry (REIMS) as a novel,</td>
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<td>Post-Harvest Handling Challenges to Optimize Beef Quality: What do we know</td>
<td>Iowa State University</td>
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<td>Predicting beef flavor differing in lipid heat denaturation and Maillard</td>
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<td>Do carcass weight and ribeye size impact beef palatability and composition?</td>
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<td>Predicting beef flavor differing in lipid heat denaturation and Maillard</td>
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<td>Beef Flavor Audit: Collaborator I</td>
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<td>Beef Flavor Audit: Collaborator II</td>
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Summary of Product Quality Research Dissemination

Research funding return on investment is maximized when research results are thoroughly disseminated to the appropriate audiences. Dissemination is a foundation area of the checkoff-funded Product Quality Research program and the beef quality message is spread through research that is shared online, in print, and through face-to-face meetings.

Results from Product Quality Research projects funded by the Beef Checkoff are presented annually by scientists at multiple scientific meetings including the American Meat Science Association’s Reciprocal Meats Conference and the American Society of Animal Science Annual Meeting. Furthermore, researchers utilize data to author scientific articles published in peer-reviewed journals. Research project summaries are posted on www.beefresearch.org for utilization by all stakeholders. Multiple publications were posted utilizing information from the National Beef Quality Audit. The information was summarized in several formats to ensure dissemination to diverse audiences was effective. In addition, more than 20 project summaries and research briefs were completed and added to this site.

Checkoff-funded research information generated through the Product Quality Research program is shared with other Beef Checkoff programs to extend project results and provide a science-based foundation for marketing and promotion activities. In fiscal year 2018, the Checkoff’s Product Quality Research program continued its development of educational resources that can be found online at www.beefresearch.org.

In addition, the Checkoff’s Product Quality Research staff conducted numerous research presentations throughout the year at meetings in support of national and state partners including audiences like foodservice operators and chefs, retailers, academics, packers, processors, etc. Product Quality Research continues to provide the knowledge base to support product innovations and improvements in beef product quality.

Report on Other Measurable Objectives:

Tactic 3A: Product Quality Research and Technical Expertise
All tactic objectives being achieved.

- Completed more than 5 novel research projects to fill significant knowledge gaps and provide industry direction for improving beef product taste and eating satisfaction.
- Created more than 20 new educational materials for industry influencers utilizing Checkoff-funded research information.
- Showcased product quality research program content through three avenues including scientific conferences, peer review articles, and the www.beefresearch.org website.
All research objectives achieved.

Note: Checkoff beef safety research projects (and the budgets approved for them) span multi-fiscal-year periods; therefore, reporting on specific efforts is grouped by the following areas:

- Outcome summaries of research projects completed in fiscal year 2018
- Table of ongoing research in the fiscal year
- Report on other AR tactics

Outcomes of Projects Completed in Fiscal Year 2018
The following projects were completed in Fiscal Year 2018 but may have been funded out of previous years’ authorization request.

Environmental Assessment of U.S. Beef Production Systems, Phase 4
Subcontractor: USDA-ARS

Expected Outcome: To determine farm gate environmental footprints of beef production systems in the U.S. and develop production information to support a full life cycle assessment of beef. Specific plans for this period are to:

- Gather cattle production information through producer surveys and visits in the southeast and northeast regions of the U.S.
- Simulate representative operations to evaluate and document the environmental impacts of beef cattle produced in these regions.
- Supply regional information on feed and cattle production and their environmental impacts to collaborators at the University of Arkansas to conduct a full chain life cycle assessment.

Objective Achieved: This information is used along with data gathered from the processing, retail and consumer portions of the industry to define economic, social and environmental factors of sustainability. A comprehensive evaluation of the industry benchmarks the current status of the industry and helps identify areas for improvement. Adoption of sustainable management practices throughout the production chain benefits the beef industry by protecting the environmental resources on which it relies and enhancing consumer confidence.
<table>
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<th>Project Title</th>
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<td>Sustainability of beef production in the United States: Quantification of</td>
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<td>human-edible inputs, protein quality and allocation of methane production</td>
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<td>Regional Sustainability Assessment of U.S. Beef Production Systems</td>
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<td>Regional Sustainability Assessment of U.S. Beef Production Systems (Part 2)</td>
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<td>Capturing beef’s ability to upcycle protein as an indicator of sustainability</td>
<td>Texas A&amp;M AgriLife Research</td>
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<td>Quantification and allocation of freshwater usage in Nebraska beef cattle</td>
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<td>production systems</td>
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<td>Use of modern diets and technology on animal growth performance and</td>
<td>USMARC – Clay Center Nebraska</td>
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<td>environmental impacts of the feedlot production system</td>
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<td>Practices for improving the sustainability of U.S. beef cattle production</td>
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<td>Ecosystem services and biodiversity assessment of U.S. beef production</td>
<td>Resilience Services, PLLC</td>
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<td>Estimating the Economic Value of U.S. Beef Cattle Ranching Based Ecosystem</td>
<td>University of Wyoming</td>
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Report on Other Measurable Objectives

Tactic 1A: Sustainability Research and Scientific Affairs

All tactic objectives achieved. See tactic tracking spreadsheet.

- Conduct a minimum of four original scientific research projects focused on understanding and benchmarking the sustainability of beef systems and the beef value chain.
  - Original AR, not an extension, continued through September 30, 2019. 6 research projects were initiated focused on benchmarking and understanding the sustainability of beef systems.

- Produce a minimum of eight tools (web content, reviews, fact sheets, videos, etc.) that clarify sustainable beef production today based on both checkoff and non-checkoff funded research findings.
  - 47 sustainability-related resources were developed and placed on beefresearch.org to showcase beef sustainability research and outreach information.

- Inform a minimum of five audiences (i.e., scientific community, consumer or industry influencers, retail or foodservice, etc.) on how beef is sustainably raised today.
  - 52 presentations on how beef is sustainably raised were provided to audiences that included the scientific community (both U.S. and international researchers), nutrition influencers, such as dietitians and food bloggers, and supply chain audiences.
Final Program Evaluation for Work Completed in Fiscal Year 2018
Beef Safety Research

Contractor: National Cattlemen’s Beef Association (Mandy Carr Johnson, Ph.D., program manager)

All research objectives achieved.

Note: Checkoff beef safety research projects (and the budgets approved for them) span multi-
fiscal-year periods; therefore, reporting on specific efforts is grouped by the following areas:

- Outcome summaries of research projects completed in fiscal year 2018
- Table of ongoing research in the fiscal year
- Summary of dissemination of research efforts
- Report on other AR tactics

Outcomes of Projects Completed in Fiscal Year 2018
The following projects were completed in Fiscal Year 2018, but may have been funded out of previous years’ authorization request.

Ecology and Transfer of Antimicrobial Resistant Bacteria and Genes in the Feed-yard and
Land-application Environment When Cattle are Fed Different Antibiotics
Subcontractor: University of Nebraska

Expected Outcome: Accurate information about persistence and dissemination of antibiotic bacteria in the environment is essential for assessing potential health risks and environmental quality. This project aimed to characterize and investigate the antimicrobial resistant bacteria transferred from beef cattle administered with different antibiotics to the surrounding environment. The long-term goal of this work was to enhance antibiotic stewardship by addressing data gaps and managing the transmission of livestock originated antimicrobial resistance, especially through environment pathways.

Objective Achieved: The use of Tylan or chlortetracycline at the cattle feedlot in this study did not significantly increase the within-herd prevalence or concentration of macrolide or tetracycline resistant *E.coli*, *Salmonella* or *Enterococcus* in feces or on hides. Effective manure management would be very helpful in reducing both overall bacteria and the antibiotic resistant ones, which can subsequently help eliminate the transmission to croplands. Based on this study, airborne transmission of macrolide and tetracycline resistant *E.coli*, *Salmonella* and *Enterococcus* from the beef cattle feedlot, manure storage and land application sites is limited.

Prevalence of filarial nematodes in cattle production systems: a role in transdermal *Salmonella*
transmission?
Subcontractor: USDA-ARS Knipling-Bushland, Texas Tech University, Dept of Animal and
Food Sciences

Expected Outcome: Skin-dwelling filarial nematodes, if present, may acquire *Salmonella* via the cattle hide or an intermediate arthropod host, providing an additional source of bacteria that can be transdermally introduced to the bovine host. The objective of the study was to
screen for the presence of skin-dwelling filarial nematode species from cattle hides and from filth fly pests/ectoparasites inhabiting cattle production settings, as this is understudied in the US.

**Objective Achieved:** Less than 1% of the 729 horn flies screened were positive for nematode DNA using a PCR assay, and no products were amplified from house flies (n = 61) or stable flies (n = 327). These indicate a low overall prevalence of nematode infection in filth fly populations sampled in March – July. Four isolates displayed similarity to non-filarial nematodes while two were similar to filarial nematode sequences; however, all six isolates remain ‘unidentified’ as they do not have high enough levels of sequence coverage to assign concrete identifications. These data support molecular monitoring of filth fly populations at livestock settings as an indicator for the prevalence of nematodes within cattle herds, but nematode identification may be precluded by availability of sequences in the public database. Future sampling should be extended for the duration of the warmer season (June – October) when there is a reported increase in prevalence of *Salmonella* in peripheral lymph nodes, and it should focus on symbovine species, i.e. horn flies.

**AMR risk assessment data gaps:** AMR in feces of culled market cows and bulls and retail meat products from animals raised with and without antibiotics

**Subcontractor:** Colorado State University

**Expected Outcome:** There exists significant public and private pressure on meat production systems to lower or eliminate use of antimicrobials. Our combined laboratories have previously conducted a number of culture-based, qPCR, 16s, and shotgun metagenomic studies to address questions related to dissemination of antimicrobial resistance (AMR) via the beef supply chain. Some of that work (Yang et al., 2016; Noyes et al., 2016b) demonstrated that a number of AMR genes (including for antimicrobials that are not used in animal agriculture) may be detected in animal/bird growing environments, but that those genes—if transmitted at all—are relatively rare on beef retail products (we have not investigated such transmission in other species). The objectives of this study were to determine the relative abundance and extent of AMR in feces of market bulls and cows, as well as in retail meat products, using metagenomic, culture and qPCR approaches.

**Objective Achieved:** Culture testing indicated that Generic *E. coli* was present in a majority of samples. *Salmonella spp.* was also found in five of the 100 samples tested, with 4 of the samples coming from the conventional set of samples. 43 of the 50 natural samples were susceptible to Tetracycline while 29 of the 50 conventional samples were susceptible to Tetracycline. The majority of samples (97/100) were susceptible to 3rd generation Cephalosporins. Susceptibility to Erythromycin was also tested for, however neither treatment seems to be more or less susceptible to the drug (23/50 Natural; 19/50 Conventional). All samples were determined to be susceptible to Vancomycin.
## Ongoing Research in Fiscal Year 2018

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<thead>
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<th>Project Title</th>
<th>Contracting Institution</th>
<th>Tactic #</th>
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<tr>
<td>Effects of Ractopamine Withdrawal in Yearling Steers</td>
<td>Colorado State University</td>
<td>6A</td>
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<tr>
<td>Construct a phage-mediated system to deliver CRISPR/Cas9 antimicrobials for sequence-specific elimination of foodborne pathogens in beef production</td>
<td>Colorado State University</td>
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<tr>
<td>Horizontal Gene Transfer of Antimicrobial Resistance in Commercial Cattle Production Environments</td>
<td>USDA-ARS, Northern Plains</td>
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</table>
Summary of Beef Safety Research Dissemination

Dissemination of research results, white paper and fact sheets on key beef safety issues is a continuous process. Materials are developed for specific audiences and strategically disseminated to ensure utilization by multiple stakeholders. The following information summarizes the diverse efforts to spread beef safety research information to the appropriate audiences.

Internal Audiences

Beef safety research data plays a key role in developing beef safety messages for consumers and industry influencers. This foundation of science allows the communication professionals to develop supportable messages that will resonate with consumers and reinforce their confidence in the safety of beef products. New information is shared with industry spokespeople to ensure they are armed with the latest data when contacted by the media for interviews. In addition, pro-active beef safety research monitors emerging issues and assists Issues Management program staff and state beef council staff in targeting key threats and preparing for them.

External Audiences

Results from safety research projects funded by The Beef Checkoff are presented by scientists at multiple scientific meetings including International Association for Food Protection, Institute of Food Technologists, Reciprocal Meat Conference, American Society for Microbiology, and the Beef Industry Safety Summit. These presentations reach thousands of scientists from around the world. Additionally, program staff share key program successes with a broad audience at industry-related conferences (examples: North American Meat Institute (NAMI), Food Marketing Institute (FMI), and Academy of Veterinary Consultants (AVC), North American Meat Institute Foundation (NAMI) as well as with other organizations interested in the beef industry’s safety efforts to protect public health (examples: Centers for Disease Control, FDA, and USDA-FSIS).

Project executive summaries are posted on www.beefresearch.org for utilization by the beef industry and other external audiences.

Additionally, investigators use the data to write scientific articles that are published in peer-reviewed scientific journals.

Report on Other Measurable Objectives

Tactic 6A: Safety Research and Scientific Affairs
All tactic objectives achieved. See tactic tracking spreadsheet.
- Complete at least 2 scientific research projects focused on pre-harvest challenges to beef safety.
  - Original AR (not an extension) continued through May 31, 2019. At least 2 research projects were completed (5 completed). See previous pages for summary.
• Showcase safety research program content through 3 avenues to influence industry adoption of new scientific evidence or assure stakeholders/influencers of the industry’s commitment to continually improve the safety of beef.
  o Six presentations were shared including at the International Assoc. of Food Protection, Reciprocal Meat Conference, Beef Industry Safety Summit and Institute of Food Technologists.

• Develop a minimum of 8 safety-related tools that answer tough questions by consumers and/or influencers about the safety of beef.
  o 43 safety-related resources were developed and placed on beefresearch.org to showcase beef safety research and outreach information.
<table>
<thead>
<tr>
<th>Tactic</th>
<th>Measurable Objectives</th>
<th>Exceeded</th>
<th>Achieved</th>
<th>Not Achieved</th>
<th>Ongoing Under Approved Extension</th>
<th>Contractor Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A</td>
<td><strong>Conduct a minimum of two original scientific research projects focused on pre-harvest challenges to beef safety. Outcomes will relate to pathogens, antimicrobial use and resistance, mechanisms/formation and transfer of resistance genes or microorganisms to humans or the environment, or risk assessment information for impacting human health.</strong></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>This AR and tactic does not end until Sept 2020. Two research projects focused on antimicrobial use and resistance have been contracted. The projects are anticipated to be completed by the end of this AR on September 30, 2020.</td>
</tr>
<tr>
<td>6A</td>
<td><strong>Develop a minimum of eight tools (web content, reviews, fact sheets, videos, etc.) that share research results or summarize research to provide information for tough questions by consumers and/or influencers about the safety of beef today.</strong></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Fifteen web content pieces have been developed to date and posted to <a href="http://www.beefresearch.org">www.beefresearch.org</a>.</td>
</tr>
<tr>
<td>6A</td>
<td><strong>Showcase safety research program content through three avenues including the Beef Industry Safety Summit, scientific conferences, peer review articles, and forums hosted by other entities. The goal is to influence industry adoption of new scientific evidence or assure stakeholders understand the industry’s commitment to improving beef safety.</strong></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Beef safety research was showcased at four scientific conferences (Reciprocal Meat Conference, International Assoc. Food Protection, Institute of Food Technologists, Beef Industry Safety Summit) to encourage industry adoption and stakeholder understanding of the industry’s advancements in beef safety knowledge.</td>
</tr>
</tbody>
</table>
| 2A     | **Conduct a minimum of two original human nutrition research trials on**                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |           |              | X                                | This AR and tactic does not end until Sept 2020. Three
<table>
<thead>
<tr>
<th></th>
<th>healthy diets across the life span, where beef is used as the primary source of dietary protein.</th>
<th></th>
<th>human nutrition research trials with beef as the primary source of dietary protein are currently being conducted (funded with FY18 budget), including one new investigator. An additional research proposal is in the final stages of review. The projects are anticipated to be completed by the end of this AR on September 30, 2020.</th>
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<tbody>
<tr>
<td>2A</td>
<td>Develop and submit for publication at least one comprehensive scientific paper on beef’s role in a healthy, sustainable diet.</td>
<td>X</td>
<td>A comprehensive review on beef’s role in a healthy, sustainable diet was completed and was published in the July/August 2018 issue of Nutrition Today.</td>
</tr>
<tr>
<td></td>
<td>Increase engagement from 40% in 2017 to 45% in 2018 of the top 100 Nutrition Science Influencers (as identified by historical data monitoring).</td>
<td>X</td>
<td>In FY18, 45% of the top 100 U.S. Nutrition Science Influencers were contacted about beef checkoff research priorities and programs. In addition, all top 100 U.S. Nutrition Science Influencers were contacted via email about the publication of the checkoff co-funded study on fresh lean red meat in a Mediterranean-style eating pattern.</td>
</tr>
<tr>
<td>3A</td>
<td>Conduct a minimum of five original scientific research projects focused on improving product quality and taste</td>
<td>X</td>
<td>Seven research projects have been selected for funding and</td>
</tr>
</tbody>
</table>
consistency. Outcomes will relate to achieving better understanding of beef flavor, tenderness and juiciness science for the development of applicable solutions to reduce beef product inconsistencies.

contracted. The projects are anticipated to be completed by the end of this AR on September 30, 2020.

| 3A | Develop a minimum of eight tools (web content, reviews, fact sheets, videos, etc.) that share research results or summarize research to provide information for questions by industry, consumers and/or influencers about beef’s quality and taste consistency. | X | More than 20 tools were developed this year related to product quality research information. Each were posted on [www.beefresearch.org](http://www.beefresearch.org). |
| 3A | Showcase product quality research program content through three avenues including scientific conferences, peer review articles, and the [www.beefresearch.org](http://www.beefresearch.org) website. The goal is to encourage industry adoption of new scientific evidence and continue to demonstrate the industry’s commitment to improving beef product quality and taste. | X | Research highlights were shared through a sponsorship of the 2018 Reciprocal Meats Conference in June and additionally Research content was shared through more than 20 pieces throughout the fiscal year via conferences, articles and the website content [www.beefresearch.org](http://www.beefresearch.org). |
| 3B | Develop a portfolio of new beef inspirations as recipes, new recipe photography, or reshoots of outdated but popular recipe photography, that address healthy, innovative, and on-trend beef meals in collaboration with other checkoff program needs that will increase use of recipes/photography by program and/or partner websites by 15% over 2017. | X | Over 100 photos (including portrait and landscape orientations) were taken over the last year for:  
- Supply chain partners  
- New recipes (nutrition and chef-inspired recipes)  
- Old recipes (to update)  
The newer Digital Asset Management system has
The Culinary Team made it possible for state and industry partners to pull photography easily from the system, rather than request them from the Culinary team. This exceeded the 15% goal (actual 66%).

<table>
<thead>
<tr>
<th>3B</th>
<th>Provide culinary expertise to other national or state partner programs that showcase beef’s nutrition, innovation, value, and/or ease of preparation through 20 in-person (demonstrations, panel speaker, etc.) or digital engagements (recorded or live videos or other digital content).</th>
<th>X</th>
<th>The Culinary Team provided support to over 35 state partner events and/or projects over the course of the year. In addition, team members also provided culinary expertise to over 25 consumer, supply chain or influencer audience (beef checkoff) events and/or projects.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3C</td>
<td>Average 16 channel intelligence data touch points per month to broaden the reach of checkoff funded insights and support research and communications programs.</td>
<td>X</td>
<td>Responded to 60 data requests for a monthly average of 20 per month. Completed analysis and summary of meat and dairy substitutes at retail, wrote first monthly article on top cuts for BIWFD.com.</td>
</tr>
<tr>
<td>3D</td>
<td>Provide Consumer Beef Index findings and implications to key beef industry stakeholders and program managers to help ensure checkoff priority decisions continue to be data-driven; dissemination will include posting on beefresearch.org accessible by industry stakeholders and sharing of key findings with at least six state beef councils.</td>
<td>X</td>
<td>Previous market research state dashboards have been conducts with a variety of states including but not limited to Texas, Washington, Michigan, Kansas, Nebraska, Iowa, Illinois and Alabama. IN addition, our new Consumer Beef Tracker (CBT) which replaces the former Consumer Beef Index launched in June.</td>
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and we have results to disseminate in October/November of 2018.

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<tr>
<td>3D</td>
<td>Post online summaries of 2-3 topics researched with the Millennial Listening Panel or via Toluna methodology on beefresearch.org.</td>
<td>X</td>
<td>We have posted 1 summary on our Steak Satisfaction tracker in March of 2018. We plan to have another summary up on recent Campaign Trends from the fiscal year from Toluna surveys in October.</td>
</tr>
<tr>
<td>3E</td>
<td>Assist the issues team with a study on a consumer hot-button issue to enhance understanding of consumer concerns, and possible messaging points for the industry.</td>
<td>X</td>
<td>This AR goes through Sept 2019 and we have two projects in process that fall under this objective. Red Meat Messaging which looks at the context and messaging points that consumers have with the term red meat. Also, we are conducting a Responsible Beef Exploratory November-January 2019 that will aim at addressing a variety of hot button issues like animal welfare.</td>
</tr>
<tr>
<td>3E</td>
<td>Test and validate a content piece(s) being leveraged for promotion and/or education with consumers and/or influencers.</td>
<td>X</td>
<td>Tested and validated Nicely Done Content in April of 2018 and Lance Pekus Strength video in May of 2018.</td>
</tr>
<tr>
<td>1A</td>
<td>Conduct a minimum of four original scientific research projects focused on understanding and benchmarking the sustainability of beef systems and the beef value chain.</td>
<td>X</td>
<td>This AR and tactic does not end until Sept 2020. Six projects have been initiated for and work in this tactic continues until the end of the AR of Sept. 2020.</td>
</tr>
<tr>
<td></td>
<td>Produce a minimum of eight tools (web content, reviews, fact sheets, videos, etc.) that clarify sustainable beef production today based on both checkoff and non-checkoff funded research findings.</td>
<td></td>
<td>Six research briefs were posted to Beefresearch.org in Q4, one infographic and one recorded sustainability presentation were developed. Over 20 were produced this year.</td>
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</tr>
<tr>
<td>1A</td>
<td>Inform a minimum of five audiences (i.e., scientific community, consumer or industry influencers, retail or foodservice, etc.) on how beef is sustainably raised today.</td>
<td></td>
<td>15 presentations on how beef is sustainably raised today were delivered in Q4. More than 50 were completed this year.</td>
</tr>
</tbody>
</table>

**DISCLAIMER:** Links to third-party websites within this document should not be considered an endorsement by the Beef Checkoff.
Appendix

AR: 1811-R
Contractor: NAMI
Program Managers: Bill Sessions
The checkoff’s post-harvest safety research program identifies and improves science-based interventions and process controls to ensure the safety of beef, which maintains and bolsters consumer trust in and demand for beef. In addition, the funded research programs have been supportive of public health. Without a doubt, the Beef Checkoff funded research has saved lives and been instrumental in preventing numerous food borne illnesses. Although post-harvest research supports demand for beef products, producers and their Checkoff leaders should also take pride in their legacy of a positive impact on public health.

The environment of microbial threats to food safety is constantly evolving. Post-harvest beef safety responds through research to develop interventions that disrupt bacteria at the cellular level. This and other novel research are needed for the beef-processing segment to mitigate threats. The research and dissemination activities conducted by this program provide practical, science-based research that can be used by in-plant personnel and others to ensure the safety of the beef supply.

The economic burden of illness is a major factor in the costs associated with pathogen contamination. According to the U.S. Department of Agriculture’s Economic Research Service, illnesses attributed to Salmonella cost $3.6 billion, STEC (non-O157 and O157) cost nearly $300 million, and Listeria costs $2.8 billion in the 2013. These costs resulted from medical costs, lost productivity, and death.

There are no acceptable levels for pathogenic organisms in beef products as evidenced by the level of foodborne illnesses in the United States. Because Salmonella is a significant source of illnesses, hospitalizations, deaths and related costs, research efforts focused on mitigating this threat in the beef supply will continue to be a key priority. Accordingly, there is a direct economic incentive for beef producers to invest in beef safety research to further reduce pathogenic contamination levels in raw materials and finished products to increase the value of and demand for their cattle, and ultimately their return on investment.
Ratings from 2018 SBC Evaluation Survey

- QSBCs use AR materials (yes/no): 6/34
- Considered a “go to” resource – 8.8 out of 10
- Improves state programs – 8.4 out of 10
- How do QSBC extend the AR results – provide research to processors and producers in states
- Would recommend to another QSBC:
  - Yes (8-10): 83.3%
  - No (1-4) 0%
  - Maybe (5-7): 16.7%
- AR work is improving:
  - Agree (8-10): 83.3%
  - No (1-4): 0%
  - Maybe (5-7): 16.7%
Final Program Evaluation for Work Completed in Fiscal Year 2018
Post-Harvest Beef Safety Research

Contractor: Foundation for Meat and Poultry Research and Education-North American Meat Institute
(Bill Sessions, Program Manager)

AR # 1811-R: All research objectives exceeded.

Outcomes of Projects Completed in Fiscal Year 2018

The following projects were completed in Fiscal Year 2018, but were funded out of previous years’ authorization requests.

- Research was conducted at Texas A&M University and co-funded with the Foundation for Meat and Poultry Research and Education (65 percent Foundation funding and 35 percent Checkoff funding for a total project cost of $125,625.00). The research project is titled: “Efficacy of antimicrobial interventions in reducing Salmonella, STECs, Campylobacter, and E. coli Biotype I Surrogates on pork carcasses, chilled pork products, beef and pork head meat, cheek meat, livers and hearts.”

- Research was conducted at ARS-Meat Animal Research Center and co-funded with the Foundation for Meat and Poultry Research and Education (50/50 funding split, total project cost is $36,000.00). The research assessed the impact in red meat processing of a mobile genetic element that imparts extreme heat resistance to E. coli.

- Research was conducted at Colorado State University. The retail portion of the research was funded by the Beef Checkoff at a cost of $110,000.00. The research project is titled: “Antimicrobial resistance (AMR) risk assessment data gaps: AMR in feces of culled market cows and bulls and retail meat products from animals raised with and without antibiotics”

- Research was conducted at the University of Manitoba. The research was funded by the Beef Checkoff at a cost of $48,600.00. The research project is titled: “Effectiveness of a novel, rechargeable, non-leaching polycationic N-halamine antibacterial coating to reduce Listeria monocytogenes in food processing environments”

- Research was conducted at Colorado State University. The research was funded by the Beef Checkoff at a cost of $74,972.00. The research project is titled: “Effect of antimicrobial treatment of beef cheek meat and tongues on pathogen survival/death and product flavor volatiles during refrigerated storage.”
Overview of the Research Projects Completed in FY 2018

Efficacy of antimicrobial interventions in reducing *Salmonella*, STECs, *Campylobacter*, and *E. coli* Biotype I Surrogates on pork carcasses, chilled pork products, beef and pork head meat, cheek meat, livers and hearts.

Expected Outcomes:

- To validate the efficacy of approved interventions in reducing *Salmonella*, STECs, *Campylobacter*, and *E. coli* Biotype I Surrogate contamination on pork carcasses and chilled pork subprimals.
- To validate the efficacy of approved interventions in reducing *Salmonella*, STECs, *Campylobacter*, and *E. coli* Biotype I Surrogate contamination on pork head or cheek meat. To validate the efficacy of approved interventions in reducing *Salmonella*, STECs, and *E. coli* Biotype I Surrogate contamination on beef head or cheek meat.
- To validate the efficacy of approved interventions in reducing *Salmonella*, STECs, *Campylobacter*, and *E. coli* Biotype I Surrogate contamination on pork hearts and livers. To validate the efficacy of approved interventions in reducing *Salmonella*, STECs, and *E. coli* Biotype I Surrogate contamination on beef hearts.
- To evaluate the color of pork following the application of antimicrobial interventions on pork carcasses, chilled pork, head and cheek meat, hearts, and livers.
- To evaluate the efficacy of approved interventions in reducing *E. coli* Biotype I Surrogate contamination on hot-boned pork.

Objective Achieved:

Antimicrobial interventions are an effective means of enhancing the safety of pork and edible beef and pork by-products. Lactic acid at 2.5% and 5.0% concentrations and applied warm (55 °C) and at room temperature along with 400 ppm peroxyacetic acid interventions can be effective at reducing pathogen contamination on a variety of beef and pork products, especially beef and pork hearts and pork livers. However, hot water (55 °C) was not an effective intervention on all product types. In addition, minimal negative impacts from lactic acid interventions were seen for product color. For pork hearts and livers, peroxyacetic acid and hot water treatments did not negatively impact product color, however, lactic acid treatments were generally more effective at reducing contamination than peroxyacetic acid or hot water. Results from this research can be applied to both the U.S. beef and pork industries, spanning domestic and export markets. Information from this study related to the efficacy of targeted interventions in pork products and beef and pork edible by-products could enhance the viability and sustainability of trade across the world, while also enhancing food safety.
Assessing the impact in red meat processing of a mobile genetic element that imparts extreme heat resistance to E. coli

Expected Outcomes

Extreme heat resistance (XHR) has been found in some E. coli and the XHR phenotype has been mapped to a genetic element termed the Locus of Heat Resistance (LHR). The goal of this research is to assess where in red meat processing XHR E. coli may pose a problem, how easily the LHR can be shared between bacteria and if current non-thermal interventions offer effective control of XHR E. coli.

1. Determine the prevalence of the LHR in different red meat processing systems.
2. Identify the rate of lateral gene transfer of the LHR between heat resistant E. coli and heat susceptible pathogens.
3. Characterize the sensitivity of XHR LHR+ E. coli to commonly used non-thermal processing interventions.

The threat of heat resistant E. coli surviving well done cooking temperatures has been the focus of recent news reports. The results of this work will provide data to answer anxious regulators and consumers concerned about the problem of heat resistant pathogens associated with meat.

Objective Achieved

Strains of E. coli previously isolated during studies of beef (n=1,054), veal (n=994), pork (n=517), and lamb (n=511) processing were screened for the LHR using a multiplex PCR test, and for the XHR phenotype (20 min exposure to 80°C). Intact and non-intact LHRs were identified in only 22 and 11 strains respectively. Most LHR containing strains were found amongst beef and veal, whereas just one pork E. coli had a non-intact LHR and 2 lamb E. coli had an intact LHR. On the other hand, 202 XHR E. coli that lacked the LHR were identified. Most from veal (n=91) and pork (n=43), and fewer from beef (n=57) and lamb (n=11). None of the LHR+ E. coli would be considered adulterants, however 36 of the XHR E. coli would.

Laboratory methods to force transfer of the LHR between positive isolates and common Shiga toxin-producing E. coli (STEC) were unsuccessful. When LHR+ E. coli were inoculated onto beef flanks and exposed to either peroxyacetic acid (PAA; 400ppm), lactic acid (LA; 4%) or hot water (85°C) sprays in a pilot scale carcass wash cabinet (20psi, 15sec) no significant differences from E. coli O157:H7 and other STEC were observed, but the LHR+ E. coli were numerically more resistant to PAA and hot water.

There is likely an ample reservoir of LHR+ E. coli present in the meat processing environment. The collections of E. coli screened here were from studies focused on E. coli O157:H7 and non-O157 STEC. As such, the collections contained few generic E. coli (n=164), yet these were the ones most commonly LHR+. We could not force the LHR to transfer to pathogenic E. coli, but that does not mean it may not be occurring naturally. The large number of XHR E. coli identified is concerning and these strains warrant further investigation, especially considering that 36 were
either an *E. coli* O157:H7 or an adulterant non-O157 STEC. Current interventions reduce LHR+ *E. coli* but the measured resistance to PAA and hot water should be examined in a processing environment where application parameters are more variable.

**AMR risk assessment data gaps: AMR in feces of culled market cows and bulls and retail meat products from animals raised with and without antibiotics.**

**Expected Outcomes**

Determine relative abundance and extent of AMR in feces of market bulls and cows, as well as in retail meat products, using metagenomic, culture and qPCR approaches. There exists significant public and private pressure on meat production systems to lower or eliminate use of antimicrobials. Our combined laboratories have previously conducted a number of culture-based, qPCR, 16s, and shotgun metagenomic studies to address questions related to dissemination of antimicrobial resistance (AMR) via the beef supply chain. Some of that work (Yang et al., 2016; Noyes et al., 2016b) demonstrated that a number of AMR genes (including for antimicrobials that are not used in animal agriculture) may be detected in animal/bird growing environments, but that those genes—if transmitted at all—are relatively rare on beef retail products (we have not investigated such transmission in other species). In our previous work, AMR gene diversity tended to decrease with time following a major management event (e.g., mass treatment with an antibiotic) or following cattle mixing or movement, thus expressing a natural tendency for the resistome to establish some form of “normal” homeostasis within a given environment—although differing environments may also differ in genetic resistome diversity.

**Objective Achieved**

Greater concentrations of generic *E. coli* were detected (*P* < 0.05) in conventional samples compared to natural ground beef. Additionally, a greater abundance of TETr *E. coli* was detected in conventional ground beef, however a greater abundance of normalized *tet*(A) and *tet*(B) genes were detected via qPCR in natural ground beef samples. Abundance of 3GCr bacteria was low, however there were significantly more (*P* < 0.05) 3GC resistance in conventional samples. City did however, significantly impact detection of 3GCr. *Salmonella* was only detected in seven of 599 ground beef samples, and there were no differences (*P* > 0.05) in generic *Enterococcus spp.* between products of differing production systems. Vancomycin and erythromycin-resistant *Enterococcus* were not detected at quantifiable levels, and MRSA was only detected in a total of six samples.

These results provide strong evidence against claims suggesting that production systems significantly impact the resistome of ground beef samples purchased at retail. The impact of variations in tetracycline resistance between production systems on human health are likely negligible considering that treatment using tetracyclines in humans is extremely rare. Of the genes detected that confer resistance to critically important antimicrobials, most were detected at low concentrations making it difficult to interpret the clinical relevance as the differential threshold at which AMR in meat becomes clinically relevant is not defined. Overall, the results from this study suggest the impact of antimicrobial use during beef production on the ground
beef microbiome and resistome are minimal since the city samples collected frequently had a greater impact on the microbiome and resistome.

Effectiveness of a novel, rechargeable, non-leaching polycationic N-halamine antibacterial coating to reduce *Listeria monocytogenes* in food processing environments

**Expected Outcomes**

The goal of this project is to evaluate the bactericidal efficacy of *N*-halamine coating when applied to stainless steel food contact surfaces to reduce *Listeria monocytogenes* on ready to eat meat products.

- To quantify the *N*-halamine coatings' bactericidal action *in-vitro* and in the presence of organic loads (e.g. deli meat juice [purge]).
- To evaluate the transfer of bacteria from bacteria spiked coated surfaces to ready to eat meat (roast beef and all beef wieners) at various contact times, temperatures and coating post-exposure times of meat products.
- To evaluate chlorination kinetics of the polymer surface and the longevity of the chlorine capturing functionality.

**Objective Achieved**

Overall, the tested *N*-halamine intact and charged coating reduced all 4 *Listeria monocytogenes* strains when exposed to the antibacterial coating for 45 min at 25 °C. Reductions were as follows: LM1 5.52 log10 CFU/cm2, LM3 5.82 log10 CFU/cm2, 2-138 5.77 log10 CFU/cm2 and 2-243 5.78 log10 CFU/cm2. Regarding the efficacy of the *N*-halamine on intact and scratched charged and non-charged coating conditions. The data analysis showed an interaction between coating treatment x temperature (P < 0.05) in all LM strains, indicating that the *N*-halamine coating antimicrobial efficacy was affected by the coating surface conditions and temperature. Thus, the main effect will not be explained. Overall *Listeria monocytogenes* reduction for charged coatings (either intact or scratched; T1 and T1S) was similar for all the strains, when exposed at 2, 10 and 25 °C (P = 0.8). They showed reductions that ranged from 4.8 to 5.2 log CFU/cm2. In contrast, for non-charged coatings (either intact or scratched; T2 and T2S), the reduction was higher at 25 °C (3.7 - 4 log CFU/cm2) than at 2 (1 to 1.8 log CFU/cm2) and 10 °C (1.7 to 2.7 log CFU/cm2) (P < 0.05). These results indicated scratches did not affect the coating effectiveness when the coating was properly charged. Also, the *N*-halamine coating needs to be charged when applied to surfaces located in refrigerated environments.
Effect of antimicrobial treatment of beef cheek meat and tongues on pathogen survival/death and product flavor volatiles during refrigerated and frozen storage.

Expected Outcomes

The objectives of the study were to: (i) evaluate the efficacy of peroxyacetic acid (PAA) acidified with a sulfuric acid and sodium sulfate blend (pH 1.2; aPAA) in reducing inoculated populations of Shiga toxin-producing *Escherichia coli* (STEC) and *Salmonella enterica* on beef cheek meat and tongues during refrigerated and frozen storage, and (ii) evaluate effects of aPAA on the flavor profile (volatile formation) of the same tissues during refrigerated and frozen storage.

Objective Achieved

Contamination with STEC of fresh and frozen beef intended for non-intact beef products is a preeminent concern for the beef industry, and reducing the risk of STEC-related foodborne illnesses associated with the consumption of these products is a top priority for the meat industry. This research provided the meat industry with a technology to increase the safety of both non-intact and intact meat products by reducing recognized adulterants prior to distribution to retailers or third parties.
### Ongoing Research in Fiscal Year 2018

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Contracting Institution</th>
<th>AR #</th>
<th>Tactic #</th>
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<tbody>
<tr>
<td>Maintenance for Literature Review: Efficacy of Interventions on Pathogens in Processed Meats and Poultry Products.</td>
<td>University of Wisconsin-Madison</td>
<td>1811</td>
<td>6-A</td>
</tr>
<tr>
<td>Evaluation of bactericidal effect of phenyllactic acid on STEC in beef products.</td>
<td>University of Georgia</td>
<td>1811</td>
<td>6-A</td>
</tr>
<tr>
<td>Intervention Validation: A Review</td>
<td>Texas A&amp;M University</td>
<td>1811</td>
<td>6-A</td>
</tr>
<tr>
<td>Natural ‘green label’ fermentates from lactic acid bacteria to inhibit <em>Listeria monocytogenes</em> and <em>Clostridium sporogenes</em> (spores) on low- and high-fat beef hotdogs.</td>
<td>Oklahoma State University</td>
<td>1811</td>
<td>6-A</td>
</tr>
<tr>
<td>Validating growth models for <em>Clostridium perfringens</em>, <em>Clostridium botulinum</em>, and <em>Bacillus cereus</em> during cooling of uncured meat and poultry products</td>
<td>University of Wisconsin-Madison</td>
<td>1811</td>
<td>6-A</td>
</tr>
<tr>
<td>Development and Validation of Dynamic Predictive Models for Growth and Toxin Formation by <em>Staphylococcus aureus</em> in Low Temperature Cooked Products</td>
<td>University of Georgia</td>
<td>1811</td>
<td>6-A</td>
</tr>
<tr>
<td>Effects of product moisture and process humidity on pathogen lethality during continuous cooking of meat and poultry products</td>
<td>Michigan State University</td>
<td>1811</td>
<td>6-A</td>
</tr>
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Summary of Dissemination and Outreach Activities for AR # 1811-R

- Continued planning for additional dissemination events including the Consumer Food Safety Education Conference (March 2019).

- Two sessions presented at the Pathogen Control in Beef Processing Conference (September 5-6, 2018) in Chicago. Presentations by Dr. Keith Belk, Dr. Kerri Gehring and separately, Dr. Jeff Sindelar. The conference was attended by 153 food safety professionals.

- Two separate sessions presented by Dr. Mick Bosilevac on CBB funded research at the International Association of Food Protection conference July 8-11, 2018, in Utah, and the Beef Safety Summit March 6-8, 2018, in Colorado.

- Beef Checkoff and FMPRE issued joint press release announcing the on-line availability of the validation spreadsheets (Recently completed Research Projects).

- Shared research findings for recently completed projects through FMPRE newsletter. Newsletter was received by 1492 recipients with an open rate of 39.2%.

- Beefsafetyresource.com website was updated and maintained.
<table>
<thead>
<tr>
<th>Tactic</th>
<th>Measurable Objectives</th>
<th>Exceeded</th>
<th>Achieved</th>
<th>Not Achieved</th>
<th>Ongoing Under Approved Extension</th>
<th>Contractor Comments</th>
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<tbody>
<tr>
<td>6A</td>
<td>Manage the execution of three research projects addressing current knowledge gaps. Topics may include antimicrobial interventions for use on fresh meats, variety meats, head and cheek meat, enhanced and ready-to-eat (RTE) products. The sustainability of interventions including chemical re-use and water use reductions is also a topic of interest.</td>
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<td>Developed and prepared post-harvest beef safety research priorities for Foundation for Meat and Poultry Research and Education annual request for proposals. Solicited proposals on Post-Harvest Beef Safety Research and immediate research needs to comply with Appendices A &amp; B. Identified projects for potential collaborative research and co-funding. Seven ongoing research projects are under management. The below project titles are abbreviated. Full titles available upon request. Co-Funded with FMPRE: 1. Intervention Validation—TAMU 2. Maintenance Lit Review—UWM 3. Appendix A Project—MSU 4. Appendix B Project—UWM 5. Appendix A Project—UGA CBB Funded 1. Antimicrobial Efficacy—UGA 2. Natural Fermentates--OSU</td>
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<td>6A</td>
<td>Facilitate the dissemination of research data and knowledge sharing through 4 meetings, webinars, documents or other events targeted to safety professionals.</td>
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<td></td>
<td>Continued planning for additional dissemination events including the Consumer Food Safety Education Conference (March 2019).</td>
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<td></td>
<td>Two sessions presented at the Pathogen Control in Beef Processing Conference (September 5-6, 2018) in Chicago. Presentations by nationally recognized meat scientists who conducted CBB sponsored research.</td>
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<td></td>
<td>Two separate sessions presented by nationally recognized meat scientist on CBB funded research at the International Association of Food Protection conference July 8-11, 2018, in Utah and the Beef Safety Summit March 6-8, 2018, in Colorado.</td>
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<td></td>
<td>Beef Checkoff and FMPRE issued joint press release announcing the on-line availability of the validation spreadsheets (Recently completed Research Projects).</td>
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<td></td>
<td>Shared research findings for recently completed projects through FMPRE newsletter.</td>
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</table>
Newsletter was received by 1492 recipients with an open rate of 39.2%.

**DISCLAIMER:** Links to third-party websites within this document should not be considered an endorsement by the Beef Checkoff.
Appendix

AR: 1820-CI
Contractor: AFBFA
Program Managers: Seth Derner & Rick Henningfeld
YE Summary from contractor

The American Farm Bureau Foundation for Agriculture (AFBFA) checkoff-funded STEM and Health educator events fill a niche role in checkoff programs by reaching national influencers in education, such as district curriculum coordinators, educational organization leaders, university teacher educators, extension educators, etc. With strategic advertising with the National Science Teachers Association (NSTA) and targeted social media campaigns, we excelled past our original PEM goals in the areas of reach and engagement.

In 2018, this program facilitated two immersive experiences for key influencers in science, technology, engineering and mathematics (STEM) education and one immersive experience for key influencers in health and nutrition education. Each event brought together education thought-leaders from across the country to a featured state to explore the practical application of STEM, health and nutrition concepts in the beef industry. A total of 390 participants applied for 105 positions to attend these events. The events increased positive public perception of the beef industry, with participants indicating a 40-50 percent increase in their positive view of beef, the beef industry, and key topics such as antibiotic use reported on post-event surveys. Most notably, a 51% increase in response that the “positives strongly outweigh the negatives of how cattle are raised”, with a pre-event survey that indicated only 29% of attendees felt the “positives strongly outweigh the negatives of how cattle are raised”, compared to 80% post event response.

These nationally-focused events leverage resources developed by other interested parties and CBB contractors, like State Beef Councils in TX, PA, and OR, and NCBA, to extend the impact of the checkoff through the facilitation of additional touchpoints with key influencers.
**Ratings from 2018 SBC Evaluation Survey**

- QSBCs use AR materials (yes/no): 9/30
- Considered a “go to” resource – 6.7 out of 10
- Improves state programs – 6.4 out of 10
- How do QSBC extend the AR results – Educator/influencer outreach, STEM events, teachers
- Would recommend to another QSBC:
  - Yes (8-10): 66.3%
  - No (1-4): 11.1%
  - Maybe (5-7): 22.2%
- AR work is improving:
  - Agree (8-10): 66.3%
  - No (1-4): 22.2%
  - Maybe (5-7): 11.1%
<table>
<thead>
<tr>
<th>Tactic</th>
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<th>Contractor Comments</th>
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<tbody>
<tr>
<td>1A</td>
<td>Reach 94,800 people through press releases, newsletters, paid marketing, social</td>
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<td>X</td>
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<td></td>
<td>We have exceeded this goal with 560,770 people reached through strategic outreach campaigns.</td>
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<td>media campaigns, and other outreach efforts.</td>
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<tr>
<td>1A</td>
<td>Engage 2,400 people through paid advertising, social media campaigns, applications</td>
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<td>X</td>
<td></td>
<td></td>
<td>We have exceeded this goal with 9,294 people engaged through strategic outreach campaigns.</td>
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<td>received, website engagement, and other outreach efforts.</td>
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<td>1A</td>
<td>Validate contact with 480 key opinion leaders through newsletter open rate and event</td>
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<td>X</td>
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<td>We have exceeded this goal documenting validated contact with 1,780 key opinion leaders.</td>
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<td></td>
<td>participation.</td>
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<tr>
<td>1A</td>
<td>Engage key opinion leaders in education whose primary role is to prepare new STEM</td>
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<td>X</td>
<td></td>
<td>This goal is complete. Total number of participants are below: Texas: 37 Oregon: 39</td>
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<td>teachers and/or provide professional development to STEM teachers in two events, with</td>
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<td>35 to 40 participants each.</td>
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<td>We are incredibly thankful for the great partnership with the Oregon and Texas State Beef Councils for these events.</td>
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<tr>
<td>1A</td>
<td>Engage two state beef councils, one in each of the states in which the events will</td>
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<td>X</td>
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<td></td>
<td>We have exceeded this goal. Key findings from pre/post assessments are highlighted below.</td>
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<td>be hosted.</td>
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<td>23% Increase in participants indicating the</td>
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<td>1A</td>
<td>Assess participant knowledge about beef and the beef industry before and after the</td>
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<td>X</td>
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<td></td>
<td>training through pre-post assessments. Achieve a 15% increase in responses indicating</td>
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<td>positives of beef strongly outweigh the negatives after attending the event.</td>
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<td><strong>47% INCREASE</strong> in participants indicating the positives of how cattle are raised strongly outweigh the negatives.</td>
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<td></td>
<td><strong>48% DECREASE</strong> in concern with antibiotic use in beef cattle.</td>
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<td><strong>37% DECREASE</strong> in concern with animal welfare in the beef industry.</td>
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<td></td>
<td><strong>35% INCREASE</strong> in opinion that the beef industry openly shares information.</td>
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<td></td>
<td><strong>19%</strong> of participants plan to <strong>Eat More Beef</strong> after attending the event.</td>
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<td><strong>1B</strong></td>
<td>Reach 94,800 people through press releases, newsletters, paid marketing, social media campaigns, and other outreach efforts.</td>
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<td>We have exceeded this goal with <strong>560,582</strong> people reached through strategic outreach campaigns.</td>
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<td><strong>1B</strong></td>
<td>Engage 2,400 people through paid advertising, social media campaigns, applications received, website engagement, and other outreach efforts.</td>
<td></td>
<td>We have exceeded this goal with <strong>8,967</strong> people engaged through campaigns, platforms and applications received.</td>
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<tr>
<td>1B</td>
<td>Validate contact with 300 key opinion leaders through newsletter open rate and event participation.</td>
<td>X</td>
<td>We have exceeded this goal documenting validated contact with 1,136 key opinion leaders.</td>
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<td>1B</td>
<td>Engage key opinion leaders in health and nutrition education in one event, with 25 – 30 participants.</td>
<td>X</td>
<td>We have completed this goal. 29 participants and several special guests attended the Pennsylvania On the Farm event.</td>
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<tr>
<td>1B</td>
<td>Engage one state beef council in the state where the event will be hosted.</td>
<td>X</td>
<td>We are thankful for the partnership and hard work of the Pennsylvania State Beef Council.</td>
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<td>1B</td>
<td>Assess participant knowledge about beef and the beef industry before and after the training through pre-post assessments. Achieve a 15% increase in responses indicating accurate knowledge of beef and the beef industry.</td>
<td>X</td>
<td>We have exceeded this goal. Key findings from pre/post assessments are highlighted below.</td>
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**50% INCREASE** in participants indicating the positives of beef strongly outweigh the negatives after attending the event.

**56% INCREASE** in participants indicating the positives of how cattle are raised strongly outweigh the negatives.

**42% DECREASE** in concern with antibiotic use in beef cattle.
<table>
<thead>
<tr>
<th>1C</th>
<th>Reach 14,500 people through exposure at key education events, impressions through major platforms including PurplePlowChallenge.org, and other outreach efforts.</th>
<th>X</th>
<th>57% DECREASE in concern with animal welfare in the beef industry.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1C</td>
<td>Engage 2,000 people through participation at key education events, direct engagement through major platforms including PurplePlowChallenge.org, and other outreach efforts.</td>
<td>X</td>
<td>57% DECREASE in concern with food safety in the beef industry.</td>
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<tr>
<td></td>
<td>Establish a beef education presence at the National Science Teachers Association conference in Atlanta and present a beef-related workshop that will engage 1-2 past participants from On the Farm STEM events.</td>
<td>X</td>
<td>50% INCREASE in opinion that the beef industry openly shares information.</td>
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<td></td>
<td>37% of participants plan to <strong>Eat More Beef</strong> after attending the event.</td>
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</table>

We have exceeded this goal, with **27,654** people reached through exposure at events and impressions.

We have exceeded this goal with **12,652** people engaged.

We have achieved this goal. AFBFA was selected by the National Science Teacher's Association to facilitate a workshop at the NSTA National Conference on the educational value of the On the Farm Beef STEM events. Chris Schau, instructional leader from Clark County.
<table>
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<tr>
<th></th>
<th>Description</th>
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<tbody>
<tr>
<td>1C</td>
<td>Validate contact with 750 key opinion leaders through outreach events and pilot programs.</td>
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<td>Schools in Nevada (Las Vegas), a former On the Farm STEM event participant, facilitated the workshop.</td>
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<td>We have exceeded this goal with <strong>1,308</strong> key opinion leaders engaged.</td>
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<td>1C</td>
<td>Facilitate activities from the True Beef: Pasture to Plate educator guide with six to eight middle and high school culinary arts, family and consumer sciences, agriculture and/or science classes in conjunction with the AFBF Annual Convention by YF&amp;R</td>
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<td>We completed this goal with <strong>7</strong> classrooms visited through YFR True Beef Pilots.</td>
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<td>1C</td>
<td>Pilot resources developed through the 2017 education grant process and work with State Beef Councils to offer grants/coupons for purchasing beef in the classroom.</td>
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<td>We have achieved this goal with intentional outreach to opt-in State Beef Council representatives and a completed pilot review of all resources.</td>
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<td>1D</td>
<td>Reach 61,000 people through strategic press releases, major platforms including MyAmericanFarm.org, website engagement at <a href="http://www.agfoundation.org/on-the-farm/learn-about-beef">http://www.agfoundation.org/on-the-farm/learn-about-beef</a>, and key event presence</td>
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<td>We have exceeded this goal with <strong>494,684</strong> people reached through press releases, major platforms, website engagement and key event presence.</td>
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<tr>
<td>1D</td>
<td>Engage 4,600 people through major platforms including MyAmericanFarm.org, website engagement at <a href="http://www.agfoundation.org/on-the-farm/learn-about-beef">http://www.agfoundation.org/on-the-farm/learn-about-beef</a>, and key event presence.</td>
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<td>We have exceeded this goal with <strong>17,156</strong> people engaged through major platforms, website engagement and key event presence.</td>
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<td>1D</td>
<td>Provide leadership for the Beef Education Stakeholders community by</td>
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<td>We have exceeded this goal with <strong>50,000</strong> people engaged through major platforms, website engagement and key event presence.</td>
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providing quarterly newsletters and hosting one in person event in conjunction with a major beef industry event for 25 key opinion leaders.

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<tr>
<th>1D</th>
<th>The Foundation will continue to maintain and update the following platforms which host beef education resources:</th>
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<tr>
<td></td>
<td>• <a href="http://www.agfoundation.org/on-the-farm/learn-about-beef">http://www.agfoundation.org/on-the-farm/learn-about-beef</a></td>
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<tr>
<td></td>
<td>• <a href="http://www.myamericanfarm.org">http://www.myamericanfarm.org</a></td>
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We have achieved this goal. Quarterly newsletters were distributed to subscribers of the Beef Education Update newsletter in January and March.

AFBFA hosted the 2\textsuperscript{nd} annual Beef Education Stakeholders Summit in Phoenix, with 36 attendees.

This effort is ongoing. AFBFA manages the respective beef education platforms with weekly social media, monthly reporting, as well as regular maintenance and support.

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Appendix

AR: 1821-CI
Contractor: MICA
Program Managers: Christie Brown, Kaitlyn Carey, & Jennifer Orr
YE Summary from contractor

The checkoff’s Northeast Beef Promotions Initiative (NEBPI) continues to center programing around positioning beef as the number one protein in the diet among our Northeast consumers and influencers and extend the checkoff message where beef promotion programing is lacking. Through the power of partnerships, NEBPI is able to leverage the strengths of our influencer partners to magnify and amplify checkoff messages, through the successes seen in our digital campaigns, such as the “Back to School with Beef” blogger partnership and the ability to secure over 13 television beef segments this year. It is vitally important that Northeast audiences continue to see, hear and experience the positive messages the beef community has to offer. In FY18, this was accomplished through our execution of regional programming such as the East Coast Ibotta campaign, in-person events like the NBC4 Health & Fitness Expo in Washington D.C. and influencer immersion experiences including the “Raising Today’s Veal” processing plant tour and the “Meat Your Beef” beef tour.
Ratings from 2018 SBC Evaluation Survey

- QSBCs use AR materials (yes/no): 6/33
- Considered a “go to” resource – 9.8 out of 10
- improves state programs – 9.7 out of 10
- How do QSBC extend the AR results – provide additional funding, social media
- Would recommend to another QSBC:
  Yes (8-10): 100%
  No (1-4): 0%
  Maybe (5-7): 0%
- AR work is improving:
  Agree (8-10): 100%
  No (1-4): 0%
  Maybe (5-7): 0%
<table>
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<tbody>
<tr>
<td>1A</td>
<td>Have a presence at or engage with a minimum of 3-4 meetings and/or programs targeted to reach key channel influencers. (See chart above) This could include regional conferences or customized promotions/campaigns.</td>
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<td>6 total meetings/channel programs were conducted, including: The 2017 Women’s Meat Retreat (WMR) in Petersham, MA in October. 39 attendees. The 2018 North American Camp FS Director Conference in Lake George, NY. 23 attendees for beef cooking demo with Chef Dave Zino. The PA Association of Meat Processors Conference, State College, PA. 56 attendees of sponsored beef cutting demonstration. Hosted 1 beef immersion experience on June 26 for 21 Philadelphia metro chefs. 2 channel campaigns, Ibotta and Fresh Direct took place in June/July, 2018.</td>
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<tr>
<td>1A</td>
<td>Host 1-2 regional media trainings with chefs with a year-end goal to reach 7-10 chefs total within the region through trainings.</td>
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<td>Regional chef training was hosted on May 9, 2018 in Harrisburg, PA with 8 regional chefs in attendance.</td>
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<td>1A</td>
<td>Meet or exceed engagement rate of 20% while attending industry meeting/conference.</td>
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<td>Engagement rate of 32% through channel conference participation.</td>
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<td></td>
<td>Measure perception of beef and the beef industry through pre and post surveys to achieve an average positive opinion rating of beef at 90%.</td>
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<td>100% positive opinion rating of beef following Regional Chef Media Training event and &quot;Meat Your Beef&quot; chef’s beef tour.</td>
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<td>1A</td>
<td>Measure online engagement with the e-newsletter by maintaining or increasing the 'Open-Rate' of 25%.</td>
<td>x</td>
<td>Average ‘Open-Rate’ for FY was 30.9% for those on the Channel Influencer newsletter list and 40.4% for the foodservice newsletter list.</td>
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<td>1A</td>
<td>Exhibit, sponsor and/or participate in a minimum of 1-2 consumer outreach programs/digital campaigns to elevate the BIWFD content/image campaign reaching a minimum of 4 million impressions. Additional events/programs will be dependent on direct SBC funding. Focus on face-to-face engagement utilizing millennial volunteers at in-person events.</td>
<td>x</td>
<td>Exhibited/Sponsored 6 consumer outreach events/campaigns, garnering 12,664,593 impressions overall: Fall into Crockpot Season with Beef Social Media Recipe Contest; Oct-Nov 2017, NBC4 Health &amp; Fitness Expo; March 2018, Washington, DC, Pandora Radio Ad Campaign; Dec-July 2018, DC Burger Week; July 2018, Washington, DC, YouTube Ad Campaign Elevating BIWFD Assets; Aug-Sept 2018, Back to School with Beef Blogger Partnership; Sept 2018.</td>
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</table>
| 1B | Maintain the consumer’s favorable rating of beef at or above 71% as measured by an onsite event questionnaire (71% is from the 2016 | x | Consumer favorable rating was measured through an onsite questionnaire at five consumer events. Of those polled, 87.4% stated ‘the
<table>
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<th>Tactic</th>
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<td>Consumer Beef Index  'Bucket Levels 1 &amp; 2’ measuring consumer’s favorability of beef)</td>
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<td></td>
<td>positives of beef strongly or somewhat outweighed the negatives,’ achieving a beef favorability rating above 71%.</td>
</tr>
<tr>
<td>1B</td>
<td>Meet or exceed engagement rate of 3% through consumer outreach efforts.</td>
<td>X</td>
<td>Achieved a 13.8% engagement rate through consumer outreach efforts.</td>
</tr>
<tr>
<td>1B</td>
<td>Secure a media interview/live cooking demonstration with 50% of chefs reached through Tactic 1A efforts.</td>
<td>X</td>
<td>While only 37.5% of chef influencers, from Tactic 1A who completed the training, executed on-air demos, a total of 13 on-air cooking segments were executed throughout the region. This exceeds our anticipated goal of 4 segments.</td>
</tr>
<tr>
<td>2A</td>
<td>Have a presence at or engage with a minimum of 4-5 meetings and/or programs targeted to reach key</td>
<td>X</td>
<td>A total of nine programs/meetings were attended or conducted. Supplemental funds from</td>
</tr>
</tbody>
</table>
nutrition influencers. (See chart above) This could include yearly state association meetings, regional conferences or customized initiatives. Number of meetings may increase as supplemental SBC funding allows.

<p>| 2A | Meet or exceed engagement rate of 20% while attending industry meetings/conferences. | X | While attending industry meetings/conferences the engagement rate averaged 30% across all meetings. |
| 2A | Host a minimum of 1-2 beef immersion experiences, to build deeper, more meaningful relationships with key influencers and help make a connection with famers who raise beef. Experiences could include on-farm tours, beef production panels, distinguished speaker opportunities, etc. | X | Three immersion experiences were conducted including a cutting and wine pairing demo at the Rhode Island Academy of Nutrition and Dietetics Meeting, Producer Panel Discussion at the School Nutrition of PA meeting and the Raising Today’s Veal tour. |</p>
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<th></th>
<th>Measure perception of beef and the beef industry through pre-and post-surveys to achieve an average positive opinion rating of beef at 90%.</th>
<th></th>
<th>X</th>
<th>Across the three immersion events/tours conducted, the average opinion rate of beef was measured at 84%. Post event survey results at the School Nutrition Association of PA meeting and Raising Today’s Veal tour revealed a 100% positive opinion rating of beef. The Immersion experiences surrounding the Rhode Island Academy of Nutrition and Dietetics event only garnered a 71% post positive opinion rating of beef, which decreased our overall average.</th>
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<td></td>
<td>Measure online engagement with the e-newsletter by maintaining or increasing the ‘Open-Rate’ of 25%, a 13% increase from the previous FY.</td>
<td></td>
<td>X</td>
<td>E-newsletter open-rate averaged 37.63% for this fiscal year.</td>
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**DISCLAIMER:** Links to third-party websites within this document should not be considered an endorsement by the Beef Checkoff.
Appendix

AR: 1822-CI
Contractor: NCBA
Program Managers: Mandy Carr Johnson, Season Solorio, & Chris Barnes
YE Summary from contractor

Tactic 2A: Food, Health and Agriculture Key Opinion Leader Engagement has historically built strong and lasting relationships with a variety of consumer influencers using a variety of techniques including immersion experiences that facilitate first-hand exposure to beef’s benefits from both a product and production standpoint, and addressing topics like how beef is raised, antibiotics and hormones. Experiences have also included training and engagement on cooking and healthy meal preparation with beef. The tactic allows the beef checkoff to identify individuals, groups or even events that target a variety of influencer audiences on topics across nutrition, product, and production.

Tactic 2B: Supply Chain Outreach and Engagement Building facilitates long-term relationships with supply chain partners – including retail, foodservice, manufacturers, packers, processors and distributors – is critical to building long-term consumer demand for beef. This tactic develops the right relationships and the right content shared through a variety of platforms (such as digital asset management tools, artificial intelligence, e-commerce shopping and application program interfaces, and/or in-person touchpoints) to extend valuable beef expertise to critical supply chain partners.

Tactic 2C: Earned Media & Media Relations includes an "always on" news engine to drive positive mentions of beef in the news, thereby increasing positive news in the social media environment as well. This included reaching out regularly to top-tier consumer media and sharing content. Working with the other tactics in the consumer information, industry information and promotion authorization requests, the team pushed “earned media” stories to the right audiences – whether that’s sharing positive earned media stories with consumers, with specific influencers or with supply chain operators or even members of the beef community. This lends credibility, authenticity and authority to beef by being a trusted source of information for these busy media influencers.
Ratings from 2018 SBC Evaluation Survey

- QSBCs use AR materials (yes/no): 39/1
- Considered a “go to” resource – 8.4 out of 10
- Improves state programs – 8.2 out of 10
- How do QSBC extend the AR results – Strategic partnerships, use content, engage dieticians and other health professionals, outreach to consumers
- Would recommend to another QSBC:
  - Yes (8-10): 89.5%
  - No (1-4): 7.9%
  - Maybe (5-7): 2.6%
- AR work is improving:
  - Agree (8-10): 81.6%
  - No (1-4): 10.5%
  - Maybe (5-7): 7.9%
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<tr>
<th>Tactic</th>
<th>Measurable Objectives</th>
<th>Exceeded</th>
<th>Achieved</th>
<th>Not Achieved</th>
<th>Ongoing Under Approved Extension</th>
<th>Contractor Comments</th>
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<tr>
<td>2A</td>
<td>Execute two influencer campaigns generating at least 500,000 positive beef and/or brand impressions through credible, third party generated content.</td>
<td>X</td>
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<td></td>
<td>4,919,076 impressions were achieved through content created to support the Taste and Strength campaign. These impressions were created through third party social posts, blogs and videos.</td>
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<tr>
<td>2A</td>
<td>Maintain event-specific influencer advocacy for beef after experiences and conferences including blog posts, hashtag usage, comments, etc. This is being benchmarked in FY2017.</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>The Strength Summit was held in September 2018 for 43 top tier nutrition researchers and influencers in San Antonio, TX. The summit included evaluating and defining the role of diet in supporting measures of physical, mental and emotional strength. The summit reached 812,944 people through social media.</td>
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<tr>
<td>2A</td>
<td>Benchmark and measure the percentage of influencers who say that they either “feel good about eating/recommending beef,” or that they “plan to eat more beef/recommend my consumers eat beef” with a goal of 75 percent of immersion/event attendees saying at least one of these post-experience.</td>
<td></td>
<td>X</td>
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<td></td>
<td>After the Med Diet Webinar, 96% of attendees reported an increased level of comfort with recommending lean beef as a part of a Mediterranean-style eating pattern. After the Sustainability webinar, 90% of attendees reported that the positives of beef either strongly or somewhat outweigh the negatives of beef.</td>
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<tr>
<td></td>
<td>2A</td>
<td>Establish a benchmark in FY2018 that would measure perceptions of beef as the number one protein in the U.S.</td>
<td></td>
<td>A benchmark was established in the first month of FY 2018 that among consumers 20-44 years of age, 50% strongly or somewhat agree that beef is their number one protein choice.</td>
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<td>2B</td>
<td>Using an online survey, maintain supply chain operators’ overall satisfaction of checkoff support year over year (FY2016 mean respondent scores showed a 7.6 score with 10 being the highest-possible score in terms of “value of beef checkoff information and resources,” and an 8.6 score on the “likelihood to recommend beef checkoff information and resources”).</td>
<td></td>
<td>The online survey has been completed and scores were maintained. FY 2018 mean respondent scores showed an 7.9 score with 10 being the highest possible score in terms of “value of beef checkoff information and resources,” and an 8.3 score on the “likelihood to recommend beef checkoff information and resources.”</td>
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<td>2B</td>
<td>Meet or exceed industry standards for real-time emails that reach supply chain operators, including open rates and click-through-rates (21 percent and 2.5 percent respectively) and increase email subscriber growth year over year (benchmarked in FY2017).</td>
<td></td>
<td>Beef News Now serves as the primary real-time email alert that reaches supply chain operators. In the fourth quarter of FY2018, the open rates were 21.1%; the click rates were 3.9%; and the number of new email subscribers grew by 117.</td>
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<td>2B</td>
<td>Identify and execute a minimum of two in-market tests or pilot programs with supply chain partners to revolutionize the beef shopping experience and benchmark purchase intent and/or beef sales.</td>
<td></td>
<td>With the importance of delivery in both retail and foodservice quickly growing, we executed in-market tests with the leader of third-party retail delivery (Instacart) and one of the leaders of third-party restaurant delivery (Postmates). The Instacart</td>
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pilot tested the effectiveness of strength vs taste messaging, as well as the effectiveness of including branded materials (a phone sleeve and scratch and sniff recipe card) in driving repeat beef orders. The Postmates pilot tested the effectiveness of sponsoring keyword search terms in the app, as well as the effectiveness of strength vs taste messaging in email communications. Both tests are still in market and will run through end of November.

<p>| 2B | Establish a benchmark in FY2018 that would measure perceptions of beef as the number one protein in the U.S. | X | A benchmark was established in the first month of FY 2018 that among consumers 20-44 years of age, 50% strongly or somewhat agree that beef is their number one protein choice. |
| 2C | Measure and benchmark the number of positive earned media stories and their combined earned traditional and social media reach. | X | Tracking completed of all earned media in FY18. |
| 2C | Host one beef industry briefings, events, workshops or experiences for top-tier reporters covering the beef industry. | X | Sponsored the FOOD &amp; WINE Classic in Aspen and met with several top-tier reporters at the Beef. It’s What’s For Dinner. booth |
| 2C | Place at least two positive stories, including but not limited to features, op-eds, quotes, and/or key data about beef sustainability, beef nutrition | X | Placed two stories in the Wall Street Journal, One in the Chicago Tribune and one in Newsweek. Also secured a |</p>
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<th>and/or beef innovation in a top-tier national consumer publication (e.g. New York Times).</th>
<th></th>
<th>morning cooking segment on Fox &amp; Friends on the FOX Network</th>
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<tr>
<td>2C</td>
<td>Place at least two positive stories, including but not limited to features, op-eds, quotes, and/or key data about beef sustainability, beef nutrition and/or beef innovation in a top-tier supply chain publication (ex. Progressive Grocer).</td>
<td>X</td>
<td>Placed stories in Food Navigator, Food Dive and Flavor and the Menu</td>
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Appendix

AR: 1830-II
Contractor: NCBA
Program Managers: Chris Barnes & Josh White
**YE Summary from contractor**

**Beef Checkoff Issues & Crisis Management and Planning**
In addition to managing several issues that emerged over the course of Fiscal 2018, the Beef Checkoff’s Beef Issues and Reputation Management function continued to accommodate requests from State Beef Councils (SBCs) for additional in-depth training on crisis/issues response and media training to help ensure SBCs could effectively manage issues and crises that erupted in their states with five workshops scheduled in 2018. Meanwhile, work also continued to finalize Foot and Mouth Disease (FMD) crisis preparedness plans and consumer messaging in coordination with the cross-species working group. In addition, the Reputation Management Team engaged into content partnerships with Quartz and Green Biz to place long-form articles that advanced positive industry messaging related to production, sustainability and related topics to influential and engaged audiences to help shift the conversation around beef’s social and environmental footprint.

**Beef Advocacy Training & Engagement**
The checkoff-funded Masters of Beef Advocacy (MBA) program surpassed 11,500 graduates and added 11 new Top of the Class graduates. New in fiscal 2018, the MBA program coordinated with State Beef Councils to train and equip 43 State Top Advocates to support and amplify advocacy efforts at the grassroots, state-level while also focusing on engaging and energizing MBA grads and developing methods to better track their activity. The beef advocate community was activated to extend the *Beef. It’s What’s For Dinner.* relaunch campaign and share their stories through Rethink The Ranch. Throughout the year, BATE provided training for 9,106 advocates and spokespeople at 67 events, workshops and presentations, equipping them to address questions and concerns from consumers about beef and raising cattle.

**Beef Quality Assurance (BQA)**
The checkoff-funded Beef Quality Assurance (BQA) program is an important tool for the beef community providing beef producers a set of best practices for producing quality beef. It also gives consumers assurance the beef they consume is both safe and raised with science-based care. During fiscal 2018, more than 86,000 individuals across the country became BQA certified. The BQA certification modules are customized for each segment of the cattle industry – cow-calf, stocker, and feedyard. The program also works collaboratively with dairy to recognize the Farmer’s Assuring Responsible Management (FARM) program in the dairy industry. Youth for the Quality Care of Animals was developed collaboratively between BQA, Pork Quality Assurance, FARM and the sheep industry to create a single, multi-species quality assurance program for youth interested in livestock production. BQA and the referenced collaborative programs cover best-management practices, including antibiotic stewardship, bringing together all resources and providing them to each audience in an appropriate language, format and style.
Ratings from 2018 SBC Evaluation Survey

- QSBCs use AR materials (yes/no): 35/4
- How do QSBC extend the AR results – BQA training, MBA resources, extend to state producers
- Issues and Crisis considered a “go to” resource – 8.9 out of 10
  - MBA considered a “go to” resource – 8.5 out of 10
  - BQA considered a “go to” resource – 8.7 out of 10
- Issues and Crisis improves state programs – 8.6 out of 10
  - MBA improves state programs – 8.3 out of 10
  - BQA improves state programs – 8.7 out of 10
- Would recommend beef issues and crisis to another QSBC:
  - Yes (8-10): 85.7%
  - No (1-4): 8.6%
  - Maybe (5-7): 5.7%
- Would recommend MBA to another QSBC:
  - Yes (8-10): 85.3%
  - No (1-4): 2.9%
  - Maybe (5-7): 11.8%
- Would recommend BQA to another QSBC:
  - Yes (8-10): 88.6%
  - No (1-4): 5.7%
  - Maybe (5-7): 5.7%
- AR work on beef issues and crisis is improving:
  - Agree (8-10): 77.1%
  - No (1-4): 14.3%
  - Maybe (5-7): 8.6%
- AR work on MBA is improving:
  - Agree (8-10): 74.3%
  - No (1-4): 14.3%
  - Maybe (5-7): 11.4%
- AR work on BQA is improving:
  - Agree (8-10): 82.9%
  - No (1-4): 5.7%
  - Maybe (5-7): 8.6%
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<tbody>
<tr>
<td>1A</td>
<td>Maintain Issues and Reputation Management program as a “trusted counselor” and “go-to resource” for state beef councils, achieving an average agreement score of 9 on a 10-point scale according to annual CBB survey.</td>
<td></td>
<td></td>
<td></td>
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<td>(Awaiting results of CBB Survey in late Oct.)</td>
</tr>
<tr>
<td>1A</td>
<td>Conduct five state issues/crisis exercises and/or workshops. Distribute pre- and post-surveys to assess readiness of participants following these exercises and increase the level of confidence they have in their ability and our ability to respond to the issue/crisis.</td>
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<td>x</td>
<td>Three workshops have been completed in CA, IA, and AZ. NE is scheduled for December and scheduling is underway for AL.</td>
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<tr>
<td>1A</td>
<td>Maintain an open rate of 20% for Beef Issues FYI's.</td>
<td>x</td>
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<td>Open rate average was 48% for 6 FYIs sent in FY18.</td>
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<tr>
<td>1A</td>
<td>Establish a benchmark in FY2018 that would measure perceptions of beef as the number one protein in the U.S.</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>A benchmark was established in the first month of FY 2018 that among consumers 20-44 years of age, 50% strongly or somewhat agree that beef is their number one protein choice.</td>
</tr>
<tr>
<td>1A</td>
<td>Establish a benchmark in FY2018 that would measure perceptions of beef as the number one protein in the U.S.</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>A benchmark was established in the first month of FY 2018 that among consumers 20-44 years of age, 50% strongly or somewhat agree that beef is their number one protein choice.</td>
</tr>
<tr>
<td>1B</td>
<td>Increase participation in MBA campaigns over FY2017 actuals by 5%</td>
<td>X</td>
<td>23.5% engagement rate in MBA campaigns during FY18.</td>
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<tr>
<td>1B</td>
<td>Produce and distribute at least 12 Advocacy in Action newsletters, MBA Action Alerts and Issues Updates.</td>
<td>X</td>
<td>Produced 17 Advocacy In Action Newsletters, MBA Action Alerts and Issues Updates in FY18.</td>
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<tr>
<td>1B</td>
<td>Conduct at least 20 in-depth media/social media message training sessions for state and national producer leaders, staff and third-party subject matter experts and other key influencers, including two pilot state-level Top of the Class trainings.</td>
<td>X</td>
<td>Conducted 67 training sessions in FY18.</td>
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<td>1C</td>
<td>Increase the number of producers that are BQA certified by 10% over 2017 certification rate.</td>
<td>X</td>
<td>Current online BQA certifications – 43,227. BQA in-person certifications shared from state BQA coordinators – 56,284. Collaboration and equivalency with dairy FARM program has evaluated 13,957 and 28,000 individuals. Youth for the Quality Care of Animals modules (BQA equivalent) have certified 55,757 individuals since March 2017 launch. Totaling all of these yields 183,268 total verified certifications, an increase of 89% (86,286).</td>
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<tr>
<td>1C</td>
<td>Engage over half of the nation’s BQA coordinators in continuing education and increase collaboration between state BQA coordinators and national program staff by conducting a</td>
<td>X</td>
<td>Two “in-person” meetings and two webinars have been conducted with 36 states represented and 67 state coordinators and/or educators participating.</td>
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<td>minimum of four “in person” or virtual meetings each year.</td>
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<td>BQA Transportation certifications through end of FY2018 totaled 1,506.</td>
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<tr>
<td>1C</td>
<td>Achieve at least 900 certified producers and livestock transporters in the new cattle transportation quality assurance platform.</td>
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Appendix

AR: 1831-II
Contractor: NLPA
Program Managers: Katie Ambrose
The symposium, in its seventh year, continued to bring experts from diverse backgrounds together to discuss the collaborative strategies for animal agriculture and human health. Eight beef producers attended the symposium and connected with One Health stakeholders including officials from the Centers for Disease Control (CDC) and FDA. These new relationships continued after the event as several of the producers also visited the campus of the CDC where they toured NARMS and PulseNet Labs and participated in collaborative meetings with the staff from the National Center for Emerging and Zoonotic Infectious Diseases division. The agenda: Antimicrobial Resistance: Saving lives & One health. In addition to these events, the program delivered an online white paper and multiple social media images and tools linked to responsible use of antibiotics that can be leveraged by the beef community to amplify reach of messages that will continue to drive improvement within the One Health world.

Joan Ruskamp, Chair of the Cattlemen's Beef Board said "It's about saving lives. Animals and human." when asked about why thought it was important for beef producers to travel to CDC for these meetings. Jennifer Houston, NCBA President-Elect said "This issue (Antimicrobial Resistance) is more top of mind than ever before."
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<th>Tactic</th>
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<tr>
<td>6A</td>
<td>200 stakeholders from the following segments will be represented at the Symposium: Human Health Professionals, Animal Agriculture Producers, Processors, Retailers, Government, Other.</td>
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<td>X</td>
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<td>The symposium attendance was diverse and included all segments indicated. Total attendance was 147.</td>
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<td>6A</td>
<td>Distribute post-event, online survey to assess the level of confidence attendees have in the key take-aways agreed upon at the closing of the symposium to build further momentum to combat antimicrobial resistance.</td>
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<td></td>
<td>The survey was executed and results indicate a high level of confidence. Many comments pointed to the importance of an on-going collaboration between human, environmental, and animal health.</td>
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<td>6B</td>
<td>A minimum of 5 beef producers will be selected to participate in all facets of the symposium.</td>
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<td>8 beef producers participated in the symposium, including representatives from cow-calf, seed-stock, feedyard, dairy, and veterinarian arenas.</td>
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<tr>
<td>6B</td>
<td>Post-symposium, 5 beef producers will visit the Centers for Disease Control and Emory University in Atlanta to continue to build strong relationships with human health professionals and maximize collaboration opportunities to</td>
<td>x</td>
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<td>March 27-28, 2018 a diverse group of beef producers traveled to Atlanta, Georgia to visit the Centers for Disease Control. The visit, included tours of CDC's NARMS and PulseNet Labs and collaborative meetings with staff</td>
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<td>support the One Health approach to combating antimicrobial resistance.</td>
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<td>from the National Center for Emerging and Zoonotic Infectious Diseases division.</td>
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<td>6B</td>
<td>Post-symposium, 80 percent of beef producers who attended the event will formally share their recommendations with key stakeholders for future initiatives that drive continuous improvement in the judicious use of antibiotics.</td>
<td>X</td>
<td>Feedback was collected from all beef producers and recommendations included tactics that can drive deeper engagement with CDC and finding creative ways to engage with beef producers where they are to discuss resistance (at regional cattle association and extension or other educational meetings for example).</td>
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<td>6C</td>
<td>A maximum of three pieces of digital content will be developed and disseminated by September 30, 2018.</td>
<td>X</td>
<td>One comprehensive digital symposium white paper was produced with highlights from the symposium. Nine digital images with messages around responsible use of antibiotics were delivered and one digital reference guide with tips for producers engaging around resistance was designed.</td>
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Appendix

AR: 1832-II
Contractor: NAMI
Program Managers: Bill Sessions
The Veal Quality Assurance (VQA) program has constantly evolved from its inception in 1990. The revisions completed in FY 17 and implemented this year reflect the best available science for veal calf care and well-being, and include a benchmarking process with expert panelists. The VQA program is recognized by packers, processors, distributors and other channel marketers as the gold-standard for calf care. It provides assurance to the entire marketing chain that the veal they merchandize is derived from ethically raised calves. More than 95 percent of domestic milk-fed veal comes from calves raised under a certified VQA program. Consumers want permission to eat veal and VQA provides a high level of confidence in the production process.
Ratings from 2018 SBC Evaluation Survey

- QSBCs use AR materials (yes/no): 1/37
- Considered a “go to” resource – 10 out of 10
- Does is improve state programs – 10 out of 10
- How do QSBC extend the AR results – tours and content
- Would recommend to another QSBC:
  Yes (8-10): 100%
  No (1-4): 0%
  Maybe (5-7): 0%
- AR work is improving:
  Agree (8-10): 100%
  No (1-4): 0%
  Maybe (5-7): 0%
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<tr>
<td>1A</td>
<td>Continue to manage on-going program implementation of VQA education and certification with veal packers/processors, feed companies, independent veal growers and others to ensure a minimum of 95% of milk-fed veal production is VQA certified.</td>
<td>X</td>
<td></td>
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<td></td>
<td>Ongoing management of the VQA program was conducted throughout the fiscal year. Based upon FY 18 slaughter estimates, 95.73% of U.S. produced milk-fed veal production was VQA certified.</td>
</tr>
<tr>
<td>1A</td>
<td>Ensure VQA content on <a href="http://www.VealFarm.com">www.VealFarm.com</a> is updated monthly and remains current and accessible to industry stakeholders such as veal packers and processors and other industry stakeholders.</td>
<td>X</td>
<td></td>
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<td></td>
<td>Updated program content has been added to the VealFarm website at: <a href="http://www.vealfarm.com/certification-resources/">http://www.vealfarm.com/certification-resources/</a> At the Veal Summit, 64% of attendees responded in a survey instrument that they access the website for VQA resources.</td>
</tr>
<tr>
<td>1A</td>
<td>Communicate VQA program updates to 350 industry stakeholders including state beef council leadership and veal growers, packers, and processors through the monthly Veal Industry e-newsletter.</td>
<td>X</td>
<td></td>
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<td></td>
<td>The veal industry has received monthly updates on the status of the VQA program through the veal industry electronic newsletters. In addition, quarterly newsletters were mailed to those producers without access to the internet. A total of 4,427 newsletters were sent to the industry (reach) with a confirmed engagement of 955 (open rate).</td>
</tr>
<tr>
<td>1A</td>
<td>Provide a VQA program update presentation to 50 leading veal</td>
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<td>Veal Summit was conducted in April 2018. The participants at the</td>
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<tr>
<td>industry stakeholders at the annual Veal Summit in March 2018.</td>
<td>X</td>
<td>Summit rated the VQA presentation at 53% Excellent; 41% Good and 6% Satisfactory in an attendee survey instrument.</td>
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**DISCLAIMER:** Links to third-party websites within this document should not be considered an endorsement by the Beef Checkoff.
Appendix

AR: 1840-FM
Contractor: NCBA/USMEF
Program Managers: Greg Hanes
An Economic Analysis of the U.S. Meat Export Federation’s Export Market Development Programs,” a study recently conducted by Dr. Harry M. Kaiser of Cornell University indicates that U.S. beef export promotion to all regions was profitable. The three objectives of this study were to: (1) quantify the return to the U.S. government and to beef, pork, corn, and soybean producers on their investment in USMEF’s export market development programs; (2) quantify the contribution of USMEF’s export market development programs to the growth in beef and pork exports that has occurred over the past decade; and (3) quantify the broader macroeconomic impacts of USMEF’s export market development programs on employment, employment income, value-added, tax revenue, and contributions to U.S. GDP. Analyzing data from 2012-2017, the results found that a 1% increase in U.S. beef export promotion resulted in a 0.57% increase in U.S. beef imports. This estimate was significantly larger than the previous study of USMEF promotion effectiveness (Kaiser 2012) which found a U.S. beef export promotion elasticity of 0.323. These econometric results suggest that U.S. export promotion had a very important impact on import demand for U.S. beef. In addition, comparing the results of this study to the results from 16 studies of similar programs for other commodities indicates that U.S. red meat export promotion has had a larger impact on import demand than many other export promotion programs. The average benefit-cost ratios for U.S. beef export promotion ranged from a low of $3.64 to a high of $12.13. This means that each dollar invested in U.S. beef promotion increased net revenue to the U.S. beef industry between $3.64 and $12.13.

2018 has been a turbulent year for international trade. At the same time, high U.S. livestock production placed an even greater importance on exports, which despite multiple trade barriers are on record pace for the year. Facing the challenges head on, USMEF remained steadfast in its efforts to develop and expand in new overseas destinations for U.S. beef while also defending its position in established markets and with loyal customers in a complicated trade environment. As a result, U.S. beef exports were able to achieve tremendous volume growth in the industry’s mainstay markets like Japan, Korea, Hong Kong and Taiwan. U.S. beef items that are traditionally popular in these key countries continued to perform well, as did new cuts and culinary/merchandising concepts targeted for promotion by USMEF also gained traction, such as thick-cut steaks, alternative cuts (tri tip, brisket and sirloin cap) and barbecue preparations. Enthusiasm for U.S. beef also extended into emerging markets like Latin America and the ASEAN where beef buyers and consumers displayed a tremendous appetite for its superior attributes, which contributed significantly to the surge in its export value. Geographic expansion, be it USMEF’s strategy to focus on the major economic growth zones like second-tier cities (Hangzhou) in eastern China or previously untapped metropolitan areas, like Puebla or Veracruz Mexico, also achieved measurable incremental growth for U.S. beef. From high-end restaurants to food truck and retail supercenters to convenience stores, U.S. beef gained new fans across the globe on a daily basis as its popularity also strengthened.

- For January through August, beef exports totaled 899,300 mt, up 9 percent from a year ago, while value climbed 18 percent to $5.51 billion.
- For January through August, exports accounted for 13.5 percent of total beef production and 11.1 percent for muscle cuts – up from 12.8 percent and 10.1 percent, respectively, last year.
- The January-August average was $318.66 per head, up 16 percent.
For chilled beef, Jan-Jun the United States remains the world’s leading exporter at 223,000 mt, up 8 percent year-over-year, followed by Australia (141,000 mt, +10.5 percent). U.S. chilled beef exports were higher for nearly all top markets including Japan (74,000 mt, +4 percent), Mexico (59,000 mt, +13 percent), South Korea (25,000 mt, +35 percent) and Taiwan (11,000 mt, +34 percent).
Ratings from 2018 SBC Evaluation Survey

- QSBCs use AR materials (yes/no): 23/15
- Considered a “go to” resource – 8.5 out of 10
- Improves state programs – 8.2 out of 10
- How do QSBC extend the AR results – Contribute funds, market intelligence, industry updates
- Would recommend to another QSBC:
  - Yes (8-10): 91.3%
  - No (1-4): 8.7%
  - Maybe (5-7): 0%
- AR work is improving:
  - Agree (8-10): 91.3%
  - No (1-4): 8.7%
  - Maybe (5-7): 0%
### 1840-FM (USMEF, NCBA)

<table>
<thead>
<tr>
<th>Tactic</th>
<th>Measurable Objectives</th>
<th>Exceeded</th>
<th>Achieved</th>
<th>Not Achieved</th>
<th>Ongoing Under Approved Extension</th>
<th>Contractor Comments</th>
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<tr>
<td>4A</td>
<td>100% of targeted trade accounts understand the profit potential of and have a favorable attitude towards U.S. beef based on information provided by USMEF.</td>
<td></td>
<td>100%</td>
<td></td>
<td></td>
<td>U.S. beef’s primary battle for ASEAN market share was in the grain-fed premium segment and mostly against Australian product. Given this distinction, U.S. beef competed head-to-head on quality and added-value aspects where it excelled. USMEF developed more opportunities for U.S. beef through relentless education which fostered more pragmatic ideas on U.S. beef applications. As active partners and participants in USMEF training for foodservice and retail users, USMEF’s targeted trade accounts gained a better understanding of the cutting information of the featured cuts, which facilitated downstream product introductions to both existing clients and targeted new customers.</td>
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<tr>
<td>4A</td>
<td>93% of targeted HRI and retail accounts understand the unique quality and profit potential of U.S. beef compared to competing products based on information provided by USMEF.</td>
<td>93%</td>
<td>USMEF focused on education to keep HRI customers of U.S. beef informed and able to disseminate this information to colleagues and others in the food industry. USMEF led discussions on U.S. beef’s quality, providing details about the U.S. production system and the importance of proper cooking methods and preparation to bring out the best characteristics in the selected cuts. An important aspect was showing chefs how to take a U.S. beef cut and use it in several different ways in several different kinds of dishes. This sparked amazing creativity and interest in U.S. beef products, which resulted in an increase in usage (especially alternative value cuts) and ultimately increased sales.</td>
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<tr>
<td>4A</td>
<td>87% of targeted HRI accounts regularly feature/promote U.S. beef</td>
<td>87%</td>
<td>USMEF worked with individual supermarkets and their local suppliers</td>
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on customized training and marketing tactics to address company specific challenges and opportunities. This helped retail accounts add value to U.S. beef promotional events which translated into incremental sales growth.

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<tbody>
<tr>
<td>4B</td>
<td>USMEF will contribute to/support initiatives to eliminate trade-restrictive policies.</td>
<td>X</td>
<td>U.S. beef/bvm exports to the ASEAN through August 2018 were up 11 percent in volume to 29,261 mt, with value up 23 percent to $160.6 million</td>
</tr>
<tr>
<td>4B</td>
<td>80% of USMEF members will report that they receive the information they need from USMEF related to market access.</td>
<td>90%</td>
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<tr>
<td>4C</td>
<td>96% of targeted importers/distributors understand the supply/quality/value relationships of U.S. beef based on information provided by USMEF.</td>
<td>96%</td>
<td>USMEF’s educational efforts in the Caribbean reinforced to beef users at all levels its value/price relationship and how this corresponds to profitability.</td>
</tr>
<tr>
<td>4C</td>
<td>80% of targeted HRI distributors promote new ways to use popular cuts or an alternative cut of U.S. beef to their customers.</td>
<td>80%</td>
<td>Importers, chefs and foodservice operators reached by USMEF activities clearly understood the value in moving beyond “middle meats” and actively promoted a product mix that reflected this thinking. These targeted</td>
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</table>
accounts differentiated themselves by the wide assortment of U.S. beef they offered (i.e., short ribs, hanger steaks, cheeks, flat irons, skirts, tomahawk and brisket, ball tips, coulottes, bottom sirloin flap, inside round and chuck steaks), and in doing so stood out as market innovators and leaders.

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<tr>
<th>4C</th>
<th>81% of targeted retailers understand proper cold chain management, handling, and merchandising of U.S. beef</th>
<th>93%</th>
<th>For U.S. beef at retail, USMEF aggressively defended and expanded the share for new cuts and product innovations by helping targeted retailers make refreshed and upgraded presentations of U.S. beef in their markets.</th>
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<td>4D</td>
<td>USMEF will contribute to/support initiatives to eliminate trade-restrictive policies.</td>
<td>X</td>
<td>U.S. beef/bvm exports to the Caribbean through August 2018 were up 10 percent in volume to 13,164 mt, with value up 3 percent to $74.9 million.</td>
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<tr>
<td>4D</td>
<td>80% of USMEF members will report that they receive information they need from USMEF related to market access.</td>
<td>90%</td>
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<tr>
<td>4E</td>
<td>60% of targeted importers/distributors that consistently source and successfully promote U.S. beef to their downstream customers.</td>
<td>60%</td>
<td>USMEF shared impactful ideas to strengthen U.S. beef demand through HRI training programs coordinated and carried</td>
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</table>
out with targeted importers/distributors in the region. Through these comprehensive efforts, USMEF fortified U.S. beef’s quality brand image and helped expand the number of cuts and concepts being promoted.

| 4E | 100% of targeted HRI accounts understand the quality and profit potential of U.S. beef based on information provided by USMEF. | 100% | Delivering information on new U.S. beef cuts and demonstrating culinary trends that could be successful in specific markets, USMEF offered innovative ways of cooking, serving and presenting different dishes that helped chefs and restaurant operators stand apart from the competition in terms of quality and value. |
| 4E | 67% of targeted retailers consistently incorporate suggested merchandising methods to promote the quality attributes of U.S. beef. | 67% | USMEF’s retail sector priorities included further expansion, new/alternative cut development, continued differentiation of USDA graded products and ongoing displacement of the competition (i.e., Nicaragua). Highlighting |
a wide variety of U.S. beef cuts, campaigns involved several marketing elements to drive customer interest. These included social networking on Facebook and Instagram, billboards and street advertisements, radio and print media, as well as point of sale materials (banners, posters, educational flyers).  

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<td><strong>4F</strong></td>
<td>USMEF will contribute to/support initiatives to eliminate trade-restrictive policies.</td>
<td>X</td>
<td></td>
<td></td>
<td>U.S. beef/bvm exports to Central America (including the Dominican Republic) through August 2018 were 13,689 mt (16 percent), valued at $87.6 million (12 percent).</td>
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<tr>
<td><strong>4F</strong></td>
<td>USMEF will present scientific evidence on the safety of U.S. beef to the region’s importers, researchers, &amp; decision makers as appropriate</td>
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<tr>
<td><strong>4F</strong></td>
<td>80% of USMEF members will report that they receive the information they need from USMEF related to market access.</td>
<td></td>
<td>90%</td>
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<tr>
<td><strong>4G</strong></td>
<td>75% of targeted importers/distributors understand the supply capabilities and quality attributes of U.S. beef based on information provided by USMEF.</td>
<td></td>
<td></td>
<td>75%</td>
<td>USMEF in China/Hong Kong maintained its focus on core educational tactics that clearly showcase the variety of U.S. cuts available and U.S. beef’s superior product attributes. Importer</td>
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</table>
education, including activities like the “U.S. beef secondary cuts” training sessions of cutting and cooking applications for foodservice and retail settings helped users maximize utilization and profitability to push demand for a wider assortment of cuts especially underutilized value cuts.

| 4G | 93% of targeted HRI outlets/chains in Hong Kong regularly use U.S. beef. | 93% | USMEF continued to collaborate with Hong Kong's top importers in their efforts to stimulate sales, expand cut applications and reinforce U.S. beef's quality image with downstream customers. This included ongoing support of the big QSR chains (Fairwood and Maxims) as well as outreach to newer foodservice targets that had proven their ability to deliver volume of beef sales (e.g., Ruby Tuesday). USMEF maximized the impact of these programs by |
| 4G | 86% of targeted HRI outlets/chains in Hong Kong actively participate in and/or contribute to USMEF promotions. | 86% | |
giving priority to operators who displayed a drive for menu innovation, marketing creativity and savvy social media usage. U.S. beef continued to be well-represented in

<table>
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<th>4H</th>
<th>USMEF will contribute to/support initiatives to eliminate trade-restrictive policies.</th>
<th>X</th>
<th>U.S. beef/bvm exports to China/Hong Kong through August 2018 were up 6 percent in volume to 79,584 mt, with value up 30 percent at $638.8 million.</th>
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<tr>
<td>4H</td>
<td>80% of USMEF members will report that they receive the information they need from USMEF related to market access.</td>
<td>90%</td>
<td>Despite fierce competition and working from a higher price point, along with supply irregularity under the EU’s HQB quota system/TRQ utilization, USMEF kept existing EU importers and distributors interested in U.S. beef – through education and regular marketing engagement. Working to overcome pricing and competitive challenges, USMEF emphasized the promotion of alternative cuts so importers could</td>
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<tr>
<td>4I</td>
<td>90% of targeted distributors will purchase U.S. beef consistently year-round.</td>
<td>90%</td>
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<td>4I</td>
<td>40% of targeted distributors will purchase muscle cuts other than traditional loin steak cuts.</td>
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<td>Derive as much value as possible from every U.S. beef shipment.</td>
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<tr>
<td>41</td>
<td>70% of newly targeted distributors will make trial purchases of U.S. beef.</td>
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<td></td>
<td>Expansion into newer markets in Central and Eastern Europe where U.S. beef's presence had been limited had a tangible impact on its performance in Europe in an otherwise challenging year—the diversification and increase in the number of distributors and wholesalers working with U.S. beef helped broaden the overall usage of U.S. beef in Europe.</td>
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<td>USMEF made a stronger push to achieve wider representation of U.S. beef in European grocery chains and gourmet stores through partnerships with distributors and retailers on new market initiatives. These intensified efforts at the retail point of sale took educational marketing of U.S. beef directly to the final consumer.</td>
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<td></td>
<td>70% of newly targeted distributors will make trial purchases of U.S. beef.</td>
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<td></td>
<td>80%</td>
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<td></td>
<td>33% of targeted retailers will regularly offer U.S. beef to their customers.</td>
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<tr>
<td></td>
<td>53%</td>
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<td>4J</td>
<td>USMEF will contribute to/support initiatives to eliminate trade-restrictive policies.</td>
<td>X</td>
<td>U.S. beef/bvm exports to Europe through August 2018 were down 14 percent in volume (13,793 mt) and value ($149.7 million).</td>
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<tr>
<td>4J</td>
<td>80% of USMEF members will report that they receive the information they need from USMEF related to market access.</td>
<td>90%</td>
<td>As the primary conduit of awareness of the “American beef” logo and U.S. beef advertising among Japanese consumers, grocery stores and supermarkets were a major downstream target for USMEF strategic programming. On a national level, USMEF primarily focused on the top chains that drive most of the country’s retail consumption. This included Aeon, Costco, and Walmart with strategies that aimed to defend current share, displace other competitors and develop new category opportunities. Strengthening U.S. beef sales in regional markets also remained a top priority for</td>
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<tr>
<td>4K</td>
<td>33% of targeted retailers will regularly offer U.S. beef to their customers.</td>
<td>33%</td>
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Throughout the year, these regional retailers worked with USMEF in adding more beef cuts and utilizing new merchandising ideas, many of which were supported with promotional activities.

USMEF continued to recognize how and where the Japan market held potential for additional growth. It also remained vigilant about the fact that the U.S. faced significantly higher tariffs than its main competitor, Australia. USMEF aggressively defended U.S. beef's position and, through displacement, helped it gain further share with a strategy promoting expanded usage of cuts (skirt, hanging tender, clod and gooseneck rounds), higher Choice and Prime grades, and brands among targeted importers and in the country’s HRI and retail sectors. USMEF also supported importers.

| 4K | 55% of targeted importers/distributors consistently purchase 2 or more U.S. beef alternative cuts. | 64% |
| 4K | 60% of targeted HRI/retail accounts that consistently feature 2 or more U.S. beef cuts | 86% | Differentiation played an important role as the further establishment of U.S. beef's image of quality through premium and value-added products helped capture additional market share and reinforced customer loyalty. USMEF partnered with HRI and retail accounts to sell larger volumes of U.S. chilled branded and more highly graded beef. It also created opportunities to position USDA Prime beef as an affordable alternative to domestic beef which was at record market prices. The evolution of Japan’s HRI sector continued to present opportunities to introduce new foodservice categories and more options for consumers as operators and a growing number of Japanese customers.

| 4K | 50% of targeted HRI/retail accounts add additional U.S. beef items to the menu/in the meat case | 50% |

and distributors with their individual differentiation strategies.
<p>| 4K | 50% of targeted bento/convenience stores (CVS) offer menu items featuring U.S. beef. | 50% | In collaboration with Japanese processors that supply the convenience sector, USMEF worked to increase U.S. beef usage in bento boxes, prepared meals and snacks sold at CVS stores and “deli” chains. |
| 4K | 17% of targeted consumers are confident in the safety of U.S. beef | 22% | U.S. beef’s growing retail prevalence that coincided with Japan’s red meat boom, also came at a time when consumers were displaying an increasing preference for beef leaner than wagyu. USMEF demonstrated to end users that U.S. beef fits perfectly into their growing appetite for beef with just the “right amount of marbling.” USMEF implemented a communication and marketing program that segmented U.S. beef’s characteristics of “safe,” “delicious,” and “healthy” in a manner that was easy to |
| 4K | 23% of targeted consumers purchased U.S. beef within the past 2 weeks. | 33% |  |</p>
<table>
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<tr>
<th>4L</th>
<th>USMEF will contribute to/support initiatives to eliminate trade-restrictive policies.</th>
<th>X</th>
<th>U.S. beef/bvm exports to Japan through August 2018 were up 7 percent in volume to 224,785 mt, with value up 11 percent at $1.42 billion.</th>
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<td>4L</td>
<td>80% of USMEF members will report that they receive the information they need from USMEF related to market access.</td>
<td>90%</td>
<td>Having re-established its reputation in Korea as a “world class” product, highly reliable in both quality and supply terms, U.S. beef enjoys widespread acceptance at all levels in this key destination. USMEF leveraged this notion of “world class” for its multi-channel communication platform focused on pushing product quality, a message that was integrated into different marketing activities throughout Korea. Along with the “World Class Beef” message, USMEF supported traders, retailers, and foodservice operators carrying U.S. beef. With the convenience category becoming a</td>
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<tr>
<td>4M</td>
<td>65% of targeted trade accounts are confident in the consistent supply of U.S. chilled beef.</td>
<td>65%</td>
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<tr>
<td>4M</td>
<td>75% share of beef imported by targeted importers will be U.S. beef vs. other imported beef.</td>
<td>75%</td>
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priority for food companies, USMEF also worked with importers and processors on their utilization of U.S. beef in more ready-to-eat meals and portion control/value-added packaging.

| 4M | 72% of targeted hotel/banquet accounts will feature U.S. beef on their menus. | 94% | USMEF’s strategy to grow U.S. share at the expense of Australian and Korea’s domestic Hanwoo beef in the institutional and banquet sectors along with capitalizing on major food trends including steak, American barbecue and premium burgers in the HRI and retail sectors was highly effective. It also created many opportunities to increase market share further as USMEF continued its role in leading the advancement of new food and meat trends in Korea, including the concepts of dry aging, American-style steak and gourmet burgers. |
72% of targeted retailers will merchandise a wide range of U.S. beef items.

USMEF’s aggressive efforts targeting Korean retailers which had switched from Australian to U.S. beef, gave U.S. beef the leading share in the chilled beef market. Shifts in Korea’s retail sector also happened at the cut level and greatly benefitted U.S. beef. The move toward ready-to-eat and pre-packaged meals favored by busy families and single people increased demand for convenience items and drove a growing interest in bulgogi (sliced, marinated meat) cuts like U.S. shoulder clod that overshadowed the traditional mainstays for Korean barbeque (chuck roll, top blade and short ribs). As an increasing number of retailers began focusing on upgrades to capture demand they turned to higher-quality U.S. beef and packaging. Similarly, Korea’s thriving “steak culture”
among home cooks led key retail chains to invest more resources into promoting U.S. steak cuts.

| 4M | 100% of targeted media outlets will report favorably on U.S. beef and incorporate recommended key message points into materials. | 100% | Having re-established its reputation in Korea as a “world class” product, U.S. beef enjoys widespread consumer acceptance in Korea, which is a major change from the sentiment that prevailed in 2008, when U.S. beef returned to the market following a BSE-related closure. USMEF leveraged this notion of “world class” for its multi-channel communication platform focused on pushing product quality, a message that was integrated into different marketing activities throughout Korea. Equally important, media reports on U.S. beef’s growing market share were balanced throughout the year, and the tone of coverage on USMEF activities was positive |

| 4M | 60% of targeted consumers will express a willingness to purchase U.S. beef. | 60% | 60% of targeted consumers will express a willingness to purchase U.S. beef. |
and favorable. From these combined efforts across sectors and integrated under the “World Class Beef” marketing umbrella, USMEF has made tremendous strides in increasing consumer receptivity and interest in U.S. beef.

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<td>4N</td>
<td>USMEF will contribute to/support initiatives to eliminate trade-restrictive policies.</td>
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<tr>
<td>4N</td>
<td>80% of USMEF members will report that they receive the information they need from USMEF related to market access.</td>
<td>90%</td>
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<tr>
<td>4O</td>
<td>70% of targeted importers/distributors/processors actively promote a range of U.S. beef cuts, including value cuts, highlighting the products’ quality attributes.</td>
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<td>70%</td>
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</table>

- U.S. beef/bvm exports to South Korea through August 2018 were up 39 percent in volume to 161,379 mt, with value up 54 percent at $1.14 billion.

- Uncertainty about the future of NAFTA and negative rhetoric towards Mexico had the potential to awaken a strong anti-American sentiment that could have caused Mexican buyers and end-consumers to stop purchasing U.S. red meat products. USMEF’s proactive response in Mexico intensified development efforts with new well-vetted companies in new channels and
expanded promotional arrangements with newly established accounts. USMEF also implemented marketing activities in areas where very little had been done in the past (Sonora, Tijuana, Chihuahua and Puebla), which had a tremendous impact in increased brand loyalty to U.S. beef. Educational outreach in these new regions generated significant interest in new U.S. cuts (baseball cut, Denver steak and coulotte). Another priority was maintaining well established relationships with existing accounts which sustained the customer retention rate among the top tier of major importing players that purchased 80 percent of all U.S. beef imported by Mexico.

<p>| 40 | 83% of targeted restaurant chains actively feature/promote U.S. beef, including value cuts, to their customers. | 83% | Given the pricen-sensitive nature of the Mexican market, educating the HRI |
| 40 | 83% of targeted restaurant and hotel groups increase sales of U.S. beef by at least 10% during USMEF promotions. | 83% | sector on utilization of alternative cuts was another primary focus for USMEF. Foodservice “cutting/cooking schools” and butcher workshops helped demonstrate how proper handling skills and fabrication techniques with these more economical value items can lead to strong sales and profits. USMEF often collaborated with importer/distributors in customized trainings for downstream customers. |
| 40 | 75% of targeted retailers consistently incorporate suggested merchandizing methods to promote U.S. beef to their customers. | 87% | USMEF worked closely with supermarket managers at targeted chains to show how promoting high quality beef using USDA Choice and Prime grades can meet the needs of their customers while giving them the flexibility of sourcing the product from multiple U.S. suppliers. Supporting decisions made by targeted retail chains to |
| 40 | 75% of targeted retailers increase sales of U.S. beef by at least 10% during USMEF promotions. | 75% | |</p>
<table>
<thead>
<tr>
<th>Quarter</th>
<th>Statement</th>
<th>Percentage</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>4P</td>
<td>USMEF will contribute to/support initiatives to prevent trade-restrictive policies.</td>
<td>X</td>
<td>U.S. beef/bvm exports to Mexico through August 2018 were up 1 percent in volume to 158,496 mt, with value up 8 percent at $693.8 million.</td>
</tr>
<tr>
<td>4P</td>
<td>80% of USMEF members will report that they receive the information they need from USMEF related to market access.</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td>4Q</td>
<td>63% of targeted importers/distributors have a favorable attitude toward U.S. beef/bvm based on information provided by USMEF.</td>
<td>63%</td>
<td>Despite a decline in U.S. beef export activity to the Middle East (mainly to Egypt), USMEF's program witnessed a steady growth in U.S. beef users as efforts made to further build demand for U.S. beef high quality and underutilized cuts, as well as for processed items, yielded positive results. USMEF helped these companies create customized strategies to satisfy the specific cost management needs of downstream customers. Confident about the quality of U.S. beef and</td>
</tr>
<tr>
<td>4Q</td>
<td>52% of targeted importers/distributors regularly purchase U.S. beef/bvm products.</td>
<td>52%</td>
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</table>
explicitly sure of its taste, tenderness and flavor, most importers retained a long-term loyalty to U.S. beef. USMEF's reliable partnership with these buyers helped secure regular purchases and the addition of new U.S. beef cuts (short ribs, breakfast beef, brisket and tri tip) to many procurement lists.

| 4Q | 89% of targeted HRI buyers regularly purchase U.S. beef/bvm products. | 89% | USMEF’s beef tutorials, master classes, workshops and live cutting/cooking demos locked down regular purchases of U.S. beef by numerous hotels and restaurants. These activities also contributed to developing business for chilled underutilized U.S. beef cuts by focusing on their quality, profitability and menu added value. USMEF stimulated further and ongoing introduction of new U.S. beef cuts and enhanced consumption in the sector by supporting menu |
| 4Q | 67% of targeted fine dining and casual family-style restaurants/chains hold U.S. beef promotions or use menu promotional materials. | 67% |  |
promotions, theme
nights and festivals at
targeted restaurants
and hotels across the
region. These activities
were also highly
effective in increasing
U.S. beef’s exposure
and awareness among
consumers and other
chefs/operators.

<table>
<thead>
<tr>
<th>4Q</th>
<th>60% of targeted retail chains/outlets have a favorable attitude toward U.S. beef/bvm and are knowledgeable of its quality based on information provided by USMEF</th>
<th>80%</th>
<th>USMEF established a positive image for U.S. beef in the retail sector through marketing partnerships. USMEF worked closely with retailers and importers to further increase interest in U.S. beef and ensure a consistency in supply. U.S. quality and price point messaging at meetings and workshops and informative literature made targeted retail operators in the Middle East more aware of U.S. beef’s virtues of quality and safety, the diverse range of cuts available and the handling and merchandising techniques that...</th>
</tr>
</thead>
<tbody>
<tr>
<td>4Q</td>
<td>70% of targeted retail chains/outlets identify the origin of U.S. beef/bvm and actively participate in USMEF promotions</td>
<td>70%</td>
<td>...</td>
</tr>
</tbody>
</table>
maximize profitability. Retail promotions conducted by USMEF underlined the origin and identity of chilled and frozen U.S. beef muscle meats and processed items at these outlets.

<table>
<thead>
<tr>
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<th>maximize profitability. Retail promotions conducted by USMEF underlined the origin and identity of chilled and frozen U.S. beef muscle meats and processed items at these outlets.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4R</td>
<td>USMEF will contribute to/support initiatives to eliminate trade-restrictive policies.</td>
<td></td>
<td></td>
<td>U.S. beef/bvm to the Middle East through August 2018 were down 5 percent in volume to 53,973 mt, with value up 6 percent at $138.3 million.</td>
</tr>
<tr>
<td>4R</td>
<td>80% of USMEF members will report that they receive the information they need from USMEF related to market access</td>
<td>90%</td>
<td></td>
<td>Despite the ongoing embargo in Russia, there was an improvement in the political environment in the surrounding region, which eased previous impediments to trade and provided easier access for U.S. beef to targeted markets.</td>
</tr>
<tr>
<td>4S</td>
<td>100% of targeted trade accounts understand U.S. beef’s quality attributes and proper handling of U.S. beef based on information provided by USMEF</td>
<td></td>
<td>100%</td>
<td>USMEF was active in the region, continuing to educate the trade and downstream users about U.S. beef and its availability in the market. Especially important was USMEF’s demonstration to target</td>
</tr>
<tr>
<td>4S</td>
<td>100% of targeted HRI outlets/restaurant chains regularly stock U.S. beef</td>
<td></td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>4S</td>
<td>100% of targeted retail outlets identify the origin of U.S. beef on product</td>
<td></td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>4S</td>
<td>77% of targeted retail outlets actively promote U.S. beef</td>
<td></td>
<td>77%</td>
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<tr>
<td>4T</td>
<td>USMEF will contribute to/support initiatives to eliminate trade-restrictive policies.</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4T</td>
<td>80% of USMEF members will report that they receive the information they need from USMEF related to market access</td>
<td></td>
<td>90%</td>
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</table>
accounts that U.S. beef is not just about expensive cuts like ribeyes but also about budget-friendly, high-quality alternative cuts, with a much heavier focus on promoting these cuts to penetrate HRI and retail outlets that had never considered U.S. beef before. This helped sustain regular shipments of U.S. beef and a growing presence on the menus of almost all top-end restaurants in the targeted markets of Ukraine, Uzbekistan and Kazakhstan. There is a heightened awareness of U.S. beef’s quality among beef users at all levels. USMEF’s efforts in Russia included ongoing interaction with and observation of the local meat industry to determine its potential impact on the global markets. USMEF also upheld its longstanding relationships with local market players to keep
4U

| 80% of targeted importers/distributors have a favorable attitude toward U.S. beef based on information provided by USMEF. | 80% | The relationships between targeted trade accounts and their downstream clients, as well as those forged between importers and U.S. suppliers were enhanced by USMEF programming that helped drive U.S. beef’s export growth to South America this year. Working with the trade in the key markets (Chile, Peru, Colombia), USMEF optimized supply distribution and channel development, especially with the introduction of more underutilized cuts. Accounts remained committed to U.S. beef with a growing interest in expanding their U.S. beef portfolios with the addition of value cuts and increasing sales of variety meats, even as competitors were becoming more aggressive and accommodating to buyers’ needs. |

| 73% of targeted importers/distributors consistently purchase U.S. beef. | 73% |  }
<table>
<thead>
<tr>
<th></th>
<th>67% of targeted HRI outlets/chains regularly use U.S. beef.</th>
<th>67%</th>
<th>USMEF worked with the leading importer/distributors in targeted markets to identify downstream users with the best potential for incremental growth. These chefs and foodservice owners were targets for customized training programs adapted to specific operational levels and category types. Given the price sensitive nature of the industry, USMEF's use of regional cuisine in these presentations made U.S. beef more approachable and was a powerful tool for introducing affordable cuts unfamiliar to many audiences.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4U</td>
<td>80% of targeted retailers identify the origin of U.S. beef on product.</td>
<td>80%</td>
<td>As the main channel of distribution for U.S. beef in South America, retailers remained an important and pivotal marketing platform for product image and awareness. U.S. beef was identified in premium outlets of USMEF’s targeted retail</td>
</tr>
<tr>
<td>4U</td>
<td>80% of targeted retailers actively promote the attributes of U.S. beef to their customers</td>
<td>80%</td>
<td></td>
</tr>
</tbody>
</table>
With USMEF support, locally owned chains partnered with importers to maintain quality product presentations and conduct effective promotions with U.S. beef. Similarly, guided by USMEF, larger groups that imported directly from the U.S. invested resources to improve sales performance, efficiency, and product quality.

| 4V | USMEF will contribute to/support initiatives to eliminate trade-restrictive policies. | X | U.S. beef/bvm exports to South America through August 2018 were up 3 percent in volume to 19,358, with value up 9 percent at $88.4 million |
| 4V | 80% of USMEF members will report that they receive the information they need from USMEF related to market access. | 90% | |
| 4W | 88% of targeted trade accounts have a favorable attitude toward U.S. beef based on information provided by USMEF. | 88% | The U.S. continued to be the largest supplier of beef to Taiwan in 2018 and held 74 percent (up from 72 in 2017) of the country’s chilled beef market, the highest of any Asian destination. USMEF has worked closely with all parties involved in the U.S. beef supply chain in Taiwan to expand |
| 4W | 88% of targeted trade accounts are willing to purchase additional U.S. beef items | 88% | |
| 4W | 100% of targeted trade accounts collaborate with downstream customers to promote U.S. beef. | 100% | |
| 4W | 75% of targeted restaurant accounts actively participate in and contribute to USMEF promotions for their customers. | 75% | To encourage the market and consumers to expand their U.S. beef experiences to more culinary styles and miscellaneous cuts, and as a way to assist accounts in the restaurant sector in their usage of alternative cuts as a way to mitigate the impact of increasing U.S. beef cost, USMEF collaborated with foodservice establishments to |
promote an exciting array of new alternative cuts. For example, promoting U.S. beef tri tip as a new steak cut for the Taiwan market and working to increase U.S. beef sales for the country’s foodservice operators, USMEF organized “2018 Steaklicious U.S. Beef Steak Month” involving more than 100 restaurants representing 40 different brands in Taipei City, New Taipei City and Taichung City. Participants’ sales of the U.S. steaks grew two to three times during the promotion.

| 4W | 54% of targeted retailers stock/promote an (additional) alternative U.S. beef cut. | 54% | Retailers like A-mart, Carrefour, Costco, RT Mart and Taiwan Fresh continued conducting various promotional events for U.S. beef, and actively supported USMEF point of sale activities and tasting demonstrations to stimulate consumption as they introduced new

<p>| 4W | 77% of targeted retailers actively promote the attributes of U.S. beef to customers. | 77% |</p>
<table>
<thead>
<tr>
<th>4X</th>
<th>USMEF will contribute to/support initiatives to eliminate trade-restrictive policies.</th>
<th>X</th>
<th>U.S. cuts to their assortment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4X</td>
<td>USMEF will provide factual information about U.S. meat safety and quality to Taiwan industry, government, and academic stakeholders as appropriate.</td>
<td>X</td>
<td>U.S. beef/bvm exports to Taiwan through August 2018 were up 36 percent in volume to 38,923 mt, with value up 40 percent at $359.9 million.</td>
</tr>
<tr>
<td>4X</td>
<td>80% of USMEF members will report that they receive the information they need from USMEF related to market access.</td>
<td>90%</td>
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Appendix

AR: 1850-PC
Contractor: CBB
Program Manager: Maggie Henton
The checkoff Producer Communications (PC) program continued to face some disruptions in fiscal 2018 including ongoing litigation involving the checkoff, eroding trust, and parting ways with the incumbent agency partner after an RFP taskforce selected a new agency of record. Despite the challenges, through our Open Doors FY18 efforts we were able to serve over 36 million impressions targeting producers, which generated a quarter of a million engagements or interactions with the content distributed. Through the Open Doors campaign, the messaging strategy was evolved to bring facts to life by taking the audience on a journey, showing them the opportunities that lie behind each door the checkoff has opened. All though the campaign went through audience testing, the Open Doors work wasn’t well received when it hit the market and didn’t gain momentum among the QSBCs. This was also a year of change in which we set the groundwork to refocus the program with an emphasis on building stronger awareness, familiarity and trust in how the checkoff is managed and how dollars are being used.
Ratings from 2018 SBC Evaluation Survey

- QSBCs use AR materials (yes/no): 25/13
- Considered a “go to” resource – 6.6 out of 10
- Improves state programs – 6.3 out of 10
- How do QSBC extend the AR results – Local advertisements, annual report in regional magazine, customized newsletter
- Would recommend to another QSBC:
  Yes (8-10): 36.0%
  No (1-4): 36.0%
  Maybe (5-7): 28.0%
- AR work is improving:
  Agree (8-10): 36.0%
  No (1-4): 44.0%
  Maybe (5-7): 20.0%
<table>
<thead>
<tr>
<th>Tactic</th>
<th>Measurable Objectives</th>
<th>Exceeded</th>
<th>Achieved</th>
<th>Not Achieved</th>
<th>Ongoing Under Approved Extension</th>
<th>Contractor Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>5A</td>
<td>Work to maintain percentage of producers reporting having seen, read, or heard information about the checkoff at 45% with MOE of ±3 percent.</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>January survey results show 43% having seen, read or heard about the beef checkoff in the past six months.</td>
</tr>
<tr>
<td>5A</td>
<td>Grow the number of state beef councils participating in coordinated producer communications project/programs (FY17 benchmark: 20 states).</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>We were able to work with over 19 states on various efforts. Providing them with resources and materials for their local efforts. By working together, we can help expand the reach of producer communications messaging. 19 states – those that have participated are CA, CO, FL, ID, IA, KY, MI, MO, MT, NE, NM, NY, OH, OK, OR, SD, TN, WA, WY</td>
</tr>
<tr>
<td>5A</td>
<td>Develop and launch a new producer communications advertising campaign.</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>The national ‘Open Doors’ campaign launched for the PC program in February and ran through the end of July.</td>
</tr>
<tr>
<td>5B</td>
<td>To conduct one independent, national quantitative study/survey of producers to inform the efforts of the Investor Relations Working Group.</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>The Producer Attitude Survey was launched in December. Report was completed and provided to CBB and the end of January.</td>
</tr>
</tbody>
</table>

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