

The Economics of Herd Expansion

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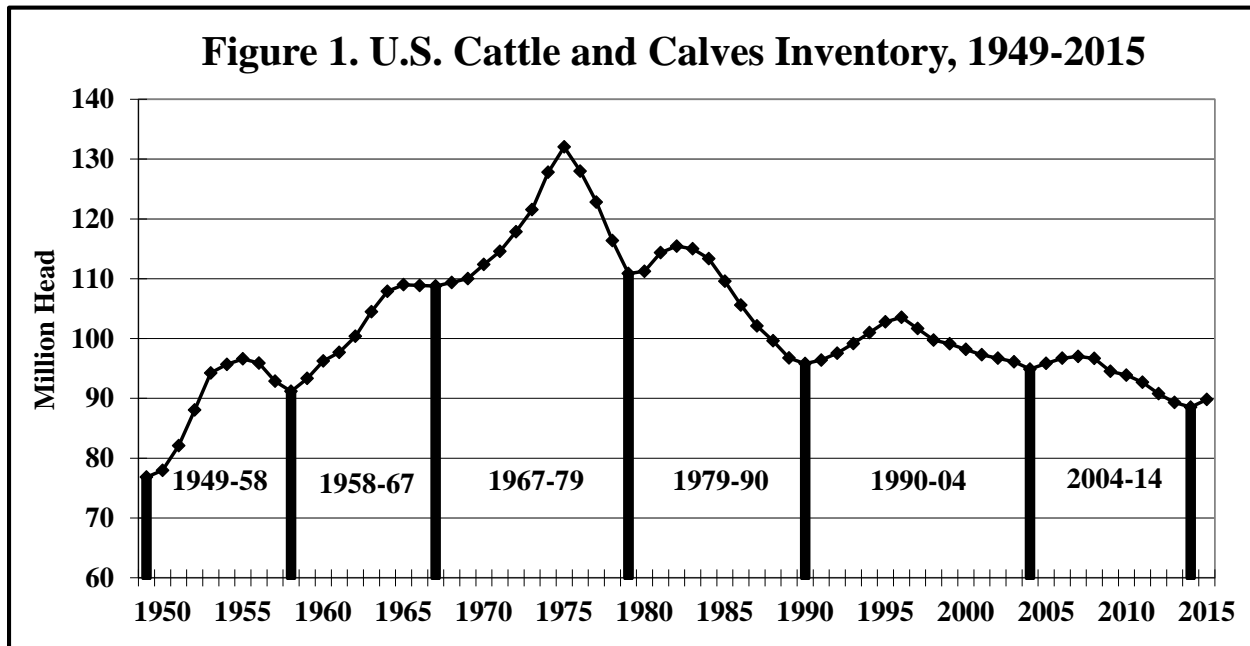
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Most cattle producers usually feel one of two ways about long-term price and profitability projections. They either feel long-term projections are worthless because no one can accurately predict the future, or they feel long-term projections aren't exactly accurate but they can be a useful guide in the decision-making process over the long run. Which one are you?

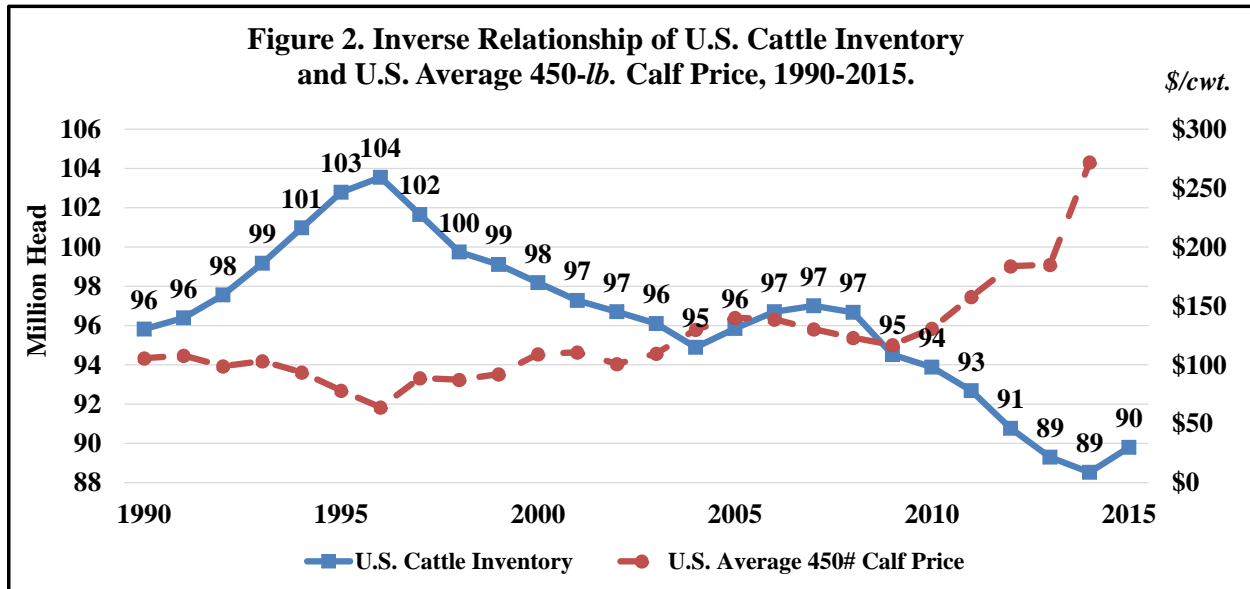
The only way to make long-term projections that actually mean something is to define the assumptions and methodology used to make the projections. Then, when more certain and realistic information is realized, adjustments can be made to the projections. This is a time consuming and repetitive process, but it will improve the decision-making and competitiveness of your cattle operation.

The Infamous U.S. Cattle Cycle and its Relationship to Expansion and Profitability

The U.S. cattle cycle is best described by the inventory of cattle and calves on farms over time. The United States Department of Agriculture (USDA) conducts two surveys per year (January 1 and July 1) to estimate the number of cattle and calves on U.S. beef and dairy operations (Prevatt, et al.). A cattle cycle documents a pattern of expansion and contraction of the inventory of cattle and calves over time. Thus, a cattle cycle is measured as the period of time from the lowest cattle and calves inventory number to the next lowest inventory number over time. Some cattlemen describe the cattle cycle as being from trough to trough. It is generally believed the cattle inventory increases over time due to higher market prices (profits) and then declines due to lower market prices (losses from over supply, etc.). Graphically, each cattle cycle is mound shaped (1949-58, 1958-67, 1967-79, 1979-90, 1990-04, and 2004-14, 2014-?), as shown in Figure 1. This data provides an overview of U.S. Cattle and Calves Inventory and Cattle Cycles from 1949-2015.

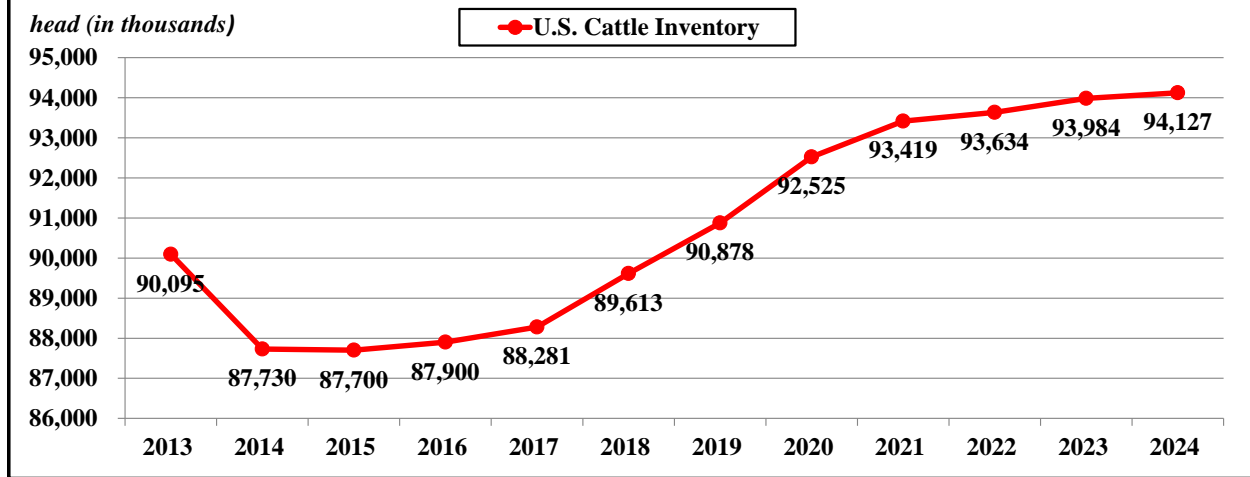


The relationship between U.S. cattle inventory and average U.S. feeder calf price is shown in Figure 2. The U.S. cattle inventory and U.S. average feeder calf prices move in opposite directions. As cattle inventory builds, average feeder calf prices decline. Likewise, after cattle and calves inventory numbers decline, average feeder calf prices increase.



The Food and Agricultural Policy Research Institute (FAPRI) based at the University of Missouri and Iowa State University and the United States Department of Agriculture (USDA) each publish a set of 10-year baseline cattle projections for production, inventory, and price (FAPRI and USDA, 2015). Each set of projections are updated and published annually in February. The USDA Cattle Inventory projection is shown in Figure 3. In 2015, the USDA projected U.S. Cattle Inventory to be 87.7 million head of cattle and calves. They expect this inventory to grow to 94.1 million head in 2024. This is a gain of approximately 7.4 million head over 10 years. Of course, this is simply a projection and as cattle and other livestock market prices, input costs, governmental policies, weather, etc. change over time, so will the projected inventory numbers. But, this provides us with a starting baseline we can make projections from.

**Figure 3. U.S. Cattle Inventory,
USDA Long-Term Projections 2013-2024**



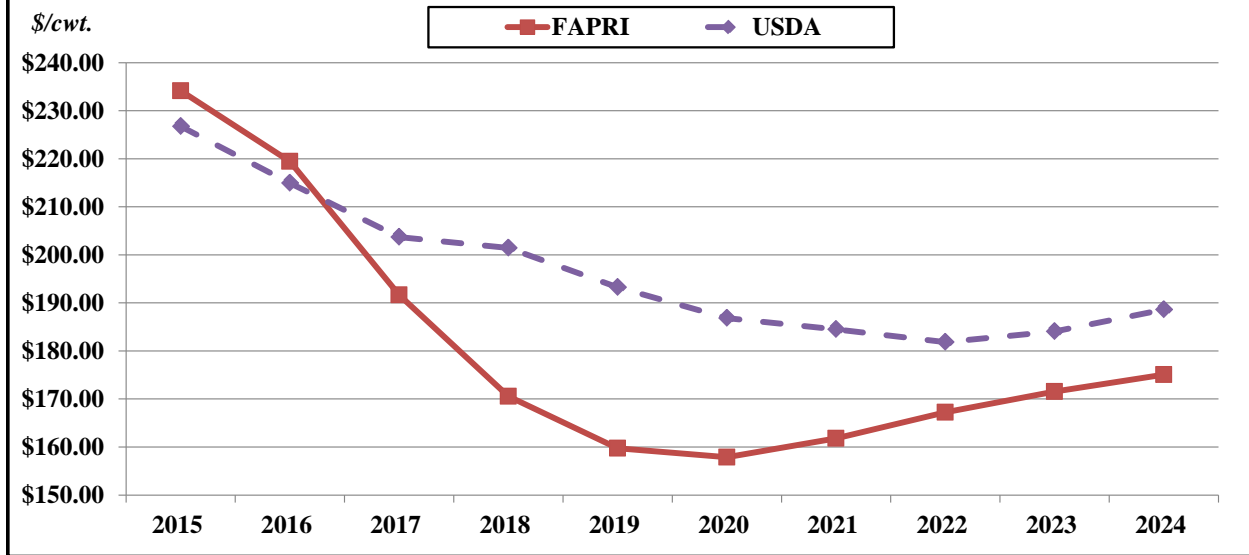
Associated with the long-term cattle inventory projections, FAPRI and USDA have made long-term projections on U.S. cattle market prices. Table 1 contains both the FAPRI and USDA’s long-term planning prices for fed cattle, feeder steers, and slaughter cows. Notice as inventory increases over time, there is a similar decline realized in market prices for the various classes of cattle.

Table 1. U.S. Beef Prices, Long-Term Baseline Projections 2015-2024

Item	Units	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Fed Cattle, Steers, 5-area (1250 lbs.)											
FAPRI	\$/cwt.	\$156.07	\$149.83	\$136.29	\$126.33	\$121.87	\$121.62	\$123.68	\$126.24	\$127.89	\$129.31
USDA	\$/cwt.	\$159.50	\$163.70	\$165.03	\$163.86	\$158.42	\$155.22	\$153.38	\$152.48	\$155.46	\$158.11
Feeder Steers, Oklahoma City (600-650 lbs.)											
FAPRI	\$/cwt.	\$234.16	\$219.45	\$191.68	\$170.55	\$159.74	\$157.87	\$161.80	\$167.23	\$171.53	\$175.05
USDA	\$/cwt.	\$226.75	\$214.96	\$203.70	\$201.46	\$193.23	\$186.83	\$184.50	\$181.85	\$184.05	\$188.59
Slaughter Cows, Breaking Utility, Sioux Falls											
FAPRI	\$/cwt.	\$107.09	\$97.81	\$85.31	\$77.83	\$74.14	\$73.85	\$74.94	\$76.64	\$77.40	\$77.99

Figure 4 contains both the FAPRI and the USDA’s long-term planning prices for Oklahoma City 650-pound feeder steers. Each set of prices follow the same general cyclical pattern observed in previous cattle cycles. However, the forecasted feeder steer prices of FAPRI are much lower than those of the USDA report during the years 2017-2021.

**Figure 4. Oklahoma City Feeder Steers, 650 lbs.
Long-Term Beef Price Projections, 2015-2024**



These two sets (FAPRI and USDA) of 10-year baseline price projections will serve as the foundation for the long-run planning prices for Florida beef cowherds (Hughes, 2013). The average of the two price projections for Oklahoma City feeder steer prices were modified based on projected transportation and handling costs between Oklahoma and Florida to project Florida feeder calf prices for 2015 to 2024. The projected feeder calf prices represent blended prices for feeder steers and heifers as reported in Table 2.

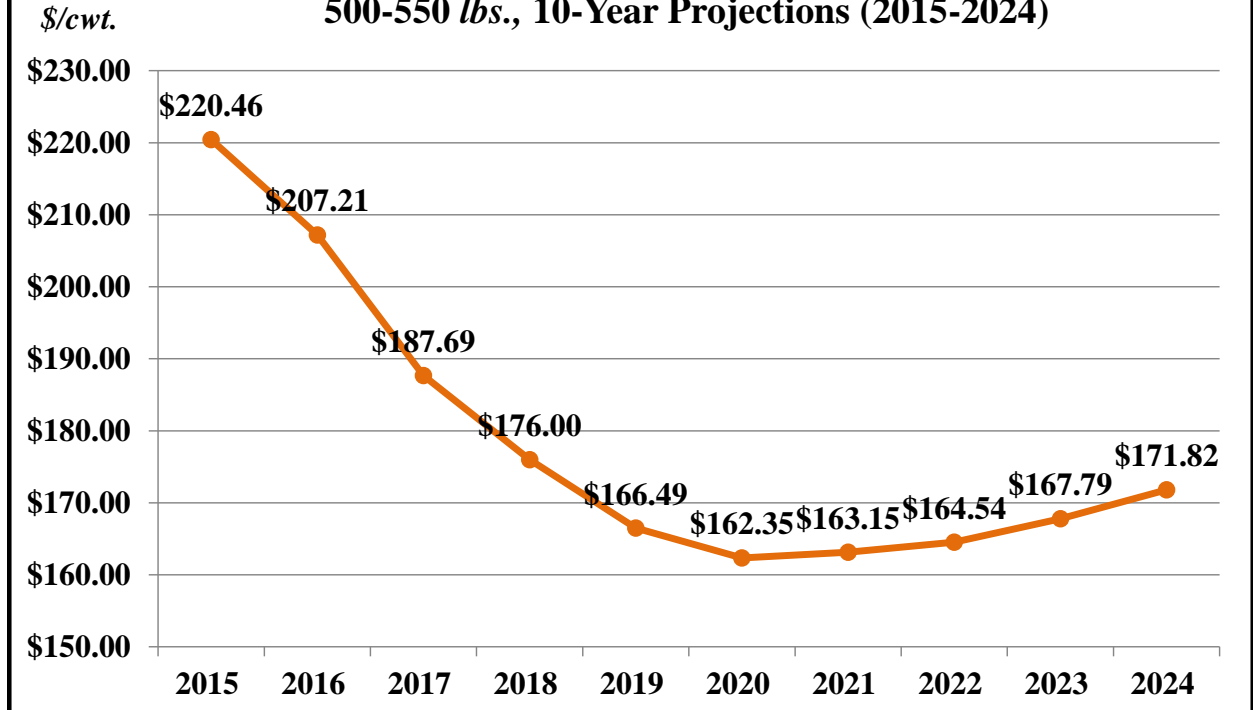
Table 2. Projected Florida Feeder Calf Prices, Med. & Lg., #1-#2, 525 lbs.

Units	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
\$/cwt.	\$220	\$207	\$188	\$176	\$166	\$162	\$163	\$165	\$168	\$172
\$/hd.	\$1,157	\$1,088	\$985	\$924	\$874	\$852	\$857	\$864	\$881	\$902
\$/truckload	\$110,228	\$103,603	\$93,846	\$88,002	\$83,243	\$81,176	\$81,576	\$82,271	\$83,896	\$85,911

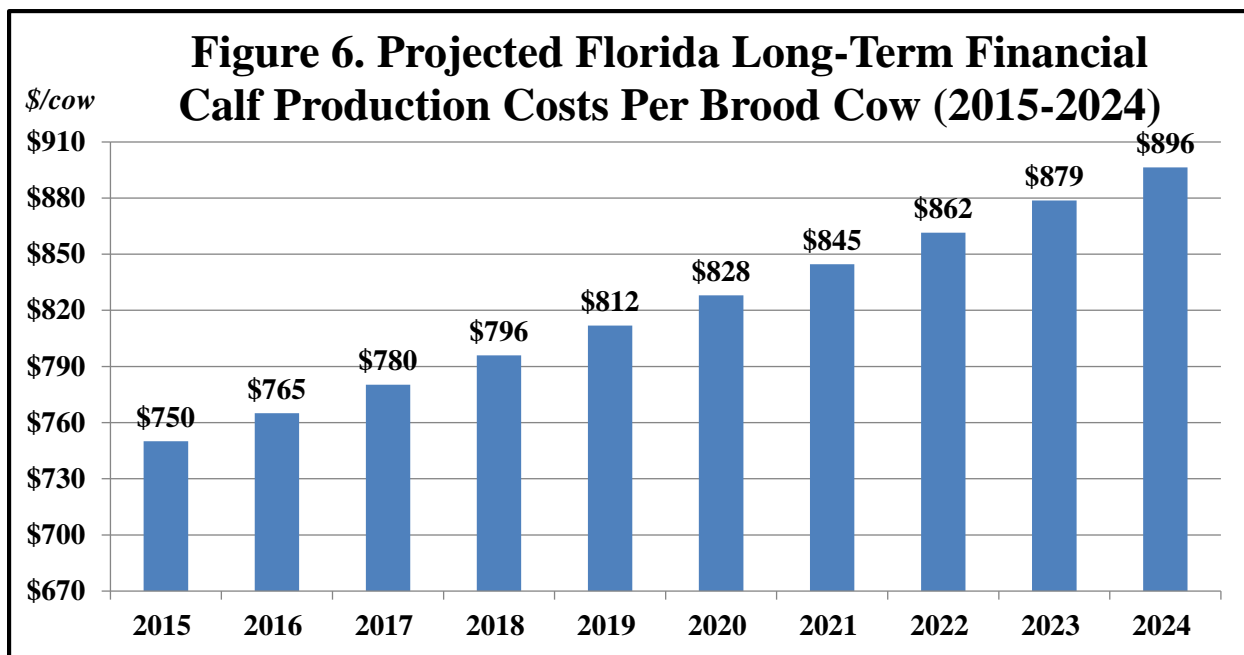
The projected Florida feeder calf prices for medium-large frame, number 1-2 muscle score, 525-pounds are presented in Figure 5. The largest decreases in projected prices correspond to the largest increases in projected inventory numbers between 2015 and 2020. At these lower prices, some cattle producers will become unprofitable and begin to reduce any expansion efforts. Beyond 2020, marginal increases in inventory are expected and projected market prices possibly improve due to other economic factors (growing population, rising disposable income, etc.).

Figure 5. Florida Feeder Calf Prices

500-550 lbs., 10-Year Projections (2015-2024)



Matching feeder calf market prices with what it costs to produce 100-pounds of calf production is essential to evaluate profitability. Calf production costs per brood cow were projected in Figure 6 for the years 2015-2024. The base calf production costs per brood cow of \$750 were projected to increase by 2% annually over the next 10 years. This amounts to an increase in calf production costs of \$149 per brood cow over the 10 year period. Even with this conservative projected cost increase of 2 percent annually, costs are going to be a large contributing factor to determine profitability.



*Calf production costs per brood cow are total production costs minus cull animal revenue divided by the total number of brood cows.

Based on the projected feeder calf prices and calf production costs per brood cow and assuming 525-pound weaned feeder calves, profits/losses may be evaluated. Table 3 presents feeder calf revenue per brood cow, calf production costs per brood cow and profits/losses per brood cow. Profits per brood cow using these projected estimates continue to be realized through 2017. Losses per brood cow are realized from 2018 through 2024. The reader should understand these profits and losses are similar to what you report on line 34 of your Federal Income Tax return, Schedule F. Many cattle operations have periods of negative net farm income, but find a way to live off of depreciation, other income, and capital gains from sales of other assets on their farms. Worse losses have been realized in previous cattle cycles than those projected in this paper.

Table 3. Florida Cow-Calf Long-Term Profit Projections

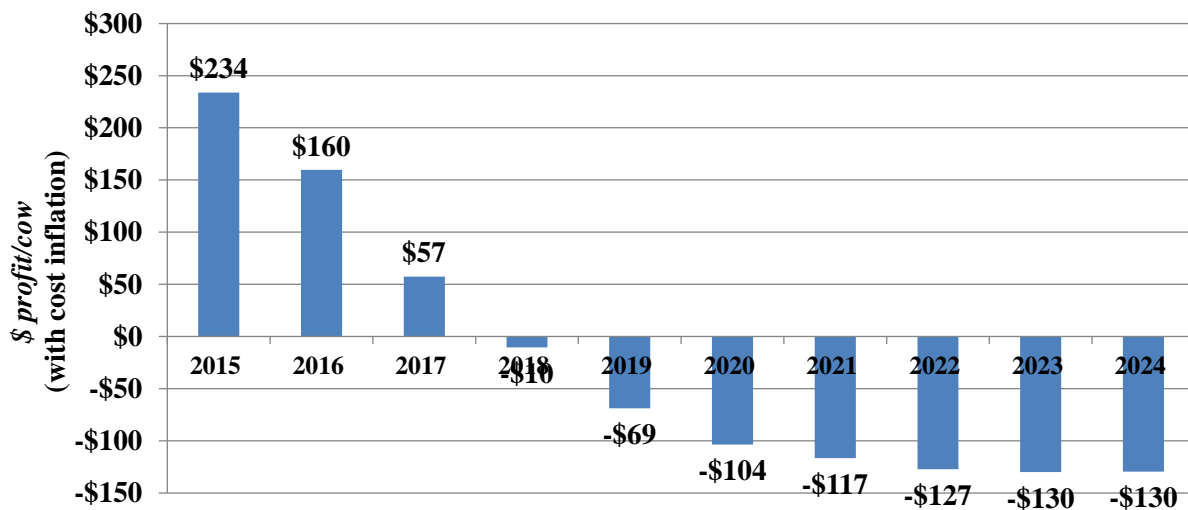
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Feeder Calf Revenue Per Brood Cow, 525 lbs., \$/hd.*	\$983.78	\$924.66	\$837.57	\$785.42	\$742.94	\$724.50	\$728.06	\$734.27	\$748.77	\$766.76
Calf Production Costs Per Brood Cow, \$/hd.**	\$750.00	\$765.00	\$780.30	\$795.91	\$811.82	\$828.06	\$844.62	\$861.51	\$878.74	\$896.32
Profits Per Brood Cow, \$/hd.	\$233.78	\$159.66	\$57.27	-\$10.49	-\$68.88	-\$103.56	-\$116.56	-\$127.25	-\$129.98	-\$129.56

*Blended steer and heifer price for feeder calf revenue per brood cow and assumes a 85% weaning percentage.

**Assumes 2% inflation annually.

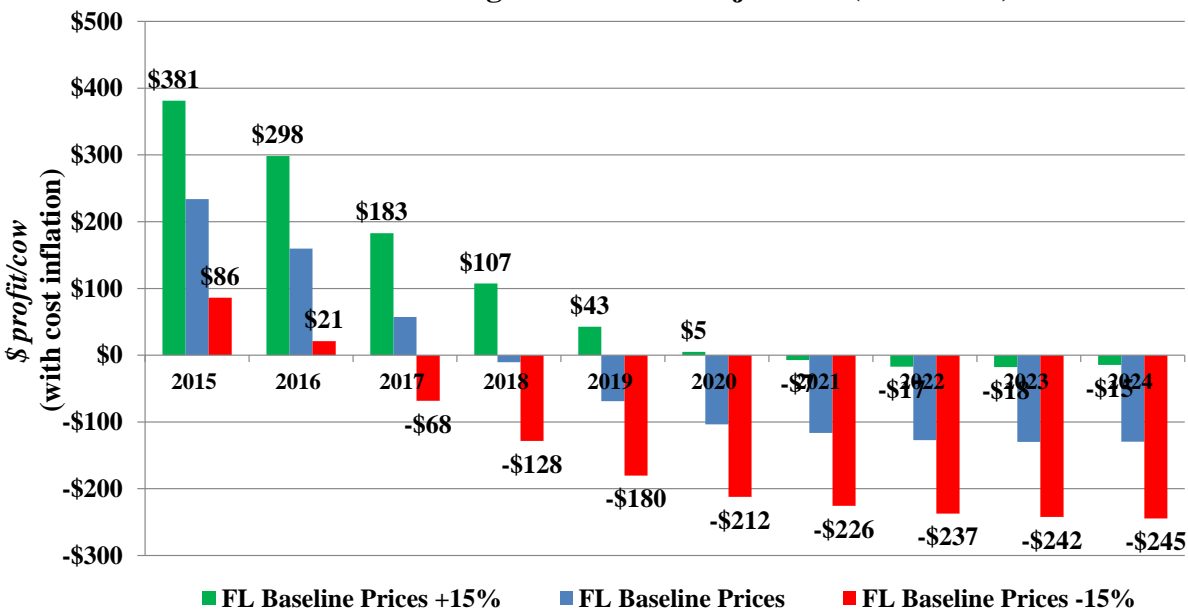
The long-run cow-calf profit/loss projections for beef cow producers are presented graphically in Figure 7. All values are expressed as dollars per brood cow. The profits generated during the years 2015-2017 are projected to be years with excellent profit potential as prices continue to be strong for cow-calf producers. After that, the projected expansion in the national beef cowherd and increases in cost of production result in losses per brood cow.

**Figure 7. Projected Profit/Loss Per Brood Cow
Florida Long-Term Profit Projections (2015-2024)**



While these long-term price projections provide us with a good starting point, we all know that unanticipated events happen (drought, recessions, food safety issues, demand, inflation, etc.). Thus, it is practical to look at more optimistic and pessimistic scenarios as well. Florida feeder calf prices were evaluated with an assumed 15 percent increase and decrease from the projected base prices. The results are presented in Figure 8. If a 15 percent improvement was realized in Florida feeder calf prices, cow-calf producers would realize profits between 2015 and 2020 (6 out of 10 years). Alternatively, if a 15-percent decrease was realized, cow-calf producers would show losses for 8 out of the 10-years evaluated (2017-2024).

**Table 8. Projected Profit/Loss Per Brood Cow
Florida Long-Term Profit Projections (2015-2024)**



Closing Remarks

There is no doubt that ranchers face lots of tough questions on a daily basis. Some of these questions include.

- What will the future hold for my business?
- How much will cattle prices decline over the cattle cycle?
- What about the level of profits/losses over the cattle cycle?
- Where will your business be in 3, 5, or even 10 years?
- How will consumers respond to beef prices?
- Will the kids/family want to continue in the cattle business?
- What governmental policies and regulations help or hurt our cattle industry?

Obviously, no one can predict the future. We can't worry about everything or research everything. We can only listen and learn each day about the events that affect our cattle industry. By using this infusion of daily information and formulating reasonable projections about our cow-calf enterprise, we can adjust our individual cattle operations as we choose. Your decision is the only one that counts.

Certainly there are a multitude of factors affecting the future of the cattle industry. Here are some factors affecting beef cattle herd expansion we should keep in mind and follow.

- Market Prices (domestic and foreign beef demand, disposal income, exchange rates, competing meats, etc.)
- Production Performance (weaning percent, weaning weight, culling rate, stocking rate, etc.)
- Cost of Production (feed, fertilizer, labor, energy prices, interest rates, inflation, etc.)
- Profitability (cash, financial, and economic profitability)
- Government Regulations and Policies (environmental, water, taxes, etc.)
- Outliers (food safety, terrorist events, war, etc.)
- Weather (droughts, floods, hurricanes, severe temperatures, etc.)

These projected planning prices present a reasonable scenario that can be useful as we consider the long-term direction for our farms and ranches. Good luck with developing a plan to survive and thrive the next decade.

References

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