

# Geneticist Insights

## April 2026 Genetic Evaluations



Dr. Jason Graham & Dr. Sam Comstock  
Holstein Association USA | April 2026

### Executive Summary

1. The formula change (protein 19→24, fat 19→14) is the primary driver of TPI movement in this release. Evaluation updates are secondary.
2. Elite bulls are the most impacted. They tend to have higher fat PTAs. The top 10% lost an average of 27 TPI points from change in TPI.
3. Overall rankings remain highly stable (rank correlation 0.999). The re-ordering concentrates on the top quartile.
4. Breeders selecting on TPI should expect protein-oriented sires to rank slightly higher and fat-oriented sires to rank slightly lower compared to previous lists.

### What Changed

The April 2026 Total Performance Index® (TPI®) release uses a revised formula. The TPI protein and fat index weights have shifted three times in the past decade: 27:16 in April 2017, 21:17 in April 2018, and 19:19 in April 2020. Since the 2020 change, genetic trends show fat PTA gains accelerating while protein PTA gains have not kept pace. The April 2026 adjustment to 24:14 moves closer to the previous TPI weightings, placing greater selection pressure on protein pounds to bring its rate of genetic progress closer to the rate achieved for fat pounds. All other TPI components stay the same. A full explanation of the rationale is available on the [GAC/CAC committee page](#).

Component	2025 Formula	2026 Formula
Protein lbs	19	24
Fat lbs	19	14
All other weights	Unchanged	Unchanged

## Overall Impact

We examined 493,498 U.S. Holstein bulls born since 2006. The mean TPI of these tested bulls moved from 2260 (previous run) to 2256 (current run), a 3.6-point average decline. The standard deviation of individual TPI changes was 24.1 points. Most bulls changed by fewer than 28 points, though shifts of 50 or more occurred in some bulls.

Rankings remained highly stable. The rank correlation between old and new TPI values is 0.999, indicating a refinement rather than a fundamental shift in how animals are ranked. As a result, very little re-ordering occurred across the full population.

## Where the Changes Concentrate

The TPI changes are uneven across the population. Elite bulls (top 10% by previous TPI) saw the largest average decline at -34 points. Bulls in the lower half of the distribution gained +3 to +6 points. The pattern fits the formula shift: previous top bulls tended to carry higher fat PTAs relative to protein, so the reduced fat weight penalizes them more.

Percentile Group	N Bulls	Mean $\Delta$ TPI	SD $\Delta$ TPI	Median $\Delta$ TPI
Top 10%	49,365	-34.3	35.4	-33
10-25%	73,966	-16.0	24.7	-16
25-50%	123,533	+0.7	19.6	+1
50-75%	123,380	+3.3	16.5	+3
75-90%	73,903	+4.1	14.2	+4
Bottom 10%	49,351	+6.1	13.8	+6

## Separating the formula effect from evaluation updates.

To isolate the two sources of change, we computed each bull's TPI under the old (2025) formula applied to the new (2026) genetic evaluations.

**Evaluation effect** (updated PTAs, same formula): small and relatively uniform across percentiles, averaging -1 to -8 points. These reflect routine evaluation updates from new data.

**Formula effect** (same PTAs, new formula): this was the dominant driver. Elite bulls (top 10%) dropped an average of 26.6 points from the formula alone. Mid-to-low TPI bulls gained 3 to 6 points.

Percentile Group	Mean Total $\Delta$ TPI	Mean Eval Effect	Mean Formula Effect
Top 10%	-34.3	-7.7	-26.6
10-25%	-16.0	-2.3	-13.6
25-50%	+0.7	-2.4	+3.1
50-75%	+3.3	-1.9	+5.2
75-90%	+4.1	-0.9	+5.0
Bottom 10%	+6.1	-0.2	+6.3

## Shifts in TPI due to daughter data.

Beyond the TPI formula change, several individual bulls showed large TPI movement as genomic predictions transitioned into daughter-proven evaluations. Comparing the December 2025 and April 2026 High Ranking Sire Reports, the mean TPI change from evaluation updates was -12 points (SD = 43 points). Most of this variation came from the addition of daughter data records.

The top TPI proven bull for December went from about 450 to over 2,300 production daughters between runs. That produced a 92-point TPI adjustment as his proof shifted from predominantly genomic to substantially daughter-based. His fertility PTA also adjusted downward as daughter reproductive data was added. Several other top-ranked bulls saw TPI adjustments of 80 to 130 points as daughter performance changed production, fertility, and health trait estimates.

## Impact on the Top 100 Genomic Young Bulls

The top 100 genomic young bulls were reviewed due to their influence on breed direction. PTAs were stable between runs (protein changed less than 1 lb on average).

Group	Mean TPI	SD TPI	Min TPI	Max TPI
Dec 2025 Top 100	3,441	34	3402	3551
Apr 2026 Top 100	3,485	35	3444	3612

The formula change impacted about a quarter of the bulls. Of the bulls that were in the top 100 in December, 74 remained in April and 26 moved out. Of the 26 bulls that entered the April top 100, 19 moved up from December 101-200 range and 7 were new to the list. The re-ordering within the top 100 was meaningful: bulls with lower F:P ratios gained rank positions, and bulls with higher ratios lost rank positions, even when their total TPI increased. In the December top 100, 35 of 100 bulls carried a F:P ratio above 2.2 and only 19 had a ratio below 1.8. The formula change compressed this imbalance by rewarding the protein-oriented bulls relatively more.

## Illustrative Example: How the Formula Affects Two Bull Profiles

To illustrate the practical effect of formula change, we constructed two simulated bull profiles. All health, fertility, conformation, and feed efficiency traits are held identical. Only protein and fat PTAs differ. TPI values are computed directly from the published April 2026 formula.

Trait	Protein-Oriented Bull	Fat-Heavy Bull
Protein	+75 lbs	+55 lbs
Fat	+90 lbs	+121 lbs
F:P Ratio	1.20	2.20
All other traits	Identical	Identical
<b>TPI (old formula, 19:19)</b>	<b>3,798</b>	<b>3,815</b>
<b>TPI (new formula, 24:14)</b>	<b>3,804 (+6)</b>	<b>3,772 (-43)</b>

Under the old 19:19 formula, the fat-heavy bull led by 17 TPI points (3,815 vs. 3,798) because his +121 fat carried the same per-unit weight as the protein-oriented bull's +75 protein. Under the new 24:14 formula, protein receives more credit per standardized unit and fat receives less. The protein-oriented bull gains 6 points. The fat-heavy bull loses 43 points, and the protein-oriented bull now leads by 32 points (3,804 vs. 3,772).

## What This Means for Breeders

The formula change increases breeding emphasis on protein relative to fat. Bulls with high protein PTAs relative to their fat PTAs benefit from the new weighting. Bulls that derived much of their previous TPI advantage from fat will see a reduction.

When the new TPI formula is applied to current genetic evaluations, the correlation between 2025 and 2026 is 0.999. The rank correlation is also 0.999. The top of the list will see the most re-ordering, but the overall ranking structure stays very consistent.

Bulls at the top of the TPI list remain the strongest available genetics for component production. A high-ranking TPI bull under the new formula still carries elite fat and protein PTAs. The updated formula simply places more value on the protein side of that balance. Breeders selecting on TPI will continue to make genetic progress for both components, with a faster rate of gain in protein than under the previous formula.