

► Once part of a huge Mexican land grant, the 292,000-acre Bell Ranch takes its name from the distinctive butte known as Bell Mountain.

The Bell Ranch Project

A historic New Mexico ranch is demonstrating how commercial cattle operations can apply genetic evaluation through progeny testing.

by Troy Smith



► Bonnie and Keith Long manage the Bell Ranch seedstock division located at Mule Camp. Yearling bulls from the closed seedstock herd are the focus of progeny testing.

It's a landscape straight from the scenes of a classic cowboy movie. Deep canyons cloaked in juniper could conceal the outlaw's hideout. Comanche scouts might scan their hunting territory from atop red, sandstone mesas that rise above a short-grass prairie studded with mesquite brush and Cholla cactus.

But this New Mexico scenery is real and not some Hollywood re-creation. It looks much the same as it did 150 years ago, when real-life drovers pushed huge herds through the area, following the Goodnight-Loving Trail from Texas to Colorado.

They passed through the sprawling Bell

Ranch, located near the center of New Mexico's northeastern quadrant. Even today, the historic outfit's employees follow traditions founded by their 19th century forebears. Granted, pickup trucks, four-wheelers and even airplanes have their uses here, but many working days still begin at the horse barn.

The modern-day cowboys saddle mounts chosen from the large Bell Ranch remuda. Some mornings may find them trailering their horses to a far corner of the nearly 300,000-acre spread, but much of the real work begins and ends on horseback.

It's hard to improve upon some traditional



► All calves sired by yearling bulls are DNA-tested to confirm parentage. Data is collected for calculation of in-herd EPDs for economically relevant traits, including weaning weight, carcass merit and reproduction.

methods for working cattle in big, rugged country, where it takes up to 45 acres to support a cow-calf pair. But that hasn't kept Bell Ranch managers from adopting new technology.

Back in the 1950s, then general manager George Ellis moved beyond visual appraisal of seedstock to base selection on performance. Ellis pioneered the use of 205-day weights to evaluate growth among the ranch's purebred Hereford cattle.

Back then, the company maintained a registered herd to raise its own breeding bulls. Once again, the ranch is producing its own bulls, as well as all of its replacement females. However, during the 1990s, a composite seedstock herd was developed. Seeking cattle optimally suited to the arid climate and scarce forage resources, the Bell Ranch created a blend of English and Continental genetics, with a touch of Brahman.

"We were most interested in having trouble-free cows that were adapted to this environment. It's rough and rocky, but it grows pretty strong grass when we get a little rain. The cows run on range all year round, with supplemental cake (range cubes) when they need extra protein," says Keith Long, who with his wife, Bonnie, manages Bell Ranch's seedstock division.

"An 1,100- to 1,150-pound cow is big enough. She has to calve on her own, so we put a lot of emphasis on low birth weight. To breed back on time, she can't milk too heavily, but we still want her to raise a calf that will grow," Long adds.

Since finding the desired biological type, Long says, the seedstock herd has been closed to outside genetics. But rather than focus on the Bell Ranch composite, the purpose of this story is to explain how technology is applied to further the ranch's goals for herd improvement.

Within-herd evaluation

It started with DNA-testing of bulls and heifers saved as seedstock herd replacements. This allowed for parentage verification, even when their dams had been exposed to several bulls in multiple-sire breeding pastures. Data was collected and submitted to the American Simmental Association, and ultimately to Cornell University, for calculation of in-herd expected progeny differences (EPDs) for birth weight, weaning weight, yearling weight and milk. Armed with the EPDs, Long developed his own index for selecting seedstock herd replacements and sire candidates for the Bell Ranch commercial division.

The seedstock herd typically tallies close to 400 females, but the ranch's main production herd numbers are close to 4,000. Each year, Long picks a set of bulls to be placed on a gain test. Based on their performance, the commercial division chooses about 40 yearlings from among the top performers. The process is not unlike the way many purebred operations select bulls they will offer for sale to their customers.

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► At branding, all calves sired by yearling bulls are individually identified and DNA-tested to match each calf with its sire.



PHOTO COURTESY OF BELL RANCH

Bell Ranch history

The first man to lay formal claim to the lands named for La Campana (Bell) mountain was Pablo Montoya, an aristocrat and former captain in the Spanish Army. In 1824, while serving as a government official in Santa Fe, Montoya acquired a Mexican land grant giving him domain over some 655,000 acres.

After New Mexico became a United States territory, attorney John S. Watts helped gain recognition of the Montoya grant by Congress. In return, he was given half interest in the holdings. By 1867, Watts had sought and secured title to all of the land.

The colorful Canadian-born Wilson Waddingham bought the ranch in about 1870. To stay ahead of his many creditors, Waddingham reorganized the ranch under several different holding companies, including Fort Bascom Cattle Co., Red River Land and Cattle and finally as Bell Ranch Co. He is also credited with registering the bell-shaped brand in 1875.

Waddingham's tough general manager, Michael Slattery, is said to have helped consolidate ranch holdings by forcing out area squatters. Slattery also fenced the ranch perimeter, introduced Durham bulls to the Longhorn cattle herd and experimented with irrigation.

After Waddingham's death, control of the ranch passed through the hands of several moneyed investors. The succession of hired managers included Charles O'Donel, noted for his dedication to developing the ranch as a grazing property and improvement of the quality of its cattle. O'Donel is said to be among the first to sell yearlings directly to Midwestern cattle feeders, instead of marketing 4- to 5-year-old steers.

In 1932, company president Julius Day hired Albert Mitchell as manager of the ranch, which was operating as Red River Valley Co. College-educated and just 30 years old, Mitchell also managed his family's Tequesquite Ranch, piloting an airplane between the two properties. Late nights in the office were followed by long days in the saddle, riding with ranch cowboys.

In the midst of drought and the Great Depression, the young manager searched out sources of forage, sending cattle to neighboring states and as far away as California and Pennsylvania. Mitchell held the outfit together and also made improvements to facilities that had fallen into disrepair. By 1947, the ranch was in shape to attract prospective buyers.

It sold, but was broken into six different parcels. Harriet Keeny purchased the headquarters and surrounding property, along with the brand. Mitchell's assistant, George Ellis, was hired to manage the "new" Bell Ranch. Working with New Mexico State University, Ellis introduced herd evaluation based on calf crop percentages, weaning (205-day) weight and temperament. Concerned with conservation and range improvement, he initiated water development and cactus control.

The ranch sold in 1970 to the William Lane family of Chicago-based Lane Industries. The family also purchased additional property that had been part of the original Montoya grant. Don Hofman succeeded Ellis as manager until 1986 when Rusty Tinnin took the reins. Upon Tinnin's death, earlier this year, Bert Ancell has served as interim general manager.

Along with its cattle operations, Bell Ranch enterprises include "The Hacienda." Constructed in the 1930s, the rock and adobe lodge served as a retreat for ranch owners and their guests, including an array of Hollywood celebrities. Today, "The Hacienda" is made available to the public, hosting family vacations and corporate meetings. Bell Ranch also hosts guided hunting of antelope and turkey, as well as trail rides among the canyons and mesas of New Mexico cow country.

The Bell Ranch Project

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In 2000, the Bell Ranch Project was initiated in cooperation with Cornell University. Headed by John Pollak, who also chairs the National Beef Cattle Evaluation Consortium (NBCEC), the Bell Ranch Project is designed to demonstrate how a commercial herd can implement genetic evaluation through progeny testing. The technological tools include individual animal identification (ID), expanded use of DNA genotyping, and data collection for additional economically important traits.

“Currently, most of the data for genetic evaluation programs comes from seedstock cattle,” Pollak states. “The hierarchy in beef cattle selection is such that genetic progress is achieved in the seedstock sector and passed on, mainly through bulls, to the commercial sector. From then on, there is virtually no further assessment or selection of those bulls. Yet those bulls produce the final product of the industry — calves for harvest.

“The industry and their customer — the consumer — would both benefit from more accurate assessment of the genetic merit of these bulls for traits like efficiency of gain, carcass quality, and female replacement fertility and adaptability,” Pollak continues. “The evaluation of these bulls should be based on their progeny performance in commercial herds.”

According to Pollak, the focus of the Bell Ranch Project is to implement data collection strategies that generate a return on investment. In other words, the expense of

technologies used for data collection and genetic evaluation should be offset by profit resulting from a response to data-driven selection. The technologies should also be easily incorporated with current management practices.

The project's management plan targets progeny testing of yearling bulls selected for use by the commercial division. In order to establish genotypes for those bulls, DNA is collected on calves born to the seedstock herd. When they go into service, the yearling bulls are sorted into breeding groups, separated from older bulls, and matched with cows of known age groups. Resulting calves also are individually identified with electronic identification (EID) ear tags and genotyped. Collection of individual calf DNA occurs when the calves are worked at branding time. Each calf can then be matched with its sire even though the dams were exposed to multiple bulls.

DNA collected on females born to the seedstock herd may later be used to validate cow-calf pairs and to enhance the ability to uniquely identify sires of their calves.

Data collection and ID

All Bell Ranch cows calve unassisted, but at the commercial division, groups of about 250 head calve in pastures ranging from 8,000 to 20,000 acres. Consequently, no calf birth dates are recorded. At branding, however, each calf is visually classified as belonging to early-, middle- or late-born groups. This allows for age-adjustment of weaning weights, similar to 205-day adjustment.

Performance data collection begins with recording of individual calf weights at

weaning time, after which the data is sent off for EPD analysis. The return of EPDs to the ranch allows selection for weaning weight to occur when bulls are 2½ years of age. Typically, bulls with the highest EPDs are designated as terminal sires.

Bell Ranch has retained ownership on some calves through the finishing phase of production, but also partners with calf buyers to obtain data on feedlot performance and carcass merit. This data is also submitted for analysis and calculation of EPDs. Additionally, genotyped heifers retained as replacements are managed as a group through three pregnancies, with the goal of generating a longevity, or stayability, EPD.

“By the time a sire is 4½ or so, we can have the information based on carcass data and his daughter's reproduction,” Long says. “We can then pick the best balanced-trait bulls for use in the seedstock herd. We also look for the bulls that have sired the most calves. Selecting from those bulls may help us reduce our bull-to-cow ratio.”

In addition to parentage identification, DNA analysis is being used to identify the presence of a gene marker associated with beef tenderness. One sire has tested homozygous for the tenderness marker. Tenderness scores are also used in selection of bulls returned to the seedstock herd. And the commercial division has sorted a group of favorably scored bulls into one breeding group, hoping to increase the frequency of tenderness genes.

Long says the ranch has implemented the necessary technologies without major changes to regular management practices. Of course, there is the added expense. The cost of genotyping calves, for example, currently runs close to \$18 per head. But Long is confident that increased profit will result from selection based on more information.

Particularly in the seedstock herd, weaning weight is trending upward, while birth weight, milk and mature cow weight have been kept in check. Long says it won't take much improvement in weaning weight to recover the costs, even if calf prices dip to 70¢ per pound.

But greater response from selection and more accurate measurement of progress is expected after 2008. That's when the commercial division's bull battery will consist of only genotyped, progeny-tested sires.

“We've collected data on close to 2,500 calves so far,” Long notes. “The real progress should come when we're testing all of them.”



Editor's Note: Following the interview to compose this story, the Longs were notified by the owners that the Bell Ranch is for sale. How this will affect the Bell Ranch Project and the future of the herd is unknown.